

Journal of Gandaki Medical College-Nepal

J-GMC-N

Peer Reviewed, Biannual, Biomedical Journal

ISSN 2070-4240 (Print), ISSN 2070-4259 (Online)

Volume 09 | Issue 02 | July-December 2016

Publishing since 2008



कर्मण्येवाधिकारस्ते
My right is to my work

An Official Publication of
Gandaki Medical College Teaching Hospital & Research Centre Pvt. Ltd.



Open access
www.gmc.edu.np



Journal of
**GANDAKI
MEDICAL
COLLEGE-
NEPAL
(J-GMC-N)**

- Patron** - CA. Santosh Kumar Khanal
Chief Executive Officer
- Editor-in-Chief** - Prof. Dr. K. Rajeshwar Reddy
- Deputy Editor-in-Chief** - Prof. Dr. Bhoj Raj Neupane
- Editors**
- Dr. Amar Nagilla
 - Dr. Dev Kumar Thapa
 - Dr. Tirtha Lal Upadhyaya
- Advisors**
- Prof. Dr. Rabeendra Prasad Shrestha
*Principal
Gandaki Medical College Teaching Hospital*
 - Prof. Dr. Tu Maya Ghale
*Medical Superintendent
Gandaki Medical College Teaching Hospital*
- International Advisors**
- Dr. T. Limjindaporn *MD, Ph.D.*
*Professor of Anatomy
Faculty of Medicine, Siriraj Hospital
Mahidol University, Thailand*
 - Dr. Ian P. Bisset
*Professor of colorectal surgery
University of Auckland
New Zealand*



Journal of GANDAKI MEDICAL COLLEGE- NEPAL (J-GMC-N)

J-GMC-N | Volume 09 | Issue 02
July-December 2016

ISSN 2070-4240 (Print)
ISSN 2070-4259 (Online)

This issue of J-GMC-N is
available at
www.gmc.edu.np

Please Contact

Prof. Dr. K. Rajeshwar Reddy
Editor-in-Chief
Gandaki Medical College
Lekhnath-2, Ritthevani,
Kaski, Nepal.
E-mail: journal@gmc.edu.np
Mobile: +977-9819125470

Journal of Gandaki Medical College (J-GMC-N) is published and owned by Gandaki Medical College Teaching Hospital and Research Centre Pvt. Ltd., Pokhara, Nepal.

Indexed in
ResearchBib



Contact Us

Web address : www.gmc.edu.np
Email address : journal@gmc.edu.np
Phone Number : +977-61-207130
+977-61-561718
Fax : +977-61-561768

Editorial Secretariat

Gandaki Medical College Teaching Hospital & Research Centre Pvt. Ltd.
Lekhnath-2, Ritthevani,
Kaski, Nepal.

Copyright

© All rights reserved. No part of this publication in general may be reproduced or transmitted in any form or by any means, electronic, mechanical photocopying and recording or any information storage system without the prior permission.

The statements or opinions or ideas expressed in the Journal are the personal views of authors and do not represent the official views of J-GMC-N editorial board.

Advertising

Please write to journal@gmc.edu.np for advertising opportunities. Acceptance of advertisement by Journal does not imply endorsement of products.

Layout and Cover design

- Shashi Neupane
Shashin1981@yahoo.com

Printed at

- Munal Offset, Pokhara, Nepal
Telephone. +977 61 531700, 523555



Journal of
**GANDAKI
MEDICAL
COLLEGE-
NEPAL
(J-GMC-N)**

J-GMC-N | Volume 09 | Issue 02
July-December 2016

Editorial Article

Some Thoughts on Becoming A Great Teacher...

Reddy KR

Original Articles

- | | Page |
|--|-------------|
| 1. Prevalence and Outcome of Cesarean Section at Gandaki Medical College Teaching Hospital and Research Centre, Pokhara, Nepal
<i>Gurung RT, Gurung G, Shrestha R, Gurung T, Sharma P</i> | 1 |
| 2. Liver Abscess: An Institutional Review at Gandaki Medical College Teaching Hospital
<i>KC Hari B, Bhujra S, Dhakal RR, Timilsina DS</i> | 7 |
| 3. Prevalence of Conventional Risk Factors and Lipid Profiles of Patients with First Day of Acute Coronary Syndrome Admitted in CCU of Gandaki Medical College Teaching Hospital, Pokhara, Nepal
<i>Hirachan GP, Hirachan R, Thapa BB, Thapa KB</i> | 13 |
| 4. Effect of Yoga Breathing Exercises on Ventilatory Function
<i>Banstola D</i> | 17 |
| 5. The Incidence of Bleeding and the Factors That Influence Its Development among Patients Admitted With Dengue Fever
<i>Thapa KB, Namrata KC, Koirala T, Bhattarai A</i> | 23 |
| 6. Sleep Apnea
<i>Uzma N, Reddy VD</i> | 29 |
| 7. Evaluation of Breast Lump by Fine Needle Aspiration Cytology
<i>Poudel S, Ranabhat S, Parajuli B, Pun G</i> | 38 |
| 8. An Overview of Sexual Assault Cases in Nepal
<i>Hirachan N, Limbu D</i> | 43 |
| 9. Knowledge on Pressure Ulcer Management among Nurses
<i>Shrestha N, Shrestha P</i> | 47 |
| 10. Prevalence and Factors Affecting Women with Uterine Prolapse in Lekhnath, Kaski, Nepal
<i>Silwal M, Gurung R, Shrestha N, Gurung A, Ojha S</i> | 52 |
| 11. Sealing Ability of Resin Based Root Canal Sealers: An <i>In Vitro</i> Study
<i>Rijal S</i> | 58 |
| Medical Education | |
| 12. Outcomes of Medical Education in Nepal
<i>Reddy VD, Upadhyay N, Yadav SK, Subedi B</i> | 63 |
| Student J-GMC-N | |
| 13. Study on Epidemiology of Chronic Obstructive Pulmonary Disease (COPD) at Western Regional Hospital, Pokhara
<i>Ghosh V, Lamichhane S, Thakuri SB, Khadka KCS, Teli SS, Adhikari SS, Shrestha S, Acharya SK, Subedi SS</i> | 65 |
| 14. Family Health Exercise: Follow-up of an Extra-pulmonary Tuberculosis Patient
<i>Thapa K, Sharma D, Karki D, Sharma D, Gurung FK, Tanwar J, Pariyar L</i> | 70 |

Guidelines to Authors

The task of the excellent teacher is to stimulate "apparently ordinary" people to unusual effort. The tough problem is not in identifying winners: It is in making winners out of ordinary people. Don't try to fix the students, fix ourselves first. A good teacher makes the poor student good and the good student superior. When our students fail, we, as teachers, too, have failed. A great teacher is a master of simplification and an enemy of simplism.

Who dares to teach must never cease to learn. To teach is to learn twice (Fig 2).

Fig 2: To teach is to learn twice



The art of the teaching is the art of assisting discovery. Professors known as outstanding teachers do two things; they use a simple plan and many examples.

Teachers are expected to reach unattainable goals with inadequate tools. The miracle is that at times they accomplish this impossible task.

Teaching should be full of ideas instead of being stuffed with facts. I like a teacher who gives me something to take home and think about rather than an assignment or test. The object of teaching a pupil is to enable him/her to get along independently without his teacher/ parents/ elders support.

The dream begins with a teacher who believes in students, who tugs and pushes and leads you to the next plateau, sometimes poking the students with a sharp stick called "truth".

In teaching you cannot see the fruit of a day's work. It is invisible and remains so, may be for twenty years.

The true teacher defends his/her students against his own personal influence. He inspires self-distrust. He guides their eyes from himself/herself to the spirit that quickens him/her.

The best teacher is the one who suggests rather than dogmatizes, and inspires his/her listener with the wish to teach himself/herself.

A teacher's purpose is not to create students in his own image, but to develop students who can create their own image.

Teaching is leaving a vestige of oneself in the development of another. And surely the student is a bank where you can deposit your most precious treasures.

"The teacher who is indeed wise does not bid you to enter the house of his wisdom but rather leads you to the threshold of your mind" – Kahlil Gibran

Fig 3: Students' expectations from teachers

- | | |
|------------------------------|-----------------------------|
| - is kind | - tell us how we are doing |
| - listen to us | - allows us to have our say |
| - is generous | - doesn't give up on us |
| - has faith in us | - cares for our opinion |
| - encourages us | - makes us feel clever |
| - keeps confidence | - makes allowances |
| - takes time to explain | - treats us equally |
| - likes teaching students | - stands up for us |
| - helps when we are stuck | - tells the truth |
| - likes teaching the subject | - is forgiving |

Fig 4: ABCs for great teachers

Adventurous	Enthusiastic	Open-minded
Ambitious	Friendly	Organised
Bright	Gifted	Polite
Cheerful	Healthy	Punctual
Clean	Humane	Quick-witted
Confident	Humorous	Resourceful
Cooperative	Industrious	Sociable
Creative	Intelligent	Talented
Critical	Joyous	Unbiased
Dependable	Kind	Visionary
Democratic	Levelheaded	Well-informed
Eloquent	Magnanimous	Youthful
Energetic	Noble	Zealous

Fig 5: Qualities of a great teacher

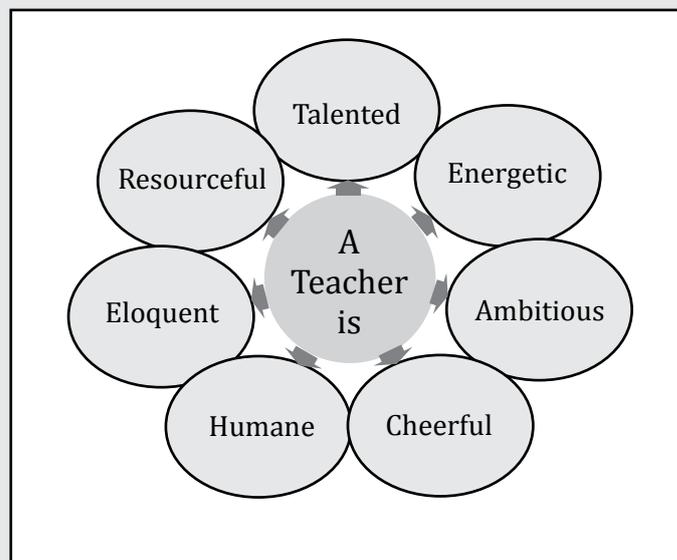
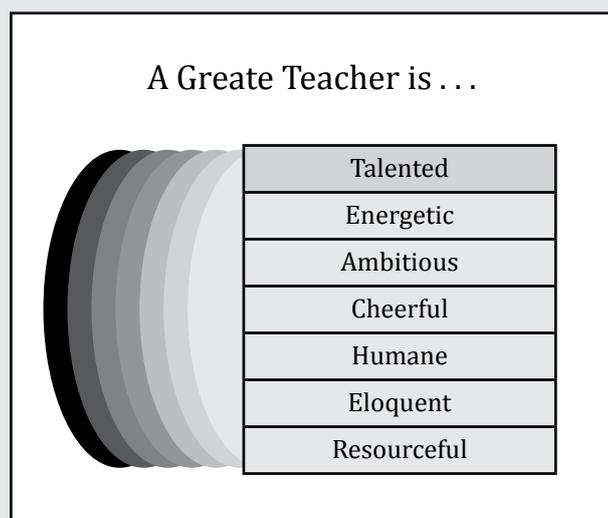


Fig 6: Qualities of a great teacher



TALENTED

A great teacher is trained, adept, learned, equipped, never ending learner, and takes questions. A great teacher learns. **Teaching is a dynamic skill**, needs regular retraining and refreshing. A great teacher will have a command of subject-specific knowledge, listens to what students tell and takes feedback and read body language of students'. A great teacher gets into his subject, gets the subject into students' hearts and mind. A great teacher structures his teaching and tells what he wants to tell and tells what he has told.

Trained
Adept
Learned
Equipped
Never ending learner
Takes questions

ENERGETIC

A great teacher is healthy, attentive, lively, and enthusiastic. A great teacher displays an energetic body language with active movement, good eye contact, good posture, impressive pace, encouraging gestures, and visually vibrant.

A great teacher is enthusiastic to teach about the subject with the students. A good teacher is confident and possesses a passion for subject, rehearse, shun shyness, imagine success, and calm down.

“What the teacher is, is more important than what he teaches” – Karl Meninnger.

Healthy
Attentive
Lively
Enthusiastic

Calm down
Rehearse
Imagine success
Shun shyness
Passion for subject

AMBITIOUS

A great teacher aims big, challenges himself and strives for success. Success comes from a desire, decision and determination. Effective teachers try and try and try and let students know they try. Determination, energy, and courage appear spontaneously when we care deeply about something.

A great teacher is positive, possesses passion to inspire, urge to help, right attitude and expect good. A teacher who inspire, know that teaching is like cultivating a garden, and those who would have nothing to do with thorns must never attempt to gather flowers. Teachers who inspire realize there will always be rocks in the road ahead of us. They will be stumbling blocks or stepping stones; it all depends on how we use them. A great teacher takes risks. If there is no chance of failure, then success is meaningless.

“A teacher attains eternity; he can never tell where his influence stops” - Henry Brooks Adams.

Passion to inspire
Urge to help
Right attitude
Expect Good

A teacher who is attempting to teach without inspiring the pupil with a desire to learn is hammering on cold iron (Regarded as bad teacher).

Good teachers are costly but bad teachers cost more

CHEERFUL

A great teacher is cheerful: Smiling, hygienic, optimistic, and well dressed. A great teacher will be having a pleasing personality: Displays smile, mention name, takes interest, listen, and empathize with students. It is hard for people to disagree with you when you are smiling.

A great teacher is humorous: Socially lubricant, enhances communication, makes class enjoyable, helps you see the joy in life, and no sarcasm.

HUMANE

A great teacher is humane: Compassionate, understanding, fair, supportive, and friendly. A great teacher is supportive and when students really have something important to say, they should be able to say it clearly, forcefully, and with proper evidence. A great teacher is fair and assesses students based on performance not personality.

“One looks back with appreciation to the brilliant teachers, but with gratitude to those who touched our human feelings”-Carl Jung.

ELOQUENT

A great teacher is fluent, pleasant, communicative, expressive, and speaks clearly, listen keenly, mind his/her words and tone, maintain eye contact, and courteous. A great teacher supports what he says with examples, statistics, definitions, and testimony.

A great teacher REACHes
Reinforce
Encourage
Acknowledge
Clarify
Highlight

A great teacher's VOICE (Visual, auditory, olfactory, kine- sthetic domains)
Vocabulary
Order of words
Intonation
Cut of the unwanted
Empower

RESOURCEFUL

A great teacher is creative, original, imaginative, intelligent, sensible, and inspiring. A great teacher keep cool, resist being provoked, establish rapport, judicious discipline, praise liberally and that's how manages his class and students.

A great teacher has commonsense: Assess situations quickly, make appropriate decisions, know what to ignore, when to react, and be pro-active.

“It is the supreme art of the teacher to awaken joy in creative expression and knowledge”
– Albert Einstein.

**The teaching is a passion to change the world,
A better place to live for the future generations.
Practice, Practice, Practice...
You will attain your GOAL.**

Prevalence and Outcome of Cesarean Section at Gandaki Medical College Teaching Hospital and Research Centre, Pokhara, Nepal

Gurung RT^{1*}, Gurung G², Shrestha R¹, Gurung T¹, Sharma P³

¹Lecturer, Department of Obstetrics & Gynecology, ²Lecturer, Department of Ophthalmology, ³Lecturer, Department of Radiology
Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

ABSTRACT

Introduction: Gandaki Medical College Teaching Hospital is providing specialized obstetrician and gynecologist services since last one decade.

Objectives: This study was conducted to know the prevalence and outcome of cesarean section at Gandaki Medical College Teaching Hospital and Research Centre during 2013 – 2015 A.D. (2070 – 2072 B.S.).

Methods: It was a retrospective study of women undergoing cesarean section from 2013 to 2015 A.D. (2070 – 2072 B.S.).

Results: During the period of three years 2013 – 2015 A.D. (2070 – 2072 B.S.) total deliveries were 2627. Among total deliveries cesarean section was performed in 1084 patients (41.26%). In 1084 patients 803 (74%) cesarean sections were performed as an emergency and 281 (26%) were elective. In this study 15 to more than 35 years old patients were enrolled. Among cesarean sections done, 52% were primigravida, 46% were para and 2% were grandmulti. The indications for cesarean section were CPD (28%), fetal distress (25%), previous cesarean (14%), malpresentation (7%), premature rupture of membrane (5%), pre-eclampsia (6%), failed induction (5%), bad obstetric history (2%), antepartum hemorrhage (1%), and twins (1%).

Conclusion: This study at Gandaki Medical College Teaching Hospital and Research Centre provided the prevalence, outcome and different indications of cesarean section which is life saving for both mother and newborn. And also the study can be useful to the hospital to improve facilities for safe motherhood and safety of newborn.

Keywords

Cesarean section, Mother, Newborn

Corresponding author

**Dr Rubina Tamrakar Gurung
Lecturer, Department of Obstetrics & Gynecology
Gandaki Medical College & Teaching Hospital, Pokhara, Nepal
Email: tamrakarrubina@yahoo.com.hk*

INTRODUCTION

Cesarean delivery defines the birth of a fetus via laparotomy and then hysterotomy. The origin of cesarean is uncertain and was reviewed in the 23rd edition of Williams Obstetrics (Cunningham, 2010). There are

two general types of cesarean delivery-primary refers to a first-time hysterotomy and secondary denotes a uterus with one or more prior hysterotomy incisions. Neither definition includes removal of the fetus from the abdominal cavity in the case of uterine rupture or with abdominal pregnancy¹. The first modern cesarean section

was performed by German gynecologist Ferdinand Adolf Kehrer in 1881². The indications for cesarean section have been varying tremendously through its documented history, and they have been shaped by religious, cultural, economic, professional and technological developments. Cesarean section has been part of human culture since ancient times, but the early history of cesarean section remains unclear. It is commonly believed to be derived from the surgical birth of Julius Caesar, but this seems unlikely, since his mother Aurelia is reputed to have lived to hear of her son's invasion of Britain³.

At that time the procedure was performed only when the mother was dead or dying, in an attempt to save the child. Cesarean sections were also made because of religious beliefs, so that the baby could be buried separately from the mother. The operation was not intended to preserve the life of the mother. It was not until the 19th century that saving the mother really was a possibility³.

Today, a cesarean section is usually performed when a vaginal delivery would put the baby's or mother's life or health at risk, although in recent times it has also been performed upon request for childbirths that could otherwise have been natural. In later years the rate has risen to a record level of 46% in China, and to levels of 25% and above in many Asian, European and Latin American countries. In 2009, the cesarean section rate was 34% in the United States⁴.

Like other parts of South Asia, Nepal demonstrates a distinct social stratification based on caste system and encompasses a wider socio-economic heterogeneity. There are about 36 castes of people residing in the hilly regions of Nepal. They have been categorized into broader groups giving five classes that include upper caste group, relatively advantaged janajatis, disadvantaged janajatis, dalits and religious minorities. The dogma of the caste system though, still remains a contentious issue; it continues to act as an obstacle in the development of communities belonging to the lower social class. Main drawback of this caste system is that lower people often face a multitude of disadvantages in socio-economic marginalization, participation in decision-making processes and employment opportunities. This ultimately affects the health issues among different groups. Cesarean section has become a common surgical procedure these days. But due to the lack of education or awareness and poverty among the dalits and disadvantaged janajatis, they have not been able to access the hospital for cesarean delivery. There has been a great difference seen among the different caste groups who undergo cesarean section.

Therefore, the objective of the study was to determine the

prevalence of cesarean section among different castes in Western Nepal⁵.

