PROCEEDINGS OF INTERNATIONAL CONFERENCE ON ALLIED HEALTH SCIENCES

EDITED BY
DR. SANDEEPPODDAR

PUBLISHED BY :

KPT/JPT/DFT/US/B33

LINCOLN UNIVERSITY COLLEGE

Published by
Lincoln University College
Mayang Plaza, Block A, No. 1
Jalan SS26/2, Taman Mayang Jaya,
47301, Petaling Jaya, Selangor Darul Ehsan
Malaysia
www.lincoln.edu.my
www.lucp.net

ISBN: 978-967-10937-1-9

Printed By
Percetakan Horizon Waves

CONTENTS

PREFACE

Lincoln University College, Kuala Lumpur, Malaysia, an institution of higher learning and aspiring to be a full-blown academic publishing house. It intends to produce high standard, innovative, and affordable books in all academic disciplines that include medical sciences, paramedical, law, human rights, allied health sciences, social, natural, cultural, gender, and environmental sciences etc.

Man and woman of any religion, race, and creed are always in need of healthy life. This book covers major aspects of Allied Health Sciences, including, related to human health development. The authors are eminent scientists, professors, doctors and research scholars from different countries of the world. The book focuses mainly on Allied Health Sciences, but students, teachers, and activists of all related area with multi-disciplinary approach of study would definitely find the book useful for their respective fields. On the onset of emerging global health problems the book may easily deserve attention of any serious mind willing to address any health problem and related social or managerial issues that we have been confronting around the globe.

I am thankful to the authors for submitting their manuscript and helping us for compilation of the book. I am also thankful to Datuk Dr Hjh. Bibi Florina Abdullah, Chief Advisor and Pro Chancellor, Dr Amiya Bhaumik, CEO and Vice Chancellor, Datuk Dr Abdul Gani Bin Mohamed Din, Deputy Vice Chancellor (Academik), Mr. Aditya Bhaumik, Deputy Vice Chancellor (Administration), Lincoln University College for actively supporting me and giving their suggestions on every work. I wish to extend my thanks to Ministry of Home Affairs, Malaysia to kindly give necessary permission to publish the book.

Dr. Sandeep Poddar
Editor

FORWARD FROM THE DESK OF PRO CHANCELLOR

It is my pleasure to write few words of this auspicious book covering all major aspects of Allied Health Sciences.

The Health care professionals include physicians, dentists, nurse practitioners, pharmacists, physiotherapists, optometrists, and others. Allied health professionals, also referred to as "health associate professionals" in the International Standard Classification of Occupations, support implementation of health care, treatment and referral plans usually established by medical, nursing and other health professionals, and usually require formal qualifications to practice their profession.

Within each field of allied health professionals, practitioners are often classified according to skill level and skill specialization. “Health professionals” are highly skilled workers, in professions that usually require extensive knowledge including formal study leading to the award of a first degree or higher qualification.

Health care provision is incredibly complex and many nations around the world spend considerable resources trying to provide it. The increasing scientific knowledge followed by World War II brought increasingly sophisticated and complex medical diagnostic and treatment procedures. Different parts of the world have used different means for health care and generally, poorer nations have struggled to provide adequate health care.

I believe the information in this book will help the health professionals, like, nursing, pharmacists, medical assistants, physiotherapists, pathologists, radiographers, dentists and doctors including the research specialists, who are indispensable team members to run entire health systems smoothly and also help them to apply current updates, like molecular biology, chromosomal studies etc. in their respective field of work.

Datuk Dr. Hjh. Bibi Florina Abdullah

Pro Chancellor
Lincoln University College
& Chief Consulting Editor (Publications)

MESSAGE FROM THE DESK OF CEO

Health care provision is incredibly complex and many nations around the world spend considerable resources trying to provide it.

The issues of inaccessibility, inadequate infrastructure and need for far more human resources for health in the rural areas however remain huge challenges. With a view to improve the accessibility, affordability and equity of health care services, particularly for the poor and vulnerable households in remote and rural areas. It is this area that the private sector can play a crucial role in augmenting and supplementing the efforts of the Government. Comprehensive healthcare system, comprising an extensive network of polyclinics and step-down care centres, to tertiary specialty & academic health centres, seeks outstanding individuals to join our team of medical and healthcare professionals in Malaysia.

The potential areas where private allied health professionals can play a key role are provision of health Services, disease control and surveillance, diagnostics and medicines, health manpower, capacity building including training and systems development, managerial service and auxiliary activities of the health sector.

The book is the outcome of our International Conference on Allied Health Sciences, held on July 2011. The major papers have been selected for publication in this book, to spread the message among the healthcare professionals, scientists, researchers and students to pursue work on this basis and to get an idea about current trends and fields of studies.

The book contains different aspects of health professionals including the role biotechnology in modern health sciences, herbal or plant extracts and its uses, the stem cell therapy and ethical issues parenting to it, recent advances in the pharmacy systems, molecular aspects in different diseases and also about the economy and healthcare aspects. It also discuss different aspects of infectious diseases like, HIV, TB etc. and other deadly diseases like diabetes and its care. This will enlighten the future necessities of the rural and urban healthcare globally.

Finally, I would like to take this opportunity to urge all the partners of development, be in the government or non government sectors to join hands and develop such workable and successful models, which can bring great benefits to the economy and the population and make health services accessible to all not only nationally but also globally. It is my earnest hope that the readers will achieve the objectives of this book.

Dr. Amiya Bhaumik

Chief Executive Officer & Vice Chancellor
Lincoln University College

LIVE CELL THERAPY – THE MALAYSIAN EXPERIENCE

Halim, A.J.
Consultant Pediatrician
Ampang Puteri Specialist Hospital
Ampang, Selangor D.E.

INTRODUCTION

Live Cell Therapy was first used on a Down Syndrome toddler in Malaysia in 2006 and at the age of 6 is now in an international school and performing as well as her peers. An autistic 3 year old girl with no speech in 2008 is now talking and being prepared for normal class next year. A patient with spinocerebellar degeneration first treated 3 years ago has lost much of the related neurological signs and to date has not shown further deterioration in his neurological status. To date almost 500 live cell therapy has been done on 200 patients for a variety of conditions untreatable/no longer treatable in conventional medicine. This therapy is well tolerated and has been shown to be very therapeutic in many cases. This form of therapy, the concept of which is ancient and first officialised in Switzerland as a medical form of treatment in 1931 is likely to be an important modality to complement conventional mainstream medicine in the coming years.

HISTORY

Live Cell Therapy is an integral part of holistic medicine aimed at restoring health through regenerating/revitalising the trillions of cells in the body which are either dying or dysfunctional. This is effected by using fetal cell suspensions and implanting them into human patients. The history of live cell therapy or stem cell transplantation is in reality the history of cell xenotransplantation whereby animal tissues are used either orally or implanted into the body of the sick patient. The concept has been known for more than 2000 years.

In 1920, Paul Niehans, the father of Cell Therapy used fresh cells derived from organs of UNBORN, CANCER RESISTANT FETAL SHEEP to treat diseases. His historic, almost miraculous and very much publicised treatment of a patient with life threatening tetany after thyroid surgery gave birth to Cell Therapy' which was officially declared in Switzerland in 1931 as an additional armamentarium in medicine. More than 5 million patients have been treated by stem cell transplantation over the last 70 years of which 99.7% are in reality xenotransplantation. Lyophilised fetal stem cell products used over the past 50 years have been described as the most powerful, non toxic biotherapy.

CURRENT PROTOCOL USED

Today in 'Live Cell Therapy' we use Fetal Precursor Stem Cell Xenotransplants (FPSCXT) derived from fetuses of closed colony rabbits and prepared by the 'state of the art method of primary tissue cultures'. Fetal cells are used because of their unique properties that set them apart adult cells. Fetal cells have a higher regenerative capacity, lower immunogenicity, greater survival capacity, higher proliferation rate and are more plastic. Live cell therapy involves the use of tissue fragments (cells are living together in a family) and not cell lines such as those derived from embryonic cells (from IVF) and those from mesenchymal origin. Getting tissue fragments from human fetuses is impossible. To procure stem cells from human abortuses will not only raise ethical issues but the fetal cells are unlikely to be better than those derived from animals raised in accredited closed

colonies. So the logical approach is to procure from animals. Rabbits have been preferred because they are probably the safest and the cleanest. Retroviruses have to date never been reported in rabbits. Prions are unlikely to be found (since feeding materials for rabbits are not from animal sources) and there has been no report of transmission of viral diseases in rabbits to man. The fact that rabbits are phylogenically distant to man is itself a barrier to transmission of disease. Coming from an accredited closed colony probably makes it less likely for transmission of zoonotic illnesses to occur. Additionally it is a requirement that a representative sample of the fetal precursor stem cell xenotransplants implanted is kept for future analysis in the event that an illness acquired by the receipient ia suspected to originate from the xenotransplants.

Fetal Precursor Stem Cell xenotransplants prepared by primary tissue cultures are safer than the older preparations of stem cells (fresh cells, lyophilised cells) because the process allows ample time for close observation to ascertain that each organ culture is free of any disease or abnormality. In addition the reduced ballasts of cells and the culture preparation itself make the live cell preparation even less immunogenic and thereby safer than the older preparations. Immunosuppression is not required since clinically detectable reactions of patient's immune system to Live Cell Therapy have not been observed or measured.[1] The situation is different from organ xenotransplantation in which patients will require life long immunosuppression.

Live Cell Therapy is a surgical procedure. It is unlike drug or hormonal treatment. The therapeutic effect of Live cell therapy is so pervasive and long lasting unlike that of drug or hormones. The 200–220 known stem cell types that the human body requires for regeneration can only be obtained from non human sources for clinical use. Through primary tissue culture technology fetal stem cells can be prepared in unlimited quantity. So in theory and practice any dysfunctional human organ can be treated by Live Cell Therapy. The doctor/the cell therapist will need to evaluate the patient clinically using in addition standard medical diagnostic tools to arrive at the diagnosis. The difference from conventional medicine is that the cell therapist will need to approach the treatment as a pathophysiologist. The prescription of fetal precursor stem cell xenotransplants will depend on the diseased/dysfunctional organs, the disease process and also the age and sex of the patient. Live Cell Therapy is not a magic bullet. It has to be a part of a holistic approach to healing. Therefore success depends on attention to details. It is important to assess the bio-terrain status of the patient, his diet, nutritional, rest, sleep and physical therapy requirements, his lifestyle and also his psychological status. Appropriate advice and therapy will be needed to improve his physical and mental status In addition toxins, heavy metal intoxication, poor blood oxygenation and unhealthy acidic blood ph will need to be corrected. Anti oxidants, Chelation, Ozone therapy may be recommended. Chronic constipation for instance needs to be treated. All these will be attended to during the preparatory phase for the Live Cell Therapy.

THE MALAYSIAN SCENARIO

The first case in Malaysia to have live cell therapy using fetal precursor stem cell xenotransplants was a Down Syndrome toddler in 2006 using the modified protocol of the late Prof. F. Schmid[2]. The response was so gratifying and now after 5 years of starting treatment her psychomotor development is age appropriate and she is showing very little of the Down Syndrome facial characteristics. More than 80 Down Syndrome children have received treatment with Live Cell Therapy in Malaysia now.

In July 2007, the author presented Fetal Precursor Stem Cell Xenotransplantation as a treatment modality to the Islamic Development Department (JAKIM) under the Prime Minister's Department. This committe endorsed the FPSCXT as 'HARUS' or permissible[3].

This modality is currently being used to treat cases which are untreatable/no longer treatable in conventional medicine. Patients requesting Live Cell Therapy will be assessed by the cell therapist and advised whether eligible for treatment. A detailed medical summary is required to enable an appropriate prescription of stem cells to be prepared. The prescription is individualised for each patient. Detailed information of the protocol is given and the exact procedure to be done is explained to the patient. Every patient or the parent is required to sign a written informed consent form prior to Live Cell Therapy.

Live Cell Therapy is carried out in a minor operation room under proper aseptic technique. The live fetal precursor stem cell transplants must be implanted within 72 hours after release from the laboratory. Implantation is given by injection at the subgluteal region for all infants and children while in adults certain cells are implanted by subaponeurotic injections at the side of the navel area. Brain cells and spinal cord stem cells in adult patients are implanted intrathecally. All cases are done without the use of immunosuppresion. Patients are allowed to go home after an hour observation. Adults receiving intrathecal implantation are advised to stay overnight for observation. For optimum result the patient is told to adhere to the pre and post treatment instructions, keep follow up appointments, follow the advice of the cell therapist and consult whenever the need arises.

To date the number of cases and live cell therapy done (from 2006–July 2011) are as below:–

Adults

Diagnosis	No
Diabetes Mellitus	13
Parkinsons Disease	2
Others(include Cancers, Aging diseases, Neuromuscular disease, Cardiovascular, Post Traumatic Paraplegia, Spinocerebellar Degeneration, Appallic syndrome, Fibrosing Alveolitis, AIDS,Chronic Fatigue Syndrome)	45
Total	60

Pediatrics

Diagnosis	No.
Down Syndrome	81
Autism	18
Cerebral Palsy	33
Others (include Duchenne MD, SMA, Immotile cilia syndrome,	13
Total	145
Total number of patients	205
Total number of Live Cell Therapy done almost	500

Infants and children tolerate Live Cell Therapy very well. Fever was reported in less than 5% following Live Cell Therapy. Rash was uncommon. No allergic reactions were noted. In adults there were occasional complaining of transient cramps over the subaponeurotic implantation site. Post lumbar puncture complains include 1 case of transient hypotension and 1 case of severe headache. These stabilised and the patients were discharged the following morning. Otherwise the therapy was well tolerated.

EFFICACY OF LIVE CELL THERAPY

Practically all adult patients reported feeling more energetic, more relaxed, mentally more alert, having good night sleep and good appetite. One case of spinocerebellar degeneration improved and the condition has remained the same after almost 3 years. Patients with Parkinsons Disease have been able to reduce the dosage of dopinergenic drugs. A glaucomatous patient being treated for aging diseases after 3 months of treatment found his intraocular pressure has dropped from

19mmHg to 6mmHg (the best in his 3 years). A Duchenne Muscular Dystrophy patient with dilated cardiomyopathy feels more energetic and his echocardiogram has shown improvement in his ejection fraction from poorly functioning Left ventricular function to 58% (3 months after Live Cell Therapy inclusive of cardiomyoblast stem cells). Another Duchenne Muscular Dystrophy patient similarly showed improvement in the left ventricular ejection fraction from 48% to 62% 5 months after Live Cell Therapy. The 2 patients with Duchenne Muscular Dystrophy are in stable condition and have not shown any further deterioration in the muscle power (one after 1½ years and the other after 3 years receiving Live Cell Therapy). Two cases of Auto Immune Deficiency Syndrome (AIDS) treated with Live Cell Therapy remain well and the CD4 have remained stable for the past 3 years. The improvement seen in Down syndrome cases were very significant. The author's own consecutive case study series of 25 Down Syndrome cases treated by Live Cell Therapy showed 80% acceleration in gross motor development, 90% acceleration in language comprehension and 50% showed improvement in the language expression. All of the author's 10 Down Syndrome cases that were not able to get Live cell therapy continued to lag behind the chronological age increasingly in all these three parameters when assessed 3 years later[4].

FUTURE DIRECTIONS

To date we have local references of therapeutic success that can be used to undertake controlled clinical studies of Live Cell Therapy on the many untreatable/no longer treatable diseases in conventional medicine. As more and more patients experience the therapeutic benefits of Live Cell Therapy, I expect this modality to be more sought after. Currently the cost is prohibitive for most who can benefit from this treatment. Only when Live Cell Therapy, a dimension of regenerative medicine becomes accepted as a complementary treatment to conventional medicine in Malaysia will this modality be more accessible to the general public. Randomised clinical trials for diseases presently untreatable/no longer treatable in conventional medicine and research in molecular biology to further the understanding of the mechanisms of action of live cell therapy should be encouraged.

SUMMARY

The clinical experience over the past 5 years of live cell therapy using primary tissue cultures of Fetal Precursor Stem Cell Xenotransplantation has been most encouraging. This modality of treatment is safe. Out of 500 Live Cell Therapy carried out there have been very few side effects. Infants and children tolerate the treatment very well. Many patients with diseases untreatable/no longer treatable in conventional medicine have shown evidence of clinical improvement. Down Syndrome children receiving live cell therapy as a part of an integrated holistic treatment have shown the most convincing evidence of psychomotor acceleration. The local references available to date can be used to support more phase 2 clinical trials. Efforts should be made to make Live Cell Therapy more affordable.

ACKNOWLEDGEMENT:

i) Dato Dr. Hamid Arshat for his support of this project.
ii) Dr. Christopher Lim Lean Chai, Ampang Puteri Specialist Hospital for his support and dedication to this project.
iii) FCTI for assistance on the statistics.

REFERENCES

1. Molnar, EM. Stem Cell Transplantation, Medical and Engineering Publishers, Inc. 2006
2. Schmid, F. Cell therapy, a New Dimension of Medicine, Ott Publishing, Thun, Switzerland, 1983.
3. Document from Department of Islamic Affairs, Prime Minister's Department, 2007 [JAKIM/(3.00)/2/1 Bil (38)]
4. Halim, A.J. The use of fetal precursor stem cell xenotransplantation in the treatment of Down Syndrome, 2011. Submitted for publication.

THE MIDWIFE AS A KEY TO SAFE EFFECTIVE MATERNITY CARE: HOW THE ROLE CAN BE EMPLOYED IN RURAL AND REMOTE AREAS OF LOW INCOME COUNTRIES

Lesley Barclay AO PhD
Professor and Director
University Centre for Rural Health
North Coast
Sydney Medical School, University of Sydney;
Southern Cross University, University of Western Sydney, University of Wollongong
with the North Coast Area Health Service NSW
PO Box 3074 Lismore NSW 2480 Email: lesley.barclay@sydney.edu.au

BACKGROUND

The history of maternity care needs to be understood within its context to make sense of effectiveness in the contemporary world. Colonial history or outside advice is influential in how modern maternity services are conceived. For example the Dutch in Indonesia set up an independent midwifery service private practice model alongside other health services.[18] In the United States the influence of medicine means midwives were rare and nursing as a subservient profession provided support to medical leadership.[8] In China, despite having a strong traditional midwife history, the influence of the United States when the country opened up ensured medical prominence and commercial imperatives dominated.[3,11,21]

The impact of outside influences on service design is also profound. For example whether the health system is set up with a public-health orientation, or the emphasis is on acute care. A public-health approach was strong, for example, in the way Britain colonised Malaysia and Sri Lanka.[15] Countries under the influence of the United States however tended to set up hospital oriented systems. The role of health professionals also reflects that outside influence.

As professions started to develop, such as Western medicine, nursing or midwifery, these tended to follow the predominant model of all colonising country rather than set up a system that was more tailored to economic circumstance geography dispersed population or the financial resources of the population to pay. Similarly the cultural systems for healing that were there were generally ignored and denigrated. Payment systems similarly were set up following the philosophy of the coloniser; eg user pays, taxation funded free services or a combination of these. For example China moved from a communal system to a user pays system very rapidly in the 80s and 90s under the influence of the United States. People who had been looked after by barefoot doctors and had accepted communal responsibility being quickly needed to pay for hospitalisation for birth or blood transfusion.[3,10,14]

Social and economic development also influenced maternity care. The role of women in society, their education and empowerment, not only influenced their access to care but also the capacity of midwifery to provide locally based village oriented care. Indeed women in some countries up until the present day, because of their gendered lower status, are not necessarily treated, nor do they have access to care in pregnancy or childbirth, when this involves cost.[7] In other countries where women's status is better society will support their right to care.[15] Midwifery and nursing with predominantly female professions, reflect an educational investment by governments in women's skill and capacity.

The authority of women in the system reflects wider societal gender issues. Of course geography, dispersal of population and access to transport will influence emergency evacuation, should treatment be available[12] and is also highly influential in the outcome of reproductive health emergencies.

This paper presents brief case study overviews of findings from 5 countries to inform a discussion of the range of issues that must be considered so midwifery can maximise outcomes, work effectively and be acceptable to local populations.

CASE STUDIES

Australia

I am associated with a research team who have had the privilege of working in a range of rural and remote areas of low income countries or poorer areas of more wealthy countries; for example a program of our research in Australia with remote living Australian aboriginal people. These women living in remote communities have poorer birth outcomes and a higher maternal mortality rate than other Australian women.[5,17] Remote women are evacuated some weeks before birth fragmenting care and introducing risk as well as being necessary in some cases. This also creates social and emotional distress as they leave families and other children. Our research has shown that one in 10 women in two large communities in the Northern Territory avoid hospital birth as a result.[1] There is no local birthing service, despite populations of 2–3,000 people in the towns in which we are working. In part informed by our research midwives are now located increasingly in remote areas and considered important in their own right.

China

We have also conducted research in China in Shanxi and Sichuan province. China now has a national program to promote hospital births. In the nine counties we sampled, which were rural, hospital births rates were between 52% and 99%. This rate had increased dramatically since 2005. In 2000 the traditional birth attendant's licenses were withdrawn and homebirth was made illegal. Despite this action there were significant barriers to birthing in hospitals in rural and remote areas. Financial difficulties, transport costs and access and again negative hospital experiences were the major barriers that made women reluctant to birth in hospital.[10] Women who gave birth in their villages without any help, perhaps because they have no money to pay transport to hospital nor the fees required by the hospital, cannot receive emergency care.[9] It is important to look at the long-term consequences of system change in China and address the issues of remote and rural women without sufficient income to pay for new town based hospital services.

Timor-Leste

In Timor-Leste, from independence in 2002, the focus was skilled attendance at birth with midwives assisting births at home or in institutions. Policy then led trends towards facility-based birthing and midwives withdrew homebirth services. Maternity waiting homes were implemented to increase access for rural and remote women. However research led by a member of our team suggests women were no more likely to use birthing facilities and most women continue to birth at home.[20] In remote areas midwives lacked transport and communication capacity and emergency obstetric care is not available. Much financial investment was going into maternity waiting homes in 2009 rather than develop a public-health and primary health-care oriented system.[19] A recent publication led by Wild shows that distance from family – the main rational for setting up these maternity homes – was not an effective argument for their use by women themselves.[20]

Samoa

In Samoa there has been a remarkable transformation where culture and commonsense have led a different decision-making process.[2] Samoa's birth model integrates traditional birth attendants

with the small number of professional nurse midwives and obstetricians who live on these small islands. Traditional birth attendants (TBAs) are encouraged to bring the women they cared for to the health centre though they still may support women in this setting. Traditional birth attendants are linked to the health system through partnership with local nurses and midwives. Samoa nurses and professional midwives and indeed leaders of the health service no longer believe that women have to fit into postcolonial hospital to be safe. Even if they did women could not afford this service and there are insufficient fully qualified professional Western educated practitioners to provide this service. Alongside this system there is an excellent externally scrutinised death review system that helps the service to continue to improve.[6]

Indonesia

Indonesia provides another interesting example where in 1990 national policy directed a large scale training program of village midwives.[16] Education systems were overloaded and support to these midwives was relatively poor. Many births were occurring at home with traditional birth attendants subsequently. In many places in Indonesia there were some success integrating traditional birth attendants into the system. Their role often was to provide cultural or religious support and many relationships were established that bought both emotional cultural and spiritual support to birthing women who were more likely to have care from a professionally educated midwife. With a professionally trained midwife this system does seem to be working and dealing with the pragmatics of bringing an old and new system together. Indonesia like Samoa seems to have combined religious spiritual and cultural practices with a better educated professional and done so at the village level where this care is accessible to poor women.[6,16]

WHAT WORKS TO IMPROVE MATERNITY CARE OUTCOMES

Firstly a skilled birth attendants can prevent somewhere up to 33% of maternal deaths.[4] Only half of the births in low income countries have an appropriately skilled birth attendant today.[13] A skilled birth attendant is not a generalist nurse nor a poorly trained junior doctor. The current focus on facility birth may divert scarce funds away from evacuation systems and evidence based emergency obstetric care. A focus on facility might take resources away from the locally available skilled caregiver and mean services are no longer accessible to women who cannot afford to travel to hospitals.

Successful experiences in reducing maternal mortality rates using midwifery in rural and remote low income countries

There are a number of countries who have made substantial inroads into maternal mortality using midwifery. Malaysia is one of these. Malaysia was colonised by the British, a country with a strong midwifery and public-health tradition from independence.[15] In Malaysia, there was a political commitment to reduce urban- rural differences, diminish poverty and also to empower women. There was an intention to promote the professional midwife role and integrate TBAs into the system. The government removed financial barriers and provided free birth services. Midwives were employed within a public-health approach and received excellent supervision. Results from this approach showed a reduction in MMR from 282 per 100,000 live births in 1950 to 20 in 1990.[15]

Sri Lanka is another country that has achieved excellent results through the training and legislation of professional midwife. Again access to a skilled birth attendant has been available at home or in institutions with high quality of emergency obstetrics. In Sri Lanka a public-health approach to service delivery has been taken, similar to Malaysia. Financial and geographic barriers to access maternity services have been removed. The government has worked to empower women through late marriage, increased education and managing fertility.[15] Sri Lanka has worked to narrow inter-district and inter-ethnic difference and puts special efforts into disadvantaged groups.[15]

CONCLUSION

Reducing maternal mortality cannot be done quickly or in isolation from contextual factors and payment systems. Experience and case study examination suggests that this takes at least a decade of effort. Facility-based birth is not the only answer and may divert funds and priorities in low income countries. A public-health rather than an acute care hospital approach is necessary for maternity care in such settings. Midwives are part of but not the only the solution.

To reduce maternal mortality and to gain best benefit from midwifery care a country must address systems costs, social partnerships and empowerment of women. The training and licensing of a professional midwife with ongoing and high quality supervision and support is necessary. Midwives must work in networks that permit referral and support evacuation to evidence based emergency obstetric care. Costs must be manageable and affordable and address not only health service but transportation as well.

Social and cultural relationships must be considered where a TBA is a part of the system. Integrating TBAs into partnerships with professional health workers can insure systems are culturally and spiritually acceptable and used. In some countries this extends the capacity of the health system to provide care through networks of social and professional systems. Women as mothers need to be valued so that their families and communities will support them if they have problems around child bearing. Midwives also need appropriate education, remuneration and professional support to achieve their full potential in reducing MMR.

REFERENCES

1. Bar-Zeev, S. J., Barclay, L., Farrington, C., & Kildea, S. (2010). From hospital to home: The quality and safety of a postnatal discharge system used for remote dwelling Aboriginal mothers and infants in the top end of Australia. *Midwifery, In Press*.
2. Barclay, L., Aiavao, F., Fenwick, J., & Papua, K. T. (2005). *Midwives 'Tales: Stories of Traditional and Professional Birthing in Samoa*: Vanderbilt University Press.
3. Blumenthal, D., & Hsiao, W. (2005). Privatization and its discontents- the evolving Chinese health care system. *The New England Journal of Medicine, 353*(11), 1165–1170.
4. Campbell, O. M., & Graham, W. J. (2006). Strategies for reducing maternal mortality: Getting on with what works. *The Lancet*, 368(9543), 1284–1299.
5. Collins, H. P., AM, Q., Allbon, P., & Campus, R. H. (2010). *Australia's mothers and babies 2008 Perinatal statistics series no. 24. Cat. no. PER 50*. Canberra.
6. Davis-Floyd, R., Barclay, L., & Tritten, J. (2009). *Birth models that work*. California: University of California Press.
7. Filippi, V., Ronsmans, C., Campbell, O. M. R., Graham, W. J., Mills, A., Borghi, J., et al. (2006). Maternal health in poor countries: the broader context and a call for action. *The Lancet*, *368*(9546), 1535–1541.
8. Francome, C., & Savage, W. (1993). Caesarean section in Britain and the United States 12% or 24%: Is either the right rate? *Social Science & amp; Medicine*, *37*(10), 1199–1218.
9. Gao, Y., & Barclay, L. (2010). Availability and quality of emergency obstetric care in Shanxi Province, China. *International Journal of Gynaecology & Obstetrics, 110*(2), 181–185.
10. Gao, Y., Barclay, L., Kildea, S., Hao, M., & Belton, S. (2010). Barriers to increasing hospital birth rates in rural Shanxi province, China. *Reproductive Health Matters, 18*(36), 35–45.
11. Harris, A., Belton, S., Barclay, L., & Fenwick, J. (2007). Midwives in China: 'jie sheng po' to 'zhu chan shi'. *Midwifery*, doi:10.1016/j.midw.2007.1001.1015
12. Jahn, A., & De Brouwere, V. (2001). Referral in pregnancy and childbirth: concepts and strategies. *Safe Motherhood Strategies: a Review of the Evidence, 17*, 229–246.

13. Koblinsky, M., Matthews, Z., Hussein, J., Mavalankar, D., Mridha, M. K., Anwar, I., et al. (2006). Going to scale with professional skilled care. *The Lancet, 368*(9544), 1377–1386.
14. Liu, Y., Hsiao, W. C. L., Li, Q., Liu, X., & Ren, M. (1995). Transformation of China's rural health care financing. *Social Science & Medicine, 41*(8), 1085–1093.
15. Pathmanathan, I., Liljestrand, J., Martins, J. M., Rajapaksa, L. C., Lissner, C., Silva, A. d., et al. (2003). *Investing in maternal health: Learning from Malaysia and Sri Lanka* (Vol. 1). Washington, DC: The World Bank Washington.
16. Shankar, A., Sebayang, S., Guarenti, L., Utomo, B., Islam, M., Fauveau, V., et al. (2008). The village-based midwife programme in Indonesia. *Ophthalmology Clinics of North America, 371*(9620), 1226–1229.
17. Sullivan, E., & King, J. (2006). *Maternal deaths in Australia 2000–2002. Maternal Deaths Series No. 2*. Cat no. PER 32. Sydney: AIHW National Perinatal Statistics Unit.
18. Toha, M. (1970). Review and Significance of the History of Obstetrics in Indonesia. *The Journal of The Asian federation of Obstetrics and Gynaecology, 1*(2), 165–173.
19. Wild, K., Barclay, L., Kelly, P., & Martins, N. (2010). Birth choices in Timor-Leste: A framework for understanding the use of maternal health services in low resource settings. *Social Science & Medicine, 71*(11), 2038–2045.
20. Wild, K., Barclay, L., Kelly, P., & Martins, N. (2011). The tyranny of distance: Maternity waiting homes and access to birthing facilities in rural Timor-Leste. *Bulletin of the World Health Organization, Accepted*.
21. Yip, W., & Hsiao, W. C. (2008). The Chinese health system at a crossroads. *Health Affairs, 27*(2), 460–468.

EFFECTS OF THE ENGLISH COURSE USING AN AUTHENTIC LEARNING APPROACH ON COMPETENCY AND SATISFACTION OF NURSING STUDENTS

Suparpit von Bormann*, Kamolrat Turner, Tanyawalai Boonprasith
Doungnatre Dhammakul, Wilaiporn Khamwong
Boromarajonani College of Nursing Changwat Nonthaburi
47/99 Tiwanon Rd., Taladkwan, Muang, Nonthaburi 11000 Thailand
*Email : suparpit@yahoo.com

ABSTRACT

Globalization mandates Thai nurses to improve their English skills, particularly speaking and listening skills, for effective communication. This quasi-experimental research was a Classroom Action Research conducted to investigate effects of the English course using an authentic learning approach on competency and satisfaction of nursing students. The sample was composed of 72 juniors enrolling in an English course of Boromarajonani College of Nursing, Changwat Nonthaburi, Thailand. An authentic learning approach was integrated into the course by a health service project. Learning achievement, English competency, and satisfaction with learning activities were evaluated. The students' perceptions on their English competency and satisfaction were assessed using self-administered questionnaires. Tutors observed the students' English competency using an observational questionnaire. The results were as follows:

1. The students' GPA was good with mean score of 71.29% (range from 61.45 to 82.06). Most students had high and moderate scores (54.20% and 41.30%, respectively).
2. Before attending the course, English competency was in low level as perceived by more than 50% of students. The perceived competency was increased up to moderate level after the course.
3. Most items of the students' English competency observed by tutors were in moderate level.
4. The English competency perceived by the students after attending the course was significantly higher than that before attending the course (t = 11.96, p< .001).
5. The students' satisfaction with this authentic learning approach was in high level in every aspect. The highest score of satisfaction was about learning contents ($\bar{x}$ = 4.04, SD = 0.37). The highest score of satisfaction was placed for teaching and learning activity.

An authentic learning approach using a health service project appears to improve the students' learning achievement, English competency, and satisfaction. It should be implemented to enhance the students' performance in English and other courses.

Key words: authentic learning, competency, English, nursing student.

BACKGROUND

The Thai Ministry of Public Health aims to develop Thailand to become a medical hub of South East Asia. This policy increases the opportunity for Thai nurses to provide health care services for foreign clients. Thus, Thai nurses need to have sufficient English competency to provide good nursing

care. The nurses who are able to communicate in English will also have more opportunities to get promoted, to go abroad for study visits, or to participate in international conferences. Therefore, English is essential for the accomplishment of oneself, his/her organization and the nursing profession. For that reason, Thai nursing education should emphasize on improving English skills of nursing students.

In practice, several studies revealed that English competency of newly graduated nurses in Thailand was at low and moderate levels as evaluated by themselves and their colleagues. A follow up study of competency of the new graduates of the Nursing Science Program (revised B.E. 2537) from Boromrajonani College of Nursing, Bangkok in Academic Year 2004 reported that, comparing with other abilities, their English ability was at the lowest level[1]. A later study also found that the newly qualified nurses perceived their English competency at the lowest level compared with other competencies[2]. Therefore, effective approach of teaching English for nurses is crucial.

English language is not a single skill, but it is an integration of speaking, listening, reading and writing skills. English learning and teaching program should be designed to integrate these skills using student-centered approach for the instruction. The students can take roles of messengers and receivers at the same time, which means that they can have interaction and can apply what they have learned in real situations[3].

In the study of Turner & Khumwong[6] on "Effects of Participatory Learning on Learning Achievement and Satisfaction of Nursing Students of Boromarajonani College of Nursing, Changwat Nonthaburi" aiming at enhancing English skills of nursing students, the researchers designed an English course to better improve English competency of the third-year nursing students. The participatory learning concept was adopted into the English course. At completion of the course, the students had good learning achievements and high level of satisfaction[6]. Based on the success of this course, methods of English teaching were further developed for the later group of students enrolling in English course of that college. The participatory learning focusing on project-based concepts were used for exposing the students to English speaking foreigners. This group of students had to practice English in a real situation. They were taught for theoretical components then they had to design their own academic service project to provide health education to non-native Thai speaking persons. This project was then designed to promote healthy behaviors in primary students in one of the international schools in Bangkok. After finishing this project, the students reported high satisfaction with teaching and learning activities. Moreover, their English competency had improved and they had good learning achievements[7].

Although the students' achievement was good, the English course could be further improved for better outcomes. The researchers of this study therefore modified an English course for a new group of the third-year students by integrating authentic learning concepts into the course. Authentic learning experience could help improving the students' English abilities that they can apply in daily life[5]. It is a learning style based on real situations and one's thinking process. Experience gained from practice can be linked with reality according to one's readiness and ability[4]. Various methods of teaching were implemented to provide an opportunity for the students to communicate in English with foreigners in real situations. Therefore, this study was conducted to examine the effects of English course using authentic learning concepts integrated with a health promotion project of providing health screening and health education to non Thai speaking foreigners studying or working at an international university in Thailand.

PURPOSES OF THE STUDY

1. To investigate the effects of English course based on authentic learning concepts on third-year nursing students' learning achievement, English competency, and satisfaction.

2. To compare English competency of nursing students before and after the completion of English course[3].
3. To explore the details of satisfaction of nursing students after completion of English course 3 based on authentic learning concept.

RESEARCH METHODOLOGY

This study employed Classroom Action Research using a quasi-experimental research design. The samples were composed of 72 third-year nursing students studying English course[3] in Academic Year 2010. Learning achievement, English competency and satisfaction were assessed.

Various tools were used, including 1) English course[3] study material using authentic learning concepts developed by Turner et al.[7]; 2) a demographic questionnaire; 3) questionnaire assessing English competency perceived by students adapted from Tongmak's[8] test; 4) questionnaire assessing English competency perceived by lecturers adapted from Tongmak's[8] test; 5) questionnaire assessing satisfaction with English adapted from Turner and Khumwong[6]; and 6) open-ended questions investigating the students' opinion about the course activities.

Data were collected following these steps:

1. The researchers designed learning and teaching programme based on the results of English course in previous year integrated with authentic learning style. This learning and teaching programme was delivered through a health promotion project, namely 'Health screening and health education for foreigners'.
2. The project was approved by the college's ethical committee.
3. The following process was conducted:

   3.1 Lecturers pre-oriented students to motivate them towards English learning and practice. Various activities were used such as speaking, listening, reading and writing to prepare the readiness of the students before entering the real situations.

   3.2 Students were encouraged to prepare information on health promotion in order to organize their health exhibition.

   3.3 Students integrated their knowledge learned from classroom with nursing skills to provide health screening and health education through a health promotion exhibition. The exhibition was composed of:

   – poster presentation and leaflets,
   – exercise demonstration using hula hoop and elastic band,
   – health screening interview using health risk assessment,
   – health education in English,
   – blood sugar test,
   – body lipid check, and
   – eye ear nose throat check up by a mobile team from Phranangklao hospital.

   3.4 Student's outcome valuation

The data were analyzed using frequency, percentage, mean, standard deviation, paired t-test and content analysis.

RESULTS

The majority of students were female (97.20%). Most students aged between 20 and 21 (88.90%). Their Grade Point Average was between 2.50 and 2.99.

The students' learning achievement was good with a mean score of 71.29% (range from 61.45 to 82.06). Most students had high and moderate level of scores (54.20% and 41.30%, respectively).

Before attending the course, English competency was in low level as perceived by more than 50% of students. The perceived competency was increased up to moderate level after the course.

The students' English competency observed by tutors was in good level in *continuously attempt to correct own English, using signs and movements in communication, and using understandable language and vocabulary*.

English competency perceived by the students after attending the course was significantly higher than that of before attending the course (t = 11.96, p< .001).

The students' satisfaction with this authentic learning approach was in high level in every aspect. The highest score of satisfaction was with learning contents ($\bar{x}$ = 4.04, *SD* = 0.37). When considering individual items, most students were satisfied with every item. The highest score of satisfaction was placed for teaching and learning activity such as '*this type of teaching and learning activity encouraged me to take part'* ($\bar{x}$=4.11, *SD*=0.54), '*providing health education for foreigners helped me to improve English skills'* ($\bar{x}$=4.08, *SD*=0.66), *'Interviewing foreigners enabled me to improve English skills'* ($\bar{x}$=4.07, *SD*=0.63), and *'providing opportunity for me to talk to foreigners enhanced my confidence'* ($\bar{x}$=4.06, *SD*=0.62).

The students' favorite activities were expressed as health exhibition for foreigners, practicing conversation, pronunciation and listening, practicing in sound lab, Nursing English book, and learning from songs. Activities that were not popular among the students were reading, summarizing, writing nursing diagnosis, English grammar, and passive learning.

DISCUSSION

The results showed that using an authentic approach by integrating a health promotion project into an English course can improve English competency perceived by the third-year nursing students. This may be due to the fact that the students had opportunities to learn from real experience using their thinking process and record the results from practice in real situation according to their readiness and ability[4]. The learning process occurred through a health promotion project when the lecturers stimulated their thinking process to link with the reality. The lecturers used a student-centered approach for the instruction that allowed students to have participatory and active learning rather than passive learning. This is relevant to the research results of Turner et al[7]. It is also relevant to what students described about learning activities they did not like, such as non-participatory learning i.e. *'only sit there and listen to the teacher without involving in learning activity' 'leaning from text book alone'* or *'sitting and listening to English all the time make me feel sleepy'*. Therefore teaching English needs to get the students to be active learners and emphasize various skills including speaking, listening, reading and writing rather than a single skill.

Child-centered instruction based on authentic learning did not only improve the students' English competency[5], but also allowed them to use English in real situation. In this project, the students were required to interview foreign clients about their health status and provide health education in English. They needed to speak, listen, read and write English well enough to communicate with their clients. This requirement stimulated them to be active and to improve their ability. Learning process occurred from the opportunity to practice in real situations. According to Kolb' concept[9], this process could enhance the students' sense of responsibility in learning. The students realized that they could apply what they learnt to their daily life[10]. In this study, most students indicated that

they liked to have outdoor activities such as conducting academic service project, creating health exhibition, performing health screening and providing health education for foreigners. For indoor activities, the students preferred learning in a sound lab, practicing dialogue and pronunciation, listening to nursing contents, learning from music. The students suggested that we should have more time for outdoor activities, particularly the activity involving foreigners.

It is interesting that the students' English competency observed by tutors was in good level in '*continuously attempt to correct own English'*, *'using signs and movements in communication'*, and *'using understandable language and vocabulary'*. This is quite different from the students' perception. The reason might due to the difference in individual perception. The students evaluated their English competency was better compared with their baseline which was low. The process of learning activity allowed them to have direct experience in using English. This could enhance their English competency more than before. Therefore, they perceived such an inner-self difference between before and after learning. Whereas lecturers evaluated the students' competency authentically emphasizing in practicing, ability in problem solving and real time expression. The evaluation procedure was conducted while the students were interviewing the clients and providing health education. To some extent, being aware that they were observed in real situations might have made the students nervous. In addition, the lecturers' expectation might have been too high to be achieved by the students.

However, the lecturers realized that the students' English skills improved suggesting by three main characters, including *'the students attempted to communicate with the clients using non-verbal and body language' 'they chose to use vocabularies that were easy to understand'* and *'they tried their best to correct their English usage'*. These comments were in accordance with the students' opinion such as *'I want to improve my English skills' 'I must acquire more knowledge and must practice using English for both grammar and structure'*.

The students' satisfaction was in high level in every aspect. This finding was in a similar vein as the results of previous studies[6,7]. This type of teaching emphasized participatory learning. The students perceived that they were more confident to communicate in English and had more positive attitude towards English. This is evident in what students answered, including *'I want to join this activity again because I am more diligent and curious to learn English'*, *'This activity is very good and makes me feel that English is important'*, *'I felt brave enough to speak'*, *'It was fun to learn English in this class'*, *'Learning English with our Thai lecturers was fun and easier to understand because they could explain in Thai when we did not understand'*, *'At first I did not like English, especially speaking, but this class has changed my view' 'I am impressed with this type of learning and I want this activity to be conducted for the next group of students'*.

In conclusion, an authentic learning approach integrated into a health service project appears to improve the students' learning achievement, English competency, and satisfaction. It should be implemented to enhance the students' performance in English.

ACKNOWLEDGEMENT

Thanks to the director of Boromarajonani College of Nursing Changwat Nonthaburi for funding this study. Thanks to lecturers, students and staff at Asian Institute of Technology, Ear Eye Nose Throat unit from Phranangklao hospital and 3rd year nursing students for collaborating in this project.

REFERENCES

1. Turner, K., Jermworapipat, S. & Suwanachart, S. (2004). A follow up study of Competency of the new graduates of the Nursing Science Program (revised B.E. 2537) from Boromrajonani College of Nursing, Bangkok in Academic Year 2004. Research Report. Boromarajonani College of Nursing Bangkok.
2. Thanirat, S. Turner, K. & Wichienrat, S. (2007). A follow up study of Competency of the new graduates of Boromrajonani College of Nursing, Changwat Nonthaburi in Academic Year 2004**.** Research Report. Boromarajonani College of Nursing, Changwat Nonthaburi.
3. Saengdet, K. (2002). Practicum English for primary school teachers**.** Bangkok. MAC.
4. Lerdpichet, B. (2010). Strategies of learning and teaching development emphasizing in student center: A case study of Bodindecha 2 (Sing Singhaseni) Bangkok. Widhayajarn Journal [Online available]. http://www.withayajarn.com/?p=323 [Accessed 1 September 2010].
5. Office of the National Primary Education Commission. (1999). National Education Act. Bangkok: Teacher Council of Thailand Lardprao.
6. Turner, K. & Khumwong, W. (2006). Effects of Participatory Learning on Learning Achievement and Satisfaction of Nursing Students of Boromarajonani College of Nursing, Chang Wat Nonthaburi. Research Report. Boromarajonani College of Nursing, Changwat Nonthaburi.
7. Turner, K., Boonprasithi, T. & Pinyomit, S. (2010). Effects of an Integrating Academic Service Project into English Course for Nursing Students. Research Report. Boromarajonani College of Nursing, Changwat Nonthaburi.
8. Thongmak, A. (2009). Effects of project-based learning on speaking and thinking in English skills of 5th year primary school students, Ban Kwansawan school, changwat Trang. Unpublished master dissertation. Srinakharinwirot University.
9. Kolb, D.A. (1984). Experiential Learning: Experience as the Source of Learning and Development. New Jersey: Prentice Hall Inc.
10. Piboonnurak, K. (2009). A study of English reading competencies of 1st year junior high school students after receiving project-based learning. Unpublished Master dissertation. Srinakharinwirot University.
11. Mullins, L.J. (1985). Management and Organization Behavior. London: Pitman Publishing Limited.

BIOETHICAL IMPLICATIONS OF PUBLIC HEALTH FROM ENVIRONMENTAL ISSUES IN LIGHT OF FUKUSHIMA

Darryl Macer, Ph.D.
Regional Advisor on Social and Human Sciences in Asia and the Pacific,
Regional Unit for Social and Human Sciences in Asia and the Pacific (RUSHSAP),
UNESCO Bangkok, 920 Sukhumwit Road, Prakanong, Bangkok Thailand 10110
Email: d.macer@unesco.org
http://www.unescobkk.org/rushsap

BIOETHICS

This paper will discuss the lessons from ethical debates over public health and medical ethics, and link these to the debates on climate change and environmental ethics. It will take an approach of global bioethics. Although many scholars in bioethics have focused on medical sciences, or human beings, there is growing scholarship on ethical issues and climate change.

Bioethics is both a word and a concept. The word comes to us only from a German paper of 1927,[4] although in English it was amplified by Potter in 1970, yet the concept comes from human heritage thousands of years old.[5,6] It is the concept of love, balancing benefits and risks of choices and decisions. This heritage can be seen in all cultures, religions, and in ancient writings from around the world. We in fact cannot trace the origin of bioethics back to their beginning, as the relationships between human beings within their society, within the biological community, and with nature and God, are formed at an earlier stage then our history would tell us. We now have the power to change not only our own genes, but the genes of every organism, and the power to remodel whole ecosystems of the planet, which has made many focus on biotechnology applications however the key questions are more basic. We have the power to remodel whole ecosystems of the planets. New technology has nevertheless been a catalyst for our thinking about bioethics, which have been stimuli for research into bioethics in the last few decades.

We can also apply a number of the ethical approaches and ethical principles agreed upon in the international community, through international environmental treaties and the Universal Declaration on Bioethics and Human Rights, into debates on ethics of climate change and on human responsibilities. Although we may see a global love of life as a foundation for ethical behaviour, how can we apply this to new areas of applied ethics. As response to the bioethical concerns about our environment that grew through the twentieth century we can also see international treaties on environmental protection outlining common ethical principles[8] and some of the limits of damage to the common environment that will be tolerated by other countries, such as the convention on ozone-damaging chemicals, and on deep sea dumping.

One of the earliest global meetings on environment convened under the auspices of the UN was in 1972 at the Conference on the Human Environment in Stockholm, Sweden. The same year also saw the adoption of the UNESCO Convention Concerning the Protection of the World's Cultural and Natural Heritage. In 1983 the UN established the World Commission on Environment and Development which four years later produced the report *"Our Common Future"*,[7] the first UN document to clearly articulate the concept of sustainable development as an alternative to development simply based on economic growth. The ethical principles that formed the basis for *"Our Common Future"* would later constitute the ethical foundation for most subsequent UN reports on environmental protection. These ethical principles included sustainable development, equity and participation.

Article 3 of the *United Nations Framework Convention on Climate Change – UNFCCC* (1992) contains a set of ethical principles which are to be of guidance to the member states in achieving the objectives of the convention.[8] As mentioned earlier, these were to a large degree drawn from 'Our Common Future' from 1987 and include:

Equity: *"The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities"* (Art.3, Par.1)

Common but differentiated responsibilities (and capabilities): *"acknowledging that… climate change calls for the widest possible cooperation by all countries…, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions" (Preamble) and "the developed country Parties should take the lead in combating climate change and the adverse effects thereof"* (Art.3, Par.1)

Vulnerability: *"the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change,…, should be given full consideration"* (Art.3, Par.2)

Precaution: *"the Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects"* (Art.3, Par.3)

Sustainable development: *"Parties have a right to, and should, promote sustainable development"* (Art.3, Par.4)

The Rio Declaration on Environment and Development (1992) consists of a set of twenty-seven principles that defines the rights and responsibilities of states in future international agreements on sustainable development and environmental protection. The main principles include:

Human rights: *"Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature"* (Principle 1)

Sustainability: *"The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations"* (Principle 3)

Equity: *"All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world"* (Principle 5)

Common but differentiated responsibilities: *"States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command"* (Principle 7)24 ECCAP WG1 Report: Universalism and Ethical Values for the Environment

Precaution: *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation"* (Principle 15)

Participation: *"Environmental issues are best handled with the participation of all concerned citizens, at the relevant level"* (Principle 10). *"Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable"* (Principle 20). *"Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development* (Principle 22).

Vulnerability: *"The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority"* (Principle 6). *"The environment and natural resources of people under oppression, domination and occupation shall be protected"* (Principle 23).

Peace: *"Peace, development and environmental protection are interdependent and indivisible"* (Principle 25)

ETHICS AND NUCLEAR ACCIDENTS

We see growing attention in environmental planning for engagement of all stakeholders in decisions and policy making, which can build upon the community structures for consensus building and decision making that exist in many nations[6]. The societal and policy infrastructures to guide the development of wise and ethical science and technology need to be carefully constructed to utilize the creativity of humankind expressed in the scientific endeavour. We cannot leave it to governments to look after the planet, the actions of individual members of the human community and corporations are required. Some types of environmental improvement can be brought about already by individuals. That is the important call of bioethics and responsibility.

Nuclear energy is one of the energy options used today across the world that could be expanded for the future because in its day-to-day operations it does not produce CO2 and other pollutants into the atmosphere, which cause global warming[7]. A nuclear power plant (NPP) generates electricity from nuclear energy. More specifically, the nuclear reactor, housed within the plant, converts the heat energy generated from nuclear fission to electricity. Once built, they can operate at a relatively low cost.

Nuclear energy has been one of the major public topics of discussion in 2011 following the Fukushima accident, which has revived the fears that emerged after Chernobyl incident in 1986. In the UNESCO Ethics and Climate Change in Asia and the Pacific (ECCAP) project there is comparative analysis of the ethics of nuclear energy compared with other energy options, in terms of efficiency, use of renewable energy, with discussion of new forms of energy production, or alternatives to manage greenhouse gas emissions such as carbon sequestration, to mention a few.

The principle of non-maleficence is very important to people's fears of nuclear technology. There are a variety of views of the world, and depending on the view that people have there will be different conclusions. A nuclear meltdown can occur if fission creates too much energy and overheats, causing damage to the surrounding structures and releasing radiation into the environment. It can also occur if the structures surrounding the nuclear reactor themselves suffer a malfunction, allowing radiation leaks. Finally, it can occur if cooling systems, such as the pressurized water moderator, malfunctions, damage the structures surrounding the nuclear reactor, and release radiation into the environment. Accidents at Three-Mile Island in the United States (1979), Chernobyl in Ukraine (1986), and Fukushima in Japan (2011) have prompted the public to raise serious questions about nuclear safety (OECD, 2005).

However, when we consider the types of risk inherent in most energy options it may be difficult to argue that nuclear energy should be absolutely prohibited simply because accidents can occur. Nuclear energy can be considered as a safe source of electricity. As a comparison, several thousand persons die in coal mine accidents each year, and hundreds die in the oil and gas industry; not to mention the added complications of health to miners and the public in general, and environmental effects.

However on the other hand, it is equally difficult to argue that such accidents should be downplayed and are "rare". Utilitarianism may consider a simple multiplication product of the magnitude of the harm multiplied by the probability of its occurrence. In the case of nuclear meltdowns, the magnitude of the harm can be enormous. While Three-Mile Island did not produce any direct recorded deaths from radiation, the indirect health and environmental damage was inconclusive. The accident in fact demonstrated the importance of safety systems. Even though half the reactor core melted, the radionuclides that were released mostly plated out on the inside of the plant or dissolved in the condensing steam. The containment building housing the reactor also prevented any significant release of radioactivity. The reactor's other protection systems also came into action.

The fact that Fukushima disaster occurred despite comprehensive safety systems and multiple redundant safety systems, and inherent and passive safety systems, has significant implications for nuclear safety (Suman). Although Fukushima nuclear accident was triggered by a major earthquake and tsunami that led to loss of power for the cooling systems, resulting in meltdowns at least three reactors, the NPP had been designed with the recurrent risk of earthquake and tsunami in that region of Japan in mind. The risk preparations were thus proven to be insufficient, with a number of implications for many other NPPs built close to earthquake faultlines.

Some of the most significant impediments to nuclear energy becoming a sustainable, safe source of power are the "unseen" expenses. The potential long-term viability of nuclear power could decrease if financial and environmental risks are ignored. Nuclear power is inherently tied to "external costs and benefits", termed as "externalities". Liabilities include the cost of environmental damage, adverse radiation effects on human health following a nuclear accident, damage to human health during routine operation of nuclear facilities, and the long-term problems associated with nuclear waste disposal and plant decommissioning. external costs of electricity generation are largely dependent on the choice of fuel, technology and location, although assumptions underlying specific technologies studied cannot be generalized. In the case of nuclear energy, the impact assessment will need to include the risk of severe radiation accidents as the major environmental burden. It is largely perceived that the weakest areas of nuclear power externality studies are the assumptions that: 1) nuclear fuel cycle wastes and other hazardous impacts are well managed. 2) The probability of nuclear accidents and its deleterious effects on society and environment, which are either ignored or neglected. Factors that might also affect nuclear externality studies are resource depletion, the extent of risk perception and capital invested in research and development.[1]

Fukushima accident has revealed the high cost of clean up of the contaminated land as well as making the site safe over the number of years. Although it appears that the clean up will equal about half of the 2011 Japanese total budget, the money is going to companies that appear to be charging high prices. The costs of containing Chernobyl accident, that occurred in 1986, still are approximately half the Ukrainian annual GDP. The estimated cost for decommission of Fukushima Daiichi may be 502 billion yen. The cost and period of decommission in Three Mile Island was about 76 billion yen, after 14 years and 5 months. The cost and period of decommission in Chernobyl is annually 10 billion yen for every year of restoration, with the planned year for finishing the decommissioning is 2064.[2]

While the right to sustainable energy arguably deserves to be recognized as a fundamental human right, the current status on a generalized basis is that this right exists not as a substantive right by law/constitution but rather as procedural right. However, a substantive emphasis is required to set objectives for energy policies and programmes. Given the complexity of the technology, it then becomes necessary to examine the imperatives of international/national policies and treaties/ programmes on nuclear energy in light of a human rights based approach. The United Nations Development Group (UNDG) Resolution adopted in 2003,[11] said that

> 'International policies and treaties on nuclear technologies need to take cognizance of the human rights principles of universality and inalienability; indivisibility; interdependence and inter-relatedness; non-discrimination and equality; participation and inclusion; accountability and the rule of law.

Further, UN High Commission on Human Rights (UNHCHR) guidance[10] can be adapted to HRBA in policies and programmes pertaining to nuclear technologies. Such guidance is helpful because it provides additional ethical support for a human rights based approach. The following are principles that may be derived from including such guidance into the approach:

The main objective of nuclear policies and programmes should be to fulfil human rights, in particular the right to sustainable energy.

Nuclear policies and programmes should identify the right-holders and their entitlements, corresponding duty-bearers and their obligations, and work towards strengthening the capacities of rights-holders to make their claims and of duty-bearers to meet their obligations (the current emphasis in the nuclear context in many countries is on 'stake-holders', not 'right-holders').

Principles and standards derived from international human rights treaties should guide all policies and programmes in the nuclear sector and in all phases.

As the above principles indicate, the right to sustainable energy is considered a fundamental ethical right. The emphasis on the right to sustainable energy will not be productive unless it is firmed up. Pinning it down would provide firm ground for a progressive framework of energy management. Energy is essential for development. Just as food is a source of energy for human development, so are renewable and non-renewable sources of energy essential for economic growth and social well-being. If there is a right to development, then there exists a right to sustainable energy.

The right to development is an inalienable and indivisible human right 'by virtue of which every person and all peoples are entitled to participate in, and contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realised' (Art. 1, Right to Development Declaration). The right to development is both, a substantive right, and a right to a process of development. The process, which as expressed in the human rights based approaches to development (HRBA, 2003), should be universal and inalienable, indivisible, interdependent and inter-related, non-discriminatory and equal, participatory and inclusive, accountable, and be situated in the rule of law. The right itself then, as society progresses, includes not only food and shelter but also energy. The right to sustainable energy is a component of the right to development. Such a right should be fulfilled in a manner that respects human rights. It is the duty of States to 'co-operate with each other in ensuring development and eliminating obstacles to development' (Article 3(3) Right to Development Declaration). Article 4 reinforces this duty by stipulating that States should 'take steps, individually and collectively, to formulate international development policies with a view to facilitating the full realization of the right to development'.[2]

As discussed in the introduction and the considerations above there are a number of principles and theories that can be applied to assist ethical policymaking in nuclear energy. A contrast in philosophical viewpoints can be found between the deontological and utilitarian approach. The deontological approach emphasizes justice and the procedural aspects of decision-making, while utilitarianism focuses on the outcome of policies. The utilitarian approach also includes principles of justice, mainly distributive and retributive. Utilitarianism focuses more on the ends, deontology more on the means.

Further reflection on alternative sets of principles can be formulated, as discussed below. Further reflection on each principle in the light of each culture can be developed in the construction of policy analysis.

According to the principle of no acceptable risk a risk can never be an 'acceptable' risk, as a risk implies that there is a negative effect to be taken into consideration, in the hope of attaining a certain benefit. That negative effect can never be absolutely acceptable. When applied to nuclear energy, there are multiple aspects that can be considered a risk or a possible negative implication. The ones mentioned in this report are the negative effects of mining, the risk of nuclear weapons proliferation and the safety risks of nuclear reactors. Although there is no absolute acceptable risk those negative effects should be weighed against the positive. This could make a negative effect more or less acceptable, but never completely acceptable.

In technology assessment, however, since all human activity has some risk, the relative risks of alternatives needs to be weighed against each other. The precautionary principle has been used to exercise precaution in applications where the risks are very difficult to calculate due to the novelty of the circumstance.

Overall, safety on nuclear sites is said by IAEA[3] to be manageable. It is not said that nuclear sites are completely safe and any meltdown can be prevented, but technology has found ways of reducing a great part of the damage in unforeseen critical situations. Measures have been taken to improve the structure and internal system of the reactors, along with general procedural safety regulations. Thus far only three main nuclear accidents with environmental consequences have occurred. Each nation needs to answer the question whether the benefits of nuclear energy outweigh the consequences of any accidents, but we should have thorough debate on these issues.

CONCLUSION

This paper discussed the situation relating to implementation of ethical standards in relation to environmental policies and their link to global bioethics, with a reference to the issues raised by the Fukushima disaster and the responses made to that disaster. Policy statements and laws are not an end point but a point along the journey for each society to travel to rediscover its values and apply them to the emerging issues raised by science and technology, and the environmental crisis that we share. Strategies to better implement these standards will be compared, along with identification of the gaps between needs of different sectors of the communities in countries at a range of different socio-economic levels, and different cultural value systems that can construct a more global bioethics.

REFERENCES

1. ExternE: External Costs Study Extern E- Externalities of Nuclear Energy. 2008. A research Project of the European Commission. Updated Jan
2. Glen Kurokawa, Suman Iyengar, Darryl Macer, Kayo Uejima, Napat Chaipraditkul, Amarbayasgalan Dorjderem, Silvia Gardini, Cao Liuying, Chamundeeswari Kuppuswamy, Jothi Rajan, Suman Rao. 2012. Ethics of Nuclear Energy Technology. Bangkok, Regional Unit for Social and Human Sciences in Asia and the Pacific (RUSHSAP), UNESCO Bangkok.
3. IAEA. 2008. Cleaning up from the past / Preserving the future. http://www.iaea.org/Publications/Magazines/Bulletin/Bull492/49205692527.pdf.
4. Jahr F (1927) Bio-Ethik. Eine Umschau ueber die ethichen Beziehungen des Menschen zu Tier und Pflanze, in: Kosmos. Handweiser fuer Naturfreunde 24 (1) 2-4.
5. Macer DRJ (1994) *Bioethics for the People by the People*. Christchurch: Eubios Ethics Institute.
6. Macer DRJ (1998) Bioethics is Love of Life: An Alternative textbook. Christchurch: Eubios Ethics Institute.
7. *Our Common Future* (1987), Oxford: Oxford University Press.
8. Rai, J. S., Thorheim, C., Dorjderem, A., and Macer, D. 2010. *Universalism and Ethical Values for the Environment: Ethics and Climate Change in Asia and the Pacific (ECCAP) Project, Working Group 1 Report.* Bangkok: UNESCO.
9. Raine Boonlong, Carol Farbotko, Claire Parfondry, Colum Graham, Darryl Macer. 2011. *Representation and Decision-Making in Environment Planning* (with Emphasis on Energy Technologies). Bangkok, Regional Unit for Social and Human Sciences in Asia and the Pacific (RUSHSAP), UNESCO Bangkok.
10. UN High Commission on Human Rights (UNHCHR) UNHCHR 2006, Frequently asked Questions on a human rights-based Approach to Development Cooperation, can be accessed at http://www.hurilink.org/tools/FAQon_HRBA_to_Development--OHCHR.pdf.
11. UNDG Resolution adopted in 2003.

STUDY OF PREDISPOSING FACTORS OF CORONARY ARTERY DISEASE

Auley De*, Gargi Podder, Aniket Adhikari, Ajanta Halder, Saumitra Ray, Jayasree Banerjee, Madhusnata De.

Department of Genetics, Vivekananda Institute of Medical sciences, Ramakrishna Mission Seva Pratishthan. Kolkata, India.

*Email : de.auley@gmail.com

ABSTRACT

The precise molecular mechanisms culminating in coronary artery disease (CAD) are not well understood, despite a wealth of knowledge on predisposing risk factors and pathomechanisms. CAD and myocardial infarction (MI) are complex diseases; neither the environment alone, nor a single gene, cause disease, rather, a mix of environmental and genetic factors lead to atherosclerosis of the coronary arteries. There is increasing evidence suggesting that coagulation may be involved in the pathogenesis of atherosclerosis, and also in the clinical progression to plaque rupture and localized occlusive thrombus formation. In the present study, our aim was to investigate the roles of and Factor VLeiden mutation in atherosclerotic coronary artery disease. 295 subjects (65 control subjects, who were angiographically normal and 230 angiographically documented coronary atherosclerotic patients) were included in this study. 191 blood samples were analyzed for lipid level, 149 samples were cardiac cases and 42 samples were control. The level of triglyceride (TGL) is 179.138±17.743 in patients 137.103±13.28 in control, Total cholesterol (T. Chol) 170.34±14.5 of patients 143.26±9.56 in control, High density lipoprotein (HDL) 40.626±2.82 in patients 45.225±2.06 in control, Low density lipoprotein (LDL) 106.272±7.28 in patients 79.72±5.98, Very low density lipoprotein (VLDL) 30.85±4.08 in patients 23.79±2.99 in control. 102 samples were studied for homocysteine level, 84 cases are patients and 18 cases are control. High level of plasma homocysteine has been associated with premature development of CHD and arterial thrombosis. Homocysteine level was high in case of Coronary Heart Disease patient 18.66±2.69 than normal healthy control 10.74±1.142. Factor V leiden was studied from DNA. Among the studied cases no polymorphism for Factor V was found, all this cases showed wild type pattern.

INTRODUCTION

Coronary artery disease (CAD) (or atherosclerotic heart disease) is the end result of the accumulation of atheromatous plaques within the walls of the coronary arteries that supply the myocardium (the muscle of the heart) with oxygen and nutrients[3]. According to the American Heart Association, coronary heart disease cause 12 million deaths in the world wide every year[10]. CAD is a multifactorial disorder because it is a result from an interaction between genetic background and environmental factors[2]. High level of low density lipoprotein (LDL) appear to increase the risk of CHD by narrowing or blocking arteries that carry blood to the heart. High levels of high density lipoprotein appear to lower the risk. High level of triglycerides which make up a large part of the body's fat and also found in the bloodstream, is also associated with increased risk of CHD.High level of serum lipid is responsible for narrowing or blocking arteries that carry blood to the heart[1]. Homocysteine is sulfur containing intermideatary amino acid in the metabolic pathway of cysteine residue. Altered homocysteine metabolism plays a potential role in the pathogenesis of atherosclerosis, thromboembolism and vascular endothelial damageHigh level of plasma homocysteine has been associated with premature development of CHD and arterial thrombosis[11]. Factor V Leiden mutation increased the risk of arterial thrombosis which can cause Coronary artery disease[4]. In the present study investigated the impact of different risk factors on Coronary Artery Disease.

MATERIALS AND METHODS:

Total **191 clincally diagnosed caoronary artery disease (CAD) cases were taken from** cardiology OPD (Out Patients Department) of Ramakrishna Mission Seva Pratishthan. **Age and sex matched 42 Control cases were included**. A questionnaire, which included questions (WHO guideline) on life style factors (smoking, alcohol consumption), personal factors (age, state of health, job history etc.), was filled-up (12). All patients gave their written consent prior to the participation, and the study procedures followed were in accordance with the Institutional Ethical committee's guidelines. Biochemical Parameters are estimated by different Biochemical Kit using Autoanalyzer.

Collection of Blood

2ml Whole blood samples of 12 patients were collected via Vacutainer blood collection tubes containing EDTA and stored frozen in microfuge tubes at –20°C.

Isolation of DNA

DNA was extracted from whole blood by salting out method .

PCR-RFLP method to detect the genotype

The PCR amplification was carried out to identify the presence of G→A at nucleotide 1691 responsible for the factor V Leiden mutation as described by *Huber et al*. PCR product (241bp) was digested with HindIII restriction enzyme.

Agarose gel electrophoresis to detect the genotype

The mutation at 1691 nucleotide G→A creates a HindIII recognition sequence, and the product was digested into 209bp and 32bp fragments. The products of restriction digestion were separated on 3% agarose gel and visualized by ethidium bromide staining.

Restriction Digestion

Factor V Leiden mutation were detected by using PCR followed by Hind III digestion. Band sizes were analyzed by 25bp ladder (Fermentas). When subjects are wild type there was no restriction site for Hind III and fragment (241 bp) remained undigested. However, when subjects are homozygous restriction site for Hind III were created on both the chromosomes that allowed the fragment to be completely digested into two fragments of 209 bp and 32 bp. When the subjects are heterozygous both patterns visible, corresponding to undigested (241 bp) and digested (209bp) amplified fragment.

RESULT & DISCUSSION

In 2000, there were an estimated 29.8 million people with CHD in India, out of a total estimated population of 1.03 billion people, or a nearly 3% overall prevalence[7]. This study shows that 62.35% cases of cardiac cases were smoker whereas 18.07% in control cases. But addiction in tobacco was some extent higher in control cases (16.6%) whereas alcohol intake was high in cardiac cases areas (Fig 1). Family history (57.64%) of coronary heart disease was higher in cardiac cases. Presence of hypertension (52.94%) & diabetes (49.41%) were higher in cardiac cases (Fig 3). Mean value of total lipid profile levels and Homocysteine level were higher in CAD cases than control cases. Percentage of Hypertension and Diabetes are high in CAD cases (Fig 2). In India, the prevalence of factor V Leiden is quite low[5,8]. There are very few study that found any prevalence of factor V leiden mutation in cardiac cases in india. Study of Khare et al describe presence of Factor V leiden mutation in acute myocardial infarction cases in western india[9]. But Gupta et al did not find any prevalence of factor V Leiden mutation among north Indian population[6]. Among 233 cases 191 were patients and 42 cases were normal (Fig 4). All of them showed wild type pattern. Our finding of this study is similar to Gupta *et al*.

Fig 1

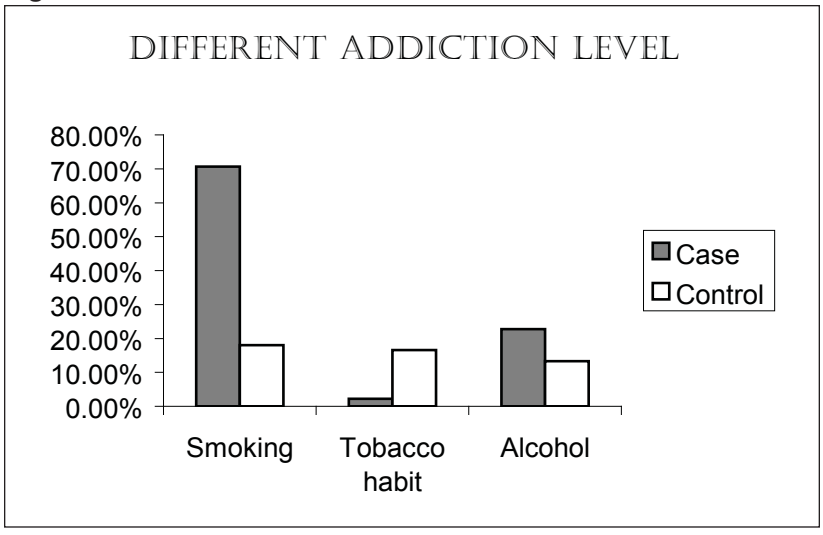


Fig 2.