This study was conducted to know the prevalence and indication of cesarean section at Gandaki Medical College Teaching Hospital. The study can also support the district health care program to educate and motivate people for routine antenatal check-ups in the hospital for the safety of mother and the baby.

METHODS

The study was conducted at Gandaki Medical College Teaching Hospital and Research Centre. This hospital is a tertiary 645 bedded health care centre. The service has been operative since 2007 A.D. The obstetrics and gynecology department has regular 10 - 15 internists. All the pregnant women in labor and for elective cesarean section were admitted in the maternity ward. They were attended for examination, evaluation and management by internist, medical officer and consultant/lecturer. All the patients for normal deliveries were transferred to the delivery room which has two beds. The patients with indications for cesarean section (Emergency/elective) were transferred to the pre-operative room. The pre-operative room had six beds where the patients undergo preparation for operation. The Anesthesiologists (five to six) have done pre-anesthetic check prior to the procedure.

Opening the abdomen can be performed with either a pfannenstiell or a vertical skin incision, but pfannenstiell is the preferred. A pfannenstiell incision is associated with less postoperative pain, greater wound strength, and better cosmetic results than the vertical midline incision.

For the lower segment cesarean section (LSCS), a pfannenstiell rather than a vertical incision is recommended for most women. This is associated with less blood loss, less need for bladder dissection, is easier to reapproximate, and has a lower risk of rupture in subsequent pregnancies. A spontaneous, rather than a manual extraction of the placenta is recommended. If the woman has subcutaneous tissue depth ≥ 2 cm, the subcutaneous tissue layer should be closed with sutures.

The concern about the increasing rate of cesarean delivery globally, is due not only to the fact that a cesarean section is expenditure for the society, but it also infers several postoperative issues for the mother. As with all types of surgery, there will always be possible complications during, and after the surgery, and a cesarean section is no exception.

In the immediate postoperative period, the woman was monitored for evidence of uterine atony, excessive vaginal or incisional bleeding, and oliguria. The blood pressure was also monitored to assess for hypotension or hypertension, which could be signs of intra abdominal bleeding or preeclampsia respectively. The mother may need some instruction on how to hold her newborn to avoid contact with the incision. Early ambulation is encouraged; the mother can take sips of water within eight hours of surgery. The usual drugs and procedures associated with cesarean birth are not a contraindication to breastfeeding.

The major non-anesthesia-related complications related to cesarean delivery are hemorrhage, infection, injury to pelvic organs, and thromboembolic disorders. There are no randomized trials comparing the outcomes of planned vaginal versus planned cesarean delivery for the term cephalic gestation. Moderate quality evidence shows that planned cesarean delivery is associated with less maternal hemorrhage, longer maternal hospital stay, and greater mild neonatal respiratory morbidity than planned vaginal delivery. The risks of severe maternal morbidity are generally higher in women with an unplanned cesarean delivery during labor. Cesarean delivery in the second stage of labor is associated with a slightly higher maternal composite morbidity than in the first stage of labor; however, neonatal morbidity rates are similar for first and second stage cesareans. In a Norwegian study 21.4% of the women had more than one complication from cesarean section. The complication rates were higher for the operations performed at 9 - 10 cm cervical dilatation. General anesthesia, low gestational age, and fetal macrosomia were also identified as independent risk factors for complications⁶. Statistical analysis was done using SPSS software 11.7 version.

RESULTS

During the period of three years 2013 – 2015 A.D. (2070 – 2072 B.S.) total deliveries were 2627. Among 2627 total deliveries cesarean section was performed in 1084 patients (41.26%). Emergency cesarean sections were 803 (74%) and 281 (26%) were performed as an elective. In this study 15 to more than 35 years old patients were enrolled. Of total 1084 patients underwent cesarean section 10% (111) patients were between 15 - 19 years age, 86% (937) were within 20 - 34 years of age and 4% were above 35 years old. Among 1084 patients underwent cesarean section, 52% (568) patients were primigravida,

46 % (495) patients were para and 2% (21) patients were grandmulti.

Table 1: Distribution of cesarean section cases by age and parity

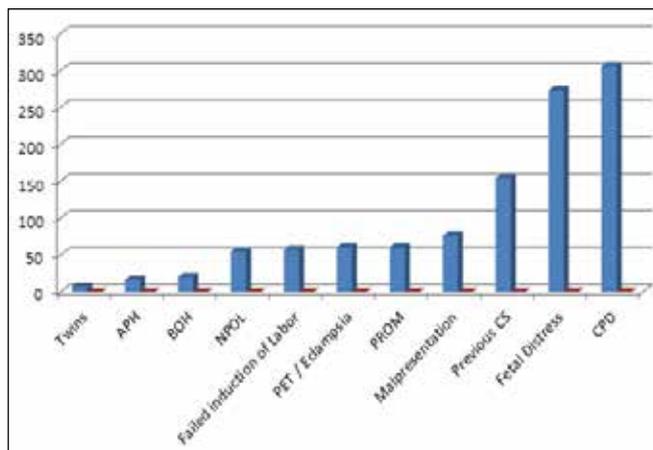
Variables	No of cesarean sections	Percentage
Age (Years)		
15 - 19	111	10%
20 - 34	937	86%
≥35	36	4%
Total	1084	100%
Parity		
Primigravida	568	52%
Para (1 - 4)	495	46%
Grandmulti	21	2%
Total	1084	100%

Elective cesarean sections were performed in 281 (26%) and emergency cesarean sections were done in 74% (803) patients.

Table 2: Types of cesarean sections, anesthesia, gestational age in weeks at Gandaki Medical College Teaching Hospital during 2013 - 2015 A.D. (2070 - 2072 B.S.)

Variables	No of cesarean sections	Percentage
Type of cesarean sections		
Elective	281	26%
Emergency	803	74%
Total	1084	100%
Bilateral tubal ligation		
Primary	930	86%
Repeat	154	14%
Total	1084	100%
Type of Anesthesia		
Yes	116	11%
No	968	89%
Total	1084	100%
Gestational age in weeks		
General anesthesia	15	1%
Spinal anesthesia	1069	99%
Total	1084	100%
Gestational age in weeks		
<37	40	4%
37 - 42	1012	93%
≥ 42	32	3%
Total	1084	100%

Fig 1: Indication of cesarean section at Gandaki Medical College Teaching Hospital during the study period



Among 1084 cesarean sections performed at Gandaki Medical College Teaching Hospital and Research Centre, 28% (306 patients) had CPD, 25% (273 patients) fetal distress, 14% (154 patients) previous cesarean, 7% (76 patients) malpresentation, 6% (60 patients) had premature rupture of membrane, 6% (60 patients) preeclampsia, 5% (57 patients) failed induction, 5% (55 patients) presented with non progress of labor, 2% (20 patients) bad obstetric history, 1% antepartum hemorrhage and twins.

DISCUSSION

In this study done at Gandaki Medical College Teaching Hospital and Research Centre among the cesarean sections performed on 1084 patients, elective cesarean sections were done in 281 (26%) and emergency cesarean sections were in 803 (74%) patients. The reason for the higher number of emergency cesarean sections performed than elective cesarean might be the number of patients attending the hospital. Majority attending the hospital were from the rural hilly regions of Nepal where the awareness of antenatal check up during pregnancy is either unreachable or the facilities are limited. Most of the elective cesarean sections performed were either local patients of the pokhara valley or those who had proper antenatal check up and motivation. These results were similar to the study done by Raj kumar Thapa, Bishrawa Bhandari *et al* on prevalence of cesarean sections among different castes in Western Nepal, which stated that low socioeconomic status and long physical distance of more than hours to the hospital acted as a barrier⁵.

Cephalopelvic disproportion was the most common indication for cesarean section in this study done at

Gandaki Medical College Teaching Hospital and Research Centre. Among 1084 (41.26%) patients, cephalopelvic disproportion was the reason in 306 (28%) patients. These results were similar to study done by Tadesse E, Adane M, Abiyou M (1996) on cesarean section deliveries at Tikur Anbessa Teaching Hospital, Ethiopia⁷ and Souza JP *et al* (2010) cesarean section term maternal outcomes⁸.

Nutrition is directly proportional to the pelvic size and shape. The pelvic contraction and stunting growth result from malnutrition. Malnutrition is still major risk factor and responsible for cephalopelvic disproportion in Nepal and other developing countries. These results were similar to study done by Geidam *et al* (2010) in Nigeria⁹.

Fetal distress was seen in 25% (273) of the patients. The results were due to increased use of cardio-tocogram. Similar to the results mentioned by Chhetri S *et al* in cesarean section: Its rate and indication in Eastern Nepal¹⁰. The study also mentioned the difference in fetal distress in 2006 (8.1%) and 2007 (10.7%) in the same institution. Cardio-tocogram is used to monitor the fetal heart rate variability, which if not reassuring, would warrant a cesarean section. Fetal distress is more common indication in developed countries than ours. Unavailability of continuous electronic fetal monitoring in the institution might be the reason.

The maternal indication of cesarean section was previous cesarean section among 154 patients (14%). The risk of complications rise with increasing number of cesarean deliveries, especially the risk of placenta accrete. Although previous cesarean is not a condition that qualifies for repeat cesarean section, it is normal practice to do it again. Previous cesarean sections increase the risk of placenta previa and uterine rupture¹¹. These results were similar to the study done by Kathryn Chu, Hilde Cortier *et al* on cesarean section rates and indication in Sub Saharan Africa¹².

Malpresentation is one of the fetal indication; for cesarean section seen among 76 patients (7%). Breech presentation is one of the types of malpresentation. The incidence of breech presentation decreases with increased gestational age, the prevalence of babies in breech position is 3 - 4% at term¹³. Early in the pregnancy many babies are breech, but most turn before birth. If the baby has not turned, it is possible to try an external cephalic version¹⁴. Some studies show fewer complications for the baby with planned cesarean¹⁵.

Transverse lie is present in about two out of 1000 births. The fetus can be in complete or partly transverse lie. This

condition is more usual in multiparous women and in multiple baby pregnancies¹⁶. The condition usually passes as the birth start with the baby turning its head down due to contractions.

Compound presentation is defined as presentation of a fetal extremity alongside the presenting part. It occurs in one to 700 to one to 1000 of deliveries. It is more common when the pelvis is not fully occupied by the fetus because of low birth weight, multiple gestation, polyhydramnios, or if there is a large pelvis. If the compound presentation does not resolve spontaneously one should do cesarean section¹⁷.

Prolonged labor is when the duration of the labor exceeds 24 hours. This may be due to a prolonged latent phase, more than 20 hours in a primigravida or more than 14 hours in a multipara, or due to delayed or lacking cervical dilatation in the active phase of labor and protracted descent of the fetus¹⁸.

In a prolonged labor, fetal distress can occur and the baby needs to be monitored. If there is any indication that the baby is suffering one should proceed with forceps, vacuum or emergency cesarean section depending on the situation¹⁶.

In this study 5% (55 patients) presented with non-progress of labor which was almost similar to the study done by Chhetri *et al*¹⁰ where the study showed 8.1% with prolonged labor.

This study stated 6% (60 patients) with preeclampsia. Preeclampsia is defined as hypertension after 20th gestational week¹⁹. The disease affects 2 - 3% of all pregnant women, it can develop quite rapid and be life threatening for both mother and fetus. The disease leads to two syndromes, one in the mother and one in the fetus. The maternal disease consists of high blood pressure, proteinuria, possible edema and activation of the coagulation system. The maternal disease can further develop into HELLP syndrome (Hemolysis, Elevated Liver Enzymes, Low Platelets) which is a rare, but very dangerous disease. The woman usually has pain in the epigastrium or underneath the right costal arch. She might be nauseous. Suspicion of HELLP syndrome is an emergency. This condition is a threat to the mother's life and therefore emergency cesarean section should be

done immediately¹⁹. The fetal syndrome starts with failing placental function. Pregnancy induced hypertension is hypertension after 20 weeks of gestation without proteinuria, that regress within 12 weeks postpartum¹⁹.

In placenta praevia the placenta is situated partly over the exit for the fetus. This can lead to a severe bleeding with an extensive blood loss for both mother and child. The typical symptom of placenta praevia is a sudden bleeding without pain or contractions. The bleeding increases as the pregnancy moves forward and pregnant women with this condition is advised to stay close to the hospital. With complete placenta praevia the placenta is covering the whole exit. In this condition cesarean is absolutely necessary and usually takes place in week 37 - 38. In partly placenta praevia birth is possible²⁰. Abruptio placenta can present in a traumatic way with severe pain, contractions, blood loss and a bad general condition or it can be without symptoms. The condition is an indication for immediate cesarean section²¹. Antepartum hemorrhage was seen in 1% of patients. Antepartum hemorrhage which includes placenta previa and abruption placenta is associated with early neonatal and maternal demise¹². Premature rupture of membrane was seen in 6% (60 patients), failed induction in 5% (57 patients), bad obstetric history in 2% (20 patients). Patients came as an elective cesarean section with twins or multiple babies were 1%. If not everything is in place for an uncomplicated vaginal birth cesarean is recommended when there is more than one baby¹⁶.

CONCLUSIONS

This study of three years duration at Gandaki Medical College Teaching Hospital and Research Centre provided the prevalence, outcome and different indications of cesarean section. Cesarean sections performed for appropriate medical or obstetric indications are life saving for both the mother as well as the new born. But the high prevalence of cesarean section is not associated with improved perinatal outcome and it has risks for the mother and the neonate. Therefore to reduce the high prevalence of cesarean sections, each case should be thoroughly evaluated to determine the possibility for vaginal delivery. And also the study can be useful to the hospital to improve facilities for safe motherhood and safety of newborn.

REFERENCES

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS *et al.* *Williams Obstetrics*. 24th edition, chapter 20, page 587.
- Caesarean section. Wikipedia. Available from http://en.wikipedia.org/wiki/Caesarean_section.
- Cesarean section – a brief history. 1993. Available from <http://www.neonatology.org/pdf/cesarean.pdf>. Page 5.
- Boruff K. Health grades reveals c-section rates across America. 2012. Available from: <http://www.healthgrades.com/ratings-and-awards/national-maternity-care>.
- Thapa RK, Bhandari B, Adhikari K, Katila P, Baral P *et al.* Prevalence of caesarian section among different castes in Western Nepal. *JHAS*. 2012; 2(1): 18-21.
- Hager RME, Daltveit AK, Hofoss D, Nilsen ST, Kolaas T, Øian P, Henriksen T. Complications of cesarean deliveries: Rates and risk factors. *American Journal of Obstetrics and Gynecology*. 2004; 190: 428e34.
- Tadesse E, Adane M, Abiyou M. Caesarean section deliveries at Tikur Anbessa Teaching Hospital, Ethiopia. *East Afr Med J*. 1996; 73: 619-622.
- Souza JP, Gülmezoglu A, Lumbiganon P, Laopaiboon M, Carroli G *et al.* Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: The 2004-2008 WHO Global Survey on Maternal and Perinatal Health. *BMC Med*. 2010; 8: 71.
- Geidam AD, Audu BM, Kawuwa BM, Obed JY. Rising trend and indications of caesarean section at the University of Maiduguri Teaching Hospital, Nigeria. *Ann Afr Med*. 2009; 8: 127-132.
- Chhetri S, Singh U. Caesarian section: Its rates and indications at a tertiary referral center in Eastern Nepal. *Nepal Journal Online*. <http://dx.doi.org/10.3126/hren.v9i3.5587>.
- Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA *et al.* Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstetrics & Gynecology*. 2006; 107(6): 1226.
- Chu K, Cortier H, Maldonado F, Mashant T, Ford N *et al.* Cesarean section rates and indications in Sub-Saharan Africa: A multi-country study. *Medecins sans Frontiers*. Sept 2012; 7(9): e44484.
- Hickok DE, Gordon DC, Milberg JA, Williams MA, Daling JR. The frequency of breech presentation by gestational age at birth: A large population based study. *American Journal of Obstetrics and Gynecology*. 1992 Mar; 166(3): 851-2.
- Hofmeyr GJ, Kulier R. External cephalic version for breech presentation at term. *Cochrane Database Syst Rev*. 2012; 10: CD000083.
- Cheong Leung, W. Chung Pun, T. Term breech trial. *Lancet*. 2001; 357(9251): 225.
- Henriksen T, Molne K. Chapter 19 Avvikende fødsler, komplikasjoner og intervensjoner. In Bergsjø, P, Maltau, JM, Molne, K, Nesheim, BI. *Obstetrikk og Gynekologi*. Gyldendal norske forlag. Second edition, 2010.
- Goplerud J, Eastman NJ. Compound presentation; A survey of 65 cases. *Obstet Gynecol*. 1953; 1(1): 59.
- Prolonged labor. The free dictionary by farlex. Downloaded 25.02.2013. Available from: <http://medical-dictionary.thefreedictionary.com/prolonged+labor>.
- Maltau JM, Øian P. Chapter 15 Sykdom hos mor i svangerskapet. In Bergsjø P, Maltau JM, Molne K, Nesheim BI, *Obstetrikk og Gynekologi*. Gyldendal norske forlag. Second edition, first circulation, 2010.
- Maltau JM. Chapter 16. Blødning i siste del av svangerskapet. In Bergsjø P, Maltau JM, Molne K, Nesheim BI, *Obstetrikk og Gynekologi*. Gyldendal norske forlag. Second edition, first circulation, 2010.
- Henriksen T, Molne K. Chapter 19. Avvikende fødsler, komplikasjoner og intervensjoner. In Bergsjø P, Maltau JM, Molne K, Nesheim BI. *Obstetrikk og Gynekologi*. Gyldendal norske forlag. Second edition, first circulation, 2010.

Liver Abscess: An Institutional Review at Gandaki Medical College Teaching Hospital

KC Hari B¹, Bhujū S², Dhakal RR², Timilsina DS³

¹Lecturer, ²Associate Professor, ³Professor

Department of Surgery, Charak Hospital, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

ABSTRACT

Background: Although liver abscess is a potentially life threatening disease, early diagnosis and prompt treatment has resulted good clinical outcome. The epidemiology and management of this condition have evolved over time.

Objective: To study our experience in clinical characteristics and management of liver abscess in a tertiary hospital over a period of three years.

Methods: The hospital records of all patients discharged with the diagnosis of liver abscess from September 2010 to March 2013 were reviewed. The demographics, clinical presentation, investigation tools, method of treatment and outcome were recorded and analyzed.

Results: Total of 17 patients of liver abscess were admitted during this period, of which, 13 were pyogenic and four amebic. The median age was 50 (7 - 75) years with male to female ratio of 1.42 : 1. Age group 40 - 60 years was most commonly affected. Single lesions were found in 11 (64.7%) and multiple in six (35.3%) patients. The most common presentation was fever and abdominal pain/tenderness. Jaundice was seen in five (29.4%) patients and abnormal liver function test in 10 (58.8%) patients. Commonest route of infection among pyogenic liver abscess were through biliary tree pathology (Five patients) and via portal venous system (Three patients). Pus and blood culture were positive in six (46.15%) and four (30.76%) patients respectively, and *E. coli* was the commonest pathogen isolated. Patients were treated with anti-microbial therapy and interventional radiology techniques: Nine patients with percutaneous needle aspiration, four with percutaneous drainage. Antibiotics alone were sufficient in three patients and open surgical drainage was required in one patient. There was one case of mortality where the abscess was associated with diabetes mellitus.

Conclusion: Liver abscess is a potentially life threatening disease and commonly associated with underlying gastrointestinal pathology. Adequate antibiotic coverage and image guided intervention is optimal first-line treatment with favorable outcome.

Keywords

Liver abscess, Percutaneous drainage, Pyogenic.