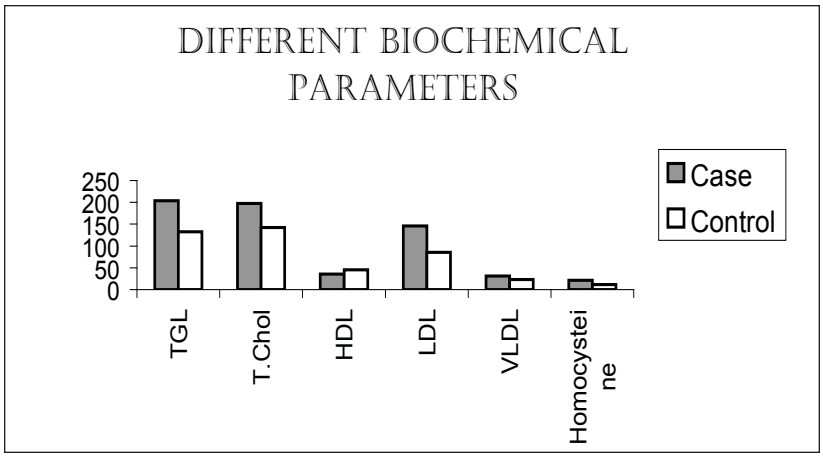


Fig 3.

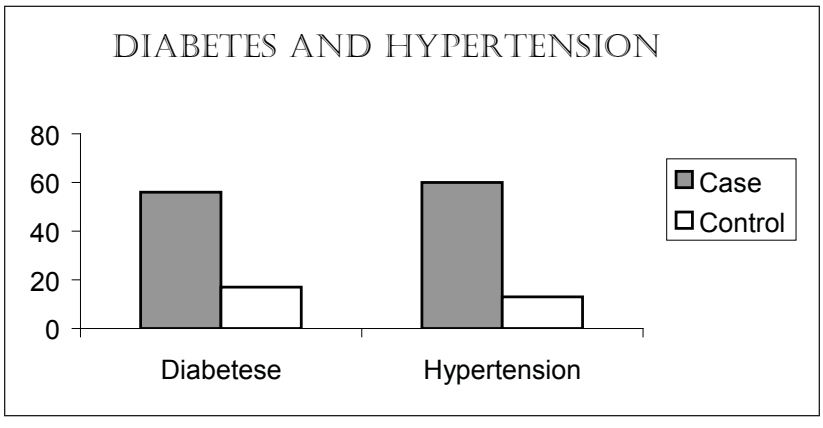
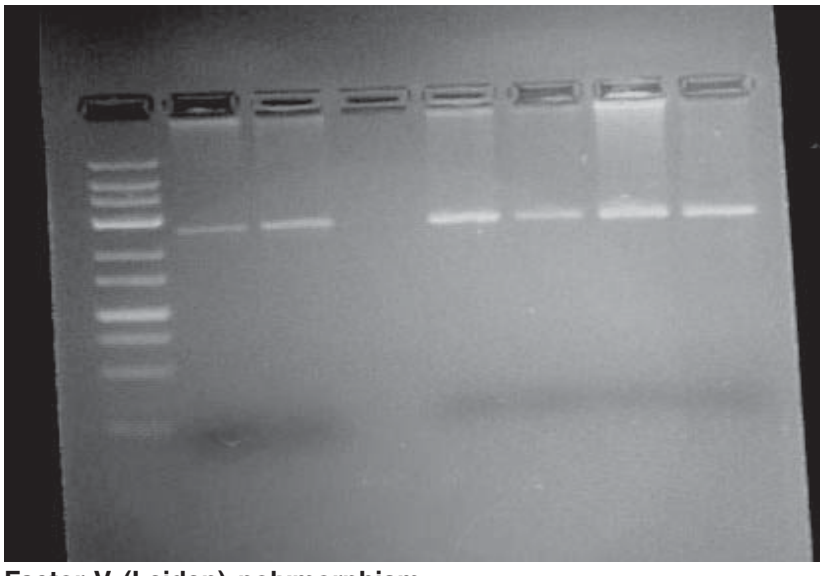


Fig 4: Agarose gel electrophoresis for Factor V leiden mutation.



Factor V (Leiden) polymorphism

Lane 1: 25bp DNA molecular weight marker ladder

Lane 2-3 & lane 5-8: Patients with wild-type pattern (241 bp)

REFERENCES:

1. Austin MA, Hokanson JE, Edwards KL. Hypertriglyceridemia as a cardiovascular risk factor. Am J Cardiol. 1998: 81:78-123. 4
2. Charles F.Sing Jari H. Stengård, Sharon L.R. Kardia. Genes, Environment and Cardiovascular disease. Arterioscler Thromb Vasc Biol. 2003: 23:1190-1196.3
3. "Dorlands Medical Dictionary: coronary artery disease" http://www.mercksource.com/pp/us/cns/cns_hl_dorlands_split.jspzQzpgzEzzSzppdocszSzuszSzcommonzSzdorlandszSzdorlandzSzthreezSz000030680zPzhtm. Retrieved on 2009-01-09.1
4. Germanakis I, Stiakaki E, Sfyridaki C, Katampekios S, Danilatou V, Kalmanti M. Stroke in an infant heterozygous carrier of both Factor V G1691A and the G20210A prothrombin mutation. Thromb Haemost 2003;90:760-3. 6
5. Ghosh K, Shetty S, Madkaikar M, Pawar A, Nair S, Khare A, et al. Venous thromboembolism in young patients from western India: A study. Clin Appl Thromb Hemost 2001;7:158-65.9
6. Gupta N, Khan F, Tripathi M, Singh VP, Tewari S, Ramesh V, Sinha N, Agrawal S. Absence of factor V Leiden (G1691A) mutation, FII G20210A allele in coronary artery disease in North India. Indian J Med Sci 2003;57:535.12
7. Gupta R, Joshi P, V Mohan V, Reddy K S, Yusuf S. Epidemiology and causation of coronary heart disease and stroke in India. Heart 2008: 94: 16-26.8
8. Herrmann FH, Salazar-Sanchez L, Schroder W, Grimm R, Schuster G, Jimenez-Arce G, et al. Prevalence of molecular risk factors FV Leiden, FVHR2, FII 20210 G>A and MTHFR 677C>T in different populations and ethnic groups of Germany, Costa Rica and India. Int J Hum Genet 2001;1:33-9.10
9. Khare A, Ghosh K, Shetty S, Kulkarni B, Mohanty D. Combination of thrombophilia markers in acute myocardial infarction of the young. Indian J Med Sci 2004;58:381-8.11
10. Moham ad khalid Nusier, Zeyad El-Akawi and Sameer Abd-Alkareem Otoom. The association of blood biochemical parameters with myocardial infarction.Journan of Health Science. 2004: 50(6) 666-669.2
11. Mudd, S.H., Levy, H.L., and Scovby, F.,(1989) Disorders of transsulfuration. The metabolic basis of inherited disease, 6th edn, Mc Graw Hill, New York.693-734.5
12. Rose GA, Blackburn H, Gillium FF, Prineas RJ. Cardiovascular survey methods. WHO: Geneva: 1982.7

GENETIC STUDY OF DOWN SYNDROME CASES

Gargi Podder*, Auley De, Aniket Adhikari, Ajanta Halder, Nalini Gupta, Jayasree Banerjee, Madhusnata De.

Department of Genetics, Vivekananda Institute of Medical Sciences, Ramakrishna Mission Seva Pratishthan. Kolkata, India.

*Email : gargi.podder86@gmail.com

ABSTRACT

Down Syndrome (DS) is a relatively common malformation having physical abnormalities of the face, eyelids, tongue, and other parts of the body with retarded physical and mental growth. The affected individuals have either a somatic cell of 46 chromosomes involving translocation of D14 / D21 chromosome or 47 chromosomes with trisomy 21. In the present study an attempt has been made for the genetic screening and diagnosis of Down syndrome in families of Index patients. 118 cases of Karyotyping were done in the cytogenetics unit of the Genetics Department of Ramakrishna Mission Seva Pratishthan in six months. Out of 118 cases 29 cases (24.57 %) were diagnosed as Down syndrome. Among 29 cases maximum number i.e. 62.06% were in the age group of 1-12 months and minimum number i.e. 3.44% were in 18+ yrs age group. 62.06% cases were males and the rest i.e. 37.93% were females. 75.86% cases have dysmorphic faces, 65.51% cases have distance of eyes, 62.06% cases have low set of ears, 55.17% cases have Severity of down, 48.27% cases have simian crease in the palm. 51.72% cases were born with congenital heart disease. Among 29 cases 24.13% patients suffered from jaundice during their birth. Among 29 cases 86.18% cases have Trisomy 21 and 13.78% cases have mosaic Down syndrome. There is no medical cure for this condition. Some of the genetic limitations of Down syndrome cannot be overcome; education and proper care will improve the quality of life.

INTRODUCTION

Down syndrome is the most common and readily identifiable chromosomal condition associated with mental retardation. Down Syndrome, Trisomy 21 or Mongolism, was first described by Dr. Langdon Down in 1865.[1]

(1) *Trisomy 21 (94%)*: The extra 21 chromosome (three instead of the usual two) produces a complement of 47 chromosomes. [4, 2, 5]

(2) *Translocation (5%)*: A segment of a 21 chromosome is found attached to other pairs of chromosomes (usually #14, thus referred to as a 14/21 translocation).[4,5]

(3) *Mosaicism (1%)*: Nondisjunction occurs at a later stage of cell division, therefore, some cells have the normal complement of 46 chromosomes and other cells 47 chromosomes (with an extra 21 chromosome).[2,5]

OBJECTIVES:

In the present study an attempt has been made for the genetic screening and diagnosis of Down syndrome in families of Index patients.

MATERIALS AND METHODS:

The total number of cases of Karyotyping done in the cytogenetics unit of the Genetics Department

of Ramakrishna Mission Seva Pratishthan 118. Out of 118 cases 29 cases (24.57 %) were diagnosed as Down syndrome. The cases were referred from different Dist., Hospitals, Health Centers, Clinics of West Bengal and also Outdoor and Indoor Deptt. of Ramakrishna Mission Seva Pratishthan.

CYTOGENETIC ANALYSIS OF THE INDEX PATIENTS: Blood cultures were made for chromosome preparations as per routine procedures.[6,9] Karyotyping was done on index patients.[3] The banding technique was applied whenever necessary.[4]

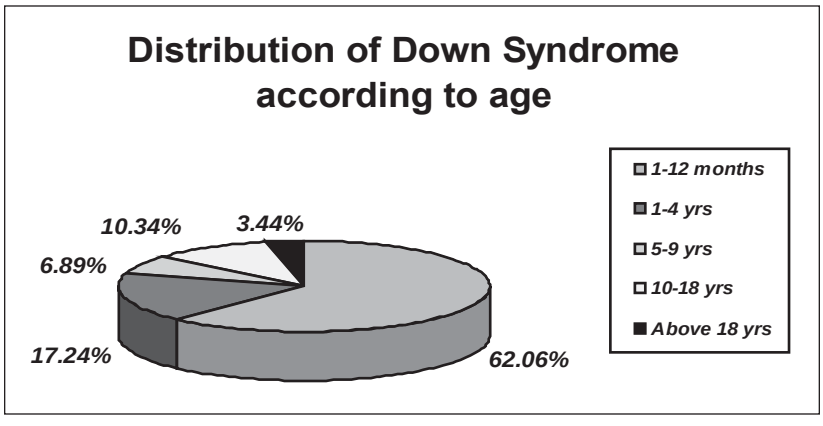
GENETIC COUNSELLING: This was carried out with the help of counselors of Ramakrishna Mission Seva Partishthan Hospital.

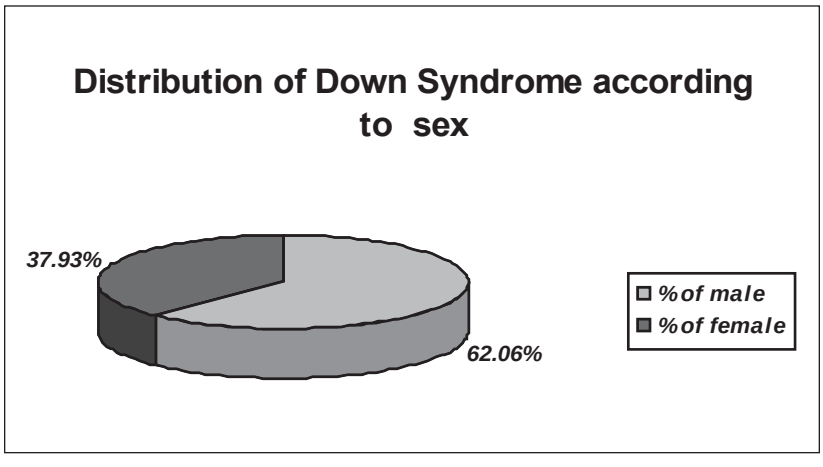
RESULT & DISCUSSION

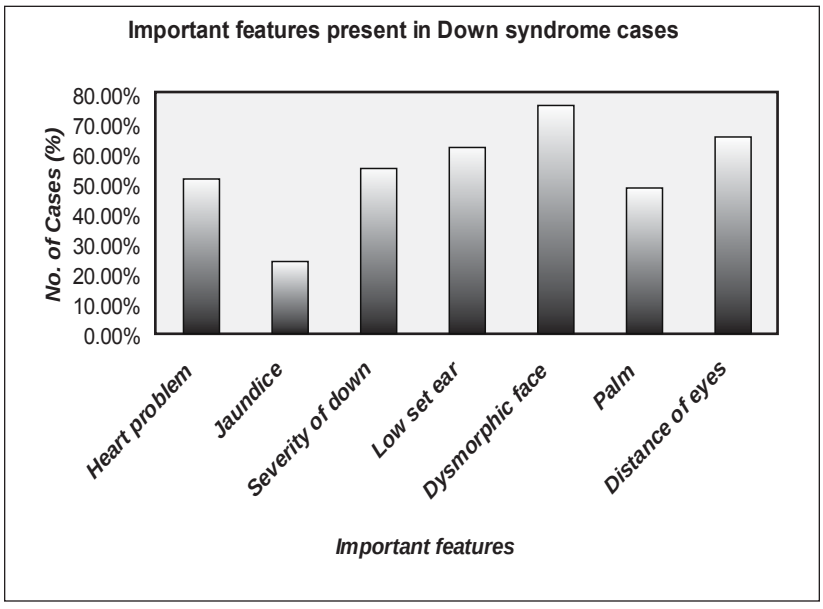
Out of 118 cases 29 cases (24.57 %) were diagnosed as Down syndrome. Among 29 cases maximum number i.e. 62.06% were in the age group of 1–12 months and minimum number i.e. 3.44% were in 18+ yrs age group. 62.06% cases were males and the rest i.e. 37.93% were females. 75.86% cases have dysmorphic faces, 65.51% cases have distance of eyes, 62.06% cases have low set of ears, 55.17% cases have Severity of down, 48.27% cases have simian crease in the palm. 51.72% cases were born with congenital heart disease. Among 29 cases 24.13% patients suffered from jaundice during their birth. Among 29 cases 86.18% cases have Trisomy 21 and 13.78% cases have mosaic Down syndrome.

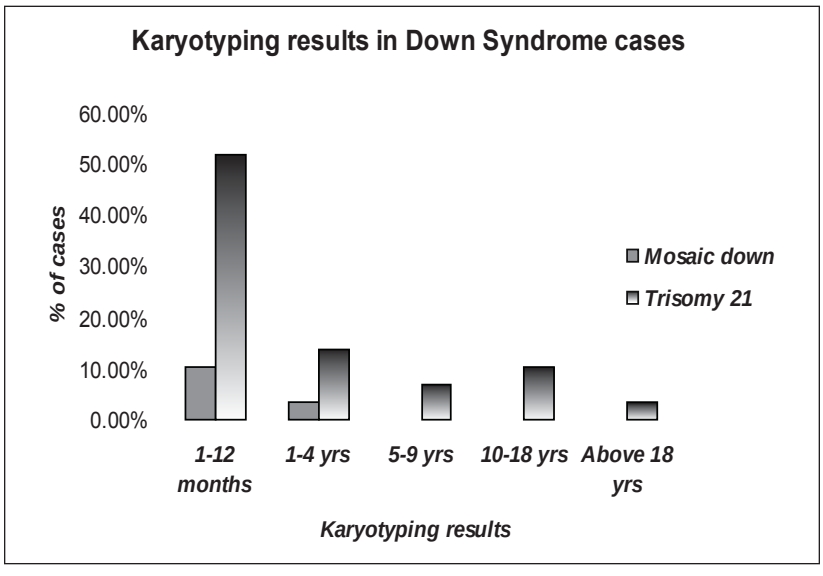
There is no medical cure for this condition. Some of the genetic limitations of Down syndrome cannot be overcome; education and proper care will improve the quality of life.[7,10]

FIGURE:









REFERENCES

1. Cooley WC, Graham JM (1991). Down syndrome: an update and review for the primary pediatrician. Clin Pediatr (Phila), 30:233–253.
2. Hassold T, Chen N, Funkhouser J, Joss T, Manuel B, Matsura J(2007). Cytogenetic study of 1000 spontaneous abortions. Annals of Human Genetics: Sep; 44(2):151-164.
3. Hungerford DA (1965). Leucocytes cultured from small inocula of whole blood and preparation of metaphase chromosomes by treatment with hypotonic KCL. Stain Technology, 40: 333-338.
4. Jyothy A, Kumar KS, Rao GN, et al (2000). Cytogenetic studies of 1001 Down syndrome cases from Andhra Pradesh, India. Indian J Med Res; 111:133-7.
5. Mikkelsen, M. (1977). Down's syndrome cytogenetic epidemiology. Hereditas, 86, 45 -59.
6. Moorehead PS, Nowell PS, Mellman WJ, Battups DM (1960). Chromosomal preparation of leucocytes cultured from human peripheral blood. Exp Cell Res, 20: 613- 616.
7. Patel ZM & Adhia RA,(2005). Birth defects surveillance study, Indian J Pediatr, 72: pp 489-491.
8. Southern Association of Institutional Dentists. Down syndrome: a review for dental professionals. Self-Study Course Module 3.
9. Verma IC and Singh MB (1975). Downs syndrome in India. Lancet, 1: 1200.
10. Wald NJ, Cuckle HS, Densem JW, Nanchahal K, Royston P, Chard T. (1988). Maternal screening for Down's Syndrome in early pregnancy. BMJ; 297: 883 – 7.

QUALITY OF LIFE AND RELATED FACTORS AMONG THE DISABLED ELDERLY IN TAIWAN

Pao-Chen Lin; Hsiu-Hung Wang
Department of Nursing, National Tainan Institute of Nursing
78, Sec. 2, Minzu Rd., Tainan City 700, Taiwan, R.O.C.
Email : nisa@mail.hwai.edu.tw

ABSTRACT

Purpose of the Study: The advancement of medical technology, development of economic system, and a steadily increasing life expectancy had resulted in a growing elderly population in Taiwan. As individuals live longer, the issues of quality of life is even more important especially for the disabled older adults. However, knowledge of quality of life in this population as well as factors that influence quality of life of disabled elderly are yet, limited. The purpose of this study examined the quality of life among disabled elders in Southern of Taiwan. Method: Using a cross-sectional study design, this study examined the quality of life among disabled elderly in Southern Taiwan. Demographic distributions, bio-psychological health status, and perceived quality of environment, as predictors of quality of life were studied. 210 disabled elderly who were dependent in one and above of activities of daily living, aged 65 and over, be able to communicate, and cognitively intact, were included. Data was analyzed with hierarchical multiple regression using SPSS for Windows Release 14.0. Results: The results of this study showed that disabled elderly had a moderate level quality of life. Among four domains, "social relationships" domain was the highest scored, while "psychological health" domain was the lowest scored. Age, marital status, educational level, perceived health status, number of chronic disease, depression, and "self esteem and caring" factor of perceived quality of environment were influent factors of overall quality of life, and 3 hierarchical variables explained 71.8% of the total variances. Conclusion: Quality of life is a complex, multidimensional concept, which no consensus existed in the literature. The study results not only provide information for understanding quality of life among disabled elders, but also generate information for designing mental health promotion program and policy to serve the elderly who have been disabled.

Key words: quality of life, health status, perceived quality of environment, disabled elderly

INTRODUCTION

Disability causes economic difficulty and burdens family members with providing care for the disabled person. Furthermore, being forced into a life of depending on others often causes the elderly to feel hopeless and lose self-esteem. Regarding disabled elderly people, quality of life has become the most emphasized outcome measures[1]. Quality of life is a multidimensional concept[2] defined differently by researchers with varying research objectives. Few studies have focused on the quality of life experienced by disabled elderly people. The purposes of this research are to examine the factors that influence the quality of life for disabled elderly people. It is the responsibility of healthcare workers to provide appropriate care and assistance, assist them in making necessary life adjustments, and enhance their quality of life.

METHOD

This research was a cross-sectional correlational study using purposive sampling. Individual (face-to-face) questionnaire-based interviews were used to collect data of the quality of life experienced by disabled elderly people in Tainan City and related factors. In addition to a quality of life scale, the questionnaire also included the Short Portable Mental Status Questionnaire (SPMSQ), Barthel Index, perceived health status scale, checklist of chronic illnesses, geriatric depression scale, perceived quality of environment scale, and a demographics section. The sample consisted of 210 elderly individuals

who aged 65 or over and required assistance with at least one daily life activity, communicated with Taiwanese and Mandarin, and had cognitively intact with a score of 6 or more on the SPMSQ.

RESULTS

The majority of the 210 subjects were women (66.7%). Ages ranged from 65 to 96 years; the average age was 79.15 years. 107 (50.9%) subjects had an elementary or junior high school level of education. The majority of subjects (55.7%) were widows or widowers. The majority of subjects (57.6%) resided in care facilities.

The score for overall quality of life was 45.73±10.03 (full score: 80), indicating a moderate quality of life. Among the four domains of quality of life, the score for "social relationships" was the highest (12.84; SD: 3.41), while the score for "psychological health" was the lowest (9.99; SD: 3.31). This study then used multiple hierarchical regression analysis to determine which factors influence quality of life for disabled elderly people. The results showed that age, marital status, level of education, perceived health status, number of chronic illnesses, depression, and scale of "self-respect and care" in perceived quality of environment are factors that significantly influence quality of life (Table 1).

Table 1 Multiple hierarchical regression analysis for overall QOL (N = 210)

Step	Variables	B	95% C.I
		-00.000	
1	Gender (R : male)	1.360	(-0.49, 3.21)
	Age : 75-84 (R : 65-74)	-2.117	(-4.04, -0.19)
	Age : 85 and above (R : 65-74)	-1.082	(-3.43, 1.27)
	Education : elementary (R : illiterate)	1.431	(-0.60, 3.46)
	Education : high school (R : illiterate)	2.737	(0.27, 5.21)
	Marital Status : Married (R : Single)	-2.769	(-5.37, -0.17)
	Marital Status : Widowed (R : Single)	-2.536	(-5.05, -0.02)
2	Perceived health status	1.043	(0.55, 1.54)
	Functional Status	-0.002	(-0.04, 0.03)
	Chronic illness	-0.544	(-1.07, 0.01)
	Depression	-1.048	(-1.29, -0.80)
3	Living arrangement (R : facility)	2.370	(-1.02, 5.76)
	Safety facilities for the disabled	0.585	(-1.34, 2.51)
	Architectural Structure	0.453	(-1.65, 2.55)
	Self-respect and caring	2.993	(1.71, 4.28)
	Resources accessibility	1.610	(-0.70, 3.92)
	R^2	0.718	
Model	F	30.649	
	P	< .001	
	☐ R^2	0.058	
Summary	☐ F	7.995	
	☐ P	< .001	

Note R = reference group; < = change ☐

DISCUSSIONS

The scores in this study indicated that subjects felt they had a moderate quality of life. The scores were significantly lower than that of previous research on others elderly people [3-7]. Whether this difference is due to varying levels of disability is a topic for further investigation in future research.

Illiterate elderly people had significantly lower quality of life scores compared to literate elderly people. This result is similar to that of previous research[4,5,8]. Because individuals with better socioeconomic status have a greater capacity to handle stress and obtain resources, they have stronger

feelings of self-respect and security, and thus a higher perceived quality of life[9]. In the future provision of health care and social services, the characteristics and needs of elderly people with a low level of education must be taken into special consideration to improve their quality of life.

Disabled elderly people with single status (unmarried, divorced, separated) had significantly higher scores for quality of life compared to those who were married or widowed. In contrast, previous research indicated that married or widowed individuals feel less social isolation, and therefore have a higher quality of life[10]. Future research should conduct more in-depth investigation of the correlation between marital status and quality of life.

Perceived health status and quality of life were significantly positively correlated; this result matched that of most studies[4,5]. Disabled elderly people with a higher number of chronic illnesses had a lower overall quality of life. This result is identical to that of many studies[4,5]. Deterioration of physical health may cause feelings of despondency and emotional withdrawal, which may lead to deterioration of mental health. This study showed that depression and quality of life are significantly negatively correlated for disabled elderly people. This result is consistent with that of previous research[4,6]. When caring for disabled elderly persons, caregivers and health professionals should actively encourage positive feelings to enhance these patients' perceived quality of life.

Perceived quality of environment was significantly positively correlated with quality of life. The factor of "self-respect and caring" was also found to influence the overall quality of life experienced by disabled elderly people. This shows that building a humanistic environment of concern and self-respect is very important to the quality of life for the elderly. Domestic and international studies also indirectly support this result[11]. Therefore, those who formulate and implement health policies should address the quality of the environment for disabled elderly people and actively strive for improvement.

The representativeness and causal inference of the research results are limited. The results also do not offer an understanding of the long-term changes in quality of life for disabled elderly people. We suggest that future studies use random sampling and a longitudinal research design to confirm the factors that influence the quality of life for disabled elderly people, as well as gain an understanding of the long-term changes in this area.

REFERENCES

1. Kane, R. L., Rockwood, T., Hyer, K., Desjardins, K., Brassard, A., Gessert, C., & Kane, M. (2005). Rating the importance of nursing home residents' quality of life. ***JAGS***, **53**(12), 2076-2082.
2. Borglin, G., Edberga, A-K., & Hallberg, I. R. (2005). The experience of quality of life among older people. *J Aging Stud*, **19**(2), 201-220.
3. Lai, K. L., Tzeng, R. J., Wang, B. L., Lee, H. S., Amidon, R. L., & Kao, S. (2005). Health-related quality of life and health utility for the institutional elderly in Taiwan. *Qual Life Res*, **14**(4), 1169-1180.
4. Lin, P-C., Yen, M., & Fetzer, S. J. (2008). Quality of life in elders living alone in Taiwan. *JCN*, **17**(12), 1670-1677.
5. Shieh, C-H. (2004). *The relationships among health status, family function, and quality of life in community elderly women*. Unpublished thesis, Chang Gung University, Tao-Yuan, Taiwan, R.O.C.
6. Hwang, H. F., Liang, W. M., Chiu, Y. N., & Lin, M. R. (2003). Suitability of the WHOQOL-BREF for community-dwelling older people in Taiwan. *Age Ageing*, **32**(6), 593-600.
7. Tseng, S. Z. & Wang, R. H. (2001). Quality of life and related factors among elderly nursing home residents in Southern Taiwan. *Public Health Nursing*, **18**(5), 304-311.
8. Tsai, S., Chi, L., Lee, L., & Chou, P. (2004). Health-related quality of life among urban, rural and island community elderly in Taiwan. *JFMA*, **103**(3), 196-204.
9. Zhan, L. (1992). Quality of life: Conceptual and measurement issues. *JAN*, **17**(7), 795-800.
10. Noro, A., & Aro, S. (1996). Health-related quality of life among the least dependent institutional elderly compared with the noninstitutional elderly population. *Qual Life Res*, **5**(3), 355-366.
11. Wilson, K., Elliott, S., Law, M., Eyles, J., Jerrett, M., & Keller-Olaman, S. (2004). Linking perceptions of neighbourhood to health in Hamilton, Canada. *J Epidemiol Community Health*, **58**(3), 192-198.

MEETING THE SOCIAL, EMOTIONAL AND PSYCHOLOGICAL NEEDS OF PATIENTS IN A CANCER PALLIATIVE CARE

NasreenSulaimanLalani[1], *MScN, BScN, RN*, Shabana D.Lakhani[2], Muslim Shah[2]
[1]Sr. Instructor, Aga Khan University School of Nursing Karachi, Pakistan (AKUSON, K,P).
[2]Post RN BScN final year student, Aga Khan University School of Nursing Karachi, Pakistan

ABSTRACT

In the early 1980s, the primary focus of palliative care was to provide pain and symptom relief. However, later the scope of palliative care was extended to take a holistic approach of care with a major emphasis on improving the quality of life of patients and their families. The health care professionals recognized that while providing pain and symptom relief measures, the physical, emotional, and spiritual needs of the patient should also be given prime importance. Holding the same vision and principles of care, the final year Post RN nursing students from a university teaching hospital in one of their clinical rotation under faculty supervision using bio-psychosocial model of care, provided holistic care to the terminally ill cancer patients in a charitable cancer palliative hospice care setting in Karachi, Pakistan.

The paper would highlight a range of patient care scenarios where student nurses utilized various non pharmacologic measures such as therapeutic communication, use of humor, guided imagery, therapeutic touch, relaxation exercises, religious and other diversional activities in order to ease the suffering, emotional distress and provide optimal comfort and support to the patients as well as their caregivers. Moreover, patient education and awareness was also part of their provision of care. These measures not only minimized patients' intensity of chronic cancer pain as evidence by their lowered pain scores but met their other physiological, social, psychological, emotional and spiritual needs as evidenced by patient verbalization of having positive attitude towards life, increased motivation, strong nurse patient relationship and increased participation in activities of daily living.

Keywords: Cancer pain, suffering, nurse patient relationship, communication, non-pharmacologic measures, caregivers, support, comfort, faith

In the early 1980s, the primary focus of palliative care was to provide pain and symptom relief. However, later the scope of palliative care was extended to take a more holistic approach of care with a major emphasis on improving the quality of life of the patients and their families. The health care professionals recognized that while providing pain and symptom relief measures, the physical, emotional, and spiritual needs of the patient should also be given prime importance and therefore, should be a part of palliative care. WHO (2007), the goal of palliative care is achievement of the best quality of life for patients and their families. The aim of palliative care is not to postpone death but helps to relieve distress, promote psychological well-being ultimately sustain life and expect dying as a normal process.[12]

Palliative care is an urgent humanitarian need for people worldwide with cancer and other chronic fatal diseases as it provide comfort and ease suffering. Palliative care services are appropriate from the time of diagnosis of life threatening illness and throughout the course of illness. It is particularly needed in places with a high proportion of patients in advanced stages of cancer, where there is little chance of cure. Relief from physical, psychosocial and spiritual problems can be achieved in over 90% of advanced cancer patients through palliative care. Nonetheless, preliminary estimates show that each year 4.8 million people who suffer from moderate to severe pain caused by cancer do not receive the treatment.[12] Access to palliative care is considered as a basic human right as both palliative care and human rights are based on the same principles of the dignity, universality and nondiscrimination of the individuals in the society. Therefore, for a palliative care personnel it is self-evident that palliative care is a human right.[4]

Pakistan is a developing country, located in South Asiawith a population of around 170 million, where one-third of people living below the income poverty line of $1/day. The government of Pakistan spends only 2% of its budget on health (WHO, 2010). The major focus of health remains towards curative and preventive aspects of care and a very minimal attention has been given to the palliative care services. This is mainly due to multiple reasons such as limited health care resources/facilities, litigation (regarding morphine availability), poor socio economic status,lack of emphasis and training on palliative care in the medical and nursing education curriculaetc. In regard to palliative care facilities, there are only two palliative care hospice in Pakistan, each in Karachi and Rawalpindi. Both of these facilities run under private sector as charitable organizations with limited medical and nursing resources.[1] In addition, Pakistan reports one of the lowest consumption of morphine for medical use in the world, nearly 0.0013 mg/ per capita. The major reasons include opioid phobia by health professionals and limited availability of opioids especially in oral forms create problems for demand and supply.[10] A survey conducted by Abbas, Muhammad, Mubeen & Abbas (2004) reported that, there is a lack of training in palliative medicine amongst Pakistani doctors.[2] However, the

medical doctors are interested and willing to have more training in pain control, breaking bad news, communication skills and terminal care. Moreover, the survey recommended that complementary therapies such as aromatherapy, music therapy, acupuncture, relaxation therapy etc. have been helpful in managing patients' suffering and mental distress. Faith and other religious coping mechanisms are another well-established source of strength and well-being. This mechanism is also supported in the bereavement phase. In the west, the bereavement support is provided by trained counselors but in east, extended families play an important role.

This paper aims to highlight a range of patient care scenarios where student nurses utilized various non-pharmacologic measures such as therapeutic communication, use of humor, guided imagery, relaxation exercises, therapeutic touch, religious and other diversional activities in order to ease the suffering, emotional distress and provide optimal comfort and support to the patients including their caregivers. Moreover, patient education and awareness was also part of their provision of care.

As part of our nursing curricula in the Post RN BScN program in one of our clinical rotations, the faculty took the student nurses to a palliative care hospice setting in Karachi, with the philosophy of care focusing not only on pain and symptom control but also providing physical, psychological and spiritual comfort to the patients suffering from terminal stages of cancer. It was a 20 bedded palliative care setting for both adult male and female patients (>than 12years old) admitted with end stage diagnosis of cancer. As the services provided in the hospital were free of cost, majority of the patients admitted in the facility belonged to a very low socio economic status. The nurse patient ratio was 1:10. There was one psychologist who used to counsel patient on referral basis and runs the clinics in the evening for two hours once a week. Moreover, there was a social worker in the hospice who was providing her services twice a week.

On the first day of our visit, we saw the patients lying on their beds with the one attendant on each bed. There was a huge silence in the unit. No interactions were found among the patients and all of them seemed anxious and distressed due to illness related pain and symptoms. There were two assigned nurses in the whole facility who were observed busy in their routine nursing tasks such as administering medications, wound dressings, carrying out the physician's orders and documentation. Only one resident, who was mostly seen on the counter, visited the patient only when called or during consultants rounds. There was a ward aid with whom the patients were more comfortable talking to as she used to chat with the patients regarding their daily activities, household worries and concerns. There was one TV in each cubicle of five patients which most of the time seen switched off.

Therapeutic communication and provision of basic care such as hygiene care and back care to the patients were the primary nursing interventions that assisted the students to build a rapport and initiate a strong nurse patient relationship. Moreover, hygiene and other basic care provision enhanced the patients' self-esteem and trust towards the student nurses. At the beginning, the patients were reluctant to talk but gradually with the provision of care, they started verbalizing their concerns and feelings. They shared their life stories, past experiences, grief and sorrows, life struggles, burden of responsibilities, future anxieties and fear of dying. The patients verbalized that this ventilation enhanced their coping abilities and brought new meaning and positive attitude towards life. One of the patients stated that,

> "I'm brain cancer patient. You students came here, talk to us in a friendly environment which gives us courage. It filled our hearts with joys; we like it and feel satisfied."

> Similarly another patient said that, "We are thankful to this hospice and these students. We feel satisfied by sharing our sorrows and happiness with them. They give us strength and courage to fight with this dangerous disease".

McCreaddie & Wiggins (2009) affirms that humor can confer positive health benefits, helps in moderating stress, adverse events or enhances social support.[8] Use of humor was utilized as a strategy during communication by a nursing student for a young 16 years old female patient suffering from Ca Colon. The patient was very weak, lethargic and distressed. As per the social worker, the patient was not communicating at all to anyone and was depressed since she came to know about her diagnosis. She was referred to the psychologist but no positive outcomes noted. The nursing student after building initial rapport with the patient tried to use humor in her communication. The nurse and the patient exchanged several jokes during their interaction which ultimately made the patient smile and laugh. Gradually, in the next few weeks, it was noted that the patient started not only communicating with her family members but with the other patients around. Moreover, she started participating in her activities of daily living (ADLs) such as taking shower, participating in group activities and other occupational skills offered to her. Moreover, she promised the student nurse on discharge that she will continue her studies which she initially thought of giving up before this relationship, and will also give tuitions to the children in her neighborhood. This strategy not only facilitated the patient but also enriched nursing student's learning and caring philosophy.

The nursing students implemented various non-pharmacological measures such as guided imagery, relaxation exercise and therapeutic touch to minimize chronic cancer pain and provide optimal comfort to the patients. Guided imagery and relaxation techniques are recommended as an adjuvant intervention to enhance pain relief and to increase patient's perception of control over pain.[7] Guided imagery was conducted among group of patients using various scenarios to divert patients' thoughts to generate positive mental images in patients' minds to reduce pain and decrease depression. Guided imagery is a cognitive behavioral management of pain and depression which create mental images and using of as many senses as possible to interrupt pain and negative behaviors. A 50 years old male patient with advanced stage of Ca. lungs reported suffering from chronic pain since last 7 years which worsen as the disease progressed and has badly affected his physical, social and psychological health. Most of the time patient was observed to be lying on bed, anxious, unwilling to participate in ADL or communicating to the health care personnel or others around. In an attempt to relieve his anxiety and pain, guided imagery was offered by the nursing student to the patient upon his agreement and the patient's intensity of pain was reduced from a verbal pain scale of 7 to 3. After the intervention, the patient was found calm and relaxed as evidenced by patient's verbal response.

> The patient verbalized that "this is the first time that my pain is relieved by another technique other than medication and I'm feeling more relaxed and comfortable".
>
> The nursing student himself reflected on this experience as "In my whole nursing career, this is the first time, I applied this technique and received a positive response from the patient."

Other relaxation techniques such as exercises were also used among the group of cancer patients while giving teachings on stress reduction and coping mechanisms by the nursing students. Kwekkeboom, Hau, Wanta, and Bumpus (2009) supported guided imagery, they tested guided imagery on patients with cancer pain and found significant results; only 10% report no change or increase in pain. Relaxation techniques play a significant role in stress reduction. It supports cancer patients to cope with pain and reduce their anxiety.[6] Moreover, it is also effective in dealing with adverse effects of chemotherapy. Another study by Sloman (2002) also showed that these relaxation activities help patients to involve actively in their own care and provide them with some sense of independence, which may help to promote positive thinking.[11]

Besides guided imagery, therapeutic touch was also used as a pain relieving measures on some patients. Therapeutic touch is energy based therapeutic approach to healing which encompasses the use of hands to balance and harmonize the human energy system, resulting in client's self-healing.[3]

A 35 years old female patient admitted in hospice with a large wound in her left axilla extending to her left breast. In the dressing room, she was extremely anxious and crying due to severe pain. She was unable to flex her hand towards the body due to the malignant cancer wound. After calming her down, the nursing student explained her about the therapeutic touch and on her acceptance, she provided therapeutic touch to her in assistance with the nursing faculty. Within 10 minutes of the therapy, the patient went to sleep without the need of any pain killers. Upon awakening, the patients' anxiety and pain was reduced and she had her wound dressing and resumed her activities afterwards. In support, Sewell reports that this technique and said that comfort can be gained from receiving touch therapies.

Faith was seen as a significant source of coping with suffering and mental distress. It has been commonly observed that when individuals are faced with adversities, including serious and life-threatening conditions (such as cancer); they turn towards a higher power or religion as a way of coping.[5] As most of the patients in the hospice were Muslims and according to Quran 26:80 "And when I am ill it is he who cures me", some of the strategies included allowing patients to read selected verses on healing from holy book of Quran, and recitation of spiritual songs. Moreover, group discussions were allowed among the patients and caregivers to share their spiritual thoughts and ideas. Certain role plays were also displayed among patients and their care givers in order to promote positive attitude and hope towards illness and emotional distress. Likewise, on the occasion of Eid day and New Year, the patients and their caregivers made greeting cards for their loved ones which assisted them in conveying their unsaid feelings and wishes to their families. This ultimately enhanced the patients' socialization and boosts their self -esteem and assisted them in their grieving process. McFarland (2009) adds that religiosity increases level of optimism and self-esteem and decreases the depressive symptoms.9 In response to these religious activities, one of the patients commented that; "These are some unforgettable moments of my life; today first time in my life I felt such happiness. I want that these kinds of activities should be held regularly so that the patients who are hopeless and near to die can get some moments of pleasure and enjoyment"

Another patient added that:

> "I liked all these activities, humans should not be afraid of any kind of disease. The illness is from God and God will cure. Whatever you taught, I liked it."

To conclude, all these activities and non-pharmacologicmeasuressupported in relieving the patients'pain andease their suffering. Moreover, these measures enhanced the patients' emotional stability, aided in their grieving process as evidenced by strong nurse patient relationship, patients positive responses, patients' increased participation in activities of daily living, socialization among other patients and

their families. The patients and their families verbalized that they want to enjoy their lives but it is the pain and anguish due to disease, imposing restrictions in several aspects and a source of distress amongst them. They added that these activities enhanced their perceptions of looking at things differently and had given a new hope, direction and meaning to their lives. Through this immense experience, the faculty and students strongly felt that the palliative care services need to be strengthened and care should not be limited to just pain control and symptom relief but an integrated, culturally sensitive holistic approach to care should be emphasized for the patients as well as their families among the health care professionals. Supportive and non pharmacological measures should be made an essential part of care and need to be prioritized over the routine aspect of care especially in a palliative care setting.

REFERENCES

1. Abbas, S. Q., & Abbas, S. Z. (2002). Palliative medicine: an emerging discipline. *Journal of Pakistan Medical Association*, 68(3),
2. Abbas, S.Q., Muhammad, S.R., Mubeen, S.M., & Abbas, S.Z. (2004). Awareness of palliative medicine among Pakistani Doctors: a Survey. *Journal of Pakistan Medical Association, 54*(4), 195-199.
3. Aken, R. VA., & Taylor, B. (2010).Emerging from depression: The experimental process of healing touch explored through grounded theory and case study. *Complementary therapies in clinical practice*, 16, 132-137.
4. Gwyther, L., Brennan, F., & Harding, R (2009). Advancing Palliative Care as a Human Right. *Journal of Pain and Symptom Management.Vol 38* (5).
5. Karekla, M., and Constantinou, M. (2010). Religious coping and cancer: Proposing an acceptance and commitment therapy approach. *Journal of Cognitive and Behavioral Practice, 17*, 371-381
6. Kwekkeboom, K. L., Hau, H., Wanta, B., & Bumpus, M. (2009). Patient's perceptions of the effectiveness of guided imagery and progressive muscle relaxation interventions used for cancer pain. *Complementary Therapies in Clinical Practice*, 14, 185-194.
7. Kwekkeboom, K. L., Kneip, J., & Pearson, L. (2003). A pilot study to predict success with guided imagery for cancer pain. *Pain Management Nursing*, 4, 112-123.
8. Mccreaddie, M., & Wiggins, S. (2009). Reconciling the good patient persona with problematic and non-problematic humour: A grounded theory. *International Journal of Nursing Studies*, 46, 1079-1091.
9. McFarland, M. J. (2009). Religion and mental health among older adults: Do the effects of religious involvement vary by gender. *Journal of Gerontology: Social Science, 65B*(5), 621-630.
10. Meghani, S.H.and Aziz, Z. (2008).The need for an effective palliative care strategy in Pakistan. *Journal of Public Health Policy*, 29, 480-484.
11. Sloman, R. (2002). Relaxation and Imagery for Anxiety and Depression Control in Community Patients With Advanced Cancer. *Cancer Nursing. Vol. 25* (6).
12. World Health organization. New guide on palliative care services for people living with advanced cancer. Geneva WHO (2007). Retrieved from http://www.who.int/mediacentre/news/notes /2007 /np31/en/index.html

INTERPROFESSIONAL COLLABORATION AND ITS ROLE IN FACILITATING DISCHARGE PLANNING ON A NEONATAL INTENSIVE CARE UNIT

Myuri Manogaran, *BSc (Hon), MHSc (Candidate)*[1] and **Brenda Gamble,** *MSc, PhD*[2]
[1]Graduate Student, Faculty of Health Science, University of Ontario Institute of Technology, Oshawa ON, Canada
[2]Assistant Professor, Faculty of Health Science, University of Ontario Institute of Technology, Oshawa ON, Canada
Email : Myuri.Manogaran@uoit.ca

ABSTRACT

Interprofessional collaboration (IPC) "occurs when multiple health workers provide comprehensive services by working together….to deliver the highest quality of care across settings" (WHO, 2010). Successful discharge planning for patients from hospitals is dependent upon the collaboration of a multi-discipline team. Hansen et al. (1998) found that poor discharge planning has been associated with increased hospital readmissions and poor health outcomes. Purpose: To identify and examine the factors associated with interprofessional collaboration that facilitate and/or hinder effective discharge planning.

Methods: Data collection is ongoing and includes participant observation, an online questionnaire, and interviews. The sample includes healthcare workers on a neonatal intensive care unit (NICU) at a large Canadian University teaching hospital. The questionnaire includes items on demographic and employment characteristics and views on the discharge planning process, leadership and IPC. Participant observations will take place during the weekly IPC rounds which occur on the NICU to observe the interaction of the healthcare workers when discussing discharge plans. Based on these observations, health care workers will be selected to interview to gain further insight. Data collection and analysis will be completed February 2011. Discussion: Review of the literature indicates that few studies have been conducted to examine the impact of IPC for discharge planning. However, it is believed that a model of discharge planning that incorporates IPC is more successful than a model that relies on the independent input of each healthcare worker.

INTRODUCTION

"Interprofessional collaboration (IPC) is defined as two or more frontline providers working and learning from, with, and about each other as a team to provide the best possible outcome for their patient". [1] Effective team work involves sharing a common purpose, team members understanding their own and others' functions, pooling knowledge, skills, resources and responsibility for the outcome of their decisions and lastly the team's ability to carry out its work and manage itself as an independent group of people.[8]

It is important for all healthcare workers involved in a patient's care to efficiently work together in order to facilitate a successful discharge.[4] Successful IPC requires healthcare providers to use both their technical skills (e.g. clinical expertise) and non-technical skills (e.g. communication). Poor communication during discharge planning can potentially negatively impact the post-discharge outcome for patients and families (e.g. re-admissions, increased costs for the healthcare system).[4]

The purpose of the overall study is to examine IPC in the discharge planning process on a neonatal intensive care unit (NICU). This paper will focus on the results that identify the lack of communication during an emergency discharge. We recommend that steps need to be taken to enhance the communication process during an emergency discharge. Specifically, the implementation of a unified electronic chart and the introduction of IPC model for emergency discharges.

METHODOLOGY

This study took place in the NICU of a large teaching hospital in Canada. This unit is a tertiary/ quaternary care NICU with a 31 – 36 bed capacity. There are approximately 800 admissions per year of patients from across Canada and from other countries.

Data was collected using three different data-collection techniques; direct observation, an online survey, and key informant interviews carried out simultaneously from December 2010 to February 2011.

The questionnaire used in this study was adapted from the collaboration questionnaire used by Zwarenstein, et al. (2007).[10] The questionnaire included items on demographic characteristics and asked healthcare workers about their views on the discharge planning process, leadership, team work, and hierarchy amongst the healthcare workers. LimeSurvey™ software was used to construct the questionnaire online. The questionnaire was electronically distributed to all healthcare workers (physicians, fellows, registered nurses, clinical support nurses, CNS-NPs, clinical managers, the discharge coordinator, respiratory therapists, pharmacists, social workers, dieticians, chaplains, occupational therapists), on the NICU. An invitation to take part in the survey was sent by email by the NICU. This email invitation included the link to the questionnaire. Consent to participate in the study was indicated by clicking a checkbox which was presented before the start of the questionnaire. Completed questionnaire were only accessible to the primary investigator and not to the staff on the NICU. The respondents were grouped into three categories: Medical Staff, Nursing Staff, and Allied Health Staff (all professionals excluding nursing and medical staff) for analysis.

The direct observations took place at the IPC rounds, which are held every week on the NICU. The purpose of these observations was to observe the interaction between the healthcare workers. Observations were collected on a standardized chart created by the researcher and validated by the scientific review team. Individuals who participated on a regular basis in the multidisciplinary meetings were identified for inclusion in the semi-structured interviews. In addition to the observations at the IPC meetings, the investigator observed the role of the discharge coordinator on the unit. This allowed the investigator to learn about the workings of the unit and how discharges are planned.

Ten (10) face-to-face semi-structured interviews were conducted. The purpose of conducting the interviews was to gain a deeper understanding of the roles and/or the content of the discussions observed during the IPC rounds.[9] Data obtained during the interviews were recorded using digital audiotape. Transcription was done by the primary investigator and was validated by a research team member. Data analysis was carried out using NVivo9™. The data were organized into the following three categories: facilitators, barriers, or both (themes which can act as either facilitators and/or barriers). Scientific review of the study was conducted by researchers at the teaching hospital. Ethics approval was obtained at the hospital and at the University of Ontario Institute of Technology.

RESULTS

The survey results provided a general understanding of the views of healthcare workers on the NICU about IPC and the discharge planning process on the unit. The interview data provided further clarification and a more in depth account.

Survey Findings

The response rate for the survey was 33% (n=66). According to Dillman (2007), a response rate greater than 23% is acceptable for online surveys. Thirteen respondents (19.6%) were grouped into the medical staff group, forty-two (63.6%) respondents were grouped into the nursing staff group (which included registered nurses, clinical support nurses, and nurse managers), and eight (12.1%) respondents were grouped into the allied health staff group.

Fifty-eight (87.9%) of the survey respondents were female and seven (10.6%) were male. The majority of the respondents provide direct patient/client care (93.9%). The number of years in the profession ranged from more than one year to 10+ years. Twenty-three (34.9%) of the respondents had more than one year to five years of experience and another twenty-three (34.9%) had more than ten years of experience. 81.8% of the sample held full-time positions. Twenty-two (33.3%) of the respondents had previous interprofessional collaboration training. The majority of respondents were registered nurses (n=40).

Survey results indicate that the majority of healthcare workers on the NICU support IPC. There was consensus across the three groups about the staff members' understanding of each others' roles and responsibilities and about the discharge planning in general. However, there was disagreement amongst the three groups on questions about communication during discharge planning. Allied health staff believed that they were not included in discussions about discharge planning and that there was a breakdown in communication.

Table 1 summarizes the questions that asked about their views on communication and conflict. From the data presented in Table 1, it can be seen that the allied health staff had concerns about the communication process. 38% of allied health staff respondents felt that the discharge plan was not adequately discussed with them by the nursing/medical staff. 50% of allied health staff respondents felt the medical staff failed to pass on important information regarding a patient's discharge to them. 38% of allied health staff respondents felt disagreements regarding a discharge often remained unresolved between them and the nursing and medical staff.

Table 1 Views on Communication and Conflict

I feel patient discharge plans are not adequately discussed between us and the ____ team.

	About MS	About NS	About AHS
Views of MS		Disagree (38%), Neither (38%)	Disagree (46%)
Views of NS	Agree (36%)		Disagree (45%)
Views of AHS	Agree (38%), Neither (38%)	Agree (38%), Disagree (38%)	

Important information regarding a patient's discharge is always passed on between us and the ____ team.

	About MS	About NS	About AHS
Views of MS		Disagree (46%)	Agree (38%)
Views of NS	Agree (36%)		Agree (48%)
Views of AHS	Disagree (50%)	Agree (38%),	

____ are usually willing to take into account our convenience when planning a patient's discharge.

	About MS	About NS	About AHS
Views of MS		Disagree (46%)	Neither (38%)
Views of NS	Disagree (43%)		Agree (74%)
Views of AHS	Disagree (50%)	Agree (88%)	

____ anticipate when we will need their help when planning a discharge.

	About MS	About NS	About AHS
Views of MS		Agree (38%), Disagree (38%)	Agree (62%)
Views of NS	Disagree (55%)		Neither (40%)
Views of AHS	Neither (38%)	Agree (63%)	

Disagreements regarding a discharge with ____ often remain unresolved.

	About MS	About NS	About AHS
Views of MS		Disagree (62%)	Disagree (62%)
Views of NS	Disagree (38%), Agree (36%)		Disagree (57%)
Views of AHS	Agree (38%)	Agree (38%), Disagree (38%)	

Note: The table is to be read horizontally to obtain the views of each of the healthcare workers (medical staff (MS), nursing staff (NS), and allied health staff (AHS)) who were surveyed about their colleagues (vertically presented). Ares where there were disagreement with the statement presented are highlighted.

Interview Data

The interview data demonstrated that the healthcare workers generally had a good idea of each others' roles on the unit. For example:

> "When things work very well, we're able to identify it early sometimes in our weekly meetings where they'll start talking about plans…"
>
> "So I think we pretty much know what each of us have to offer, what we can do. We know who our resources are. We know who to go to and we know who does what and who does it best."

The ten key informants interviewed indicated that effective communication, role clarity and mutual respect were needed for the full participation of all members of the interprofessional team. This was most prevalent when the need arose to quickly discharge a patient.

The interviews with the allied health staff revealed that they felt left out of the discussions on discharge planning during an emergency discharge. The key informants indicated that the current discharge process set in place worked well under normal situations.

One key informant shared their frustration with being left out of communication on a patient's discharge:

> "But I think sometimes when things have to happen quickly… sometimes, you know… for me sometimes I won't know if a discharge plan has come up after rounds…"

Another key informant stressed the importance of making sure everyone on the discharge team was aware of the plans:

> "So there's a little bit of… ummm… you know, it's easy to say 'you can go', but to make everything happen it is more difficult. So they need to make sure that everybody has the plan and everybody's up-to-date and knows on the medical team, because it does change daily."

A key informant shares her frustration with her role not being respected by other staff:

> "I think it has a lot to do with respect… interprofessional respect. Not only knowing what the other person does, but respecting them as a professional that's on… If not at completely an equal level, but at a, uhh, necessary or valuable level within the team."

As noted, problems arose during an emergency discharge. One of the key informants very clearly explained what they are faced with during these emergency situations:

> So, and they say yesterday you had to do A to Z with this one child before discharge. You then now remove 10 things from that list because you do not have the time to do it to discharge because you have an admission. Therefore you put the child at risk and they willingly do it because they need the bed. So what was good one day or what were the requirements for one day all of a sudden is not a requirement, not a priority because you have a child in the periphery who's dying without care or is very sick without care or will succumb without care. So you have to pick and choose who you can focus you're energies on.

DISCUSSION

The literature identifies that an understanding of interprofessional collaboration, clear communication amongst healthcare workers, and an understanding of each other's role is essential for successful teamwork.[4,6] The views of respondents highlight the same areas as important for IPC.

From the survey, the results indicate that the healthcare workers on the NICU understand each other's roles and acknowledge that they are willing to discuss discharge plans with each other. However, the allied health staff group stated that they felt they were not considered when planning a discharge. They also felt that information regarding a discharge was not adequately shared with them.

Healthcare workers interviewed believed that the NICU's current system for discharge planning worked well during a routine discharge. However, the allied health staff group identified a time when the current system does not work. This is during an emergency situation.

An emergency situation arises when there is an immediate need to admit a new patient to the unit. This means that another child on the unit must be discharged to make a bed available for the new admission. It is important to note that once an infant leaves the NICU, no mechanism has been put into place to follow up on the prognosis of the infant.

In an emergency discharge, the discharge coordinator and the medical team are responsible for deciding which infant will be discharged. Often there is not enough time prior to discharge to contact allied health staff who are involved in the treatment of the infant. As a result, important information that may prevent an infant from being discharged may not be available. This is when the discharge planning system already in place on the unit does not work well.

The medical team is responsible for the decision to discharge. However, there is a two-week turnover on the unit (meaning the neonatologist switches every two weeks on the unit). Thus, when there is an immediate need for discharge, it may be that the neonatologist has not been involved in the care of the infant. The medical staff relies on the discharge coordinator to provide the most updated information needed to make the decision to discharge. The role of the discharge coordinator is to obtain this information from the different healthcare workers involved in an infant's care and facilitate the discharge communication. Patient files are continually updated. However, due to varying work schedules the most up-to-date information may not be available.

CONCLUSION

The structure and the organization of the neonatal unit provided several different opportunities for the communication of patient information (e.g., electronic records, rounds, daily meetings of the interprofessional team (IPT) and a discharge planner position). However when faced with an emergency situation there was an increased reliance on the traditional model of care requiring that the decisions made with regards to discharging was the sole responsibility of the physician. This is not a surprising finding as physicians are ultimately responsible from a medical-legal perspective.[5] However,

one of the unintended consequences was that other IPT members who had been involved in the care of the patient were uncertain as to whether their contributions were taken into consideration.

Clearly, while the mechanisms exist to communicate effectively on the unit, the organization and structure of the current communication processes does not allow for the integration of information in a meaningful way.

To address this problem we recommend the implementation of a unified electronic chart and the creation of a new discharge model for emergency situations.

A unified electronic chart would make accessible to all healthcare workers the most up to date information for each patient.[3,7] It also allows all healthcare workers involved in a patient's care to have access to information even when colleagues are absent during an emergency discharge.

Another recommendation is to either update the current discharge planning model (e.g. creating a checklist which identifies all the healthcare workers involved in the child's care to be included in the patient's chart) or to create a separate IPC model for emergency discharges.

This would help to empower the entire allied health staff involved to be active in the discharge planning of the infant under their care and would help to alleviate issues around ineffective communication.

ACKNOWLEDGMENTS

Funding and support for this research project was provided by the MD Sutton Fund. We would like to thank our co-investigators: Dr. Sue Coffey and Ms Lori Ives-Baine, for invaluable advice; any errors cannot be attributed to them. We would particularly like to thank our research partner, SickKids, who assisted us in identifying the sampling frame, encouraging responses, and dissemination of the results.

REFERENCES

1. CAIPE. (2002). *Defining IPE*. Retrieved April 15, 2010, from Centre for the Advancement of Interprofessional Education: http://www.caipe.org.uk/about-us/defining-ipe/
2. Dillmann, D.A. (2007). *Mail and Internet Questionnaires: The Tailored Design Method*. New Jersey: John Wiley & Sons, Inc.
3. Friedman, C., Sturm, L.K., & Chenoweth, C. (2002). Electronic chart review as an aid to postdischarge surgical site surveillance: Increased case finding. *American Journal of Infection Control*, 29(5), 329-332.
4. Hansen, H. E., Bull, M. J., & Gross, C. R. (1998). Interdisciplinary collaboration and discharge planning communication for elders. *Journal of Nursing Administration, 2*8(9), 37-46.
5. Lahey, W. and Currie, R. (2005). Regulatory and medico-legal barriers to interprofessional practice. *Journal of Interprofessional Care*, 19(Suppl. 1), 197-223.
6. McKenna, H., Keeney, S., Glenn, A., & Gordon, P. (2000). Discharge planning: An exploratory study. *Journal of Clinical Nursing*, 9(4), 594-601.
7. Miller, R.H., West, C., Brown, T.M., Sim, I., & Ganchoff, C. (2005). The value of electronic health records in solo or small group practices. *Health Affairs*, 25(5), 1127-1137.
8. Pethybridge, J. (2004). How team working influences discharge planning from hospital: A study of four multi-disciplinary teams in an acute hospital in England. *Journal of Interprofessional Care, 18*(1), 29-41.
9. Yin, R.K. (2002). *Case Study Research: Design and Methods*. California: Sage Publications, Inc.
10. Zwarenstein, M., Reeves, S., Russel, A., et al (2007). Structuring communication relationships for interprofessional teamwork (SCRIPT): a cluster randomized controlled trial. *Journal of Interprofessional Care, 21*(1), 111-114.

PHYSIOLOGICAL, EMOTIONAL AND PSYCHOLOGICAL CHANGES AND SUPPORTIVE NEEDS AMONG ELDERLY RESIDENT OF NURSING HOME IN KARACHI, PAKISTAN

Shabana D. Lakhani
Post RN BSc.N student
Aga Khan University School of Nursing Karachi, Pakistan.
Email :hotice04@hotmail.com

ABSTRACT

In recent years, the focus of elderly care has been shifted towards nursing home. It has been observed that these individuals face numerous physiological, emotional and psychological changes as part of their aging process. Amongst them, certain issues are not given prime importance unless become troublesome for individuals. During my mental health nursing clinical rotation, I got the opportunity to work with those citizens to cater their basic needs and promote mental health. In context to the setting, it was a 30 bedded place for both males and females with separate floors for both. While a hall with terrace serves the purpose of gathering and dinning. Most of the residents were with mild physiological illnesses. The residents were from lower to middle socio-economic status. Their functional class differs ranging from completely dependent to those requiring mild assistance. These residents found this place as last resort to spend rest of their lives. The paper will highlight common concerns faced by this group. While working with them, the issues which I came across were mostly pertinent to hearing and visual impairments, skin problems, self care deficit, nutritional deficiencies, contractures, pressure sores and dementia. In addition to that, they had feeling of powerlessness, low self esteem, hopelessness, loneliness and many of them verbalized feeling of loss. At this point, it is crucial to make them realize that they are an essential member of society. To achieve this goal, several activities were carried out. These include participation in completing daily errands by assigning different tasks to them like helping in cooking, watering plants, feeding birds etc. At the end we found that these activities kept them busy and boosted their self esteem. Thus, it was concluded that these people mainly require support, motivation and encouragement to live their lives with the best of their abilities.

Key words: Elderly residents, nursing home, physiological problems, emotional problems, psychological problems.

INTRODUCTION

Merriam Webster dictionary has defined nursing home as, "a privately operated establishment where maintenance and personal or nursing care are provided for persons (as the aged or the chronically ill) who are unable to care for themselves properly." Regarding old age, although United Nations has not clearly defined the age limit for its classification but they regarded 60 plus years to refer to the older population". According to World Health Organization (2009),[11] the life expectancy of an average person has increased to 65.4 years. In 2009, the life expectancy of an average person has increased to 78.2 years. This can lead to increase in number of elderly population. World Health Organization (2010) stated that, "In Pakistan, the elderly population would increase to 26.84 million (11 percent of the total population) in 2025."[12] Thus, this has resulted in a shift in increase demand of care for aging population. However, unfortunately today a number of such individuals are admitted

to old age homes by giving the reasons of poverty, busy schedule and inability to take care of aging parents. According to the government's Social Welfare Department, six welfare organizations are providing shelter to more than 150 elderly people in Karachi.[7] As part of aging, there are several changes which a person undergoes, and such changes need to be dealt with care.

During my clinical at one of the nursing home in Karachi, Pakistan, I got the opportunity to work with residents of one of the private nursing home. In context to the setting, it was a 30 bedded place for both males and females with separate floors for both. While a hall with terrace serves the purpose of gathering and dinning. After working there, I had identified issues pertinent to their physiological, emotional and psychological health.

PHYSIOLOGICAL CHANGES

Under the broad category of physiological symptoms, hearing and visual impairment are regarded as the most common symptoms observed among elderly residents of nursing home. Furthermore other complaints include, dry skin, tremors, generalized weakness, poor dentition, decrease oral intake, dehydration, malnutrition, decrease physical activity, constipation, weight loss, fatigue and self care deficit. As stated by The American Psychological Association, "Common age-related physical changes include hearing impairment, weakening vision, and the increasing probability of arthritis, hypertension, heart disease, diabetes, and osteoporosis." All these symptoms can be due to increased age. "The pathology of fatigue has not yet been illuminated in elderly persons. Natural changes and the disadvantages of aging might contribute to fatigue."[9]

Apart from this, fall is more common among elderly citizens. As stated by Tremblay and Barber (2005), "Annually, falls are reported by one-third of all people 65 and older."[10] With regard to this setting, the residents were also on high risk for fall while, some of them had actual incidents of fall due to visual and sensory impairments. Tremblay and Barber (2005) regard loss of independent functioning as the profound effect of fall. As per him, about 50 percent of the elderly who sustain a fall-related injury will be discharged to a nursing home rather than return home. Age-related physiologic factors that can lead to falls include decreased muscle mass, decrease sensorium, visuoperceptual decline and impaired mobility. Tremblay and Barber (2005) stated that, age-related vision diseases and a decrease in bone density can contribute to falls.[10]

All these physiological conditions are co-related with each other and if symptoms are not treated at initial stage, they can result into other consequences. Likewise, poor dentition can be the reason for decrease oral intake that can lead to malnutrition, dehydration, constipation, dry skin and generalized weakness due to which patient can end up with fall or other diseases, due to which physical activity can be restricted. Furthermore, increase age also aggravate risk for acquiring infections due to decrease immunity.

EMOTIONAL CHANGES

Advance age is linked with maturity and well being. A framework on developmental psychology developed by Erik Erikson (1902–1994) had several stages based on psychosocial stages. As stated in the framework, the last stage is integrity versus despair. According to this stage, at the final phase of life individuals either accept their lives as having meaning and integrity, or they consider it as unproductive and have feeling of despair. With regard to nursing home setting, most of the residents fall in between these two ends. Some of the emotional manifestations commonly noted among this age group include wandering, verbal out bursts, anger, irritability, constant repetition of same words and crying spells. I observed some of the residents pacing near their beds. The elderly residents were reluctant to move out of bed for activities such as hygiene care and dinning and when they were

forced they become angry. But, with assistance, encouragement and motivation they were able to participate in activity of daily living. It was also noted that, individuals with positive thought were the source of motivation and inspiration for others as well as for themselves. For example, there was one resident who had a number of physical complaints but he was active and used to motivate others to gather during meal timings and for activities. Simon and Andreas (2008) believed that, "motivational reserve acts as a protective factor against the manifestation of cognitive impairment and emotional problems in later life."[8]

PSYCHOLOGICAL CHANGES

In nursing home, most of the residents were less interactive, socially isolated, had feeling of helplessness and seemed to be depressed. Thus, after communicating with them causes were identified which showed that, these manifestations were either due to major changes in life or are the result of aging process. While communicating, many patients verbalized feeling of loss due to death of spouse and living away from children and family as the major reasons for social isolation. "Older persons grow increasingly isolated because of retirement, mobility limitations, and the death of friends and loved ones, all of which prevent the individual from forming and sustaining relationships."[6] Besides this, some of them also appeared to be depressed. Alexopoulos and Morimoto (2011) contend that, the course of aging may serve as etiological factors by directly promoting metabolic changes mediating the depressive syndrome. As per him, chronic stress can also be a predisposing factor for depression.[1] Similar condition was found to be present in this group of aging population.

Besides this, sleep disturbance was the common concern shared by most of the nursing home residents. In addition to that, in some of the cases, confusion, dementia, and other cognitive deficits were also present.

There exists a relationship between physiological, emotional and psychological changes. Likewise, with aging the function of immune system is disrupted. This disruption results in continuous production of pro-inflammatory cytokines that can contribute to the development of depressive symptoms with age.[1] Besides this, a psychological stressor can have its impact on physical health by reducing appetite as well as can affect a person's emotional health in terms of sadness.

INTERVENTIONS TO MEET SUPPORTIVE NEEDS OF ELDERLY NURSING HOME RESIDENTS

Due to physiological, emotional and psychological changes, aging population require protection and comfort. Nursing home provides them the platform to meet their supportive needs and ensure provision of comfort care. The ultimate goal is to improve their quality of life.

It is a common perception that energy decreases with age and therefore elderly people cannot take part in activities. While Christensen (2009) contends that, "Older adults – under the age of 85 – tend to remain more capable and mobile than before." [4] The former perception is responsible to create hindrances in lives of older citizens. As our own biases and perceptions have great impact on lives of those whom we take care of. Similarly, in nursing home staff taking care of elderly residents had several myths related to aging population and therefore routine of these residents were restricted to bed time, meal time and personal activities to fulfill their own spiritual needs.

During my practicum, the residents were initially encouraged to sit together in a group after breakfast to share their life stories and concerns. At the beginning only few people talked and others remain quiet but along with time, it became more interactive. The participants felt good which was evident from active participation and smiles on their faces. Moreover, this had also ingrained in them a

concept of caring and support for each other. It was observed that they were holding each other's hands when they move assistance in mobilization.

In order to deal with the feeling of loneliness, it was planned that every day different tasks would be assigned to all residents based on their capacity. These included watering plants, feeding birds and helping in food preparation.

Besides this, it was also identified that there were some people whose interest was to read books and newspaper but they were doing it at their own time. By making use of their capability and keeping in view their interest they were encouraged to form a small group with whom they will read newspaper or book and talk about it. This strategy was implemented to promote socialization among them. As a result of this strategy, the interest of reading books and newspaper also developed in those who previously did not used to do it.

Previously, when these residents were living in isolation most of them were not taking their meals completely. But when social interaction was promoted among them, they took meals on time with their colleagues. Most of the people during fruit time previously send their fruits back because they want to have it but with increase in interaction among them they were having their all meals on time.

However, after assessment and involving them in small group discussions and activities, it was identified that the participation provide them a sense of worthiness and with the passage of time they started interacting with others and enjoyed the time being with other residents and staff. Gradually, a routine was set by residents themselves that included separate time for personal hygiene, socialization, meal time, prayer and rest. In this way, they were able to meet all the aspects of an individual's life that is physical, social, psychological and spiritual.

Although physiological, emotional and psychological discomforts are part of aging but supportive care is required to minimize sufferings. By catering these needs of elderly residents their quality of life can be upgraded.

REFERENCES

1. Alexopoulos, G.S., & Morimoto, S.S. (2011). The inflammation hypothesis in geriatric depression. International Journal of Geriatric Psychiatry, 26 (7). DOI: 10.1002/gps.2672
2. American Psychological Association. (n.d.). Older Adults' Health and Age-Related Changes: Reality versus Myth. Retrieved on June 7, 2011. http://www.apa.org/pi/aging/resources/guides/older-adults.pdf
3. Cherry, K. (n.d.). Erikson's Theory of Psychosocial Development. Retrieved on June 11, 2011. http://psychology.about.com/od/psychosocialtheories/a/psychosocial.htm
4. Christensen. (2009). Late adulthood developmental psychology. Retrieved on June 11, 2011. http://www.allpsychologycareers.com/topics/late-adulthood-development.html
5. Merriam Webster. Definition of Nursing home. Retrieved from http://mw1.merriam-webster.com/medical/nursing%20home June 13, 2011
6. Schnittker, J. Psychology of Social Support Look (Closely) at All the Lonely People: Age and the Social Psychology of Social Support. *Journal of Aging and Health, 19(4)*. 659-682. DOI: 10.1177/0898264307301178
7. Shah, F. (2010, July 14). The curse of old age. *The Express Tribune*. Retrieved on June 6, 2011. http://tribune.com.pk/story/27667/the-curse-of-old-age
8. Simon, F., & Andreas, M. (2008). Motivational reserve: Lifetime motivational abilities contribute to cognitive and emotional health in old age. *Psychology and Aging, 23 (4)*. 886-899.

9. Soyuer, F., & Senol, V. (2011). Fatigue and physical activity levels of 65 and over older people living in rest home. *International Journal of Gerontology, 5*. doi:10.1016/j.ijge.2011.01.003
10. Tremblay, K.R. and Barber, C.E. (2005). Preventing falls in the elderly. Retrieved on June 7, 2011. http://www.ext.colostate.edu/pubs/consumer/10242.html
11. World Health Organization. (2009). Proposed Working Definition of an Older Person in Africa for the MDS Project. Retrieved on June 1, 2011 http://www.who.int/healthinfo/survey/ageingdefnolder/en/index.html
12. World Health Organization.(2010). Demographic indicators. Retrieved on June 5, 2011 http://www.emro.who.int/emrinfo/index.aspx?Ctry=pak

COMPARISON OF MICROSCOPY AND PCR ASSAY FOR THE DIAGNOSIS OF MALARIA IN INDIAN SYMPTOMATIC ISOLATES

Vineeta Singh*, Purva Gupta
National Institute of Malaria Research, Sector-8 Dwarka, New Delhi-110077 India.
*Email: vineetas_2000@yahoo.com

ABSTRACT

Malaria is a major infectious disease of worldwide significance with more than 500 million people suffering from the disease and at least one million deaths. *Plasmodium falciparum* and *P. vivax* are responsible for most of the global burden of the disease. Accurate diagnosis of malaria is vital for its treatment and control. Eighty six symptomatic blood samples were collected from northern, central and southern India and screened by Rapid Diagnostic Tests (RDT) and microscopy. Further diagnosis of pure and mixed infections was done by PCR assay for confirmation. By PCR assay about 17% samples were mixed infections of *P. falciparum* and *P. vivax* whereas only two samples were positive for mixed infection by microscopy signifying the high sensitivity of PCR against microscopy.

INTRODUCTION

Malaria is caused by four Plasmodium species in humans (*P. falciparum, P. vivax, P. malariae* and *P. ovale*) of which *P. falciparum* and *P. vivax* occur almost equally in India.[8] This increases the possibility of infections to host for more than one species at the same time. Microscopy is the traditional diagnostic technique used for the detection and identification of Plasmodium species. RDT is another useful diagnostic test which incorporates immunochromatographic procedures based on the capture of parasite antigen from peripheral blood.[7] However its sensitivity remains a problem because unless optimum parasite load is present, parasite antigen would not be picked up and cannot be detected. Sometimes early onset of the infection is also not picked up by RDT if the antibodies are not formed at the time in response to the antigen. Keeping these factors in mind PCR amplification diagnostic technique was used based on the detection of species specific DNA sequence which is considered to be more sensitive than microscopy.[9]

Eighty six symptomatic samples from three different regions of India were analyzed by microscopy, RDT and PCR assay to determine the specificity and efficiency of the diagnosis that is needed for effective treatment to develop proper malaria control measures.

METHODS

Study area: The ethical committee of the Institute gave the approval for the present study. Detailed patient history and informed consent was received from all patients before the collection of samples. A total of 86 samples were collected during 2008–2011 from three different regions in India by the finger prick method. Fifteen samples were collected from northern India (Delhi), 23 samples from central India (Raipur and Jabalpur) and 48 samples from southern India (Mangalore) (Figure 1).

Figure 1: Map of India showing the regions of sample collection, number of samples from each region as identified by microscopy and the climate of each region.

Preliminary diagnosis: RDT (Bioline SD Rapid Test) was carried out on symptomatic patients for initial detection of malaria. Thick and thin peripheral blood smears were stained and used for microscopic diagnosis. Bloodspots were made on Whatman (Number 3) filter paper strips for all the samples that were positive and stored at 4ºC for further processing.

Genomic DNA extraction: Genomic DNA was extracted from the filter paper blood spots of *Plasmodium* samples by QIAamp DNA Blood Mini Kit (Qiagen Inc) according to the manufacturer's instructions.

Detection of mixed infections: PCR assay was carried out in two steps where the first step used a pair of genus specific primers rPLU5 and rPLU6 for amplifying 18s rRNA gene (Table 1). The second step used three sets of primers rFAL1, rFAL2; rVIV1, rVIV2 and rMAL1, rMAL2 each specific to *P. falciparum, P. vivax* and *P. malariae* respectively. *P. falciparum* specific primers amplify a 205 bp region of 18s rRNA gene, *P. vivax* primers amplify a 120 bp region and *P. malariae* specific primers amplify a 144 bp region. Primary PCR cycle included an initial denaturation of 95°C for 5 mins followed by 30 cycles of 94°C for 1 min, 60°C for 2 mins, 72°C for 2 mins and a final extension of 72°C for 5 mins. Nested PCR amplification cycle included an initial denaturation of 95°C for 5 mins followed by 30 cycles of 94°C for 1 min, 55°C for 2 mins, 72°C for 2 mins and a final extension of 72°C for 5 mins.

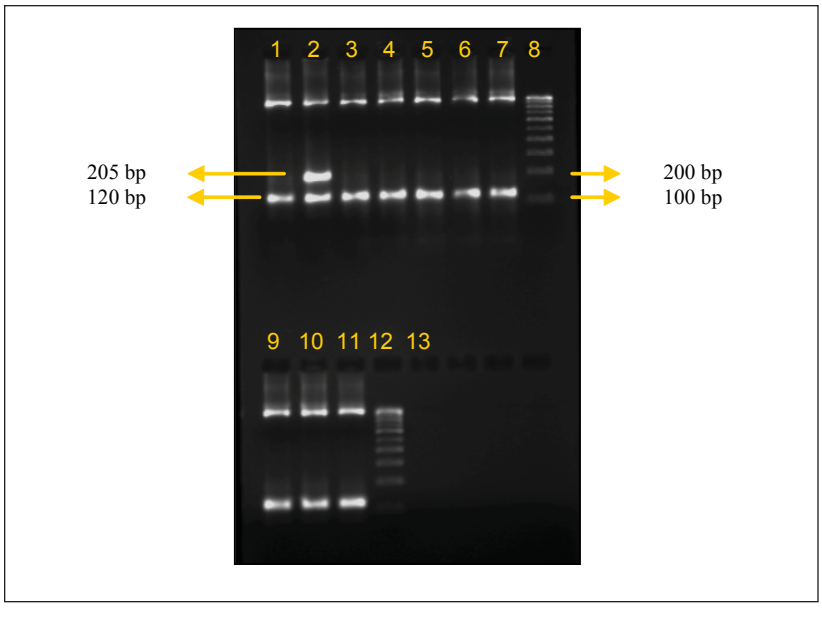
Table 1: List of primers used in the present study.

Primary PCR for 18SrRNA (detection of *Plasmodium*) [4]	
rPLU5	5' CCTGTTGTTGCCTTAAACTTC 3'
rPLU6	5' TTAAAATTGTTGCAGTTAAAACG 3'
Nested PCR for *P. falciparum*	
rFAL1	5' TTAAACTGGTTTGGGAAAACCAAATATATT 3'
rFAL2	5' ACACAATGAACTCAATCATGACTACCCGTC 3'
Nested PCR for *P. vivax*	
rVIV1	5' CGCTTCTAGCTTAATCCACATAACTGATAC 3'
rVIV2	5' ACTTCCAAGCCGAAGCAAAGAAAGTCCTTA 3'
Nested PCR for *P. malariae*	
rMAL1	5' ATAACATAGTTGTACGTTAAGAATAACCGC 3'
rMAL2	5' AAAATTCCCATGCATAAAAAATTATACAAA 3'

RESULTS

Out of the 86 samples tested for infection by microscopy, 12 from central India were *P. falciparum* positive, two samples from central India were *P. falciparum* and *P. vivax* mixed infections. The remaining nine samples from central India, 15 samples from northern India and 48 samples from southern India were positive for *P. vivax*. The diagnosis with RDT yielded same results as in microscopy. However PCR assay showed different results. Fifteen samples from southern India were mixed infections for *P. falciparum* and *P. vivax* showing bands at both 205 and 120 bp (Figure 2) and 14 samples from central India were pure *P. falciparum* infection. The remaining nine samples from central India, 15 samples from northern India and 33 samples from southern India were pure *P. vivax* infections.

Figure 2: Gel picture showing mixed infection of *P. falciparum* and *P. vivax*. Lane 2 showing mixed infection of *P. falciparum* and *P. vivax* and lanes 1, 3-7 and 9-11 showing single *P. vivax* infection. Lane 13 is negative control. Lanes 8 and 12 show 100 bp ladder.



DISCUSSION

Microscopic technique for the detection of Plasmodium species has long since been considered the standard method of diagnosis.[1] A total of 86 samples were used for the study in which two samples showed asexual stages of both *P. falciparum* and *P. vivax*. Twelve samples were *P. falciparum* positive by microscopy. The remaining 72 samples were positive for P. vivax in blood smears by microscopy. The PCR assay results showed 14 samples with positive P. falciparum infection, 15 samples showed mixed infection of *P. falciparum* and *P. vivax* and 57 samples showed pure P. vivax infection thus indicating that PCR assay is more sensitive than microscopy.[3] Mixed infection was seen in south India probably because of the high prevalence of both the species in that region.[10] If a patient has mixed infection, it is probable that the stages of one of the species might completely be missed in the fields observed by microscopy. It is because many infections occur with parasitemia below the threshold detectable by microscopy. Competition between two species might occur at the blood cell level suppressing one species and making it indistinguishable.[6] Also for *P. falciparum* peripheral blood smear shows only ring stages and occasionally gametocytes. It could be possible that since immature stages of both species appear similar the species are not diagnosed distinctly. Keeping these factors in mind a lot of expertise and time is required for proper and correct diagnosis of *Plasmodium* species by microscopy. PCR is a more confirmatory technique for detection of *Plasmodium* species since it targets the specific genome of the species thus being more robust and accurate.[3]

Incorrect malaria diagnosis is a matter of severe public health concern as it can lead to relapse and can cause drug resistance.[5] Therefore correct malaria parasite identification is important for effective treatment and malaria control. A much larger sample size spaced over a number of transmission periods for all the regions is required for a more accurate mixed infection study to obtain a clearer picture of the epidemiological situation in India so that further population genetic studies can be carried out.

ACKNOWLEDGEMENTS

We would like to thank the Department of Biotechnology (DBT) Government of India, for providing us the grant required for carrying out all the research work.

REFERENCES

1. Bronzan RN, McMorrow ML, Kachur SP. Diagnosis of malaria: challenges for clinicians in endemic and non-endemic regions. *Mol Diagn Ther*. 2008, 12(5):299-306.
2. de Roode JC, Culleton R, Bell AS, Read AF. Competitive release of drug resistance following drug treatment of mixed *Plasmodium chabaudi* infections. *Malar J*. 2004, Sep 14;3:33.
3. Gupta B, Gupta P, Sharma A, Singh V, Dash AP, Das A. High proportion of mixed-species *Plasmodium* infections in India revealed by PCR diagnostic assay. *Trop Med Int Health*. 2010, Jul;15(7):819-24.
4. Johnston SP, Pieniazek NJ, Xayavong MV, Slemenda SB, Wilkins PP & da Silva AJ (2006) PCR as a confirmatory technique for laboratory diagnosis of malaria. Journal of Clinical Microbiology. 2006,44, 1087–1089.
5. Mayxay M, Pukrittayakamee S, Newton PN, White NJ. Mixed species malaria infections in humans. *Trends Parasitol*. 2004, May;20(5):233-40.
6. McQueen PG, McKenzie FE. Competition for red blood cells can enhance *Plasmodium vivax* parasitemia in mixed-species malaria infections. *Am J Trop Med Hyg*. 2006, Jul;75(1):112-25.
7. Moody A. Rapid diagnostic tests for malaria parasites. *Clin Microbiol* Rev. 2002, Jan;15(1):66-78.
8. Singh V, Mishra N, Awasthi G, Dash AP, Das A. Why is it important to study malaria epidemiology in India? *Trends Parasitol*. 2009, Oct;25(10):452-7.
9. Snounou G, Viriyakosol S, Jarra W, Thithong S & Brown KN. Identification of the four human malaria parasite species in field samples by polymerase chain reaction and detection of high prevalence of mixed infections. *Mol and Biochem Parasitol*. 1993, 58, 283–292.
10. Website: *http://www.malariasite.com/malaria/MalariaInMangalore.htm.*

THE IMPACT OF UTILIZATION OF MENTAL HEALTH RESOURCES BY MENTAL HEALTH OUTPATIENTS

Sivajini Suthaharan, *BSc (Hon), MHSc Candidate,*
Brenda Gamble, *Ph.D.*
University of Ontario Institute of Technology
Email : sivajini.suthaharan@uoit.ca

ABSTRACT

Interprofessional collaboration (IPC) "occurs when multiple health workers provide comprehensive services by working together….to deliver the highest quality of care across settings"(WHO, 2010). Successful discharge planning for patients from hospitals is dependent upon the collaboration of a multi-discipline team. Hansen et al. (1998) found that poor discharge planning has been associated with increased hospital readmissions and poor health outcomes. Purpose: To identify and examine the factors associated with interprofessional collaboration that facilitate and/or hinder effective discharge planning.

Methods: Data collection is ongoing and includes participant observation, an online questionnaire, and interviews. The sample includes healthcare workers on a neonatal intensive care unit (NICU) at a large Canadian University teaching hospital. The questionnaire includes items on demographic and employment characteristics and views on the discharge planning process, leadership and IPC. Participant observations will take place during the weekly IPC rounds which occur on the NICU to observe the interaction of the healthcare workers when discussing discharge plans. Based on these observations, health care workers will be selected to interview to gain further insight. Data collection and analysis will be completed February 2011. **Discussion:** Review of the literature indicates that few studies have been conducted to examine the impact of IPC for discharge planning. However, it is believed that a model of discharge planning that incorporates IPC is more successful than a model that relies on the independent input of each healthcare worker.

Key Words: mental illness, community mental health program, mental health benefits, social support, social network, social skills

INTRODUCTION

Mental well-being is an integral part of living a full and healthy life.[1] Worldwide, 1 in every 4 people, or 25% of individuals, will develop one or more mental disorders at some point in their life.[2] Currently, about 450 million people are estimated to be suffering from a mental illness.[3] In Canada, mental illnesses are recognized as a serious and growing problem.[4] It is estimated that 1 in[5] Canadians will develop a mental illness at some point in their lives.[5] Research has traditionally focused on mental health clinical treatments and not on the social needs of mental health outpatients. It is equally important to give mentally ill outpatients, the opportunity to engage in culturally specific mental health social programs and to build social network.[6]

Even though, Canada is a multicultural country, most mental health social programs do not address the needs of mental health outpatients from different cultural backgrounds. This may put many mental health outpatients at a disadvantage in accessing and utilizing the mental health services.

RATIONALE AND AIMS

Promoting socialization of mental health outpatients and engaging them with community mental health services may improve outpatients' overall mental health. However, outpatients find it difficult to form meaningful social relationships and engage with the community, due to difficulties in social functioning, social withdrawal and social isolation.[7] Stigma and functional difficulties can also inhibit mentally ill patients from interacting with others and in turn from forming relationships.[8] Evaluation of programs that promote social engagement for mentally ill patients indicate that there is an improvement in psychological health and functioning of patients.[9] Therefore, the implementation of social programs and activities into the continuum of care can potentially help outpatients form social relationships within the community and improve their well-being.

This study documents and analyzes the views of Tamil mental health outpatients, based on their experience from participating in an outpatient mental health social program. The findings will help inform mental health social program planning by identifying the variables associated with the implementation of culturally-oriented supportive social programs.

DESIGN AND METHODS

This inductive qualitative study is based on grounded theory, which consists of a set of systematic, flexible guidelines for conducting inductive qualitative inquiry aimed toward theory construction.[10] Qualitative studies are effective in obtaining culturally specific information, perspectives and

experiences of particular populations and it also provides information about the human side of an issue, including behaviours, beliefs, opinions, and emotions.[11]

This study was conducted at a large community based hospital in Canada. The hospital offers a community mental health program (CMHP) that provides many social activities and programs to help mental health outpatients improve their life skills and independence.

30 Tamil mental health outpatients, both male and female between the ages of 25–60, were interviewed. Outpatients were recruited until data saturation was reached. As the study progressed, new themes and categories, stopped emerging, at which point data saturation occurred. Inclusion criteria included outpatients who have attended at least 3 sessions of the CMHP and whose cultural background is Tamil. Exclusion criteria included non-Tamil outpatients and outpatients who cannot comprehend the interview questions and therefore cannot participate in the interview.

A self-reported paper questionnaire was given to outpatients, in order to understand the basic demographic characteristics of the outpatient population. Semi-structured interviews, approximately 30 minutes long were conducted, which allowed outpatients to expand on areas which they felt were important.[13] This helped to get an in-depth understanding of the outpatients' experiences. Moreover, it allowed the researcher to ask for clarifications in order to get further explanations and to generate supplementary questions during the session.[14] Interviews were audio taped, with outpatients' consent and then translated into English. The interviews were then transcribed and coded using the QSR NVivo software. Next, a content analysis was performed to identify emerging themes.

The results of this study are based on those who consented to participate in the study. And the results presented in this paper are based on preliminary analysis/findings. All study procedures were approved by the University of Ontario Institute of Technology's Research Ethics Board.

Limitations of this study include out-patients' medical history, which was not reviewed prior to the study. The mental health outpatients who participated in this study may have short attention span affecting the half-hour length interviews. The outpatients that chose to participate might be the ones that are already social and talkative, which could be a potential bias in this study. Also, this is not a longitudinal study and no follow-up will be done, to examine the long term benefits.

RESULTS

Community Mental Health Program:

The CMHP of the hospital is a social recreational program for those with mental illness. Outpatients that attend this CMHP require a referral from a mental health professional. A number of different mental health professionals, including registered nurses, recreational therapists and social workers participate in the CMHP. The objective of the CMHP is to provide daily community-based support and to provide a range of services designed to promote and maintain independence, participation in the community and to prevent re-hospitalization.[15] Services offered at the CMHP, include social/ recreational programming, wellness teaching, voluntary work activity program, therapeutic groups, individualized goal setting, supportive counseling, crisis intervention and referrals to community agencies as appropriate.[16] A medication clinic is offered as well. The services offered at the CMHP are sustained with the help of volunteers and community partners.

Survey Results:

Demographic questionnaire results indicate that 57% of the respondents have been attending the CMHP for more than three years. 70% of the respondents participate in the social activities more than 2 days a week. Both males and females indicated that they prefer to participate in yoga exercise, walk and talk, group discussions, aerobic exercise, cooking and social events. The majority (87%) of the respondents live with other people and have the opportunity to talk to family, friends and relatives. Most respondents (83%) are unemployed and spend their free time at home, attending family responsibilities.

Interview Results:

Themes which were identified by those who participated in the study fall into the following categories: mental health benefits, physical health benefits, social skills, social network, other benefits, culture, barriers, and recommendations. Table 1 provides an audit trail of the themes identified, including the quotes for each theme identified.

Table 1: Audit trail of themes identified and the quotes for each theme

Theme	Quote
Mental Health Related Benefits	*"We are happy talking to others. It makes me happy, getting ready and taking the bus to the program with other people"*
	"We were asked about our problem and we talked about it. It is very helpful. My mind was relieved"
	"We don't worry anymore"
	"We talk openly to everyone and our mind gets relieved"
	"If I am home I will be sitting alone thinking about so many different things. It worries me a lot when I am alone, but I feel very relaxed when I come here."
	"It helps me to relax"
	"I personally don't have any problem coming here because my family knows; when I come here I am refreshed and happy and relaxed. So they want me to go to the program. They knew the difference between when I stay home all day and when I go out"
	"We feel happy. We get information and our mind becomes relaxed"
	"After I started coming here, I felt better. Now I feel happy"

Theme	Quote
Physical Health Related benefits	*"I feel healthy by doing Yoga here at this program"*
	"My diabetes level will go down and cholesterol level will also improve if I do Yoga here "
	"If I come here, I do Yoga and it makes me feel better and helps me to reduce diabetes, cholesterol level"
	"It was difficult for me to do Yoga. Then I learned little by little. Now I feel like I have to come. I feel like a whole day workout can be done by 1 hour of Yoga"
	"When I do 1 hour of Yoga, I feel very good. If I have pain anywhere, I do more for those areas. Then I won't have those pain"
	"I used to feel unhealthy. I couldn't control my diabetes. Now I walk home. I am able to control my diabetes"
	"I know how to reduce my weight"
Social Skills	*"I learned to talk to people"*
	"I learned to be friendly. I listen to people and give advice to them "
	"I feel confident and enthusiastic. I know where to go and what to do for my problem"
	"After I came here, I started talking to people"
	"I have self confidence now"
Other Benefits	*"This (mental health social program) helps me 50% and the medication helps with the other half"*
	"It works 50:50"
	"Medication alone didn't help much. I was getting mad and felt like what is the use of my life and I didn't feel like doing anything"
	"After I came here, I became an informative person"
	"It's a good program, because we are mentally ill people and it's a good way to get us out of the house"
	"I don't depend on other people like before"
Social Network	*"I have more opportunities to talk to other people by coming here. I got more friends by coming here and it makes me happy."*
	"By talking openly to these people (other out patients) and workers here, it is helping me communicate with other people".
	"Interviewer: So, if they didn't help, what would have happened to your mental health?
	Outpatient: My mental health would have been affected more. "
	"We don't feel the loneliness anymore. We have peer groups and we have good relationship with each other, because we have been coming here for a long time."
	"I usually talk socially with people. Everyone who sees me here, they talk to me freely about their problem. I tell them that I am like them too. They say they feel better when they talk to me… That lady was sad about something. I talked to her and encouraged her"
	"We share important information with each other. It makes me happy. People who don't know about these things (services) ask me and do it. "
	"It makes me feel better. When we come here, we move with the same kind of people, who have the same problem. Our purpose is same"
	"We came to know lots of workers here. They are very friendly. It makes us to feel like we are free to talk to them about anything. We don't have to see one staff for everything. We can talk to anyone and they will act on our need. They are very trustworthy. We didn't know anything before. Now, we know that if we go to them, they will solve our problem or send us to someone else."

Theme	Quote
	"The information I get from workers, helps me to do my work"
	"When I have to do something I get advice and talk to people and make a good decision"
	"We get the information about where to go and what kind of services we can get. We learn about school and education here. It helps with being informed about my children`s education"
	"We talk to people, say jokes and have fun. It makes us happy and relaxed. The workers are friendly too"
	"Sometimes I bring letters here and a staff reads it and explains it to me. We get those kind of help here too"
	"After starting to see my case worker, I felt better"
	"[the health care worker] helps me a lot"
Culture	*"They come here without letting the other people know that they are coming here. They think if they tell outside (to others) they will think badly of them"*
	"They feel, that if other people know about them, they will face problem when their children's marriage proposal."
	"If anyone has mental problem, they separate the people in our culture."
	"It's because of change in culture. Some people couldn't accept that."
	"I was alone at home; faced struggle back home and a family member left me. All these things are the reasons for my problem. I used to be scared of everything before."
	"Everyone has anxiety problem there (in home land). They are worried about (getting attacked)."
	"It's because of the family problems. That's why I got sick."
	"We have celebrations here. We have Diwali celebration here and now New Year celebration is coming up."
	"They wear our traditional clothes and put the lights on and it will be fun. Everyone brings their kind of food … and we celebrate."
	"I only talk to Tamil people, because I don't understand English."
	"I don't know what they will do if they both (Tamil translators) are not there."
	"We don't understand everything … what the people here say. They are the ones (Tamil translators) who explains it to us. If we don't have them, we wouldn't understand anything. We'll come, sit and go. We won't get anything out of being here."
	"Interviewer: Do you think all these Tamil people will come here if you don't have the translator?
	Outpatient: For sure, they won't come. How can they come? They will hesitate to come. We must have Tamil workers here"
Barriers	*"It is hard for me to come in the bus"*
	"If I have to go somewhere, a [health care worker] helps me to go to those places, because I don't know how to go"
	"I take medication. It makes me sleepy"
	"I don't exercise, because I feel very tired"
	"… Medicine made me tired … to come here"
	"My health problem didn't allow me to continue to work. I was getting tired and it was making me sicker"
	"I like to come here, but I take medications. It's hard for me to get up in the morning and get ready and come"

Theme	Quote
Recommendations	*"I went for English classes. I went for 3 years… I forget everything right away. It is not helpful to me. I can read, but not big words. But I don't understand anything. I am too old to study"*
	"If they learn English they can get information and help and do everything by themselves"
	"It's better, if we have English classes just for Tamil people. Then we can ask questions freely even if we forget everything"
	"It is even hard for me to look after myself, like preparing food and tea for myself"
	"If we eat healthy food here, we don't have to worry about it when we go home"
	"Some people say they feel tired and they don't feel like cooking, because of their mental health problem. It is going to be helpful if we give them food. It could be a need for them."
	"It will be encouraging if they give bus tokens and food in the program"
	"It's better if we have these kinds of programs everywhere. It will be helpful for people like us"
	"If there are different location… closer to their house, it will be easier because some people are coming from far places"
	"When they open a new location like this, they have to inform about that to the doctors and psychiatrists. Then they can let their patients know about this"

As can be noted by Table 1, the research subjects identified a number of benefits. They also provided views on the cultural components of the CMHP, identified barriers to access and recommendations to improve the CMHP.

DISCUSSION

Based on preliminary data, mental health outpatients reported that they benefited from participating in the CMHP at the hospital. The outpatients have seen improvements in their mental illness and in their overall life, after attending the CMHP. One outpatient said, "*After I started coming here, I felt better. Now I feel happy.*" Coming to the CMHP gave them a reason to get out of their house and be actively involved in the CMHP. Another outpatient said, "*If I am home, I will be sitting alone thinking about so many different things. It worries me a lot when I am alone, but I feel very relaxed when I come here.*" The majority of outpatients indicated that the improvement they have seen with their mental illness is a result of both medication and CMHP. Outpatients also commented on certain physical health benefits, including the ability to control diabetes, cholesterol and weight, which is a potential side effect of medication. An outpatient said, "*I feel healthy by doing yoga here at this program.*"

Outpatients indicated that they have made friends and expanded their social network, after coming to the CMHP. An outpatient said, "*I have more opportunities to talk to other people by coming here. I got more friends by coming here and it makes me happy.*" Furthermore, outpatients indicated, having group discussions was very beneficial to them and it allowed them to share their troubles, express themselves and receive advice and feedback. An outpatient said, "*We were asked about our problem and we talked about it. It is very helpful. My mind was relieved.*" Conversing with other outpatients caused a positive change in mood. Another outpatient said, "*We don't feel the loneliness anymore.*" Outpatients reported that the healthcare workers at the CMHP are very friendly and trustworthy. Thus, the outpatients said, this allowed them to open up and talk freely to the health care workers and approach them with any requests for help. Outpatients also indicated that they

received other support from other outpatients and staff, including support with filling out application forms, travelling, and services they required, including government assistance.

Outpatients also indicated that their social skills have improved, including communication and listening skills. Through group discussions, outpatients learned to talk, express their feelings, listen to others' problems, and respect each other. Outpatients felt comfortable with each other because they were all in a similar situation and were able to share similar stories. In addition to becoming friendly, enthusiastic people, outpatients also became more socially active and outgoing. They also reported that their confidence level has increased and they are now more independent.

When asked about their culture and cultural barriers, the majority of Tamil mental health outpatients indicated that they did not inform their relatives and friends about attending the CMHP, due to the stigma associated with being a mental health outpatient. Among many factors that caused the mental illness, the commonly reported ones were, cultural changes faced as an immigrant, various problems caused by war in their own country including the loss of family relatives, and family problems.

Since the majority of the mental health outpatients at this CMHP are Tamil, the need for a Tamil speaking translator was recognized and thus hired to meet the needs of these outpatients who did not understand English. An outpatient said, "*If we don't have them, we wouldn't understand anything. We'll come, sit and go. We won't get anything out of being here.*" The benefits of this include, an increase in the number of Tamil outpatients attending the CMHP, opportunity for Tamil outpatients to participate in group discussions, and opportunity to speak openly to the health care worker in their own language. Thus, the CMHP is culturally sensitive.

The mental health outpatients also reported barriers to attending CMHP, including the side effects of medication, which causes difficulty in waking up in the morning and participating in the CMHP. An outpatient said, "*I like to come here, but I take medications. It's hard for me to get up in the morning and get ready and come.*" Geographical barrier also prevented some outpatients from attending the CMHP and gaining the full benefits of it. Other outpatients had trouble travelling to the CMHP, due to physical functional barriers and mental health barriers, which prevented some outpatients from travelling on their own.

Outpatients also provided some recommendations for the CMHP, including providing food at the CHMP and additional CMHP in various locations, which would benefit mental health outpatients who are unable to access the CMHP due to geographical barriers. An outpatient said, "*It's better if we have these kinds of programs everywhere. It will be helpful for people like us.*" Another recommendation is the implementation of English learning classes that suit the specific needs of the mentally ill population, who cannot comprehend or focus for a long period, due to their mental health barriers. Psychiatrists also need to understand the importance and benefits of social programs, so the referral process can be improved and psychiatrists can refer their outpatients to these programs. An outpatient said, "*When they open a new location like this, they have to inform about that to the doctors and psychiatrists. Then they can let their patients know about this.*"

CONCLUSION

Preliminary findings from this study support the existing evidence on mental health social programs and support for mental health outpatients. This study indicates that the outpatient CMHP has benefited many of the mental health outpatients interviewed, including improvements in their mental health, physical health, social skills, and social network. This study further sheds light on the need for cultural integration in mental health programs.

After attending the CMHP, outpatients' overall mental health improved, thus their general health and life also improved. Outpatients reported a decrease in stress level and an increase in the level of happiness experienced. Outpatients also view the CMHP as positively impacting their physical health.

After attending the CMHP, outpatients had the opportunity to expand their social network. Knowing someone is there, gave outpatients' a sense of belonging. This decreased the feeling of loneliness that most outpatients faced at home. The benefit gained from having someone to talk to, reiterates the previous studies, that befriending is effective in reducing feelings of loneliness and isolation.[17] Outpatients also improved on their social skills including communication skills. Additionally, outpatients' confidence level increased and they became more independent.

When asked about cultural integration in the CMHP, outpatients indicated that the CMHP is multi-culturally oriented. Moreover, having a Tamil mental health care worker was very beneficial to the Tamil outpatients as this provided an opportunity for outpatients to discuss mental health issues, which may not be available in their cultural community. This raises a question about how do reduce stigma within the cultural community, for individuals who cannot access the mental health services due to the stigma associated with it, suggesting directions for future research.

Barriers that sometimes prevent outpatients from participating in this CMHP include the inability for outpatients to participate due to side effects of medication and difficulties in travelling. Some outpatients were unable to access the CMHP frequently, due to geographical barriers. Some recommendations that may improve the mental well-being of the outpatients include providing food at the CMHP, additional CMHPs in various locations, specialized English learning classes that suit the specific needs of the mentally ill population, and a better referral process for psychiatrists.

In summary, mental health outpatients reported that their mental illness has improved due to combination of medication and social support they have received from the CMHP. Mental health outpatients gained many benefits including, improvements in their mental health and overall life. This is also evident from the CMHP data, which indicates that the number of hospitalizations have decreased dramatically over time, including the number of episodes and number of days spent hospitalized. Additionally, through this study, the outpatients pointed out the importance of integrating cultural components in the CMHP, in order to gain the full benefit from the social activities.

There are many potential impact factors involved in this study. Having social programs to engage in and social network, can help the mentally ill outpatients decrease their level of stress, decrease the feeling of social isolation and help develop social skills, including the ability to express themselves and state opinions.[18] Their quality of life may improve and they will be able to better integrate with their community. Additionally, the outpatients can benefit from the cost-effective mental health programs, rather than solely depending on costly medications. Furthermore, an understanding of different social programs and their impact on mentally ill outpatients' quality of life and overall health may assist psychiatrists and mental health care workers by providing direction for future mental health program planning.

ACKNOWLEDGEMENTS

We would like to thank the research committee members, Wendy Stanyon, RN, Ed.D. and Jason Ramsay, Ph.D. for their invaluable advice; any errors cannot be attributed to them. We would also like to thank our research partner, Pathways program at the Rouge Valley Health System.

REFERENCES

1. WHO (1948). Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June 1946, and entered into force on 7 April 1948.
2. World Health Organization (2001). Mental and neurological disorders. Fact Sheet: The World Health Report, Geneva.
3. World Health Organization (2003). Investing in Mental Health. Department of Mental Health and Substance Dependence, Geneva.
4. Canadian Mental Health Association (2011). Questions and Answers. Retrieved on June 02, 2011 from: http://www.cmha.ca/bins/content_page.asp?cid=6-20-23-45&lang=1
5. Canadian Mental Health Association (2011). Questions and Answers. Retrieved on June 02, 2011 from: http://www.cmha.ca/bins/content_page.asp?cid=6-20-23-45&lang=1
6. McCorkle, B. H., Dunn, E. C., Wan Y.M., & Gagne, C. (2009). Compeer friends: A qualitative study of a volunteer friendship programme for people with serious mental illness. *The International Journal of Social Psychiatry,* **55**(4), 291-305.
7. McCorkle, B. H., Dunn, E. C., Wan Y.M., & Gagne, C. (2009). Compeer friends: A qualitative study of a volunteer friendship programme for people with serious mental illness. *The International Journal of Social Psychiatry,* **55**(4), 291-305.
8. MacDonald, E.M., Jackson, H.J., Hayes, R.L., Baglioni, A.J. & Madden, C. (1998) Social skill as a determinant of social networks and perceived social support in schizophrenia. *Schizophrenia Research,* **29**, 275–286.
9. Solomon, P. (2004) Peer support/peer-provided services: Underlying processes, benefits and critical ingredients. *Psychiatric Rehabilitation Journal*, **27**, 392–401.
10. Given, L. (2008). *The SAGE Encyclopedia of Qualitative Research Methods*. University of Alberta: *SAGE Publications, Inc.*
11. Mack, N., Woodsong, C., Macqueen, K.M., Guest, G., Namey, E. (2005). Qualitative Research Methods: A Data Collector's Field Guide. North Carolina, USA: Family Health International.
12. Marshall, M.N. (1996). Sampling for qualitative research. Family Practice, Oxford University Press, **13** (6).
13. Bowling, A., Ebrahim, S. (2005). *Handbook of health research methods – Investigation, measurement, and analysis*. Berkshire, England: Open University Press.
14. James, N., Busher, H. (2006). Credibility, authenticity and voice: dilemmas in online interviewing. London, Thousand Oaks, CA and New Delhi: SAGE Publications, 6 (3) 403-420.
15. Rouge Valley Health System (n.d.). Pathways. [Brochure].
16. Rouge Valley Health System (n.d.). Pathways. [Brochure].
17. McCorkle, B. H., Dunn, E. C., Wan Y.M., & Gagne, C. (2009). Compeer friends: A qualitative study of a volunteer friendship programme for people with serious mental illness. *The International Journal of Social Psychiatry*, **55**(4), 291-305.
18. McCorkle, B. H., Dunn, E. C., Wan Y.M., & Gagne, C. (2009). Compeer friends: A qualitative study of a volunteer friendship programme for people with serious mental illness. *The International Journal of Social Psychiatry*, **55**(4), 291-305.

MORBIDITY PROFILE OF A GERIATRIC POPULATION IN A SLUM AREA IN KOLKATA

Dr. Sampa Mitra, M.D.
Professor & Head
Department of Maternal & Child Health
All India Institute of Hygiene & Public Health
110, C.R Avenue, Kolkata-700073, India
Email :sampamitra2003@yahoo.co.in

ABSTRACT

Background: Geriatric population is increasing in size throughout the world. The old people are at risk of many diseases. But there is not much information about their health status and morbidity profile, which is essential for planning of appropriate services for them.

Objectives: 1) Study of the health status and morbidity profile of the elderly study population. 2) Study of the various socio-economic factors related with the morbidity of the population.

Methods: It is a community based cross-sectional study, undertaken at the slum area adjoining to the Urban Health Centre, attached to All India Institute of Hygiene & Public Health, Kolkata. Participants were 256 elderly people (of 60 years of age and above) of both sexes, selected by simple random sampling.

Results: It was observed that 47.66% of the geriatric population was male and 52.34% was female. 75% of the female participants were illiterate, whereas only 33% of male participants were illiterate. Only 36.89% of the males were economically dependent on their kin but majority (87.31%) of the females was dependent. Prevalence of pallor (anaemia) among females was significantly higher (85.82%) compared to their male counterpart (47.54%). Regarding musculo-skeletal system, osteoarthritis was observed to be the leading problem among the population. The prevalence was higher among the females (53%) compared to their male counterpart (38.52%). Regarding prevalence of other morbidities like, hypertension, gastro-intestinal tract disorders, peptic ulcer disease etc, the distribution was not much different among the two sexes.

Conclusion: There is a gender-wise difference in the study population, as per literacy, economic dependence and health status. The condition of the females revealed in this study reflects less economic power, more illiteracy and poorer health status compared to their male counterpart.

Keywords: Geriatric population, slum area, morbidity profile, socio-economic factors, gender.

INTRODUCTION:

Expectation of life at birth for males and females has increased in the recent years in India, as well as throughout the world. Projections made by the U.N. (1990) have indicated that 21% of the Indian population will be 60+ years by 2050, which was 6.8% in 1991.[1]

Old age is not a disease by itself, but the elderly are vulnerable to many diseases, due to decline in the functioning of various body systems, viz. musculoskeletal disorders, cerebro-vascular accidents, cancers, cataract, mental depression etc.

The problems associated with the ageing of the population are absence of appropriate facilities for treatment and lack of care and economic support. The government should effectively plan health care services for the elderly and prepare a feasible implementation design relevant to the country needs. So, information on health status and morbidity profile of this population is an essential prerequisite for planning of health care facilities for them. With this background, the present study was undertaken to examine the health status and morbidity profile of a geriatric population and to study the relationship of socio-economic factors with the morbidity pattern of the said population.

MATERIALS AND METHODS

Study design: Community-based, cross-sectional study.
Study area: The slum area adjoining to urban health centre (at Chetla), attached to All India Institute of Hygiene & Public Health, Kolkata.
Study period: 6 months (August 2007 to January 2008).
Participants: 256 elderly people (of age 60 years and above) of both sexes in the study area selected by simple random sampling.
Sample size: Considering the current 60% morbidity rate of the geriatric population in our country, 95% confidence limits and 10% allowable error, the sample size is estimated to be 256 by applying the formula $n=4pq/L^2$.

Since there are four units in the Urban Health Centre, taking equal proportions from each unit, 64 subjects were selected by random sampling from each unit.

Data was collected through house-to-house visits, by using a pre-designed, pre-tested and semi-structured questionnaire.
Statistical analysis: Proportion, chi-square test.

RESULTS

It was observed that 47.66% of the geriatric population was male and 52.34% was female. Most of the subjects (58.59%) were in the 60–64 years and 65–69 years age-group i.e., below 70 years of age. Majority (94%) of the study population was Hindu and only 6% was Muslim. No other religion was found in the study population. 75% of the female participants were found to be illiterate. But, majority (67%) of the male participants had received primary or secondary education.

Regarding addiction habits, 39.34% of the male subjects were habituated to smoking of tobacco (cigarette/ bidi) and another 39.34% were habituated to chewing of tobacco. Among the females, 25.37% were addicted to chewing tobacco and 23.88% to use of “guraku”. So, it is evident that tobacco constituted the major addiction material for the population. However, 11.47% of the males were addicted to alcohol.

A contrasting picture was observed regarding dependency status, among the two sexes (vide Table 1).

Table 1 Distribution of the study population according to dependency status

Dependency Status	Number of Males	Percentage	Number of Females	Percentage	Total	Total %
Fully Independent	57	46.72	6	4.48	63	24.61
Partially Dependent	20	16.39	11	7.43	31	12.11
Fully Dependent	45	36.89	117	87.31	162	63.28
Total	122	100	134	100	256	100

$p< 0.05$ Statistically significant.

Table 1 shows that, whereas 36.89% of the males were economically dependent on near relatives, the percentage of economically dependent females was much higher (87.31%) and the difference was statistically significant. Overall, 63.28% of the study population were economically dependent.

Regarding prevalence of pallor (anaemia), a vast majority (85.82%) of female subjects were having clinically recognizable pallor compared to their male counterpart (47.54%), the difference being statistically significant (vide Table 2).

Table 2 Distribution of the study population according to prevalence of pallor

Pallor	Number of Males	Percentage	Number of Females	Percentage
Present	58	47.54	115	85.82
Absent	64	52.46	19	14.18
Total	122	100	134	100

$p < 0.05$ Statistically significant.

Regarding blood pressure, it was observed that the prevalence of hypertension was 38.8% in females and 32.79% in males, i.e., more or less similar among the two sexes. Overall, the prevalence was 35.94%.

Regarding gastro-intestinal tract (G.I. tract) disorders, the distribution was also not much different among the two sexes. The major G.I. tract disorders identified were peptic ulcer disease and constipation. The prevalence of peptic ulcer disease among the males was 38.52% and that among the females was 32.09%. Prevalence of constipation among the males was 30.52% and that among the females was 23.88%.

The leading genito-urinary problem among the male subjects was increased frequency of urine (17.21%). There were 13.93% diagnosed cases of hypertrophy of prostate among the male subjects, as evidenced by OPD tickets and prescriptions. Among the females, the leading ailment was urinary tract infection with chief complaint of burning sensation during micturition (14.17%).

Among the musculo-skeletal disorder, osteoarthritis was observed to be the leading problem affecting about 46% of the population. The prevalence was 53% among the females and 38.52% among the males. Other ailments that were present were spondylosis, low back pain etc. (vide Table 3).

Table 3 Distribution of musculoskeletal problems among the study population

Disease	Number of Males	Percentage of Males	Number of Females	Percentage of Females	Total	Total %
Osteoarthritis	47	38.52	71	53.00	118	46.09
Low Back Pain	5	4.09	9	6.72	14	5.47
Cervical Spondylosis	1	0.82	1	0.75	2	0.78
Others	2	1.63	0	0	2	0.78

DISCUSSION

In the present study, 47.66% of the study-population was male and 52.34% was female. But, in an OPD-based study done by Kishore *et al.*[2] at Dehradun, majority of the subjects was observed to be male (62.1%) and only 37.55% was female. In a field-based study by Prakash *et al.*[3] at Udaipur, the number of males was found to be greater (63.33%) than that of females (36.67%).

In the present study, 75% of the female participants were found to be illiterate. Here, female illiteracy is much higher than that observed (45.83%) by Khokhar *et al*[4] in their study based on an urban community in Delhi.

Regarding economic dependency, it has been observed in the present study that the percentage of economically fully dependent males was 36.89% and that of fully dependent females was 87.31%, the difference being statistically significant. In general, 63.28% of the population was economically dependent on their relatives. Goel *et al.*[5] in their study in rural Meerut, found that 58.5% of the geriatric study population was economically dependent, though gender-wise distribution was not shown. In a study by Jain and Aras[6] in an urban slum of Mumbai, it has been observed that mental depression was significantly high in elderly females and economic dependency was one of the important associated factors.

Regarding clinically determined anaemia (pallor), the prevalence is much higher in the females (85.85%) than that in the males (47.54%) in the present study. This is probably due to the fact that the food provided to the female participants in our study was inferior in quality and smaller in quantity compared to that available to the males. The study by Khokhar *et al*[4] also shows that clinical anaemia is significantly higher in the females (29.2%) than that in the males (16.1%), though the prevalence is much less among both males and females, compared to the present study.

The prevalence of hypertension in the present study has been observed to be 32.79% in the males and 38.8% in the females. In general, it is 35.94%. More or less a similar pattern has been observed by Kishore *et al*[2]. In their study, the overall prevalence of hypertension was found to be 41.4%. It was 39.5% in the males and 44.4% in the females. In the study by Prakash *et al.*[3], the prevalence was however found to be, to some extent, higher among the females (54.5%). It was 44.2% in the males and 48% in general—both higher than the present study.

Regarding major musculoskeletal problems, viz., osteoarthritis, the present study shows 53% prevalence among the females and 38.52% among the males. The overall prevalence was 46.09%. In the study by Kishore *et al.*[2], the prevalence of musculoskeletal problems among the females was higher (64.8%), though the overall prevalence was less (36.8%) than that in the present study. In the study by Prakash *et al.*[3], the prevalence of musculoskeletal problems in both males and females was lower than that in the present study (11.6% and 20% respectively). But, the prevalence was found to be much higher in both the sexes by Khokhar *et al*. It was 79.61% in the females and 60.71% in the males.

CONCLUSION

It is evident that there is a gender-wise difference in the study population as per literacy, dependency status and health status. The female group was predominantly illiterate (75%), whereas the male group was predominantly literate (67%). Only 36.89% of the males was economically dependent, whereas most of the (87.31%) females was dependent.

Prevalence of pallor was significantly higher in the females (85.82%) than that in the males (47.54%).The females suffer more from musculoskeletal problems (53%) than the males (38.52%). The prevalence of hypertension and peptic ulcer was somewhat similar among the two sex groups. Urinary tract infection was more common among the females (14.17%) than that among the males (8.19%). Thus, the condition of the females revealed in this study, reflects less economic power, more illiteracy and poorer health status compared to their male counterpart.

ACKNOWLEDGEMENT

I am grateful to my students Dr. Samrat Ray Chaudhuri, Dr. Amitabha Mondal, Dr. Sutirtha Hajra, Dr. Indrajit Adhikary and Dr. Sukanya Hajra for collection of data in this study under my guidance.

REFERENCES

1. United Nations (UN). The sex and age distributions of population: the 1990 revision. The Organization; 1990.
2. Kishore S, Juyal R, Semwal J, Chandra R. Morbidity profile of elderly persons. JK Sci 2007 Apr-Jun;9(2):87-9.
3. Prakash R, Choudhary SK, Singh US. A study of morbidity pattern among geriatric population in an urban area of Udaipur Rajasthan. Ind J Comm Med 2004 Jan-Mar;29(1):35-40.
4. Khokhar A, Mehra M. Life style and morbidity profile of geriatric population in an urbans community of Delhi. Ind J Med Sci 2001 Nov;55(11):609-15.
5. Goel PK, Garg SK, Singh JV, Bhatnagar M, Chopra H, Bajpai SK. Unmet needs of the elderly in a rural population of Meerut. Ind J Comm Med 2003 Oct-Dec;28(4):165-6.
6. Jain RK, Aras RY. Depression in geriatric population in urban slums of Mumbai. Ind J Pub Heal 2007 Apr-Jun;51(2):112-3.

EVALUATION OF GENOTOXICITY OF SODIUM FLUORIDE ON HUMAN PERIPHERAL BLOOD CELLS

Avisek Basu, Anita Mukherjee
Dept of Genetics, University of Calcutta, Kolkata-700019, India
Address for correspondence- Professor Anita Mukherjee, Head, Dept. of Genetics, University of Calcutta, Kolkata-700019, India
Email: prof.amukherjee.cu@gmail.com

ABSTRACT

Fluoride is a known water contaminant raising big health issues in India and world over. Studies focusing on possible genotoxic effect of excess fluoride are contradictory and inconclusive. This report proposed to evaluate the genotoxic effects of sodium fluoride (0.1, 0.5, 1, 1.5 and 2 mM) on human lymphocytes *in vitro* for 3 hours. In another set of experiment, sodium fluoride at 2, 4, 8 and 10 mM concentrations was evaluated cytotoxicity for cytotoxicity. Cell viability for both 3 and 24 hours of treatment and DNA damage was evaluated after 3 hours of treatment. Fluoride did not cause any concern for cytotoxicity. The trypan blue dye exclusion test, MTT and resazurin cell viability assay did not reveal any statistically significant increase in cytotoxicity in any of the 3 and 24 hours test set. In comet assay DNA damaging potential of sodium fluoride was observed at concentrations 0.5 mM and above. In DNA laddering experiments sodium fluoride failed to induce DNA fragmentations in human lymphocytes. Exposure of pBR 322 plasmid DNA to sodium fluoride did not result in induction of strand breaks. Based on the present results we can conclude that sodium fluoride was not cytotoxic to human lymphocytes at the concentrations and treatment period tested. The comet parameters confirm the DNA damaging potential of sodium fluoride.

Keywords: Sodium Fluoride, Genotoxicity, Cytotoxicity

INTRODUCTION

Fluoride (F) is probably best-known for its ability to prevent dental caries. According to the Center for Diseases Control, fluoridation of community drinking water for the prevention of dental caries was considered to be one of the ten most important public health achievements of the 20th century.[1] Fluoride at low concentration is an essential element for humans[2] but higher level of fluoride in drinking water causes fluorosis in humans and cattle living in endemic areas.[3] The genetic toxicity of fluoride has been investigated extensively by various test systems. However, results obtained have been inconsistent. Fluoride has been reported to be non-genotoxic, genotoxic, and synergistic or antagonistic with certain mutagens. These studies involved the use of various assay systems, including microbes, insects, cultured mammalian cells, and various animals.[4] Fluoride is toxic when consumed in excess but of benefit when consumed within permissible limit.[5] According to some reports, fluoride does not induce DNA damage.[6] On the contrary, it also have been reported that excessive fluoride causes DNA damage in rat cells[7] as well as in human peripheral blood lymphocytes.[8] However, there are a few published studies on the genotoxicity of fluoride in human PBMN cells utilizing a battery of genotoxic tests. Although fluoride is not mutagenic in standard bacterial systems, it has been accepted that fluoride produces chromosomal aberrations and gene mutations in cultured mammalian cells.[9]

In the present study the cytotoxicity and genotoxicity of sodium fluoride was investigated in human PBMN cells. Cytotoxicity was evaluated by trypan blue dye exclusion assay, MTT, and resazurin

assay. Genotoxicity of fluoride was assessed by DNA migration (comet assay) and DNA fragmentation (Laddering) assay. Additional study was conducted to observe DNA strand scission in pBR 322 plasmid DNA.

MATERIALS AND METHODS

Chemicals

RPMI- 1640 medium was procured from Invitrogen Corporation, USA. Resazurin, Ethidium bromide, Histopaque, low melting point agarose (LMPA), methyl methanesulphonate, trypan blue, SDS, RNase A and proteinase-K were purchased from Sigma-Aldrich Co. (USA). Normal Melting Agarose (NMA), Phosphate Buffered Saline (PBS, Ca^{2+}, Mg^{2+} free), were purchased from Hi Media Ltd., Mumbai, India. MTT kit was purchased from Millipore. Dimethyl sulfoxide (DMSO), disodium EDTA, sodium chloride (NaCl), sodium hydroxide (NaOH), triton X-100, acetic acid, trizma base, hydrochloric acid (HCl), boric acid and ethanol were purchased locally and were of analytical grade.

Test system

Human peripheral blood was obtained by venipuncture from healthy volunteers (20–25 year old male donors, non-smokers, non-alcohol consuming and not undergoing any medication) into heparinised vacutainers. All the experiments were done strictly according to ethical guidelines decided by University Ethical Committee. Lymphocytes were isolated from fresh blood according to the method of Boyum,[10] using Histopaque. The cells were washed with PBS and resuspended in RPMI-1640 media at a concentration of 106 cell/ml for further use. All experiments were conducted in accordance with the institutional guidelines. Freshly isolated human lymphocytes were incubated for 3 hours at 37°C in RPMI-1640 media with different concentrations of sodium fluoride. Methyl methane sulphonate (MMS, 100 μM) served as positive control. After incubation, the cells were centrifuged at 2000 rpm for 10 min and the supernatant was discarded. Then the cells were resuspended in fresh media and were used for the bioassays described below.

Cell viability assay

Viability of the cells were evaluated using trypan blue dye exclusion method, described by Tennant.[11] The cytotoxicity of the chemical under study was determined by using the resazurin cell viability assay kit[12] and MTT reduction assay[13] according to the supplier's guideline. Data are presented as mean % cell viability ± SE.

Alkaline comet assay

The DNA damage studies were carried out following the comet assay according to the method of Singh et al.[14] with modifications.[15] The median values of each concentration with respect to the comet parameter were calculated.

DNA laddering and DNA strand scission with pBR 322plasmid DNA

DNA gel electrophoresis was performed as described by Hermann et al.[16] with modifications. The plasmid pBR322 DNA (400 ng), in Tris-HCl (10 mM, pH 8) and EDTA (1mM) was exposed to sodium fluoride and the DNA was subjected to electrophoresis in 1% agarose gel by using 0.8mM Tris borate/2mM EDTA buffer pH 8.3, as described in Sambrook.[17]

Statistical analysis

The data were analyzed using the Statistical Programme SigmaStat3.0 (SPSS Inc., Chicago, IL, USA). One- way analysis of variance (ANOVA) test, followed by Dunnett's Multiple Comparison Test at $P \leq 0.05$, was done.

RESULTS AND DISCUSSION

Cytotoxicity of fluoride (0.1, 0.5, 1, 1.5 and 2 mM) to human PBMN for a period of 3 h exposure was negative. The same was also found negative when exposed to higher concentration of fluoride (2, 4, 8 and 10 mM) for 24 h. Trypan blue dye exclusion test, MTT cell viability assay, WST1 assay and Resazurin assay did not induce significant increases in cytotoxicity when compared to control. The percent viability varied between 76-98% in both 3 (Fig 1a, 1b) and 24 hours exposed cells (Fig 1c). The tail intensity (% tail DNA) and tail extent (µm) values were significantly higher than the control (Fig 2a, 2b), but was not dependent on the concentrations of fluoride. DNA Laddering assay confirmed the absence of DNA fragmentation in the lymphocytes (Fig 3) and in pBR 322 plasmid DNA strand scission assay (Fig 4).

Fig 1a: Cytotoxicity induced in human peripheral blood lymphocyte by sodium fluoride as found in Trypan Blue Dye Exclusion test after 3 hours of exposure

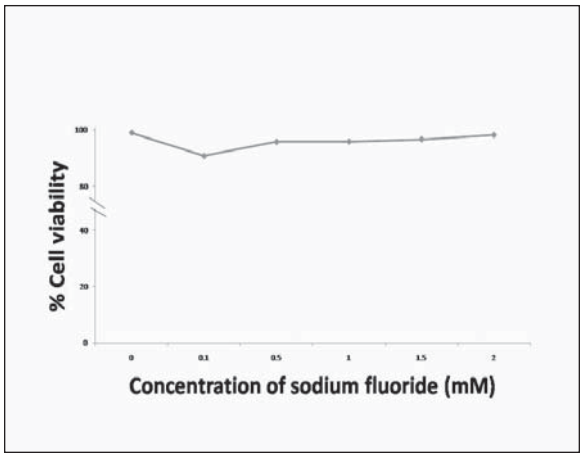


Fig 1b: Cytotoxicity induced in human peripheral blood lymphocyte by sodium fluoride as found in Resazurin and MTT assay after 3 hours of exposure

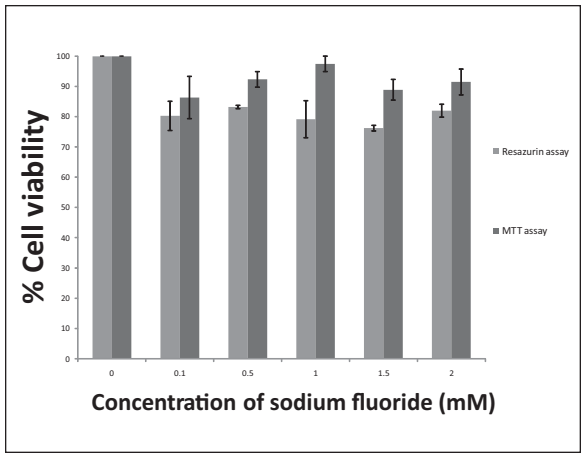


Fig 1c: Cytotoxicity induced in human peripheral blood lymphocyte by sodium fluoride as found in MTT cell viability assay after 24 hours of exposure

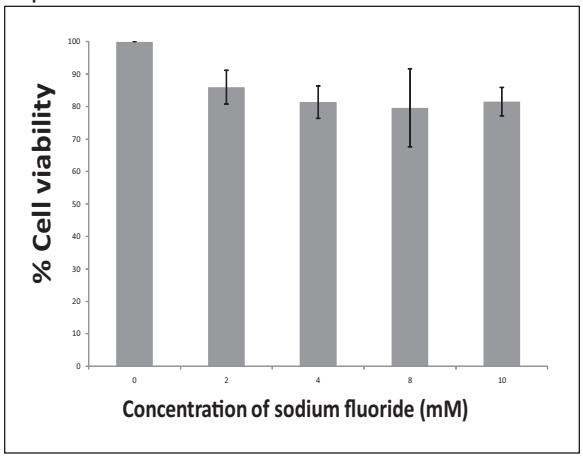


Fig 2a: Comet data (% tail DNA and tail extent) of sodium fluoride treated (0, 0.1, 0.5, 1, 1.5 and 2 mM) human lymphocytes at 3 hours exposure; *$p \leq 0.05$

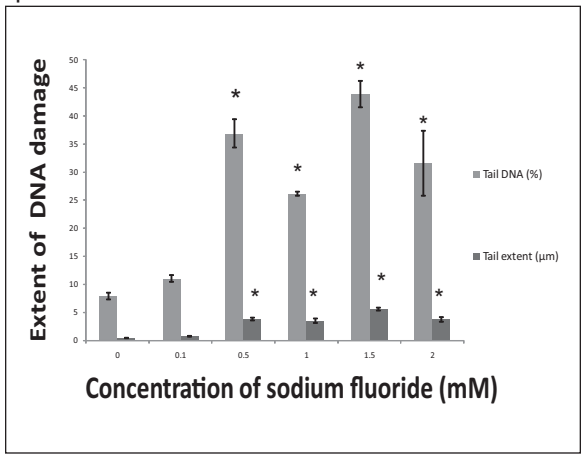


FIG 2b: Images of human lymphocyte cells at different concentrations of sodium fluoride (A-E), MMS (100μM) as positive control (F), showing varying extent of DNA damage as analyzed by comet assay

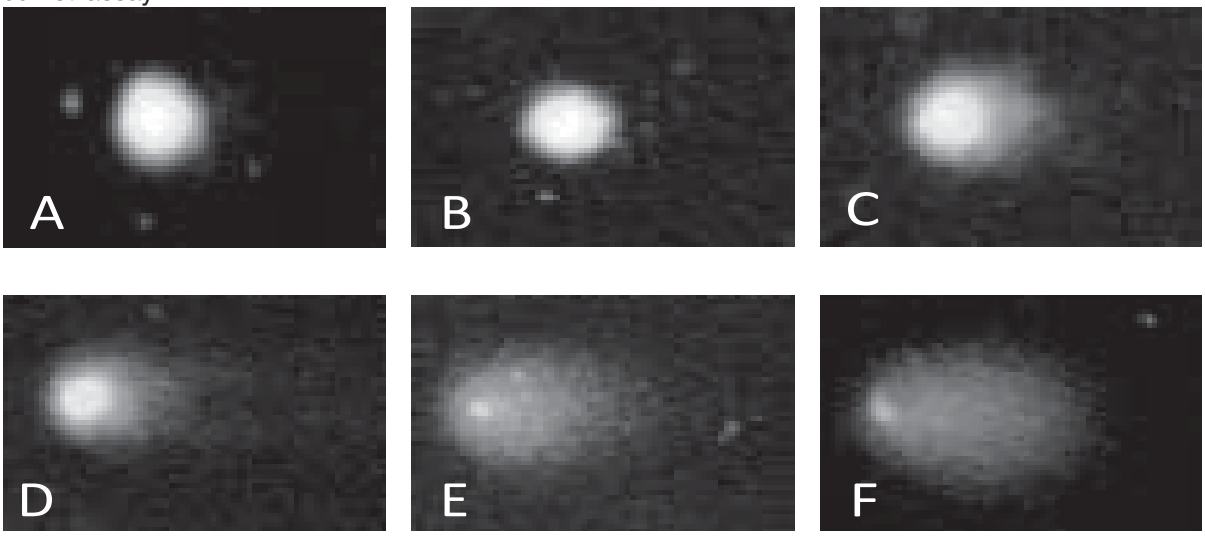


FIG 3: DNA fragmentation of DNA from human lymphocytes, treated with different concentrations of sodium fluoride for 3 hours

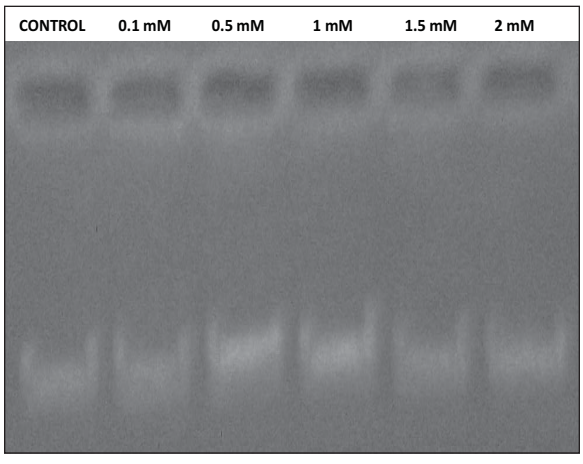
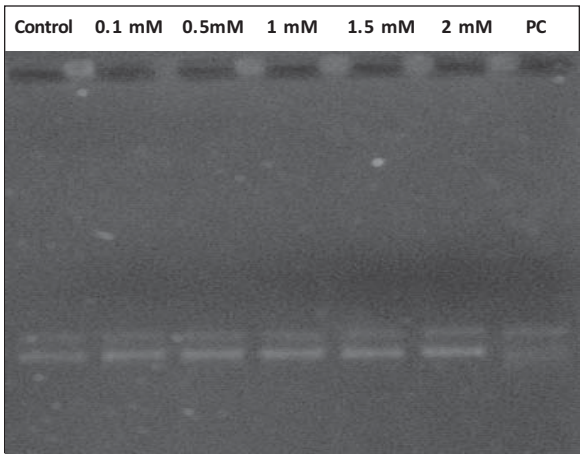


FIG 4: DNA fragmentation result of pBR-322 plasmid, treated with different concentrations of sodium fluoride and UV exposure for 30 minutes as positive control



The genotoxic potential of fluoride has been a frequently contested issue. The results reported in the literature are inconsistent and sometimes contradictory. In general, the scientific literature provides three distinctive and contradictory conclusions concerning the genotoxicity of fluoride: (1) Fluoride has no genotoxic effects;[18, 19] (2) fluoride is mutagenic and causes damage to DNA and chromosomes;[20] and (3) fluoride has synergistic or antagonistic effects with certain mutagens.[21–24] According to some authors, fluoride does not induce DNA damage in eukaryotic cells either in vitro or in vivo system.[25–27]

The data in the literature clearly show that there is no established correlations regarding the genotoxicity of fluoride. Due to its demonstrated cariostatic efficacy, use of fluoride has been, and will continue to be an important measure in dental caries prevention. On the other hand, the potential significance of genotoxic risks of any agents used in healthcare should not be discounted.

The findings of the present study clearly demonstrated that sodium fluoride in concentrations from 0.5 mM and above can cause DNA damage to human lymphocytes. Negative results in DNA fragmentation (Laddering) and pBR 322 plasmid DNA cannot be explained at the moment. Further studies on long-term exposure will be important to substantiate these results.

ACKNOWLEDGEMENT

The authors would like to thank Council for Scientific and Industrial Research [Sanc no- 09/ 028 (0764)/ 2010 EMR-I, dt- 7-6-2011] and BRNS (DAE) for financial support.

REFERENCES

1. Everett, ET, McHenry, MAK, Reynolds, N, Eggertsson, H, Sullivan, J, Kantmann, C, Martinez-Mier, EA, Warrick, JM, Stooky, GK. Dental fluorosis: variability among different inbred mouse strains. *J Dent Res* 2002; **81**: 794-798.
2. Robinson, C, Connell, S, Kirkham, J, Brookes, SJ, Shore RC, Smith, AM. The effect of fluoride on the developing tooth. *Caries Res* 2004; **38**: 268–276.
3. World Health Organization (WHO), in: K. Bailey, J. Chilton, E. Dahi, M. Lennon, P. Jackson, J. Fawell (Eds.), Fluoride in Drinking-water, WHO Press, Switzerland, 2006.
4. National Research Council (NRC). Health effects of ingested fluoride. Washington, DC: *National Academy Press*, 1993; pp. 91-108.
5. Guan, ZZ, Xiao, KQ, Zeng, XY, Cheng, YH, Jiang, SF, Wang, YN. Changed cellular membrane lipid composition and lipid peroxidation of kidney in rats with chronic fluorosis. *Arch. Toxicol* 2000; **74**: 602–608.
6. Ribeiro, DA, Alves, de, Lima, PL, Marques, MEA, Salvadori, DMF. Lack of DNA damage induced by fluoride on mouse lymphoma and human fibroblast cells by single cell gel (comet) assay. *Braz Dent J* 2006; **17**(2): 91-94.
7. Ling-Fei, He, Jian-Gang, Chen. DNA damage, apoptosis and cell cycle changes induced by fluoride in rat oral mucosal cells and hepatocytes. *World J Gastroenterol* 2006; **12**(7): 1144-1148.
8. Joseph, S, Gadhia, PK. Sister chromatid exchange frequency and chromosome aberrations in residents of fluoride endemic regions of south Gujarat. *Fluoride* 2000; **33**(4): 154-158.
9. Charles, CT, Mc Queen, CA, Sharma, VB, Williams, GM. The lack of genotoxicity of sodium fluoride in a battery of cellular tests. *Cell Biol Toxicol* 1988; **4**: 173-186.
10. Boyum, A. Isolation of lymphocytes, granulocytes and macrophages. *Scand J Immunol* 1976; **5**: 9–15.
11. Tennant, JR. Evaluation of the trypan blue technique for determination of cell viability. *Transplantation* 1964; **2**: 685–694.
12. Strotmann, UJ, Butz, B, Bias, W-R. The dehydrogenase assay with resazurin: Practical performance as a monitoring system and pH-dependent toxicity of phenolic compounds. *Ecotoxicol Environ Saf* 1993; **25**: 79-89.