Corresponding author

Dr. Hari Bahadur KC
Lecturer, Department of Surgery
Gandaki Medical College & Teaching
Hospital, Pokhara, Nepal
E-mail: hari_kc7@yahoo.com

INTRODUCTION

Liver abscess is a potentially life threatening disease which had high morbidity and mortality in past. Oschsner and DeBaKey described the first largest study of liver abscess in their classic paper on pyogenic liver abscess in 1938¹. Earlier it was the disease of the young people in their 20s - 30s largely in the setting of intra-abdominal infection, but at present it predominantly affects the elderly persons^{2,3}. Recent studies have shown the biliary tree as the most common potential route of infection while no cause is seen in many cases⁴. The symptoms are largely non-specific and classical triad of fever, jaundice and right upper quadrant pain and tenderness are seen in less than 10% of population⁵.

Ultrasound and CT scan of abdomen are the mainstays of diagnostic modalities in liver abscess. The most common organisms involved are *E coli* and *Klebsiella*. Treatment of liver abscess has changed over the last two decades from surgical towards a minimal invasive approach, largely because of improved interventional radiologic techniques^{6,7,8,9}. Percutaneous drainage or intermittent needle aspiration in combination with systemic antibiotics are the current treatment of choice and surgical drainage is reserved for failure cases¹⁰. In Nepal, no known large studies regarding management of liver abscess has been performed. We have tried to analyze the epidemiology, diagnostic modalities, predisposing factors and management options for liver abscess in our hospital over the period of three years.

METHODS

Hospital registers of the patients discharged with the diagnosis of liver abscess from September 2010 to March 2013 were reviewed. Case of liver abscess was defined as any patient having one or more filling defects in liver on abdominal Ultrasound or CT scan together with identification of pus or complete resolution of radiological abnormalities following antimicrobial therapy. The data regarding demographic profiles, duration of symptoms, clinical features, laboratory parameters, imaging findings, pus cultures, method of treatment were collected. Likewise predisposing factors, clinical course, any complications, duration of hospital stay and outcome were recorded. Liver abscess was considered secondary to biliary tract disease in patients with gall stones and/or acute cholecystitis, or who had other documented biliary tract abnormality. It was considered secondary to portal spread when there was documented infection or abdominal pathology in the distribution of portal vein and was considered cryptogenic where no obvious extra-hepatic source of infection was identified. Data were analyzed using SPSS version 17.0.

RESULTS

Fig 1: Age distribution of patients with liver abscess

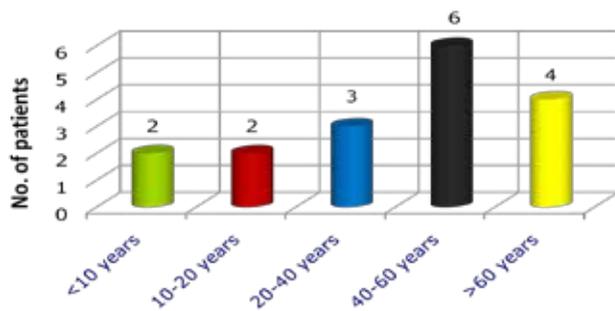


Fig 2: (a) Number of abscess; **(b)** Location of abscess

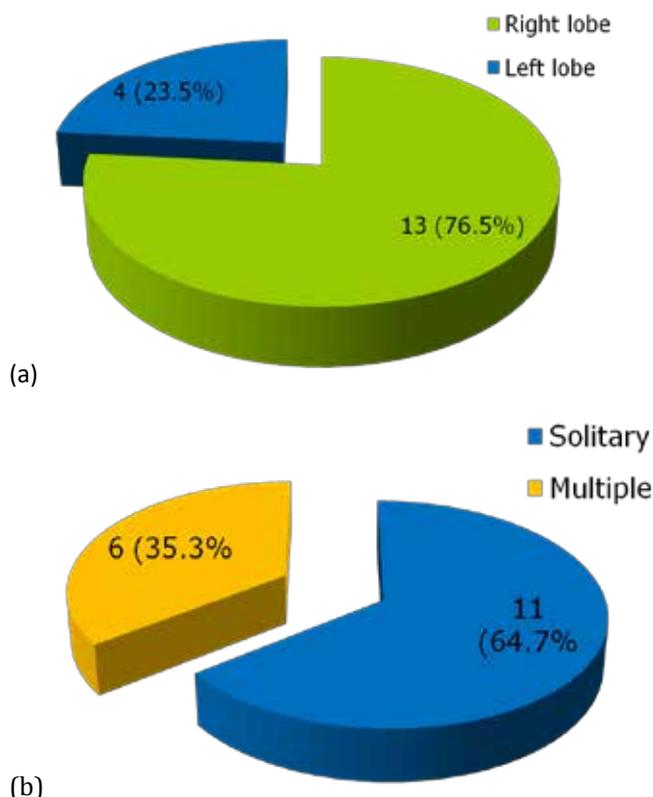


Table 1: Main complaints and clinical findings on admission

Symptoms	Number (%)	Signs	Number (%)
Abdominal pain	16 (94.1%)	Fever	10 (58.8%)
Fever	11 (64.7%)	RUQ tenderness	14 (82.4%)
Nausea /vomiting	5 (29.4%)	Jaundice	5 (29.4%)
Weight loss	6 (35.3%)	Chest signs	4 (23.5%)
Night sweat	7 (41.2%)	Hepatomegaly	7 (41.2%)
Diarrhea	4 (23.5%)		
Jaundice	4 (23.5%)		

Table 2: Hematological and biochemical parameters on the day of admission

Tests	Mean (range)	Normal value	Abnormal test result n (%)
White cell count (/mm ³)	15000 (6600 - 25000)	4000 - 11000	15 (88.2%)
Neutrophil (%)	75% (49 - 85)	50 - 70	14 (82.3%)
Hemoglobin (gm/dl)	14.2 (12.4 - 16.5)	12.2 - 16.4	
Bilirubin (mg/dl)	1.1 (0.8 - 4.6)	0.3 - 1.0	5 (29.4%)
AST (IU/L)	36 (20 - 95)	10 - 34	7 (41.25%)
ALT (IU/L)	37 (21 - 110)	7 - 33	9 (52.9%)
ALP (IU/L)	156 (93 - 540)	20 - 140	9 (52.9%)
LFT			10 (58.8%)

ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase; LFT, liver function test

Table 3: Potential underlying pathology among patients with pyogenic liver abscess

Causes	Patient Number	Percentage(%)
Biliary	5	38.46%
Portal	4	30.76%
Crypto-genic	4	30.76%

Fig 3: Bacterial isolates from pus and blood of patients with pyogenic liver abscess

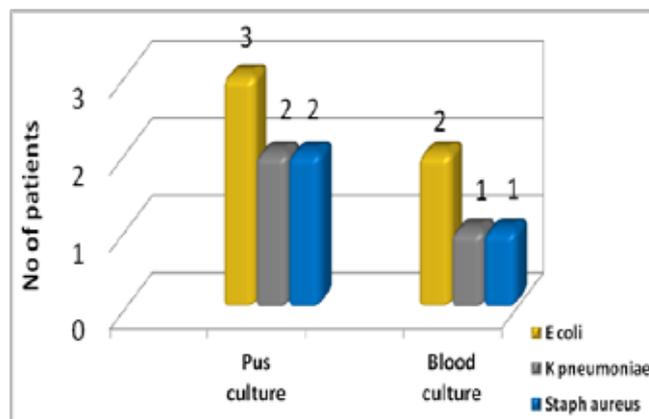
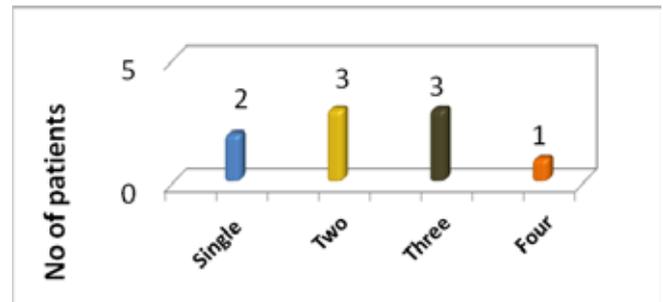


Table 4: Different modalities of treatment employed

Treatment method	No.	%	Outcome
Antibiotic alone	3	17.6%	
Antibiotics and percutaneous aspiration	9	52.9%	Multiple aspirations required
Antibiotics and percutaneous drain	4	23.5%	
Surgical drainage	1	5.9%	Death

Fig 4: Number of aspiration performed in patient treated with percutaneous aspiration



Total of 17 patients of liver abscess were admitted during this period, of which, 13 were pyogenic and four amebic abscesses. The median age was 50 (7 - 75) years with male to female ratio of 1.42 : 1. Age group 40 - 60 years was most commonly affected (Fig 1). Single lesions were found in 11 (64.7%) and multiple in six (35.3%) patients. In 13 patients (76.5%), the abscess was on right lobe and in four (23.5%) patients on left lobe (Fig 2). Average duration of symptoms before presenting to hospital was 19.18 ± 9.1 (10 - 45) days. The most common symptoms and signs were fever (64.7%) and abdominal pain/tenderness (94.1%). Clinically evident jaundice was seen in 5 (29.4%) patients (Table 1). The results of routine hematological and biochemical tests are shown on Table 2. Most of the patients had leukocytosis (88.2%) and neutrophilia (82.3%) and 10 (58.8%) patients had abnormal liver function tests. Ultrasound was the initial imaging tool in all patients and had the accuracy of 88%. Abdominal CT scan was performed in 12 patients (70.6%).

Four patients had positive *Entamoeba histolytica* serology, hence labeled as amebic liver abscess. Of them three had single lesions; one had multiple lesions and in three patients, abscesses were on right lobe of liver. All of them were treated with antibiotics which included metronidazole. Of them, two received only antibiotics while two patients underwent percutaneous aspiration as well.

Potential underlying pathology was found in nine out of 13 (69.23%) patients with pyogenic liver abscess. Among

them five patients had biliary tree pathology and spread of infection via portal venous system was suspected in four patients, while four patients were regarded as cryptogenic because no definitive causes were found in them (Table 3). Pus and blood culture were positive in six (46.15%) and four (30.76%) patients respectively, and *E. coli* was the commonest pathogen isolated (Fig 3).

Various modalities of treatment were utilized for the patients (Table 4). Among the pyogenic abscess group, only antibiotics were sufficient for three patients. Percutaneous aspiration along with antibiotic coverage was the treatment in nine patients, and multiple aspirations were required for most of them (Fig 4). Percutaneous drainage and adequate antibiotics was performed in four patients. Choice of antibiotics was according to the protocol, empirically the broad spectrum antibiotics to cover all possible common microbes, and it was changed according to the culture sensitivity report once available. Intravenous ceftriaxone and metronidazole were given for 10 to 14 days followed by oral ciprofloxacin and metronidazole for variable periods depending on the response.

DISCUSSION

Liver abscess, particularly the pyogenic, is more prevalent in elderly population as compared to the higher incidence among younger population in the past. In a study by Mohsen *et al*, 77% of patients were above 50 years⁹ and in our study too, age group 40 - 60 years was the most prevalent one. There was male preponderance which is in accordance with other studies^{9,10,11}.

Various predisposing factors are involved in liver abscess, the commonest being portal venous spread, biliary tree pathology and cryptogenic etiology. This study shows the biliary tree pathology as the most common underlying factor followed by spread of infection through portal venous system (38% vs 23%) and this finding is supported by studies by Bertel *et al*¹², Cohen *et al*¹³, Chan *et al*¹¹ while is opposed by Ochsner *et al*¹, Perera *et al*² and Mohsen *et al*⁹ where portal venous spread was most common. One patient had history of liver trauma six months back. Only one patient had diabetes mellitus; however higher incidence was reported in other studies. There is high percentage of cryptogenic cases (30%) which can be due to inadequate evaluation for the cause and warrants more vigorous search for the underlying cause. Factors contributing for portal venous spread are colonic diseases like diverticulitis, inflammatory bowel disease, carcinoma; gastric condition like atrophic gastritis resulting in change in the bowel bacterial flora¹⁴; and immunocompromised conditions like diabetes, steroid use etc. Half of the pyogenic liver abscesses are

multicentric and three-fourth are located on right lobe. In this study, 77% lesions are located on right side which is in accordance with similar results from Alvarez *et al*¹⁵ and Wong *et al*¹⁶. Regarding multicentricity, one third of patients in this study had multiple lesions, as also reported by other studies^{9,11}.

The clinical features of liver abscess are non-specific. The most common features are fever and abdominal pain. Abdominal pain and tenderness was found in 94.1% of patients and was mostly right upper quadrant while fever was found in 64.7% of cases. Other non specific symptoms like nausea/vomiting, weight loss, night sweat, chest pain, diarrhea were found in about one third of patients. Clinical evidence of jaundice was seen in five (29.4%) cases while a lower incidence of 14% was seen in study by Mohsen *et al*⁹. Most cases presented late in the hospital with average duration of 19 days after symptoms started.

Abdominal ultrasound is the most commonly used diagnostic tool with sensitivity of 90%⁹. It is the initial imaging tool and the lesion appears as round to oval mass which is hypoechoic than liver parenchyma. It was performed in all patients and the accuracy in this series is 88% while CT scan was positive in all who had undergone this test. CT scan is highly sensitive with (95 - 100%) and can pick up small abscess and multiple abscesses which may be missed by Ultrasound. They appear as hypodense space occupying lesion with enhanced wall. Both CT and ultrasound are useful in diagnosing other intra-abdominal pathology, such as biliary disease (ultrasound) or inflammatory disorders like appendicitis or diverticulitis (CT).

The bacteriological analysis in our series revealed that *E. coli* was the most common pathogen isolated, which is in accordance with the many studies reported from Western countries^{9,17}, however higher incidence of *Klebsiella pneumoniae* was reported in studies from Taiwan^{18,19}. In this study pus culture was positive in 46% cases and blood culture only in 30% patients which is quite low as compared to other studies where pus and blood culture is positive in 75% and 50% cases. This low rate of isolation of microbes in culture can be attributed to many factors like poor quality of lab, improper technique of sample collection and transport, non-availability of anaerobic culture, many patients already had antibiotics etc.

When the diagnosis of pyogenic hepatic abscess is suspected, broad-spectrum IV antibiotics are started immediately to control ongoing bacteremia and its associated complications. Blood cultures and cultures of the abscess from aspiration are sent for aerobic and anaerobic cultures. The combination of ceftriaxone and metronidazole was used intravenously for 10-14 days followed by oral agents (ciprofloxacin and metronidazole).

The management of liver abscess has evolved over time. Before the use of antibiotics and surgical drainage procedures, liver abscess was fatal disease. Open surgical drainage was gradually started and, with the addition of antibiotics, was the sole treatment for hepatic abscess until the 1980s. However, since then less invasive percutaneous drainage techniques have been employed with good results and open surgical drainage is reserved for failure cases only^{1,20,21}. Indications of open surgical drainage at present time are failure of percutaneous drainage, large abscess >10 cm, requiring surgical treatment for other pathology eg. appendicitis, proximity to vital structures etc.

Percutaneous drainage procedures for pyogenic hepatic abscesses were first reported in 1953 but did not gain widespread acceptance until the development of high-quality imaging techniques and expertise in interventional radiologic techniques after 1980s. It has become the treatment of choice for liver abscess during last 20 years with success rates ranging from 69% to 90%^{10,22,23}. The advantages to catheter drainage are the simplicity of treatment, avoidance of general anesthesia and a laparotomy while relative contraindications include the presence of ascites, coagulopathy, or proximity to vital structures. In this study, percutaneous ultrasound guided drainage was used in four patients.

Nine patients in our study were subjected to percutaneous needle aspiration. This technique has become popular in recent time. The abscess is aspirated under ultrasound guidance with wide bore needle and usually multiple aspiration is required. In a study by Yu CH in 2004, 64 patients were randomized into two groups: Continuous catheter drainage and intermittent needle aspiration. The outcome was similar in terms of treatment success rate, hospital stay, antibiotic duration, and mortality. Two third patients required multiple aspirations; 40% required two aspirations, and 20% required three aspirations¹⁰.

There are some reports of treatment of liver abscess with antibiotics alone; however its role as standard treatment is controversial. Variable success rate as high as 79%²⁴ (Herbert DA *et al* 1982) and as low as 7%⁷ (McCorkell S 1985) has been reported. In a study by Mohsen *et al*, success of antibiotics alone was 58.4% (Seven out of 12 patients)⁹. Since most patients have had a diagnostic aspiration and thus at least a partial drainage in these cases. However, some series have shown very high mortality rate with antibiotics alone without any drainage procedures (59%-100%)²⁵. In present study, three patients were treated with antibiotics alone.

CONCLUSIONS

Liver abscess is a potentially life threatening disease, the

epidemiology and management of which have changed over time. The common associated pathology is the underlying gastrointestinal disorders like biliary tree and portal tract diseases. The clinical presentation is variable with fever and abdominal pain being the most common findings. Image guided percutaneous aspiration or drainage along with adequate antibiotics is the first line treatment of liver abscess at present time.

REFERENCES

1. Ochsner A, De Bakey M, Murrey S. Pyogenic liver abscess II: An analysis of forty-seven cases with review of the literature. *Am J Surg*. 1938; 40: 292-319.
2. Perera MR, Kirk A, Noone P. Presentation, diagnosis and management of liver abscess. *Lancet*. 1980; 2: 629-32.
3. Branum DD, Tyson GS, Branum MA, Meyers WC. Hepatic abscess: Changes in etiology, diagnosis, and management. *Ann Surg*. 1990; 121: 655-62.
4. Man KC, Tat SF, Edward CSL *et al*. Pyogenic liver abscess: An audit of experience over the past decade. *Arch Surg*. 1996; 131: 148-52.
5. D'Angelica M, Fong Y. The Liver. In: Townsend CM *et al* editors. Sabiston Textbook of Surgery. 18th ed. Philadelphia: Elsevier; 2008. p. 1489.
6. Herbert DA, Fogel DA, Rothman J, Wilson S, Simmons F, Ruskin J. Pyogenic liver abscesses: Successful non-surgical therapy. *Lancet*. 1982; 1: 134-6.
7. McCorkell SJ, Niles NL. Pyogenic liver abscesses: Another look at medical management. *Lancet*. 1985; 1: 803-6.
8. Rajak CL, Gupta S, Jain S, Chawla Y, Gulati M, Suri S. Percutaneous treatment of liver abscesses: Needle aspiration versus catheter drainage. *Am J Roentgenol*. 1998; 170: 1035-9.
9. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: ten years experience in a UK centre. *Q J Med*. 2002; 95: 797-802.
10. Yu Simon CH, Ho Simon SM, Lau WY, Yeung Deacons TK, Yuen Edmund HY, Lee Paul SF *et al*. Treatment of pyogenic liver abscess: Prospective randomized comparison of catheter drainage and needle aspiration. *Hepatology*. 2004; 39: 932-8.
11. Chan KS, Chen CM, Cheng KC, Hou CC, Lin HJ and Yu WL. Pyogenic liver abscess: A retrospective analysis of 107 patients during a 3-Year Period. *Jpn J Infect Dis*. 2005; 58: 366-8.
12. Bertel CK, Van Heeden JA, Sheedy PF II. Treatment of pyogenic hepatic abscesses: Surgical vs PCD. *Arch*

- Surg.* 1986; 121: 554-8.
13. Cohen JL, Martin MF, Rossi LR, Schoetz DJ. Liver abscess: The need for complete gastrointestinal evaluation. *Arch Surg.* 1989; 124: 561-4.
 14. Krasinski SD, Russell RM, Samloff IM *et al.* Fundic atrophic gastritis in an elderly population: Effect on hemoglobin and several serum nutritional indicators. *J Am Geriatr Soc.* 1986; 34: 800-6.
 15. Alvarez JA, Gonzalez JJ, Baldonado RF, Sanz L and Carreno G. Single and multiple pyogenic liver abscesses: etiology, clinical course, and outcome. *Dig Surg.* 2001; 18: 283-8.
 16. Wong WM, Wong BC, Hui CK, Ng M, Lai KC, Tso WK, Lam SK, Lai CL. Pyogenic liver abscess: Retrospective analysis of 80 cases over a 10-year period. *J Gastroenterol Hepatol.* 2002; 17: 1001-7.
 17. Alvarez JA, Gonzalez JJ, Baldonado RF, Sanz L, Carreno G, Junco A Rodriguez JI *et al.* Clinical course, treatment, and multivariate analysis of risk factors for pyogenic liver abscess. *Am J Surg.* 2001; 181: 177-86.
 18. Chou FF, Sheen-Chen SM, Chen YS and Chen MC. Single and multiple pyogenic liver abscesses: Clinical course, etiology and results of treatment. *World J Surg.* 1997; 21: 384-8.
 19. Cheng HP, Chang FY, Fung CP, and Siu LK. *Klebsiella pneumoniae* liver abscess in Taiwan is not caused by a clonal spread strain. *J Microbiol Immunol Infect.* 2002; 35: 85-8.
 20. Satiani B, Davidson ED. Hepatic abscesses: Improvement in mortality with early diagnosis and treatment. *Am J Surg.* 1978; 135: 647-50.
 21. Pitt HA, Zuidema GD. Factors influencing mortality in the treatment of pyogenic hepatic abscess. *Surg Gynecol Obstet.* 1975; 140: 228-34.
 22. Kaplan GG, Gregson DB, Laupland KB: Populationbased study of the epidemiology of and the risk factors for pyogenic liver abscess. *Clin Gastroenterol Hepatol.* 2004; 2: 1032-8.
 23. Johannsen EC, Sifri CD, Madoff LC. Infections of the liver: Pyogenic liver abscess. *Infect Dis Clin N Am.* 2000; 14: 547-63.
 24. Herbert DA, Fogel DA, Rothman J *et al.* Pyogenic liver abscesses: Successful non-surgical therapy. *Lancet.* 1982; 1: 134-6.
 25. Pope IM, Poston GJ: Pyogenic liver abscess. In: Blumgart LH, Fong Y, ed. *Surgery of the Liver and Biliary Tract*, London: WB Saunders; 2000: 1135-45.

Prevalence of Conventional Risk Factors and Lipid Profiles of Patients with First Day of Acute Coronary Syndrome Admitted in CCU of Gandaki Medical College Teaching Hospital, Pokhara, Nepal

Hirachan GP¹, Hirachan R², Thapa BB³, Thapa KB⁴

¹Professor and HOD, ³Clinical professor, ⁴Lecturer; Department of Medicine, ²Lecturer; Department of Anesthesia, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

Keywords

Acute coronary syndrome, Lipid profile, Risk factors.

Abbreviations:

ACS	Acute coronary syndrome
BMI	Body mass index
CABG	Coronary artery bypass grafting
CAD	Coronary artery disease
CCU	Coronary care unit
MI	Myocardial infarction
STEMI	ST-elevation myocardial infarction

Corresponding author

Dr. Gopi Prasad Hirachan
Professor & Head, Department of
Medicine, Gandaki Medical College
Teaching Hospital, Pokhara, Nepal
Email: hirachangopi7@gmail.com

ABSTRACT

Background: Out of the total number of patients admitted in coronary care unit (CCU) with acute coronary syndrome (ACS), 75 - 85% presented with conventional risk factors. On the other hand, lipid profile modification after a cardiovascular event related to acute coronary syndrome has also been recognized. But there are controversies regarding the temporary changes in lipid profile after ACS. In our country, there are limited studies about the basal characteristics of lipid profile and the variability of its components after an ACS.

Objectives:

- 1) To analyze the changes in lipoprotein levels in a group of patients hospitalized with ACS.
- 2) To describe the basal lipid profile.
- 3) To find out the prevalence of conventional risk factors of ACS patients.

Methods: A total of 300 patients with the diagnosis of ACS were studied and the presence of conventional risk factors including smoking, hypertension, dyslipidemia and diabetes were recorded. In addition, we also analyzed the lipid profile within the first 24 hours of admission and body mass index (BMI) of all the patients included in the study.

Results: Among a total of 300 patients, the mean age of men was 45 - 75 years and women 50 - 65 years. There were 47.5% patients with non-STEMI and 52.5% with ST-elevated myocardial infarction (STEMI). In patients with BMI <24, 23.9% were males and 32.2% females; in patients with BMI 25 - 29, 55.4% were males and 48.7% females and in patients with BMI >30, 20.7% were males and 19.1% females. Among the study population, prior myocardial infarction (MI) was seen in 29%, prior CABG in 4.2% and 10.5% had family history of CAD. In this study, diabetes and dyslipidemia were more in STEMI whereas dyslipidemia was common in non-STEMI. Among the conventional risk factors, smoking and hypertension were more common in STEMI in both men and women.

Conclusions: In all patients admitted in CCU, basal lipid profile should be evaluated at the time of admission for choosing the most adequate treatment.

INTRODUCTION

Extensive studies on acute coronary syndrome (ACS) regarding its diagnosis and management has proved that acute coronary syndrome and alteration of blood lipids have close relationship^{1,2,3}. There is a general agreement that the evaluation of level of plasma lipids within first 24 hours of admission after an ACS reflects its habitual value^{4,5,6}. Conventional risk factors such as hypertension, diabetes, smoking and dyslipidemia increase the risk of developing acute coronary events⁷⁻¹³.

Increasing evidence suggest that statins decrease morbidity and mortality when administered early after admission to all the patients with acute coronary syndrome^{9,14,15}. This is of prime importance that in hospital lipid testing and initiation of statins use in all patients with ACS are strongly recommended^{8,16-18}.

The relationship between lipid profile and obstruction disease in coronary arteries are well known event^{6,10,17,18}. It has been suggested from OPERA registry that in patients with ACS, the in-hospital deaths were due to untreated dyslipidemia². It has been recognized that alteration in lipid level consists of decrease in total cholesterol, LDL-C and increased triglyceride after ACS^{1,19}. There is strong association between risk factors and occurrence of coronary artery disease^{7,9,14}. There have been conflicting reports regarding risk factors and severity of coronary atherosclerosis^{9,20}.

The primary goal of our study was to analyze the changes in the plasma level of total cholesterol, low density lipoprotein-C (LDL-C), high density lipoprotein-C (HDL-C) and triglyceride within first 24 hours of admission and to find out the conventional risk factors and its association with severity of ACS.

METHODS

This was a databased cross-sectional study. Information was gathered from the registry of coronary care unit (CCU) of Gandaki Medical College Teaching Hospital from October 2012 to September 2013. The data which were recorded includes demographic information, cardiac history, clinical characteristics and laboratory investigations. Patients with diagnosis of ACS were identified and classified as ST-elevation myocardial infarction (STEMI) or non ST-

elevation myocardial infarction (Non-STEMI) on the basis of clinical characteristics and electrocardiogram changes and biochemical markers.

In all the patients recorded for the study, the presence or absence of conventional risk factors was recorded at the time of admission to CCU. For all the patients, serum total cholesterol, LDL-C, HDL-C, triglycerides were determined within the first 24 hours of admission.

BMI was also calculated in all the patients who were included in our study. Patients were classified as normal (BMI <24.9), overweight (BMI 25 - 29.9) or obese (BMI >30). In our study, patients who had been receiving lipid lowering drugs were excluded.

Statistical analysis

All the patients were stratified by sex for further analysis. All the variables were reported by frequency and percentage; groups were compared with percentage on chi-square testing. Reports were calculated by student t-test. P value <0.05 was considered significant. All the analysis was performed using SPSS 16.

RESULTS

In our study, a total of 300 patients were included with features of ACS. We analyzed the conventional risk factors among these patients. Among them 30% were STEMI and 70% were non-STEMI. The total number of male patients with STEMI were 55% and non-STEMI were 61.1%; similarly among the female patients, total STEMI were 38.8% and non-STEMI were 33.33%. Among the conventional risk factors, smoking and high blood pressure were most frequently encountered in our study followed by dyslipidemia and diabetes. Most patients were overweight (BMI >25) and men were more overweight than women in our study (55.4% in men and 48.7% in women) with p value 0.04.

In our study, high level of cholesterol (200 ±48) was found in males and 198 ±45 in females. Triglycerides were significantly higher among men 175 ±44 than in women 154 ±35 (p value 0.003). HDL-C was significantly lower in both men and women. Previous history of MI was found in 29.1% of all patients with almost no difference between men and women (27.9 versus 26.5 respectively with p value of 0.016).

Fig 1: Prevalence of conventional risk factors

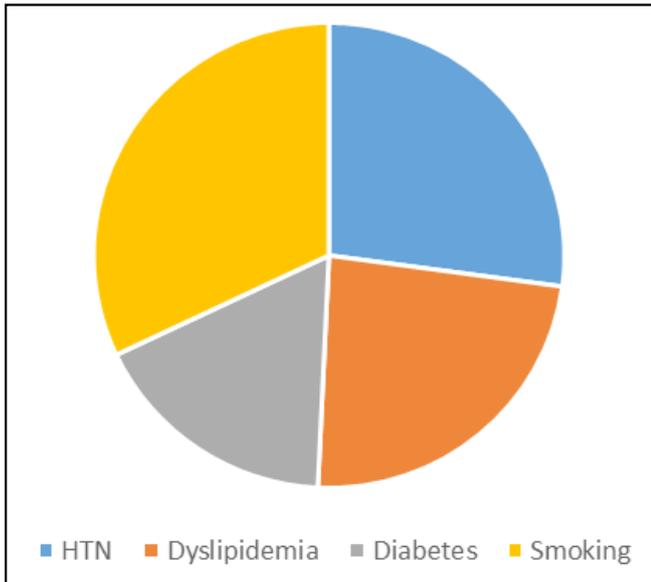


Fig 2: Prevalence of conventional risk factors in different age groups

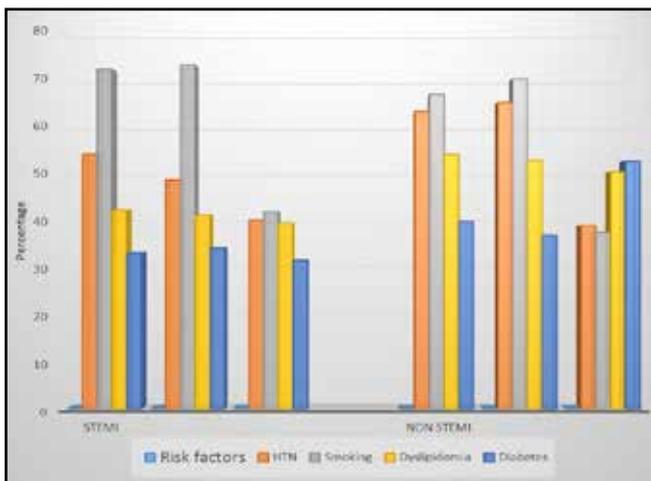


Fig 3: Mean lipid values on admission in men

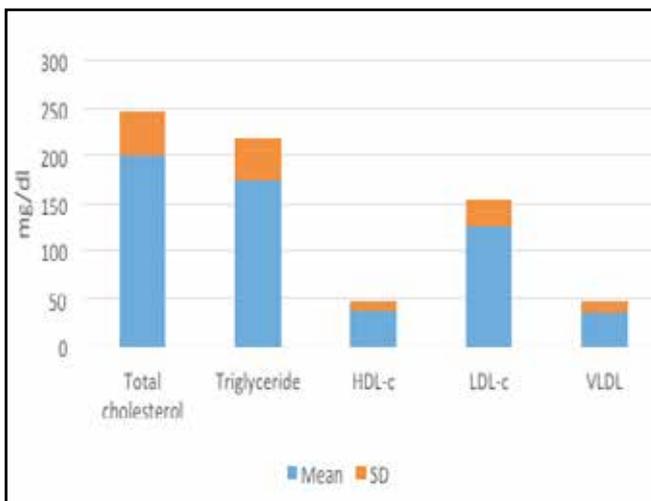
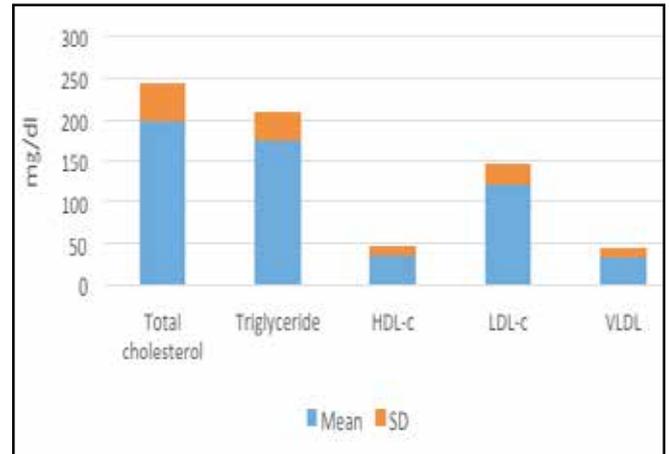


Fig 4: Mean lipid values on admission in women



DISCUSSION

In this study, we included patients with acute coronary syndrome (both ST elevation MI and non ST elevation MI). We found that conventional risk factors were common, at least one form of risk factor like smoking, dyslipidemia, diabetes and high blood pressure were present in patients with any form of MI. The lipid profile analyses demonstrate that some type of dyslipidemia is present in all patients and among them males had higher values than females.

The prevalence of conventional risk factor is high in all patients with ACS but dyslipidemia and smoking were common in males and hypertension and diabetes were common among the female patients. In our series, the risk factors with higher prevalence were smoking and hypertension respectively. A similar finding was reported in INTERHEART study¹.

In the past, it was thought that more than 50% patients with CAD had no conventional risk factor but in one study done by Rosengren showed that there is higher prevalence of one or more risk factors for CAD in individuals who developed acute coronary syndrome¹². Knot *et al*, analyzed 1,22,458 patients in 14 clinical studies on ACS, and demonstrated that 85% of patients had at least one of the four conventional risk factors⁷.

Although epidemiological studies have shown a reduction in total cholesterol and LDL-C levels in general population, the levels of HDL-C have reduced significantly¹. This reduction has attributed to increased frequency of obesity, insulin resistance and diabetes^{11,21}. So a better knowledge of lipid profile in patients with ACS allows better understanding of type of dyslipidemia and for tailoring specific treatment.

CONCLUSIONS

In ACS patients, the prevalence of conventional risk factors were common and among them hypertension and smoking were most common to STEMI and dyslipidemia and diabetes to non-STEMI. Most patients presented with one to three risk factors. The lipid profile analysis helps to find out some type of dyslipidemia in all patients. So determining the lipid profile of patients admitted with ACS allows for early detection of type of dyslipidemia and thereby helps to select the type or intensity of lipid lowering therapy because many of the risk factors are modifiable and can be treated.

REFERENCES

- Pacheco HG, Barron JV *et al.* Prevalence of conventional risk factors and lipid profile in patients with acute coronary syndrome and significant coronary disease. *Ther Clin Risk Manag.* 2014; 10: 815-23.
- Montalescot G, Dallongeville J, Van Bella E *et al.* PERA Investigator STEMI and Non-STEMI: Are they so different? 1 year outcomes in acute myocardial infarction as defined by the ESC/ACC definition (the OPERA registry). *Eur Heart J.* 2007; 28(12): 1409-17.
- Rosenson RS. Myocardial injury: The acute phase response and lipoprotein metabolism. *J Am Coll Cardiol.* 1993; 22(3): 933-40.
- Siniawski D, Masson W *et al.* Changes in lipid profile of patients with acute coronary syndrome within the first days of hospitalization. *Rev Argent Cardiol.* 2010; 78: 238-44.
- Canto JG, Kiefe CI, Rogers WJ *et al.* Number of coronary heart disease risk factors and mortality in patients with first myocardial infarction. *JAMA.* 2011 Nov; 306(19): 2120-2127.
- Jackson R, Scrogg R, Marshall R *et al.* Changes in lipid concentration during first 24 hours after myocardial infarction. *BMJ.* 1987; 294: 1588-9.
- Knot UN, Knot MB, Bajzer CT *et al.* Prevalence of conventional risk factors in patients with coronary heart disease. *JAMA.* 2003; 290(7): 898-904.
- Roe MT, Halahi AR, Metha RH *et al.* Documented traditional cardiovascular risk factors and mortality in non-ST segment elevation myocardial infarction. *Am Heart J.* 2007; 153(4): 507-514.
- Dey S, Flather MD, Devlin G *et al.* Sex related differences in the presentation, treatment and outcomes among patients with acute coronary syndromes: The global registry of acute coronary events. *Heart.* 2009; 95(1):20-6.
- Pitt B, Loscalzo J, Yeas J, Raichlen JS. Lipid levels after acute coronary syndrome. *J Am Coll Cardiol.* 2008; 51: 1440-1145.
- Gregg EW, Cheng YJ, Cadwell BL *et al.* Secular trends in cardiovascular disease risk factors according to body mass index in US adults. *JAMA.* 2005; 293(15): 1868-1874.
- Rosengren A, Wallentin L, Simoons M *et al.* Cardiovascular risk factors and clinical presentation in acute coronary syndrome. *Heart.* 2005; 91(9): 1141-1147.
- Futterman LG, Lemberg L. Fifty percent of patients with coronary artery disease don't have any of the conventional risk factors. *Am J Crit Care.* 1998; 7: 891-7.
- Ko DT, Alder DA, Newman AM, Donovan LR, Tu JV. Association between lipid testing and statin therapy in acute myocardial infarction patients. *Am Heart J.* 2006; 150: 419-425.
- Paudel B, Paudel K. Western Nepal Acute Coronary Syndrome registry: Characters, management in Hospital outcome of patients admitted with acute coronary syndrome in Western Nepal. *J-GMC-N.* 2009; 2(3):51-59.
- Saab F, Mukherjee D, Gurm H *et al.* Risk factors in first presentation acute coronary syndrome (ACS): How do we move from population to individual risk prediction? *Angiology.* 2009; 60(6): 663-667.
- Henkin Y, Crystal E, Goldberg Y, Friger M *et al.* Usefulness of lipoprotein changes during acute coronary syndrome for predicting post discharge lipoprotein level. *Am J Crdiol.* 2002; 89: 7-11.
- Pitt B, Loscalzo J, Ycos J, Raichlen JS. Lipid levels after acute coronary syndrome. *J Am Coll Cardiol.* 2008; 51(15): 1440-1145.
- Balci B. The modification of serum lipids after Acute Coronary Syndrome and importance in clinical practice. *Curr Cardiol Rev.* 2011 Nov; 7(4): 272-6.
- Krishnaswami S, Jose VJ, Joseph G. Lack of correlation between coronary risk factors and CAD severity. *Int J Cardiology.* 1994; 47(1): 37-43.
- Fresco C, Meggioni AP, Signorini S, Merlini PA, Mocarelli P, Fabbri G *et al.* Latin investigators variation in lipoproteins levels after myocardial infarction and unstable angina: The LATIN trial. *Ital Heart Journal.* 2002; 3: 587-592.

Effect of Yoga Breathing Exercises on Ventilatory Function

Banstola D^{1*}

¹Associate professor, Physiology Department
Institute of Medicine, Maharajgunj, Kathmandu, Nepal

ABSTRACT

Introduction: Controlled breathing not only keeps your mind and body functioning at their best, it can also lower blood pressure, promote feelings of calm and relaxation and help you de-stress. Many experts encourage using the yoga breathing exercises as a means of increasing awareness, mindfulness and reducing anxiety. Over-worked, under-slept, and feeling pressure may impair breathing pattern. There are some yoga breathing exercise techniques that improve ventilatory function.