13. Mosmann, T. Rapid colorimetric Assay for Cellular Growth and Survival: Application to Proliferation and Cytotoxicity Assays. *J Immunol Methods* 1983; **65**: 55-63.
14. Singh, NP, McCoy, MT, Tice, RR, Schneider, EL. A simple technique for quantification of low levels of DNA damage in individual cells. *Exp Cell Res* 1988; **175**: 184–191.
15. Tice, RR, Agurell, E, Anderson, D, Burlinson, B, Hartmann, A, Kobayashi, H, Miyamae, Y, Rojas, E, Ryu, JC, Sasaki, YF. Single cell gel/comet assay: guidelines for in vitro and in vivo genetic toxicology testing. *Environ Mol Mutagen* 2000; **35**: 206–221.
16. Herrmann, M, Lorenz, HM, Voll, R, Grunke, M, Woith, W, Kalden, JR. A rapid and simple method for the isolation of apoptotic DNA fragments. *Nucleic Acids Res*. 1994; **22**:5506–5507.
17. Sambrook, K, Fritsch, J, Maniatis, T. Molecular Cloning: a Laboratory Manual, 1, second ed., Cold Spring Harbour Laboratory Press, New York, 1989. 6.3–6.17.
18. Dunipace, AJ, Zhang, W, Noblitt, TW, Li, Y, Stookey, GK. Genotoxic evaluation of chronic fluoride exposure: micronucleus and mouse sperm morphology studies. *J. Dent. Res*. 1989; **68**: 1525-1528.
19. Slamenova, D, Gabelova, A, Ruppova, K. Cytotoxicity and genotoxicity testing of sodium fluoride on Chinese hamster V79 cells and human EUE cells. *Mutat. Res*. 1992; **279**: 109-115.
20. National Toxicology Program. Technical report 393. Toxicology and carcinogenesis studies of sodium fluoride in F344/N rats and B6C3F1 mice. NIH Publication 1990; No. 90- 2848. Washington, DC.
21. Mukherjee, RN, Sobels, FA. The effects of sodium fluoride and iodoacetamide on mutation induction by x-irradiation in mature spermatozoa of Drosophila. *Mutat Res* 1968; **6**:217-225.
22. Vogel, E. Strong antimutagenic effects of fluoride on mutation induction by Trenimon and 1-phenyl-3,3- dimethyltriazene in Drosophila melanogaster. *Mutat Res* 1973; **20**: 339-352.
23. Obe, G, Slacik-Erben, R. Suppressive activity by fluoride on the induction of chromosome aberrations in human cells with alkylating agents in vitro. *Mutat Res* 1973; **19**: 369-371.
24. Slacik-Erben, R, Obe, G. The effect of sodium fluoride on DNA synthesis, mitotic indices and chromosomal aberrations in human leukocytes treated with Trenimon in vitro. *Mutat Res* 1976; **37**: 253-266.
25. Li, YM, Zhang, W, Noblitt, TW, Dunipace, AJ, Stookey, GK. Genotoxic evaluation of chronic fluoride exposure: sister-chromatid exchange study. *Mut Res* 1989; **227**: 159-165.
26. Ribeiro, DA, Marquis ME, Assis, GF, Anzai, A, Poleti, ML, Salvadori, DMF. No relationship between subchronic fluoride intake and DNA damage in Wister rats. *Caries Res* 2004; **38**: 576-579.
27. Buzalaf, MAR, Salvadori, DMF, Marquis, MEA, Caroselli, EE, Leite, AL, Camargo, EA, Ribeiro, DA. Absence of DNA damage in multiple organs after oral exposure to fluoride in Wister rats. Bull. Environ. *Contam. Toxicol*. 2006; **77**: 700-706.

A COMPARISON OF THE PREVALENCE AND RISK FACTORS FOR DEPRESSIVE SYMPTOMS IN INSTITUTIONAL RESIDENTS AND COMMUNITY-DWELLING ELDERS IN TAIWAN

Pao-Chen Lin; Hsiu-Hung Wang
Department of Nursing, National Tainan Institute of Nursing
78, Sec. 2, Minzu Rd., Tainan City 700, Taiwan, R.O.C.
Email : nisa@mail.hwai.edu.tw

ABSTRACT

Experiencing depressive symptoms that do not meet the threshold of psychiatric diagnosis can even result in a decreased quality of life and a rise in morbidity.
Aims: The aim of this study was to compare the depressive symptoms of institutional residents and community-dwelling elders.
Methods: A descriptive comparative design was used for this investigation. The sample for this study included 121 residents and 89 community-dwelling elderly who lived in the southern of Taiwan. Inclusion criteria required that all subjects be at least 65 years of age, spoke Taiwanese or Mandarin, and cognitively intact. The 15-item Geriatric Depression Scale was adopted to assess depressive symptoms. Logistic regression analyses were employed to determine the risk factors of depressive symptoms in two groups.
Results: Results indicated that the prevalence of depressive symptoms was higher in participants from community-dwelling elders (48.3%) than in institutional residents (37.2%). Logistic regression analysis indicated that gender, educational level, and perceived health status significantly predicted depressive symptoms in institutional residents. Significant predictor of depressive symptoms in the community-dwelling elders was perceived health status.
Conclusion: The findings might provide information that aids in the design of a preventative program that improves the psychological status of older adults.

Key words: depressive symptoms, self-rated health status, institutional residents, community-dwelling elders

INTRODUCTION

Aging is often accompanied by a loss of social status, a decline in health, the loss of loved ones, and a dependency on others for one's daily needs, which can result in various psychological challenges, including feelings of vulnerability[1]. Several studies have estimated that there is a great probability of being depressed in later life. Chong et al. (2001) surveyed 1,350 community-dwelling elderly in southern Taiwan, and the Automated Geriatric Examination for Computerized Assisted Taxonomy (GMS-AGECAT) was used, and detected a one-month prevalence of psychiatric disorders was 37.7%, with 15.3% depressive neurosis and 5.9% major depression[2]. Wang et al. (2009) used the Geriatric Depression Scale-Short Form (GDS-SF) to evaluate 1,313 residents within two veterans' homes in southern Taiwan. The prevalence of depressive symptoms (GDS >= 5) was found to be 14.9%[3]. Depressive symptoms include sadness, an absence of emotion, a loss of interest, poor appetite, weight loss, fatigue, sleeping problems, and a decline in physical function. Experiencing depressive symptoms that do not meet the threshold of psychiatric diagnosis can even result in a decreased quality of life and a rise in morbidity. The aim of this study is to clarify the following two questions: (1) what is the prevalence of depressive symptoms in elderly and does it differ in institutional residents and community-dwelling elders? (2) What variables predict the depressive symptoms among institutional residents and community-dwelling elders? We hope the results of this study can provide the information of living arrangement difference on risk factors of depressive symptoms to healthcare professions when planning mental health services for the elderly population.

METHODS

A descriptive comparative design was used for this investigation. The sample for this study included 121 residents and 89 community-dwelling elderly who lived in the southern of Taiwan. Inclusion criteria required that all subjects be at least 65 years of age, spoke Taiwanese or Mandarin, and cognitively intact (assessed using the Short Portable Mental Status Questionnaire, SPMSQ). This study used several instruments to assess depressive symptoms and related variables. The 15-item Geriatric Depression Scale was adopted to assess depressive symptoms. The demographic data collected were gender, age, education level, marital status, and religious beliefs. Logistic regression analyses were employed to determine the risk factors of depressive symptoms in two groups.

RESULTS

Using a score of seven as the cut-off point for depression[4], this study showed that the prevalence of depressive symptoms was higher in participants from community-dwelling elders (48.3%) than in institutional residents (37.2%). The independent variable data indicated that these community-dwelling elders tended to be female, poorer self-rated health status, higher cognitive scores, and higher ADL scores ($p < .05$) than institutional residents. However, there were no significant living arrangement differences in age, educational level, marital status, and chronic illnesses (Table 1). In the two samples, elders educated at the junior high school level or above tended to have fewer depressive symptoms than less educated elders. In addition, self-rated health status, chronic illnesses, and ADL were significantly related to depressive symptoms among institutional residents. In the community-dwelling sample, self-rated health status, chronic illnesses, and cognitive status were significantly related to depressive symptoms. Logistic regression analysis indicated that educational level and perceived health status significantly predicted depressive symptoms in institutional residents. Significant predictor of depressive symptoms in the community-dwelling elders was perceived health status and cognitive status (Table 2).

Table 1. Characteristics of the Participants by Living Arrangement

Variables	Institution (n = 121) n (%)	Community-dwelling (n = 89) n (%)	χ^2 / t	P value
Gender			6.591	.012[a]
male	49 (40.5)	21 (23.6)		
female	72 (59.5)	68 (76.4)		
Age (yrs)			2.859	.239
65-74	37 (30.6)	18 (20.2)		
75-84	56 (46.3)	48 (53.9)		
85 and above	28 (23.1)	23 (25.8)		
Educational Level			2.527	.283
Illiterate	28 (23.1)	28 (31.5)		
Elementary and Junior high school	67 (55.4)	40 (44.9)		
Senior high school and above	26 (21.5)	21 (23.6)		
Marital Status			4.967	.083
Never married	23 (19.0)	8 (9.0)		
Married	31 (25.6)	31 (34.8)		
Widowed	67 (55.4)	50 (56.2)		
Self-rated health status (M ± SD)	7.50 ± 2.21	6.25 ±1.80	4.513	.013
Chronic illness (M ± SD)	2.49 ± 1.52	3.35 ± 1.68	-3.882	.246
Cognitive Scores (M ± SD)	8.31 ± 1.55	10.06 ±1.39	-8.564	.042
ADL Scores (M ± SD)	56.57 ± 25.72	76.80 ± 16.14	-6.982	<.001
Depressive symptoms			2.607	.121 a
Yes (GDS >= 7)	76 (62.8)	46 (51.7)		
No (GDS < 7)	45 (37.2)	43 (48.3)		

[a] by Fisher's exact test

Table 2. Logistic Regression Analyses for Risk Factors of Depressive Symptoms by Living Arrangement

Variables	Institution			Community-dwelling		
	OR	(95% C.I)		OR	(95% C.I)	
Educational Level						
Elementary school versus Illiterate	0.270	(0.081	; 0.892)	0.490	(0.140	; 1.723)
Junior high school versus Illiterate	0.255	(0.066	; 0.980)	0.884	(0.191	; 4.089)
Self-rated Health Status	0.549	(0.420	; 0.717)	0.485	(0.320	; 0.737)
Chronic Illness	1.260	(0.905	; 1.756)	1.111	(0.786	; 1.570)
ADL Scores	0.991	(0.971	; 1.011)	1.007	(0.971	; 1.046)
Cognitive Status	0.917	(0.657	; 1.281)	0.467	(0.263	; 0.829)

DISCUSSIONS

The prevalence of depressive symptoms among elderly persons was high in both the institutional and community-dwelling samples. Moreover, the prevalence of depressive symptoms was higher in the community-dwelling sample (χ^2=2.607, p = .121). Because of the negative effects of depression, health care providers need to pay more attention to the mental health of elderly people. In Taiwan, the studies of Tsai *et al*. (2005) reported that the prevalence of depressive symptoms were 43.3% among elderly nursing home residents that was higher than in our surveys of institutional residents (37.2%), but less than our community-dwelling sample (48.3%)[5]. Researchers have indicated that elderly people's ability to control or determine their living arrangements, as well as the living arrangements themselves; can be used to predict the quality of life for disabled elderly people. Compared to institutionalized elderly people, elderly people who live in the community feel that they have a greater degree of decisive control over their living arrangements. A greater capacity to control or determine living arrangements indicates a higher overall quality of life. In this study, community-dwelling elders tended to be poorer self-rated health status than institutional residents. Most international and domestic studies have produced consistent results on the correlation between the state of health and depression. The self-rated health status of the elderly person was found to be significantly negatively correlated with their depression mood and quality of life[6,7]. The findings might provide information that aids in the design of a preventative program that improves the psychological status of older adults.

REFERENCES

1. Suen, L. W. & Tusaie, K. (2004). Is somatization a significant depressive symptom in older Taiwanese Americans? *Geriatrics Nursing*, 25(3), 157-163.
2. Chong, M-Y., Tsang, H-Y., Chen, C-S., Tang, T-C., Chen, C-C., Yeh, T-L., et al. (2001). Community study of depression in old age in Taiwan: Prevalence, life events and socio-demographic correlates. *The British Journal of Psychiatry, 178*, 29-35.
3. Wang, L-H., Chow, P. C., Chu, C-L., Tou, S-L., Lu, T., Lin, Y-T., et al. (2009). Prevalence of depression and its correlates among institutionalized veterans in Southern Taiwan. *Taiwanese Journal of Psychiatry, 23*, 135-145.
4. Chan, A. C. (1996). Clinical validation of the geriatric depression scale (GDS): Chinese version. *Journal of Aging and Health, 8*(2), 238-253.
5. Tsai, Y. F., Chung, J. W. Y., Wong, T. K. S., & Huang, C. M. (2005). Comparison of the prevalence and risk factors for depressive symptoms among elderly nursing home residents in Taiwan and Hong Kong. *International Journal of Geriatric Psychiatry, 20*, 315-321.
6. Lin, P-C., Yen, M., & Fetzer, S. J. (2008). Quality of life in elders living alone in Taiwan. *Journal of Clinical Nursing, 17*(12), 1670-1677.
7. Lai, K. L., Tzeng, R. J., Wang, B. L., Lee, H. S., Amidon, R. L., & Kao, S. (2005). Health-related quality of life and health utility for the institutional elderly in Taiwan. *Quality of Life Research, 14*(4), 1169-1180.

ETHICS IN USING MEDICAL INFORMATION TECHNOLOGY

Pegah Rezai-Rad, *BSc* student
Health Information Technology (HIT),
Tehran University of Medical Sciences (TUMS),
Tehran, Iran. Email: gm.onfi@gmail.com

ABSTRACT

Background: In an era that computer-based technologies are the important factor for improvement, no one can deny the impact of computer-based systems in any organization. Healthcare organizations are also keen to use computer systems more and more each day. The interdisciplinary "health information technology" major has been started in 2009 in Iran, and this shows its significant effect in improvement of healthcare. This opens up an issue about the ethics for using patient information through healthcare systems.

Objectives: The specific objective of this review article is to answer the questions which appear while architecting the infrastructures of our health information systems: 1) What are appropriate uses of health information systems?, 2) Who should use these systems?, 3) how information technology effects on physician-patient relationship?, 4) What is the best method of using information systems in order to provide ethical considerations and patient's rights?

Result: According to findings, appropriate uses of health information systems contain easy access to clients' information for various utilizations like diagnosis, conducting researches, and so on. All health professionals can use this system and access to data, according to their specialties. While information technology accelerates the speed of access to patient's information and medical diagnosis and even planning treatments, but it decreases the relationship between patient/client and other health professionals. Although teleconferences can facilitate this problem, but deficiency of face-to-face communication still can be seen. To use the health information systems in a best way, in-service education is needed both for system usage and ethical considerations.

Conclusion: Although information systems play an important role in facilitating patient's management in various ways, but still we can't be optimistic to full ethical patient safety.

Keywords: Ethics, Health, Health Information Systems (HISs), Information systems, Moral dilemma

INTRODUCTION

Health information technology (HIT) can be identified as key component of health care systems. If used properly, can hopefully reduce costs, improve quality and efficiency, and give service to more patients[1]. Electronic health records (EHR), as a part of HIT, could have the following benefits[2]:

- reducing the duplication of diagnostic tests;
- reminding physicians about appropriate preventive care;
- identifying harmful drug interactions or possible allergic reactions to prescribed medicines;
- and helping physicians manage the care of patients with complex chronic conditions.

The use of health information technology (HIT) is becoming increasingly important in medical providers' efforts to support decision-making and to promote quality health care delivery and equitable access to services in rural areas in different parts of the world. However, technological interventions in remote settings have attracted ethics concern and conflict[3]. In using HIT in rural or urban setting, health care providers must give more consideration to patient welfare, protect confidentiality, ensure privacy, promote trust in the healing relationship, and ensure fair and equitable access to quality services[3].

Although HIT is an inseparable part of our governmental or non-governmental health care organizations, we confront with many problems: lack data protection laws[4], access to unauthorized personnel and/or non-health practitioners[5], data theft, loss, and misuse[6], weakening relationship between patient-physicians and/or other health care practitioners[7] third parties (i.e. hospital managers, medical students,…)[8], and above all many ethical problems which affects the rights of patients and clients (e.g. privacy)[9].

The many problems accompanied with HIT, especially ethical dilemmas are the concern of this review article.

METHOD OF STUDY

In this review study, we used different references searched in PubMed, EBSCO and GoogleScholar, related to the health information technology and ethics. In a preliminary search about 200 books, articles, and reports were found, but only most related information were used to conclude the information needed for this study.

FINDINGS

Different studies had diverse findings, which can be mentioned in related to the problem they had encountered in different fields of health care.

Malicious Data: Because most countries still lack data protection laws, making malicious data de-identification is, however, difficult to control through the worldwide scale. The most feasible solution therefore will be highly restricted data access[4].

Modern applications in healthcare and welfare, like the EHR, are always linked to end user awareness, confidence, and acceptance. Knowing about existing and emerging concerns and weaknesses right in advance allows to taking actions on an ethical, social, and societal level[5].

Patient-physician Relationship: Unless HIT are implemented with substantial forethought, they may disturb delicate balances in the patient-physician relationship, widen social disparities in health outcomes, and create barriers to access to health care[7]. Patient care increasingly requires clinical practitioners to access detailed and complete health records in order to manage the safe and effective delivery of complex and knowledge-intensive health care, and to share this information within and between care teams[9]. Patients nowadays also require access to their own EHR to an extent that permits them to play an active role in their health management. These requirements are becoming more urgent as the focus of health care delivery shifts progressively from specialist centers to community settings[9]. Health care systems and providers must be cautious against developing excessive reliance on information technologies, such that the traditional patient-clinician relationship is inadvertently weakened[3].

Ethical Aspects of HIT: Ethical aspects HIT contains the following items[9]: authorship and duty of care responsibilities, subject of care, dates and times of healthcare actions and of their recording, version control, access rights, emphasis, and preservation of meaning on transferring the record to another site.

Information Sharing: International research has highlighted the clinical, ethical and technical requirements that need to be met in order to effect this transition. There is a need for interoperability standards meeting these requirements that can permit clinical computer systems to share health record data whilst preserving faithfully the clinical meaning of the individual authored contributions within it. Concerns about protecting the *confidentiality* of sensitive personal information must also be addressed if consumer confidence is to be maintained when EHRs are widely accessible[9].

As health care organizations collect, process, and store more health information in computerized form and use both private and public telecommunications systems to transmit this information between different entities, they must ensure that adequate mechanisms are in place to protect the information1[1].

Discrimination-based Genetic Information: This has recently become a major concern for patients and physicians. The privacy of genetic data is more sensitive than the privacy of clinical data; because these data involves discrimination for the individual and their relatives who have not been genetically tested. Recent court cases have emerged as evidence of the challenges and risks associated with the collection and use of genetic information. Modern courts have recognized the sensitive nature of genetic information, and their recent decisions reflect a perceived need for additional protection of this type of information[12].

Misuse forms of patients' information: They can take many forms[14]:

- discussing confidential information in earshot of third parties,
- deletion of records,
- not locking filing cabinets, or
- the unsecure disposal of records.

Constraints of e-mail communication: Many physicians are concerned that they could be overwhelmed by long, numerous e-mail messages from their patients. The interface could effect flow control by tracking the number and length of messages being sent by patients; when thresholds defined by the individual provider are exceeded, the system could suggest a telephone call or visit. Health services and informatics methods should be applied to study the effect of modifying the human-computer interface on communication. There is a fine line between filtering out inappropriate communication and creating a barrier to access[7].

Medicolegal Liability of e-mailing: The use of e-mail has complex medicolegal implications. Most office staff will be unable to respond instantly to e-mail from patients. A safe and reliable system must somehow prevent the generation of messages that require urgent or emergency responses if the messages might remain unanswered for a long time. The inherently superior documentation of e-mail communication compared with telephone calls, for example, could either protect against or increase physician liability. Once e-mail is in widespread use between physicians and patients, surveillance should be set up that will allow the legal system to derive risk management principles specific to the new and evolving situation[7].

Inequitable Access to Health Information Technology: Inequitable distribution of a new technology may widen social disparities in health care access and outcomes. An effective therapy that has differential access according to socioeconomic characteristics or ethnicities may cause a divergence in health status outcomes among segments of the population.

Medicine will need to adapt the technology, not create it. With increased use of the Internet for everyday consumer commerce, repeated predictions of widespread degradation or "brownouts" in the quality of service have been made. Medical systems offering electronic medical communication should research and monitor rates of access within their diverse patient populations. Voice and video capabilities of e-mail systems could improve access for patients who are not literate. In addition, if widespread access is to be promoted, the technology must be used sensibly. Rates of access will improve if software to communicate with a health system or physician practice is accessible from any Internet-connected device. Conversely, access will be diminished if patients are required to have specialized software on a local hard drive or a proprietary e-mail account[7].

Uses of Handheld Computers in Clinical Practice: As in many service organizations, there is a diverse and growing list of possible commonly uses for handheld computers in clinical practice: 1) patient data access, 2) pharmaceutical reference, 3) guideline dissemination, 4) medical calculator functions, and 5) scheduling and appointment reminders. Innovative new uses may include: 1) collection of information about medical errors and near misses; 2) data acquisition through questionnaires or surveys; 3) distribution of databases such as formularies, consultant physician information, pharmacy phone numbers; 4) provider-directed patient education; and 5) clinical uses beyond physicians (e.g., nurse practitioners; nurses; dietary; physician assistants; pharmacy; inventory)[15].

Balancing Ethical Obligations to Patients with Technology Usage: Respecting patient *autonomy* requires that clinicians do everything in their power to ensure privacy, and to respect the patient's right to make informed decisions. The ethical obligations pertain to actions taken on patients' behalf, to improve their health status and protect their personal information. Respect for autonomy, however, requires that information regarding patient encounters be kept private, whether obtained in person or via electronic (virtual) means, unless the patient requests or gives permission to have personal information shared. When using e-mail, telephone, videoconferencing, or other electronic means, one can never be completely sure who is gleaning information on the other end of the line, or even tapping into such information as it is being sent across the network[3].

A broader ethics concern is that *confidentiality* may become less important, or more difficult to enforce, as health information technologies become more universally available and applied, particularly as human curiosity continues to promote behavior that derails even the most secure system. Breaches in confidentiality can be both visual and auditory. Other concerns include unauthorized viewing of patient images or clinic notes in an electronic database that is shared by providers, and/or unauthorized retrieval of patient information from a protected database by staff members for purposes other than billing or quality assurance. Unauthorized viewing of patient information of any kind—intentional or unintentional, whether written, electronic, or auditory—is unethical and, typically, not in compliance with the law or regulatory policies regarding privacy[3].

Telehealth Ethical Concerns:

Telehealth has the following ethical concerns[3]:

- Lack of maintaining privacy and confidentiality,
- Lack of adequate patient informed consent,
- Inadequate disclosure of the possible presence of other clinicians or trainees ,
- Lack of informed consent for the presence of others, photos being taken and stored, biopsy, or scrapings, or telehealth intervention,
- Potential loss of trust between patient and provider.

RESULTS AND CONCLUSION

When using health information technologies, health care providers must never sway from the moral precepts that underscore our obligations as health care professionals: to serve the patient's needs first (beneficence); prevent harm if at all possible (nonmaleficence); provide fair access to reasonable forms of treatment and care (justice); and above all, to respect the patient's right to make informed decisions about his or her health care—including the right to refuse or accept what is offered[3].

Preventing Ethics Conflicts in HIT:

- **Telehealth** Respect privacy and confidentiality; ensure adequate informed consent
- **Electronic Medical Records** Ensure accuracy, accessibility and accountability by providers; seek information transferability between systems
- **Electronic Clinical Support Systems** Ensure access and reliability of decision support systems for local sites, with support from tertiary care sites when needed
- **Online Health Care Resources** Ensure accuracy and reliability of information being accessed; encourage careful scrutiny by those accessing such information
- **Additional Protections** Establish policies and procedures to ensure consistency, generalization, and quality; develop informational material for providers and patients; provide community-wide education on health information technology[3].

Recommendations: All health care managers, supervisors and practitioners are looking forward to practical ways and methods to solve problems related to HIT.

A. Strategic recommendations: These actions must be done by policy makers, national and top managers in departments of health, higher education, and other effective bodies in the government and NGOs.

1. set up a committee or sub-committee on ethics in HIT including multidisciplinary sciences, i.e. IT & HIT experts, health care practitioners, representatives of the patients, representatives of other effective bodies. They should work on new policies, standards, regulations, criteria, monitoring procedures….
2. up-to-date standards, regulations, criteria,... (for further information and guideline see the work of National Research Council[11]).
3. set up a committee on Maintaining Privacy Security in Health Care Applications of the National Information Infrastructure[11],
4. prepare and/or revise curriculum of different health care students for college courses, workshops, proceedings on ethical pitfalls on HIT for different health care students and practitioners;
5. define and implement new job descriptions in order to utilize HIT in practice,
6. define new medical legal aspects of HIT misuse and inappropriate use;
7. passing laws by Parliament to protect private genetic information[12] & enforce the laws;
8. preparing a practical manual on how, when, and necessity of HIT for different health care practitioners and including them in their training[13];

B. Implementation recommendations:

1. increase public awareness of genetic privacy and to inform probands continuously about the use of their samples and data[4],
2. include the risks of re-identification of anonymized data in informed consent procedures, and any data sharing needs to be explicitly approved by the DNA donor[4],
3. genetic data should not be distributed on public Internet sites, and data sets with more than 100 SNP markers should be removed from public web servers if not explicitly endorsed by the donor[4],
4. define appropriate use of the various modes of patient-physician communication[15],

5. ensure the security and confidentiality of patient information[15],
6. create user interfaces that guide patients in effective use of the technology[15],
7. proactively assess medicolegal liability[15],
8. preparing manual guides for implementing ethics in HIT contexts,
9. define and classify authorized users and the level of access to information,
10. ensure that the tools used to link physicians and patients can be used safely and appropriately by a multicultural, multilingual population with a wide range of literacy, especially in diverse countries like Iran, India, Malaysia, USA, …[15]
11. new communication technologies must never replace the crucial interpersonal contacts that are the very basis of the patient-physician relationship. Rather, e-mail and other forms of electronic communications should be used to enhance such contacts[15],
12. finding new techniques for communication between patients and physicians and other health care practitioners in the new digital world and health information technology,
13. preparing a manual guides for in-service training of health practitioners,
14. up-dating IT utilities in health care institutions[15],
15. control access to health information[11],
16. Educate nurses and physicians involved in telehealth and related activities about the importance of full disclosure and transparency, as well as what the clinicians may expect of the patient[3],
17. establish guidelines for medical record storage and the organization of e-mail correspondence[7],
18. when patients become distressed, it is important to provide reassurance, and to further inform the patient and his or her family about the nature, benefits, and risks of the telehealth service being offered[3].
19. patients have the right to refuse, and should be given the information necessary for informed decision-making, including any potential negative aspects of the telehealth experience[3].
20. enforcing the law related to privacy and utilization of bioinformations[12,14];
21. reformulation of the Hippocratic bargain to protecting privacy in the electronic age[13];
22. protecting against data theft, loss, and misuse which involves various people, technology, and operations countermeasures[6],
23. play more effective role as a health care manager in planning, leading, and implementation of EHR[16],

REFERENCES

1 Stroetmann, K. A., Jones, T., Dobrev, A. & Stroetmann, V. N. eHealth is Worth it. *The economic benefits of implemented eHealth solutions at ten European sites, European Commission* (2006).

2 Orszag, P. R. *The overuse, underuse, and misuse of health care*. (Congressional Budget Office, 2008).

3 Fleming., D. A. in *Handbook for rural health care ethics: A practical guide for professionals* (ed W.A. Nelson) (University Press of New England, 2009).

4 Wjst, M. Caught you: threats to confidentiality due to the public release of large-scale genetic data sets. *BMC Medical Ethics* **11**, 21, doi:10.1186/1472-6939-11-21 (2010).

5 Nordberg, R. EHR in the perspective of security, integrity and ethics. *Studies in health technology and informatics* **121**, 291 (2006).

6 Mellor, M. Data Theft, Loss, and Misuse Panel Testimony. (2011). <http://healthit.hhs.gov/portal/server.pt/gateway/PTARGS_0_10741_909249_0_0_18/Mellor-DataTheftLossandMisusePanel111909.pdf>.

7 Mandl, K. D., Kohane, I. S. & Brandt, A. M. Electronic patient-physician communication: problems and promise. *Annals of Internal Medicine* **129**, 495 (1998).

8 Spagnolo, A. & Refolo, P. Electronic oral health records: ethical issues. (2010). <http://www.cersi.it/itais2010/pdf/082.pdf>.

9 Kalra, D. Electronic health record standards. *IMIA yearbook of medical informatics* 2006, 136-144 (2006).

10 Lewis, D. *Consumer health informatics: informing consumers and improving health care*. (Springer Verlag, 2005).

11 National Research Council. Committee on Maintaining Privacy Security in Health Care Applications of the National Information Infrastructure *For the record: protecting electronic health information*. (National Academies Press, 1997).

12 Sethi, P. & Theodos, K. Translational bioinformatics and healthcare informatics: computational and ethical challenges. *Perspectives in health information management/AHIMA, American Health Information Management Association* 6 (2009).

13 Rothstein, M. A. The Hippocratic Bargain and Health Information Technology. *The Journal of Law, Medicine & Ethics* 38, 7-13, doi:10.1111/j.1748-720X.2010.00460.x. (2010).

14 Excellence, C. f. h. c. R. Data misuse and the health professional regulators. (2009). <https://www.chre.org.uk/_img/pics/library/pdf_1286379012.pdf>.

15 McAlearney, A. S., Schweikhart, S. B. & Medow, M. A. Handheld Computers in Clinical Practice: Implementation Strategies and Challenges. (Center for Health Management Research, Ohio, 2004).

16 HRET & CHiME. *Health Care Leader Action Guide on Implementation of Electronic Health Records*. (Health Research & Educational Trust (HRET) and College of Healthcare Information Management Executives (CHiME), 2010).

DEVELOPMENT OF COMPETENCY IN ADMINISTRATION OF HEALTH ADMINISTERS AT PRIMARY HEALTH CARE UNITS IN THAILAND

Patcharin Bangthamai
Boromarajonani College of Nursing, Chang Wat Nonthaburi, Thailand
Email : bangthamai@yahoo.com

ABSTRACT

World health Organization focuses on improvement of primary care service to increase the status of health of people in the community. Administrators at Primary Health Care Units are therefore important groups of health personnel carrying out health policies and plans of the country into action. A five-week training program was hence developed to enhance their competency in administration. This descriptive study was conducted to examine administration behaviors of 30 health administrators working at health centers, as perceived by themselves, 31 superiors, and 29 colleagues. The results revealed that all sample groups expressed the same opinions that the administrators had the high level of administration behaviors for honesty and lowest for regular exercise both before and after attending the training program. The result of t-test analysis showed that the mean score of administration behaviors after attending the training program was significantly higher than that of before. The content perceived as very useful and applicable to work included communication and relationship, public speaking, strategic plan, management and administration, critical thinking, and development of teamwork. The finding of this study showed that the training program helped improve competency in administration of the health administrators working at primary care units. It is recommended that the program should be used to improve the competency in administration of the health administrators at primary units of the whole country.

Key words: competency, administers, Primary Health Care

BACKGROUND

In the health care organizational management, al people agree that the most essential factor is human resources or persons who work in that organization. Currently, the World Health Organization focuses on the improvement of primary care service to increase the health status of people in the community. Administrators at Primary Health Care Units (PCUs) are important health personnel who transform the national health policies into action1. They play a significant role in the provision of health service to people. Therefore, capacity building development is crucial for these first-line health administrators. The Boromarajonani College of Nursing, Chang Wat Nonthaburi and College of Public Health Administrators are aware of the importance of increasing administrative competency of them. They should be trained in all aspects including self-development. A five-week training program was hence developed to enhance their administrative competency. A follow up study was, therefore, needed to conducted to evaluate the effectiveness of training program. So that the program can be improved to better develop the competency of the administrators.

Aims of the study

The aims of this study were:

1. To examine the administrative competencies of those who were trained in the program.
2. To compare the competencies pre and post training in the program perceive by the trainees, their supervisors and colleagues.
3. To identify the course contents which can be applied to the trainees'work.

Methods

This descriptive research was conducted to examine the administrative competencies of 47 trainees who were trained in the First-Line Public Health Administrators Training Program at Boromarajonani college of Nursing, Chang Wat Nonthaburi, Thailand in 2007. Research instruments were questionnaires developed by the program committee. The questionnaires assessing administrative competency were applied at six months after completion of the training. Self-administered questionnaires were sent to 47 graduated trainees, their supervisors and colleagues. The sample was composed 30 trainees, 31 supervisors and 29 colleagues. Data were analyzed using frequencies, percentages, means, standard deviations and a paired t-test.

Results

Demographics data revealed that the trainees were 50% female and 50% male. The ages ranged from 35-55 years old. Most trainees aged 41-45 years old (53.5%). Most trainees had the positions as Public health officer (40%) and registered nurses (26.7%). In addition, most trainees worked in the community settings (66.7%).

The results of this study were divided into 3 parts as follows:

1. **The administrative competencies at the post training of the program perceived by the trainees, their supervisors and colleagues.**
   The results revealed that all sample groups expressed the same opinions that the trainees had the highest level of the administrative competency for their honesty and the lowest for regular exercise after attending the training program. The mean scores of the administrative competencies after attending the training program were significantly higher than before in the most aspects.

2. **Comparison of the competencies at the pre and post training of the program perceived by trainees, their supervisors and colleagues.**

Table 1 Comparing mean scores of the competencies at the pre and post training of the program perceived by the trainees.

Behaviors/Competencies	Pre training		Post training		t	p
	$\bar{x}$	SD	$\bar{x}$	SD		
1. Appropriate dress	3.40	.67	4.17	.53	.38	.03
2. Communication with others	3.40	.72	4.10	.48	.47	.00
3. Interpersonal relationships	3.67	.66	4.20	.61	.51	.00
4. Manners	3.63	.55	4.20	.55	.47	.00
5. Emotional control maturity	3.27	.69	4.30	.59	.30	.10
6. Having appropriate behaviors in public	3.53	.57	4.30	.53	.36	.05
7. Opening to other's opinions	3.63	.61	4.37	.55	.30	.10
8. On time	3.83	.64	4.33	.54	.45	.01
9. Enthusiasm in group activities	3.63	.49	4.23	.50	.21	.24
10. Regular exercise	3.10	1.02	3.80	.71	.59	.00
11. Time management	3.67	.55	4.30	.46	.49	.00
12. Building team work	3.33	.66	4.17	.46	.49	.00
13. Conflict management	3.23	.50	4.20	.55	.44	.01
14. Group participation	3.77	.67	4.43	.50	.30	.10
15. Motivation of colleagues	3.4	.67	4.10	.60	.74	.00
16. Following group regulations	3.77	.56	4.37	.49	.44	.01
17. Acheivement determining and dedication	3.73	.63	4.40	.56	.40	.02
18. Accountability	3.63	.61	4.37	.55	.70	.00
19. Systematic thinking	3.43	.67	4.33	.47	.70	.00
20. Honesty	4.27	.52	4.47	.50	.55	.00

Administrative competencies perceived by the trainees before and after the training had the highest level for their honesty and the lowest for regular exercise. The trainee's administrative competencies were significantly different in terms of appropriate dress, communication with others, interpersonal relationships, manners, having appropriate behaviors in public, on time, regular exercise, time management, building team work, conflict management, motivation of colleagues, following group regulations, achievement determining and dedication, accountability, systematic thinking, honesty and were not significantly different in terms of emotional control, being open to other's opinions, enthusiasm in group activities and group participation.

Table 2 Comparing the competencies at the pre and post training of the program perceived by their supervisors.

	Behaviors/Competencies	Pre training		Post training		t	p
		$\bar{x}$	SD	$\bar{x}$	SD		
1.	Appropriate dress	3.96	.60	4.51	.50	.27	.13
2.	Communicationwith others	3.80	.74	4.38	.76	.60	.00
3.	Interpersonal relationships	3.87	.71	4.45	.76	.65	.00
4.	Manners	4.06	.57	4.54	.62	.55	.00
5.	Emotional control maturity	3.74	.63	4.35	.66	.62	.00
6.	Having appropriate behaviors in public	3.90	.65	4.45	.56	.57	.00
7.	Opening to other's opinions	3.87	.71	4.48	.67	.68	.00
8.	On time	3.77	.84	4.38	.80	.82	.00
9.	Enthusiasm in group activities	3.83	.77	4.45	.80	.80	.00
10.	Regular exercise	3.32	1.07	3.87	1.05	.82	.00
11.	Time management	3.61	.80	4.22	.84	.82	.00
12.	Building team work	3.51	.85	4.19	1.01	.76	.00
13.	Conflict management	3.51	.76	4.16	.77	.74	.00
14.	Group participation	3.83	.73	4.38	.80	.73	.00
15.	Motivation of colleagues	3.54	.85	4.16	1.00	.75	.00
16.	Following group regulations	3.90	.78	4.41	.71	.71	.00
17.	Acheivement determining and dedication	3.90	.78	4.35	.91	.74	.00
18.	Accountability	3.64	.66	4.41	.84	.69	.00
19.	Systematic thinking	3.48	.72	4.32	.87	.74	.00
20.	Honesty	4.32	.65	4.61	.55	.53	.00

Administrative competencies perceived by the supervisors before and after the training had the highest level for honesty and the lowest for regular exercise. From the supervisors' point of view, the mean score of administrative competency after the training was significantly higher than before in the most aspects except in terms of having smart and appropriate dress were not significantly different.

Table 3 Comparing the competencies at the pre and post training at the program perceived by their colleagues.

	Behaviors/Competencies	Pre training		Post training			
		$\bar{x}$	SD	$\bar{x}$	SD	t	P
1.	Appropriate dress	3.79	.72	4.62	.49	.47	.01
2.	Communicationwith others	3.79	.72	4.41	.56	.64	.00
3.	Interpersonal relationships	3.93	.65	4.65	.48	.37	.04
4.	Manners	4.00	.59	4.65	.48	.49	.00
5.	Emotional control maturity	3.68	.71	4.44	.50	.49	.00
6.	Having appropriate behaviors in public	3.79	.72	4.41	.62	.66	.00
7.	Opening to other's opinions	3.68	.80	4.41	.56	.60	.00
8.	On time	4.00	.84	4.45	.50	.75	.00
9.	Enthusiasm in group activities	3.79	.90	4.48	.50	.61	.00
10.	Regular exercise	3.13	1.0	4.03	.90	.77	.00
11.	Time management	3.58	.77	4.37	.49	.60	.00
12.	Building team work	3.37	.77	4.31	.54	.56	.00
13.	Conflict management	3.41	.56	4.34	.61	.60	.00
14.	Group participation	3.68	.71	4.44	.57	.44	.01
15.	Motivation of colleagues	3.48	.78	4.44	.57	.61	.00
16.	Following group regulations	3.75	.73	4.48	.57	.53	.00
17.	Acheivement determining and dedication	3.86	.74	4.55	.57	.43	.01
18.	Accountability	3.68	.71	4.65	.48	.50	.00
19.	Systematic thinking	3.41	.94	4.65	.48	.24	.20
20.	Honesty	4.27	.64	4.79	.41	.48	.00

Administrative competencies perceived by the colleagues before and after the training had the highest level for honesty and the lowest for regular exercise. From the colleagues' point of view, the mean score of administrative competency after the training was significantly higher than before in the most aspects except in terms of systematic thinking was not significantly different.

3. The course contents of the program

The course contents were perceived by the trainees as very useful and applicable in their work in terms of communication and relationships ($\bar{x}$=4.56, SD=0.56), public speaking ($\bar{x}$=4.53, SD=0.50), personal development ($\bar{x}$=4.50, SD=0.50), systematic and critical thinking ($\bar{x}$=4.50, SD=0.57), strategic planning ($\bar{x}$=4.46, SD=0.57), management and administration ($\bar{x}$=4.46, SD=0.57), group relationships and teamwork development ($\bar{x}$=4.26, SD=0.58).

DISCUSSION

The results revealed that the trainees, their supervisors and colleagues rated the administrative competency of honesty with the highest mean scores. It can be concluded that honesty is a basic desirable behavior for all administrators. This finding conformed with the 10 moral[2] guidelines of management for Thai government officers. Honesty is one of the guidelines that the government officers should practice in all thinking, speaking and actions[3,4]. They should adhere to the rules and regulations, and provide services to people with equality and equity. Moreover, honesty is one of the guidelines for the management of the good governance which is transparency[5]. Thus, it can be said that this training can attain the objectives of the program because the trainees behave better and do their work more effectively after attending the program.

However, the trainees had rated their behavior of regular exercise with the lowest mean score which conformed with the opinions of their supervisors and colleagues. The program had provided the

physical capacity tests at the beginning of the program and the exercise activity for 1 hour every morning. The trainees had regularly exercised during the training period, however, they had no exercise after going back to work. The reasons of stopping exercise were having no time, tiredness from working, no motivation, no equipments and skills etc. Therefore, the program may need to include more activities for promoting the trainees to exercise regularly and continuously such as having the physical capacity tests at the completion of the program and giving rewards if their physical capacity improved.

For the course contents, the trainees agreed that the contents of communication and relationships, public speaking, personal development, and systematic and critical thinking were very useful and applicable in their work. These contents were essential for them because they were the administrators and had several subordinates. The good communication skills were necessary for the success of organizational management[6,7]. In addition, the staff in the medical and public health fields normally needs to work as a team including multidisciplinary, therefore, the communication within the team are important. Contrarily, the content that had the lowest mean score was the additional skill activity (dance). As mentioned in the demographic data of the trainees, most of them worked in the community, thus, they might not have opportunity to use the dancing skills too often.

When comparing the administrative competencies and behaviors of the trainees before and after completion of the program, it was found that the trainees' administrative competencies were significantly different in terms of appropriate dress, communication with others, interpersonal relationships, manners, having appropriate behaviors in public, on time, regular exercise, time management, building team work, conflict management, motivation of colleagues, following group regulations, achievement determining and dedication, accountability, systematic thinking, and honesty, except the competencies of the emotional control, being open to other's opinions, enthusiasm in group activities and group participation were not significantly different. Therefore, it can be concluded that the program had helped the trainees to improve their administrative competencies or behaviors. Although there were some behaviors of the trainees were not changed after attending the program, this may be the trainees had already had the competencies or good behaviors before participating in the program[8,9].

CONCLUSION AND SUGGESTIONS

It can be concluded that the training program helped in improving the administrative competencies of the health administrators working at PCUs. Thus, it is suggested that the program should be used to improve the administrative competencies of health administrators at the primary care level for nationally. However, the results of this follow-up study suggested that the trainees would like to add more presentation assignments and participate in selecting the activities for promoting their skills. These would provide the knowledge and skills that were more useful for the trainees after finishing the training.

Further qualitative studies are still needed, for instance, promotion of motivation for regular exercise. The studies will provide the basic data for developing the guidelines for changing the trainees' behaviors to be more healthy, effectively and continuously.

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to the trainees, their supervisors and colleagues for their participation in the study. I also would like to express my greatest appreciation to the administrators of Boromarajonani College of Nursing, Chang Wat Nonthaburi for financial support.

REFERENCES

1. Public Health Administrator college. (2008). Core Competency for Public Health Administrator. Bangkok: S.P.S. Printing co.
2. Glapachon, P. (2005). Virtue, Morality, Code of Vocation Conduct. (2nd ed.) Bangkok: Cowfang Printing.
3. Surakitbovorn, S. (2006). The Leadership of Professional Executive. Bangkok: Suveeriyasan.
4. Prasertsri, R. (1991). The Leadership. Bangkok: Thanathut.
5. Phunpae, P. (2009). Leader and Change Administration. Pitsanulok: D.K. Copy.
6. Mungmeemahasan, U. (2009). Communicate Type Leader. Bangkok: Chulalongkorn University.
7. Sungrung, P. (2006). Human Relations in an Organization. (9th ed.) Bangkok: Suan Dusit Rajabhat University.
8. Maungman, T. & Suwan, S. (1997). Organization Behavior. Bangkok: Thaiwathanapanit.
9. Vithaya-udom, V. (2007). Organization Development. Bangkok: Thanathut.

INCIDENCE OF SURGICAL SITE INFECTION (SSI) AND ITS ASSOCIATION WITH PATIENT'S HEALTH RELATED OUTCOMES AT SECONDARY HOSPITAL KARIMABAD

Dr. Khurshid Khowaja *(PDF, PhD, BScN, RN, RM)*, **Dr. Neelofur Babar** *(Assistant Professor, Obs/Gyn)*, **Dr. Zaibunnisa Memon** *(Sr. Instructor, Obs/Gyn)*, **Ms. Rozina Shazad Ramji** *(BScN, RN, RM)*, **Ms. Ambreen Noorani** *(BScN, RN)*
Aga Khan University Hospital, Pakistan
Email: rozina.shazad [rozina.shazad@aku.edu]

ABSTRACT

Surgical site Infection is the second most common hospital acquired infection in the United States of America, increases patient mortality and morbidity with physical disability, prolonged hospital stay poses heavy economic burden. A prospective cohort study was conducted to follow patients until the 30th postoperative day after surgeries at secondary hospitals of Aga Khan University, Pakistan. National Nosocomial Infection Surveillance (NNIS) system criteria were used to identify the infections. The analysis of study will improve clinical outcome of the patients in the hospitals of the developing countries. Efforts of the study can provide guidance to implement processes to improve the care of surgical patients and can facilitates surgical infection prevention practices. Rationale of the study: The goal of the study was to estimate the incidence rate of surgical site infection after surgeries during hospitalization and after discharge from the hospital for 30 days. To estimate risk factors, to measure outcome with length of stay, cost of care, morbidity and mortality, To recommend the strategies for the prevention of surgical site Infections. Conclusion: This study has great impact on preventing infections. The Aga Khan Secondary Hospital, Pakistan, where approximately 8,000 surgeries per year are performed, cost effective quality care are provided and best practice guidelines implemented to prevent infections are monitored and evaluated. However, our SSIs rates were no significant but it remains a major challenge to manage & prevent surgical infections. Therefore, it is empirical to assess incidence of SSI in the institution and optimize evidence based practices on the basis of finding. Further research study also plan to recommend strategies to decrease Surgical Site Infections rates, increase patient safety and decrease the cost of patient and institution.

Key words: Surgical Site Infection (SSI), National Nosocomial Infection Surveillance (NNIS), Post operative Patient

INTRODUCTION

Surgical site Infection (SSI) is the second most common hospital acquired infection in the United States of America, increases patient mortality and morbidity with physical disability, prolonged hospital stay and poses heavy economic burden reported in different studies.[26,33,23,5] The Centers for disease control and prevention estimates that approximately 500,000 SSI occur annually in the United States.[28] The magnitude of SSI varies considerably in different parts of the world and different rates of SSI are reported such as in USA it has been reported 2.6%.[12] In African &Tanzania comparatively very high rate up to 19.4%.[6] Consequently, in one of the study in Karachi Pakistan showed significantly high infection rate of 22.7% in emergency surgeries and 8.89% in elective surgical procedures.[34] Another study from Sindh (province of Pakistan) Sangrasi, 2008 found SSI rate 13.0% in different surgeries.[33] However, two studies from Italy and Karachi Pakistan showed post discharge SSI rates are 60% and 22%

respectively.[26,2] Surgical site infections represent a substantial burden of disease on patients and health services. One study reported the mean length (mean of 44.2 vs. 23.5 days; P<0.001) of postoperative stay is significantly longer for patients with surgical site infections than those without infections.[1] According to CDC definition of wound classification reported different rates of SSI. According to Pakistani studies SSI rates are 5.05% clean, 8.39% clean contaminated, 45.45% contaminated and 66.6% dirty cases, 5.3% in clean operations, 12.4% in clean-contaminated, 36.3% in contaminated and 40% in dirt-infected cases reported respectively.[33,34] It has been estimated that each patient with a SSI will require an additional days results in the doubling of hospital costs of patient.[2,29,13] The true rate of SSI is actually unknown but, it is varies from surgeon to surgeon, hospital to hospital, one procedure to another and even from one patient to another patient. The primary management is for all healthcare practitioners to make significant efforts and develop numerous measures to prevent SSI.[2] According to current literature, active SSI surveillance is useful in reducing SSI incidence by surveillance-induced infection control efforts. According to Teresa et al, 2008 "Infections are associated with complications or extensions of infections".[38] Therefore in order to decrease the morbidity and mortality of the postoperative patients new surgical innovations must be explored and developed.

RATIONALE FOR STUDY

1. Rationale of the study:

The Pakistani healthcare system most of the health care institution have lack of access to health care facilities, deficient health infrastructure, extreme poverty, and lack of awareness among the population regarding health maintenance are fundamental barriers to public health advancement. This means that the people of Pakistan are deprived of their basic human right to access good healthcare. This health care burden can be prevented through promoting the patient safety goals.

The Aga Khan Secondary Hospital Karimabad, where approximately 1500 surgeries per year are performed, cost effective quality care are provided and best practice guidelines to prevent infections are monitored and evaluated. However, our SSIs rates are not known yet and it remains a major challenge to manage & prevent surgical infections. Therefore, it is empirical to assess incidence of SSI in the institution and optimize evidence based practices on the basis of finding. Study also plan to recommend strategies to decrease SSI rates, increase patient safety and decrease the cost of patient and institution.

LITERATURE REVIEW

SSI is the most frequent nosocomial infections accounting for 38% of all such infections.[22] SSI can occur at an incision site within 30 days of an operation, but wounds that are closed and primarily healed are not considered infected.[16] The patient's health related outcome in SSI are infections experience substantial morbidity, pain and discomfort, inconvenience, and cost and, occasionally, may die. From the perspective of health services, patients with surgical site infections stay in hospital on average about twice as long as uninfected patients and the cost of total care is more than doubled.[40]

Moreover, SSI rate varies in different countries, different areas and even in different hospitals. Internationally SSI rate from 1% to 2.6% is reported. According to Horan, 1992 from USA reported that SSI is the third most and frequently nosocomial infection, account for 14–16%.[15] Annually in USA 30 million surgical procedures have been performed and out of 780,000 results in SSI.[9] Moreover, there are numerous SSI studies conducted in Asian countries. In one of the study from Iran Tehran reported the high rate of SSI 17.4% compared with the 14% quoted in literature.[36] Whereas, in Japan SSI rate is reported 7.7%. With regard to surgical procedures.[14] In Vietnam, out of 702 surgical patients, 80 (11.4%) developed SSI.[18] In Thailand nine hospitals reported SSI rate 1.4 infections/100 operations.[16] On the other hand, In Pakistan very few studies conducted on SSI. In one of the study

from Sindh, Pakistan has reported SSI 13.0%.[33] According to Centre of Disease Control, surveillance and prevention programmes can reduce the number of Nosocomial infection in hospitals by 32% each year. In addition literature has reported distinct rates of SSI in different surgeries. SSI rates are 2–5% in clean extra-abdominal surgeries, 20% in intra-abdominal surgeries, 1.15% in herniorraphy, 9.2% in colon surgery reported respectively.[5,7,35,25] Moreover many studies estimate post discharge SSI rates in various studies. Post discharge SSI detected 27.6% and 10.6%.[16,27]

According USA survey report (1992) risk for wound infection in Clean wounds is less than 1.5% (prosthesis placements, central nervous system operations, or cardiac procedure), Clean contaminated wound is 7.7% (head and neck, thoracic, biliary, gastro duodenal and Genito-urinary procedures, colorectal operations) and, Contaminated, infected, or dirty wounds (a ruptured, viscous or traumatic wound in which the rate of infection is 15–40%:. 5.3% in clean operations, 12.4% in clean-contaminated, 36.3% in contaminated, 40% in dirt-infected cases, and 2.2%, 0.5% in clean operation, 2.8% in clean contaminated, 9.1% in contaminated and 2.3% in dirty operations, and 8.3% in clean wounds, 8.6%, clean-contaminated, 12.2%, 43.9% in dirty wounds are respectively report in different studies.[24,33,30]

Subsequently, there is several putative risk factors have been found in many studies. These significant risk factors are Preoperative controls of co-morbid conditions, control of operative environment, proper skin cleansing, use of aseptic surgical technique, high degree of wound contamination, prolonged preoperative hospital stay, emergency operation, prolonged duration of operation, any complication such as obstruction or perforation, emergency admission, age over 40, hospital stay prior to surgery, Age, use of surgical drain, duration of operation, obesity, and diabetes.[6,4,16,30,31,36,37]

On the other hand different Studies has quoted the most common pathogens isolated are *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa* with different percentages of infections respectively.[16,18,21] Estimating the cost of hospital infection has become a matter of increasing interest in terms of health economics. In Thailand study mean of extra hospital charge for SSI is 43,658 (95% C.I; 30,228-57,088.[16] There are number of Studies have shown that the postoperative length of stay with SSI increase the cost of the treatment and put economical burden on patients and their families.[2,19,11,8,32,16,,20,17,40,2,29]

The costs can estimate through increased hospital lengths of stay, ambulatory nursing visits for wound care, and pharmacy costs for antibiotics, increased outpatient and emergency room visits, diagnostic laboratory studies, reoperation rate, and physician expenses.

OPERATIONAL DEFINITION OF SSI

Diagnosis of SSI is made according to the National nosocomial infection surveillance (NNIS). The definitions of Nosocomial infection. Surgical wounds are classified according to Centre for disease control (CDC) classification, for superficial infections. These criteria included 1) purulent wound secretion; 2) pain or tenderness, localized swelling, redness, or heat at the surgical site SSI is classified as being either incision or organ/space. Incision SSI are divided into those involving skin and subcutaneous tissue (superficial incision) and those involving deeper soft tissue of surgical incision (deep incision SSI). Organ/space SSI involves any part of the anatomy other than incised body wall layers that was opened or manipulated during an operation.[38,26,1,22,3,15,39]

GOAL OF THE STUDY

Identification of Incidence of Surgical Site Infection and its Association with SSI bundle compliance.

OBJECTIVES

1. To estimate the incidence rate of surgical site infection (SSI) in post LSCS patients during hospitalization and after discharge from the hospital for 30 days.
2. To estimate bundle compliance and other risk associated factors.
3. To measure incidence rate of surgical site infection (SSI) with bundle compliance
4. To recommend the strategies for the prevention of surgical site Infections and enhance the patient safety at tertiary care hospital.

RESEARCH METHODOLOGY

Study Design:

A prospective cohort study was conducted at Karimabad secondary hospitals to estimate the incidence rate of surgical site infection (SSI) in all post LSCS patients during hospitalization and after discharge from the hospital for 30 days. National Nosocomial Infection Surveillance (NNIS) system criteria (refer to operational definition of SSI) used to identify SSI associated with surgeries.

Surveillance staff was assigned to assess surgical patients every day and her key roles will be: direct observation, case note review, and questioning of the nurses caring for the patients. Patients were contacted via telephone, on follow-up appointments with in four week after their operations. Thus, Surveillance staff followed until 30 days or up till their wounds are healed without infection or until an infection was detected.

STATISTICAL ANALYSIS

A descriptive analysis was done for demographic, clinical features and results were presented as mean ± standard deviation for quantitative variables and number (Percentage) for qualitative variables. In univariate analyses, rate of SSI was compared with other variables using the Chi-square test or Fisher exact test where appropriate. For contrasts of continuous variables, one-way analysis of variance, and independent sample t-test will be used to assess the difference of means.

All analyses was conducted by using the Statistical package for social science SPSS (Release 16.0, standard version, copyright © SPSS; 1989-02). All p-values were two sided and considered as statistically significant if < 0.05.

SAMPLE SIZE:

All Post operative (LSCS) patient.

ETHICAL CONSIDERATION

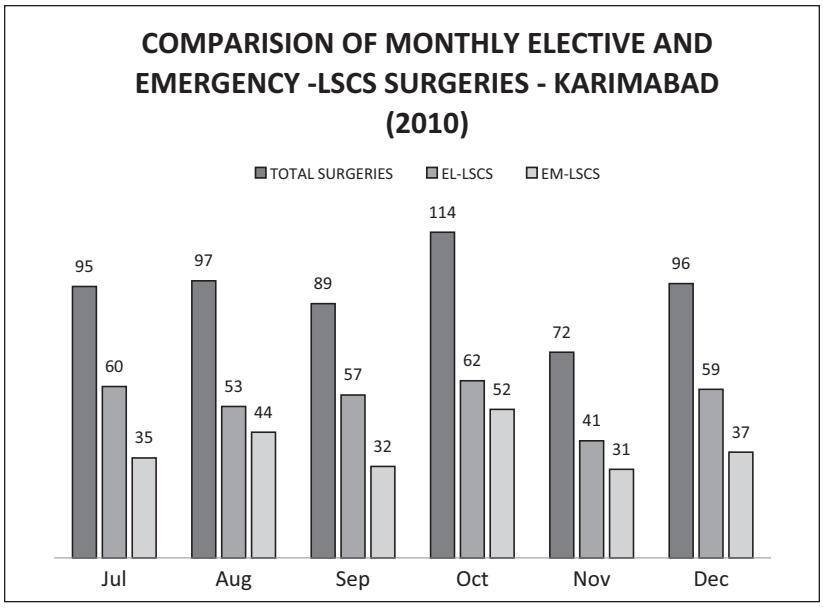
Permission to conduct the study was obtained from the ethical review committee of tertiary care university hospital Karachi, Pakistan. Verbal consent was obtained from study subjects (Patients) where ever required. The confidentiality of data will be maintained by assigning special codes to study subjects.

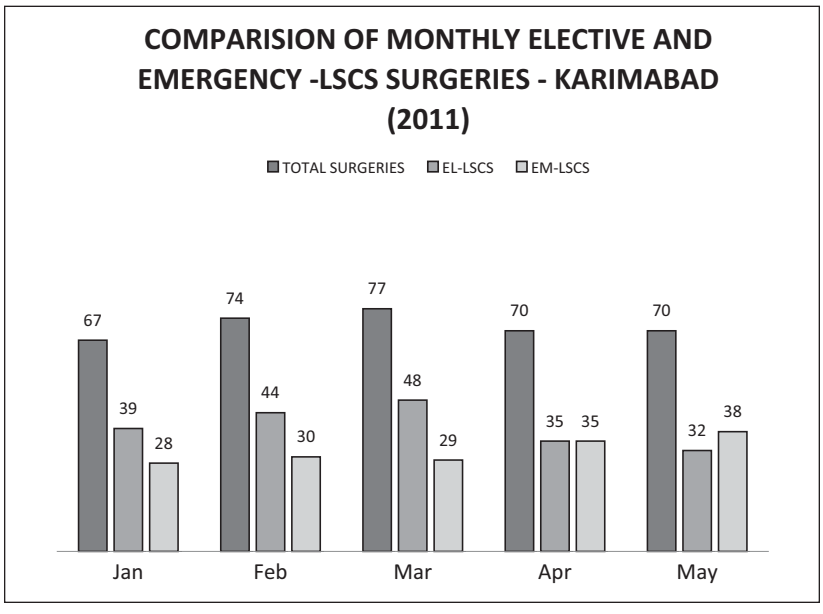
INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria

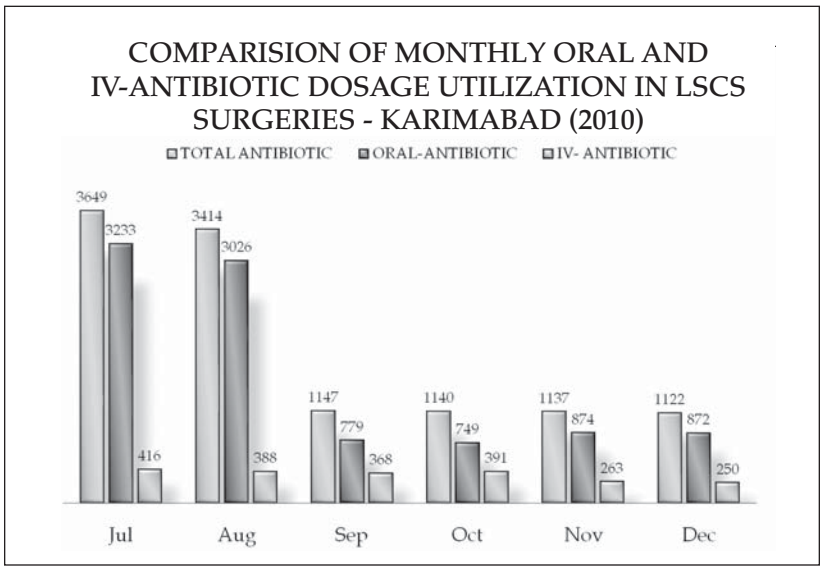
1. Age >14 years.
2. Regardless of comorbits.

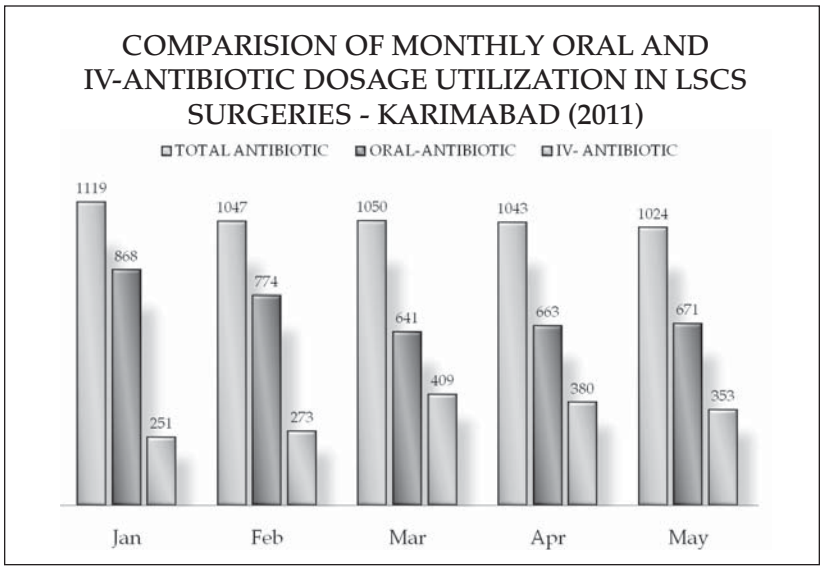
GRAPH 1



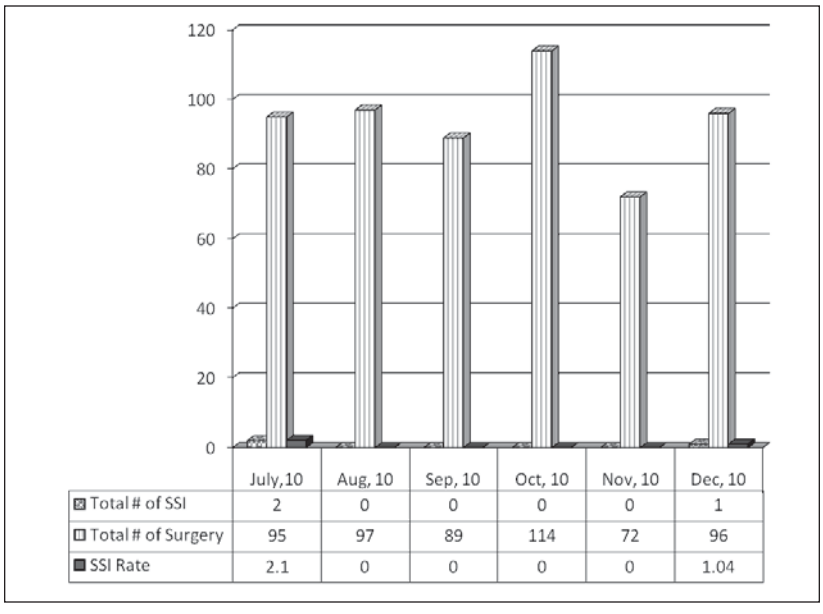


GRAPH 2

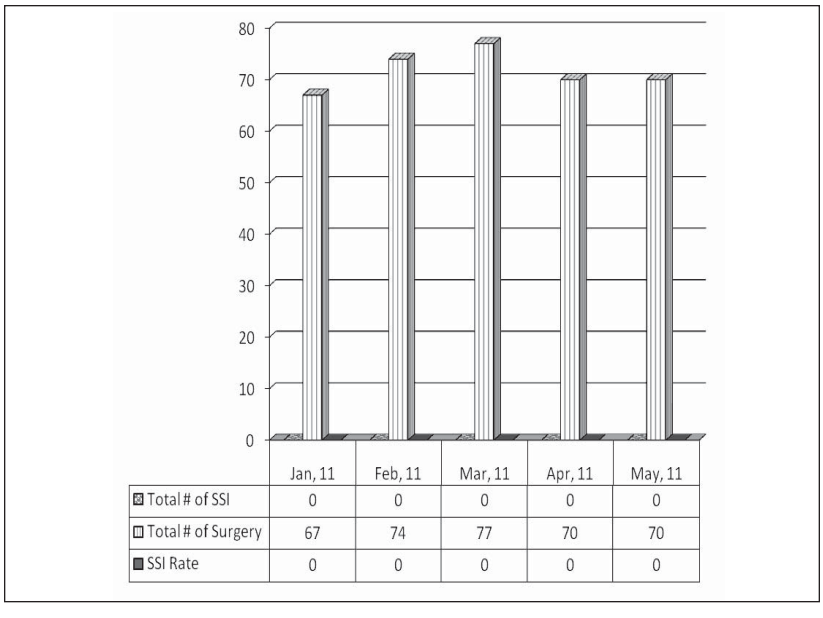




3. Patients undergoing LSCS Surgery



	July,10	Aug, 10	Sep, 10	Oct, 10	Nov, 10	Dec, 10
Total # of SSI	2	0	0	0	0	1
Total # of Surgery	95	97	89	114	72	96
SSI Rate	2.1	0	0	0	0	1.04



	Jan, 11	Feb, 11	Mar, 11	Apr, 11	May, 11
Total # of SSI	0	0	0	0	0
Total # of Surgery	67	74	77	70	70
SSI Rate	0	0	0	0	0

Exclusion Criteria

1. Refusal to participate in the study.
2. Patients already receiving antibiotics for >1 week.
3. Patients undergoing re-operation.
4. Multiple surgeries

STUDY INSTRUMENTS

Extensive literature search was done to develop study instrument. The instrument will be pilot to get the reliability and validatity.

FINDINGS

There were two types of data sets. One data set of LSCS data where its indicated that pt was plan elective or emergency LSCS. (Refer Graph 1) and Graph 2 Indicates that utilization of antibiotics during patient hospitalization.

Study revealed that, at secondary hospital of Aga Khan University, Karachi the SSI rate was within bench mark but need to review for other categories of surgeries. Refer graph 3

LIMITATION

The major limitations were lack of time and difficult to contact participants as they were in postnatal phase and some time not available. In addition, this study only for LSCS we should further study for other categories of surgeries in order to monitor SSI rates.

RECOMMENDATIONS

Based on the results certain recommendations were proposed:

- Further research and interventions was required
- Community projects should be done
- It should Part of dash board indicators and regularly present in quality improvement committees
- Should explore for other surgeries
- Should replicate for other secondary Hospitals

CONCLUSION

Surgical site Infection (SSI) is the second most common hospital acquired infection resulting in increased morbidity, hospitalization, and costs. SSI rates at the Aga Khan Secondary Hospital, Karachi Pakistan are not currently detected and monitored. Therefore it is crucially important to monitor SSI rates in the institution which can be one of the most important clinical indicators to monitor in order to implement active wound surveillance and prevention programs and anlysis of the study will help to improve clinical outcome of the patients in the tertiary care hospitals of the developing countries.

REFERENCES

1. AHRQ Technical Reviews and Summaries, AHCPR Supported Clinical Practice Guidelines, (2004). CDC/NNIS definitions for nosocomial infections.
2. Ahmed, F, Wasti, S. (2001). Infectious complications following abdominal hysterectomy in Karachi, Pakistan. *Int J Gynaecol Obstet.*; 73(1):27-34-73.