Objective: To assess the effect of yoga breathing exercises on their ventilatory function.

Methods: Forty eight male and female students of 18 - 30 years were involved in the study of ventilatory function before and after yoga breathing exercise. Pulmonary function tests were performed with the subject sitting in a comfortable chair. Initial recording of tidal volume, inspiratory capacity, inspiratory reserve volume, expiratory reserve volume, forced vital capacity, and timed vital capacity in one second were measured.

Results: There was significant increase in inspiratory reserve volume, expiratory reserve volume, vital capacity, forced expiratory volume in one second and forced vital capacity after yoga breathing exercise.

Conclusion: Yoga breathing exercise improves ventilatory function.

Keywords

Yoga, Breathing exercise, Ventilatory function.

Corresponding author

*Dinesh Banstola, Associate professor
Physiology Department
Institute of Medicine, Maharajgunj,
Kathmandu, Nepal
Email: dinesh_banstola@hotmail.com*

INTRODUCTION

Controlled breathing not only keeps your mind and body functioning at their best, it can also lower blood pressure, promote feelings of calm and relaxation and help you de-stress. Many experts encourage using the yoga breathing exercises as a means of increasing awareness, mindfulness and reducing anxiety. Over-worked, under-slept, and feeling pressure may impair breathing pattern. There are some yoga breathing exercise techniques that improve ventilatory function¹⁻⁴.

Breathing is synonymous with being alive. Correct breathing leads to proper ventilation and oxygenation⁵⁻⁹. Breathing even though finely controlled by neural and

chemical feedback mechanisms can be affected by many ways e.g. stress, anxiety, panic states, abdominal and thoracic trauma and surgery apart from diseases of respiratory system¹⁰⁻¹⁵. Breathing exercise is used widely in clinical medicine as one of the methods of physiotherapy. It is also used in everyday life as a part of relaxation technique to alleviate stress and to regularize breathing pattern.

Certain guided breathing exercises are being used like yoga, pranayama and chants are advocated to improve pulmonary function. Respiratory muscles strengthening were tried using music therapy exercise. Effects of meditation and mental chanting of "OM" on certain

physiological parameters has been studied by several workers. These studies show increased alertness, autonomic changes, physical relaxation, changes in oxygen consumption, and basal metabolic rate. Large number of literature is available on the effects of music therapy. Listening to specific "ragas" is said to improve health, bring down elevated blood pressure, relieve headache and abdominal pain. No extensive study has gone into the mechanism of such therapy benefits.

Effect of yoga breathing exercises on their ventilatory function has not been so far studied. The present investigation was to assess the certain pulmonary functions before and after yoga breathing exercise in young male and female students.

OBJECTIVE

To assess the effect of yoga breathing exercises on their ventilatory function.

METHODS

Forty eight students were involved in the study of ventilatory function before and after yoga breathing exercise. Both male and female students were involved. The students were within 18 to 30 year age groups.

Inclusion criteria

1. Subjects 18 - 30 years without respiratory problems
2. Non-smokers
3. Subjects without history of chronic cardiovascular disease
4. Subjects without history of allergy that affects breathing

Exclusion criteria

1. Subjects with upper respiratory tract infections and any sort of other respiratory disorders
2. Subjects with smoking habits
3. Subjects with history of chronic cardiovascular disease
4. Subjects with history of allergy that affects breathing

All tests were done at the same time of the day to avoid possible diurnal variation. Informed consent was obtained from each volunteered student for this study.

Pulmonary function tests were performed in Knipping-open spirometer C.F. Palmer Ltd, London, England. Before each test the subject was familiarized with the instrument

and a detailed instruction cum demonstration upto the satisfaction was given. All the procedures were carried out in the postgraduate laboratory, Physiology Department, IOM.

During the test, the subjects were adequately encouraged to perform at their optimum level. The forced respiratory maneuvers were repeated at least five times and the highest values were considered for the analysis.

Pulmonary function tests were performed with the subject sitting in a comfortable chair. After reassurance, the procedure was explained. Initial measurement of tidal volume (TV), inspiratory capacity (IC), inspiratory reserve volume (IRV), expiratory reserve volume (ERV), forced vital capacity (FVC) and timed vital capacity in one second (FEV1) measured. Breaths interrupted by swallowing or coughing were identified and discarded.

Spirometry is a procedure that measures the volume of air an individual inhales or exhales as a function of time¹⁻¹¹. The measurement was performed with the subject in an upright position, usually seated. Procedure was demonstrated till subjects were clear regarding the technique. Subjects were given instruction to loosen their clothes that might restrict the movement of the chest and upper abdomen.

Yoga breathing exercises session

After initial recording of the above tests, the yoga breathing exercise was administered at morning time, in small groups of six to eight people. All subjects were put through daily practice of "yoga breathing exercise" for one hour each day for 60 days.

Method 1: Bhastrika pranayam: Bellows breath

1. **Breathe in deeply through your nostrils.** First, feel the diaphragm move down, allowing the lungs to expand and forcing the abdomen out; then feel your chest expand with your collar bones rising last.
2. **Breath out quickly through your nostrils.** Feel your collar bones dropping, chest deflating, and abdomen shrinking as the lungs collapse. This process of exhaling should be much faster than the process of inhaling - almost like a rapid deflation.
3. **Repeat the process.** When correctly done, your chest will expand when you breathe in and deflate when you breathe out. Continue doing this for five minutes.
4. **With practice, speed up your breathing.** Beginners should always start slowly to avoid hyperventilating, but over time, it will be possible to turn this into a rapid breathing technique.

Method 2: Kapalbhata pranayam: Shining forehead breath

1. **Inhale through your nostrils normally until your lungs are full.** Keep your inhalation slow but unforced. First, feel the diaphragm move down, allowing the lungs to expand and forcing the abdomen out; then feel your chest expand with your collar bones rising last.
2. **Exhale through both nostrils forcefully.** This places the emphasis of the breath on the exhale rather than the (natural) inhale. Assist your exhalation by pulling in your stomach muscles to expel air. Exhaling should take much less time than it took to inhale.
 - “Forced” exhalation means that the contraction of your stomach muscles helps push the air out of your body. It does **not** mean that the exhalation should be uncomfortable for you in any way
3. **Repeat breaths for 15 minutes.** You may take a minute rest after every five minutes.

Method 3: Anulom vilom pranayam: Alternate nostril breath

1. **Close your eyes.** Focus your attention on your breathing.
2. **Close the right nostril with the right thumb.** Simply press the thumb against your nostril to block it.
3. **Inhale slowly through the left nostril.** Fill your lungs with air. First, feel the diaphragm move down, allowing the lungs to expand and forcing the abdomen out; then feel your chest expand with your collar bones rising last.
4. **Remove your thumb from your right nostril.** Keep your right hand by your nose and your lungs full of air.
5. **Use your ring and middle finger to close your left nostril.** Most people find it easier to continue using the same hand to block either nostril, but you’re welcome to switch hands depending on which nostril you’re blocking. You can also switch if your arm gets tired
6. **Exhale slowly and completely with the right nostril.** Feel the collar bones dropping, chest deflating, and abdomen shrinking as the lungs collapse. When you’ve finished exhaling, keep your left nostril closed.
7. **Inhale through the right nostril.** Fill your lungs.

8. **Close the right nostril and open the left.**
9. **Breathe out slowly through the left nostril.** This process is one round of anulom vilom pranayam.
10. **Continue for 15 minutes.** You may take a minute’s rest after every five minutes of exercise.

Method 4: Bahya pranayam: External breath

1. **Inhale deeply through your nose.** First, feel the diaphragm move down, allowing the lungs to expand and forcing the abdomen out; then feel your chest expand with your collar bones rising last.
2. **Exhale forcefully.** Use your stomach and diaphragm to push the air from your body. “Forced” exhalation means that the contraction of your stomach muscles helps push the air out of your body. It does **not** mean that the exhalation should be uncomfortable for you in any way.
3. **Touch your chin to your chest and suck in your stomach completely.** The goal is to leave a hollow below your ribcage, making it look like the front muscle wall of your abdomen is pressed against the back. Hold this position -- and your breath -- for as long as is comfortable.
4. **Lift your chin and breathe in slowly.** Allow your lungs to completely fill with air.
5. **Repeat three to five times.**

Method 5: Bhramari pranayam: Bee breath

1. **Close your eyes.** Focus on your breathing.
2. **Place your thumbs in your ears, your index fingers above your eyebrows, and remaining fingers along the sides of your nose.** Keep each pinky finger near a nostril.
3. **Breathe in deeply through the nose.** First, feel the diaphragm move down, allowing the lungs to expand and forcing the abdomen out; then feel your chest expand with your collar bones rising last.
4. **Use your pinkies to partially close each nostril.** Keep your lungs filled.
5. **Breathe out through the nose while humming.** Note that the humming sound should originate in your throat, not as a result of your partially-blocked nostrils.
6. **Repeat three times.**

Method 6: Udgeeth pranayam: Chanting breath

1. **Breathe in deeply through the nose.** First, feel the diaphragm move down, allowing the lungs to expand

and forcing the abdomen out; then feel your chest expand with your collar bones rising last

2. **Exhale very slowly while saying Om.** Allow the syllable to draw out as slowly as you can. Make sure to keep the 'O' long and the 'M' short. ("OOOOOom.")
3. **Repeat three times.**

All the lung volume and capacities were estimated for the entire group of students after 15 days of breathing exercise session. The mean values of guided breathing exercises were compared with the mean values of the same parameters after breathing exercise using paired "t" test. P values of <0.05 was considered significant. Each subject acted as his own control.

Results were tabulated. Age, height and weight of each subject were recorded and body surface area was calculated.

RESULTS

Forty eight students were involved in the study. The mean age of subject was 21.05 years. The mean height was 1.61 meters. The mean weight of students was 57.3 kg. The mean body surface area was 1.61 sq meter.

The values of the lung volume, capacities and percentage of FEV1/FVC parameters measured in subject before and after yoga breathing exercise depicted in Table 1.

Table 1: Parameters of lung volume, capacities, FEV1 and percentage of FEV1/FVC

S No	Test	Parameter	Mean	SD ± SE	t value	p value
1	Pre test	IRV	1549.47	454.5 ± 65.6	4.97	0.0001*
	Post test		1704.34	490.5 ± 62.8		
2	Pre test	ERV	1281.25	391.8 ± 56.5	3.5	0.004*
	Post test		1450.62	461 ± 73.8		
3	Pre test	TV	505.72	145.4 ± 20.9	-0.91	0.224
	Post test		499.06	125.8 ± 27.4		
4	Pre test	IC	2056.25	507.5 ± 73.2	3.14	0.005*
	Post test		2183.83	573.7 ± 95.3		
5	Pre test	VC	2973.95	683.2 ± 98.6	3.56	0.003*
	Post test		3280.98	721.6 ± 104.7		
6	Pre test	FVC	3007.39	633.4 ± 91.4	2.99	0.006*
	Post test		3219.91	718.3 ± 105.6		
7	Pre test	FEV1	2398.60	710.7 ± 102.5	3.28	0.001*
	Post test		2659.84	716.6 ± 105.7		
8	Pre test	% of FEV1 / FVC	80.21	14.7 ± 2.1	0.98	0.248
	Post test		83.19	12.389 ± 1.6		

*p value significance as it is <0.05

The mean value of tidal volume before exercise was 505.7

ml but after yoga breathing exercise it decreased up to 499 ml which was statistically insignificant (p>0.05).

Mean inspiratory reserve volume of total subjects was 1549 ml before exercise but after exercise it increased up to 1704 ml. Increment of inspiratory reserve volume was statistically significant (p<0.05).

The mean value of inspiratory capacity before exercise was 2056 ml but after yoga breathing exercise it increased up to 2183 ml which was statistically significant.

The mean expiratory reserve volume of total subjects was 1281 ml before exercise but after exercise it increased upto 1450 ml. The increment was statistically significant (p<0.05).

The mean value of vital capacity before exercise was 2973 ml but after yoga breathing exercise it increased up to 3280 ml. The increments and p-value are significant.

The mean forced vital capacity of total subjects was 3007 ml before yoga breathing exercise but after yoga breathing exercise it increased up to 3219 ml.

The mean expiratory volume in one second was 2398 ml before exercise but after yoga breathing exercise it increased up to 2659 ml which is highly significant.

The mean value of percentage of FEV1 was 80% before yoga breathing exercise it increased upto 82%. The values are however statistically non-significant.

DISCUSSION

Yoga was practiced since more than one thousand years in Indian subcontinent. It consists of exercise of different body parts. Breathing exercises are one of them. Yoga is considered to be a very good exercise for maintaining proper health and also has a profound effect on the lung function of an individual. It is claimed that yogic practices help in prevention, control and rehabilitation of many respiratory diseases. Yoga breathing exercise increases compliance of lungs and thorax, airway resistance and strength of respiratory muscles¹⁶⁻²⁰.

Some researchers like Vinayak P, Doijad *et al*¹⁶, Makwana K *et al*¹⁷, Joshi LN *et al*¹⁸, Yadav RK *et al*¹⁹ and Sodhi C *et al*²⁰ had carried out study on effect of yoga breathing exercise on pulmonary or ventilatory functions and they all observed that following yoga breathing practice there was significant improvement in forced vital capacity (FVC) and timed vital capacity in one second (FEV1) but there was no significant change in tidal volume (TV) and percentage of timed vital capacity in one second (%FEV1)¹⁶⁻²⁰. This

finding is similar to present study result.

Tidal volume

During quiet breathing, expiration is a passive process and is brought about by relaxation of the inspiratory muscles and lung recoil. Since contraction of the inspiratory muscles increases the size of the thoracic cage, relaxation of the same muscles decreases the size of the thoracic cage to the original. That is enough to generate positive pressure in the lungs to expel the normal tidal volume. Spirometric measurement of tidal volume varies from breath to breath.

Tidal volume was found to be less after yoga breathing exercises. The mean value of tidal volume before exercise was 505.7 ml but after yoga breathing exercise it decreased up to 499 ml which was statistically insignificant ($p > 0.05$).

Inspiratory reserve volume and inspiratory capacity

Inspiratory reserve volume and inspiratory capacity depend upon the use of accessory muscles of respiration. These forced breathing maneuvers depend on the strength of inspiratory muscles. These muscles have to be used to their maximum capacity to inhale the inspiratory reserve volumes.

Mean inspiratory reserve volume of total subjects was 1549 ml before exercise but after exercise it increased up to 1704 ml. Increment of inspiratory reserve volume was statistically significant ($p < 0.05$).

The mean value of inspiratory capacity before exercise was 2056 ml but after yoga breathing exercise it increased up to 2183 ml which was statistically significant. Better use of inspiratory muscles following yoga breathing exercise may be the reason for the increase in inspiratory reserve volume and inspiratory capacity.

Expiratory reserve volume

Expiratory muscles have to be used to their maximum capacity to expel the expiratory reserve volume. During forceful expiration abdominal muscles play an important role augmenting the expiratory pressure.

The mean expiratory reserve volume of total subject was 1281ml before exercise but after exercise it increased upto 1450 ml. The increment was statistically significant ($p < 0.05$).

Better use of the expiratory muscles following yoga breathing exercise may be the reason for the increase in expiratory reserve volume. Decreased airway resistance may be indirectly contributing in the increase to expiratory reserve volume.

Vital capacity

Vital capacity depends on the strength of respiratory muscles compliance of lung and chest wall, airway resistance, integrity of pleura and thoracic structures. The mean value of vital capacity before exercise was 2973 ml but after yoga breathing exercise it increased up to 3280 ml. The increments and p-value are significant. Yoga breathing exercises have resulted in increased values of vital capacity and forced vital capacity. This can be explained by better use of respiratory muscles, greater compliance and mobility of chest wall structures or decreased airway resistance following yoga breathing exercise.

Forced vital capacity and forced expiratory volume in one second

The mean forced vital capacity of total subjects was 3007 ml before yoga breathing exercise but after yoga breathing exercise it increased up to 3219 ml.

The mean expiratory volume in one second was 2398 ml before exercise but after yoga breathing exercise it increased up to 2659 ml which is highly significant. FEV1 depends on the airway resistance. It is a test to differentiate obstructive lung disease and restrictive lung disease. Increased FEV1 may be due to lesser airway resistance after yoga breathing exercise.

The percentage of FEV1

The mean value of percentage of FEV1 was 80% before yoga breathing exercise, and it increased up to 83%. The values are however statistically non-significant.

Some researchers claim effectiveness of yoga therapy, which may include improved pulmonary function, muscle relaxation, reduced anxiety levels. Yoga breathing exercises may be a better therapeutic modality since the present study revealed improved ventilatory function following yoga breathing exercises. This was evident from the increase in the value of inspiratory reserve volume, inspiratory capacity, vital capacity, expiratory reserve volume, forced vital capacity and forced expiratory volume in one second.

CONCLUSION

In conclusion, yoga breathing exercises are feasible and can improve lung function. It seems to be beneficial on respiratory efficiency. Further studies are required to establish the fact that whether yoga exercises can improve quality of life by preventing respiratory disorder.

REFERENCES

1. Rodrigues MR, Carvalho CRF, Santaella DF, Filho GL, Marie SKN. Effects of yoga breathing exercises on pulmonary function in patients with Duchene muscular dystrophy: An exploratory analysis. *J Bras Pneumol*. March - April 2014; 40(2). Webpage:<http://dx.doi.org/10.1590/SI 806-37132014000200005>.
2. Holland AE, Hill CJ, Jones AY, McDonald CF. Breathing exercises for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2012; 10:CD008250.
3. Posadzki P, Ernst E. Yoga for asthma? A systematic review of randomized clinical trials. *J Asthma*. 2011; 48(6):632-9.
4. Field T. Exercise research on children and adolescents. *Complement Ther Clin Pract*. 2012; 18(1):54-9.
5. Giri PR., Sharma B, Jindal SK. Normal Spirometry in healthy natives of Bhutan. *Journal of Association Physician, India*. 1996; 44:320-322.
6. Gansler EA. Analysis of ventilator defect by timed capacity measurement. *Am Rev Tuberc*. 1951; 64:256-278.
7. Leslie A. Inspiratory expiratory vital capacity test of pulmonary function. *American Journal of Medicine*. 1952; 13: 809-812.
8. Knudson RJ, Slatin RC, Lebowitz MD. The maximal expiratory flow-volume curve: Normal standards, variability and effects of age. *Am Rev Respir Dis*. 1976; 113:587-600.
9. Polgar G, Wong TR. The functional development of respiratory system. *American review of Respiratory Disease*. 1979; 170:625-695.
10. Dickman DL, Schmidt Gardner RM. Spirometric standard for normal children and adolescents age 5 - 18 years. *American Review of Respiratory Disease*. 1971; 104:680-687.
11. Culver BH, Butler J. Alternation in pulmonary function: In principles of geriatric medicine. Anders R, Bierwman EL, Hazzard WR. 1985; 26:280-87.
12. Seely JE, Gujmen CA, Fecklake MR. Heart and lung function at rest and exercise in adolescents. *Journal of applied physiology*. 1974; 6:34-40.
13. Bye PTP, Farkas GA, Roussos C. Respiratory factors limiting exercise. *Annual Review of physiology*. 1983; 45:439-451.
14. Sobush DC. Breathing exercises: Laying a foundation for a clinical guideline. *Cardiopulmonary Physical Therapy Journal*. 1992; 3:8-10.
15. Bart Lett RH, Gazzaniga AB, Geraputy TR. Respiratory maneuvers to prevent post operative pulmonary complication: A critical review. *JAMA*. 1973; 224:10-17.
16. Doijad VP, Surdi AD. Effect of short term yoga practice on pulmonary function tests. *Indian Journal of Basic and Applied Medical Research*. 2012; 1(3): 226-230.
17. Makwana K, Khirwadkar N, Gupta HC. Effect of Short term yoga practice on ventilatory function tests. *Indian J Physiol Pharmacol*. 1988; 32(3):202-8.
18. Joshi LN, Joshi VD, Gokhale LV. Effect of short term pranayam practice on breathing rate and ventilatory functions of lung. *Indian J Physiol Pharmacol*. 1992; 36(2):105-8.
19. Yadav RK, Das S. Effect of yogic practice on pulmonary functions in young females. *Indian J Physiol Pharmacol*. 2001; 45(4):493-6.
20. Sodhi C, Singh S, Dandona PK. A study of the effect of yoga training on pulmonary functions in patients with bronchial asthma. *Indian J Physiol Pharmacol*. 2009; 53(2):169-74.