3. Albers, B.A, Patka. P, Haarman, H.J, Kostense, P.J. (1994). Cost effectiveness of preventive antibiotic administration for lowering risk of infection by 0.25%. (12):625-8.
4. Ambiru, S, Kato A, Kimura F, Shimizu H, Yoshidome H, Otsuka M, Miyazaki M. (2008). Poor postoperative blood glucose control increases surgical site infections after surgery for hepato-biliary-pancreatic cancer: a prospective study in a high-volume institute in *Japan*. *J. Hosp Infect.*; 68(3):230-3.
5. Astagneau, P, Olivier M., Grandbastien B. (1999–2004) Surgical Site Infection Surveillance In Franc;. *Journal of Thrombosis and Homeostasis: 5*.
6. Bishnu, R.G. HomPrasad, P.P, Ravi. S, Chandrasekhar, T. Sreeramareddy, Pranav Kumar, S. (2008). The Surgical site infection and Antibiotics use pattern in a tertiary care hospital in *Nepal. Journal of Pakistan Medical Association*, 58-3.
7. Bratzler D.W, Houck, P.M. (2004). Antimicrobial prophylaxis for surgery: an advisory statement from the National Surgical Infection Prevention Project. *Clin Infect Dis*. 2; 38(12):1706-1715.
8. Coello, R, Charlett A, Wilson J, Ward V, Pearson A, Borriello P. (2006), Adverse impact of surgical site infections in English hospitals. *Hosp Infect*; 62(3):392.
9. Cook, P. (2004). Hospital learn simple, clean, cheep steps on prevent infections. *An Francisco Churchle*.
10. Donald, M, Grabsch, E, Marshall, C, Forbes. A. (1999). Single- versus multiple-dose antimicrobial prophylaxis for major surgery: *HKMJ*: 5-1.
11. Graves, N, Halton K, Curtis M, Doidge S, Lairson D, McLaws M, Whitby M. (2006). Costs of surgical site infections that appear after hospital discharge. *Emerg Infect Dis*.: 12(5):831-4.
12. Gaynes, R.P, Culver, D.H, Horan, T.C, Edwards, J.R, Richards C, Tolson J.S. Surgical site Infection (SSI) rate in the United States, 1992 to 1998 (2001): the National Nosocomial Surveillance System basic SSI risk index. *Clin Infect Dis*: 33:69-77.
13. Geubbbles, E, Minites Grout, A, J, Van den Berg J, M, A, S. (2000) An operating surveillance system of surgical site infections in the Netherlands: results of the PREZIES national surveillance network. Preventie van Ziekenhuisinfecties door Surveillance. *Infect Control Hosp Epidemiology*; 21 (5): 107.
14. Harihara, Y, Konishi, T. (2006). Surgical site infection (SSI) surveillance. *Nippon Geka Gakkai Zasshi*.: 107(5):230-4.
15. Horan, T.C, Gaynes, R.P, Martone, W.J, Jarvis, W.R, Emori, T.G. CDC definitions of nosocomial surgical site infections (1992): a modification of CDC definitions of surgical wound infections. *Infect Control Hosp Epidemiol*; 13:606-8.
16. Kasatpibal, N, Jamulitrat, S, Chongsuvivatwong V. (2005). Standardized incidence rates of surgical site infection: a multicenter study in Thailand. *Am J Infect Control.*: 33(10):587-94.
17. Leaper, D.J, Van,Goor .H, Reilly J, Petrosillo N, Geiss HK, Torres AJ, Berger A. (2004). Surgical site infection-a European perspective of incidence and economic burden. *Int Wound J.*; 1:247–273
18. Le TA, Sohn A.H, Nguyen P.T, Vo, T.C, V.o V.N, Tran Nguyen T.H, Ewald B, Dibley M.(2006). Microbiology of surgical site infections and associated antimicrobial use among Vietnamese orthopedic and neurosurgical patients. *Infect Control HospEpidemio.*; 27(8):855-62.
19. Maksimović, J, Marković-Denić, L, Bumbasirević, M, Marinković, J, Vlajinac, H. (2008). Surgical site infections in orthopedic patients: prospective cohort study *Croat Med J.*; 49(1)
20. Masood, A, Shams, N, Obaidullah, K. S. Manzar. (2007). A Surgeon's Dilemma Post- operative wound infection" *Pakistan Journal of Surgery*, Volume 23.
21. Mahmood, A. (2000), Bacteriology of surgical site infections and antibiotic susceptibility pattern of the isolates at a tertiary care hospital in Karachi. *J Pak Med Assoc*.;50(8):256-9-50.
22. Mangram, A.J, Horan, T.C, & Pearson, M.L. (1999). Guideline for prevention of surgical site infection; hospital infection control practice advisory committee. *Infect Control Hosp Epidemiol* 20:250–278.

23. Nicolas, P, Yazdan, Y, Pierre. C. (2007). Research Article: Prevention of surgical site infection after breast cancer surgery by targeted prophylaxis antibiotic in patients at high risk of surgical site infection. *Journal of Surg. Oncol*.: 96:124-129.
24. Nguyen, D, MacLeod, W.B, Phung, D.C, Cong, Q.T, Nguy, V.H, VanNguyen, H, Hamer, D.H (2001). Incidence and predictors of surgical-site infections in Vietnam. *Infect Control Hosp Epidemiol*.; 22(8):485-92.
25. Nandi, et al. (1998)systematic review. *Aust NZ J Surg*; 68:388-96.
26. Petrosillo, N, Drapeau, C.M, Nicastri E, Martini L, Ippolito G, Moro ML; Anipo. (2008). surgical site infections in Italian Hospitals: a prospective multicenter study. *BMC Infect Dis*. 7; 8:34
27. Prospero E, Cavicchi A, Bacelli S, Barbadoro P, Tantucci L, D'Errico M.M. (2006). Surveillance for surgical site infection after hospital discharge: a surgical procedure-specific perspective. *Infect Control Hosp Epidemiol*; 27(12):1313-7.
28. Perencevich E.N, Sands K.E, Cosgrove S.E. (2003). Health and economic impact of surgical site infections diagnosed after hospital discharge. *Journal of Emerg Infect Dis*: 9(2):196-203.
29. Plowman R, Graves N, Griffin MA, Roberts JA, Swan AV, Cookson, B, et al. (2001). The rate and cost of hospital–acquired infections occurring in patients admitted to selected specialties of a district general hospital in England and the national burden imposed. *J Hosp Infect*: 47(3):198–209.
30. Raja'a Y.A, Salam A.R, Salih Y.A, Salman M.S, A.l-Baseer L.S, Al-Kirshi NA, Al-Jalal NS. (2002). Rate and risk factors of surgical site infections with antibiotic prophylaxis *Saudi Med J.*; 23(6):672-4.
31. Razavi, S.M, Ibrahimpoor M, Sabouri Kashani A, Jafarian A. (2005). Abdominal surgical site infections: incidence and risk factors at an Iranian teaching hospital. *BMC Surg*. 27; 5:2.
32. Rey J.E, Gardener, S.M, Cushing, R.D. (2005) Determinants of surgical site Infection after breast biopsy. *Am J Infect Control*; 33:126-9.
33. Sangrasi A.K, Leghari A.A, Memon A, Talpur A.K, Qureshi G.A, Memon J.M. (2008) Surgical site infection rate and associated risk factors in elective general surgery at a Public sector medical university in Pakistan. *Int Wound J*. 7; 8:34
34. Salman, A, Khalid, M. G, Mohammed A, Yar Mohammad, Abdul R.G, Fowad K, Abdul M C. (2001). Surgical Wound Site Infection - Our experience. *Ann King Edward Med Coll*: 7(3):211-2.
35. Shojania, K.G, Duncan, B.W, McDonald, K.M, (2001). Making Health Care Safer: A Critical Analysis of Patient Safety Practices. Evidence Report/Technology Assessment. *Journal of AHRQ*. 43.
36. Simsek Yavuz S, Bicer Y, Yapici N, Kalaca S, Aydin O.O, Camur G, Kocak F, Aykac Z. (2006). Analysis of risk factors for sternal surgical site infection: emphasizing the appropriate ventilation of the operating theaters. *Infect Control HospEpidemiol*. 27(9):958-63.
37. Siegman-Igra Y, Rozin R, Simchen E. (1993). Determinants of wound infection in gastrointestinal operations: the Israeli study of surgical infections. J Clin Epidemiol. 1993 Feb; 46(2):133-40.
38. Teresa C. Horan, Mary, Andrus, B.A, Margaret A. Dudeck, Atlanta, Georgia (2008). CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting Am J Infect Control 36:309-32.
39. Vegas A.A, Jodra V.M, Garcia M.L. Nosocomial infection in surgery wards: a controlled study of increased duration of hospital stays and directs cost of hospitalization. Eur J Epidemiol (1993); 9(5):504-10.
40. Wilson APR, Gibbons C, Reeves BC, Hodgson B, Liu M, Plummer D, Krukowski ZH, Bruce J, Wilson J, Pearson. (2004). Surgical wound infection as a performance indicator: agreement of common definitions of wound infection in 4773 patients. 25; 329(7468):720.

HUMAN RESOURCES RETENTION AMONG HEALTH CARE PERSONNEL IN IRAN

Majid Rezai-Rad, PhD
Health Care Management, Assistant Professor,
IRI Police Univ. (IRIPU), Management Dept., Tehran-: IRAN.Email: mrezairad41@yahoo.com
Abdullah Majidi, PhD
State Management, Assistant Professor,
IRI Police Univ. (IRIPU), Management Dept., Tehran, IRAN.Email: drmajidi@yahoo.com
Hurmuz Sanaeinasab, PhD
Health Education, Assistant Professor,
Baghiyatallah Univ. of Medical Sciences(BUMS), Tehran, IRAN.Email: sanain20@yahoo.co.in

ABSTRACT

All measurements for human resources retention in any organization are implemented to have healthy, qualified, and motivated personnel. Benefitting from such personnel, any organization can ensure that all the duties and missions of the organization are performed in the best way, and clients get their utmost services. Without suitable human resources retention, we will face different situations such as low motivation, low turnover, and job displacement and mobility. This is the case in all organizations, but the situation is more under consideration in health care services sections wherein health care providers are maintaining life or death, and health or wellness of their clients.

Different factors have impact on retention among personnel, especially health-care providers. The present study mainly aims at finding out the most effective factors and aspects of retention among health care personnel in Iran and different ways of promoting retention among them.

The studies conducted in Iran indicate that among different factors of retention on the part of health care providers and related workers: recruiting qualified personnel, suitable welfare benefits, services, and programs, job satisfaction, job security, leadership style, job enrichment, organizational culture, job motivation are the most determining factors.

Key Words: Employees retention, Health care workers, Human resources management, Job satisfaction, Turnover, Organizational commitment

INTRODUCTION

Health care systems cannot function correctly without trained health workers[1], however researchers and policymakers have recently paid more attention to their role in developing countries[2]. Experts in many countries agree that health workers are an integral part of health systems, and a critical element in improving health outcomes. Therefore, without sufficient number of well-trained and supported health workers, health-related Millennium Development Goals (MDGs)[1, 3] would not be achieved. Developing countries seek to strengthen their health systems to help meet the Millennium Development Goals (MDGs). An important impediment ahead of achieving the MDGs is the absence of properly trained and motivated workforce, and improving the retention of health workers is critical for health system performance[1].

Human resources, in any country, are the heart of the health system, the most important aspect of health care systems, and a very important component in health policies[4]. Health human resources

include trained health professionals (doctors, nurses, midwives, pharmacists, dentists, laboratory and all other health-related technical assistants), and non-health professionals working in health systems (managers, economists, accountants, information technologists and all other administrative supporting workers)[5]. These human resources have specific characteristics that make them difficult to manage: higher education, costly specialized courses, vital services to clients and service in need by them, not easily replaceable in a short time. As in the EMRO Region it has a different look: "the disparity in supply and demand, geographic mal-distribution in urban and rural settings and imbalance in the number of different categories of professionals, represent further dimensions of the crisis facing health system development and its health workforce."[5] And "the development of human resources for health is not a matter of choice but a strategic necessity." Health care workers are the "heartbeat of each and every health system and the availability of sufficient and competent workers is vital to the well-being of people and achievement of national, regional and global health goals," including the MDGs[5].

Part of the duties of a government … and health care human resource manager, among other responsibilities, is retention of employees in … their organizations. Developing and implementing comprehensive human resources for health plans have different benefits including "adequate supply and retention of well-trained health staff, high levels of teamwork and staff performance, savings in costs because of reduced absenteeism and staff turnover, more motivated workforce, healthier population, improved health outcomes, increased access to health care services, and enhanced health interventions and program outcomes."[5]

Iran as a member of EMRO also has its own health human resources problems, such as turnover, migration from rural to urban regions and abroad, quitting their job, etc. The present systemic review aims at looking into the effective factors in the retention of health care workers in Iran.

METHOD

A systematic review was utilized to implement the study. All studies conducted in Iran, directly and/or indirectly were included in the study. Farsi (Persian) texts were included in the study. The search was carried out through PUBMED and EBSCO, Google Scholar databases for English items related to previous studies and IRANDOC, SID, medical and humanities journals. The search terms used were: employees' retention, staff retention, turnover, organizational commitment, job satisfaction, health care providers, and health practitioners. There was no time limitation due to the limited number of researches in Iran. Two reviewers independently assessed the works searched.

FINDINGS

Only 11 studies were finalized in the study related to the objectives of the study in Iran. Ten major themes regarding retention factors were identified as follows:

- Job incentives (in terms of job content and entity, working conditions, job security, job stress, job dependence, autonomy, personnel motivations; procedural, distributive, and interactive justice, job independence and diversity, job enrichment, group persuasion, proper encounter of people and authorities)
- Payment and benefits (in terms of satisfaction of pays, effective payment system, payment and remuneration assessment system, reward, housing allowance, welfare, raise in payment and benefits, bank loan facilitation, land grant for building)
- Training & development (having the specialty and knowledge of work, providing proper training, providing opportunity for continuing education, job skill development, scientific promotion of personnel)

- Socialization (referring to social support, orientation before employment, changing organizational culture, setting up an academic position for health workers, appreciating specialists' performance)
- Management & leadership (refers to supervision and leadership style, communication, persuasive behavior of supervisors, appreciation of mangers, managerial support)
- Clearly defined goals and expectations (refers to clear career path, lack of role ambiguity, role conflict, and clear duties excepted)
- Suitable utilization of human resources (in terms of delegating jobs according to competence, utilizing human resources in a correct way)
- Cooperation and team cohesion atmosphere
- Recruitment & employment (in terms of revising employment system, recruiting new managers from inside organizations)
- Demographic characteristics (in terms of marital status, level of education, age, sex, years of service, and rank).

The articles used in the study indicate the themes that each study considers as retention factors in Iran, which are illustrated in table 1.

Table 1. Major Retention Factors in Iran

Author(s)	Year	Job incentives	Payment & benefits	Management & leadership	Training & development	Socialization	Clearly defined goals and expectations	Suitable human resource utilization	Recruitment & employment	Demographic characteristics	Environment of cooperation & team cohesion
Majidi[6]	1997		+		+	+		+	+		
Rahmanpour[7]	2002		+				+	+			
Hooshmand Bahabadi, Sayf, & Nikbakht, Nasrabadi[8]	*2005*	+		+		+					
Motamedi[9]	*2005*	+	+		+	+					
Ranjbar & Vahidshahi[10]	2007	+	+	+							
Jahangiri & Mehrali[11]	2009	+	+	+			+				+
Sajadi, Khamesipour, Hassanzadeh & Vali[12]	*2009*	+			+	+			+		
Nehrir , Tofighi, Karimi Zarchi, & Honarvar[13]	2010	+	+	+						Married	
Shahbazi,Onsoori, & Javaheri Kamel[14]	*2010*	+		+	+					Level of education, age, sex, length of service, rank	
Akbari Pakrow[15]	2011	+	+								
Golparvar & Nadi[16]	2011	+									
Total Number of studies	**11**	**9 (82%)**	**7(64%)**	**5 (45%)**	**4 (36%)**	**4 (36%)**	**2 (18%)**	**2 (18%)**	**2(18%)**	**2(18%)**	**1 (9%)**

DISCUSSION

The present article reviewed the factors in the retention of human resources of health care, and has come up with recommendations to improve the retention of health care workers in Iran. Ten different major themes were identified in these studies. Any actions done to improve health worker performance are "associated with better motivation, and a well-motivated workforce is likely to mean better retention of existing workers and increased recruitment of new workers."[17]

Different studies have reinforced the studies explored in this paper which could be used to promote the retention of health care workers not only in Iran but also in all WHO members interested in achieving the MDGs. These policy briefs are intended to assist those who make and carry out health policy worldwide, which address the following[17]:

- Strengthening information and research on the health workforce: strategies for action
- Investing in education for expanded capacity and lifelong learning
- Making the most of the existing health workforce
- Addressing the complex challenges of health worker migration
- Bridging between health workers in separate public health programs
- Financing health workforce development.

Willis-Shattuck, et al., in the previous systemic review concludes that[18]:

> high quality care cannot be provided unless issues of de-motivated staff are comprehensively addressed and more information is clearly needed to strengthen the evidence base for effective human resource strategies and policy decisions. Financial incentives, career development and management issues are core factors affecting motivation. It is clear that recognition is highly influential in health worker motivation; furthermore adequate supplies and appropriate infrastructure are factors that can significantly improve morale. Hence, financial incentives by themselves are not the appropriate response….

Different recommendations have been made to promote retention among community health worker (CHWs) as a toolkit done by Paraprofessional Healthcare Institute (PHI)[19, 20], for Staff retention and support by Hongoro, & McPake[4], for unplanned migration, tailoring education and recruitment to rural realities, improving working conditions more generally and facilitating the return of migrants represent important retention strategies,[1] working conditions and management practices, are as important an incentive as pay; providing drugs, gloves, equipment, decent infrastructure and adequate supervision are central to improving morale and retention[21], on how the impact of retention strategies be measured and evaluated[3], on positive leadership in nursing[22, 20] practical ways to Improve Employee Retention by American Society of Radiologic Technologists[23], various factors influencing staff retention and mobility[24].

Limitation: We only had access to state universities dissertation and thesis in IRANDDOC databases; Islamic Azad University was not included. Some of the earliest dissertations did not include any information except title, author, date, university, and/advisor.

CONCLUSION

With respect to the relationship between organizational commitment and job satisfaction, job security, and knowledge and specialty (professionalism) and not quitting a job, we can come to the dimensions of human resources retention. Therefore, all the factors that affect these dimensions, i.e. job satisfaction, job security, organizational commitment, knowledge and specialty, could also affect quitting job (table 2).

Table 2. Dimensions of Human Resources Retention

Author(s), year	Physical well-being	Psychological well-being	Coordination towards policies and strategies of the organization	Job satisfaction	Organizational commitment	Intention to stay
Gharajah, 2010[25]	+	+				
Farhangi & Samadi, 2011[26]		+	+			
Jahangiri & Mehrali, 2009 [27]				+	+	+
Sajadi & others, 2009[12]					+	+

The most important dimension of human resources retention is job satisfaction. Rezaei Dehghani, Hosseini, Tavakol, & Bakhtiyari argued that human resources retention not only prevents the turnover of vital service of health care providers, but also those who stay at work, have a suitable attitude toward clients: this in turn, especially in service works will promote the quality of service[28].

REFERENCES:

1. WHO. *The world health report 2006: working together for health*. (World Health Organization, 2006)
2. Grépin, K. A. & Savedoff, W. D. 10 best resources on… health workers in developing countries. *Health Policy and Planning* **24**, 479 (2009)
3. Dolea, C., Stormont, L., Shaw, D., Zurn, P. & Braichet, J. *Increasing access to health workers in remote and rural areas through improved retention*. (World Health Organization, 2009)
4. Hongoro, C. & McPake, B., How to bridge the gap in human resources for health. *The Lancet* **364**, 1451-1456 (2004)
5. WHO Regional Office for the Eastern Mediterranean. *Strengthening National and Sub national Departments for Human Resources Development*. Vol. 1 (World Health Organization, 2008)
6. Majidi, A. *The impact of turnover on organizational commitment and job satisfaction* (M.Sc. thesis), Tarbiyat Modares University, (1997)
7. Rahmanpour, L. *Effective factors of human resource retention among Refah Bank workers* M.Sc. thesis, Tarbiat Modares, (2002).
8. Hooshmand Behabadi, A., Sayf, H., Nikbakht Nasrabadi, A. Survey of nurse retention in a 10 years period. *Teb va Tazkiyeh*, 10-20 (Winter 2005).
9. Motamedi, A. Factors related to the retention of experts in deprived regions (in Iran). *Social Science Letter* **24**, 175-197 (2005)
10. Ranjbar, M., Vahidshahi, K. Effective Factors on Faculty Members' Job Satisfaction in Mazandaran University of Medical Sciences, School of Medicin, 2006. *Studies in Development of Medical Education* **4**, 92-99 (Autumn & Winter 2007)
11. Jahangir F, Pazargadi M, Mahfoozpoor S & Akbarzadeh Baghban AR. A Single High-Dose 308-nm Excimer Laser in Treatment of Stable Plaque Psoriasis, *Pajoohandeh Journal* **12**, 407-416 (2007)
12. Sajadi, H. S., Khamesipour, M., Hassanzadeh, A., Vali, L. Organizational commitment and job turnover among staff in administrative chancellery of Isfahan University of Medical Sciences (IUMS). *Iran Occupational Health Journal* **6**, 37-40 (Falls 2009).
13. Nehrir B., E. A., Tofighi Sh., Karimi Zarchi A. A., Honarvar H. Relationship of job satisfaction and organizational commitment in hospital nurses, *Iranian Journal of Military Medicine* **12**, 23-26 (Spring 2010).
14. Shahbazi, M., Onsoori, A., Javaheri Kamel, M., Effective factors of police job satisfaction. *Human Resource Police Management* **6**, 89 (2010)
15. Akbari Pakrow, M. *The reasons behind turnover of medical specialists of Hamedan Univesrsity of Medical Sciences (HUMS)* M. Sc. thesis, Payam Noor Universty- Tehran Center Branch, (2011)
16. Golparvar, M., Nadi, M. A. Cultural values and justice: Organizational justice, job satisfaction and turnover. *Tahghighat Farhanghi Iran (Iran Cultural Research)* **3**, 207-228 (Spring 2011) [Farsi]
17. WHO. Working *Together for Health: The World Health Report 2006 Policy Briefs*, (World Health Organization, 2006)
18. Willis-Shattuck, M. et al. Motivation and retention of health workers in developing countries: a systematic review. *BMC Health Services Research* **8**, 247, doi:10.1186/1472-6963-8-247 (2008).
19. PHI. *12 Steps for Creating a Culture of Retention: a Workbook for Home and Community-Based Long-Term Care Providers*. (Paraprofessional Healthcare Institute (PHI), 2008).

20. PHI. *Creating a Culture of Retention: A Coaching Approach to Paraprofessional Supervision*, (Paraprofessional Healthcare Institute (PHI), 2001).
21. Palmer, D. Tackling Malawi's human resources crisis. *Reproductive Health Matters* **14**, 27-39 (2006)
22. Duffield, C. M., Roche, M. A., Blay, N. & Stasa, H. Nursing unit managers, staff retention and the work environment. *Journal of Clinical Nursing* **20**, 23-33, doi:10.1111/j.1365-2702.2010.03478.x (2011)
23. American Society of Radiologic Technologists, A. S. o. R. *Recruitment and Retention Tool Kit: the Top 20 Ways to Improve Employee Retention* <https://www.asrt.org/content/RecruitmentRetention/RetentionTools/Employee_Retention.aspx> (2011).
24. Dieleman, M. & Harnmeijer, J. W. Improving health worker performance: in search of promising practices. *Geneva: WHO Evidence and Information for Policy, Department of Human Resources for Health* (2006).
25. Garejah, M. Morale promotion and mental health of personnel in *The 1st Conference on Human Resource Retention* (ed Police Human Resource Research Bureau) (Pardis Danesh, Tehran, 2010).
26. Farhanghi, A. A., Samadi, M. . Socialization of personnel at the beginning of service and its impact on human resource retention, *Police Human Resource Management* **5**, 107 (2010)
27. Jahangiri, A., Mehrali, A. H. Recognizing and prioritizing the effective retention factors of expert personnel of defence industry organization. *Journal of Humanities and Social Sciences* **8**, 37-56 (2009)
28. Rezaei Dehghani, A. A., Hosseini, H. A., Tavakol, KH., Bakhtiyari, S. Relationship between communication manners of head nurses with job satisfaction of nurses under their supervision in educational hospitals of Isfahan University of Medical Sciences in 2006. *Iranian Journal of Nursing and Midwifery Research (IJNMR)* **15**, 43-47 (Spring 2010)

COMPARING OF EFFECTIVE DOSE FOR PEDIATRIC AND ADULT CHEST X-RAY EXAMINATION

Idrees M. T., Khadija N. A.
Department of Physics-College of Education/Scientific Departments,
University of Salahaddin-Hawler, KRG, Iraq
E-mail: edreesharki@esc-ush.com / gardi.1978@yahoo.com

ABSTRACT

Chest radiography is the most frequent tool in the medical diagnostic examination. However, it is common knowledge that x-rays examinations involve a certain risk for the examinees due to their exposure to ionizing radiation. The risk for pediatric patients that undergo X-ray examinations is higher than that for adults because their cells, tissues and organs have higher radio sensitivity. The aim of this study is to estimate the radiation dose for children and compare it with the radiation dose to adult arising from diagnostic medical exposure. This study is carried out in four hospitals in Erbil city, Al-Jmhore Hospital (JH), Rzgary Hospital (RH), Heart Center Hospital (HCH) and Nanakely Hospital (NH). Four X-ray machines are used in this work. 160 patients in different ages and sex were used and divided into three groups (1-15), (16-30), (31-60) year respectively. Different parameters have been recorded such as sex, weight, height, thickness and technical parameters (Tube Voltage kVp, current-time product mAs,FFD) Using an ionizing chamber. The Entrance Surface Dose (ESD) for each patient involved chest X-ray examination, which calculated indirectly. Monte Carlo simulation was performed to estimate effective dose (ED) by using PCXMC Dose Calculation software. A wide distribution of doses has been obtained. The higher value mean±SD of ED is recorded for male (60.02±17.11) μSv in RH, (48.69±18.73) μSv in NH, (66.67±20.38) μSv in NH, but the low value (41.48±7.24) μSv in HCH, (17.98± 5.30) μSv in JH (15.55± 4.71) in JH are recorded for age (1-15), (16-30), (31-60)year, respectively. And for female the higher value mean±SD of ED is recorded (67.75±13.56) μSv in RH (64.69±19.44) μSv in RH (59.03±8.58) μSv in NH. But the low value (12.44± 2.92) μSv in HCH, (13.29± 1.42) μSv in HCH (17.83± 5.19) in JH are recorded for age (1-15), (16-30), (31-60) year, respectively.

Keywords:Entrance Surface Dose, Effective dose, chest radiography,radiation protection.

INTRODUCTION:

Chest radiography is the most frequent tool in medical diagnostic examination for allowing the evaluation of a very wide range of clinical complaints[1]. However, it is common knowledge that X-ray examinations involve a certain risk for the examinees due to their exposure to ionizing radiation. For this, it is important that radiological examinations performed are justified and optimized. To justify radiological examinations, risks to the patient from the radiation exposure should be known. In recent years concern has been raised over the hazards of exposure to small doses of ionizing radiation, the chest x-ray is one of the lowest radiation exposure medical examinations performed today[2], for this it is necessary to know the radiation exposure from chest examinations. However, the probability of a fatal cancer being induced in an individual patient from a single x-ray examination, although small, is dependent on the age of the patient[3]. In addition to the chances of repeat examinations which are higher with pediatric patients due to improper immobilization and less effective communication during the examinations[4], the risk for pediatric patients of developing long-term biological effects following exposure to ionizing radiation is higher than that for adults because their cells, tissues and organs have higher radio sensitivity, and they have a longer time to live, thereby enable the effects to manifest[3]. The European Commission (EC)[5] states that 'radiation exposure in the first 10 years of life is estimated to have a risk about 4 times greater than exposures incurred at 30–40 years of age for some detrimental effects'. Although radiation

doses during diagnostic X-ray examinations of the adult patients have been extensively studied[5-8], few studies have focused on radiation doses for newborn babies and 1-year-old infants[4, 10-12]. These studies have shown that there is a wide range of ESD values for the same X-ray examination.

To assess the probability of health detriment from low doses of ionizing radiation, the International Commission on Radiation Protection (ICRP) proposed a theoretical quantity in 1975 that was first named effective dose equivalent and became known as effective dose (ED) in 1990. This quantity takes the health risk (fatal and nonfatal cancers, taking into account the latency period as well as severe hereditary disorders) of a "standard" patient who is not uniformly exposed to ionizing radiation and transposes it into a situation in which this patient would be uniformly exposed to a radiation field. Effective Dose (ED), which has the same units as equivalent dose, is obtained by summing individual organ equivalent doses (H_T) multiplied by the corresponding tissue weighting factors.

$$ED = \sum_T W_T H_T \quad \text{with} \quad \sum_T W_T = 1$$

where W_T are dimensionless tissue weighting factors characterizing the relative sensitivity of various tissues with respect to the endpoints, such as cancer induction and mortality[13]. The most appropriate method for ED calculations is the Monte Carlo simulation of the radiography accompanied by measurements of entrance surface dose (ESD) or dose area product (DAP). Similar practices have been followed by many surveys[6, 14] regarding the risk to children from simple X-ray examinations.

MATERIALS AND METHODS

This study was carried out in 4 hospitals in Erbil city, Al-Jmhore Hospital (JH), Rzgary Hospital (RH), Heart Center Hospital (HCH) and Nanakely Hospital. 4 X-ray machines were used in this work as described in Table (1). For 160 patients which divided into three groups of ages, (1-15), (16-30) and (31-60) year, sex, weight, height, thickness and technical parameters (Tube Voltage kVp, current-time product mAs, FFD)were recorded.

The Entrance Surface Dose (ESD) for each patient involved in chest X-ray examination were calculated indirectly by using a suitable detector (ionizing chamber) to measure air kerma (in mGy) at 1m focus-detector distance for different kVp setting. Dividing the resulting dose by the applied mAs to get mGy/mAs and plotting these values against the kVp, as shown in the Figures (1, 2, 3, 4).From these curves one determines for a given kVp and mAs the air kerma at 1m $AK_{(100)}$. The ESD can be calculated using $AK_{(100)}$ by using the following equation:

$$ESD = AK_{(100)}\left[\frac{FSD}{100}\right]^2$$

Where the FSD the focus to surface distances

In this study the Monte Carlo simulation was performed to estimate effective dose (ED) by using PCXMC Dose Calculation software version 1.5.2 copyright STUK 2004.

RESULTS AND DISCUSSION:

The Body patients Thickness (B.T), mean±SD for Body Mass Index (BMI) kgm/m^2, Focal to Film Distance (FFD), applied potential kVp and mAs for male group and female group patients in each hospital are shown in table (2). And Table (3) shows the comparison of mean±SD of ESD for chest PA examination of three age groups (1-15, 16-30 and 31-60) years. Note; the maximum value for male patients were (o.473±0.062) mGy in RH, (0.479±0.156) mGy in HCH and (0.636±0.194) mGy in RH for (1-15), (16-30) and (31-60) years recorded, respectively, but the minimum values were (0.154±0.024) mGy, (0.222±0.046) mGy and (0.201±0.044) mGy for (1-15), (16-30) and (31-60) years were recorded in JH, respectively. While the maximum values for female patients were recorded, (0.516±0.114) mGy in RH, (0.739±0.151) mGy in RH and (0.621±0.110) mGy in HCH, but the minimum values were (0.140±0.03) mGy in HCH,

(0.167±0.01) mGy for HCH and (0.21±0.05) mGy for JH, recorded for (1-15), (16-30) and (31-60) years, respectively. In general, the JH recorded the minimum value of mean±SD for ESD of males group of all three groups because the JH technician used the minimum value of KVp and optimum value of mAs, and this agrees with the recommendation of the Commission of European Communities (CEC), which recommended the use of (60-80) KVp for children must be between (0-15) years of age[3]. Observed that HCH recorded the minimum value of female for both groups (1-15) and (16-30) years, while JH recorded the minimum value for (31-60) years groups, also for the same reason explained above. On the other hand, we observed that the ESD increased with increasing the age for all hospitals except RH as shown in figure (5), this result agrees with the conclusion of Walter Huda, et. al.[15], when they concluded that the value of entrance skin exposure and energy imparted to patients generally increased with increasing patient age and vice versa the result of mean±SD of ESD for female group in RH do not agree with[15], the reason of these return to use high value of KVp and mAs with low value of BMI kg/m2 for (16-30) years group that B.T equal to 21 cm with FFD equal to 188.4 cm, but we used the smaller value of KVp and mAs for (31-60) years group that B.T larger equal to 22.7 cm and FFD smaller equal to 171.6 cm. Table (4) show the comparison of effective dose estimated by using Monte Carlo simulation for both gender (male and female) patients of the ages (1-15, 16-30 and 31-60) years, for the chest PA examination in this study with others. A wide distribution of doses has been obtained for each group of ages, on the other hand we can note the significant differences ($p<0.05$) of ED between the male and female patients for different ages. The differences between men and women stem from the specificity of their organ[16]. Finally, one note is the range of variations from one type of age group for various hospitals. And the result is in a good agreement with other result rather well with the EC reference doses value.

Table 1: Description of X-ray instruments used.

Instruments	Model No.	Serial No.	Made in	Filtration Al(mm)	Hospital
Siemens	1P5526087	S 0054 S60L	Germany	1.6	(JH)
Siemens	4803404	1224997	China	1.0	(RH)
Silhouette VR	2226680	47350HL4	Japan	1.6	(HCH)
Sedecal Ralco	R 302/A	20035-ISSO	Italy	2	(NH)

Table 2: Characteristics for both gender (male and female) patients and Radiological Procedures

Age group	Hospital	Gender	KVp	mAs	FFD (cm)	B.T (cm)	BMI (Kg/m^2)
(1–15) year	JH	male	57.6 (55-65)	15.35 (12.5-18)	115	13 (11-17)	0.00167±0.00060
		female	57.8 (55-60)	14.6 (10-20)	118 (115-120)	15.7 (11-28)	0.00184±0.00047
	RH	male	62.65 (58-66)	12.22 (11-16)	190	14.8 (12-19)	0.00161±0.00024
		female	63.23 (61.5-65)	13 (10-18)	193 (190-200)	15.1 (11-20)	0.00168±0.00040
	HCH	male	67.5 (64-79)	10.75 (10-12.5)	191 (190-200)	15.1 (12-19)	0.00161±0.00025
		female	68.8 (62-78)	11.3 (8-12.5)	186 (170-200)	17.5 (13-23)	0.00192±0.00047
	NH	male	76.2 (59-95)	3.12 (2-8)	150	15.2 (10-25)	0.00184± 0.00056
		female	80 (69-87)	2.7 (2-3.2)	150	16.5 (12-23)	0.00183± 0.00044

Age group	Hospital	Gender	KVp	mAs	FFD (cm)	B.T (cm)	BMI (Kg/m^2)
(16–30) year	JH	male	64.5	18.6	129	19.1	0.00225±0.00036
			(60-70)	(16-20)	(120-150)	(13-22)	
		female	64.1	19.2	129	22.1	0.00272±0.00051
			(58.5-73)	(16-20)	(120-150)	(17-28)	
	RH	male	70.15	18	193	20.4	0.00253±0.00046
			(64.5-75)	(16-20)	(190-200)	(13-25)	
		female	70.45	18.4	188.4	21	0.00254±0.00046
			(66-73)	(16-20)	(144-200)	(18-25)	
	HCH	male	71.1	12.5	197	21	0.00227± 0.00030
			(65-77)		(190-200)	(17-25)	
		female	71.9	12.5	195	21.1	0.00240±0.00056
			(68-77)	(190-200)		(19-26)	
	NH	male	87.2	3.39	150	20.2	0.00208± 0.00038
			(82-89)	(2.5-4)		(16-24)	
		female	86.9	3.41	150	21.5	0.00251± 0.00048
			(86-88)	(2.5-4)		(19-26)	
(31–60) year	JH	male	65.45	19.4	126	24	0.00283±0.00054
			(54.5-73)	(16-20)	(120-150)	(19-33)	
		female	67.92	19.69	126.92	23.61	0.00317±0.00056
			(61.5-77)	(18-20)	(120-150)	(19-30)	
	RH	male	70.55	18.6	176.2	23	0.00254±0.00035
			(66-75)	(16-20)	(144-190)	(20-26)	
		female	67.85	17.4	171.6	22.7	0.00260±0.00052
			(64.5-70)	(14-20)	(144-190)	(19-25)	
	HCH	male	84.16	13.95	195	24.66	0.00303± 0.00030
			(64-100)	(12.5-16)	(190-200)	(20-30)	
		female	86.8	14.95	195	27.5	0.00336±0.00034
			(80-104)	(12.5-16)	(190-200)	(26-30)	
	NH	male	89.2	4.5	150	22.3	0.00262± 0.00046
			(86-94)	(3.2-5)		(19-25)	
		female	87.8	3.89	150	22.7	0.00283± 0.00056
			(86-90)	(3.2-5)		(19-27)	

Table 3: Comparison of ESD for chest PA examination with ages of different hospitals and other studies

Age	Current study ESD (mGy) / Other studies ESD (mGy)				Hospitals
	JH	RH	HCH	NH	
(1-15) Years	0.1548±0.0243m	0.4730±0.0629m	0.4056±0.0491m	0.3840±0.0304m	
	0.1451±0.0314f	0.5166± 0.1148f	0.1400± 0.0350f	0.3237± 0.1050f	0.22[35], 0.45[37]
(16-30) Years	0.2229±0.0462m	0.4392±0.0525m	0.4792± 0.156m	0.4476±0.0908m	0.4[26]
	0.2176±0.0459f	0.7398± 0.1514f	0.1673± 0.0109f	0.4346± 0.0456f	
(31-60) Years	0.2012±0.0445m	0.6363±0.1943m	0.5822±0.0920m	0.6068±0.1678m	0.32±0.05[36],
	0.2139±0.0551f	0.5474± 0.2036f	0.6219± 0.1108f	0.4981± 0.0608f	0.4±0.2[21]

Table 4: The Compassion of ED for current study with other studies.

Age	Current Study ED (μSv) / Other Studies ED (μSv)				Hospitals
	JH	RH	HCH	NH	
(1-15) years	42.08± 4.54m	60.02±17.11m	41.48±7.24m	47.69±26.71m	62 Sudan[31],
	17.69±5.72f	67.75±13.56f	12.44± 2.92f	44.03±12.879f	30 Finland[37]
(16-30)years	17.98± 5.30m	33.69±2.88m	36.50± 6.32m	48.69±18.73m	18 Nigeria[26]
	17.86± 5.14f	64.69±19.44f	13.29± 1.42f	49.08±7.18f	
(31-60)years	15.55± 4.71m	50.79±15.66m	49.58±13.12m	66.67±20.38m	40 Serbia &
	17.83± 5.19f	45.52±17.14f	57.81±16.24f	59.03±8.58f	Montenegro[21]

Fig. 1: Shimadzu X-ray in JH.

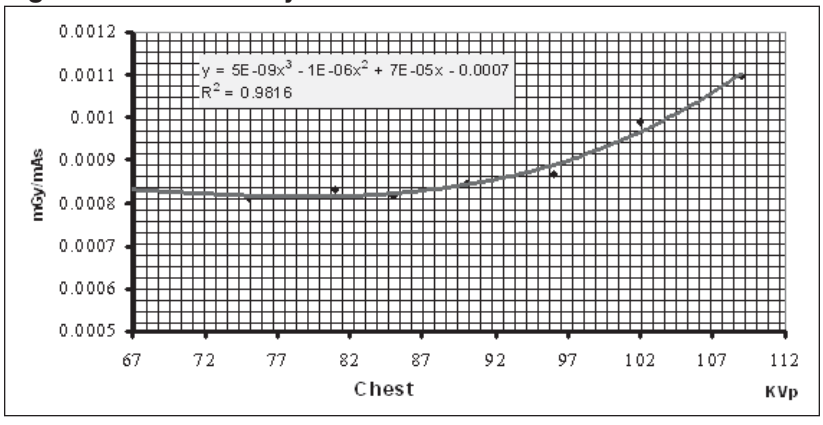


Fig. 2: Siemens X-ray in RH.

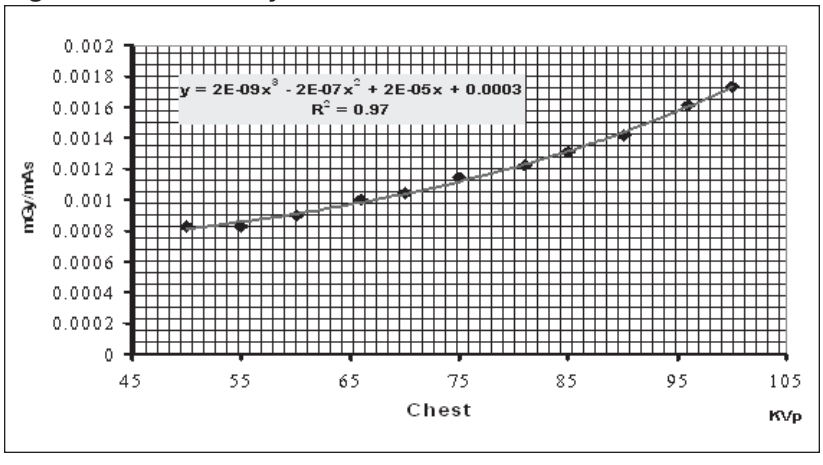


Fig. 3: Silhouette VR –ray in HCH.

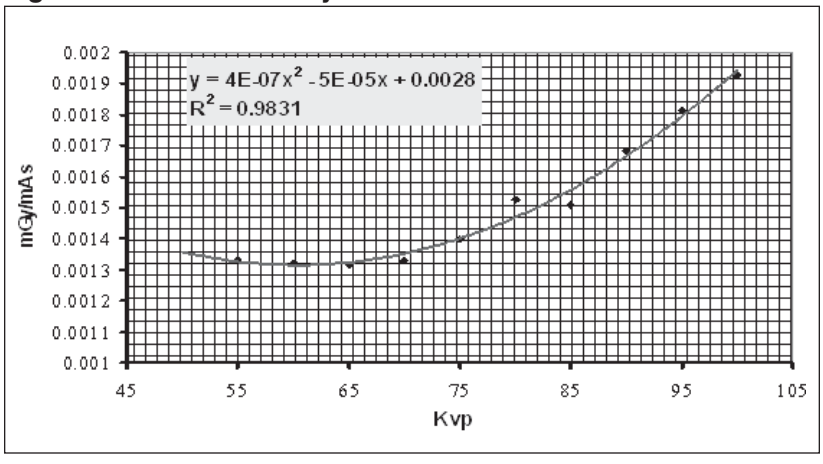


Fig. 4: Sedecal Ralco s –ray in NH

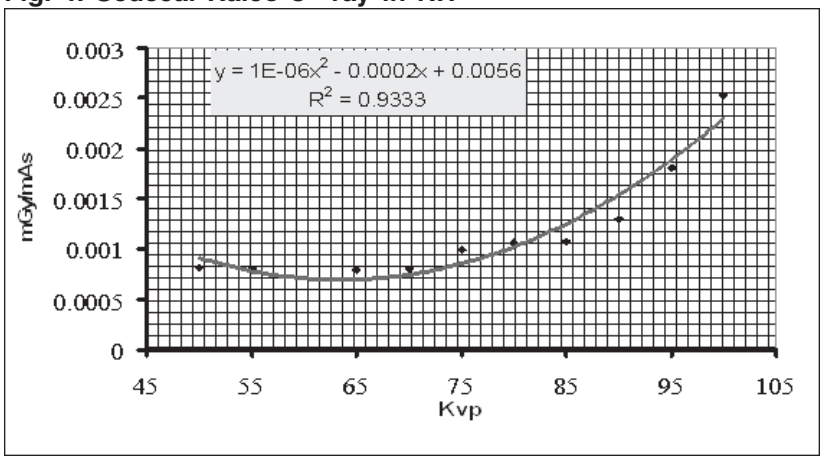
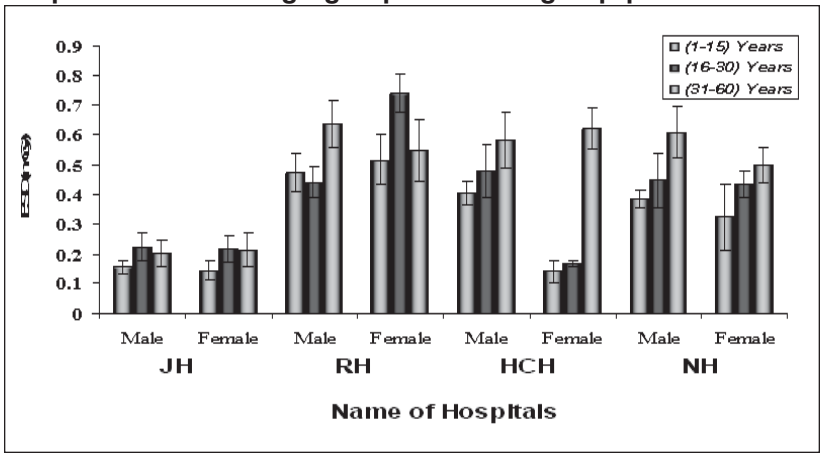


Fig. 5: Comparison of ESD for chest PA examination with different hospitals and three age groups for both group patients.



REFERENCES

1] Samanda C.A. Correa, Edmilson M. Souza, Ademir X. Silva, Helio Yoriyaz, Ricardo T. Lones "Patient dose study in chest radiographic examinations for different exposure techniques using Monte Carlo methods and voxel phantom", INAC 2007, Santos, SP, Brazil.

2] Huda W., George A.S., Roger F.P. and David S. ,"Radiation doses and detriment from chest x-ray examinations", Phys. Med. Biol., 1989, Vol. 34, No 10, 1477-1492.

3] Ramanaidu S., MSc, TDCR, RB Sta Maria,…et all '"Evaluation of radiation dose and image quality following changes to tube potential (kVp) in conventional pediatric chest radiography", Biomed Imaging Interv J 2006; 2(3):e35.

4] Brindhaban A.C.U. Eze "Estimation of Radiation Dose during Diagnostic X-Ray Examinations of Newborn Babies and 1-Year-Old Infants" Med.Princ. Pract. 2006; 15:260-265.

5] European commission: "European guidelines on quality criteria for diagnostic radiographic images in paediatrics", European Commission EUR 161261 EN. Luxembourg, European Commission 1990.

6] Stratakis J., Damilakis J. and Gourtsoyiannis, "Organ and effective dose conversion coefficients for radiographic examinations of the pediatric skull estimated by monte carlo methods", Eur Radial 2005, 15:1948-1958.

7] Mohamadain K.E.M., and Azevedo A.C.P., "Radiation Dose Survey in Conventional Pediatric Radiology", J.Sc.Tech., 2009, vpl. 10(2):175-184.

8] Mohamadain K.E.M., and Azevedo A.C.P., Rosa L.A.R., Guebel M.R.N., Boechat M.C.B., "Dose measurements using thermolum-inescent dosimetery and DoseCal software at two pediatric hospitals in Rio de Janeiro", Applied Radiation and Isotopes 59, 2003,:53-57.

9] Kettunen A., "Radiation dose and radiation Risk to Foetuses and newborns During X-ray Examinations", STUK-A204/MAY 2004.

10] Ratnapalan S. MD, Yedidia Bentur MD, Gideon Koren MD, "Doctor, will that x-ray harm my unborn child?", CMAJ • DECEMBER 2, 2008 • 179(12).
11] Gallini R.E, Belletti S, Berna V, Giugni U; "Adult and Childern doses in Standarised X-ray examinations", rad Prot Dosim 1992; 43; 41-47.
12] David B. and Walter H., "Effictive Dose: A Usfful Concept in Diagnostic Radiology?", Radiation Protection Dosimetry (2008), Vol. 128, No. 4, pp. 503–508.
13] George I.G., Emmanulel N.Y., Anastasion I. …et. all. "Monte Carlo Estimation of Radiation Doses in Red Bone Marrow And Breast in Common Pediatric X-Ray Examinations", Health physics, september 2008, volume 95, No.3,331-336.
14] Huda W. and N.A., "Gkanatsios,'Effective dose and energy imparted in Diagnostic Radiology", Medical Physics, 24:1311-1316, 1997.
15] Vader A., J.P. Vader and J.F. Valley, "Survey on Exposure by Radio Diagnostic in Switzerland in 1998, University Institute of Applied Radiation Physics", Project Financed Par the Federal Office of Public Health Contract No. 316. 90. 0576, 2000

READINESS IN PERFORMING PROFESSIONAL NURSING ROLES: DOES EMOTIONAL QUOTIENT MATTER?

Suparpit von Bormann
Nurse lecturer, Boromarajonani College of Nursing Changwat Nonthaburi,
47/99 Tiwanon Rd., Taladkwan, Muang, Nonthaburi 11000 Thailand
Email : suparpit@yahoo.com

ABSTRACT

Emotional Quotient (EQ) is related to professional nursing roles especially when working under pressure. A relationship between these two elements in nursing students is unclear. This study is a descriptive study aimed to investigate the relationship between Emotional Quotient (EQ) and readiness in performing professional nursing roles. Samples were composed of 234 nursing students in six colleges in northern Thailand. Instruments used were an EQ test and a questionnaire assessing readiness in performing professional nursing roles. Data were analyzed using descriptive statistics and Pearson Correlation Coefficient. The results showed that:

1. The majority of nursing students (57.9%) had average EQ score.
2. Most students had the scores of Overall Readiness, Intention Readiness and Experience-Perception Readiness to perform professional nursing roles at highest levels (68.4%, 58.4, and 67.4, respectively) and Preparation Readiness at a high level (56.3%).
3. Overall EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness to perform professional nursing roles ($p<.001$, r=.34, .36, .33).
4. Good EQ was significantly positively related to the scores of Overall Readiness, Intention Readiness and Experience-Perception Readiness to perform professional nursing roles at $p<.001$ (r=.25, .32, .24).
5. Smart EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness ($p<.001$, r=.34, .34, .32) and Preparation Readiness ($p<.05$, r=.15) to perform Professional nursing roles.
6. Happy EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness ($p<.001$, r=.34, .33, .33, consecutively) and Preparation Readiness ($p<.05$, r=.15) to perform Professional nursing roles.

The results revealed that nursing students had EQ score at average. There was a relationship between EQ and readiness in performing professional nursing roles. Instructors may apply these findings in improving the EQ of nursing students to be ready to perform professional nursing roles in the future.

Key words: Emotional Quotient (EQ), readiness, professional nursing role, nursing student

BACKGROUND

Nursing is a professions being expected by society to have high capability in taking care of their health. Nurses should therefore be competent, responsible, devoted and patient. One who wants to become a nurse must be trained and assessed by nursing school. Nursing curriculum in nursing school is composed of theoretical and practicum modules that enable nursing students to improve their competency[1]. While studying in nursing institute, students are supposed to study hard. After being qualified, newly graduated nurses are supposed to perform their profession in a high standard.

This is also expected by professional organisations such as nursing council and nurses association. Furthermore, nurses must keep the standard as governed by law and legislation[2]. As for society, nurses are expected to perform various roles such as carer, teacher, counsellor, client's right protector, colleague, leader, change agent, and user of information technology. Nurses therefore have to adapt themselves to those expectations and perform well in different situations.

Intelligence does not guarantee to be successful. A nurse should have emotional intelligence. Emotional intelligence or EQ influence their thought, behaviour, as well as competency and working outcome[3]. Those who have adequate EQ are capable to work with others, to be responsible, to manage their own emotions and to improve themselves. They can also adapt themselves and solve problems efficiently[4]. Moreover, they tend to acknowledge their good and not so good qualities, be optimistic, happy and able to adapt themselves with environment[5]. EQ is regarded as one of the necessary competencies of nurses[6]. There is a positive relationship between EQ and leadership and companionship[7]. Also, smart EQ, good EQ, and happy EQ are positively related to leadership and companionship.

In terms of readiness in performing professional nursing roles among nursing students, several studies have revealed that nursing students have overall readiness on a high level. However, these studies have been conducted in the middle and eastern parts of Thailand. So far, there was no study regarding EQ and readiness in performing professional nursing roles of fourth year nursing students in the northern region of Thailand. The aim of this study was to gain information suitable for teaching plan in nursing college in the future.

OBJECTIVES

1. To explore EQ of fourth year nursing students in northern Thailand.
2. To study readiness to perform professional nursing roles among fourth year nursing students in northern Thailand.
3. TO investigate relationship between EQ and readiness to perform professional nursing roles among fourth year nursing students in northern Thailand.

RESEARCH METHODOLOGY

This is a descriptive research. Populations were 835 fourth year nursing students to be graduated in March 2010 from six nursing colleges in northern Thailand. Participants were 234 students, 52 of which were from Sawanpracharak, 51 from Pitsanulok, 29 from Uttaradit, 24 from Chiang Mai, 40 from Lampang, and 38 from Phayao. Student's identification numbers were selected using random table.

The researcher got approval from the directors of the nursing colleges and contacted lecturers who were responsible for their colleges' research work. These lecturers collected data following the identification number of their students. Before providing informed consent, the students were aware about their rights to participate in the research. They were also informed that all data will be coded and transformed into numbers during the process of analysis. Their participation or non-participation had no effect on them in any way.

Research instruments included 1) demographic questionnaire; 2) EQ test; and 3) a questionnaire assessing readiness in performing professional nursing roles developed by Sangarom[8]. These instruments were tried out with 30 students. Reliability of the second and third instruments analysed using Cronbach's alpha coefficient were .87 and .97, respectively. Data were analysed using frequency, percentage, mean, standard deviation, and Pearson's correlation coefficient.

RESULTS

The majority of participants were female (94.2%), age between 21-24 year (mean 22). Most were Buddhist (52.1%) and had moderate level of GPA (2.51-3.00).

Most students (57.9%) had average EQ score, 22.1% lower and 16.8% higher than normal EQ score. There were 3.2% overestimated their EQ.

Most students had the scores of Overall Readiness, Intention Readiness and Experience-Perception Readiness to perform professional nursing roles at highest levels (68.4%, 58.4, and 67.4, respectively) and Preparation Readiness at a high level (56.3%).

Table 1 shows that Overall EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness to perform professional nursing roles ($p < .001$, r = .34, .36, .33).

Good EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness to perform professional nursing roles at $p < .001$ (r = .25, .32, .24). Smart EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness ($p < .001$, r = .34, .34, .32) and Preparation Readiness ($p < .05$, r = .15) to perform professional nursing roles. Happy EQ was significantly positively related to Overall Readiness, Intention Readiness and Experience-Perception Readiness ($p < .001$, r = .34, .33, .33, respectively) and Preparation Readiness ($p < .05$, r = .15) to perform professional nursing roles.

Table 1 Relationship between EQ and readiness in performing professional nursing roles

Readiness / EQ	Overall readiness		Preparation Readiness		Intention Readiness		Experience-Perception Readiness	
	r	p-value	r	p-value	r	p-value	r	p-value
Overall EQ	.340***	.000	.126	.084	.362***	.000	.330***	.000
Good EQ	.253***	.000	.051	.488	.323***	.000	.245**	.001
Smart EQ	.337***	.000	.149*	.040	.340***	.000	.325***	.000
Happy EQ	.341***	.000	.146*	.044	.329***	.000	.332***	.000

* *p-value* < .05, ** *p-value* < .01, *** p-value < .001

DISCUSSION

The results of this study were relevant to those in previous studies[9;10] that reported good level of EQ among nurses. This may be due to the fact that nursing curriculum emphasises not only theory but also passion and good attitude towards nursing profession. They learned to be empathetic with suffering people. It is evident in this study that most students chose to answer 'real true' in some items, such as value others' kindness' and 'I can apologise when I did something wrong'. They answered 'fairly true' in items like 'I realise when people around me change their mood', 'I accepted if others have their own reason not to be satisfied with what I do', 'Even though I have workload I am willing to listen their suffering' and 'Though I have to sacrifice I am willing to do for others' benefits'. These characteristics are regarded as 'empathy' and 'responsibility' which are 'Good EQ'11. Moreover, in practicum, the students automatically practiced self-adaptation when facing unpleasant situations. This is also evident in the answer. Most of them answered 'real true' in self-controlling items. For example, I realize when happen to me when I feel angry or sad', 'I can wait to achieve my goal' and 'I can convince others when I was forced to do something I don't like'. These characteristics are also regarded as 'Good EQ'[12].

In practicum, the students have opportunity to practice in real situations enabling them to gain direct experience[13;14]. In addition, it allows the students to know themselves, know their capability, motivate and encourage themselves, and determine to achieve their goal. This is evident that most students answered 'real true' in 'having self-esteem to do my best' and answered 'fairly true' in 'I am confident to do my job though it was a difficult one' and 'I will not give up even though I encountered and obstacle and disappointment'. These characteristics were regarded as 'having motivation' which is 'Smart EQ'[11]. During practice, students have to coordinate with other health personnel. They have to conform to the rule and cultures of each practicum setting. They have to learn to make decision in problem solving. This can be seen in the results of this study. Most students answered 'real true' in 'I can prioritise things when I have to so several tasks at the same time', which is regarded as 'making decision' and 'problem solving'. In addition, when they had to coordinate with various health workers the students had to build up relationship with them. Most students answered 'fairly true' in 'I can easily make friend with others', which is regarded as 'relationship with others' in 'Smart EQ'[11].

When the students went through the process of several examinations until they nearly finished their degree, they were proud of themselves. Most students answered 'fairly true' in 'I can do good in any roles' and 'I can do my best on my assigned tasks'. These pride is regarded as 'Happy EQ'. Furthermore, the majority answered 'real true' in 'every problem has a solution', 'I can enjoy recreational activities during my holidays' and 'I am satisfied with who I am'. They answered 'fairly true' in 'even though the situation is bad, I hope it will be better', 'I can alter stressful atmosphere to be relaxing or fun', 'I will do what I like when I have free time'. Most students answered 'fairly true' in 'I know how to relax when I feel bad' and 'I can relax though I am tired of work'. These characteristics are regarded as 'Happy EQ'.

Most students had readiness in performing professional nursing roles in highest level, followed by high level. This is relevant to results from various studies[8;15-18]. Most students had readiness in 'reviewing and seeking knowledge' in high level and 'intention and experience-perception' in highest level. These are relevant to the study by Sangarom8 who reported that fourth-year nursing students at Boromarajonani College of Nursing Bangkok had 'reviewing and seeking knowledge' in high level, and 'intention and experience-perception' in highest level. This may be due to the curriculum structure that has 144 credits. Lecturers adopted various methods in their theory, practice and laboratory teaching. These methods used enable the students to gain experience. Faculty-student ratio of 1:8 in practicum allows lecturers to be able to closely supervise their students. The students have more confidence and can apply their knowledge and experience in real situations. Before graduate, all students have to pass a variety of requirements and exams. This makes the students regularly review their lessons and knowledge. In addition, all Boromarajonani Colleges of Nursing under jurisdiction of Praboromarajchanok Institute for Health Workforce Development have affiliated with their local universities. Therefore, the students have to pass summative exam to be awarded Bachelor degree by those universities and first-class nursing license by Thailand Nursing Council[19]. After all these procedures, the students become 'professional nurses' as appointed by Nursing and Midwifery Act.

EQ was positively related to readiness in performing professional nursing roles in almost every aspect. High EQ students had more readiness in performing professional nursing roles than those who had lower EQ. Therefore, it is necessary to develop the students' EQ to enable them to be smart, good and happy. The results of this study are relevant to a study by Charernsri and Grairerg[7] who found a relationship between EQ and leadership and fellowship in nurses working in north east Thailand.

The goal of Praboromarajchanok Institute for Health Workforce Development is to produce nurses who have knowledge, capability, attitude, moral and ethics. These qualities are regarded as one of the

EQ aspects. The process to prepare the students to be ready in performing professional nursing roles must start from their first year in nursing college. Therefore, lecturers must organise teaching and learning activities to promote wisdom, critical thinking, and capability to collect data to do research. These qualities can help the students to make right decisions based on evidence and rational. They also can enhance their leadership and responsibility in seeking for knowledge. Thus, not only the students themselves but also nursing profession will be developed.

CONCLUSION

To ease others' suffering, professional nurses need to be smart and have EQ in satisfactory level. Lecturers should therefore arrange various methods of teaching to improve not only knowledge but also EQ of their nursing students.

REFERENCES

1. Othaganon, P. (2000). Educational quality assurance of Nursing Science. Bangkok: Chulalongkorn University Publishing.
2. Namfon, N. (1993). Identity of professional nurses. Songkla: Tame Publishing.
3. Brewer, J. & Cadman, C. (2000). Emotional intelligence: enhancing student effectiveness and patient outcomes. *Nurse Education*. 25(6): 264-66.
4. Wajiramanee, K. & Chanintayutawong, W. (2000). EQ: Emotional Intelligence (Revised ed). Nonthaburi: Mental Health Development Bureau.
5. Pannitamai, W. (2001). EQ: Indicator of happiness and success in life. (2nd ed). Bangkok: Expernet.
6. Jordan, P.J. & Troth, A.C. (2002). Emotional intelligence and conflict resolution in nursing. *Contemporary Nurse*. 13(1): 94-100.
7. Charernsri, S. & Grairerg, M. (2007). Relationship between Emotional Intelligence and leadership and fellowship of professional nurses in general hospitals, Region 11 in North Eastern Thailand, The Ministry of Public Health. *Khon Kaen University Journal*; 7(2); pp.70-82.
8. Sangarom, A. (2001). Readiness in performing professional nursing roles of 4th year nursing students from Boromarajonani College of Nursing Bangkok. Unpublished master dissertation. Graduate School. Chiang Mai University.
9. Wichanpreecha, N. (2001). EQ and performance of nurses in public hospitals. Unpublished master dissertation. Graduate School. Chiang Mai University.
10. Sritamachart, L. (2006). Relationship between EQ and caring behavior of carers in drug dependence treatment center. Unpublished master dissertation. Graduate School. Chiang Mai University.
11. Department of Mental Health. (2000). Emotional Intelligence Manual. Bangkok: The War Veteran Organisation of Thailand Publishing.
12. Sukarom, A. & Indarakamhaeng A. (2005). Systematic review about EQ in Thailand. Bangkok: Behavioural Science Research Institute. Srinakharinwirot University.
13. Lueboonthawatchai, A. (2000). Critical thinking: teaching and learning in nursing science. Bangkok: Tana place and graphic ltd.
14. Morgan, R. (2006). Using clinial skills laboratories to promote theory-practice integration during first practice placement: An Irish perspective. *Journal of Clinical Nursing*. 15(2): 55-61.
15. Janpong, P. (2001). Relationship between learning achievement, attitude towards nursing profession and readiness in performing professional nursing roles of graduates from Boromarajonani College of Nursing affiliated with Naraesuan University, Academic Year 2001. Research report. Boromarajonani College of Nursing Sawanpracharak Nakhonsawan. Praboromarajchanok Institute for Health Workforce Development. The Ministry of Public Health.
16. Ujarattana, P. et al. (1996). Readiness in performing professional nursing roles of graduates from Faculty of Nursing, Mahidol University. *Journal of Nursing Science*. 14(5); pp.39-48.

17. Hansajarupan, W. (1997). A study of readiness in performing professional nursing roles of nursing students from private university. Unpublished master dissertation. Graduate School. Chulalongkorn University.
18. Siwadul, W. et al. (2000). Readiness in performing professional nursing roles of graduates from Boromarajonani College of Nursing, Chonburi, Academic Year 1999. *Journal of Boromarajonani College of Nursing Chonburi*. 14(2), pp.19-26.
19. Thailand Nursing Council. (1998). Law in nursing and midwifery profession. Nonthaburi: The best graphic and print.

PHENOTYPES OF MACROLIDE-RESISTANCE AMONG *STREPTOCOCCUS PYOGENES* ISOLATED FROM WESTERN REGION OF SAUDI ARABIA

Atif H Asghar PhD
Associate Professor of Medical Microbiology, Environmental and Health Research Department,
P.O. Box: 6287, Environmental and Health Research Department
The Custodian of The Two Holy Mosques Institute of Hajj Research, Umm Al-Qura University, Makkah, Saudi Arabia.
Email: asghar1000@gmail.com
Phone:+966 (0) 505511003, Fax: +966 (0) 2 5573282.

ABSTRACT

Objectives: Resistance to macrolides among *Streptococcus pyogenes* is an increasing problem worldwide. The aim of this study was to determine the antimicrobial resistance among *S. pyogenes* in western region of Saudi Arabia and to elucidate the phenotypes of macrolide-resistant isolates.

Methods: From December, 2008 to May, 2009, a total of 57 *S. pyogenes* isolates were identified from 1072 clinical swabs in which 1040 were throat swabs taken from suspected patients coming to the medical clinics of hospitals and primary care health centers in Makkah and Jeddah - Saudi Arabia. A standard method of Microbiology was used to identify the organisms and antimicrobial susceptibility testing. The MIC was performed using Microscan Walkaway. The results were interpreted by Clinical Laboratory Standards Institute (CLSI) guidelines. Macrolide resistance phenotypes were determined by double-disk diffusion.

Results: Only 20 clinical isolates of *S. pyogenes* (2%) out of 1040 throat swabs were isolated during the study period. The highest number isolates were collected from throat swabs and wound swabs of patients suffering from upper respiratory tract infection (65%) and skin infection (26%). The majority of infection with *S. pyogenes* were in Saudi patients (82.5%), male gender (84%) and in age group between 1-20 years old (47.4%). Erythromycin and tetracycline resistance among *S. pyogenes* clinical isolates were (26.3%) and 63.2%, respectively.

Conclusion: Infections with *S. pyogenes* is not very common among patients suffering from throat infection in Makkah region. Erythromycin resistant is moderately common and tetracycline is predominant among *S. pyogenes* clinical isolates.

Keywords: Macrolide resistance, Streptococcus pyogenes*, Antibiotic susceptibility*

INTRODUCTION

Streptococcus pyogenes is one of the most common human pathogens that can cause acute suppurative infections including most cases of tonsillitis and pharyngitis in children and severe diseases such as sepsis, necrotising fasciitis and toxic shock syndrome[1]. To avoid serious complications of infections caused by *S. pyogenes*, antibiotic treatment is recommended for all these infections. Empirical treatment of bacterial infections is usually applied as a clinical approach, particularly in the community setting. For this reason, current regional resistance patterns and the mechanisms of resistance should be considered when selecting an antimicrobial therapy for a given infection[2].

Penicillin has been the therapy of choice for decades for treatment of *S. pyogenes* infections, and other β-lactam antibiotics such as amoxicillin and cefaclor, have also been used successfully in the treatment of *S. pyogenes* infection. Moreover, macrolide antibiotics have demonstrating important treatment alternatives particularly for patients with β-lactam-associated allergies[2]. However, increasing usage of macrolides has caused emerging levels of macrolide resistance among *S. pyogenes* in some countries. There are two main phenotypes of macrolide resistance: the M phenotype, mediated by the *mef* genes, which confer low-level resistance to 14- and 15-membered macrolides but not to 16-membered macrolides, lincosamides, or streptogramin B, and the MLSB phenotype, mediated by the *erm* genes, which confer resistance to macrolides, lincosamides, and streptogramin B antimicrobial agents. This latter phenotype can be constitutive, generally mediated by the *ermB* gene, or inducible, generally mediated by the *ermA subclass TR (ermA) gene*[3].

This study was aimed to determine the antimicrobial resistance among *S. pyogenes* in western region of Saudi Arabia and to elucidate the phenotypes of macrolide-resistant isolates collected from in-patients and out-patients clinics of hospitals and primary care health centres in Makkah and Jeddah – Saudi Arabia.

MATERIALS AND METHODS

This study was undertaken on selected hospitals and primary health care centres in Makkah (Al-Noor Specialist Hospital, Hera General Hospital, King Abdul-Aziz Hospital, King Faisal Hospital, Tonsi Hospital, Maternity & Children Hospital and primary care health centres; Al-sharaie, Al-Mansoor, Al-Azizah, Al-Otaibeya) and Jeddah (Bugshan Hospital, King Fahad Hospital) during the period of six months, from Dhu Al-Hijjah 1429AH (December, 2008) to Jumada I 1430AH (May, 2009). A total of 1072 clinical swabs were collected from patients in hospitals and primary health care centres during the study period for determining the percentage of macrolide-resistance among *S. pyogenes* isolates.

Clinical isolates were identified by a routine microbiological methods including; morphology, β haemolysis, sensitivity to bacitracin on blood agar media, Gram-stain and catalase test. Lancefield grouping test was performed (BD Diagnostic systems, USA) for confirmation of group A streptococci. All collected strains were stored at -86°C in nutrient broth containing 15% glycerol until used.

All *S. pyogenes* isolates were subjected to susceptibility testing using disc diffusion and minimum inhibitory concentration (MICs). Disc diffusion susceptibility test was performed against erythromycin, clarithromycin, azithromycin, clidamycin, ciprofloxacin, levofloxacin, amoxacillin, penicllin, cefaclor, ceftrixone, cefuroxime, cefpodoxime, vancomycin, linezolid, tetracycline, chloramphenicol. The MIC was performed using Microscan WalkAway 40si (Siemens Healthcare Diagnostics, Deerfield, IL, USA) against erythromycin, azithromycin, clindamycin, ampicillin, penicillin, cefaclor, cefepime, cefotaxime, ceftrixone, cefuroxime, chloramphenicol, tetracycline, levofloxacin, meropenem and vancomycin.

Phenotypes macrolide resistance were performed using Erythromycin and clindamycin double-disk susceptibility method[3,4]. To test the effect of erythromycin on the expression of clindamycin resistance, a disk containing 15 µg of erythromycin was placed 20 mm from the center of a disk containing 2 µg of clindamycin. Inhibition of the circular zone around the disk was considered positive after 24 hours. Isolates with blunting of the inhibition zone around the clindamycin disk adjacent to the erythromycin disk were considered to be inducible MLSB phenotype. Clindamycin susceptible isolated without blunting were considered to be M phenotype. Isolates that were resistant to erythromycin and clindamycin were considered to be constitutive MLSB phenotype.

RESULTS

A total of 57 S. *pyogenes* isolates were identified from 1072 clinical swabs of patients referred to hospitals and primary care health centers located in Makkah and Jeddah – western region of Saudi Arabia over 6-months period, from December, 2008 through May, 2009. The majority of swabs (1040) were throat swabs taken from suspected patients coming to the medical clinics of hospitals and primary care health centers and the remaining specimens (throat and skin swabs) were obtained from the laboratory of the hospitals included in this study. Only 20 clinical isolates of S. pyogenes (2%) out of 1040 throat swabs were isolated during the study period. The most clinical isolates were collected from Bugshan Hospital (29.8%), Al-Noor Specialist Hospital (17.5%) and King Abdul-Aziz Hospital (10.5%). The highest number isolates were collected from throat swabs and wound swabs of patients suffering from upper respiratory tract infection (65%) and skin infection (26%), respectively (Figures 1). The majority of infection with *S. pyogenes* were in Saudi patients (82.5%), male gender (84%) and in age group between 1–20 years old (47.4%) (Figure 2).

Figure 1. Distribution of infections with *S. pyogenes* according to body sites

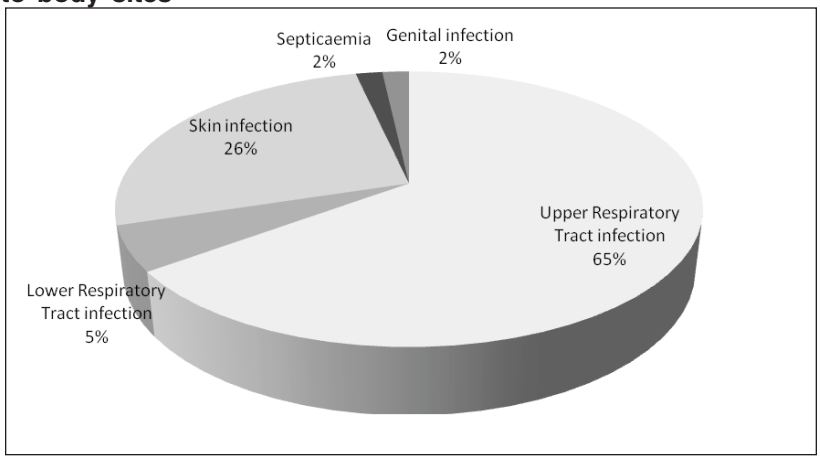
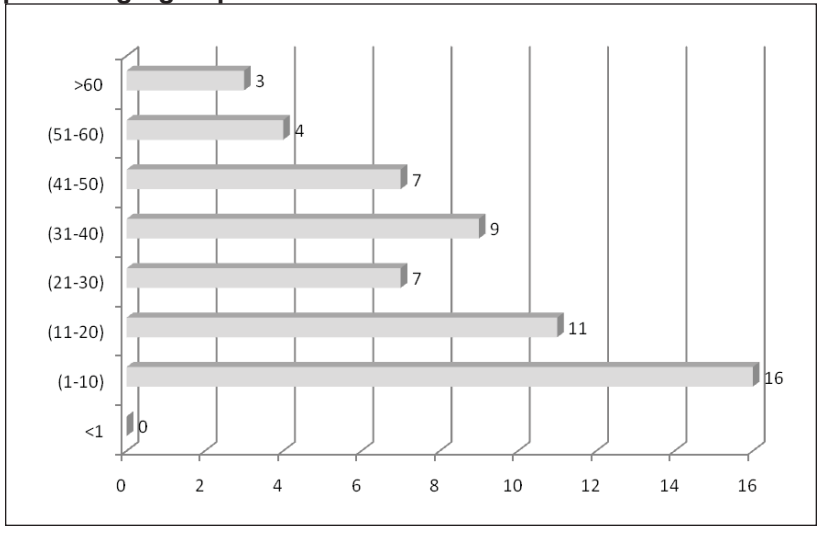


Figure 2. Distribution of the *S. pyogenes* infection according to patient age group.



The results of susceptibility testing of 57 *S. pyogenes* isolates in vitro and the MIC range and the calculated MIC_{50} and MIC_{90} values are summarized in Table 1. Regarding resistant rate among macrolides and lincosamides compounds, fifteen isolates (26.3%) were resistant to erythromycin (MICs 0.06-0.5mg/L) and clarithromycin, 9 isolates (15.8%) (MICs 0.25-2mg/L) were resistant to azithromycin and one isolate (1.8%) (MICs 0.06-0.5mg/L) were resistant to clindamycin. Of these 15 isolates resistant to erythromycin, 3 were resistant to clarithromycin, 6 were resistant to azithromycin and none of these isolates were resistant to clindamycin. High rate of resistance among *S. pyogenes* to tetracycline 63.2% (36 out of 57 isolates) (MICs 0.5-4mg/l) was reported, in which tetracycline resistance was found in 11 of the 15 erythromycin- resistant strains.

Table 1. Susceptibility of 57 isolates of S. pyogenes to 19 antibiotics

Antimicrobial	MIC (mg/L)			Percentage of isolates		
agents	Range	MIC50	MIC90	Susceptible	Intermediate	Resistant
Erythromycin	0.06 - 0.5	0.06	0.5	66.7	7.0	26.3
Clarithromycin		nt		78.9	8.8	12.3
Azithromycin	0.25 - 2	0.25	2	80.7	3.5	15.8
Clindamycin	0.06 - 0.5	0.06	0.12	77.2	21.1	1.8
Penicillin	0.03 - 1	0.06	1	100	-	-
Amoxacillin	0.06 - 1	0.12	1	98.2	-	1.8
Cefaclor	4	0.5 - 4		94.7	1.8	3.5
Cefepime	0.25 - 2	0.25	1		nt	
Cefotaxime	0.25 - 2	0.25	1		nt	
Ceftrixone	0.25 - 2	0.25	1	93.0	-	7.0
Cefuroxime	0.25 - 2	0.25	2	96.5	3.5	-
Cefpodoxime		nt		89.5	3.5	7.0
Chloramphenicol	1 - 16	2	4	84.2	8.8	7.0
Tetracycline	0.5 - 4	2	4	28.1	8.8	63.2
Levofloxacin	0.25 - 2	1	2	73.7	17.5	8.8
Ciprofloxacin		nt	52.6	33.3	14.0	
Linezolid		nt	91.2	-	8.8	
Meropenem	0.06 - 0.5	0.06	0.25		nt	
Vancomycin	0.12 - 1	0.5	1	52.6	-	47.4

nt. not tested

All Erythromycin-resistant isolates (n = 15) were tested for phenotype of resistance using double disk-diffusion. The majority of erythromycin-resistant strains, 14 (93.3%) had M phenotype and only 1 (6.7%) had the constitutive MLS phenotype. None of the isolates expressed the inducible MLS phenotype.

DISCUSSION

A total of 57 *S. pyogenes* isolates were identified from clinical specimens of patients referred to hospitals and primary care health centers in Makkah and Jeddah – Saudi Arabia over 6-months period. Only 20 clinical isolates of *S. pyogenes* (2%) out of 1040 throat swabs were isolated during the study period. This indicates that most throat infections is due to viral and bacterial infections other than *S. pyogenes*. Moreover, this may indicate that the infection and/or the carriage rate of *S. pyogenes* in our region less than other countries[5-9]. However, Arguelles *et al*., found zero carriage rate in examined population, and they stated that; this could be due to factors such as the improvements in the living conditions of the families and developments within the community[10].

This study showed that the majority of infections with *S. pyogenes* were in patients with age group between 1–20 years old (47.4%). Many studies have shown that *S. pyogenes* is the most common bacterial cause of pharyngitis, and primarily affects children 5 to 15 years of age[8-11].

World-wide, penicillin-resistance has not been identified in clinical strains so far[2], and also, the present data confirms the continuing susceptibility of *S. pyogenes* to penicillin. Resistance to erythromycin was moderately high (26.3%) among *S. pyogenes* in this study. Similar results of erythromycin resistance were found in Korea (23%), Greek (24%), Spain (21.3-33.2%) and India (29.4%)[12-16]. However, in other countries such as USA, France, Poland and Belgian showed much less resistance rate to erythromycin (2-12 %)[4,17-20]. The reason of the high rate of macrolides resistance could be due to the regular prescription to allergic and non-allergic patients for treatment of streptococcal tonsillopharyngitis and other indications. It has been reported that, increasing macrolides resistance were associated with high utilization of these antibiotics[2]. A High rate of resistance was observed among *S. pyogenes* to tetracycline (63.2%) in which tetracycline resistance was found in 11 of the 15 erythromycin- resistant strains. A moderate to high rate of resistance (26-43%) were reported in many countries[2,12,20,21]. Tetracycline is not recommended for infections caused by *S. pyogenes*. Therefore, treatment of non-streptococcal infections using tetracycline in patients who are asymptomatic carriers of *S. pyogenes* might contribute to emergence and spread of tetracycline resistance among *S. pyogenes*.

This study showed that, the M phenotype was predominant among erythromycin-resistant strains (93.3%). These data are similar to those found in European countries, Canada and India where the M phenotype was most common[3,4,13,14,22,23]. However, the inducible MLS (51%) and constitutive MLS (31%) were more common among erythromycin resistant strains in Korea[12]. It seemed that the prevalence of the phenotypes of erythromycin-resistant *S. pyogenes* varies from region to another.

CONCLUSIONS

Infections with *S. pyogenes* is not very common among patients suffering from throat infection in Makkah region. Erythromycin resistant is moderately common and tetracycline is predominant among *S. pyogenes* clinical isolates. Educational programs for medical staff to increase awareness of emerging bacterial resistance to antibiotics and particularly, macrolides resistant *S. pyogenes* to avoid mistreatment.

ACKNOWLEDGMENT

The author gratefully acknowledge The Custodian of The Two Holy Mosques Institute of Hajj Research for supporting this study. I thank Mr. Wail Abdul-Salam, Mr. Abdul-Elah Al-Jeaid, Mr. Abdul-Kareem Abid, Abdul-Aziz Al-Qarni and Mr. Abdulla Allehyani (Medical sciences students) for their help in specimen's collection and practical assistant. I would like to thank also hospitals and health centers staff involved in this study; without their help this work could not be done.

REFERENCES

1. Cunningham MW. 2000 Pathogenesis of group A streptococcal infections. *Clin Microbiol Rev*; **13**: 470-511.
2. Gattringer R, 2004 et al. Antimicrobial susceptibility and macrolide resistance genes in *Streptococcus pyogenes* collected in Austria and Hungary. *Int J Antimicrob Agents*; **24**: 92-5.
3. Giovanetti E, *1999* et al. Phenotypes and genotypes of erythromycin-resistant *Streptococcus pyogenes* strains in Italy and heterogeneity of inducibly resistant strains. *Antimicrob Agents Chemother*; **43**: 1935-40.

4. Descheemaeker P, 2010 et al. Macrolide resistance and erythromycin resistance determinants among Belgian Streptococcus pyogenes and Streptococcus pneumoniae isolates. *J Antimicrob Chemother*; **45**: 167-73.
5. Durmaz R, 2003 et al. Prevalence of group A streptococcal carriers in asymptomatic children and clonal relatedness among isolates in Malatya, Turkey. J Clin Microbiol; 4: 5285-7.
6. Herruzo R, 2002 et al. Prevalence and antimicrobial resistance of *S. pneumoniae* and *S. pyogenes* in healthy children in the region of Madrid. *Int J Pediatr Otorhinolaryngol*; **65**: 117-23.
7. Hirakataa Y, 2005 et al. Antimicrobial susceptibilities of potential bacterial pathogens in adults with acute respiratory tract infections. Prospective Epidemiological Network Investigating Community-acquired Infection SurveiLLance In Nagasaki (PENICILLIN) Study. *Diag Microbiol Infect Dis*; **51**: 271-80.
8. Magnusdottir B, Jonsson J, Kristinsson K. 2008 Prevalence of Streptococcus pyogenes and methicillin-resistant Staphylococcus aureus in the pharynx of healthy children in the town of Gardabaer. *Laeknabladid*; **94**: 447-5.
9. Zydoon J. Prevalence and identification of beta hemalytic streptococci among patients having throat infection in Al-Hudaida. http://www.yemennic.info/contents/studies/detail.php?ID= 23436.2008
10. Arguelles K, Naguit R, Cabrera E. 2004 Incidence of *Streptococcus pyogenes* as pharyngeal flora among children ages 5 to 12 of Barangay 708, Leveriza, Malate, Manila. *Phil J Microbiol Infect Dis*; **33**: 149-51.
11. Madigan M, Martinko J, Parker J. 2003 *Biology of Microorganisms*. Prentice Hall.
12. Bae S, 2007 et al. Phenotypes and genotypes of macrolide-resistant *Streptococcus pyogenes* isolated in Seoul, Korea. *J Med Microbiol*; **56**: 229-35.
13. Capoor M, 2006 et al. Resistant to erythromycin and rising penicillin MIC in *Streptococcus pyogenes* in India. *Jpn J Infect Dis*; **59**: 334-6.
14. Grivea I, 2006 et al. Resistance to erythromycin and telithromycin in *Streptococcus pyogenes* isolates obtained between 1999 and 2002 from Greek children with tonsillopharyngitis: phenotypic and genotypic analysis. *Antimicrob Agents Chemother*; **50**: 256-61.
15. Trallero E, 2005 et al. Geographical and ecological analysis of resistance, coresistance, and coupled resistance to antimicrobials in respiratory pathogenic bacteria in Spain. *Antimicrob Agents Chemother*; **49**: 1965-72.
16. Trallero E, 2007 et al. Phenotypic and genotypic characterization of *Streptococcus pyogenes* isolates displaying the MLSB phenotype of macrolide resistance in Spain, 1999 to 2005. *Antimicrob Agents Chemother*; **51**:1228-33.
17. Bingen E, 2000 et al. Resistance to macrolides in *Streptococcus pyogenes* in France in pediatric patients. *Antimicrob Agents Chemother*; **44**: 1453-7.
18. Nir-Paz R, 2006 et al. Macrolide, lincosamide and tetracycline susceptibility and emm characterisation of invasive *Streptococcus pyogenes* isolates in Israel. *Int J Antimicrob Agents*; **28**: 313-9.
19. Richter S, 2005 et al. Macrolide-resistant *Streptococcus pyogenes* in the United States, 2002-2003. *Clin Infecti Dis*; **41**: 599-608.
20. Szczypa K, 2004 et al. A rapid increase in macrolide resistance in *Streptococcus pyogenes* isolated in Poland during 1996-2002. *J Antimicrobiol Chemother*; 54: 828-31.
21. Jasir A, Tanna A, Noorani A, 2000 et al. High rate of tetracycline resistance in *Streptococcus pyogenes* in Iran: an epidemiological study. *J Clin Microbiol*; **38**: 2103-7.
22. De Azavedo J, 1999 et al. Prevalence and mechanisms of macrolide resistance in clinical isolates of group A streptococci from Ontario, Canada. *Antimicrob Agents Chemother*; **43**: 2144-7.
23. Kataja J, Huovinen P, Seppala H. Erythromycin 2000 resistance genes in group A streptococci of different geographical origins. *J Antimicrob Chemother*; **46**: 789-92.

FUTURE OF HEALTHCARE SERVICES IN THE KINGDOM OF SAUDI ARABIA

Dr. Zuber M. Shaikh, FACHE, PhD, MPhil, MHM
Dr. Sulaiman Al-Habib Medical Group, King Fahad Road,
Olaya, P.O.Box-91877, Riyadh-11643, Kingdom of Saudi Arabia
drzuber5@yahoo.co.in; Contact No: +966-564629290
Dr. (Mrs.) Gazala Khan, PhD, MHM
Sancheti Institute for Orthopedics and Rehabilitation
Shivaji Nagar, Pune, Maharashtra State, India
Dr. Soleiman Al-Towyan
Vice-President-Hospital Affairs, Dr. Sulaiman Al-Habib Medical Group,
Olaya, P.O.Box-91877, Riyadh-11643, Kingdom of Saudi Arabia
Ms. Sharon Lee Mayhew
Dr. Sulaiman Al-Habib Medical Group, King Fahad Road,
Olaya, P.O.Box-91877, Riyadh-11643, Kingdom of Saudi Arabia

ABSTRACT

Healthcare in Saudi Arabia continues to be a thriving sector as the government continues to finance health services for a rapidly growing population of 24 million, which is growing by more than 3 percent per annum, and is expected to grow to 30% in the next 10 years.[1] On the back of high birth rates, greater per capita demand for aged population health due to the growing affluence and rising life-expectancy rates, and a continuing influx of expatriate workers, the Kingdom's health sector is in need of serious expansion by maintaining the quality of services in all the healthcare sectors. The total numbers of hospitals (1429H) in the Kingdom was 393 with 53,888 beds,[2] but only 15% of the hospitals are accredited by the International and National Accreditation Organizations (2010). The rate of hospital beds per 10,000 populations was dropped by 2.46 in 2008 as compared to the year 1989. The current supply of hospital beds and doctors is already strained, and 500,000 residents do not have access to the basic healthcare services in the Kingdom. The MOH banned 16,270 healthcare workers with fake medical degrees in 2009.[3]

Objective: To study the future demands of healthcare services in KSA

Methodology: It is an observation method, in which the primary data was collected by observations and secondary data was collected from the MOH statistical year books, relevant published research materials in the national and international research journals, and government resources.

Conclusions: There is an enormous future and demand for healthcare services in the Kingdom for the local and expatriate population at an affordable cost with better accessibility, availability, and best possible outcome in all the regions of the Kingdom to achieve the highest patient satisfaction in all the healthcare sectors.

Key words: Kingdom of Saudi Arabia (KSA), Hijri (H), Ministry of Health (MOH), Healthcare Quality, Accreditation, Healthcare Workers.

INTRODUCTION

Over the next few decades, Saudi Arabia is expected to face a sharp increase in its health care needs. Rising population with growing percentage of Saudi nationals over 70 years and a surge in the illnesses of affluence are all expected to create tremendous new demands for health care and quality management services. Planners within the Saudi Government believe that the current, largely state-funded health care system will be unable to meet these needs. To cope with that growth in demand, plans are being made to encourage the development of a private health care sector to maintain the healthcare service quality. This is likely to create a tremendous opportunity for a broad range of foreign health care companies to participate in the Middle East's large health care market.[4]

GEOGRAPHY OF SAUDI ARABIA:

Situated in the Southern-Eastern part of the Asian Continent, the Kingdom occupies 2,149,690 sq km of Arabian Peninsula, and is approximately one-fifth the size of the United States. The land total boundaries is 4,431 km, and the border countries are Iraq 814 km, Jordan 744 km, Kuwait 222 km, Oman 676 km, Qatar 60 km, UAE 457 km, Yemen 1,458 k m. The Kingdom stands on the 14 rank in the list of country comparison to the world. The weather is harsh, dry desert with great temperature extremes. The land is full of natural resources as petroleum, natural gas, iron ore, gold, and copper.[5]

DEMOGRAPHY OF SAUDI ARABIA:

Population growth (3% per annum) is the chief driver of the healthcare demand in the Kingdom. According to preliminary population estimates by the Central Department of Statistics (CDS), the Kingdom's population increased by 6.73 million individuals over the 14 year period 1992–2006, and reached to 24807273 in 2008. This translates to a 2.4% compounded annual growth rate (CAGR), roughly twice the world's average growth of 1.2% per annum, putting the Kingdom among the highest population growth countries in the world.

Table 1: Saudi Population Growth Historic and Projections (2006-2015):

Population	2000*	2006*	2015**	Absolute Change 06-15
Total Population	20,473,623	23,678,849	29,625,273	5,946,424
Saudi	14,925,536	17,270,181	21,618,607	4,348,426
Non- Saudi	5,548,087	6,408,668	8,006,666	1,597,998
Ages 60+	859,892	994,512	1,322,017	327,506

Source:*CDS and Ministry of Economy and Planning. **NCB

The experts expect that the total population of KSA will expand to 6.0 million by 2015, bringing the total to 29.6 million. The aged population by 2015 is expected to comprise 4.5% of total population, roughly 1,322,017 individuals, meaning that the number of elders in the Saudi society requiring more frequent healthcare, will increase by 327,506 individuals by 2015. However in the year 2008 the total population of the Kingdom was 24807273.[6]

ECONOMY OF SAUDI ARABIA[7]

Saudi Arabia has an oil-based economy with strong government controls over major economic activities. It possesses more than 20% of the world's proven petroleum reserves, ranks as the largest exporter of petroleum, and plays a leading role in OPEC. The petroleum sector accounts for roughly 80% of budget revenues, 45% of GDP, and 90% of export earnings. About 40% of GDP comes from

the private sector. High oil prices through mid-2008 have boosted growth, government revenues, and Saudi ownership of foreign assets, while enabling Riyadh to pay down domestic debt. In 2008 the GDP Per capita (US$) was 19206, MOH Budget (% of Governmental Budget) was 5.6 and, MOH Expenditure per capita (by US$) was 271.

HEALTHCARE SERVICES IN SAUDI ARABIA

The organization of the health services in the Kingdom started in 1925, when the Public Health Department was established. In 1951, the Ministry of Health was established to undertake the health and preventive health tasks and responsibilities and to continue the development of health systems and facilities in order to attain an improved level of health care.

Healthcare services in the Kingdom are provided by the three parties, namely: the Ministry of Health (MOH), Other Government Sectors and the Private Sector. MOH plays a vital role in providing the healthcare services in the Kingdom and accounts 58.77%, Other Government Sectors accounts 9.94% and the Private Healthcare Sectors accounts 31.29%. The private healthcare sector is now booming as the MOH services are lagging behind in quality healthcare services.[8]

BURDEN OF DISEASES

The burden of disease is markedly reduced but there is a sharp increase in non-communicable diseases, in particular cardiovascular disease and diabetes. Deaths from road traffic accidents are now the largest cause of death in adult males aged 16 to 36 years.

HEALTHCARE QUALITY IN SAUDI ARABIA

In Saudi Arabia there has been interest in improving the quality of health care since the early seventies. This was reflected by an increase in expenditure on health care and an increase in the numbers of hospitals and employees in both the private and the public sectors. This development is accompanied by the expansion of the range of health services from treatment services to preventive services. Since the early nineties, the development plans have concentrated on improving the quality of health services, improving the effectiveness of health care institutions, and continuing their quantitative growth.[9]

Out of 393 hospitals (2008) in all the healthcare sectors of the Kingdom, only 38 (9.66%) hospitals have International Accreditation,[10] where as 21 (5.34%) hospitals have National Accreditation. Overall only 15% of the hospitals in the Kingdom are accredited by the National and International Accreditation Organizations. Now the MOH is planning to make the accreditation as mandatory for all the hospitals in all the sectors of healthcare in the coming years to improve the quality of the healthcare services in the Kingdom.[11]

The satisfaction level of the patients visiting to MOH services is average to moderate [only12], due to the poor healthcare services, average quality of patient care, lack of continuity of care, lack of accessibility, lack of availability,[13] moderate to average medical technology, increase in the number of medical errors,[14] high turnover of medical staff with average job satisfaction, lack of motivation[15], absence of a tailor made strategic plan, lack of reliable health information systems, high operating cost,[16] and lack of planning and training in the healthcare sector.[17]

In spite of the significant achievements that are evident in the hospitals of the Kingdom, there are still many issues and problems that need to be tackled and solved in order to raise the level of quality of the provided health services and to pave the way for the implementation of healthcare

quality concepts. Some of the most important problems that face the government hospitals in the Kingdom to implement the quality concepts are as follows:[19]

Labour Force Problems

Health workforce strategies are not clearly specified. There is no connection between health education and the actual needs of the health institution's employees, and, in addition, there is no connection between health education and training and actual employment. The larger proportion of the expatriate labour force is from other Arab countries and from the countries of East Asia or other developing countries which do not implement quality programmes in their hospitals and their educational programmes. There is also a very low percentage of qualified Saudi labour in the healthcare sector, particularly in the medical, nursing and medical support fields.

Administrative Problems

The healthcare sector is still operating in the traditional administrative manner. Hospitals are still suffering from a wide shortage of qualified and experienced administrative staff at all levels Moreover, in some cases, physicians or non qualified personnel are assuming managerial posts in hospitals although many of them have never received any managerial degree, diploma, training or certificates. There is a deficiency in employment policies and job description in the health related occupations.[18] Also there is a deficiency in management decentralization, wage levels and motivation in the MOH hospitals.

Problems of Buildings

Government hospitals are suffering from the absence of quality measures for the care and design of hospitals. Some buildings are old, and inadequate to meet requirements and suffering from poor maintenance.

Problems of Equipment

These result from the dependence on imported technology, non-availability of standard criteria that determine the type, number and specifications of the medical equipment and devices. While this situation leads to diversity in hospital facilities, and technological developments in the area of health equipment and devices, preparing adequate and suitable maintenance programmes for these facilities is deficient.

Problems of Medical Supplies

Annual planning is required to define the actual requirements of medicines and medical supplies. Moreover, there has been a reduction in the financial allocation for these medicines and medical supplies. Non-performance despite contractual obligations from suppliers, results in serious shortages in medical supplies. In addition to the high level of consumption of medicines and medical supplies, there are inefficient systems for the disposal of medicines and of controlling their consumption.

Problems of Nutrition

Contractors carry out nutrition provision in hospitals. The most important problems are: inaccuracy of the conditions and specifications by the MOH and the service and quality delivery by contractors, deficiency of the quantity and quality of the staff specialized in nutrition, deficiency in the organizational structure of these staff in hospitals and a weak relationship between the MOH and the contractors.

Problems of the Services' Beneficiary

These include: A lack of awareness of the objectives of the Primary Health Care Centers and a low level of understanding regarding the role of the hospital.

HEALTHCARE DEVELOPMENT IN SAUDI ARABIA[20]

Table 2: Hospitals and Beds in All Health Sectors and Rate of Beds/ 10,000 Population, KSA.

Sectors	1989		2008	Total Increase		
	Hosp.	Beds	Hosp.	Beds	Hosp.	Beds
MOH	162	25,918	231 (58.77%)	31720	69	5802
Other Govt.	30	6,592	39 (9.94%)	10806	09	4214
Private	61	6,445	123 (31.29%)	11362	62	4917
Total	**253**	**38,955**	**393**	**53,888**	**140**	**14,933**
PHC's	**1,640**		**1,986**		**346**	
Population	**16,108,539**		**24,807,273**		**8,698,734**	
Rate of Beds per 10,000 Population	23.00		21.70			

The table- 2 depicts that 69 hospitals in MOH, 9 hospitals in Other Government, and 62 hospitals in the Private healthcare sector added since 1989 to 2008. The rate of beds per 10,000 population is decreased by 1.3 in 2008 as compared to year 1989, despite of the tremendous increase in the population in the Kingdom.

In the year 2008, the MOH has following utilities: 231 hospitals, 1086 PHC's, 20 Dental Centers, 3 TB Centers, 13 Rehabilitation Centers, 8 Central Laboratory, 25 Health Centres Control at Entry Points, 31 Anti – Smoking Clinic, 18 Forensic Medicine and 3 others.

Table 3: Physicians*, Nurses and Allied Health Personnel, KSA**

Sectors		2006		2007		2008	
		No.	Saudi %	No.	Saudi %	No.	Saudi %
MOH	Physicians	21265	19.3	22643	20.0	24802	19.0
	Nurses44395	41.5	51188	44.1	55429	44.5	
	Allied Health Personnel	26075	71.4	27958	75.6	30281	77.9
Other Govt.	Physicians	10233	46.5	10808	48.2	11592	48.0
	Nurses20488	17.5	21462	17.2	23536	16.6	
	Allied Health Personnel	15192	49.6	16162	50.9	17183	49.9
Private	Physicians	14091	4.5	14468	4.1	16444	4.5
	Nurses18985	3.8	21085	3.6	22333	4.1	
	Allied Health Personnel	7872	14.9	7168	13.1	8462	17.3
Total	Physicians	45589	20.8	47919	21.6	52838	20.8
	Nurses83868	27.1	93735	28.8	101298	29.1	
	Allied Health Personnel	49139	55.6	51288	59.1	55926	60.1

* Includes Dentists

**Include Pharmacists except those in private pharmacies

The healthcare workforce in the MOH comprises of Physicians, Nurses and Allied Health Personnel. The percentage of Saudi staff in all healthcare sectors is as follows: Physicians 20.8%, Nurses 29.1%, and Allied Health Personnel 60.1%.

There are only 11 Medical Colleges, 5 Dentistry Colleges, 7 Pharmacy Colleges, 8 Applied Science Colleges and 5 Nursing Colleges in the year 2008, which highlights the weakness in the medical education system in the Kingdom.

Table 4: Visits to Various Sectors and Average Number of Visits per Person, 2008, KSA.

Sector	2006	2008
MOH	61848955	65312406
%	55.4	51.8
Other Govt. Sector	20108041	24694368
%	18.0	19.6
Private Sector	29616979	36036721
%	26.5	28.6
Total	111573975	126043495
Average no. of visits / person/ year	4.7	5.1

Table 4 depicts that there is 3.6% drop in the utilization of MOH hospitals, whereas there is a 1.6% increase in the Other Government Sector. Private Healthcare Sector increase is 2.6% in the Kingdom. This illustrates that the quality of the healthcare delivery system is a low and patients are not satisfied with the existing services in the MOH hospitals. Overall there is a 0.4 increase in the average number of visits per person per year in the kingdom as compared with the data of 2006.

Table 5: In-Patients in all Healthcare Sectors in 2008, KSA.

Sector	2004	2005	2006	2007	2008	
MOH	No.	1312534	1319625	1432834	1640388	1612581
	%	54.8	54.5	52.1	58.8	52.6
Other Govt.	No.	429947	447978	457811	498144	513774
	%	17.9	18.5	16.7	17.8	16.7
Private	No.	654132	651786	857450	653574	941075
	%	27.3	26.9	31.2	23.4	30.7
Total		**2396613**	**2419389**	**2748095**	**2792106**	**3067430**
Average No. of admissions/ 100 persons		10.6	10.5	11.6	11.5	12.4

The table- 5 depicts that there is sudden decrease of 6.2 % In-Patients in MOH, 1.1 % decrease in Other Govt. Sector and there is sudden increase of 7.3% in patients in the Private Healthcare Sector. This is due to the reasons as explained earlier in this paper, which shoes that there is a great future for private healthcare sectors in the Kingdom and also shows that the MOH services are far behind in delivering the quality healthcare services required in the Kingdom.

CONCLUSION

There is an enormous future and demand for healthcare services in the Kingdom for the local and expatriate population at an affordable cost with better accessibility, availability, and best possible outcome in all the regions of the Kingdom to achieve the highest patient satisfaction in all the healthcare sectors. The existing healthcare services should implement International/National Accreditation to improve their services by qualified healthcare professionals.

ACKNOWLEDGEMENT

The Author is presently working with Dr. Sulaiman Al-Habib Medical Group, as a Quality and Medical Coordinator for the group, and is responsible for Planning, Designing, Hospital Commissioning, Operations, Strategies, Quality Improvement (Joint Commission International Accreditation of the group hospitals). The author has presented 13 research papers in the International Conferences.

REFERENCES

1 Sector Report, Life Science/ Healthcare –Saudi Arabia, Produced by- Syed Zaman, *UK Trade and Investment, Riyadh*, revised June 2009.

2 Health Statistical Year Book, Kingdom of Saudi Arabia, Ministry of Health, 1429 H (2008).

3 The National Newspaper, Saudi citizens sick and tired of bad health care, by - Wael Mahdi, Foreign Correspondent, April 12. 2010

4 Investing in Saudi-Arabian Healthcare sector, by- Ghassan Barraage, Ziad Fares, Rene Perillieux and Richard Shediac, *Booz Allen Hamilton*, 2007.

5 Saudi Arabia, Central Intelligence Agency, 2010

6 National Commercial Bank Report , Saudi Health Sector Service Review, December 2007

7 Saudi Arabia, Central Intelligence Agency, 2010

8 Health Statistical Year Book, Kingdom of Saudi Arabia, Ministry of Health, 1429 H (2008).

9 Considering Total Quality Management in Ministry of Health Hospitals in Jeddah City in Saudi Arabia, By- Amal Mohammed Sheikh Damanhouri, 2002.

10 The impact of accreditation on patient care in Saudi Hospitals, By- Dr. Saeed Al Qahtani, 2009 and Joint Commission International Accredited Hospitals List, 2010.

11 Arab News, 21 Government hospitals granted CBAHI Accreditation, By- P.K. Abdul Ghafour, July 25, 2010.

12 El Shabrawy, A., & Mahmoud, M. A study of patient satisfaction with primary health care services in Saudi Arabia. J Community Health 1993; 18(1):49-54;

13 Mansour, A., & Al-Osimy, M. A study of satisfaction among primary health care patients in Saudi Arabia. J Community Health 1993; 18(3):163-73.

14 Saudi Gazette, 73 cases of medical error filed last year by Matooq Al-Sharif, 25 August.

15 Saud Al- Nimir and Girmay Berhie, Problem of Retention of Physicians in the Ministry of Health.

16 Girmay Berhie, The Health Planning Process at National and Facility Levels in Saudi Arabia: Policy Implications, Journal of Saud University, Vol.3, Admin, Sci (1), PP.3-16(A.H.1411/1991).

17 Badran A. Al-Omar and Shafiq Chowdhury, Planned and Achieved Outputs in Saudi Health Care System: Reducing the Gap, Journal of Saud University, Vol.11, Admin, Sci (1), PP.63-78 A.H.1419/1999.

18 World Report, WHO 1983, p. 133, 137

19 World Report WHO, 1988, p.52; Considering Total Quality Management in Ministry of Health Hospitals in Jeddah City in Saudi Arabia, By- Amal Mohammed Sheikh Damanhouri, 2002.

20 Health Statistical Year Book, Kingdom of Saudi Arabia, Ministry of Health, 1429 H (2008).

MUTAGENIC ACTIVITY OF MITRAGYNINE COMPOUND

Mohd Saleh Bin Ahmad Kamal, Master's student
Biomedical Science Department, Faculty of Allied Health Science,
Universiti Kebangsaan Malaysia, Jalan Raja Muda Aziz,
50300 Kuala Lumpur, Malaysia

ABSTRACT

Toxicology study is an important part of natural product development. The safety data must be provided before the health product can be used. The toxicity testing comprises general toxicity, fetal or fertility toxicity, mutagenic and carcinogenic responses. This involves testing against a large variety of different *in vitro* and *in vivo* tests. The sign of toxicity is depend on many factors. *Mitragyna speciosa* has been used in traditional medicine, especially at southern Thailand and peninsular Malaysia. In Malaysia, they are commonly called as "ketum" or "biak". Local peoples used it to alleviate pain, coughing, diarrhea, counter fatigue, addicts of heroin addiction, anti-worm, improve blood circulation and even to treat diabetes. In peninsular Malaysia, the leaves were processed and used as a substitute for opium. A study conducted in Thailand in 1975 showed that ketum users became addicted. Recently in Malaysia, there has been a growing trend among drug addicts to drink the aqueous of bitter-tasting ketum leaves to get high as replacement of insufficient supply cannabis or heroin. Mitragynine is the dominant alkaloid isolated from ketom leaves and believed to be the most active component with potent physiological action. Mitragynine is said to have stimulating and/or sedative effects on the brain and have opiate-like effects such as analgesia, antitussive and also hypothermia in animals while its action was not reversed by nalorphine though it suppress the opioid withdrawal syndrome. However, there is no basic toxicological study on mitragynine as the dominant alkaloid of *Mitragyna speciosa* in order to use it safely. The present topic shows the findings of the mutagenic study on the mitragynine. Study is guided by Ames test protocol (*Maron and Ames 1983*) and done on bacteria Salmonella *typhimurium* TA98 and TA100. Results showed that in mutagenicity study, at 50mg/ml concentration of mitragynine has mutagenicity effect on *Salmonella typhimurium* TA98 while at 25mg/ml and 50 mg/ml dose of mitragynine also has mutagenicity effect on Salmonella typhimurium TA100. As conclusion, the mitragynine of *Mitragyna speciosa* is mutagenic at concentration 25 mg/ml and 50 mg/ml.

Key words: Mutagenic, mitragynine, Ames Test, Mitragyna speciosa *Korth,* Salmonella typhimurium

INTRODUCTION

Mitragyna speciosa Korth (MS) or more known locally as "Ketum" or "daun Biak" is part of the family Rubiciacceae and found naturally in tropical and subtropical regions of Asia especially in Thailand and Malaysia[1]. MS is a large tree and can grow up to 50 feet with elliptical dark shiny green leaves and bearing yellowish flowers and oblong-ovoid shape fruits. Studies back to 1921 have shown that mitragynine is the dominant alkaloid isolated from ketom leaves and believed to be the most active component with potent physiological action[2].

Mitragynine is said to have stimulating and/or sedative effects on the brain and have opiate-like effects such as analgesia, antitussive and also hypothermia in animals while its action was not reversed by nalorphine though it suppress the opioid withdrawal syndrome[3]. Like other plants with many potential uses, scientific research has shown that some substances present in them may be

potentially toxic and carcinogenic. Research has shown that many plants which are used as food ingredients or in traditional medicine also showed *in vitro* mutagenic effects[4,5,6]

The most active compound isolated from a plant also needed to be tested against a large variety of different in vitro tests to reveal different types of toxicity including mutagenic and carcinogenic responses[7]. Thus, the aim of this study was to evaluate the mutagenic potential activity of mitragynine compound by studying their effects on two histidine requiring *Salmonella typhimurium* in the absence of a liver metabolizing system.

SAMPLE OF MITRAGYNINE COMPOUND AND MUTAGENICITY ASSAY

After serial extraction, about 1000 gram young leaves of MS were giving 2.5 gram of dry crude alkaloid extract[8]. Then, the major alkaloid (mitragynine) was isolated by silica-gel column chromatography eluted with 5:95 MeOH:CHCl3. Mitragynine was identified chromatographically using the Agilent Gas Chromatography Mass Spectrophotometry. The genotypes of the test strains were checked for their histidine requirement, deep rough (*rfa*) character, UV sensitivity (*uvrB* mutation) and presence of the R-factor plasmid[9]. Salmonella typhimurium strain TA 98 gives an indication of frame shift mutation while a positive response from strain TA 100 indicates base-pair substitution mutation.

Mitragynine compound was examined for its mutagenic effect by the *Salmonella*/microsome assay according to mutagenicity test protocol[9]. The assay was based on the pre-incubation method using *Salmonella typhimurium* test strains TA 98 and TA 100 without metabolic activation (S9 mix fraction). The standard mutagens used as positive controls were 2-Nitrofluorene (2-NF) for TA98 (without S9) and sodium azide (NaN_3) for TA100 (without S9)[9,10] while DMSO served as the negative control for the mitragynine.

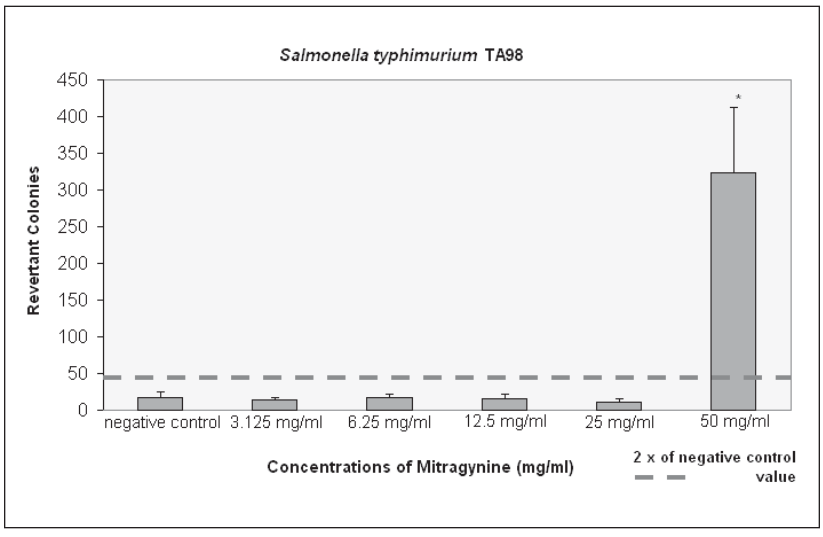
All the assays were done in triplicate and all the data were collected in mean ± SD. The sample was considered to be mutagenic when the mean number of revertant colonies was at least double that found in the negative control culture. The results were expressed as mean ± SD of three independent experiments (n=3). The one-way analysis of variance (ANOVA) test was used to analyse the result and *$P<0.05$ was considered statistically significant.

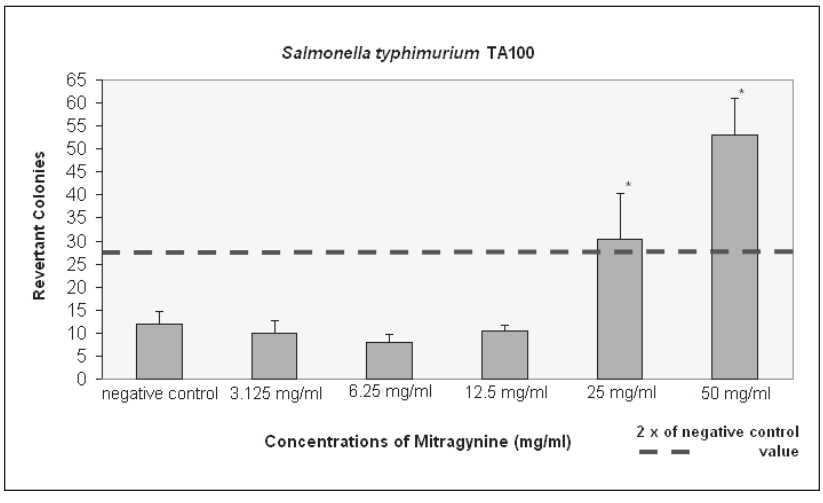
RESULTS AND DISCUSSION

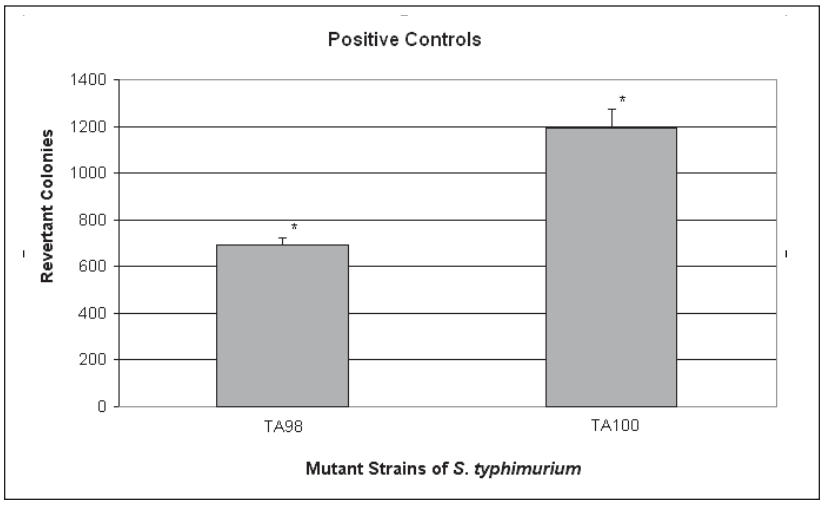
Results of mutagenic evaluation assay for mitragynine compound in revertants/plate were shown in the below bar chart. Mitragynine compound showed the presence of mutagenic activity by a high mean/plate for the concentration of 50 mg/ml for frame shift (TA98) and at concentration of 50 mg/m and 25 mg/ml for base pair (TA100). These samples were reported as mutagenic since the number of revertant colonies were at least twice the negative control yield and showed a significant response with ANOVA ($p<0.05$).

Mitragynine compound can induce mutagenic activity at higher dose and is considered totally not safe. Chemicals are not judged non-mutagenic unless they have been tested in at least four Salmonella tester strains (TA98, TA100, TA1535 and TA97 or TA1537) and a positive response in any single strain either with or without metabolic activation is sufficient for designating a chemical as mutagen[11]. Even without metabolic activation S9, mitragynine shows to be mutagenic at high concentration, and bearing in mind that mitragynine is the major constituent, accounting for approximately 12% of the total alkaloid extract of MS[12] and one gram of aqueous extract of MS yields 1.0 to 1.6 mg of mitragynine, so the possibility of consuming MS at higher dose or if taken continuously for a long period of time can be mutagenic.

Besides the pharmacology activity of mitragynine, this active compound of MS has chemical substances which reverts mutations present in the test strains and restore the functional capability of the bacteria to synthesize an essential amino acid. The revertant bacteria are detected by their ability to grow in the absence of the amino acid required by the parent test strain[13]. Mitragynine is the dominant alkaloid of MS and many alkaloids are toxic to other organisms[14] because nitroasmines, functional groups of alkaloid that contain a basic nitrogen atom with a lone pair can exhibit minimal mutagenic activity in the absence of exogenous metabolic activation[15]. Thus, it is showed that alkaloid group have mutagenic effect on genetic materials based on the present study.







Higher concentration of mitragynine compound need to be further investigated to determine its mutagenicity effect. One of the examples is to run this Ames test with metabolic activation system (S9 mix fraction). The reason of this because the majority of chemicals are not directly toxic and one disadvantage of a bacterial system *in vitro* is that the bacteria lack the enzymes that are responsible in mammals for the activation of chemicals to toxic metabolites[16]. So, we can check whether the mutagenic effect of mitragynine can be influence by metabolic activation system or not.

CONCLUSION

Mutagenic activity was found at the high concentration of mitragynine compound in both bacteria *Salmonella typhimurium* test strains TA 98 and TA 100.

ACKNOWLEDGEMENT

We are grateful to the Director of Institute for Medical Research and Ministry of Health Malaysia for providing the financial support under the project grant JPP-IMR 07-007. We also wish to thank Mr. Mohd. Isa Wasiman for providing mitragynine compound for the research purpose.

REFERENCES

1 Wiart, C. Medicinal Plants of Southern Asia. Pearson Malaysia; Malaysia. (2002).
2 Jansen, KLR and Prast, CJ. *Ethnopharmacology of Kratom and the Mitragyna alkaloids*. Journal of Ethnopharmacology **23**: 115-119 (1988).
3 Idid, SZ, Saad, LB, Yaacob, H & Shahimi, MM. *Evaluation of analgesia induced by mitragynine, morphine and paracetamol on mice*. ASEAN Review of Biodiversity and Environmental Conservation (ARBEC) VI (1998).
4 Campos, DM et al.. *Acute toxicity and mutagenic activity of Mexican plants used in traditional medicine*. Journal of Ethnopharmacology 110: 334-342. (2007).
5 Mohd-Fuat, AR, Kofi, EA & Allan, GG. *Mutagenic and cytotoxic properties of three herbal plants from Southest Asia*. Tropical Biomedicine 24: 49-59. (2007).
6 Cardoso, CRP et al.. *Mutagenic activity promoted by amentoflavone and methanolic extract of Byrsonima crassa Niedenzu*. Toxicology 225: 55-63. (2006).
7 Ibrahim, J. *Medicinal plant research in Malaysia: Scientific interests and advances*. Jurnal Sains Kesihatan 2 (2): 27-46. (2004).
8 Houghton, PJ & Raman, A. Laboratory Handbook for the Fractionation of Natural Extracts. Chapman & Hall; London. (1998).
9 Maron, DM & Ames, BN. *Revised methods for Salmonella mutagenicity test*. USA Journal of Biomedical Press: 174-193. (1983).
10 Mortelmans, K & Zeiger, E. *The Ames Salmonella/microsome mutagenicity assay*. Mutation Research 455: 29-60 (2000).
11 Zeiger, E. *Mutagens that are not carcinogens: faulty theory or faulty tests?* Genetic Topxicology and Environmental Mutagenesis 492: 29-38. (2001).
12 Takayama, H. *Chemistry and pharmacology of analgesic indole alkaloids from the rubiaceous plant, Mitragyna speciosa*. Chemical and Pharmaceutical Bulletin 52: 916-928. (2004).
13 OECD. *Bacterial Reverse Mutation Test*. OECD Guideline for testing of chemicals 471 (1997)
14 Torssell, KBG. Natural Product Chemistry. John Wiley & Sons Limited; United States of America. (1983).
15 Barile, FA. Principles of Toxicology Testing. CRC Press; United States of America (2008).
16 Woolley, A. A guide to practical toxicology: Evaluation, prediction and risk. Taylor & Francis: New York. (2003).

DETECTION OF FUSIDIC ACID RESISTANCE AND DETERMINANTS IN METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* ISOLATED FROM CLINICAL SAMPLES IN MALAYSIA AND SAUDI ARABIA

Alreshidi Mateq Ali[1], Ali Abdullah Al salamah[2] , VasanthaKumari Neela[1], Rukman Awang Hamat[1], Alshrari Ahmed Subeh[1], Hisham Alajlan[3] and Mariana Nor Shamsudin[1,2]

[1]Department of Medical Microbiology and Parasitology,
Faculty of Medicine and Health Sciences,
[2]Laboratory of Marine Science and Aquaculture, Insitute of Bioscience.
Universiti Putra Malaysia, Serdang 43400, Selangor, Malaysia
[3]Department of Botany and Microbiology, College of Science, King Saud University, Riyadh, Saudi Arabia
[3]Medical Laboratory, Riyadh Armed Forces Hospital, Riyadh 10123, Saudi Arabia

ABSTRACT

Fusidic acid is a narrow spectrum antibiotic used almost exclusively as an anti-staphylococcal agent. Although frequencies of resistance to this antibiotic have remained generally low, emerging resistance is a problem that could limit the therapeutic options available for treatment of staphylococcal infections.

The aim of the present study is to determine the prevalence of fusidic acid resistant and its determinants *fusB* and *fusC*.

Sixty samples were collected from each country, high resistance rate was observed in Saudi Arabia 63.3% compared to 31.6% in Malaysian isolates and the majority of resistant isolates (91%) were positive with *fusB* or *fusC* determinant.

In the light of these findings, fusidic acid prescription should be limited and used only in combination with other agents where clinically indicated, and where the infecting bacteria are susceptible especially in Saudi Arabia to prevent the risks of promoting clinically important resistance.

Key words: MRSA, Fusidic acid resistance, *fusB, fusC.*

INTRODUCTION

Antimicrobial resistance of *Staphylococcus aureus* especially methicillin-resistant *S. aureus* (MRSA) is continues to be a problem for clinicians worldwide, It is associated with a variety of clinical infections including septicemia, pneumonia, wound sepsis, septic arthritis, osteomyelitis and post-surgical toxic shock syndrome with substantial rates of morbidity and mortality of patients[7] and fusidic acid is one of several antibiotics used in its management[10]. Fusidic acid is a narrow-spectrum bacteriostatic antibiotic, particularly active against staphylococci. It is used both topically and systemically for the treatment of staphylococcal disease.

Fusidic acid acts as a bacterial protein synthesis inhibitor by acting directly on the elongation factor G (EF-G) and preventing its release from the ribosome during translation. There several mechanisms known to cause resistance to fusidic acid in *S. aureus* including alteration of the drug target by spontaneous mutation in the gene encoding EF-G or by protection of the drug target by

acquisition of the *fusB* and *fusC* determinants which encodes an EF-G-binding protein that protects EF-G from binding with fusidic acid molecules.[10] However, some fusidic acid-resistant *S. aureus* strains lack these mechanisms, and therefore additional, uncharacterized determinants of resistance to fusidic acid exist.[2]

As this antibiotic provides an alternative or switch therapy to vancomycin in both Malaysia and Saudi Arabia, knowledge of the local fusidic resistance of MRSA is essential to guide empirical and pathogen specific therapy. Hence, it is important to know the resistance rates of MRSA to this antibiotic agent. This study reports on the fusidic acid susceptibility of MRSA from clinical samples in Malaysia and Saudi Arabia.

MATERIALS AND METHODS

Microbiological analysis and identification

A total of 120 non-duplicate isolates were obtained from samples submitted to the microbiology labs in tertiary care hospitals in Malaysia and Saudi Arabia (60 each). The isolates were from clinical samples and were identified in the microbiology laboratory of each of the hospital by standard morphological and biochemical methods and confirmed by PCR detection of the *mecA* gene. No duplicate isolates from the same patient and no environmental strains were included in this study.

Antimicrobial Susceptibility Tests

Susceptibility testing was performed by the disc diffusion method according to the Clinical and Laboratory Standards Institute's guidelines (CLSI, 2009) and the susceptibility to fusidic acid was interpreted following guidelines by the British Society for Antimicrobial Chemotherapy (BSAC).[5] Susceptibility testing was done with fusidic acid paper discs (10 µg) on Muller Hinton Agar with an inoculum of 0.5 McFarland Standard. Isolates growing with an inhibitory zone of <22 mm were defined as resistant to fusidic acid. The methicillin resistant *S. aureus* ATCC 700698 was included as a reference strain for quality control.

PCR amplification

Total genomic DNA of all isolates in this study was extracted using GF-1 Bacterial DNA Extraction Kit (Vivantis Technologies, Malaysia), as described by the manufacturer. The MRSA strains were confirmed by detection of the *mecA* gene by PCR.

Searches for *fusB*, *fusC*, and *mecA* were performed with sets of primers and cycling conditions as shown in Table 1. The PCR amplification was carried out in 0.5 ml tubes with a final reaction volume of 50 µl. The PCR mixture contained 10 µl of PCR master mix (iDNA, Biotechnology Sdn Bhd, Malaysia), 0.1 µl of the respective primers (forward and reverse primers), 37.8 µl distilled water and 2 µl of DNA template. All experiments were carried out in duplicate. PCR products were electrophoresed through 1% agarose gel. The gel was visualized under a UV transilluminator (Alpha Innotech 2200).

Results and Discussion

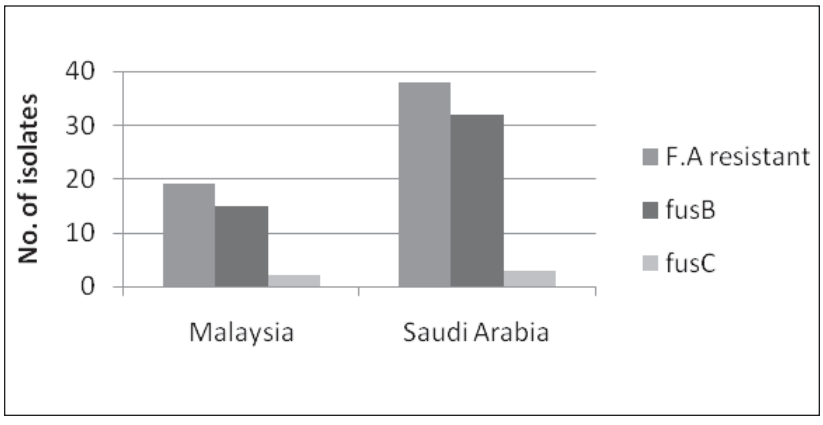
A total of 120 MRSA isolates was investigated by antibiotic disk susceptibility testing, of which 19 (31.6%) and 38 (63.3%) isolates were found to be resistant to fusidic acid in Malaysia and Saudi Arabia respectively. In this study, the *fusB* was the major determinant 82.4% followed by *fusC* with 8.7% fusidic acid-resistance in MRSA isolates. This findings were in agreement with previous studies finding indicated that the majority of fusidic acid-resistant MRSA carrying *fusB*.[2,6]

Figure 1 shows the prevalence of fusidic acid resistance and its determinants in MRSA from both countries.

Table1: Oligonucleotide primers used for antiseptic genes detection in this study.

Gene	Primer sequence	Product size (bp)	PCR Condition	Reference
mecA	5-GTGGAAGTTAGATTGGGATCATAGC-3 5-GTCAACGATTGTGACACGATAGC-3	544	30 sec, 95°C; 30 sec,58°C; 30 sec, 72°C	6
fusB	5- TCA TAT AGA TGA CGA TAT TG-3 5- ACA ATG AAT GCT ATC TCG AC-3	496	1 min, 94°C; 1 min, 50°C; 2 min, 72°C	7
fusC	5- GAT ATT GAT ATC TCG GAC TT-3 5- AGT TGA CTT GAT GAA GGT AT-3	128		

Figure 1: The prevalence of fusidic acid resistance and its determinants.



Increased resistance to fusidic will further reduce the already limited treatment options for MRSA infections. Fusidic-acid-resistant MRSA has increased over time. In Malaysia, the rate of resistance about 20 years ago was less than 1%. in Malaysian hospitals,[1] the resistance rates for fusidic acid was reported to be within the range 3–5% in the years 1992–1996[8] and 11% in 2009.[1] In Saudi Arabia, fusidic acid resistance has increased from 10% in 1994 to 29.8 in 2009.[4] The development of resistance during treatment with fusidic acid when it is used alone is being reported increasingly,[8] hence the differences in the susceptibility of the isolates from different countries probably reflect the different patterns of antibiotic usage and thus development of resistance in this country.

In view of the high resistance rates of MRSA to fusidic acid, treatment of MRSA infections -especially in Saudi Arabia- with this antibacterial agent would be unreliable and as the emergence of resistance has been associated with monotherapy, fusidic acid prescription should be limited and used only in combination with other agents where clinically indicated, and where the infecting bacteria are susceptible and the education of physicians on the appropriate prescribing of fusidic acid is crucial to prevent further emergence of these resistant strains.

REFERENCES

1. Castanheira, M., Watters, A.A., Bell, J.M., Turnidge, J.D. & Jones, R.N. Fusidic acid resistance rates and prevalence of resistance mechanisms among Staphylococcus spp. isolated in North America and Australia, 2007-2008. *Antimicrobial agents and chemotherapy* 54, 3614-7 (2010).
2. Ihab M. Moussa, A.M.S. Molecular characterization of methicillin-resistant Staphylococcus aureus recovered from outpatient clinics in Riyadh, Saudi Arabia. *Saudi Med J* 30, 611-617 (2009).
3. Lannergard, J., Norstrom, T. & Hughes, D. Genetic determinants of resistance to fusidic acid among clinical bacteremia isolates of Staphylococcus aureus. *Antimicrobial agents and chemotherapy* 53, 2059-65 (2009).

4. McLaws, F.B., Larsen, A.R., Skov, R.L., Chopra, I. & O'Neill, A.J. Distribution of Fusidic Acid Resistance Determinants in Methicillin-Resistant Staphylococcus aureus. *Antimicrob. Agents Chemother*. 55, 1173-1176 (2011).
5. Noguchi, N. *et al*. Antimicrobial agent of susceptibilities and antiseptic resistance gene distribution among methicillin-resistant Staphylococcus aureus isolates from patients with impetigo and staphylococcal scalded skin syndrome. *Journal of clinical microbiology* 44, 2119-25 (2006).
6. Norazah, A., V. K. E. Lim, Y. T. Koh, M. Y. Rohani, H. Zuridah, K. Spencer, P. P. Ng, and A. G. M. Kamel. Molecular fingerprinting of fusidic acid- and rifampicin-resistant strains of methicillin-resistant Staphylococcus aureus (MRSA) from Malaysian hospitals. *J. Med. Microbiol* 12, 1113–1116 (2002).
7. O'Neill, A.J., McLaws, F., Kahlmeter, G., Henriksen, A.S. & Chopra, I. Genetic basis of resistance to fusidic acid in staphylococci. *Antimicrobial agents and chemotherapy* 51, 1737-40 (2007).
8. Shittu, A.O. & Lin, J. Antimicrobial susceptibility patterns and characterization of clinical isolates of Staphylococcus aureus in KwaZulu-Natal province, South Africa. *BMC infectious diseases* 6, 125 (2006).
9. Thong, K.L., June Junnie, Fong Yin Liew, Mohd Yasim Yusof, and Yasmin A. Hanifah. Antibiograms and molecular subtypes of Methicillin-Resistant staphylococcus aureus in local teaching hospital, Malaysia. *J. Microbiol. Biotechnol* 19, 1265–1270 (2009).
10. Udo, E.E. & Sarkhoo, E. Genetic analysis of high-level mupirocin resistance in the ST80 clone of community-associated meticillin-resistant Staphylococcus aureus. *Journal of medical microbiology* 59, 193-9 (2010).

CHOREOGRAPHY OF THE MOLECULAR EVENTS IN RHABDOVIRAL INFECTION

Dhrubajyoti Chattopadhyay
Pro-Vice-Chancellor (Academic) & Director
Centre for Research in Nanoscience and Nanotechnology
University of Calcutta; Kolkata India

ABSTRACT

Chandipura virus (CHPV), a single stranded negative sense RNA virus, has recently been classified as an emerging human pathogen in the Indian subcontinent. This virus belongs to the Rhabdoviridae family and vesiculovirus genera. CHPV is closely related to Vesicular Stomatitis Virus (VSV) in terms of structure, function, and genetic makeup. However major differences in host range and nucleotide sequences of genes distinguishes it from other two members of this genera, VSV New Jersy and Indiana serotypes. The 11.5kb long CHPV genome is packaged with nucleocapsid protein into a helical structure and associated with the viral RNA dependent RNA polymerase consists of large protein L and the phosphoprotein P. This Nucleocapsid together with viral RdRp forms viral Ribonucleoprotein particle (RNP), a self sufficient entity for infection when injected into the host cellular cytoplasm. The most crucial event in the viral life cycle is the transcription– replication switching process. The RdRp is capable of performing the role of transcriptase as well as replicase. The three viral polypeptides i.e. N, P and L, play pivotal role in regulating the switch of the polymerase from transcriptive to replicative mode. Hence CHPV may be considered as a model system for studying transcription – replication machinery. In our study of viral propagation inside the host cellular milieu we have mainly focused upon the interplay between these viral polypeptides, their interaction with viral ribonucleic acid as well as host factors. Our work have elucidated that how viral genome RNA is enwrapped by Nucleocapsid protein N in its oligomeric form, how P protein helps N protein in recognizing the specific viral RNA sequence in presence of the large crowd of cellular RNAs. We have also investigated the mechanism of recruitment of the RdRp on the N-RNA template for the synthesis of viral RNA genome or mRNAs. Our work has also shed light upon the interaction of viral machinery with host factors. Eventually a complex network of interaction among these viral macromolecules with the host machinery will be understood and proper analysis of this information will not only reveal evolutionary relationships among these diverse classes of viruses but also help to design antiviral molecules/agents.

INTRODUCTION

Chandipura Virus and its life cycle:

Chandipura Virus (CHPV), a prototype non segmented, negative stranded RNA virus has been inflecting severe health hazards in parts of the Indian sub-continent that has often augmented to epidemic proportions, since the last few decades. It was first isolated in 1965 from a patient suffering from febrile illness in a village called Chandipura in India and was shown to have cytopathic effect on cells in the tissue culture.[6] Although, CHPV was known to cause mild symptoms upon human infection, only in 2003 first evidence for its association in human epidemics was obtained when CHPV was identified from patient samples during an outbreak of acute encephalitis with high fatality rate in India.[17] Subsequently, another outbreak of encephalitis associated with CHPV infection with more than 75% fatality rate was reported in the eastern state of Gujarat in India in 2004.[7] These occurrences indicated possible emergence of Chandipura virus as a deadly human pathogen in Indian Subcontinent.

Chandipura virus has been assigned into vesiculovirus genus and Rhabdoviridae family within the virus order mononegaviridae. The RNA genome serves as the template for both transcription as well as replication

for these rhabdoviruses. CHPV genome RNA comprises of a short 49 nt leader gene (l), followed by five transcriptional units coding for viral polypeptides separated by intragenic spacer regions and a short non-transcribed 46 nt trailer sequence (t) arranged in the order 3' l-N-P-M-G-L-t 5'. Upon infection the virus release its genome in host cytosol where it undergoes both the transcription as well as the replication event. The viral RNA dependant RNA polymerase, large protein L, does both of the event with help of phosphoprotein P. Transcription initiates at the 3' end of the encapsidated genome resulting the synthesis of all the six viral mRNAs with progressive termination at each gene junction.[1] One of the key features of the rhabdoviruses is the polar nature of transcription. In the replication mode the same RNA polymerase copies the entire genome to produce a positive stranded polycistronic RNA strand complementary to the whole viral genome. This positive sense RNA used as templates for subsequent synthesis of negative stranded progeny RNAs. This transcription and replication events depends on whether RNA polymerase can read-through the gene boundaries or not. Termination of the products at gene boundaries leads to transcription event, where as anti-termination gives replication product. The genome organization of the Rhabdovirus family is more or less common in nature and that led us to study CHPV as the model system to decipher the molecular mechanism of viral life cycle as well as to develop drugs against a common target.

The Phosphoprotein P:

The phosphoprotein P is one of the key players of viral transcription-replication switch. Along with the large protein L, this P protein constitutes the viral RNA dependent RNA polymerase (RdRp), where L is the catalytic subunit and P is a co-factor.[4] Addition of viral P protein along with L, and not L and P alone, allowed viral mRNA synthesis. These studies confirmed a role of phosphoprotein as an activator of viral transcription.[9] P of both VSVind and VSVnj serotypes was extensively phosphorylated within infected cells at multiple sites.[12,1,10] Casein Kinase II (CKII) was shown to be responsible for phosphorylating P of both VSV serotypes.[2,3] Studies with recombinant CHPV-P revealed CKII, indeed similarly phosphorylates P *in vitro*,[8] although, CHPV-P exhibited less than 20% homology with P protein from other vesiculoviruses.[14] Further investigations identified serine-62 at the N-terminal acidic domain of CHPV P protein was specifically modified by CKII.[9] Only CKII phosphorylated form of recombinant P could effectively substitute P protein purified from virus to support transcription from nucleocapsid template *in vitro*.[9] Therefore, CKII mediated phosphorylation appeared to be indispensable for P to act as a transcriptional activator. The P protein has been arbitrarily divided into three domains, domain I, II, and III, with a hypervariable hinge region connecting domain I to domain II. Functionally this hinge region has remained very ill characterized in CHPV and in most other Rhabdovirus.

P protein forms homodimers:

The P protein forms two different homodimers. One, upon phosphorylation, called phosphorylation dependent homodimerization and the other in a concentration dependent manner. P_0 was found to undergo a concentration dependant dimerization where above 3.5mM of protein concentration it exclusively exists as dimer. The oligomeric state of the phosphorylated P was found to be different from that of unphosphorylated one in gel filtration experiments. His-tag pull down assay was performed to address the oligomeric state of P protein and it revealed that phosphorylated P protein forms homodimer whereas the unphosphorylated P protein exist as monomer in solution.[16] Several deletion mutants of P was generated to study the region responsible for phosphorylation dependent homodimerization and it revealed that first 46 amino acids are essential to form dimmer.[16]

MATERIALS AND METHODS

Purification of untagged P protein form Bacterial Lysate:

Materials:

i) Equilibration buffer: 50mM Tris-HCl, pH 8.0, 1mM EDTA, 0.1% Triton X 100.
ii) Wash Buffer: 50mM Tris-HCl, pH 8.0, 1mM EDTA, 0.1% Triton X 100 containing 100mM, 200mM, 250mM, and 275mM NaCl.
iii) Elution Buffer: 50mM Tris-HCl, pH 8.0, 1mM EDTA, 0.1% Triton X 100 and 325mM NaCl.

Method:
For production of the proteins, Phosphoprotein constructs were transformed into Escherichia coli BL21 (DE3) cells. Cells were then grown in Luria broth containing ampicillin at a concentration of 50 μg/ml at 37C till the O.D. of the culture reached 0.3. For the production of the proteins, isopropyl-β-D-thiogalactopyranoside (IPTG) at a concentration of 0.25 mM was added to the culture and the cells were incubated at 20C for overnight and subsequently harvested by centrifugation and were stored at – 80 ºC.

For purification of the proteins, cells were thawed on ice and then resuspended in TET buffer containing 50 mM Tris-Cl, pH 8.0, 1mM EDTA and 0.1% Triton X-100. The resuspended cells were then lysed by sonication and centrifuged at 10,000 g to remove the cell debris and the supernatant was collected. It was then loaded onto a Q-Sepharose column pre-equilibrated with TET buffer. The column was then washed sequentially with TET buffer containing 100 mM NaCl, 200 mM NaCl, 250 mM NaCl and 290 mM NaCl. Proteins were then eluted from the column with a wash of TET buffer containing 330 mM NaCl. Purity of the eluted protein was then checked by running 10% SDS-PAGE.

For the fluorescence and phosphorescence studies, protein fractions were pooled together and dialysed extensively against a buffer containing 10 mM Tris–HCl (pH 8), 100 mM NaCl, 40 mM KCl and 5 mM $MgCl_2$. Concentration of the proteins were measured using the Bio-Rad DC protein estimation kit using bovine serum albumin (BSA) as standard.

For all the fluorescence as well as the phosphorescence studies, protein concentrations were 750 nM.

Cloning, expression and purification of P-mutants:
All these mutants were created by Polymerase chain reaction by using self-complementary primers containing the mutation, cloned into pET32a at NcoI and SalI sites. All the clones were checked by restriction digestion and mutations were verified by automated sequencing.

Cell line maintenance:
BHK21 cell line was grown as monolayers in DMEM enriched with 5% FCS, 100U/ml Penicillin-Streptomycin, 2mM Glutamine in tissue culture treated flask in CO_2 incubator at 5% CO_2, 80% humidity and 37°C. For VERO cells MEM medium with 5% FCS was used for maintaining cells. Cell splitting was done with minimum volume of Trypsin-EDTA solution.

Virus Propagation:
CHP virus infected cell extract was used to infect monolayers of BHK21 cells. Infection virus mixture was prepared by mixing infected cell extract to DMEM so that the M.O.I was approximately 0.1. After washing the cells with 1X PBS, the infecting medium was added to cell monolayer. The cells were incubated at 37°C for 1 hr and the infecting medium was aspirated out and complete medium was added. The cells were visualized under light phase contrast microscope. All the cells were scrapped from the surface of the flask with the medium. The suspension was centrifuged at 5000 rpm at 4°C to get the infected cell extract.

Virus Titre Determination:
Plaque assay was performed for quantitative determination of pfu/ml present in virus stock. BHK21 cells were grown in T25 tissue culture flask. Confluent cells were collected and equally dispensed into each well of a 6-well plate followed by incubation for 12hr until cells become atleast 50% confluent. Sterile 4% agarose stock was melted by incubation at 70°C. Melted agarose solution and (1.3X) D-MEM media was kept in a waterbath at 400°C for 1hr. Different virus dilutions ranging

from approximately 10^{-3} to 10^{-8} pfu/ml was prepared. Sequentially the media was removed from each well and immediately replaced with 1ml of the respective virus dilution, incubated for 1hr. 30ml of the D-MEM medium and 10ml of the 4% agarose solution were mixed gently. The bottle of plaquing overlay was kept at 40°C waterbath until use. Subsequent to 1hr incubation, virus solution was removed from the wells and replaced with 2ml of the diluted agarose, allowed the agarose to solidify for 10min and then incubated at 37°C for 36 hr. number of plaques was determined and thus titre of the stock was calculated.