The Incidence of Bleeding and the Factors That Influence Its Development among Patients Admitted With Dengue Fever

Thapa KB^{1*}, Namrata KC², Koirala T¹, Bhattarai A²

¹Consultant Physician & Lecturer, Department of Medicine, ²Lecturer, Department of Pediatrics, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

ABSTRACT

Background: Dengue virus is now classified as a major global health threat by the World Health Organization. Bleeding is a common complication and is one of the most feared. There is an increase incidence in the adult population, hence, the focus of this study.

Objectives: To determine the incidence of bleeding and the factors that influence its development among patients admitted with dengue fever at Fatima Medical Center, Phillipines from January 2009 to December 2011.

Methods: This is a case control study using chart review. The incidence of bleeding is calculated using risk ratio. Factors affecting bleeding are determined using chi square for qualitative variables and T-test or ANOVA for quantitative variables. Simultaneous determination of factors association with bleeding will be analyzed using multiple logistic regression. Level of significance will be set at alpha = 0.05.

Results: The female sex is significantly more prone to develop bleeding (p=0.044). There is no significant increase in bleeding in patients who have co-morbidities (p=0.447). In every one unit increase in WBC (1 x 10⁹) the odds of bleeding decrease by 15%. For every one unit increase in hematocrit the odds of bleeding decreases by 6.8%. For every one unit increase in platelet count the odds of bleeding decreases by 3% that is every 10 unit increase in platelet count the odds of bleeding decrease by 22.9%.

Conclusions: Female sex, a low initial WBC and platelet count will increase a patient's propensity to develop bleeding.

Keywords

Bleeding, Dengue fever, Thrombocytopenia.

Corresponding author

*Krishna Bahadur Thapa
Consultant Physician & Lecturer
Department of Medicine
Gandaki Medical College & Teaching
Hospital, Pokhara, Nepal
Email: krish_thapa09@yahoo.com

INTRODUCTION

Dengue fever is the most common arboviral illness. It is now classified as a major global health threat by the World Health Organization (WHO) and estimates that presently about two-fifths of the world population is at risk of this viral infection¹. Dengue was first reported in 1780, when Benjamin Rush described this condition as "break-bone fever". It is a mosquito-borne viral infection caused by four serotypes². Infection with dengue virus causes a broad spectrum of illnesses, ranging from asymptomatic infection, undifferentiated fever and classical dengue

fever (DF) to the more severe forms dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) with high rates of morbidity and mortality^{3,4}. Infection with one serotype of dengue virus (DENV) provides lifelong immunity to that serotype, but results only in partial and transient protection against subsequent infection by the other three serotypes. It is well documented that sequential infection with different DENV serotypes increases the risk of developing dengue hemorrhagic fever (DHF). There is currently no specific treatment for DENV infection, although several potential vaccines are

in development; therefore, the only method of preventing DENV transmission is vector control^{5,6}.

The pathognomonic feature of DHF is an increase in systemic vascular permeability resulting in reduced intravascular plasma volume, with progression to hypovolemic shock in severe cases⁸. Thrombocytopenia and coagulopathy are also prominent features of symptomatic infection. Severe thrombocytopenia and increased vascular permeability are two major characteristics of dengue hemorrhagic fever (DHF). An immune mechanism of thrombocytopenia due to increased platelet destruction appears to be operative in patients with DHF^{7,8}. This study will focus on adult patients with bleeding and thrombocytopenia. Bleeding is a common complication of dengue and is one of the most feared. Bleeding is caused by capillary fragility and thrombocytopenia and may manifest in various forms, ranging from petechial skin hemorrhages to life-threatening gastrointestinal bleeding^{9,10}.

Most Dengue related literature is focused in the pediatric population, as dengue fever used to be mainly a pediatric problem^{11,12}. Recent trends show an increasing incidence of dengue fever in the adult population, hence the focus of this study. The internist when faced with a patient with dengue fever should also take into consideration the presence of co-morbid conditions such as diabetes and hypertension¹³. The increasing incidence of dengue fever and dengue hemorrhagic fever and the fact that it is no longer seasonal but occurs all year round makes it necessary to conduct studies regarding its complications, since morbidity in the adult population will also have an economic impact¹⁴.

Furthermore, one of the aims is to decrease the mortality resulting from dengue fever. As bleeding is a common complication of dengue fever, this study aims to determine some factors that will influence its development.

METHODS

This is a case control study conducted in patients admitted at Fatima Medical Center during the study period. Sample size was calculated with the following assumptions; assuming that in the general population based on previous studies 27% will develop bleeding and 42% among those with co-morbid conditions. With an alpha error of 0.05 powers of 90% one tailed alternative hypothesis sample size will be equal to 170 per group x 2 for two groups. Adding 25% for each variable controlled, a total of 680 sample sizes will be collected for four (4) additional control variables. Chart review of all patients admitted due to dengue fever during the study period, January 2009 - December 2011.

Charts of all patients admitted with dengue fever and

developed bleeding during the course in the ward are reviewed. CBC results are tabulated. The results are analyzed with the use of the appropriate statistical tool.

Selection of Subjects

Inclusion Criteria

Patients admitted at Fatima Medical Center diagnosed with dengue fever according to WHO criteria.

Exclusion Criteria

Patients with bleeding but with other causes other than dengue fever.

Patients with blood dyscrasias

Variable Description and Definition of Terms

Dependent variable

Bleeding: Bleeding is defined as spontaneous bleeding, more than two ml in quantity seen by a doctor. The bleeding is visible in any part of the body. The bleeding includes vaginal bleeding and upper GI bleeding manifested as melena.

Independent variable

Co-morbid conditions:

Hypertension: Two office reading of a BP more than 130/80, and or having maintenance anti-hypertensive medications.

Diabetes: Diabetes is defined based on the ADA criteria of a FBS more than 126 mg/dL and two hours PPBS of more than 200 mg/dL and or having maintenance medications for diabetes.

Sex:

Male

Female

Previous Dengue:

With previous dengue: Doctor diagnosed dengue fever in the past.

Without previous dengue.

Hematologic Parameters: All laboratory parameters must be done in Fatima Medical Center for standardization.

Platelet Count: Normal Count (150 - 450 x 10⁹/L)

WBC: (5.0 - 10 x 10⁹/L)

Hematocrit Level:

Male: 0.42 - 0.49

Female: 0.37 - 0.42

Statistical Tool

The incidence of bleeding is calculated using risk ratio. The factors affecting bleeding are determined using Chi square for qualitative variables and T-test or ANOVA for

quantitative variables initially using univariate analysis. Simultaneous determination of factors association with bleeding will be analyzed using multiple logistic regression. Level of significance is set at $\alpha = 0.05$.

Determination of the relationship between dengue fever and factors that are qualitative in nature were analyzed initially using chi-square test in the univariate analysis. Factors that are quantitative in nature were analyzed by using logistic regression. All factors related to dengue fever were then analyzed in the multivariate analysis using multiple logistic regression.

RESULTS

The profiles of 702 patients who had dengue fever, based on the WHO criteria were analyzed. Out of the 702 patients who fulfilled the WHO criteria of dengue fever 132 developed bleeding during the course of confinement. The demographic characteristics, past medical history, course in the wards and hematologic parameters of the subjects were then analyzed.

Table 1 shows the demographic characteristics of the patients included in this study. The total number of subjects 702, 385 (55%) were males and 318 (45%) were females.

Table 1: Demographic Characteristics

		Bleeding					
		Yes		No		Total	
		Num-ber	Per-centage	Num-ber	Per-cent	Num-ber	Per-centage
Marital Status	Single	99	17.0%	483	82.9%	582	82.9%
	Married	33	27.9%	85	72.0%	118	16.8%
	Separated	0	.0%	2	100%	2	0.3%
	Widow	0	.0%	0	.0%	0	.0%
	Total	132	18.8%	570	81.1%	702	100%
Occupation	Office work	40	16.1%	207	83.8%	247	35.2%
	Outdoors	6	28.5%	15	71.4%	21	3.0%
	Hard labor	12	22.2%	42	77.7%	54	7.7%
	House	19	25.6%	55	74.3%	74	10.5%
	Student	55	17.9%	251	82.0%	306	43.6%
	Total	132	18.8%	570	81.1%	702	100%
Address	Malabon	12	20.3%	47	79.6%	59	8.5%
	Navotas	2	100%	0	.0%	2	0.3%
	Valenzuela	111	19.5%	457	80.4%	568	82.2%
	Bulacan	2	4.6%	41	95.3%	43	6.2%
	Quezon City	4	26.6%	11	73.3%	15	2.2%
	Manila	0	.0%	0	.0%	0	.0%
	Others	1	25%	3	75%	4	.6%
	Total	132	19.1%	559	80.8%	691	100%

Based on the figures above, majority of the subjects were single (82.9%). However 27.9% of the married subjects developed bleeding compared to only 17% of the singles population.

Table 2: Previous dengue infection

		Bleeding				P value
		Yes		No		
		Num-ber	Per-centage	Num-ber	Per-centage	
Previous Dengue	No	119	18.6%	521	81.4%	0.648
	Yes	13	21.0%	49	79.0%	
	Total	132	18.8%	570	81.2%	

Sixty two subjects have previous dengue fever. Twenty one percent (21 %) of those subjects developed bleeding during the course of confinement.

Table 3: History of blood transfusion

			Bleeding		
			Yes	No	Total
Previous blood transfusion	Yes	Count	9	3	12
		% within Previous Blood Transfusion	75.0%	25.0%	100.0%
	No	Count	123	567	690
		% within Previous Blood Transfusion	17.8%	82.2%	100.0%
Total	Count	132	570	702	
	% within Previous Blood Transfusion	18.8%	81.2%	100.0%	

Table 3 shows the subjects who have a previous history of blood transfusion. Among the subjects 12 have a history of previous blood transfusion. Among the 12, nine (75%) developed bleeding during the course in the ward and three (25 %) did not. Among the 690 subjects who have no previous history of blood transfusion, 123 developed bleeding and 567 did not.

Table 4: Course in the ward, including blood transfusion, presence of bleeding and blood products transfused

		Number	Percentage
BT hospital	Yes	42	31.8%
	No	90	68.2%
	Total	132	100.0%
Blood products transfused	Platelet concentrate	33	68.8%
	Fresh frozen plasma	14	29.2%
	PRBC	1	2.1%
	Total	48	100.0%
Site of bleeding	Gums/Lips	31	29.0%
	Nose	29	27.1%
	Urinary tract	19	17.8%
	Vaginal	23	21.5%
	GI	2	1.9%
	Vaginal/Nose	2	1.9%
	Nose/Gums	1	.9%
	Lungs	0	.0%
	Total	107	100.0%

Table 4 shows the course of the patient in the ward. Among the subjects, 31.8% had blood transfusion during the course of their hospital stay. Platelet concentrate is the most common blood product that was transfused (68.8%) followed by fresh frozen plasma and PRBC. The most common site of bleeding is the oral mucosa, the gums and the lips with 29%; this is followed by the nose at 27.1% and vaginal bleeding in the form of menstruation (21.5%). Other bleeding sites are the urinary tract, manifested as hematuria and GI tract.

Table 5: Sex, previous dengue and co-morbid conditions in relation to bleeding

		Bleeding				P-value
		Yes		No		
		Number	Percentage	Number	Percentage	
Sex	Male	62	16.1%	323	83.9%	0.044
	Female	70	22.1%	247	77.9%	
	Total	132	18.8%	570	81.2%	
Previous Dengue	No	119	18.6%	521	81.4%	0.648
	Yes	13	21.0%	49	79.0%	
	Total	132	18.8%	570	81.2%	
Co-morbidity	Yes	24	21.2%	89	78.8%	0.447
	No	107	18.2%	481	81.8%	
	Total	131	18.7%	570	81.3%	

Table 5 shows these factors that influence a dengue patient to develop bleeding. Among the factors studied are sex, previous dengue and co-morbid conditions (diabetes and hypertension).

Table 6: Hematologic parameters

	B	p-value	Odds Ratio (OR)	90% C.I.for OR	
				Lower	Upper
Lowest WBC	-0.161	0.003	0.851	0.779	0.930
Lowest Hematocrit	-0.065	0.001	0.937	0.908	0.967
Lowest Platelet Count	-0.026	0.000	0.974	0.968	0.981
Initial WBC	-0.128	0.036	0.880	0.796	0.973
Initial Hematocrit	-3.192	0.148	0.041	0.001	1.542
Initial Platelet Count	0.004	0.134	1.004	1.000	1.008

Table 6 shows that in every one unit increase in WBC (1×10^9) the odds of bleeding decreases by 15%. For every one unit increase in hematocrit the odds of bleeding decreases by 6.8%. For every one unit increase in platelet count the odds of bleeding decreases by 3% that is every 10 unit increase in platelet count the odds of bleeding decreases by 22.9%. For every one unit increase in the initial WBC the odds of bleeding decreases by 12%.

Table 7: Multivariate analysis of hematologic parameters, sex and serologic studies

	B	p-value	Odds Ratio (OR)	90% C.I.for OR	
				Lower	Upper
Lowest WBC	-0.247	.000	.781	.711	.858
Lowest Hematocrit	-0.067	.001	.935	.904	.967
Lowest Platelet Count	-0.024	.000	.976	.970	.982
Sex (Male: Female)	-0.603	.006	.547	.382	.784
Number of Days Febrile During Admission	-0.199	.013	.820	.718	.935
Dengue Ns1Ag (Positive: Negative)	.570	.104	1.769	.993	3.152
IgG (Positive: Negative)	1.080	.000	2.945	2.030	4.271
Co- morbidity (Present: Absent)	.505	.080	1.657	1.030	2.666

Table 7 shows that in every one unit increase in WBC, the odds of bleeding decreases by 22% holding all others variable constant. For every one unit increase in platelet count the odds of bleeding decreases by 21.3%. The odds of bleeding ratio among female and male is 2:1. Every one day increase in number of days fever, the odds bleeding of decreases by 18%.The odds of bleeding among those with NS1Ag positive is 1.76 times greater than of bleeding to those who has negative NSAg.

DISCUSSION

As seen in the Table 1 majority of the subjects were students, with age ranging from 20 - 30 years and came from the Valenzuela area. According to an epidemiological study in Belgium, Dengue Fever is typically acknowledged to be a childhood disease and is an important cause of pediatric hospitalization in Southeast Asia. There is, however, evidence of increasing incidence of DHF among older age groups. Since the early 1980s, several studies in both Latin America and Southeast Asia have reported a higher association of DHF with older ages. In some Southeast Asian countries where dengue has been epidemic for several years, this age shift is clearly observed, indicating an epidemiological change in dengue infection in those locations¹⁴. This study is focused on the adult population and did not include pediatric cases. The trend for increased incidence among young adults has important implications for control and prevention. Sixty two subjects had previous dengue fever. Twenty one percent (21%) of those subjects developed bleeding during the course of confinement to develop complications. Previous studies states that a past history of dengue fever is a contributory factor to a more

complicated second dengue infection. A study on adult patients in Sri Lanka states that there were instances where the primary infection resulted in severe complications, such as shock syndrome⁹. The figures in Table 2 shows a p value of 0.648 which means that having a previous episode of dengue fever may be a factor for the chances of bleeding.

The premise is to evaluate if factors such as sex, previous dengue and co-morbid conditions, will increase a patient's chance to develop bleeding during the course of confinement. There is no significant increase in bleeding in patients who have co-morbidities ($p=0.447$). A previous study done on adult patients with dengue fever and DHF showed that age above 65 years, history of dengue infection, diabetes mellitus, hypertension and renal insufficiency have been identified as being significantly associated with DHF/DSS¹⁰. The aforementioned study mentioned that the presence of co-morbidities will increase the risk to develop DHF, but not necessarily bleeding. Compared to the results obtained in this study, which shows that the presence or absence of a co-morbid condition has no impact on the risk of a patient to develop bleeding. In this study patients with co-morbid conditions that increases bleeding risks, such as liver and blood pathologies, was not included.

A Case Control Study on the risk factors for DHF, states that, although it is unclear why some cases of dengue fever progress to DHF/DSS, there is weak evidence that some diseases could have a role in this process, such as diabetes, hypertension, and allergies. It further showed that individuals who reported having allergies, or those who reported diabetes, were two and a half times as likely to have DHF. The explanation of the authors why diabetes mellitus patients have an increased risk in developing bleeding or Dengue Shock Syndrome is that Type II diabetes, reduces the use of glucose by the organism, changes the anatomical and physiological integrity of the endothelium due to a permanent inflammatory condition caused by activation of T-lymphocytes.

There is no significant relationship between bleeding and co-morbid conditions ($p=0.447$). Another paper on Dengue Shock Syndrome and co-morbid conditions states that although no statistically significant association was found between hypertension and DHF, it is interesting that when individuals without hypertension were taken as a reference group, a clear trend was found for an increased likelihood of DHF among those who reported having hypertension but did not use any antihypertensive medication followed by hypertensive individuals who used more than one antihypertensive drug¹³.

Literature review has shown that the history of a previous dengue infection will increase the patients risk to develop a severe form of dengue, however, it was not mentioned that a previous dengue infection will increase the risk of

bleeding. In this study previous dengue infection does not correlate with increased risk of bleeding ($p=0.648$).

Sex is also a risk factor in the development of a more severe infection. In this study, the p value is significant, showing that the female sex is more prone to develop bleeding. Comparing the results of this study to previous researches shows that three independent studies from epidemics in India and Singapore found nearly twice the number of male patients compared to females, with a male to female ratios of 1.9 : 1 in Singapore and 1 : 0.57 in New Delhi. Another study found a male to female ratio of 1 : 0.25 cases for DSS. However, of the three deaths in this study, two were females¹⁵. The reason for this discrepancy is that this study considered vaginal bleeding and menstruation, which was not included in the other studies. In the previous studies although males have an increased bleeding risk, it also showed that females have a higher incidence to develop a more complicated course.

The data in this research has similar results with two studies done in Asia which shows that severe illness and case fatality rate were consistently higher among females despite higher incidence in males. As early as 1970, a paper on Dengue Fever stated that males predominate among those with milder disease but females account for more severe illness and suggested that either immune response in females is more competent than in males, resulting in greater production of cytokines, or the capillary bed of females is prone to increased permeability¹⁴.

The result of this study is useful for doctors to predict if a patient will develop bleeding and to take measures to prevent mortality in bleeding patients. The data gathered is useful for the physician in counseling of the patient, as bleeding is a feared complication of the disease. There are already various researches done on bleeding and thrombocytopenia, but most are done in children so this study will be able to provide a data for the adult population.

CONCLUSIONS

Female sex, a low initial WBC and platelet count will increase a patient's propensity to develop bleeding. The presence of a positive Dengue Ns1Ag will also increase the risk of bleeding. Serial monitoring of CBC is imperative in the management of dengue fever, since changes in hematologic values is a factor in the development of bleeding. Previous dengue infection is a factor in the development of a more severe second dengue infection, but it does not increase a patient's risk to develop bleeding. The presence of a co-morbid condition, namely hypertension and diabetes has no effect on the risk of a patient to develop bleeding.

REFERENCES

1. World Health Organization. Dengue guidelines for diagnosis, treatment, prevention and control. New edition. Geneva: World Health Organization; 2009.
2. Guzman MG, Halstead SB, Artsob H, Buchy P, Farrar J, Gubler DJ *et al*. Dengue: A continuing global threat. *Nat Rev Microbiol*. 2010; 8 (12 Suppl): S7-16.
3. Lee IK, Liu JW, Yang KD. Clinical and laboratory characteristics and risk factors for fatality in elderly patients with dengue hemorrhagic fever. *The American Journal of Tropical Medicine and Hygiene*. 2008; 79(2): 149-153.
4. Wichmann O *et al*. Risk factor and clinical features associated with severe dengue infection in adults and children during the 2001 epidemic in Chonburi Thailand. *Trop Med Int Health*. 2004; 9(9): 1022-9.
5. Narayanan M, Aravind MA, Thilothammal N, Prema R, Sargunam CS, Ramamurthy N. Dengue fever epidemic in Chennai – A study of clinical profile and outcome. *Indian Pediatr*. 2002; 39(11): 1027-33.
6. Malavige GN, Fernando S, Fernando DJ, Seneviratne SL. Dengue viral infections. *Postgrad Med J*. 2004; 80(948): 588-601.
7. Krishna Murti C, Kalayanarooj S, Cutting MA, Peat RA, Rothwell SW, Reid TJ, Green S, Nisalak A, Endy TP, Vaughn DW, Nimmannitya S, Innis BL. Mechanisms of Hemorrhage in Dengue without Circulatory Collapse. *Am. J. Trop. Med. Hyg*. 65(6); 2001; 840–847.
8. Wills B, Tran VN, Nguyen TH *et al*. Hemostatic changes in Vietnamese children with mild dengue correlate with the severity of vascular leakage rather than bleeding. *The American Society of Tropical Medicine and Hygiene*. 2009; 81: 4.
9. Kularatnae SAM, Gawarammana IB, Kumarasiri PRV. Epidemiology, clinical features, laboratory investigations and early diagnosis of dengue fever in adults: A descriptive study in Sri Lanka. *South East Asian J Trop Med Public Health*. May 2005; 36: 3.
10. Teo D, Ng LC, Lam S. Is Dengue a threat to the blood supply? *Transfus Med*. 2009 Apr; 19(2): 66–77.
11. Narayanan M, Aravind MA, Thilothammal N, Prema R, Sargunam CS, Ramamurthy N. Dengue fever epidemic in Chennai – A study of clinical profile and outcome. *Indian Pediatr*. 2002; 39(11): 1027-33.
12. Malavige GN, Fernando S, Fernando DJ, Seneviratne SL. Dengue viral infections. *Postgrad Med J*. 2004; 80(948): 588-601.
13. Maria Apalcida Figurado *et al*. Allergies and diabetes as risk factors for dengue hemorrhagic fever: Results of a case control study. *PLoS Negl Trop Dis*. 2010 Jun; 4(6): e699.
14. Debarati-Guha Sapir. Dengue Fever: New paradigms for a changing epidemiology. *Emerging themes in epidemiology*. 2005; 2: 1

Sleep Apnea

Uzma N^{1*}, Reddy VD²

¹Asst Professor, Department of Physiology, Deccan College of Medical Sciences, Hyderabad, Telangana, India

²Professor & Head, Department of Physiology, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

ABSTRACT

Background: Sleep apnea is a condition that interrupts breathing while sleeping, usually caused by an obstruction blocking the back of the throat so that the air cannot reach the lungs. The brief cessation in breath automatically forces individuals to wake up and restart breathing. This can happen many times during the night, making it hard for the body to get enough oxygen, and impacts the sleep quality. It is the most common type of sleep disorder breathing.

Objectives: The present study was designed to investigate the effects of obstructive sleep apnea (OSA) on different mental, physical and nervous disorders which are manifested in such patients. This study would not only benefit in ascertaining the causes of OSA through assessment of higher mental functions of autonomic and peripheral nervous systems but also in the development of algorithm for estimation of degree of damage to the nervous system with severity of OSA.

Methods: A total of 1365 consecutive participants participated in this study at the Department of Pulmonary Medicine, Deccan College of Medical Sciences, Hyderabad, Telangana State, India for suspected sleep disordered breathing (SDB) between October 2012 and February 2016. In this cohort, 1140 participants were deemed ineligible, as per the inclusion criteria. Therefore, 225 patients were considered in the study along with 75 control subjects, who were healthy individuals. The cohort was diagnosed by an experienced pulmonologist for the symptoms of snoring and daytime somnolence. The data included documentation of age, gender, weight, height, BMI, waist and neck circumference, and clinical data such as history of apnea, insomnia, dyslipidemia, hypertension, and coronary heart disease. All participants underwent overnight polysomnography (PSG) in sleep laboratory. The cognitive function tests consisted of mini-mental state examination and by employing the depression questionnaire (Using Zung self report depression scale). The autonomic function tests were performed. Variabilities in heart rate were determined. Brain natriuretic peptide (BNP) levels in the blood were measured.

Results: The study group had an AHI ≥ 5 per hour of sleep while the control group had AHI < 5 per hour of sleep. Overall, patients in the OSA cohort were older compared to those in the Control cohort. The overnight polysomnography values indicated distinct differences

Keywords

Apnea, hypoxia, Obstructive sleep apnea, Polysomnography, Sleep.

Corresponding author

**Ms Nazia Uzma*

*Asst Professor, Department of Physiology
Deccan College of Medical Sciences,
Hyderabad, Telangana, India
Email: naziauzma@rediffmail.com*

among the parameters of the analysis depending upon the category of the patient (i.e., mild, moderate and severe). Oxygen saturation in blood during both REM and NREM sleep stages clearly indicated lower oxygen in patient cohort than the control group. The cognitive function tests revealed that in comparison to the control group, OSA patients had significantly impaired cognition. OSA patients had significantly higher ($p \leq 0.05$) depression. Motor action, muscle action potential and nerve action potential was significantly lower ($p \leq 0.05$) than that of the control group of healthy patients. The plasma BNP in OSA patients was significantly higher ($p \leq 0.05$) than control subjects. RR intervals in the patient group were significantly shorter than in the control group. The blood pressure of the OSA patients in general was relatively higher than the control group, both during the postural response and in handgrip test.

Conclusions: Among the enrolled individuals, those with severe OSA were affected in all faculties, namely, cognitive abilities and health attributes; and had high BNP levels in their blood. In aggregate, OSA patients can be alleviated from the syndrome, if accurate diagnosis is made on time. This study developed an algorithm which would aid the clinicians in early detection of OSA symptoms and mitigate the prognosis of the syndrome.

INTRODUCTION

Definition

Sleep is an integral part of a healthy life. Pathological disruption of sleep results in adverse effects on health. Apnea is the transient pause in breathing during sleep (for about 10 sec) and causes decreased oxygen levels in blood.

Sleep apnea is a condition that interrupts breathing while sleeping. This is usually caused by an obstruction blocking the back of the throat so that the air cannot reach the lungs. The brief cessation in breath automatically forces individuals to wake up and restart breathing. This can happen many times during the night, making it hard for the body to get enough oxygen, and impacts the sleep quality¹. It is the most common type of sleep disorder breathing (SDB) worldwide as reported in different epidemiological studies².

Obstructive sleep apnea (OSA) is a sleep disorder involving repeated episodes of complete or partial obstruction of the upper airway, which cause transient cessations of breathing during sleep. These breathing disruptions cause intermittent hypoxia and sleep disturbances which are associated with daytime sleepiness and fatigue³. The recurrent complete or partial obstruction of the upper airway causing intermittent hypoxia (IH) results

in complete or partial airflow interruptions⁴. These episodes of oxygen denaturation are followed by alternate reoxygenation. This airflow impairment is a significant health problem with neurocognitive and cardiovascular morbidities.

The disruption in the airway relates to the upper respiratory tract consisting of nasal and oral cavities, pharynx, larynx and the extra thoracic trachea⁵. The airway closure during sleep is the main cause of the apnea. OSA also reportedly affects brain function through intermittent hypoxemia and sleep fragmentation owing to repeated apneas⁶. The mechanisms responsible for these cognitive deficits still remain elusive, with researchers hypothesizing the same to be a result of daytime sleepiness⁷.

Unlike central sleep apnea, OSA is associated with snoring and daytime somnolence⁸. OSA is described as apnea and/or hypopnea in accordance with the sleep hours. Common symptoms include daytime sleepiness, recurrent apneas during sleep, fatigue and repeated awakenings during sleep, morning headache, daytime fatigue and impaired concentration. OSA is usually diagnosed when apnea-hypopnea index (AHI) is ≥ 5 , an index to indicate the extent of sleep apnea, represented by the number of apnea-hypopnea events per hour of sleep. The normal AHI score is between 0 - 4. A recent study conducted on

south Indian patients revealed that OSA was clinically manifested in patients in age group of 55 years and older, and BMI >25 kg/m². These patients also showed symptoms of hypertension, dyslipidemia, duration of apnea >20 seconds and oxygen desaturation index >10/h⁹. In another study conducted on a cohort from north India, OSA was found to be prevalent in 9.3% individuals, with high BMI and abdominal fat and the males having more propensities to acquire the disease. Also OSA was linearly associated with the socio-economic strata of the patients¹⁰.

Epidemiology and etiology of OSA

OSA affects cognitive functions in 1 - 4% of adults, with increased risk among men than women (24% vs. 9%). The risk factors mainly affect old and obese males¹¹.

OSA is also known to diminish physical, emotional and intellectual capabilities, in addition to affecting functional quality of life. OSA patients suffer from attention deficits, impaired concentration, memory and cognition loss, and reduced executive functioning^{12,13,14}. Executive functions are a group of neuropsychological processes that enable individuals to behave flexibly in a goal-directed manner as well as adapt to task and environmental demands¹⁵. OSA also severely affects public health by impairing socio-economic productivity and cultural behavior causing severe functional impairments such as impaired driving, increased risk for accidents, increased maintenance and healthcare cost and decreased quality of life^{16,17}.

The evidence on impairment and difficulties in normal life functioning has been further elaborated by several meta-analyses based on systematic reviews conducted by researchers on OSA. Recent meta-analyses on OSA provided evidence on impairments in attention or vigilance, motor conduction, delayed verbal and visual long-term memory, visuo-spatial or constructional abilities, and executive function. OSA not only affects the health state but also the socio-economic condition, productivity and quality of life¹⁷⁻¹⁹. Another meta-analysis on OSA patients further confirmed that attention and memory impairment was prevalent in 60% of OSA patients; while in 80% of OSA patients, visuo-construction and psychomotor functioning has been reported to be impaired²⁰.

Co-morbidities

Multiple co-morbidities are reported to be associated with

OSA which increased the burden of this malady on patients. Associated with OSA are also ailments of cardiovascular diseases, obesity, hypertension, dyslipidemia, insulin resistance and diabetes. Cardiovascular diseases are the most prevalent co-morbidity among OSA subjects. OSA patients reportedly suffer from myocardial infarction caused by brain natriuretic peptide (BNP) released by cardiac ventricles in response to volume and pressure overload due to apnea^{2,21,22}. Therefore, OSA holistically affects patients overall nervous system (including the autonomic and peripheral nervous systems).

Mechanism

The precise mechanism responsible for cognitive and psychological consequences is still unknown. The principal mechanism has been attributed to recurrent collapse of pharyngeal airway during sleep, causing intermittent blood-gas disturbance (hypercapnia and hypoxemia) and surges of sympathetic activation¹¹. Owing to the correlation of plasma concentration of BNP with severity of OSA, preventing myocardial infarction in such patients by monitoring the symptoms of apnea could be possible. One proposed mechanism outlines the adverse effects on prefrontal complex (the area of brain responsible for executive functions, being affected by intermittent hypoxia, since it is metabolically active. As a result, several metabolic disorders have also been manifested in OSA patients²³. The chronic repeated hypoxia from OSA could also lead to peripheral neuropathy, which has not been investigated yet.

Therefore, the present study was designed to investigate the effects of OSA on different mental, physical and nervous disorders which are manifested in such patients. This study would not only benefit in ascertaining the causes of OSA through assessment of higher mental functions of autonomic and peripheral nervous systems but also in the development of algorithm for estimation of degree of damage to the nervous system with severity of OSA.

OBJECTIVES

The present study was undertaken with the following specific objectives.

- To investigate the functioning of nervous system viz., higher mental function, peripheral nervous system and autonomic nervous system in OSA patients.

- For Estimation of sensory and motor nerve conduction velocities in normal patients and compare with OSA patients
- To assess the plasma BNP levels and its correlation with severity of disturbance in respiration during sleep.
- To assess and compare the effects of OSA on higher mental functions, nerve conduction velocities, autonomic functions, changes in these attributes with the severity among patients with OSA versus normal individuals
- For ascertaining whether effect on higher mental functions, nerve conduction velocities, autonomic functions could be employed as a prognostic marker for early detection of OSA.
- For estimation of plasma BNP levels in OSA patients.
- For Development of an algorithm for early detection of the syndrome in the patients.

METHODS

Sample Size

A total of 1365 consecutive participants participated in this study at the Department of Pulmonary Medicine, Deccan College of Medical Sciences, Hyderabad, Telangana State, India for suspected sleep disordered breathing (SDB) between October 2012 and February 2016. In this cohort, 1140 participants were deemed ineligible, as they were not appropriate as per the inclusion criteria. Therefore, 225 patients were considered in the study along with 75 control subjects, who were healthy individuals. The study group had an AHI ≥ 5 per hour of sleep while the control group had AHI < 5 per hour of sleep. The cohort was diagnosed by an experienced pulmonologist for the symptoms of snoring and daytime somnolence.

Inclusion criteria

Patients who met the following inclusion criteria were selected in this study.

- Adults (21 - 65 years) having symptoms of sleep apnea (Loud snoring, witnessed apneas or history of OSA based on laboratory PSG within three months of screening).
- Patients not using continuous positive airway pressure (CPAP) therapy, oral appliances or any other treatment for OSA.

Exclusion criteria

Patients meeting any of the following criteria were excluded from the study.

- History of treatment for OSA, diabetes, other disorders such as Parkinson's disease which are known to affect peripheral neuropathy which cannot be stopped safely for 48 hrs, no peripheral neuropathy (B_{12} , thyroid stimulating hormone, serum protein electrophoresis), patients unable to stop hypertensive medicine for 48 h, inability to cooperate with testing/ undergo testing, smokers, pregnant and lactating females.
- Not willing to sign informed consent form

Regulatory Approval

- The study protocol was approved by the institutional ethics committee and informed consent was obtained from the participants by the modified questionnaire by trained professionals before overnight polysomnography.

Study Variables/Outcomes

Variables

These data included documentation of age, gender, weight, height, BMI, waist and neck circumference, and clinical data such as history of apnea, insomnia, dyslipidemia, hypertension, and coronary heart disease. These data provided a basis of classification of patients besides the apnea-hyponea index (AHI), and a means to correlate OSA with associated physical and clinical symptoms. The study protocol was approved by the institutional ethics committee and informed consent was obtained from the participants by the modified questionnaire by trained professionals before overnight polysomnography. These results were verified by the physician before the test. The data were recorded in accordance with the reported method²⁴. The patients' age, height and weight, body mass index (BMI), daytime sleepiness (The Epworth sleepiness scale) and self-reported habitual snoring (by spouse/ attendee with the patient).

Outcomes

Polysomnography

All participants underwent overnight polysomnography (PSG) in sleep laboratory of Owaisi Hospital and Research Centre, Hyderabad, Telangana, India under the supervision of trained personnel. Standard protocol for the study was followed and was in accordance with the

literature. Arousal and stages of sleep were ascertained employing standard experimental criteria in accordance with literature²⁵. Based on the severity of apnea, patients were categorized into mild, moderate and severe groups, prior to inclusion into the study. The control subjects were those without any disturbance in breathing during sleep. For homogenous experimental design, the patient population of each category was kept the same, along with number of control (healthy) individuals. Philips' Alice 5 computerized system product number 1043941 was employed to analyze the PSG results.

Cognitive function tests

The cognitive function tests consisted of mini-mental state examination and by employing the depression questionnaire (Using Zung self report depression scale). Mini-mental state examination aimed at measuring the degree of alertness and cognition among OSA subjects' vis-à-vis control subjects using the attributes such as language, memory and recall, and calculation skills. The depression questionnaire scaled the depression level of the subjects on the basis of scores such as scores lower than 50 indicating no depression, 50-59 mild depression, 60 and higher showing moderate to higher depression. The protocol for these studies was in accordance with literature^{26,27}.

Nerve conduction studies

The nerve conduction studies for the patient population and the control group was conducted on the left leg of the patients and the control group. ALERON 201, RMS India was employed for this work. The research aimed at ascertaining attributes of motor conduction, conduction velocity, muscle action potential, nerve action potential using standard procedures which have been reported previously²⁸.

Autonomic function test

The autonomic function tests were performed to determine the changes in responses pertaining to attributes of heart to the syndrome on the basis of valsalva maneuver, deep breathing, blood pressure and blood pressure response to handgrip. These tests would provide insight into the changes in various functions of heart and its behavior in the patient population (On the basis of severity of the syndrome) and the control group. The investigation would be carried out in accordance with literature reports^{29,30}.

Heart rate variability test

The present research also envisages working the variabilities in heart rate of the cohort under study, by measuring values of mean, standard deviation, square root of mean squared difference for R-R intervals, using polyrite-D (Recorders and medicare systems, Chandigarh, India. The study protocol adapted the methods reported by previous study³¹.

Measurement of brain natriuretic peptide (BNP) levels in the cohort

In order to further assess the physical state of the population under study, BNP levels in the blood were measured for patients and the control group, using Triage meter plus device (Biosite Diagnostics, San Diego, CA, USA), immediately after blood collection. The examination was conducted between 8-10 AM, using fluorescent immunoassay. The quantity (%) of blood BNP was correlated to its concentration, for comparative analysis between patient and control group. The assay was carried out as per the method reported in the literature³².

Algorithm for OSA diagnosis

Based on the clinical findings from this study, an algorithm would be developed to assess the severity of the syndrome based on diagnostic symptoms of the patients. This would aid early detection of the syndrome allowing suitable intervention or measures to take effect.

RESULTS & DISCUSSION

Overall, patients in the OSA cohort were older compared to those in the control cohort (Mean age: 56.0 years vs. 53.0 years) and had higher proportion of males than females (79:11) (Table 1). The BMI value of the patient group was significantly higher than control group, suggestion role of high BMI in conceiving of OSA. Also, behavioral parameters such as alcohol intake, hypertension and habitual snoring were found to be significantly different in the two groups, again with significant difference. A significantly high lipid content in patients group over control group further attested to the occurrence of the syndrome in individuals with higher lipids in blood. Further, high BMI was well correlated with higher lipids in blood of patient group ($r = 0.90$), strongly indicative of a relation between BMI values, lipid content in blood and risk of conceiving the syndrome.

Table 1: Baseline demographic and clinical characteristics of OSA patients and controls

Characteristic	Patient (n=225)	Controls (n=75)	Level of significance
Age (21 - 65 years)	56 ±11	53 ±8	p = 0.000
Gender (Male : female)	79 : 11	71 : 29	NA
Body mass index (BMI)	36 ±6	23 ±4	p = 0.000
Alcohol intake (%)	12 ±3	6 ±2	p = 0.000
Hypertension (%)	86 ±8	31 ±4	p = 0.000
Hyperlipidemia (%)	31 ±5	23 ±3	p = 0.000
Habitual snoring (%)	92 ±10	43 ±8	p = 0.000

NA: not applicable

Significant difference among means was considered at p ≤0.05.