Viral Plaque Reduction Assay:

Viral plaque reduction assay is a standard procedure of determining the efficacy of drugs in controlling virus induced cytopathic effects. BHK-21 or VERO cells are seeded at a density of 1.5×10^5 cells/ml and after one day of incubation, a confluent monolayer is obtained. After washing the cells with PBS twice, the cells are incubated with five different concentrations of the test drug, 0.1µM, 0.5µM, 1.0 µM, 10.0 µM, and 100 µM for 1 hour at 37°C in a CO_2 incubator. Thereafter, the cells are rinsed with PBS twice and infected with virus solution equivalent to 150 Plaque Forming Units (PFU) for 1 hour at 37°C in a CO_2 incubator, during which the viruses are expected to adsorb onto the cells. Next, the virus infection solution is aspirated out and the cells washed with PBS twice, followed by overlaying with 1% Low melting point (LMP) Agarose in 1x DMEM, which is made by mixing equal volumes of 2% molten LMP agarose and 2x DMEM. After 2 days of incubation at 37°C in a 5% CO_2 incubator, the monolayers are fixed with 10% formaldehyde, and the agar medium is removed. The cells were stained with 1% solution of crystal violet in 70% ethanol for two hours. The plates are washed with distilled water, and the PFU determined. Agents capable of reducing the PFU by 50% or more without considerable cytopathic effect are considered to be interfering with the viral lifecycle processes. To assess the ability of the drug to inhibit the adsorbtion or endocytosis process of the virus into the host cell, a similar procedure is carried out but with the exception of addition of the drug during the viral infection and not one hour before the infection procedure.

Synthesis of RNA probes:

Positive sense leader RNA was synthesized *in vitro* from CHPl/pGEM-3Z clone linearized with HindIII using T7 RNA polymerase by standard protocols.[5] 65 nt long non-viral RNA used as control in this study was synthesized by transcribing HindIII digested pGEM-3Z vector with T7 RNA polymerase. Trailer RNA was synthesized using the EcoRI linearized CHPt/pGEM4z clone with T7 polymerase. Leader RNA synthesized in *in vitro* transcription reaction has 12 nt vector derived fusion at the 5' end of the 49 nt long leader RNA sequence whereas the trailer bears a 13 nt vector derived sequence at the 5' end. The non-viral RNA used as control bears the same 12 nt sequence at 5' termini as present in leader transcript. To obtain radiolabeled RNA α^{32}P UTP (BRIT) was included in the transcription reaction *In vitro* synthesized RNA was eluted from the urea-polyacrylamide gel, precipitated twice with ethanol and suspended in RNase free water. Radioactivity was measured in liquid scintillation counter. RNAs used in this study were quantified spectrophotometrically by their absorbance at 260 nm.

Electrophoretic Mobility Shift Assay (EMSA)

For EMSA, leader, non-viral or trailer RNA probes (60,000 cpm) were incubated with indicated amounts of N protein in 1X binding buffer (10mM Tris-HCl pH 8.0, 100mM NaCl, 40mM KCl, and 5mM $MgCl_2$) supplemented with 0.01mg/ml BSA for 15 min at 37°C in a total volume of 20µl.[5] Native gel loading dye was added to the reaction mixture (final 3% ficoll, 0.1mM EDTA, 0.025% Bromophenol Blue and 0.025% Xylene Cyanol) and finally the complexes were resolved on 4% native polyacrylamide gel containing 5% glycerol, run at 4°C in 1x TAE. The gels were dried and exposed to X-ray film.

RESULTS AND DISCUSSIONS

I. Studies of the interaction between the leader RNA and the Phosphoprotein of CHPV.

Understanding the interaction between the leader RNA and Phosphoprotein (P) of the Chandipura virus

The absence of a specific anti-viral treatment against the Chandipura Virus, together with its incubation period being as low as 48 hours, demands the development of novel antiviral approaches targeting specific macromolecular interaction indispensible to the viral life cycle. We are trying to develop a novel peptidomimetic approach that blocks the interaction between the phosphoprotein P and the leader RNA l, resulting in a strong inhibition of viral replication.

Transcription/replication complex is an attractive antiviral target. The RNP (ribonucleic-protein complex) constitutes the template for the viral RdRp (L protein) and its co-factor Phosphoprotein (P). This complex is typical to negative stranded RNA viruses, which is favorable for developing wide spectrum anti-viral drugs in the absence of (or with low) cellular toxicity. Recent structural data obtained from elements of the transcription/replication complex indicate a great similarity between viruses despite substantial differences in the primary sequence of their proteins.[13,15]

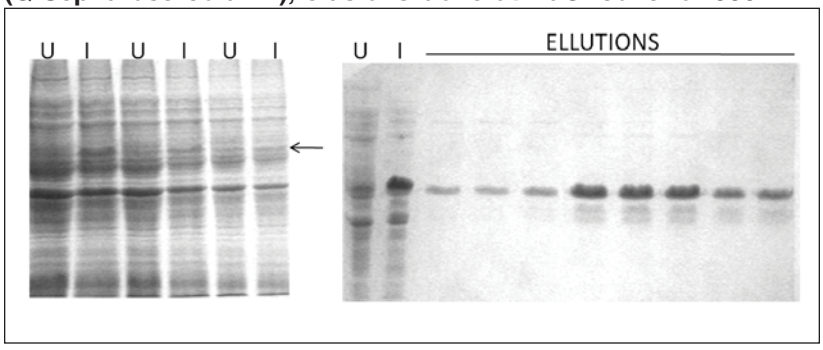
Previous reports by our laboratory have shown for the first time that the unphosphorylated P protein interacts with the 49nt long Leader RNA, and this interaction is indispensible for genome replication. The phosphorylated form of the P protein (P_1) has been established to function as a cofactor for the functional RdRp complex during transcription. However, it now appears that the unphosphorylated form of the P protein (P_0) in conjunction with the leader RNA has a role in modulating the Viral RdRp into the replication mode.

Construction of P_{V269C} as a tool for highthroughput screening of small molecules capable of interrupting interaction between P protein and leader RNA:

Screening of a large number of small molecules is often an essential prerequisite for development of promising antiviral compounds. However, screening of such vast chemical library using conventional cell culture techniques, such as the viral plaque reduction assay is enormously time consuming and often impractical. Thus, we are attempting to develop an *in-vitro* high throughput screening system, which would serve to initially screen the library, to give potential hits which may be further tested in *ex-vivo* and *in-vivo* systems. Interaction between the phosphoprotein P and the leader RNA 'l' of CHPV is indispensable to the viral life cycle. Interaction of the non-phosphorylated form of the P protein (P_0) with the 49 nt long leader RNA appears to be involved in viral replication. The C-terminal domain of the P protein has been shown to be predominantly responsible for leader RNA interaction. If this RNA protein interaction can be inhibited by any small molecules, then there is a fair chance that this molecule may prove to be potential antiviral agent. On the other hand, the P protein does not have any surface exposed cysteins, which makes provisions for site directed mutagenic insertion of a cysteine residue in the C-terminal RNA binding domain. This cystein residue can be tagged with specific fluorophores (Rhodamine λ_{ex} 530nm, λ_{em} 610nm), and the leader RNA can be labelled with a suitable fluorophore (Fluorescin λ_{ex} 488nm, λ_{em} 543nm) that can form a good donor acceptor pair for FRET. Interaction between these labelled P protein and leader RNA will result in inter molecular FRET. Small molecules will be screened by their ability of hamper this FRET, and thus inhibit P_0- leader RNA interaction.

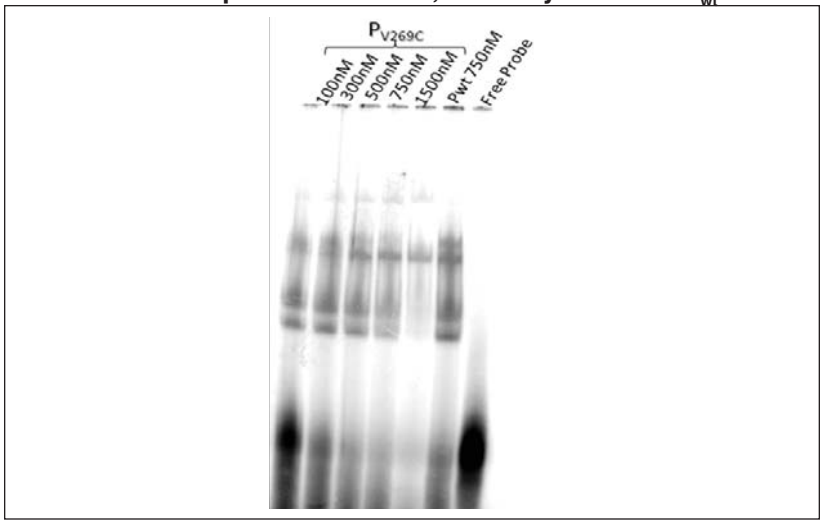
Site directed mutagenesis of P_{wt} to P_{V269C} was carried out by the mutagenic primer overlap PCR method, and the fragment was cloned into pET28a expression vector. Expression was standardised in BL21 DE3 cells, at 37°C with 0.3 mM IPTG (fig. 1). The mutant protein was purified as described under methods.

Fig 1: A. Induction of 3 positive clones of pET 28a P_{V269C}. U, uninduced; I, induced. B. Purification of P_{V269C} by anion exchange (Q-Sepharose column), elusions done at NaCl conc. of 330 mM.



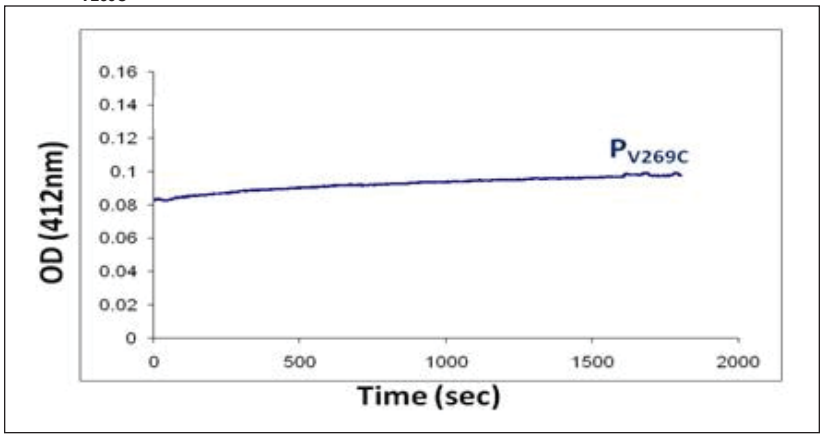
Interaction ability of the newly created mutant with the leader RNA was assessed next. Electrophoretic mobility shift assay (EMSA) was performed to assess the leader RNA binding ability of P_{V269C}. P_{V269C} interacts with the leader RNA similarly as P_{wt} (fig. 2).

Fig 2: P_{V269C} binds to leader RNA, forming two complexes in a concentration dependent manner, similarly as does P_{wt}.



The DTNB method of estimation of surface exposed Cysteins was performed. P_{V269C} was found to have only one surface exposed Cysteine (fig. 3) which is ideal to conjugate it with fluorophore Rhodamine, with an aim to achieve FRET with fluorescein labled leader RNA.

Fig 3: DTNB estimation of surface exposed Cysteine in Pwt and P_{V269C}.



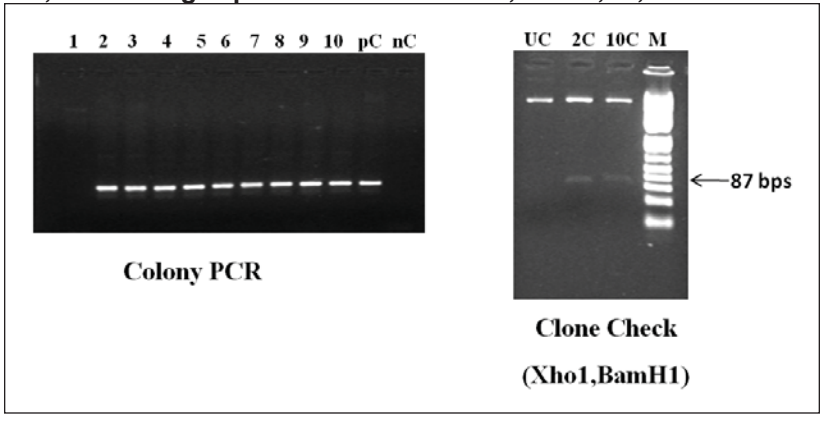
II) Studies of the Phosphoprotein P of CHPV.

Functional Characterization of the putative Oligomerization Domain of Chandipura Virus Phosphoprotein P:

The Phosphoprotein (P protein) of Chandipura (CHP) Virus plays an important role in the viral transcription and replication. The phosphorylated form of the P protein is known to form a homodimer, which serves as a transcriptional activator of the viral RdRp. The phosphorylation dependent homodimerization of P protein has been studied to considerable details and it has been established that the N terminal 46 amino acids are essential for the interaction. On the other hand, the unphosphorylated P protein is found to undergo a concentration dependent oligomerization, which we hypothesize to be one of the triggers responsible for the transcription to replication switching of the RdRp complex. However, the concentration dependent homo-oligomerization has not been studied in regards to the amino acids or domains involved. With an aim to elucidate the domain of the P protein involved in this phenomenon, we initially undertook a bioinformatics approach to first identify any probable interacting domains. In light of the recently reported crystal structure for the dimerization domain of VSVind P protein, by Ding et al. (2006), and homology mapping between the VSVind P protein and the CHPV P protein; the central domain, spanning 107–177 residues was identified as a probable domain. Next, $P_{97\text{-}184}$ was cloned into expression vector system, overexpressed, purified, and its oligomerization status determined.

$P_{97\text{-}184}$ was cloned into the expression vector pET20b, and colonies screened by colony PCR, and restriction digestion (fig. 4). The construct was purified by plasmid DNA Mini prep and transformed into Bl21 DE3 cells for over expression.

Fig 4: A. 1% agarose gel of Colony PCR of $P_{97\text{-}184}$ cloned into pET20b, 1-10 colonies; pC, positive control; nC, negative control. B. Restriction digestion of the positive clone, colonies 2(2C) and colony 10(10C) with XhoI and BamHI. A fragment of 87 bps excised out, confirming a positive insertion. UC, uncut; M, marker.



Transformed BL21 DE3 cells were inoculated in LB in presence of 100µg/ml final concentration of Ampicillin and incubated at 37°C till an OD_{600} of 0.3 was attained, following which it was induced with 0.5mM IPTG for 3 hrs at 37°C. Induction check and solubility check were performed (fig.6). Overexpressed protein was purified by anion exchange followed by gel filtration using S200 column in a FPLC. The protein was purified to 95% homogeneity (fig. 5).

The oligomerization status of $P_{97\text{-}184}$ was determined by gel filtration analysis as compared to molecular weight standards. $P_{97\text{-}184}$ eluted at 15.4 ml, which shows that it has a molecular weight of ~ 28KD, close to the trimeric protein (29 KD) (fig. 7).

Fig. 5: A. Induction of P_{97-184} at 37°C with 0.5 mM IPTG resolved on 10% SDS PAGE) B. Solubility check of P_{97-184} in buffers either containing Triton X100 or not containing the detergent. Triton X100 was found to be not necessary for solubilisation of the truncated protein.

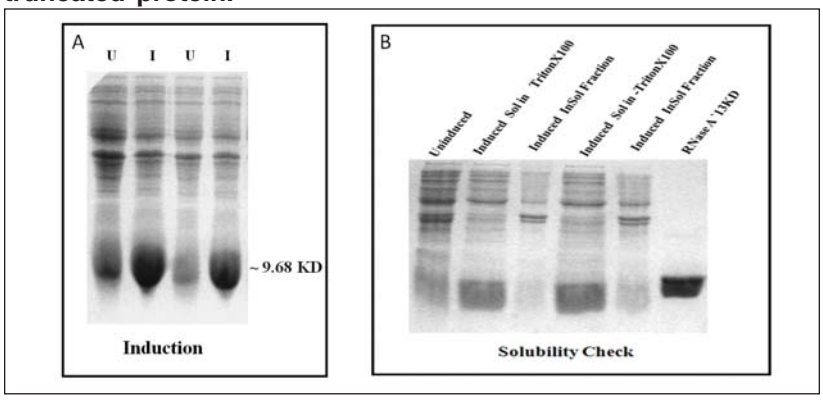


Fig 6: A. P_{97-184} does not bind to Q-sepharose resin, as evident from the profile of the flowthrough (lane 2) and elusions. B. Purification of P_{97-184} by gel filtration chromatography (S-200) using a FPLC system. RNAse A has been used as a molecular weight marker.

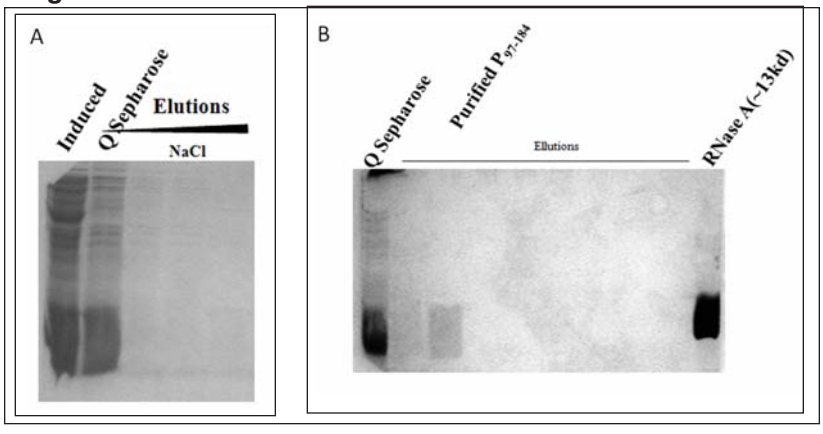
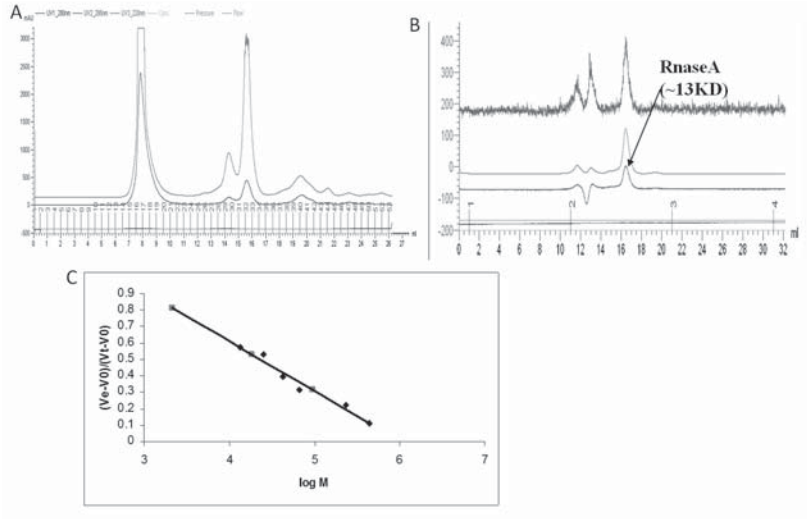
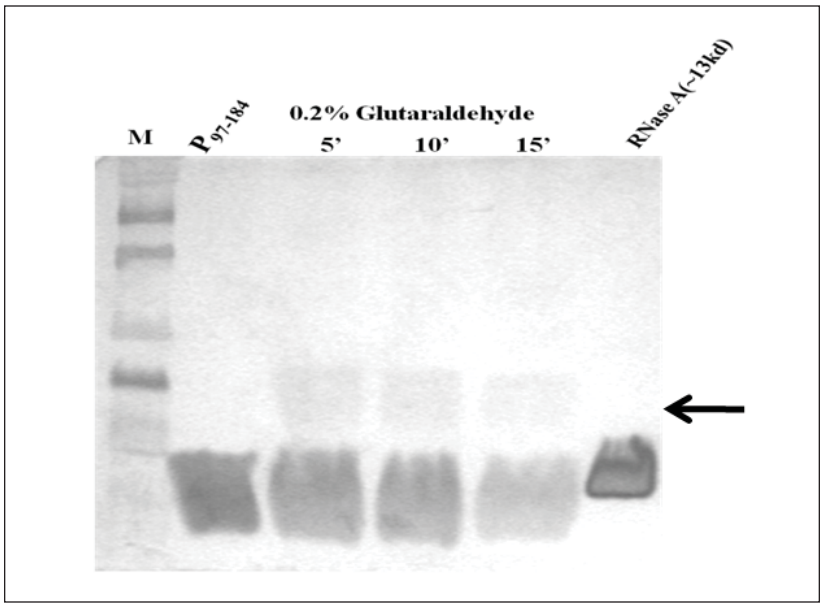


Fig 7: A. Gel elution profile of P_{97-184}. P_{97-184} elutes at 15.4ml, which as compared to the standard is ~28KD. B. Gel elution profile of molecular weight standards. C. Standard curve of molecular weight standards.



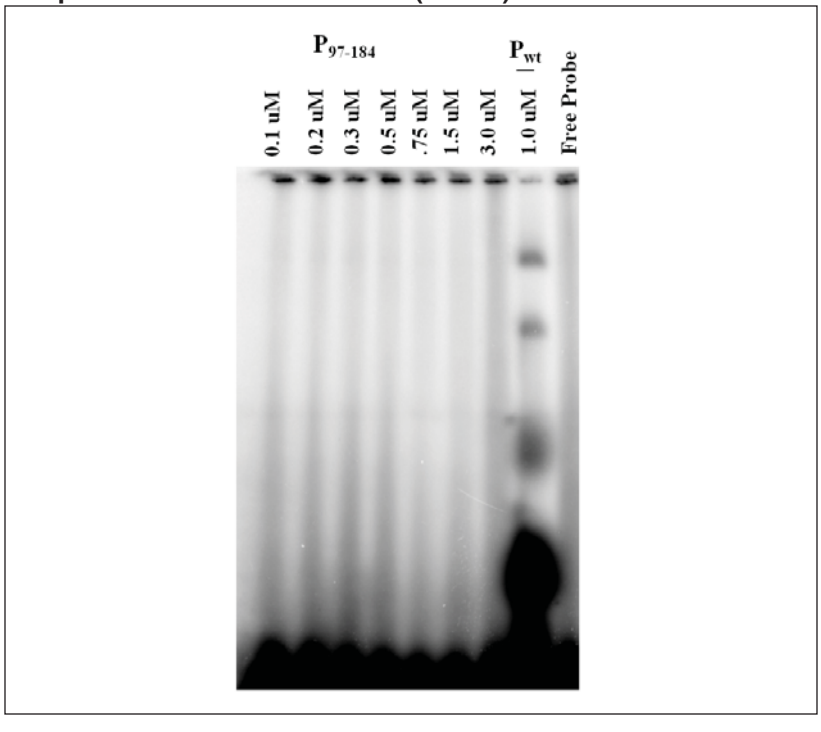
Glutaraldehyde Crosslinking of P_{97-184} yields Higher-mers. Gluteraldehyde being a zero length crosslinker cross-links proteins which come in contact with other. Formation of higher-mers suggest that P_{97-184} has ability to oligomerize (fig. 8).

Fig 8: Glutaraldehyde cross linking yields higher-mers of P_{97-184}. 15% SDS-PAGE of Glutaraldehyde cross linked P_{97-184}. Crosslinking was performed at room temperature for 5, 10, and 15 minutes as indicated.



Electrophoretic mobility shift assay (EMSA) was performed to assess the leader RNA binding ability of P_{97-184}. No RNA-Protein complex formation was detected (fig. 9), confirming that the hinge region of CHPV P protein, P_{97-184} is not enough for its binding to the leader RNA.

Fig 9: EMSA of P_{97-184}. P_{97-184} was not found to interact with the leader RNA, as compared with the P_{wt} which forms two complexes with the leader RNA(lane 8).



REFERENCES

1. Banerjee AK (1987a) Transcription and replication of rhabdoviruses. Microbiol Rev 51:66–87
2. Banerjee AK (1987b) The transcription complex of vesicular stomatitis virus. Cell 48:363–364
3. Barik S, Banerjee AK (1992a) Phosphorylation by cellular casein kinase II is essential for transcriptional activity of vesicular stomatitis virus phosphoprotein P. Proc Natl Acad Sci USA 89:6570–6574
4. Barik S, Banerjee AK (1992b) Sequential phosphorylation of the phosphoprotein of vesicular stomatitis virus by cellular and viral protein kinases is essential for transcription activation. J Virol 66:1109–1118
5. Basak S, Raha T, Chattopadhyay D, Majumder A, Shaila MS, Chattopadhyay DJ (2003) Leader RNA binding ability of Chandipura virus P protein is regulated by its phosphorylation status: a possible role in genome transcription-replication switch. Virology 307:372–385
6. Bhatt PN, Rodrigues FM (1967) Chandipura: a new Arbovirus isolated in India from patients with febrile illness. Indian J Med Res 55: 1295-1305.
7. Chadha MS, Arankalle VA, Jadi RS, Joshi MV, Thakare JP et al. (2005) An outbreak of Chandipura virus encephalitis in the eastern districts of Gujarat state, India. Am J Trop Med Hyg 73: 566-570.
8. Chattopadhyay D, Chattopadhyay D (1994) Cloning of the chandipura virus phosphoprotein encoding gene and its expression in Escherichia coli. Cell Mol Biol Res 40:693–698
9. Chattopadhyay D, Raha T, Chattopadhyay D (1997) Single serine phosphorylation within the acidic domain of Chandipura virus P protein regulates the transcription in vitro. Virology 239:11–19
10. Clinton GM, Burge BW, Huang AS (1979) Phosphoproteins of vesicular stomatitis virus: identity and interconversion of phosphorylated forms. Virology 99:84–94
11. Ding H, Green TJ, Lu S, Luo M (2006). Crystal Structure of the Oligomerization Domain of the Phosphoprotein of Vesicular Stomatitis Virus. Journal of Virology 80(6): 2808-2814
12. Hsu CH, Kingsbury DW (1982) NS phosphoprotein of vesicular stomatitis virus: subspecies separated by electrophoresis and isoelectric focusing. J Virol 42:342–345
13. Luo M, Green TJ, Zhang X, Tsao J, Qiu S (2007) Conserved characteristics of the rhabdovirus nucleoprotein. Virus Res 129:246-51
14. Masters PS, Banerjee AK (1987) Sequences of Chandipura virus N and NS genes: evidence for high mutability of the NS gene within vesiculoviruses. Virology 157:298–306
15. Mavrakis M, Iseni F, Mazza C, Schoehn G, Ebel C, Gentzel M, Franz T, Ruigrok RW (2003) Isolation and characterisation of the rabies virus N degrees-P complex produced in insect cells. Virology 305:406-14
16. Raha T, Chattopadhyay D, Roy S (1999) A phosphorylation-induced major structural change in the N terminal domain of the P protein of Chandipura virus. Biochemistry 38:2110–2116
17. Rao BL, Basu A, Wairagkar NS, Gore MM, Arankalle VA, et al. (2004) A large outbreak of acute encephalitis with high fatality rate in children in Andhra Pradesh, India, in 2003, associated with Chandipura virus. Lancet 364: 869-874.

WOMEN'S SOCIAL BARRIERS INFLUENCE PARTICIPATION IN MAMMOGRAPHY ON THE IRANIAN WOMEN IN METROPOLITAN, TEHRAN, IRAN

Maryam Ahmadian*, Asnarulkhadi Abu Samah , Ma'rof Redzuan , Zahid Emby, Mazanah Muhammad, Ali Montazeri
Faculty of Human Ecology, Universiti Putra Malaysia
43400, UPM Serdang, Selangor, Malaysia
Email: Marydian50@yahoo.com*

ABSTRACT

Background: Breast cancer is the most prevalent cancer among women worldwide. The success of breast cancer screening initiatives, particularly doing mammography depends on the target women, their knowledge and attitudes. However, women's knowledge and attitude can not lead their participation in mammography. The aim of this study is to determine women's social and cultural barriers that prevent women to attend mammography.

Methods: The study was carried out among female clients of maternity hospitals affiliated to Medical Sciences of Tehran University, Tehran, Iran. A total of 400 women aged 35-69 years, were randomly selected. Women compliant and non-compliant with medical recommendations on doing mammography were identified. Women who had undergone a mammogram in past two years were evaluated as a participant or compliant group (n=86) and those with no history of having a mammogram classified as a non-participant or non-compliant group (n=314). Questionnaire listed 15 possible reasons for non-participation in mammography. Principal Components Analysis was applied to describe the psychometric evaluation of the instruments measuring barriers. The reliability of the data and scale was computed with Cronbach's Alpha. The value was 0.952 for barriers. The alpha values exceeded 0.70 suggested as acceptable inter-item reliability threshold, indicating high correlation among the barrier items in the data set.

Results: A Friedman test was performed to determine whether respondents had a differential rank ordered preference for the fifteen items of barrier. Results presented a differential rank for the fifteen items of barriers ($p<0.001$). Friedman test highlighted specific differences between the two groups. The result exposed that lack of doctors' advice for complaints, and embarrassment for non-complaints are selected barriers. Therefore, all women in both groups were influenced by barriers regarding mammography.

Conclusion: Amendment of health behavior through health education and social empowerment of women are critical for a successful population or community based breast cancer screening program among Iranian women. This study highlights the need for the doctors, healthcare professionals, primary physicians, and/or gynecologists in Iran, who are frontline medical professionals, to undergo more training in the area of breast cancer and screening awareness to overcome women's barriers and encourage them to take charge of their well-being in breast matters. Findings suggest a multifaceted approach to focus on these barriers.

Keywords: Breast cancer, Mammography, Social barriers, Public policy, Health care professionals.

INTRODUCTION

Breast cancer is the most common cancer among Iranian women. Having no precise statistics of breast cancer in Iran, resulted in underestimation of the incidence rate of this cancer in registered data.[10] According to the national cancer registry in Iran, cancer is the third highest cause of death after coronary heart disease and accidents from 2003 to 2006.[23] Cancer risk factors have high prevalence and growing trend in Iran. Studies show that breast cancer prevalence occurs among 15 to 84 year-old patient with those from 40-49 being the most. In 2007, the incidence of breast cancer in women was 22 per 100,000. The prevalence in the same population was 120 per 100,000.[23] The incidence of breast cancer varies between countries being highest in the United States of America and Northern South America, and lowest in Asia. But the incidence of breast cancer increased because of the western life style in Asian countries.[26]

According to Boyce (2001) community participation can be studied at the personal level, with a stress on individual motivation, personal benefits, and prediction of involvement based on psychological characteristics.[3,41] This research starts to look at community participation in health, especially at the personal level to obtain information about factors influencing women's participation in mammography.

Perceived barrier is an important factor influencing women's participation in mammography which determines their health behaviour change.[15] Barrier imposes a prominent inhibitory effect on mammography, particularly on mammography attitude and knowledge. Previous literature proved that in trying to increase breast self examination practices in women, it seems that the threat of breast cancer would encourage women to accept early detection but there are some barriers to perform the breast self-exam that might have a greater influence on the behaviour.[4,5,40] Some of the barriers include difficulty with starting a new behaviour or developing a new habit, fear of not being able to perform desired behaviour and embarrassment.[40]

Furthermore, previous studies also indicated that physicians are less likely to share information with individuals differ from them by social class, ethnicity, gender, and age.[19,25] Health care professionals may also have stereotypical ideas about Muslim women as being powerless, uneducated and subservient.[19] Considering that physician recommendation is one of the most determinants of mammography, the lack of communication between physician and the patient is an important barrier to compliance with breast cancer screening.

Rashidi (2000) argued that the unique complexities in the socio-cultural backgrounds of Asian Muslim immigrant women could also hinder access to healthcare services.[33] Among the socio-cultural barriers are patient-physician communication difficulties and beliefs about cancer and cancer prevention. Physician communication problems exist due to religious, cultural and linguistic differences between older Asian Muslim women and their physicians. The three most commonly cited barriers were: taking no care of oneself, lack of information, and fear.[9] Women who had been screened before cited fear, pain, or other personal barriers more often, but women who had never had a mammogram cited cost or other logistical barriers.

In addition, lack of knowledge is a barrier to regular cancer screening for minority women related to Asian communities. Fear and reluctance are other barriers experienced by women. According to Phipps, et al. (1999), Cambodian American women still hold misconceptions about breast cancer etiology and fatalistic perspectives.[29] Morrison (1996) has also concluded early breast cancer screening detection prescribed by a clinician is a significant variable of screening behaviour in older minority women.[21] Yet, older women are less likely to have received routine breast self exam instruction from a health care provider or to perform breast self-exam.[4,21] Moreover, finding of many studies

noted that women were fearful about cancer and death. Thus, they are unwilling to participate in mammography test.[2,17,24] In a study it was revealed that 58% of 1,012 Chinese women from Hong Kong never heard of mammography screening. Lack of time and costs were the most frequently reported reasons for their reluctance to participate in clinical breast examinations or mammography screenings.[6]

Barriers in the case of mammography could include fear of cancer, pain, cost, travel and time.5 Researchers have demonstrated that increased benefits and decreased barriers are linked to increased screening.[4,32,36] In another study that was aimed at identifying age and racial differences in mammography practices of African American and Caucasian women indicated that after controlling income and education, younger Caucasians and older African Americans had the highest total barrier scores. The main reasons cited at baseline for not getting a mammogram were significantly different for Caucasian and African American women. Pain was cited significantly as a barrier for younger Caucasian women. There was an age and race interaction, with older African American women most likely due to fear of radiation exposure.[34]

Physical examination of body parts is a barrier to screening for Asian and Latina women. This barrier includes a woman's concern for maintaining her own expectations of modesty and the attitudes of her male sexual partner. Although there is little information about the cancer screening behaviour of Muslim women, modesty has also been concerned in these communities.[33] Smith, et al. (2006) claimed that fatalism, fear, language barriers and preference for traditional healers are barriers for participation in mammography.[37] In Asian traditional culture, women embarrassment inhibits them to show their breasts to others, including to health care providers.[14,17,37]

Previous studies highlighted barriers to screening behaviour including fear of results, fear of treatment and fear of the test itself. These studies surrounded counties such as, Iran.[16] Malaysia[12], United Arab Emirates[2] and Jordan[28]. Therefore, to design a health program in every community, policy makers should pay attention to women barriers to increase their participation in mammography.

Early diagnosis of breast cancer can reduce mortality rate and promote women's quality of life and wellbeing. Women's barriers need to be known to ensure the early detection of breast cancer. To make this change happen, the understanding of women's barriers to this specific health issue is important. Few studies have been done on the identification of social barriers of Iranian women about breast cancer prevention through screening or doing mammography.

This study attempts to understand women's barriers which determine compliance or non-compliance with mammography recommendations among Iranian women in the city of Tehran on the basis of health belief model. In this study, barriers are related to the obstacles which cease women from participating in mammography such as cultural, social and emotional barriers. Thus, the aim of this paper is to determine Iranian women's barriers to participation in mammography to provide valuable information for healthcare providers, researchers, and public health educators.

MATERIAL AND METHODS

Study Sample

The data for this study consisted of 400 women aged 35-69 years and were selected using a multistage cluster sampling procedure from hospitals affiliated to Tehran University of Medical Sciences in Tehran, Iran. A face-to-face interviewing technique was used for data collection, which was conducted in the waiting area of gynaecology wards. Women were classified depending on the mammography participation or non-participation in the past two years into a participant (compliant) group and a non-participant (non-compliant) group respectively.

Development of the Instrument for Barrier themes

The questionnaire was constructed based on the literature review, and the items developed and measured on the 5 points-Likert scale. The scores ranged from 15 to 75 with higher scores indicating lower barriers in doing mammography and 15 barrier items included in the health belief model components. After the selection of proper instrument for the study, it was adapted and modified by the researcher through literature review, and followed by revision for content and face validity by an expert panel, comprising of three social scientist with specialty in community development, two specialized doctors in surgery, oncologist, a radiologist with specialty in breast cancer diagnosis, two family medicine physicians, two epidemiologist and a professor with specialty in public health. The modified questionnaires were translated by three translators fluent in both English and Persian. They were all health care professionals who have worked for many years. Each item on the scale was evaluated, and translation was agreed on. The translation of the questionnaire by the three persons was time-consuming. Besides, some items of the questionnaire were changed because of the translations from English to Persian and vice versa. However, the best translation was concluded and this confirmed the accuracy of the translations. The researcher evaluated the linguistic and cultural accuracy of the translation by using an expert panel particularly, an expert translator. The questionnaires were assessed for information quality and legitimacy, and corrections were made as needed. Based on the reliability alpha, the instrument revealed the Cronbach's alpha values in the pilot study and actual study as more than 0.70.

Data analysis

Data analysis was conducted with The Statistical Package for Social Sciences (SPSS 13). Descriptive and inferential statistics were used to outline the information about the sample socio-demographics and knowledge as an independent variable. Statistical significance was determined at the level .05. The assessment of frequency distribution for each variable, confirmed that the data set had no problems with skewness and kurtosis. Bivariate analyses were conducted using analysis of variance (ANOVA), chi-square, and independent t-tests. Descriptive statistics described the demographic characteristics. Chi-square test was used to identify significant association between participation in mammography and demographic factors. In this study, a series of one- way ANOVAs were used to compare the differences in barrier, based on socio-demographic variables. Then, Post Hoc tests (Tukey HSD test) were conducted. A Friedman test was performed to determine whether respondents had a differential rank ordered preference for the fifteen items of barrier. Preliminary exploratory data analysis was carried out to appraise for missing values, detect outliers, and check for normality. The comprehensive research framework of study, simple random sampling, and face-to-face data collection by female trained interviewers enhanced the response rate with no main problems of understanding on the question asked.

RESULTS

The data was analyzed after obtaining the questionnaires from a random sample of 400 women, referred to one of the four participating hospitals as clients of gynecology ward from July through October, 2009, in Tehran, Iran. Women who had undergone mammogram test in the past two years were evaluated as participants and those with no history of having a mammogram were classified as a non participant group. Initial quantitative analysis began with descriptive analysis, including frequency distributions for variables of interest, accuracy of data input, and missing values. Data analysis was conducted on a total of 400 respondents without any missing values. Chi-square ($\chi 2$) test uncovered all demographic variables between two groups, Participants and non-participants were significantly different (p-value$<$0.01).

Table 1: Demographic Characteristics of the Respondent

n=400

		Participation					
		Non-participant n=314(78.5%)		participant n=86(21.5%)			
		n	%	n	%	χ^2	P
Age	-40	76	24.2%	20	23.3%		
	41-45	69	22.0%	35	40.7%		
	46-50	58	18.5%	23	26.7%	26.809	.001
	>51	111	35.4%	8	9.3%		
Education	Primary school	124	39.5%	4	4.7%		
	diploma	69	22.0%	11	12.8%		
	Graduate	81	25.8%	61	70.9%	67.26	.001
	postgraduate	40	12.7%	10	11.6%		
Marital	Married	215	68.5%	59	68.6%		
	Widow	69	22.0%	10	11.6%	9.65	.008
	Single	30	9.6%	17	19.8%		
Occupation	Full time Employee	89	28.3%	58	67.4%		
	Part Time Employee	58	18.5%	14	16.3%	48.58	.001
	Unemployed or Housewife	167	53.2%	14	16.3%		
Income	low	111	35.4%	3	3.5%		
	middle	173	55.1%	70	81.4%	33.67	.001
	high	30	9.6%	13	15.1%		
Insurance	public	229	72.9%	77	89.5%		
	private	15	4.8%	9	10.5%	25.24	.001
	uninsured	70	22.3%	–			

Women Barriers to Participation in Mammography

The most significant construct of the health belief model is perceived barrier that determines behavior change.[15] It is an individual's own estimation of the obstacles in his or her way in adopting a new behavior. Some of the barriers include difficulty with starting a new behavior or a new habit, fear of not being able to perform a desired behavior and embarrassment.[40]

A Friedman test was performed to determine whether respondents had a differential rank ordered preference for the fifteen items of barrier. The results of that analysis indicated that there was a differential rank for the fifteen items of barrier. Most of respondents admitted embarrassment, lack of doctor or health care provider advice regarding mammography, worry about mammogram devices, and cancer diagnosis as reasons for their non-compliance with mammography[χ^2 (14) =1566.72, p=.000].

Table 2: Comparisons of the Mean Rank of Barrier Items for all Respondents (n=400)

Barrier Items	Mean Rank
Cost of mammogram is too much	5.44
Too hard to figure out where to go for mammogram	5.88
Lack of transportation to get to a mammography center	6.19
No one to stay with children or grand children	6.02
Worry the breast X-ray might find cancer	9.52
Doctor /health provider has not advised to do it	10.09
Do not think mammography can save our life	7.32
People who perform mammography do not treat patients with respect	4.39
Too many other things are going on in our lives	8.13
Worry that mammography might give us cancer	10.03
Do not think we need mammography	7.86
No one we know talks about getting breast cancer	8.97
Media and promotional resources about mammograms do not exist in our neighborhood	9.97
Breast X-ray cannot change our destiny	9.43
It makes me embarrassed	10.78

χ^2 =1566.726, p=.000

Compliant Women Barriers to Participation in Mammography

Friedman test highlighted specific differences between two groups. For compliant group, lack of doctor preference has higher mean compared to the other items. Therefore, all women were influenced by barriers regarding mammography. The evident reason is that women in developing countries such as Iran do not feel any benefit in mammography use.

Table 3: Comparisons of the Mean Rank of Barrier Items for Compliant Group (n=86)

Barrier Items	Mean Rank
Doctor /health provider has not advised to do it	11.98
Worry the breast X-ray might find cancer	10.96
Worry that mammography might give us cancer	10.10
It makes me embarrassed	9.90
Media and promotional resources about mammograms do not exist in our neighborhood.	9.28
Too many other things are going on in our lives	7.78
Breast X-ray cannot change our destiny	7.76
No one we know talks about getting breast cancer	7.44
Do not think mammography can save our life	7.31
People who perform mammography do not treat patients with respect	7.08
Do not think we need mammography	6.97
Lack of transportation to get to a mammography center	6.59
Too hard to figure out where to go for mammogram	6.52
No one to stay with children or grand children	5.91
Cost of mammogram is too much	4.44

χ^2=324.201, p=.000

Non-Compliant Women Barriers to Participation in Mammography

In contrast, non-participant group selected embarrassment as the prominent barrier. On the other hand, However "Media and promotional resources about mammograms do not exist in our neighborhood "was acknowledged by non-participant group, as well. Non-compliant believed that mammography cannot change their destiny; consequently, they have not participated in this trial exam.

Table 4: Comparisons of the Mean Rank of Barrier Items for Non-Compliant Group (n=314)

Barrier Items	Mean Rank
It makes me embarrassed	11.02
Media and promotional resources about mammograms do not exist in our neighborhood	10.15
Worry that mammography might give us cancer	10.00
Breast X-ray cannot change our destiny	9.88
Doctor /health provider has not advised to do it	9.57
No one we know talks about getting breast cancer	9.39
Worry the breast X-ray might find cancer	9.13
Too many other things are going on in our lives	8.22
Do not think we need mammography	8.10
Do not think mammography can save our life	7.33
Lack of transportation to get to a mammography center	6.08
No one to stay with children or grand children	6.06
Cost of mammogram is too much	5.71
Too hard to figure out where to go for mammogram	5.70
People who perform mammography do not treat patients with respect	3.65

χ^2=1409.726, p=.000

DISCUSSION

The evident reason is that women in developing countries such as Iran do not feel any benefit in mammography use. The role of anxiety in mammography compliance, fear, and embarrassment is to discourage mammography among Iranian women. Lack of media and resources, lack of physician prescription, worries about knowing cancers during mammography, also devalued mammography utilization among Iranian women. Turning to the influence of medical environment on a woman's decision for compliance with mammography, and the role of healthcare staff has not been systematically placed in Iran. Therefore, compliance decisions regarding mammography from a cultural perspective should be at high priority in Iranian health care system.

Previous literature focusing on women barriers especially in Asian countries is consistent with the findings. Asian women are unwilling to show their breasts to others, including to health care providers.[14,17,37] Sometimes unpleasant previous experiences stresses the modesty issues of the Korean, Chinese, and Iranian women further.[1,14,17] Male physicians also do the clinical exams in Iran which needs women expose their breasts to them. Thus, they feel ashamed and as a result they do not tend to undergo a stressful mammography.

To verify our data, some studies suggest that having a gynecologist, as a regular physician, and physician referral are important predictors in mammography.[14,16,17,35] Also, the rate of referral by a physician was substantially higher among participating women in mammography. In some Asian countries such as Iran, Turkey, and Korea insurance for having mammography requires doctor's reference to ensure payments.[16,17,35,27] Thus, the choice of lack of doctor's preference as a salient barrier by women was expected in this study.Participating group also admitted that "the breast x-ray might find cancer "or "mammography can give us cancer", so fear discourages mammography among Iranian women. Likewise, women were fearful about cancer and death.[17,24,2]

The study also discovered that even participating women acknowledged that "it is too hard to figure out where to go for mammogram". It is believed that the strong negative social and cultural perception of breast cancer in developing countries could be the main reason for the delayed women and attention to themselves. This is made worse by poverty and the lack of health care services wide geographical.[27] The survey results show that participant group totally relies on health care professional, despite their participation in this trial exam during last two years. Thus, to mobilize women groups towards new health practices such as mammography, policy makers should understand some priorities such as recognizing barriers in taking mammography as breast cancer affects Iranian women at least one decade earlier.

Similarly, previous authors claimed that the sense of fatalism leads to their passive view about illness and treatment which in itself acts as an important barrier to participation in cancer screening or cancer detection.[8,30,31,38,42]

Non–compliant group also admitted that "Worry that mammography might give us cancer", "the breast x-ray might find cancer", "mammography can give us cancer", and "Doctor /health provider has not advised to do it". As above mentioned, women were fearful about cancer and death.[2,17,24] Regarding fear of breast cancer screening results, Parsa (2006) reported that Yarbrough and Braden (2001) carried out a review of 16 published descriptive studies highlighting barriers to screening behavior which include fear of results, fear of treatment and fear of the test itself. [27,44]

These findings are found to be similar with the results of other researchers in Iran[16], Malaysia[12], United Arab Emirates[2] and Jordan[28]. Consistent with the study result, findings of some studies in Iran revealed that most women aged 40 years and older did not receive mammography referral from

their physicians. The low rate of mammography screening could be due to physicians' limited referral frequency and patients' dependency on irregular visits to gynaecologists. Therefore, it needs efforts to educate health care providers, particularly physicians about the importance of the mammography referral and enthusiasm in making those referrals and gynaecologist visits in regular intervals

Barrier-Items like "too many other things going on in our lives "or" do not think we need mammography" revealed that Iranian women are not aware of the importance of mammography. Similarly, Asian women's low participation rate in mammography reported as women inability to perceive the importance of screening. Results of some studies which were performed in Korea[14,18], Singapore[39], Malaysia[12], Iran[16] showed women did not perceive the importance of early detection of breast cancer such as mammography. On the other hand, underestimated role of women at home causes them to forget their own needs, including health care needs.[2,13,14,24] However, increasing women's awareness about the importance of early detection also is useful for their involvement in breast cancer prevention issue in Iran. Besides, it enables the community to sustain their behavior changes in order to attain and maintain optimal health, as a part of their commitment about their own health.

CONCLUSION

This paper intends to identify barriers that may have an impact on women's participation in mammography. Friedman test was conducted to determine whether respondents had a differential rank- ordered preference for the fifteen items of barrier.

Most of respondents admitted embarrassment, lack of doctor or health care provider advice regarding mammography, worry about mammogram devices, and cancer diagnosis as reasons for their non-compliance with mammography. However "Media and promotional resources about mammograms do not exist in our neighborhood" was acknowledged by nonparticipant group, as well, (p=0.000). Friedman test highlighted specific differences between the two groups. The results showed that lack of doctors' advice for complaints, and embarrassment for non- complaints in mammography, are selected barriers. Therefore, all women in both groups were influenced by barriers regarding mammography.

This study highlights the need for the doctors, healthcare professionals, primary physicians, and/or gynecologists in Iran, who are frontline medical professionals, to undergo more training in the area of breast cancer and screening awareness to overcome women's barriers and encourage them to take charge of their well-being in breast matters. In addition, women should be informed that mammography can decrease mortality of breast cancer and increases breast cancer awareness which encourages them to take charge of their well-being in breast matters. Finally, a theoretical-based intervention study should be carried out on community participation in breast cancer prevention among Iranian women. There are many innovative and collaborative interventions that might give positive results in a relatively short period if they are carried out well, such as radio programs or pamphlets distributed to the public through social groups regarding individual and community participation in mammography and breast cancer prevention. Since government policy in Iran is dominated by the national level, powerful advocacy efforts concerning breast cancer prevention could benefit many thousands of women throughout the country at the individual level to overcome their social barriers. This study provides health care professionals new information for future interventions to increase women's participation in mammography and breast cancer prevention programs with emphasis on their immediate social and cultural barriers.

REFERENCES

1. Abdulah, A., & Leung, T. (2000). Factors associated with the use of breast and cervical cancer screening services among Chinese women in Hong Kong. *Public Health*, *115*, 212-7.
2. Bener, A., Honein, G., Carter, A. O., & Da'ar, Z. (2002). The determinants of breast cancer screening behavior: A focus group study of women in the United Arab Emirates. *Oncology Nursing Forum*, *29*, 91-8.
3. Boyce, W. F. (2001). Disadvantaged persons' participation in health promotion projects: Some structural dimensions. *Social Science and Medicine*, *52*(10), 1551-1564.
4. Champion, V. L. (1992). Compliance with guidelines for mammography screening. *Cancer Detection and Prevention*, *16*, 253-258.
5. Champion, V. L., & Scott, C. R. (1997). Reliability and validity of breast cancer screening belief scales in African American women. *Nursing Research, 46*, 331–7.
6. Chua, M. S. T., Mok, T. S., Kwan, W. H., Yeo, W., & Zee, B. (2005). Knowledge, perceptions, and attitudes of Hong Kong Chinese women on screening mammography and early breast cancer management. *Breast Journal, 11*(1), 52-6.
7. Crane, L. A, Kaplan, C. P, & Bastani, R. (1996). Determinants of adherence among health department patients referred for a mammogram. *Women and Health, 24*(2), 43-6.
8. Daaleman, T. P., Williams, C. S., Hamilton, V. L., & Zimmerman, S. (2008). Spiritual care at the end of life in long-term care. *Medical Care, 46*, 85–91.
9. Garbers, S., Jessop, D. J., Foti, H., Uribelarrea, M., & Chiasson, M.A. (2003). Barriers to breast cancer screening for low-income Mexican and Dominican women in New York City. *Journal of Urban Health, 80*(1), 81-91.
10. Harirchi, I., Ebrahimi, M., Zamani, N., Jarvandi, & Montazeri, A. (2000). Breast cancer in Iran: A review of 903 case records. *Public Health, 114*, 143-145.
11. Hiatt, R. A. (1996). Pathways to early cancer detection in the multiethnic population of San Francisco Bay Area. *Health Education Quarterly, 23*, 10-27.
12. Hisham, A. N., & Yip, C. H. (2003). Spectrum of breast cancer in Malaysian women: An overview. *World Journal of Surgery, 27*, 921-3.
13. Hisham, A. N., & Yip, C. H. (2004). Overview of breast cancer in Malaysian women: A problem with late diagnosis. *Asian Journal Surgery, 27*, 130-133.
14. Im, E. O., Park, Y. S., & Lee, E. O. (2004). Korean women's attitudes toward breast cancer screening tests. *International Journal of Nursing Studies, 41*, 583-9.
15. Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A decade later. *Health Education Quarterly, II*, 1-47.
16. Jarvandi, S., Montazeri, A., Harirchi, I., & Kazemnejad, A. (2002). Beliefs and behaviors of Iranian teachers toward early detection of breast cancer and breast self-examination. *Public Health, 116*, 245-249.
17. Juon, H. S., Kim, M., & Shankar, S. (2004). Predictors of adherence to screening mammography among Korean American women. *Preventive Medicine, 39*, 474-81.
18. Lee, C. Y., Kim, H. S., & Ham, O. (2000). Knowledge, practice, and risk of breast cancer among rural women in Korea. *Nursing and Health Sciences, 2*(4), 225-230.
19. Meleis, A. & Hatter-Pollard, M. (1995). Arab middle Eastern American women. Stereotyped, invisible, but powerful. In D. L. Adams (Ed.), Health Issues for Women of Color: *A cultural diversity perspective* (pp. 133-163). Sage Publications.
20. Montazeri, A., Haji-Mahmoodi, M., & Jarvandi, S. (2003). Breast self-examination: do religious beliefs matter? A descriptive study. *Journal of Public Health Medicine, 25*(2), 154-5.
21. Morrison, C. (1996). Determining crucial correlates of breast self-exam in older women with low incomes. *Oncology Nursing Forum, 23*, 83-93.
22. Mousavi, S. M., Montazeri, A., Mohagheghi, M. A., Jarrahi, A. M., Harirchi, I., & Najafi, M. (2007). Breast cancer in Iran: An epidemiological review. *The Breast Journal, 13*(4), 383-391.

23. Mousavi, S., Gouya, M., Ramazani, R., Davanlou, M., Hajsadeghi, N., & Seddighi, Z. (2009). Cancer incidence and mortality in Iran. *Annuals of Oncology, 20*(3), 556.
24. Nissan, A., Spira, M., & Hamburger, T. (2004). Clinical profile of breast cancer in Arab and Jewish women in the Jerusalem area. *American Journal of Surgery, 188*, 62-7.
25. O'Malley, A. S., Earp, J. A., & Harris, R. P. (1997). Race and mammography use in two North Carolina counties. *American Journal of Public health, 87*(5), 782-786.
26. Parsa, P., & Kandiah, M. (2005). Breast cancer knowledge, perception and breast self-examination practices among Iranian women. *International Medicine Journal, 4*, 17-24.
27. Parsa, P., Kandiah, M., Abdul Rahman, H., & Zulkefli, N. (2006). Barriers for breast cancer screening among Asian women: A mini literature review. *Asian Pacific Journal of Cancer Prevention, 7*(4), 509.
28. Petro-Nustus, W., & Mikhail, B. (2002). Factors associated with breast self examination among Jordanian women. *Public Health Nursing, 19*, 263-71.
29. Phipps, E., Cohen, M., Sorn, R., & Braitman, L. (1999). A pilot study of cancer knowledge and screening behaviors of Vietnamese and Cambodian women. *Health Care for Women International, 20*, 195-207.
30. Powe, B. D., & Finnie, R. (2003). Cancer fatalism: The state of the science. *Cancer Nursing, 26*, 454–465.
31. Powe, B. D., Hamilton, J., & Brooks, P. (2006). Perceptions of cancer fatalism and cancer knowledge: A comparison of older and younger African American women. *Journal of Psychological Oncology, 24*(4), 1–13.
32. Rakowski, W., Dube, C. E., & Marcus, B. H. (1992). Assessing elements of women's decisions about mammography. *Health Psychology, 11*, 111.
33. Rashidi, A., & Rajaram, S. (2000). Middle Eastern Islamic Women and Breast Self-Examination. *Cancer Nursing, 23*, 64-71.
34. Rawl, S. M., Champion, V. L., Menon, U., & Foster, J. L. (2000). The impact of age and race on mammography practices. *Health Care for Women International, 2*, 583-597.
35. Secginli, S. & Nahcivan, N. O. (2006). Factors associated with breast cancer screening behaviors in a sample of Turkish women: A questionnaire survey. *International Journal of Nursing Studies, 43*, 161-71.
36. Slenker, S. E., & Grant, M. C. (1989). Attitudes, beliefs, and knowledge about mammography among women forty years of age. *Journal of Cancer Education, 4*, 61-65.
37. Smith, R., Maira, C., & Ute, S. (2006). Breast cancer in limited resource countries: Early detection and access to care. *Breast J, 12*, 16-26.
38. Spurlock, W. R., & Cullins, L. S. (2006). Cancer fatalism and breast cancer screening in African American women. *ABNF Journal, 17*(1), 38–43.
39. Straughan, P., & Seow, A. (2000). Attitude as barriers in breast screening: A prospective study among Singapore women. *Social Science and Medicine, 51*, 1695-703.
40. Umeh, K. & Rogan-Gibson, J. (2001). *British Journal of Health Psychology, 6*(4), 361-372.
41. Wandersman, A. (1981). A framework of participation in community organizations. *Journal of Applied Behavioral Analysis, 17*(1), 27–58.
42. Weinmann, S., Taplin, S. H., Gilbert, J., Beverly, R. K., Geiger, A. M., & Yood, M. U. (2005). Characteristics of women refusing follow-up for tests or symptoms suggestive of breast cancer. *Journal of the National Cancer Institute Monographs, 35*, 33–38.
43. World Health Organization (WHO). (2008, July). *CANCER Fact sheet*. Retrieved November, 20, 2009, from http://www.who.int/mediacentre/factsheets /fs297/en /index.html
44. Yarbrough, S., & Braden, C. (2001). Utility of health belief model as a guide for explaining or predicting breast cancer screening behaviors. *Journal of Advanced Nursing, 33*, 677-88.

TIPPING POINT: DOES IT MATTER?

F.K.Leong, M.A. Zamzila, N.S.Shahril, M.S.Nora'i
Wilayah Persekutuan, Department of Nursing
Hospital Putrajaya, Putrajaya, Malaysia,

ABSTRACT

Background: Needlestick injuries (NSIs) have been recognized as one of the occupational hazards among healthcare workers. In Malaysia, the reported prevalence of NSI has been reported from 23.5% to 53.7%.

Objective: The aim of the study is to see the pattern of needlestick injury (NSIs) in Putrajaya Hospital, and to identify the mode of injury and its risk factors.

Method: This is a retrospective, descriptive study. All reported NSIs cases from year 2007 to 2010 were reviewed in terms of demographic and circumstances in which the NSI occurred. The data were analysed using SPSS version 15.

Result: 51% cases (n=57) occurred among doctors: 31.5% house officers and 19.8% medical officer; followed by 21.6% involving staff nurses (n=24). About half of the needle sticks injury cases (56.8%) happened in those who have less than a year of service in clinical practice. 27% had 2 to 5 years clinical experience whereas 16.2% had more than 5 years experience. Most of the NSIs occur in operation theatre (23.4%), medical department (21.6%) and emergency department (9%). Hypodermic needle was the highest (47.7%) followed by suturing needles (21%). Hypodermic NSIs occurrence was high in Medical department and NSIs involving suture needles were highest in operation theatre. Common circumstances in which NSI involving hypodermic needles were during venepuncture, insertion and removal of needles and for those who involving suture needles were in the procedure of suturing.

Conclusion: Needle stick injury is common among doctors. It is seen commonly in those inexperienced. NSIs mainly occur in the usage of needles for intended purposes.

Keyword: Needlestick Injuries (NSIs), Healthcare workers

INTRODUCTION

At a 'tip of an iceberg' or 'blink of an eye', an incident of Needlestick Injury (NSI) may change a person's life. Worldwide, 35 million healthcare workers are potentially at risk of NSIs. According Pruss-Ustun et al, (2005), about 2.1 million healthcare workers per year are exposed to HBV through percutaneous injuries. An estimated of 600,000 to 800,000 receive NSIs from conventional needles and sharps in USA and 100,000 cases in United Kingdom.[11]

It has been reported by the Occupational Health Unit of Malaysia, (2008) that NSIs (1998 to 2005) was the major cause of injury among the Ministry of Health personnel; which contributes to a total of 74.9% of all injuries. In Malaysia, authentic data on NSIs are scarce and not conclusive but an estimated prevalence that has been reported from 23.5% to 53.7%.[7,8,13]

In this era of many virulent infectious blood borne diseases[20], it would imperative that healthcare workers should protect themselves against NSI. Majority of the NSI are self-inflicted injuries which are preventable and these are of concern by the hospital management.[9] According to statistics compiled by the Medical Industry Association,[12] at least one in nine nurses will suffer a NSI each year.

The aim of this study is to see the occurrence of NSI in Putrajaya Hospital, identify the pattern of injury and its risk factors.

METHOD

This is a retrospective, descriptive study on NSI in Putrajaya Hospital, a 278-bedded specialist hospital in Putrajaya, Malaysia. All NSIs reported cases from year 2007 to 2010 were reviewed. Data of each NSI were extracted from the hospital NSI forms that were adapted from the Incident Reporting Forms (WEHU 1 & 2) used by the Occupational Safety and Health Division in the Ministry of Health, Malaysia. Data was collected using the data collection form (appendix 1), which include:

i) Background demographic information of affected personnel including years of service, training on universal precaution, and hepatitis B immunization status
ii) Mode of NSI
iii) Circumstances under which the NSI had occurred
iv) Outcome of NSI in terms of transmission of hepatitis B, C and HIV infection.

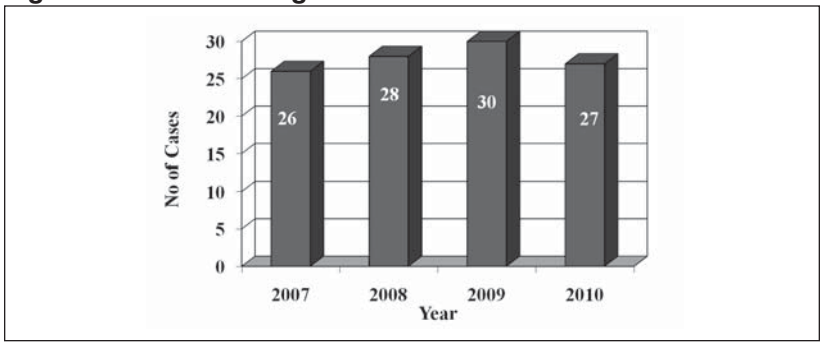
This study was approved by the hospital management and registered at National Medical Research Register.

The study population included specialist, medical officers, house officers, medical students, staff nurses, student nurses, medical assistants, researchers, laboratory assistants, dental technicians, pharmacists, health attendants and ambulance drivers. NSI is defined as the parenteral introduction into the body of blood or other potentially infectious material by a hollow-bore needle or sharp instrument, including suture needles, lancets, scalpels, and contaminated broken glass used during the performance of duties.[5,16,21] Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 15.

RESULTS

There were 111 reported cases of NSI from the year 2007 – 2010: 26 cases in 2007, 28 cases in 2008, 30 cases in 2009 and 27 cases in 2010 as shown in figure 1.

Figure 1 - NSI Trending from 2007 – 2010



Out of the 111 cases, 73% were females (n= 81) and 27% male (n= 30). Majority of the cases occurred within the age group of 20–30 years (77.5%) and Malays (89.2%). More than half of the cases (56.8%) had been in service less than one year. The highest number of NSI cases occurred among house officers (31.5%), followed by staff nurse (21.6%) and medical officers (19.8%). The operation theatre had the most NSI (23.4%) followed by medical wards (21.6%) and paediatric wards (9.9%). Half of the cases (51.4%) had some of training or awareness program within a year prior to the NSI; whereas 24.3% did not receive any form of training. 86.5% of the cases had received hepatitis B immunization. There was no reported transmission of hepatitis B, C and HIV infections in all the 111 cases. Table 1 summarizes the baseline demographics of the NSI cases from year 2007 – 2010.

Table 1 - Demographic (2007-2010)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Female	81	73%
Male	30	27%
Age group		
20 – 30 years	86	77.5%
31 – 40 years	15	13.5%
41 – 50 years	8	7.2%
> 51 years	2	1.8%
Race		
Malay	99	89.2%
Chinese	6	5.4%
Indian	4	3.6%
Others	2	1.8%
Job		
House officer	35	31.5%
Medical officer	22	19.8%
Specialist	6	5.4%
Staff nurse	24	21.6%
Community nurse	3	2.7%
Medical assistant	6	5.4%
Health attendant	2	1.8%
Dental technician	1	0.9%
Lab assistant	1	0.9%
Researcher	1	0.9%
Cleaner	3	2.7%
Medical Student	3	2.7%
Nursing Student	3	2.7%
Ambulance driver	1	0.9%
Location		
Medical wards	24	21.6%
Operating theatre	26	23.4%
Paediatric wards	11	9.9%
Emergency department	10	9.0%
Obstetric wards	9	8.1%
Orthopaedic ward	8	7.2%
Dental	1	0.9%
Pathology department	3	2.7%
Daycare wards	6	5.4%
Eye department	3	2.7%
ICU/CCU units	3	2.7%
Imaging department	2	1.8%
Surgical wards	5	4.5%
Hepatitis B immunization		
Yes	96	86.5%
No	15	13.5%
Awareness/ training program		
None	27	24.3%
< 1 year	57	51.4%
2 - 5 year	19	17.1%
> 5 year	8	7.2%

Out of the 111 NSIs, 89.1% (99 cases) were caused mostly by needles and the remaining were sharps 10.9% (12 cases). Most of the needles used were hollow-bore needles comprising of hypodermic needles, branula/venofix, butterfly needles, with suture needles only being 18.9% (21 cases) as shown in Table 2.

Table 2 -Type of sharps involved in NSIs

Type	Frequency (%)
HOLLOW BORE NEEDLE	
Hypodermic needle	47.7% (53)
Branula	15.3% (17)
Butterfly	7.2% (8)
NON-HOLLOW NEEDLE	
Suture needle	18.9% (21)
OTHER FORMS OF SHARPS	
Blade	6.3% (7)
K-wire	2.7% (3)
Trocar	0.9% (1)
Glass	0.9% (1)

The five most common procedures in which NSI occurred were venepuncture (32.4%), assisting in procedures (17.1%), giving injection (11.7%), suturing (10.8%) and cleaning process (10.8%) as in Table 3.

Table 3 – How did NSI Occur?

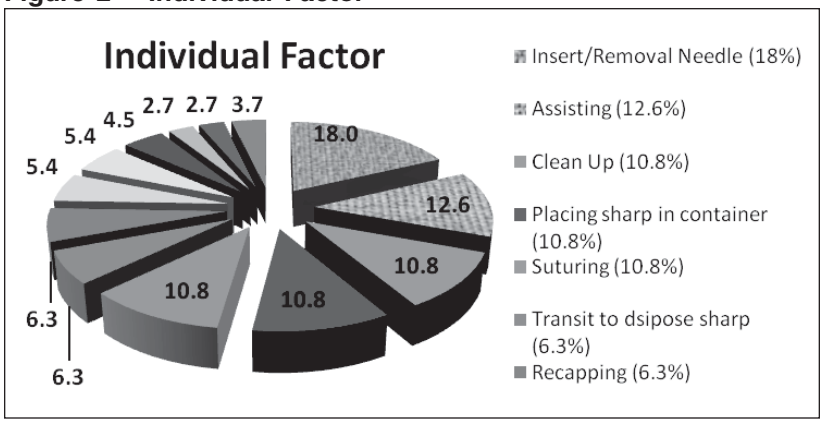
Procedure	Frequency (n)
Venepuncture	34.2% (38)
Assisting in procedure – suturing, inserting lines etc.	17.1% (19)
SC/ IM injection	11.7% (13)
Suturing	10.8% (12)
Process of clearing sharps/needles	10.8% (12)
Establishing IV/ Arterial lines	5.4% (6)
Other forms of sharps (blade/trocar/ K-wire)	4.5% (5)
Others	
Obtaining body fluid or tissue samples e.g.FNAC	2.7% (3)
(fine needle aspiration for cytology)	1.8% (2)
Removal of foreign body/ tissue	
Breaking glass vials	0.9% (1)

Only 74.8% of the respondents wear gloves while performing procedures dealing with blood and body fluids.

Factors leading to the occurrence of NSI were identified for each case. These were divided into: 1) individual factors, 2) environmental factors and 3) device factor. Individual factors reflect that injury caused was due to the individual own doing e.g. the act of suturing. Environmental factors would include factors beyond the control of the individual e.g. protruding sharp from bins. Faulty device or inappropriate device designs were categorized as device factor.

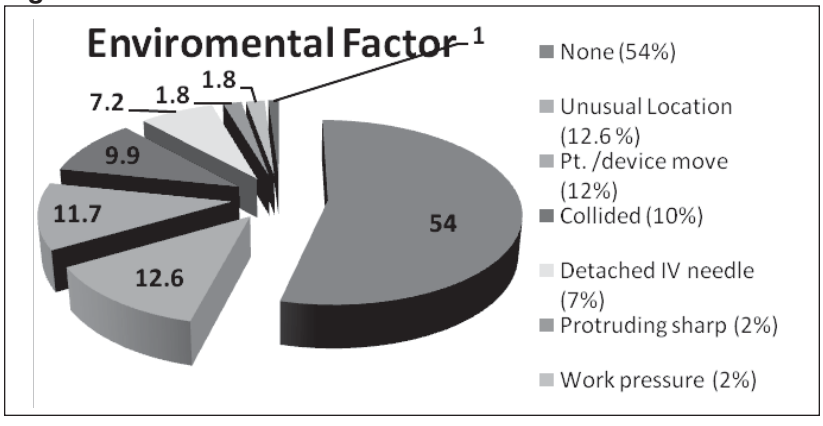
NSI occurred mostly during insertion or removal of used needle (18%) followed by assisting suturing (12.6%), during process of cleaning up (10.8%), placing needle/sharp in container (10.8%) and suturing (10.8%) as shown in figure 2.

Figure 2 – Individual Factor



Needle or sharp were placed in an unusual location (12.6%), patient or device moved (11.7%), victim collided with used needle or sharp (9.9%) were the common environmental factors identified as shown in figure 3. Device factor was not identified in any of the reported cases. Sub-analysis revealed that most of the NSIs happened were either due to individual factors (52.3%) or combination of both individual and environment factors (45%).

Figure 3 – Environmental Factor



DISCUSSIONS

All the NSIs were percutaneous injuries where 94.6% (n=105) sustained moderate depth punctures with minimal bleeding and 5.4% (n=6) had superficial injuries. No deep injuries were involved. Most of the cases (86.5%) had Hepatitis B vaccination. This could explain why there was no reported transmission of hepatits B infection in this study. Hepatitis B vaccination is important for all healthcare workers as the risk of transmission is higher as supported by Simonsen *et al*, (1999)[19] whereby reported risk of transmission was 3–10% for Hepatitis B, 3% for Hepatitis C and 0.3% for HIV infection.

The group identified as being at high risk of NSI were those aged between 20-30 years and with the majority having less than a year service such as the house officers and newly graduate staff nurses. Two previous studies by Clarke et al, (2003)[4] and Chia et al, (1994)[3] showed similar findings.

This study showed that NSIs occurred most with hypodermic needles used for venepuncture (47.7%) and during the procedure of insertion and removal of needles with the highest incidence occurring in Medical department. This may be due to high turnover of young inexperienced healthcare workers especially house officers, and blood taking procedure being the highest in statistics in medical wards. The high occurrence of NSIs during blood withdrawal (55%) and history of NSI occurring in the preceding 1 year (80.1%) was also cited in Muralidhar et al, (2010).[10]

The guidelines of CDC, (1987) instruct that a hard or 'sharps' container should be placed as near as possible to the injection site. 18% of the cases in this study had NSIs during transit to dispose of used sharps and during picking up used sharps in a tray before disposal into sharps bin, 12.6% cases got injured due to needles left carelessly in unusual location by others and 10.8% cases sustained injury while clearing tray/trolley for others. When we analysed the individual case the used needle was often placed in the tray mixed with cotton swabs, gauze, used gloved or specimen containers. Therefore, there is a potential risk of injury when trying to dispose the used needle. Similar incidents were also reported by Raghavendran et. al, (2006)[18] that 70% of the respondents got injured during clearing of sharps for others and Watterson, (2004) raised the concern that more than 1/3 of the NSIs were sustained by someone and not the original user of the sharps.[22]

NSIs involving suture needles were highest in operation theatres, of which 10.8% cases got injured while performing suturing and 12.6% cases sustained NSI during assisting suturing. Berguer & Heller, 2004 reported similar incidences[1] whereby NSI occur during suturing of muscle and fascia (during wound closure), particularly while using the fingers to manipulate needles and tissue. It was also reported about 6% – 16% sustained NSI while passing sharp instruments hand-to-hand and 24% were inflicted by their co-worker. In another study by Efetie & Salami, (2009) reported that 86.2% respondents had NSI during suturing.[6]

RECOMMENDATION

Continuous awareness and training program to all healthcare workers, especially to the juniors and the newly reported staff is important in the NSI prevention program. The use of equipped trolley with sharps bin and other requirements for venepuncture instead of putting into a tray may help to reduce the risk of getting pricked accidently.

Venepuncture training program and use of needleless system (vacutainer system) should be ongoing, focusing on the new and junior staffs. Promoting the use of sharp containers at point of use and having campaigns like – "You use it, you dispose it" could help to build in the safe culture in the organization.

Safe suturing and assisting techniques should be focused in operation theatre where training on 'non-touch technique' and protocols to be included. The use of blunt needle or thimbles to protect fingers may also prevent injury during performing procedure.

LIMITATION

As this was a retrospective study, we were not able to assess the experience and skill in handling needles by the affected staff and the knowledge perceived after the awareness program. Unreported NSI cases may be missed out in the analysis.

CONCLUSION

Needle stick injury is common among doctors in Putrajaya Hospital. It was seen commonly in those inexperienced. They should therefore, be accepted as risk groups and targeted for training programmes to prevent NSI especially in safe venepuncture procedure, suturing technique, and operation assisting techniques. The NSIs mainly occurs in the usage of needles for intended purposes and many of these were self-inflicted injuries that are preventable. NSI is an important issue that should be given serious attention by policymaker and managers as safety issues and is looked upon by Occupational Safety and Health Act 1994 as a requirement towards Accreditation Programme.

ACKNOWLEDGMENT

I would like to thank my assistant, Zamzila Mat Akhair for helping me in the data entries. My special thanks to my supervisor and mentor, Dr. Shuhaila Shahril who has spent her precious time to guide me through this study, especially in using of SPSS. Last but not least, my grateful thanks to the Hospital Director, Dr. Nora'i Mohd Said for giving this opportunity to do this study and for her consistent heart-felt encouragement.

REFERENCES

1. Berguer, R. & Heller, P.J. (2004) 'Preventing Sharps Injuries in the Operating Room' American College of Surgeons, pp. 462-466.
2. Centers for Disease Control, (1987) 'Recommendations for prevention of HIV transmission in health care settings', *Morbidity and Mortality Weekly Report*, (36).
3. Chia, HP., Koh, D., Chong,R., Jeyaratnam, J. (1994) 'A study of needlestick injuries among house officers in a major hospital', Singapore Medical Journal, (35), pp. 41-43.
4. Clarke, S.P., Rockett, J., Sloane, D.M., Aiken, L.H. (2003) 'Organizational climate, staffing and safety equipment as predictors of needlestick injuries and near misses in hospital nurses', *American Journal of Infection Control*, (30), pp. 207-216.
5. Cooley, C & Gabriel, J.(2004) 'Reducing risks of sharps injuries in health professionals', *Nursing Times*, 100(26), pp. 28-29.
6. Efetie, E.R. & Salami, H.A. (2009) 'Prevalence of and attitude towards, needlestick injuries by Nigerian gynaecological surgeons', Nigerian Journal of Clinical Practice, (12), pp. 34-36.
7. Lee, L.K. & Ismail,N.H. (2005) 'Implication of the prevalence of Needlestick Injuries in a General Hospital in Malaysia and Its Risk in Clinical Practice', *Environmental Health and Preventive Medicine*, (10), pp. 33-41.
8. Lekhraj, R., Rosidah, Z., Leong, W.S., Azhar, MZ. (2010) "Needle Stick and Sharps Injuries and Factors Associated Among Health Care Workers in a Malaysian Hospital" *European Journal of Social Sciences*, (13), pp. 354 – 362.
9. McNamara, M & Patterson, D. (2008) 'Workplace safety and needlestick injuries are top concerns for nurses', *American Nurses Association*, pp. 1-4. ANA. Online. Available at: www.NursingWorld.org. (Accessed: 20 May, 2011)
10. Muralidhar, S., Kumar, P.S., Jain, R.K., Malhotra, M., & Bala, M. (2010) 'Needle stick injuries among health care workers in a tertiary care hospital of India' *Indian Journal of Medical Research*, (131), pp 405-410.
11. National Institute for Occupational Safety and Health (NIÖSH, 1999), "Alert: Preventing needlestick injuries in healthcare settings", pp. 2000-2108. Washington DC: NIOSH
12. New South Wales Nurses' Association, (2006) 'Working Safely With Sharps'. Online. Available at: http://www.nswnurses.asn.au/news/4241.html (Accessed: 20 May, 2011)
13. Noor Hassim I, Rosnah I & Rampal K.G. (2009) 'Needlestick injury: a review of twelve theses among Healthcare Personnel in Malaysia', *Journal of Community Health*, (15), pp. 47-50.
14. Occupational Health Unit of Malaysia, (2008) *Sharps Injury Surveillance*, Putrajaya: Occupational Health Unit, Disease Control Division, Ministry of Health, Malaysia.
15. OSHA. (1994) *Occupational Safety and Health Act*, (Act 514). 2nd ed. Kuala Lumpur: Nasional Malaysia Berhad.
16. Parkes, A & Bell, K.R. (2001) 'Needlestick Injuries, CPD anaesthesia', 3 (3), pp. 131-134.
17. Pruss-Ustun, A., Rapiti, E., Hutin, Y. (2005) 'Estimation of the Global Burden of Disease Attributable to Contaminated Sharps Injuries Among Health-care Workers', *American Journal of Industrial Medicine*, 48, pp. 482-490. Wiley-Liss, Inc. Online. Available at: www.interscience.wiley.com (Accessed: 20 May, 2011).
18. Raghavendran, S., Bagry, H.S., Leith, S., Budd, J.M. (2006) 'Needlestick Injuries: a comparison of practice and attitudes in two UK District General Hospital', *Anaesthesia*, (61), pp. 867-872.

19. Simonsen, L., Kane, A., Lloyd, J., Zaffran, M., Kane, M. (1999) 'Unsafe injections in the developing world and transmission of blood borne pathogens: a review', *Bulletin of World Health Organization*, 77(10), pp.789-793.
20. Susan, Q.W. (2004) "Preventing Needlestick Injuries among Healthcare Workers", *International Journal Occupational Environment Health*, (4), pp. 451-456.
21. Vaz'.K, Mcgrowder, D., Crawford, T., Alexander-Lindo,R.L.,Irving, R. (2010) 'Prevalence of Injuries and reporting of accidents among healthcare workers at the University Hospital of the West Indies', *International Journal of Occupational Medicines and Environment Health*, 23(2), pp. 133-143.
22. Watterson, L. (2004) 'Monitoring sharps injuries: EPINet(TM) surveillance results', *Nursing Standard*, 19, p.3. ProQuest Nursing & Allied Health Source.

PROFILE OF PATIENTS WITH DIABETES SEEN BY DIABETES NURSE EDUCATORS IN PUTRAJAYA HOSPITAL

Jumiatin.O[1] , Nurain.M.N[2], Nora'I.M.S[3], Noorhayati.H[4], Rozana.A[5]
[1, 4, 5] Diabetes Resource Centre, Putrajaya Hospital
[2] Endocrinology Department, Putrajaya Hospital
[3]Hospital Director, Putrajaya Hospital

ABSTRACT

Diabetes Nurse Educators (DNEs) are health care professionals who focus on helping individuals with and at risk for diabetes. DNEs play an important role in supporting diabetes patients to effectively manage their disease. At Putrajaya Hospital, the physician will refer diabetic patients to DNEs for help in achieving better glycaemic control. To describe the type of diabetic patients seen by a DNEs in term of demographic, glycaemic control, medications and the complications seen. This is a cross sectional retrospective study. The list of patients seen by a diabetes educator in the ward or diabetes resource centre during the month of February 2011 were retrieved. The information regarding the disease was obtained from the electronic medical records. The data was analysed using SPSS version 15. In the month of February 2011, there were 140 patients seen by DNEs. Type 2 Diabetes Mellitus is the most commonly seen (80.7%) followed by gestational diabetes mellitus (18.6%) and Type 1 DM (0.7%). 57.1% of patients were seen as in patients where as the rest were seen as outpatient in diabetes resource centre. The mean age was 50 years old and the median duration of diabetes mellitus was 10 years. Most of the patients referred to DNEs for counselling were on insulin injection (71.4%), 13.6% on oral hypoglycaemic agents (OHA) and 10.7% of combination therapy. The most common advice given was on self monitoring of blood glucose (SMBG) which were 89.3.% followed by insulin injection technique (55.7%). There were only 12.1 % who had good glycaemic control (defined as HbA1c < 6.5%). The complications seen were retinopathy (18.6%), nephropathy (17.9%) and neuropathy (16.4%). The patients that were seen by a DNEs in this study were those with poor control and longer duration of Type 2 DM. Most of the patients were on insulin therapy leading to the need of SMBG and insulin injection counselling.

INTRODUCTION

Background information

Diabetes Mellitus is one of the chronic diseases which have big impact in the world, regardless the rate of development of the country, like Malaysia. Diabetes is detected to be 1-2% in 1960, 6.3% in 1986, and increasing rapidly towards 1996, at 9.6%. The National Health Morbidity Surveys (NHMS III) that been held in 2006 showed the rate of 14.9% in Diabetic cases.[16] This drastic increase will be the greatest challenges ever faced by the medical world of 21th century and its employees. Diabetes is usually associated with the increased cases of death, heart attacks and strokes, kidney failure, eye and nerve complications, pregnancy complications, amputations, which in turn will ultimately causes death or disability.[14] According to Hassan A.R (2010), Diabetes is an almost permanent disease and under par care practices will increase the chances of facing diabetes related complications, and god forbids premature deaths.[8] Diabetes related complications are very horrifying, it will lessen the quality of life and also the patient will become a huge financial burden for their parents and families.

Putrajaya Hospital is a fully IT, paperless hospital and an endocrine referral centre in Malaysia. Most of the Diabetes Mellitus patients that have been referred to this hospital are a chronic type patients

and also facing various complications from this disease. At Putrajaya Hospital, the physician will refer diabetic patients to Diabetes Nurse Educator's (DNEs) to help in achieving better glycaemic control. According to Rosenberg (2006), DNEs is a healthcare professional with special credentialing and experience who function interactively and collaboratively with diabetic or pre-diabetic patients.[17] In Malaysia, it is in the regulations that DNEs should hold Diploma in Nursing and passed the Advance Diploma of Diabetes Management which is held for 6 months. Diabetes Nurse Educator's role as a healthcare professional is to give sufficient information regarding how Diabetes patients should adapt with the changes in their lifestyle and their diseases (Self-Management). Diabetes Nurse Educators maintain vital responsibility in giving instructions and knowledge to the Diabetes patients. Patients that are equipped with sufficient knowledge on disease management, nutrition, blood glucose monitoring, exercising method, medications, potential complications and daily care of their body are more confident to be on top of its disease and live productively.[11] Diabetes Nurse Educator's is a healthcare professional who closely related with diabetes patients, as they spend a lot of time and space with the patients, compared with doctors. Diabetes Nurse Educators's have the soft skills needed in interacting with patients and their families. Therefore, it makes it easier for the patients to share their problems with Diabetes Nurse Educators. To put it simply, Diabetes Nurse Educator's play a crucial role to improve self-management on Diabetes patients in order for them to reduce complications.

In this study, we aim to describe the type of diabetic patients seen by Diabetes Nurse Educators in term of demographic, glycaemic control, medications and the complications seen.

METHODOLOGY

This is a cross sectional retrospective study. The list of patients seen by a Diabetes Nurse Educator's in the ward or Diabetes Resource Centre during the month of February 2011 was retrieved. The information regarding the disease were obtained from the Electronic Medical Records (EMR).

The data was analysed using the Statistic Package for Social Science (SPSS) version 15.

FINDINGS

In the month of February 2011, there were 140 patients seen by DNEs. Type 2 Diabetes Mellitus is the most commonly seen (80.7%) followed by Gestational Diabetes Mellitus (18.6%) and Type 1 DM (0.7%) (Table 1). The mean age was 50 years old and the median duration of diabetes mellitus was 10 years (Table 2). The majority of the patients were female 67.9% followed by male 32.1%. 57.1% of patients were seen as in patients where as the rest were seen as outpatient in Diabetes Resource Centre. The majority of the cases seen by DNEs were new cases (58.6%), while repeat cases (41.4%). The ethnic composition observed were mainly Malays (82.1%), followed by 9.3% Indian, 7.9% Chinese and 0.7% others. All of the patients which are given counselling came from reference, ward and professional clinic (60%), and the rest (40%) are self-initiative to go to the Diabetes Resource Centre.

The most common advice given was on self monitoring of blood glucose (SMBG) which were 125 (89.3.%)followed by diet 116 (82.9%), insulin injection technique 78 (55.7%), exercise 54 (38.6%), foot care 45 (32.1%), Diabetes Mellitus 28 (20%), foot examination 5(3.6%) and medication 134 (95.7%) (Figure 1). Most of the patients referred to DNEs for counselling were on insulin injection (71.4%), 13.6% on oral hypoglycaemic agents (OHA) and 10.7% of combination therapy. Most of the patients referred to DNEs for counselling were on q.i.d insulin injection (45.7%), 8.6% on b.d insulin injection, 7.9% on t.d.s injection and 7.9% on daily injection.

From this study, only 12.1% had good glycaemic control (defines as HBA1C below than 6.5%). The complications seen were retinopathy (18.6%), nephropathy (17.9%) and neuropathy (16.4%).

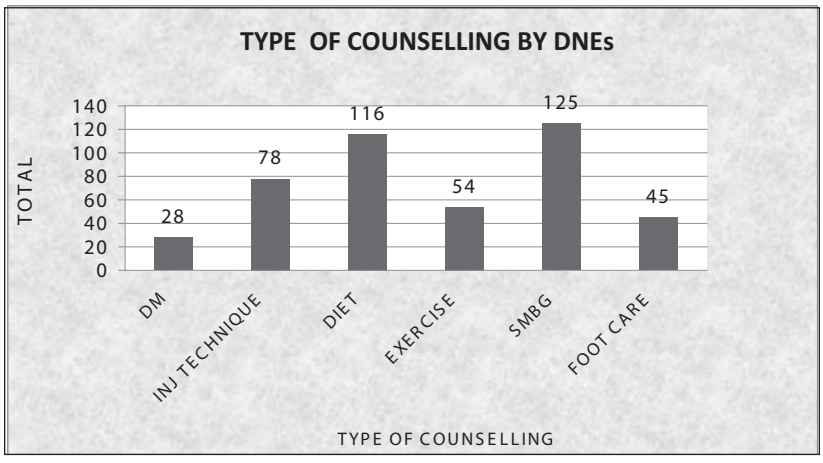
Table 1 **TYPE DM**

					Cumulative
Valid	1	1	,7	,7	,7
	2	113	80,7	80,7	81,4
	3	26	18,6	18,6	100,0
	Total	140	100,0	100,0	

Table 2 **Duration**

					Cumulative
Valid		48	34,3	34,3	34,3
	>20	1	,7	,7	35,0
	1	6	4,3	4,3	39,3
	1 bulan	1	,7	,7	40,0
	10	14	10,0	10,0	50,0
	11	1	,7	,7	50,7
	13	3	2,1	2,1	52,9
	14	2	1,4	1,4	54,3
	15	3	2,1	2,1	56,4
	16	2	1,4	1,4	57,9
	18	3	2,1	2,1	60,0
	19	1	,7	,7	60,7
	2	5	3,6	3,6	64,3
	2 bulan	1	,7	,7	65,0
	20	8	5,7	5,7	70,7
	21	2	1,4	1,4	72,1
	25	4	2,9	2,9	75,0
	3	2	1,4	1,4	76,4
	3 bln	1	,7	,7	77,1
	30	1	,7	,7	77,9
	3bln	1	,7	,7	78,6
	4	3	2,1	2,1	80,7
	4 bulan	1	,7	,7	81,4
	5	3	2,1	2,1	83,6
	6	4	2,9	2,9	86,4
	7	5	3,6	3,6	90,0
	8	5	3,6	3,6	93,6
	9	4	2,9	2,9	96,4
	GDM	5	3,6	3,6	100,0
	Total	140	100,0	100,0	

Figure 1



DISCUSSION

From the review, we found out that most of the patients are mainly those with long standing DM with poor glycaemic control which will lead to complicated DM patients.[13] This is what we seen at the hospital, as Putrajaya Hospital is the Endocrine Referral Centre. According to Mollema E.D (2001), the stress and fear to do the insulin injection and the fear to do the blood glucose test made the patients refuse to comply with the medication, which in turn will lead to more chronic complications for the patients.[15]

Most of the patients were on 4 times injection where the counselling were mainly on Self Monitoring Blood Glucose and injection technique.

CONCLUSION

The patients that were seen by Diabetes Nurse Educators in this study were those with poor control and long duration of Type 2 DM. Most of the patients were on insulin therapy leading to the need of SMBG and insulin injection counselling.

REFERENCES

1. Aaron K.Y. Wong, Andrew G.O Stewart, John S. Furler. (2009). Development and validation of the Diabetes Management Orientation Scale (DMOS): Assessing culturally related approaches to diabetes self-management. *Diabetes Research And Clinical Practice 86*. pp: 24 – 30.
2. American Diabetes Association. (2008). Standards of medical care in diabetes-2008. *Diabetes Care*, 30(Suppl. 1), S4.
3. Aroyo C, Hu, F B, Ryan L M , Kawachi I, Colditz G A, Speizer F E, et al, (2004). Depression symptoms and risk of type 2 diabetes in women, *Diabetes Care* 27, pp: 129 – 133.
4. Brown LC, Majumdar SR, Newman SC, Johnson JA, et al., (2005). History of depression increases risk of type 2 in younger adults, *Diabetes Care 28*, pp: 1063 – 1067.
5. Clinical Practice Gulidelines (CPG)(2009). Management of Type 2 Diabetes Mellitus (4th edition), pp: 1-73.
6. Coffey J.T., Brandle M., Zhou H., Marriott D., Burke R., Tabael B.P, Englelgau M.M., Kaplan R.M. & Herman W.H. (2002). Valuing health related quality of life in diabetes. *Diabetes care 25*, pp: 2238 – 2243.
7. Dunn. S.M, Hoskins P, Constantino M, Overland J, Yue DK, Turtle JR. (1994). Diabetic management: the role of the diabetes center. *Diabetes Rev* 2, pp: 389 – 402.
8. Hassan A.R. (2010). Diabetes education and prevention. National *Diabetes Conference*, pp: 2.

9. Jeong – Rim Lee, Soon – Ai Kim, Joo – Wha Yoo, Yang – Kyo Kang. (2007) The present status of diabetes education and the role recognition as a diabetes educators of nurses in Korea. *Diabetes Research and Clinical Practice*, 77S, pp: 199 – 204.
10. Lin E H, Katon W, Von Kortff M, Rutter C, Simon G E, Oliver M, et al.., (2004). Relationship of depression and diabetes self care, medication adherence and preventive care. *Diabetes Care* 27, pp:2154 – 2160.
11. Linda J. Beeney et al. (1996) Patient psychological and information needs when the diagnosis is diabetes. *Patient Education and Counselin*g (29), pp: 109 – 116.
12. Lynn Hull. (2008). Diabetes Mellitus: A case history of community care. *Journal of Community Nursing, 22* (4), pp: 4 – 6.
13. Meetoo D (2004). Clinical skills: Empowering people with diabetes to minimize complications. *British Journal of Nursing, 2004*. Vol 13, No 11. Pp 644 - 651
14. Mohamad T.A, Fatanah .I, Noor azah.D, (2004). Holistic Approach Of Diabetes Management. *Third National Diabetes Care Conference*, pp: 3 – 5.
15. Mollema E.D et al. (2001) Phobia of self – testing in insulin-treated diabetes patients: opportunities for screening. Diabetes UK. *Diabetic Medicine*, 18, 671 - 674
16. National Health and Morbidity Survey (NHMS III). Malaysia: Ministry of Health (2006) pp: 252 - 253.
17. Rosenberg Carole (2006). The Diabetic Educator as a Member of the Wound Care Team. *Journal Podiatry Management*, 25(9), pp: 217-218.

THE IMPORTANCE OF TRAINING AMONG MEDICAL STAFF IN SUPPORTING BREAST FEEDING PRACTICES IN HOSPITAL PUTRAJAYA.

Fariza A.R., Haliza A.M., M.S.Nora'i
Nursing Director, Hospital Putrajaya, Putrajaya 62250, Malaysia

ABSTRACT

The Baby-friendly Hospital Initiative (BFHI) was launched by World Health Organization (WHO) and UNICEF in 1991. In Malaysia, National Lactation Centre is situated at Selayang Hospital. Putrajaya Hospital has been awarded the Baby Friendly Hospital Initiative (BFHI) since 2005. One of the measures in promoting and improving the knowledge and practices in breast-feeding among hospital staff is to implement the 20-hours training module that was introduced by National Lactation Centre, Ministry Of Health. The training includes theory and practical session involving staff from all units and departments.

Objective: The aim of this study is to determine the importance of training and practices of breast feeding among medical staff in Putrajaya Hospital in promoting BFHI. Method: This is a retrospective review conducted from Mac, 2010 to Mac, 2011 in 81 medical staff. They were interviewed and observed by using the validated questionnaire Baby-Friendly Hospital Initiative–monitoring tool provided by World Health Organization (WHO). The respondents were staff from the Obstetric Unit, Pediatric Unit and Neonatal Unit.

Result: Majority of staff (91.4%) had received both theory and practical training. However, only 80.0% of those who received this training could explain and demonstrated the correct step of breast-feeding technique to assessor.

Conclusion: Breast feeding theory and practical training need to be strengthen among medical staff to maximize their knowledge and practices in enhancing BFHI in Putrajaya Hospital.

Key words: Breastfeeding practices, training, medical staff.

INTRODUCTION:

Breast feeding is a fundamental to the health and development of children, and it's also important for the health of their mothers.

Breastfeeding is an unequaled way of providing ideal food for the healthy growth and development of infants. As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to archive optimal growth, development and health.[26]

The breastfeeding programs has long recognized for the control of diarrheal diseases. This program also need for the promotion of exclusive breastfeeding in the first four to six month of life, and sustained breastfeeding, together with adequate complementary food up to two years of age, or beyond, to reduce morbidity and mortality.

The internationally defined term of 'Baby-Friendly' may be used only by maternity services that have passed external assessment according to the global criteria for the Baby-Friendly Hospital Initiative (BFHI). BFHI was launched by United Nation Children's Fund (UNICEF) and World Health Organization (WHO) in 1991-1992.

More than 20,000 hospital have been designated in156 countries around the world over the last fifteen years. It is initiative of WHO/UNICEF to give every baby the best start in life.[24]

The promotion of breast-feeding is one of the essential interventions for reduction of infant mortality and improving infant development worldwide. In 1990 the government was extends the promotion of breastfeeding programs into hospitals as a result of WHO and UNICEF introducing the Baby-Friendly Initiative.[25]

To help in the implementation of the promotion, different tools and materials were developed, field-tested and provided, including a course for maternity staff, a self-appraisal tool and an external assessment tool. Additional tools were developed afterwards, such as monitoring and reassessment tools.

BACKGROUND

In Malaysia, A National Breastfeeding policy was formulated in 1993 whereby exclusive breastfeeding was recommended for the first four to six months of life and continued up to two years and followed by recognition committee.[6]

Putrajaya Hospital has been awarded as BFHI since 2005, has to undergo a second assessment in May 2011 in order to maintain the status of BFHI.
Workers concerned with nutrition, and with maternal and child health also recognized the importance of improved infant feeding practices. In 1991, UNICEF and WHO jointly launched the Baby Friendly Hospital Initiative which aim to improve maternity services so that they protect, promote, and support breast feeding, by putting into practice the "10 step to successful breast feeding". Many maternity facilities throughout the world are now training to achieve "Baby Friendly" status.[25]

Hospital Putrajaya was recognized Baby friendly Hospital Initiative (BHI) since 2005. First assessment was done in 2008, and second assessment was done in March 2011.

To maintain the recognition and to ensure that these benefits are realized, staffs need to understand why breast-feeding is important. They also need to understand the mechanics of breast-feeding, how to instruct their patients in breast-feeding technique, and types of issues that their patients might encounter. Some study found that mothers often report being given incorrect or incomplete information, or that staff were apathetic about breastfeeding during medical visits.[18,16,10] Most of the study found that a general lack of breastfeeding knowledge among health professionals (nurses, medical assistant, physicians, pediatricians)[14,19,20]. For these reason training of staff is necessary. Twenty hours breast-feeding course will provide staff that managing ante natal and post natal mother included neonatal and Operation Theater. These training courses was conducted three times per year for new staff, repeat course was schedule two years after the first course. These courses are including detailed information regarding the theory and hands on of lactation management that the exercises cover ten steps outlined in the BFHI. Its help our staff to develop in promoting breast-feeding and also to encourage in all specialties to become a counselor and supporters of breast-feeding and lactation management.

OBJECTIVE

The rate of breastfeeding among Malaysian mothers is very low – a mere 14.5% breastfeeding their children up to six month, according to Health Ministry statistic.[22]

Table 1: Monitoring Tool that used to observe and interview the staff.

Baby-friendly Hospital Initiative
Monitoring tool

V. Interview with staff member No. ____
(Maternity services interview)

Name of health facility: _____
Type of ward (postpartum, labor, etc.): _____
Name of interviewer: _____
Date: ____/____/____
(dd / mm / yy)

Introduction: Good *(morning/afternoon/evening)*. My name is *[INSERT YOUR NAME]* and I am working with *[INSERT THE NAME OF THE ORGANIZATION YOU WORK FOR]*. We are interested in learning more about some aspects of the services here, in particular, about how babies are fed. Our discussion will take about 5 to 10 minutes of your time. This is not a test. Our purpose is to try to improve/keep a high quality of service in this maternity. The information you will give me will be kept confidential.

V.1 When did you join the staff of the maternity services? _____, _____
Day and month Year

[Include in the sample only staff members that have been hired six or more months ago. If the staff member has been on the staff less than six months, thank him or her and terminate the interview.]

V.2 What is your position here in the maternity services?
❒ Physician ❒ Midwife ❒ Nurse
❒ Auxiliary worker, *type*: _____
❒ Other *[specify:]* _____

V.3 Have you received any training in breastfeeding and lactation management while you have been on the staff of the hospital? ..... ❒ Yes ❒ No 2b (p.24)
[If Yes:] Duration (in hours) of
first training _____ second training _____ third training _____

V.4 Have you had some on the job training? ..... ❒ Yes ❒ No 2b (p.24)
[If Yes:] How many hours was it in total? ..... _____ hours

Now, I'm going to ask you a few questions about breastfeeding. Don't worry if you do not know the answers to some of them, as it is not a test of your knowledge in particular, and your name will be kept confidential.

V.5 Do you teach or show mothers how to position and attach their infants for breastfeeding? ..... ❒ Yes ❒ No *[➤ V.7]*

V.6 Could you please:
❒ demonstrate how you teach positioning and attachment by teaching a mother with a baby on the ward, **or**
❒ show me a mother whose breastfeeding baby is correctly positioned and attached and describe why, **or**
❒ show me how you would teach a mother, by teaching me in your usual way, using a doll, and describing the key points?

Positioning:
❒ Correct
❒ Incorrect
Attachment:
❒ Correct
❒ Incorrect

5d (p.27)

_____
_____
_____

Baby-friendly Hospital Initiative
Monitoring tool ***Staff interview***

*[**Key Points:** Baby's body turned to mother, close, stomach to stomach; mouth wide open, lower lip not folded in; chin touching breast; more of areola below nipple in mouth; rhythmic burst-pause suckling and swallowing]*

V.7 Do you show or teach mothers how to express their breast milk by hand? ..... ❒ Yes ❒ No *[➤ V.9]*

V.8 Please describe the technique for expressing milk by hand that you teach to mothers: .....
_____
_____
_____

❒ Acceptable
❒ Not acceptable
❒ Didn't describe

5f (p.28)

*[**Key points:** Thumb on areola, fingers opposite; press inwards; do not slide fingers on skin; repeat press-release for several minutes; stimulate let-down reflex; rotate around nipple to compress all sinuses]*
*[**Note:** It is not expected that staff will demonstrate with a mother.]*

V.9 What effects can giving formula or water before the breast milk comes in have on the success of breastfeeding? *(Probe if necessary.)*
_____
_____
_____

❒ Correct
❒ Incorrect or inadequate
❒ Didn't answer

*[**Key points**: Reduced desire of infant to breastfeed; nipple confusion if given by bottle; increased risk of allergy; may lead to mother feeling inadequate.] **Note:** Staff member should mention at least two key points for the response to be considered "correct".*

V.10 What is the major cause of painful nipples?
_____
_____
_____

❒ Correct
❒ Incorrect
❒ Didn't answer

*[**Key points**: Poor attachment; baby not taking enough of breast into mouth]*

V.11 What is the most common cause of insufficient milk?
_____
_____
_____

❒ Correct
❒ Incorrect
❒ Didn't answer

*[**Key points**: Correct if mention one or more of the following: infrequent feeding, improper suckling, poor attachment, using bottles or pacifiers, early supplementation]*

Total of correct answers on questions 9-11: _____ 2c (p.24)

END. Thank you very much for taking the time to answer these questions.

Health care workers need to encourage and support all mothers to breastfeed their infants exclusively for the six months and thereafter to provide safe and appropriate complementary feeds with continued breastfeeding for up to two years.[19]

The purpose of the study is to analyze the knowledge, practices and promoting among the staff towards in supporting Breast Feeding Hospital Initiative in Putrajaya Hospital. According to Weimers.L, (2006) midwives and neonatal nurses who lack knowledge in breast feeding management experience difficulties in giving timely and adequate information, and supporting mother. In fact, breast feeding frequency is increased when nursing staff have theoretical and practical knowledge of good breast feeding technique.[15]

METHOD AND MATERIAL

Putrajaya Hospital had 13 lactation counselors who were conducted the monitoring tool twice a year as schedule by National Lactation Center, Ministry Of Health. It was done through observe and interview by using a structured validated standard questionnaires designed by WHO and Wellstart International. It was developed to measure the knowledge and practices of breastfeeding among medical staff as showed at Table 1.

This is a retrospective review study. Total of 81 samples were taken from monitoring tool, which is done in March 2010, Jun 2010 and March 2011. Respondent randomly selected staff from Obstetric unit, Pediatric unit and Neonatal Unit.

DATA ANALYSIS

Data was collected from Baby Friendly Hospital Initiative monitoring tool. Data were analyzed using SPSS version 15. Total respondent is 81 of staff. It is included 3 (3.7%) doctors, 43 (53.1%) Midwife, 28 (34.6%) registered nurse with non midwifery, 7(8.6%) Hospital Attendant. Those are including who are trained and not trained. Total of 91.4% from 81 of staff was trained and 8.6% from 81 of respondent was not train. Data was shown the percentage of staff who had received the training and not received the training from total of 81 respondent and percentage of staff who can show the correct or incorrect technique of breastfeeding. A p value of less than 0.05 was considered as statistically significant. (Table 2).

Table 2: Percentage of staff had received training and percentage of staff can demonstrate the correct technique.

Staff	Percentage
Received training	91.40% (74)
Not received training	8.60% (7)
Correct technique	85.20% (69)
Incorrect technique	14.80% (12)

RESULT

This study shown that the staff who received the training 89.2% can demonstrate correctly while 10.3% failed to demonstrate but 42.9% of staff not received the training still can demonstrate correctly and logically who not received the training failed to demonstrate (57.1%) the correct technique of breastfeeding. (Table 3 and Figure 1).

Research conducted in Southeast U.S. revealed that many staff do not promote breastfeeding because they do not feel knowledgeable and able to handle breastfeeding problem that may arise.[2,12]

Study was done in Glasgow and the result shown a positive association between staff who having received breastfeeding training in the previous two years and their mothers breastfeeding practice.[21]

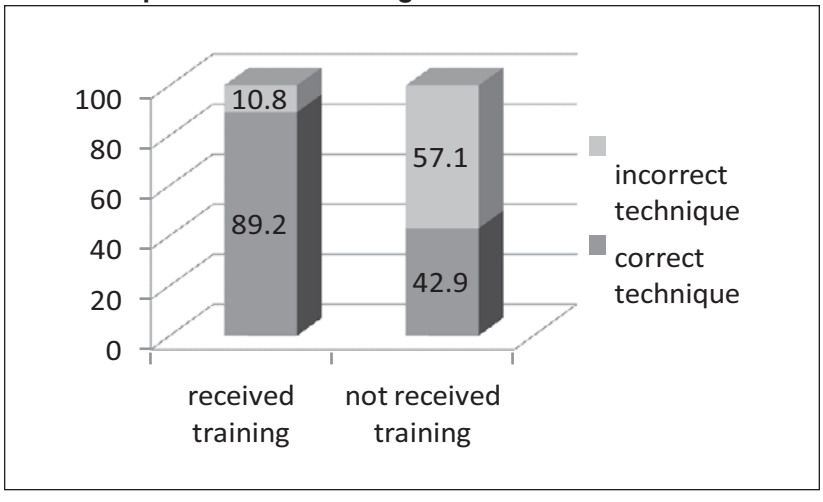
Three days course presented in Chile resulted in changes in reported clinical practices among staff which support the concept of the BFHI that an 18-24 hours course can change clinical practices.[24]

Ekstrom A,(2005) and (Marten P, 2000) showed that short training in breastfeeding for health professionals resulted in better knowledge and higher, exclusive, breastfeeding rates among the mother.[1,17]

Table 3: Staff who received training, can demonstrate correctly the technique of breast feeding

Staff	Correct technique	Incorrect technique
Received training	89.2%	10.8%
Not received training	42.9%	57.1%

Figure 1 : Staff who received training , can demonstrate correctly the technique of breast feeding



DISCUSSION:

Successful breastfeeding initiation and duration requires mothers to feel confident, understand available information, and receive appropriate support from health professionals. A health professional is a key figure in promoting and implementing breastfeeding.

Thus, it is imperative that health professionals have appropriate knowledge to help women to breastfeed. Study have done in Western part of Denmark and shown that an interactive course can increase their knowledge and management of breastfeeding practice.[7]

From this study the prevalence of staff who went to complete training had enough knowledge and successful in practice will be assisted in promoting the BFHI. However there is some staff who did not receive the training still can show the right technique of breastfeeding. It may be their found the knowledge through observation, reading the book, magazine, pamphlet or through internet.

Implementation of breastfeeding education and training programs can increase support for breastfeeding among staff.[12]

The state of Wisconsin implemented the Lactation Educator Training Program and found that the program improved trainees' knowledge and generated breastfeeding promotion and support activities across the state.[9]

A breastfeeding promotion campaign, including health worker training, improved health worker knowledge and practices in Kenya.[3]

CONCLUSION

We need the Baby-Friendly Hospital Initiative to change the attitudes of health care workers and practices in maternity services and to disseminate knowledge of optimal infant feeding practice for child survival.[13]

Courses and workshops that include practical exercises can improve health care professional knowledge, modify their attitudes towards breastfeeding, and increase their clinical skill in guiding breastfeeding mothers.[4,8]

Training the staff in improved breastfeeding management is an important part of a multi-faceted approach toward improving breastfeeding rates, as advocated by the UNICEF UK Baby Friendly Initiative.[11,23]

Training for at least thre days with a course including practical sessions and counseling skills is effective in changing hospital practices, knowledge of health workers, and breastfeeding rates.[5]

REFERENCES

1. Anette Ekstrom, Ann-Marie Widstrom, Eva Nissen, Precess-oriented training in breastfeeding alters attitudes to breastfeeding in health professionals, Scandinavian Journal of public Health, 2005; 33: 424-431.
2. Best Start Social Marketing, Research brief: national breastfeeding promotion project. Tampa (FL): Best Start; 1996.
3. Bradly JE,Meme J. Breastfeeding promotion in Kenya: changes in health worker knowledge, attitudes and practices, 1982-89. J Trop Pediatr 1992;38:228-34.
4. Bulletin WHO , 1999, 77: 492-8.
5. Cattaneo A, Buzzetti R, Effect on rates of breastfeeding of training for the baby friendly hospital initiative, BMJ 2001 Dec 8, 323(7325): 1358-62
6. Fatimah S, Siti Saadiah HN, Tahir A,Hussain Imam MI, Ahmad Faudzi Y: Breastfeeding in Malaysia: Results of the Third National Health and MorbidityNSurvey (NHMS III) 2006, Mal J Nutr 16(2):195-206, 2010.
7. Hanne K, Michael V, Jorn O, Ingegerd H; Helath visitors and breastfeeding support: influence of knowledge and self efficacy, European Journal of Public Health, vol 18, No.3, 283-288, 2007.
8. Haughwout JC, Eglash AR, Plane MB. Improving residents Breastfeeding assessment skill: a problem based workshop. Fam Pract 2000; 17: 541-6.
9. Health Resources and Services Administration (US), Maternal and Child Health Bureau. Breastfeeding-abstracts and products of MCHB-funded projects. Rockville (MD): MCHB; 1996.
10. HumerickS, Hill P, Spiegelberg P: Breastfeeding and health professional encouragement . J hum Lact 1998, 14:305-310
11. Ingram J, Multiprofesional training for breastfeeding management in primary care in the UK; International breastfeeding journal 2006, 1:9.
12. Khoury A J, Hinton A , Mitra A K, Carothers C, Foretich C, Improving Breastfeeding Knowledge, Atitudes, and Practices of WIC Clinic Staff, Public Health Report, September-October 2002, vol :117.

13. Koe Swee Lee, Iej SME 2009: 3 (2): 1-2, www.imu.edu/my/e journal.
14. Lasen PG: Effect of an educational intervention about breastfeeding on the knowledge , confidence, and behaviors of pediatric resident physicians. Pediatrics 2002, 110(5):e59.
15. Lena Weimers, Kristin Svensson, Louise Dumas, Lars Never and Vivian Wahlberg , Hands – on approach during breast feeding support in a neonatal intensive care unit : a qualitative study of Swedish mothers experiences. International Breast Feeding Journal (2006),1:20
16. Losh M, Dungy C, Russell D, Dusdieker L; Impact of attitudeson maternal decisions regarding infant feeding. J Pediatr 1995, 126(4):507-514.
17. Marten P. Does breastfeedingeducation affect nursing staff beliefs, exclusive breastfeeding rates, and baby-friendly hospital initiative compliance? The experience of a small rural Canadian Hospital. J Human Lactation 2000;16:309-18.
18. Moussa Abba A, Konick M D, Hamelin A M: A qualitative study of the promotion of exclusive breastfeeding by health professionals in Niamey, Niger. International breastfeeding Journal 2010 5:8.
19. Mpaweb.org.my,October 2008.pg 1.OlaOlorun FM, Lawoyin TO: Health workers' support for breastfeeding in Ibadan,Nigeria. J Hum Lactation 2006, 22(2):188-194.
20. Shah S, Rollin NC: Breastfeeding knowledge among health workers in rural South Africa. J Trop Pediatr 2005, 51(1)33-38.
21. Tappin D; The effect of health visitors a breastfeeding in Glasgow. Int. breastfeeding J 2006; 5: 111.
22. Thestar.com.my/news/strong, Friday December 26, 2008.
23. UNICEF UK Baby Friendly Initiative (http://www.babyfriendly.org.uk).
24. Valdes V, Pugin E, Labbock MH, Perez A, Catalan S, Aravena R, et al. The effects on professional practices of a three-day course on breastfeeding .WHO /UNICEF Baby-Friendly Hospital Initiative Section 4: Hospital Self-Appraisal and Monitoring, 2009.
25. WHO/UNICEF, Breastfeeding counseling: A Training Course, Trainers' guide, 1993.
26. WHO/UNICEF, Global Strategy For Infant And Young Child Feeding, 2003.

VENTILATOR-ASSOCIATED PNEUMONIA AMONG PATIENTS IN INTENSIVE CARE UNIT (ICU), PUTRAJAYA HOSPITAL

Noorainee. R[1], Norazlin. D[2], M.S. Nora'i[3]
Hospital Putrajaya, Putrajaya, Malaysia,

ABSTRACT

Aim: The aim of this study is to determine the prevalence of ventilator-associated pneumonia (VAP) among patients in Intensive Care Unit, Putrajaya Hospital.

Design: This is a retrospective case review conducted from 2008 to 2010 in 867 patients who received mechanical ventilator after intubation (by endotracheal tube or tracheostomy) in Intensive Care Unit, Putrajaya Hospital. Data were analyzed with Microsoft Excell.

Methodology: Ventilator-associated pneumonia (VAP) refers to nosocomial pneumonia developing in a patient receiving mechanical ventilation ≥ 48 hours. Diagnosis of VAP were based on suspicion of VAP; new and or progressive pulmonary infiltrates in chest X-rays; presence of at least 2 of the following criteria: fever ≥ 38.50C or < 360C within 24 hours; total white cell count >12 000/mm3 within 24 hours; purulent trachea-bronchial secretions within 24 hours and reduction of PaO2/FiO2 ≥ 15% in the last 48 hours. Date of diagnosis refers to the first episode of VAP. When diagnosis of VAP was made, the tracheal aspiration results for the relevant organism/s isolated were confirmed.

Results: There were a total of 867 patients who required mechanical ventilator from 2008 to 2010. The percentage of patient with VAP was 6.74% in 2008, highest in 2009 (6.93%) and 3.03% in 2010. Presence of fever and increase total white cell count were the common presentations found in patients who develop VAP. The most common organism present in 2008 (27.77%) and 2009 (38.09%) were pseudomonas spp. In 2010, acinobacter spp was commonly seen (66.66%). There was a case in 2009 and 2 cases in 2010 with multi resistant organism (MRO) culture.

Conclusion: VAP is common in mechanical ventilated patients. The common organisms found were pseudomonas spp and acinobacter spp. In this review there was a reducing trend of VAP seen in Intensive Care Unit, Putrajaya Hospital.

Key words – Ventilator-associated pneumonia, Ventilator Care Bundle, Evidence base practice.

INTRODUCTION

Ventilated-associated pneumonia (VAP) is the most common hospital infection in Intensive Care Unit among patients receiving mechanical ventilator resulting in mortality and prolonged lengths of hospital stay[1]. However according Fabregas and Torres[2], VAP developed in mechanical ventilated patients who were intubated for more than 48 hours without the presence of pneumonia at the time of intubation. Amongs patients received mechanical ventilation the incidence rate of VAP ranges from 10% to 25%[3], with the prevalence ranging from 10% to 65%[4].

For VAP to develop, the organism may given access into the lower respiratory tract via a several routes such as microaspiration of orophryngeal secretions colonized with pathogen bacteria, aspiration of gastric contents, inhalation of an infected aerosol, haematogenous spread of infection from distant site of infection, exogenous penetration from an infected site (example pleural space) and direct inoculation into the airway of intubated patient from ICU health care provider[5].

According to the Malaysian Registry of Intensive Care Report , the incidence of VAP had decreased by more than half from 28.0 in 2003 to 11.6 per 1000 ventilators days in 2009. Most likely introduction of ventilator care bundle in 2007 had contributed to this decrease .

VENTILATOR-ASSOCIATED PNEUMONIA

Aim

To determine the prevalence of VAP patients in Intensive Care Unit Putrajaya Hospital.

Defination

VAP is defined as Nosocomial pneumonia developing in a patient receiving mechanical ventilation ≥ 48 hours after endotracheal or tracheostomy intubation. VAP is also further defined as early-onset VAP whivh occurring < 5 days after intubation and late –onset VAP occurring ≥ 5 days after intubation[6].

Ventilator Care Bundle

In Intensive Care Unit, Putrajaya Hospital, the ventilator care bundle was initiated in June 2008. It is a group of evidence-based practice which was implemented for all patient who receiving mechanical ventilator. The result shows a reductions in the incidence of VAP. The key component of the Ventilator care bundle are elevation of head of bed 30-45 degrees 7 to minimises gastro-oesophgeal reflux and aspiration, Daily 'sedation vacation ' and assessment of readiness to extubate 8 reduce patients stress and suffering, Peptic ulcer disease propalyxis[9] decrease the PH of gastric contents and deep vein thrombosis (DVT) prophylaxis[10].

METHODOLOGY

This is a restrospective case review conducted from 2008 to 2010 in 867 patients who received mechanical ventilator after intubation in Intensive Care Unit, Putrajaya Hospital. Data were analysed with Microsoft Excell.

In Intensive Care Unit, Putrajaya Hospital, the data were collected by using Ventilator-associated pneumonia checklist (VAPB-ventilator-associated pneumonia bundle). The checklist had been filled by the specialist incharged once the patient were suspected having VAP. Diagnosis of VAP were based on clinical suspicion of VAP with a new or progressive chest X-ray infiltrates after 48 hours of patients on mechanical ventilation, presence of at least 2 of the following criteria: fever ≥ 38.5°C or ≤ 36°C within 24 hours, total white cell count (leukocytosis) > 12000/mm3 within 24 hours; purulent trachea-bronchial secretions within 24 hours and reduction of Pao2/Fio2≥ 15% in the last 48 hours (worsening of respiratory insufficiency) Moreover, the presence of significant growth on quantitative cultures of the bronchoscopic protected specimen brush (≥ 103 colony froming units(cfu)/ml) was required to accept the pneumonia as microbiologically proven[11]. Patients were reviewed daily till discharge from ICU or to death.

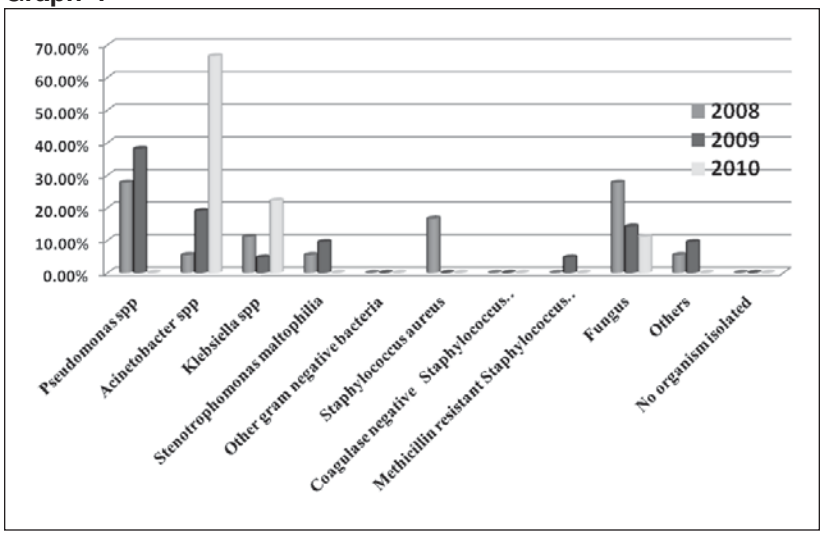
RESULTS

Table 1 TOTAL VENTILATED PATIENTS WITH VAP

	2008	2009	2010
Mechanical Ventilated	267	303	297
Patients with VAP	6.74%	6.93%	3.03%

In 2009, graph shows that there was an increase of VAP in Intensive Care Unit in Putrajaya hospital that was 6.93% due to increase of admission to ICU.

Graph 1



Weber DJ et.al[12], mention that for any infection to occur, there must be an interaction of three factors such as impaired host defense, access of pathogenic bacteria to the lower respiratory tract and the virulence of the organism. The organism may entered into the lungs by several routes i.e. micro aspiration of oropharyngeal secretions, aspiration of gastric content, inhalation, haematogenous spread, direct inoculation and exogenous penetration. But the most common route are micro-aspiration.

The highest causative organism in 2010 (refer to data 1) was acinobacter spp followed by klebsiella (transmitted from person to person through direct contact). In general accinobacter spp (it is an aerobic gram negative bacilli- late onset bacterial pneumonia)had significantly increase over the years.

DISCUSSION

In month of June, July and August 2004, a multiple-one day prevalence study was conducted to look for prevalence,factors contributing to VAP and also some ICU practices related to VAP in 14 Ministry of Health ICUs. Organism was cultured either from blood or tracheal aspirate from 79.3% of patient with VAP. Acinetobacter species is the most common organism cultured. 19.4% of organism cultured were multiresistant organism[13]. Trending in Putrajaya Hospital are the same as the Ministry of Health.

However in 2009, gram-negative organism accounted for more than 77.2% of the causative organisms in VAP. Over the past 7 years (2003-2009) the most common organisms were Acinetobacter spp, Klebsiella spp, and Pseudomonas spp. The percentage of Acinetobacter spp, had significantly increased over the years[13].

The most common etiologic agents of VAP were gram-negative rods, which were 83.2% of the bacteria isolated. Acinetobacter spp. Accounted for 35% of all isolated. Pseudomonas aeruginosa and Enterobacteriaceae were the most common pathogens involved in VAP, Fagon et.al[14]. The high incidence of VAP caused by Acinetobacter spp. may due to prolonged hospitalization and previous antibiotic therapy .

LIMITATION

As this study is a retrospective study with no control group some data will not be able to analyse other finding that may reduce the VAP rates.

STRATEGIES TO PREVENT VENTILATED –ASSOCIATED PNEUMONIA

Strictly infection control by hand decontamination. Hand of the Health care workers are one of the common route which causes spreading of infection among ICU patients. Hand decontimination involves one of the following – washing hand with soap and water if visibly dirty or soiled with body fluids or use of alcohol-based antiseptic (hand rub) if hand are not soiled.

Oral decontamination by using chlorhexidine. To reduce the number of micro-organism in the mouth through oral care it will decreased the risk of translocation and colonization in the lungs and therefore it will also reduce the risk of VAP. Oral hygiene in ICU include tooth brushing and rinsing of the oral cavity to remove the plaque. This will decrease the likelihood of colonization of the oropharynx.

Open Suction system versus closed Suction system. Mucus in the airways is a very good medium for bacterial growth. To prevent contamination of the airways, maintain an aseptic technique when performing the endotracheal or tracheostomy suctioning. If closed system is used, the catheter should be rinsed free from secretions away from patient or change a new catheter once it is due for changing.

Ventilator Circuit. Studies had been shown that changing the ventilator circuit as frequently as once a week does not increase the risk of VAP. Anyhow it is recommended that the ventilator circuit should be changed when visibly soiled.

Airway Humidification. Studies had been carried out that the impact of heat and moisture exchangers on the incidence of VAP with the impact of heated humidifiers. Results were inconclusive as to which form of humidity is associated with higher incidence of VAP.

Endotracheal Tube pressure inflation device. Maintain adequate cuff pressure at no less than 20 cm H20. It will decrease the likelihood that secretions will leak around the cuff or be aspirated.

Practice of bronchialdilator therapy. Nebulisers have been associated with outbreaks of infections and hence MDIs are recommended.

Ventilator Care Bundle should be strictly practice in all ICUs.

Education. To have ongoing education for all health care workers to instill awareness on the important of infection control measures. The nurse-patient ratio should be 1:1. to avoid or minimize infection.

CONCLUSION

The health care provider in Putrajaya Hospital need to adhere to Ventilator Care Bundle Guideline to reduce the rates of ventilator-Associated Pneumonia (VAP). Prevention of VAP is important to avoid mortality, morbidity and reduce patgient length os stay as well as reduce the hospital costs.

REFERENCES

1. Zack J, Garrison T, Trovillion E, Clinkscale D, Coopersmith C, Fraser V, Kollef M. (2002). Effect of an education programme aimed at reducing the occurence of ventilator associated pneumonia. *Critical Care Medicine*; 30: 2407-2412.
2. Fabregas N, Torres A. (2002). Epidemiology of ventilator-associated pneumonia. http://www.euroanesthesia.org/education/rc_vienna/12rc8.HTM (accessed 5/12/06).
3. Hixson,S., Sole, M L.,& King,T.(1998), Nursing strategies to prevent ventilator-acquired pneumonia. AACN Clinical Issues: Advanced Practice in Acute Care, 9(1), 76-90.
4. Ibrahim, E.H., Tracy, L., Hill, C., Fraser,V.J., & Kollef, M.H.(2011). The occurance of ventilator-associated pneumonia in a community hospital: Risk factors and clinical outcomes. Chest, 120, 555-561.
5. The official statement of the American thoracic society was adopted bt the ATS board of directors, American Thoracic Society. Hospital-acquired pneumonia in adults: Diagnosis, assessment of severity, initial antimicrobial therapy, and preventive strategies. A consensus statement. AM J Respir Crit Care Med 1995;153:1711-25.
6. Pieracci FM,Barie PS, Strategies in the prevention and management of ventilator-associated pneumonia Am Surg 2007, 73 421-432.
7. Drakulovic ME, Torres A, Bauer TT, Nicolas JM, Nogue S, Ferrer M, Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients a randomized trial lancet 1999, 354 1q851-1858
8. Kress JP, Pohiman AS, O'Conner MF, Hall JB, Daily interruption of sedative infusion in critically ill patients undergoing mechanical ventilation N Engi J Med 2000, 342(20) 1471-1477
9. Dellinger RP, Levy MM, Carlet JM, et al. for the International Surviving Sepsis Campaign Guideline Committee Surviving Sepsis Campaign International guideline for management of severe sepsis and septic shock 2008 Crit Care M 2009: 36(1): 296:327.
10 Geerts WH, Pineo GF, Heit JA,et al. Prevention of venous throboembolism Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy Chest 2004: 126: 3 Suppl, 338S-400S
11. Fagon JY, Chastre J, Domart Y, Trouillet JL, Pierre J, Darne C, Gibert C: Nosocomial pneumonia in patients receiving continuous mechanical ventilation. Prospective analysis of 52 episodes with use of a protected specimen brush and quantitative culture techniques. Am Rev Respir Dis 1989, 139:877-884.
12 Weber DJ, Rutala W, Mayhall CG, Nosocomial Respiratory Tract Infection and Gram negative Pneumonia. Chap-143 in Fishman's Text Book of Pulmonary disease and disorders. 3rd ed, vol-2, New York: Mcgraw Hill Publication: 1998. P 2213-29
13 Malaysian Registry if Intensive care Report 2009 –prepared by Technical Committee of Malaysia Registry of Intensive Care.
14 Fagon JY, Chastre J, Domart Y, Trouillet JL, Gibert C: Mortality due to ventilator-associated pneumonia or colonization with Pseudomonas or Acinetobacter species: assessment by quantitative culture of samples obtained of a protected specimen brush. Clinical Infectious Disease (1996) 23:538-542.

HEALTH PROMOTION BEHAVIOURS OF THAI ELDERLY IN NONTHABURI COMMUNITY

Kittikan Pandang, RN, M.Ed.
Boromarajonani College of Nursing Chang Wat Nonthaburi, Nonthaburi, Thailand

ABSTRACT

The number of elderly in Thailand has gradually increased to 10.7% of population. This has been challenged for health providers to promote healthy aging. The understanding of health promotion behaviours of elderly will assist health provider to appropriately develop program for promoting the health of elderly. **Objective:** This qualitative research aimed to explore health promotion behaviors of elderly in Bangrang community, Nonthaburi province, Thailand. **Method:** Fourteen elders, whose age over 60 years old, were selected for structural interviews. Data analysis was used inductive approach with constant comparison method. Content validity was performed by member checks. **Results:** The results revealed 6 major themes of health promotion behaviors including; a) health responsibility; the elderly had health responsibility in terms of having enough relaxation, visiting physician for followed up or ill, and seeking alternative treatments to gain better health, b) exercise; most participants had no clearly pattern of exercises, they perceived that daily activities were exercise, c) nutrition; the participants mostly had soft food, less spicy and increasing fruits and vegetables in their meal. They reduced coconut cream or oily diet. They avoided food which impacts on their illness. d) interpersonal-relationship; participants had good relationship with their families. They believed that their families will look after them if they sick, e) stress management; the participants reduced stress by watching television, talking with others and relaxing, and f) spiritual beliefs; most participants believe in Karma, they practice their belief by follow Buddhist religious. **Conclusion and Recommendations:** This study revealed that participants tried to take care of themselves to gain good health. Nurse should a promote pattern physical exercise for the elderly. The elderly club in the community should be involved in health promotion and home visiting for elderly who unable to participated in social activities.

Keyword: Health Promotion Behaviour, Exercise, Physical activity

INTRODUCTION:

Good health is a desire for everybody. Since 2007 the number of elderly group have increased rapidly to be 7 million or 10.7% of Thai population.[1] The elderly group generally have poor physical health. Their physical health depends on genetic, life style, social and environment. Most elderly have Communicable diseases such as gastrointestinal disease, respiratory system and skin problem and Non-communicable diseases such as cancer, diabetes, blood pressure, heart disease and aging. Besides, problem from losing their lovers, works and potential of working can cause mental health problem. Taking care of the health of elderly is crucial. Thus, the researcher is interested in studying the health behaviour of elderly. The objectives of this study were to study health promotion behaviour and explore factors to the health promotion behaviour of elderly in community.

METHODOLOGY:

This research is a qualitative research. The study period started from May 2010 to February 2011. The structured interview was used to interview fourteen elder people age over 60 years old. All participants were selected using purposive sampling method and they understood the research's

conditions. The participants were interviewed for about 60-90 minutes using face to face interview. Two main themes for data collection included health promotion behaviour and factors to health promotion behaviour were recorded. This voice recording was permitted by participants with verbatim interview for doing the interviewing scripts.[7] Data were analysed using inductive analysis with constant comparison in 4 steps. Those stepts are scanning data for common categories, classifying common themes, placing data into common categories and explaining of categories.[7] For reliability and validity, the researcher used the member checks to check that all samples are match with the result of data analysis.

RESULTS:

Results of study revealed that the average age of the participants was 69.5 years (range 60 – 70 years). Most were Buddhists. The majority finished primary school, three of them finished high school and one of them finished Bachelor degree. Most participants had income between 500 – 15,000 baht/month and four of them did not disclose the income. Seven persons lived with their children. Two persons lived with children and grand children, Two persons lived with grand children. Two persons lived together and only one person lived alone. The results of this research were concluded in 2 themes. The first theme was separated into 6 categories, Including 1) health responsibility; 2) exercise; 3) nutrition; 4) interpersonal relationship; 5) spiritual beliefs; and 6) stress management (Table 1)

Table 1: Health promotion behaviour of elderly in community

1) Health responsibility	2) Exercise	3) Nutrition	4) Interpersonal relationship	5) Spiritual beliefs	6) Stress management
1.1 Relaxation Activity	2.1 Exercise food	3.1 Types of relationship	4.1 Family	5.1 Beliefs	6.1 Stress reduction activity
1.2 Health check up	2.2 Self practice	3.2 Types of excepted food	4.2 Relationship with others		
1.3 Seeking alternative treatment					

The second theme included factors relating to health promotion behaviour such as 1) Physical fitness, 2) Self care and 3) social factors (Table 2)

Table 2: Factors relating to health promotion behaviour

1) Physical fitness	2) Self care	3) Social factors
1.1 Over weight	2.1 Inadequate rest	Low income
1.2 Older	2.2 Consequences of previous exercises	

Therefore, two themes were explained as follows:

Theme 1: ***Health promotion behaviour of elderly in the community which was revealed in six topics.***

1. **Health responsibility**
   - 1.1 Relaxation: Most participants had enough rest. They normally went to bed at 9.00 p.m. and got up at 6.00 a.m. Some of them did not have enough rest because they had to:
     - look after a sick person and cleaning their houses.
     - open their shops early and rested for less than 8 hours a day.
   - 1.2 Health checking: Most participants paid attention to check up their health. Some of them found that they had diabetes so they tried to eat less carbohydrate.

1.3 Seeking alternative treatments: The participants seek alternative treatments when they were ill. Some of them said that they ate herbs and medicine to help them feeling better.

2. **Exercise** (Exercise activity and Self practice). Most participants did not have typical exercises but they had physical activity daily. Some of them said looking after a sick person and cleaning their house were regarded as their exercises.
3. **Nutrition.** Type of food: The majority had three meals a day on time. Most participants did not preferred spicy, low salt diet. Food that is chewable was also preferred. Most participants did not like such food as coconut cream and sea food.
4. **Interpersonal relationship**

4.1 Family relationship: Most participants had good relationship with their family. Some of them said their family always gave them phone calls. Some of them said "My kid often calls me to check if I'm okay when will I go to live with them. His wife and children take good care of me."

4.2 Relationship with others: The participants had good relationship with others. Some of them liked to chat with neighbours, had a meeting with friends or help monks to do some chores.

5. **Spiritual development.** Most participants believed in spirit and religions. They said they felt relax after making merits. They also thought that making merits will result in good future. They believed that illness is the effects of what people did in their past lives.
6. **Stress management.** Most participants managed their stress by watching television, talking with others and relaxing.

Theme 2: Factors relating to health promotion behaviour of elderly in the community.

1. **Physical fitness.** This research found two factors relating to physical fitness.

1.1 Over weight: This research found that overweight influenced most participant's health. Some of them said they had pain in their knees because they were overweight.

1.2 Older: This research found that age impacts on their health. Some of them said they cannot walk properly, unlike young people.

2. **Self care.** The research found two factors relating to self care.

2.1 Inadequate rest: Inadequate rest was related to the participant's health. For example, some participants had headache when they did not have enough sleep. Some said looking after a relative who was sick also linked to Inadequate rest, being tired, frustrated and stressful.

2.2 Consequences of previous exercises: This research found that previous exercises had effects on the participants' health. One woman said being a soldier in the past results in her good health currently.

3. **Social factors**

Low income: Having low income was the factor relating to the participants' health. Most participants felt stressful because they had inadequate income to look after their families.

DISCUSSION

The study results on 14 elderly who aged over 60 years old in the community were concluded in two themes: health promotion behaviour and factors relating to health promotion behaviour.

1. **Health promotion behaviour**

1.1 Health responsibility: The researcher found that most participants had health responsibility in terms of relaxing. Some elderly who had inadequate resting will have health problems such as mental problems. The researcher also found that health checking and seeking for alternative treatments improved their health.

1.2 Exercise: The researcher found that most participants did not have a clear pattern of exercises but they regarded doing chores to be their daily exercise.

1.3 Nutrition: The researcher found that participants preferred the type of food that was soft, not spicy, not salty and chewy. They preferred vegetables, fruits and reduced coconut cream and oily food. Additionally, they had less sweeten food cause diabetes and avoided drinking coffee and alcohol. The participants seek healthy food that can improve their health. The results of this research were related to the research of Nunthabut, K.[3] which reported that health behaviour was related to daily activity such as dining, working and social activity.

1.4 Interpersonal relationship: The researcher found that the participants had good relationship with their family. They thought that when they are sick, their family will look after them. They also had good relationship with others.

1.5 Spiritual beliefs: Most participants held spiritual and religious beliefs. They believed in doing good deed, such as making merits.

1.6 Stress management: The researcher found that most participants reduced their stress by watching television, talking with others and relaxing.

2. Factors relating to health promotion behaviour.

2.1 Physical fitness: The research results showed that physical change influenced on the participants' health. It also reduced physical activities and exercise. This will result in increasing their weight. Besides, their overweight caused bone and knee problems. This results were related to the study of Rattanavanit, P.[6] who reported that aging had negative influence on health promotion behaviour.

2.2 Self care

2.2.1 Inadequate rest: Inadequate rest was a factor influencing their health. Normally, elderly should sleep at least 8 hours at night and 1 hour at the day time. This study found that the participants had headache because they did not have enough sleeping. However, the participants tried to relax by watching television, listen music, chatting with friends and neighbours. These results were related to the results of Pankra, S. et al.[5] who found that watching television is one kind of list.

2.2.2 Consequence of previous exercise: The researcher found that previous exercise can help improving their condition of bones. Thus, when the participants were older, their bones' structure were good without having exercise.

2.3 Social factors

Low income: The researcher found that most participants had low income because they cannot work hard as before. Therefore, the elderly who had support from their government fund and family did not have any problem to pay for health services. They also had good spirit. The participants who did not have enough income and lack of support had problems. This research results were related to the study of Khumhom, R. et al.[2] who found that the majority of participants had average income at 1,000 baht/month which was supported by their children and grand children. The results were also related to the study of Vatisunthorn, M.[8] that problems regarding economic crisis pushed the participants under the nursing care. In addition, these results were related to the study of Pasertpol, P.[4] who found that sex, age, marital status and income were related to health promotion behaviour.

RECOMMENDATIONS:

The elderly's behaviours that are problematic such as lack of exercise should be minimize by encouraging them to know about the benefits of exercise. Other problem like eating difficulty due to they have loosening teeth should be under the case of the Ministry of Public Health. Elderly community should be organized in order to support the elderly who can help themselves in various ways, such as providing jobs for them or finding markets so that they can sell their products.

ACKNOWLEDGEMENT:

I would like to express sincere thanks to all participants of this research in Nonthaburi Community.

KEY DEFINITIONS:

Exercise = The activity in using muscles, arms and legs together.

Physical Activity = The daily activity to help the elderly movement the body part such as watering plants.

REFERENCES

1. Juraitussanee, S., et al. (2010). Continuing care of the elderly: from hospital to home. in Aging Society: Care across the Continuum. Bangkok: Mahidol University.89-96.
2. Khumhom, R., et al. (2004). Factors affecting social services needs of the elderly in rural area. Research report.
3. Nunthabut, K. et al. (2003). Development of abilities to care for the elderly with Diabetes on the basis of the local cultural Northeast Thailand. Khon kane: Khon kane University. Research report.
4. Pasertpol, P. et al. (2004). Health promotion behaviors of the elderly in Saraburi, Thailand. Research report.
5. Pankra, S., et al. (2001). Factors associated with Self-Care behaviors and quality of life of the elderly in the district, Saraburi, Thailand. Research report.
6. Rattanavanit, P. (2003). Factors influence to health promotion behaviours of elderly in Senior citizen club Boromarajonani College of Nursing,Trang.Trang: Boromarajonani College of Nursing, Trang. Research report.
7. Supaporn, S. (2007). Qualitative Research in Physical Education and Sport. Bangkok: Samlada Company.
8. Vatisunthorn, M., et al. (2008). Long-term care model of the elderly in hospital. Research report.

AUTHOR INDEX