Overnight polysomnography of patients and control group

The overnight polysomnography values indicated distinct differences among the parameters of the analysis depending upon the category of the patient (i.e., mild, moderate and severe) (Table 2). From the analysis it was quite evident that patients with severe OSA required maximum time to go to sleep. The patient group required significantly higher time to achieve rapid eye movement (REM) sleep stage, indicative of intermissions. Accordingly, during the entire sleep time, the REM sage was comparatively lower for OSA patients than the control group. The patient group had comparatively lower sleep efficiency than the control group, along with higher arousal index and lower oxygen in blood both when asleep and upon waking.

Furthermore, oxygen saturation in blood during both REM and NREM sleep stages clearly indicated lower oxygen in patient cohort than the control group. Even among OSA patients, there is a strong indication of differences in the values of PSG indicative of differences in the sleep patterns and efficiency, depending upon the stage of the syndrome in the individual (Table 2). These findings strongly indicate substantial loss of nocturnal sleep in OSA patients which leads to commonly reported daytime somnolence, lack of alertness, headache and other associated sleep related morbidities.

Table 2: Changes in polysomnographic parameters in the study groups

Characteristic	OSA Patient type			Control (n=75)	Level of significance
	Mild (n=75)	Moderate (n=75)	Severe (n=75)		
Sleep onset	12.38 ±7.40	18.50 ±10.43	20.05 ±12.40	4.22 ±3.81	p = 0.000
REM onset	152.60 ±48.42	172.22 ±58.45	184.29 ±61.62	7.52 ±64.15	p = 0.000
Sleep efficiency (%)	63.85 ±3.72	73.82 ±4.93	85.87 ±6.19	90.56 ±7.44	p = 0.000
REM stage (%)	12.45 ±5.45	14.84 ±8.21	17.43 ±8.96	20.71 ±9.04	p = 0.000
Apnea-hyponea index	26.20 ±13.12	31.20 ±16.32	39.90 ±18.32	1.25 ±0.7	p = 0.000
Apnea index	6.63 ±3.14	8.83 ±4.24	12.83 ±6.24	0.77 ±0.22	p = 0.000
Mean arousal index	14.45 ±2.52	17.45 ±3.11	21.45 ±5.53	4.63 ±1.43	p = 0.000
Lowest level of oxygen saturation (%)	86.10 ±4.32	81.30 ±4.45	67.25 ±3.81	92.45 ±5.10	p = 0.000
Saturation during wake	96.22 ±3.64	96.10 ±3.82	92.15 ±2.22	97.53 ±4.32	p = 0.000
Saturation during REM sleep	93.28 ±2.68	91.9 ±3.89	81.94 ±2.10	96.64 ±3.10	p = 0.000
Saturation during NREM sleep	94.24 ±3.60	92.55 ±3.30	85.13 ±2.20	96.91 ±3.90	p = 0.000

Participants were in the age group of 21 – 75 years, with equal number of individuals in each category of patients (mild, moderate and severe) and control individuals (n=75 in each group).

Significant difference among means was considered at p ≤0.05.

Cognitive function tests of patients and control group

The cognitive function tests revealed that in comparison to the control group, OSA patients had significantly impaired cognition and their scores were significantly lower than the control group. The participants were unable to recognize the alphabets and had short memory, difficulty in carrying out simple calculations. These results strongly indicate lack of sleep affecting the overall alertness, cognition, and verbal and non verbal ability and memory.

Furthermore, OSA patients had significantly higher ($p \leq 0.05$) depression on Zung's self reporting depression scale. Insomnia, poor daily routine performance possibly led to increase in depression in OSA subjects. The patients with severe OSA recorded a score >60 , moderate 55 - 60 and mild 50 - 55. The control subjects on an average had a score <50 , indicative of no depression. The correlation between cognitive impairment and depression was found to be high ($r = 0.94$), indicative of a co-morbid cumulative effect of OSA on overall cognition, intelligence, memory and depression. These findings also suggest societal difficulties of OSA patients, especially those with moderate to severe OSA.

Nerve conduction study in patient and control group

The nerve conduction study revealed a significant decrease in OSA patients. Motor action, muscle action potential and nerve action potential was significantly lower ($p \leq 0.05$) than that of the control group of healthy patients. OSA patients had significantly higher distal latency and lower measured velocity ($p \leq 0.05$), indicative of lower impulse of nerve conduction owing to the syndrome. The sural sensory conduction velocity and sural sensory nerve action potential were also comparatively lower in OSA patients than the control group; with the least conduction in the OSA patients in the severe category.

Autonomic function testing of the cohort

The autonomic function tests showed clear effect of OSA on the heart and its functions. The values established on negative effects of OSA on breathing of the OSA patients in comparison with the control group. The subjects had difficulty in breathing and the heart rate was significantly higher than that of the normal subjects, during deep breathing, standing up and Valsalva manoeuvre, indicative of detrimental effect of OSA on heart. The blood pressure of the OSA patients in general was relatively higher than the control group, both during the postural response and in handgrip test. Measurement of heart rate during handgrip and Valsalva manoeuvre challenges revealed significant heart rate differences among OSA patients and between OSA and control group ($p \leq 0.05$). The 30 : 15 ratio was significantly higher in the control group than in the patient population, indicating cardiovascular issues in the latter population ($p \leq 0.05$). AHI was well related to Valsalva and 30 : 15 ratios, higher the severity higher the value, with concomitant higher health hazard.

Analysis of heart rate variability in the subjects

The examination of heart rate variability in the population

marked a strong relationship between OSA and heart rate variability. The 24 hour Hotter scale readings also corroborated this fact and revealed that RR intervals in the patient group were significantly shorter than in the control group. Even within the patients group, the RR interval for the patients with severe OSA was the shortest. The SDNN, SDANN, RMSSD, VLF, LF, HF values were significantly higher in the control group than in the patient population. This finding indicates that the OSA patients had lower RR intervals, inducing a pressure on the heart for pumping of blood resulting in difficulty in breathing.

Analysis of plasma BNP levels

The plasma BNP in OSA patients was significantly higher ($p \leq 0.05$) than control subjects. Among OSA patients also, highest BNP was observed in patients in the severe category with values in the range of 184 ± 15 pg/mL while that for the moderate patients was 130 ± 12 pg/mL, mild was 82 ± 10 pg/mL, while control subjects had BNP at 6 ± 3 pg/mL.

Algorithm for diagnosis of OSA syndrome

A first of its kind of algorithm was developed for sequential assessment of the symptoms and the tests data for a clinician to ascertain the characteristic of the disease in the patient and its severity. This algorithm is based on the findings made in this study in various experiments. This algorithm would possibly aid early detection of the syndrome and alleviation of the patients from this condition.

CONCLUSIONS

OSA is a serious sleep disorder that affects millions of individuals across the globe. The present study which included South Indian patients specifically residing in and around Hyderabad, Telangana State, India, highlights the effects of OSA in higher mental functions and in heart diseases. The study encompassed a categorized patient population comprising of individuals with mild, moderate and severe OSA based on AHI scores. Among the enrolled individuals, those with severe OSA were affected in all faculties, namely, cognitive abilities and health attributes; and had high BNP levels in their blood. In aggregate, OSA patients can be alleviated from the syndrome, if accurate diagnosis is made on time. For achieving this, this study developed an algorithm which would aid the clinicians in early detection of OSA symptoms and mitigate the prognosis of the syndrome.

REFERENCES

- British snoring and sleep apnoea association. 2016. London, England. Available: http://www.britishsnoring.co.uk/sleep_apnoea/what_is_sleep_apnoea.php.
- Lam JC, Sharma SK, Lam B. Obstructive sleep apnoea: Definitions, epidemiology and natural history. *Indian J Med Res.* 2010; 131: 165-70.
- Dempsey JA, Veasey SC, Morgan BJ, O'Donnell CP. Pathophysiology of sleep apnea. *Physiol Rev.* 2010; 90: 47-112.
- Mathieu A, Mazza S, Decary A, Massicotte-Marquez J, Petit D, Gosselin N, Malo J, Montplaisir J. Effects of obstructive sleep apnea on cognitive function: A comparison between younger and older OSAS patients. *Sleep Med.* 2008; 9: 112-20.
- Uzma N, Hasan A, Kumar BS. High Mallampati score, obesity and obstructive sleep apnea: Triple insult to lung function? *Journal of Medical & Allied Sciences.* 2014; 4: 69.
- Beebe DW, Gozal D. Obstructive sleep apnea and the prefrontal cortex: Towards a comprehensive model linking nocturnal upper airway obstruction to daytime cognitive and behavioral deficits. *Journal of sleep research.* 2002; 11: 1-16.
- Daurat A, Foret J, Bret-Dibat JL, Fureix C, Tiberge M. Spatial and temporal memories are affected by sleep fragmentation in obstructive sleep apnea syndrome. *Journal of Clinical and Experimental Neuropsychology.* 2008; 30: 91-101.
- Caples SM, Gami AS, Somers VK. Obstructive sleep apnea. *Annals of internal medicine.* 2005; 142: 187-197.
- Sreedharan SE, Agrawal P, Rajith RS, Nair S, Sarma SP, Radhakrishnan A. Clinical and polysomnographic predictors of severe obstructive sleep apnea in the South Indian population. *Ann Indian Acad Neurol.* 2016; 19: 216-20.
- Reddy EV, Kadiravan T, Mishra HK, Sreenivas V, Handa KK, Sinha S, Sharma SK. Prevalence and risk factors of obstructive sleep apnea among middle-aged urban Indians: A community-based study. *Sleep Med.* 2009; 10: 913-8.
- Eckert DJ, Malhotra A. Pathophysiology of adult obstructive sleep apnea. *Proceedings of the American Thoracic Society.* 2008; 5: 144-153.
- Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. *New England Journal of Medicine.* 1993; 328: 1230-1235.
- Engleman HM, Kingshott RN, Martin SE, Douglas NJ. Cognitive function in the sleep apnea/hypopnea syndrome (SAHS). *Sleep.* 2000; 23: S102-8.
- Baldwin CM, Griffith KA, Nieto F, O'Connor GT, Walsleben JA, Redline S. The association of sleep-disordered breathing and sleep symptoms with quality of life in the Sleep Heart Health Study. *Sleep.* 2001; 24: 96-105.
- Lezak MD. Neuropsychological assessment. 2004. Oxford University Press, USA.
- George C, Smiley A. Sleep apnea and automobile crashes. *Sleep.* 1999; 22: 790-795.
- Bucks RS, Olaithe M, Eastwood P. Neurocognitive function in obstructive sleep apnoea: A meta-review. *Respirology.* 2013; 18: 61-70.
- Beebe DW, Groesz L, Wells C, Nichols A, Mcgee K. The neuropsychological effects of obstructive sleep apnea: a meta-analysis of norm-referenced and case-controlled data. *Sleep - New York Then Westchester.* 2003; 26: 298-307.
- Fulda S, Schulz H. Cognitive dysfunction in sleep-related breathing disorders: A meta-analysis. *Sleep Res Online.* 2003; 5: 19-51.
- Aloia MS, Arnedt JT, Davis JD, Riggs RL, Byrd D. Neuropsychological sequelae of obstructive sleep apnea-hypopnea syndrome: A critical review. *Journal of the International Neuropsychological Society.* 2004; 10: 772-785.
- Morita E, Yasue H, Yoshimura M, Ogawa H, Jougasaki M, Matsumura T, Mukoyama M, Nakao K. Increased plasma levels of brain natriuretic peptide in patients with acute myocardial infarction. *Circulation.* 1993; 88: 82-91.
- Maeda K, Tsutamoto T, Wada A, Hisanaga T, Kinoshita M. Plasma brain natriuretic peptide as a biochemical marker of high left ventricular end-diastolic pressure

- in patients with symptomatic left ventricular dysfunction. *American heart journal*. 1998; 135: 825-832.
23. Harrison Y, Horne JA. The impact of sleep deprivation on decision making: A review. *Journal of experimental psychology: Applied*. 2000; 6: 236.
24. Hasan A, Uzma N, Swamy TL, Shoba A, Kumar BS. Correlation of clinical profiles with obstructive sleep apnea and metabolic syndrome. *Sleep Breath*. 2012; 16: 111-6.
25. Tulek B, Atalay NB, Kanat F, Suerdem M. Attentional control is partially impaired in obstructive sleep apnea syndrome. *J Sleep Res*. 2013; 22: 422-9.
26. Bawden FC, Oliveira CA, Caramelli P. Impact of obstructive sleep apnea on cognitive performance. *Arquivos de neuro-psiquiatria*. 2011; 69: 585-589.
27. Zung WW. A self-rating depression scale. *Arch Gen Psychiatry*. 1965; 12, 63-70.
28. Ingall TJ, Mcleod J, O'Brien P. The effect of ageing on autonomic nervous system function. *Australian and New Zealand journal of medicine*. 1990; 20: 570-577.
29. Veale D, Pepin J, Wuyam B, Levy P. Abnormal autonomic stress responses in obstructive sleep apnoea are reversed by nasal continuous positive airway pressure. *European Respiratory Journal*. 1996; 9: 2122-2126.
30. Wang W, Tretriluxana S, Redline S, Surovec S, Gottlieb DJ, Khoo MC. Association of cardiac autonomic function measures with severity of sleep-disordered breathing in a community-based sample. *Journal of sleep research*. 2008; 17: 251-262.
31. Kaditis AG, Alexopoulos EI, Hatzi F, Kostadima E, Kiaffas M, Zakynthinos E, Gourgoulis K. Overnight change in brain natriuretic peptide levels in children with sleep-disordered breathing. *Chest*. 2006; 130: 1377-84.

Evaluation of Breast Lump by Fine Needle Aspiration Cytology

Poudel S^{1*}, Ranabhat S¹, Parajuli B¹, Pun G¹

¹Lecturer, Department of Pathology, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

Keywords

Breast lump, Fibroadenoma, Fine needle aspiration cytology, Histopathology.

Corresponding author

*Dr. Suman Poudel, MD

Lecturer, Department of Pathology
Gandaki Medical College & Teaching
Hospital, Pokhara, Nepal
Email: batigsu@gmail.com

ABSTRACT

Introduction: Fine needle aspiration cytology (FNAC) is the important part of triple assessment in diagnosing the palpable breast lump. It categorizes the lesion into benign, malignant and its subtypes. It can also identify the residual diseases after treatment.

Methods: It was a cross sectional descriptive study of cases of breast lump carried out during June 2015 to May 2016 in the Department of Pathology, Gandaki Medical College Teaching Hospital, Pokhara, Nepal. All the patients presenting in Pathology Department with history of breast lump were examined in detail. FNAC was done by standard procedure; smears were prepared and stained with Giemsa and pap for evaluation. Histopathology slides were stained with hematoxylin and eosin stain and evaluated by pathologists in Gandaki Medical College Teaching Hospital.

Results: The study showed that, fibroadenoma of breast is the commonest benign lesion among the young populations. Only 13.11% of breast lump is malignant in the elderly population.

Conclusion: FNAC is one of the safest and cheapest procedure that can be done in outpatient department for the diagnosis of breast lump. And there is no significant difference in diagnosis made by FNAC and histopathology examination.

INTRODUCTION

Lump in breast, whether benign or malignant is the main cause of anxiety to the patient and her family members. Breast carcinoma is the most common malignant neoplasm and the leading cause of death from cancer in women, with more than one million cases occurring worldwide annually^{1,2}. Though histopathological diagnosis is universally accepted confirmatory mode of diagnosis and follow up, fine needle aspiration cytology (FNAC) of breast lumps is an important part of triple assessment (Clinical examination, imaging, and FNAC) of palpable breast lumps³. It bridges the gap between clinical evaluation and final surgical pathological diagnosis in majority of cases and helps to reduce unwanted surgeries⁴. Scope of FNA

has now extended into identifying the subtypes of benign, malignant lesions and residual disease for the purpose of planning the therapeutic protocol and eventual follow-up⁵.

The present study is intended to evaluate the frequency of distribution of various lesions of palpable breast lumps among the patients visiting Gandaki Medical College Teaching Hospital, Pokhara, Nepal.

METHODS

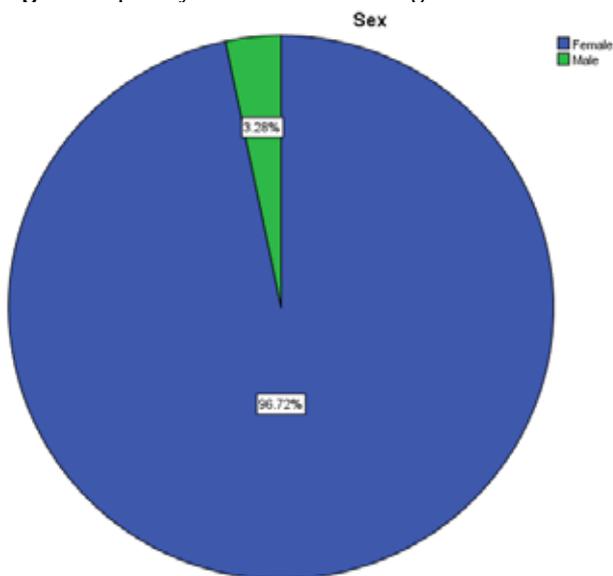
It was a cross sectional descriptive study of cases of breast lump carried out during June 2015 to May 2016 in the Department of Pathology, Gandaki Medical College

Teaching Hospital, Pokhara. All the patients presenting in our department with history of breast lump were examined in detail. FNAC was done following the standard procedure with 22 gauge needle by aspiration technique. From the sample obtained at least two dry and two wet smears were prepared and stained with Giemsa and Papanicolau stains respectively. In case of cystic lesions fluid was aspirated first followed by re-aspiration from the solid area. In difficult cases, image guided FNAC was done. The smears were evaluated by consultant pathologists and the final diagnoses of the FNAC were reported. Findings of FNAC were correlated with data from histopathology records wherever possible. For the histopathology diagnosis the standard protocol was followed. The tissue was formalin fixed, processed and paraffin embedded. The slides were stained with hematoxylin and eosin stain. The cytomorphological details, FNAC diagnosis and histopathology data were entered in the microsoft excel 2010 and study variables were statistically analyzed by statistical package for social service (SPSS) 16.0.

RESULTS

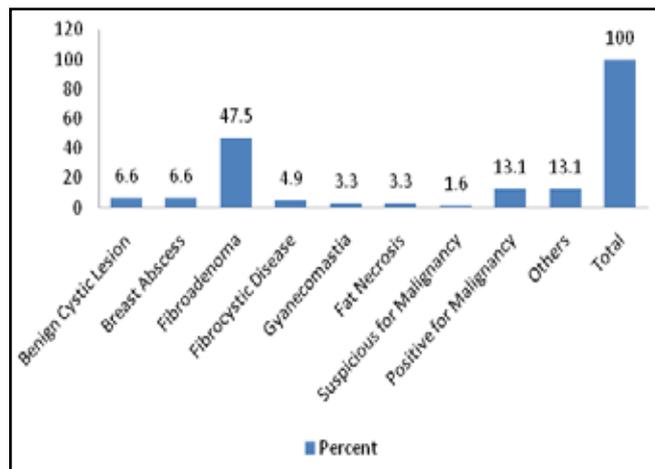
A total of 61 cases were evaluated with preponderance of female population (59). The most common age group presented with breast lump was 11 - 30 years. All of them present with benign lesions most commonly fibroadenoma comprising of 47.54%. The malignant breast lumps were found in 13.11% of patients ranging from 50 - 70 years. Though only 15 cases after FNAC undergo biopsy, there was no significant difference between the diagnosis made by FNAC and histopathology study.

Fig 1: Frequency of lesions according to sex



In our study, there was preponderance of female population with breast lump.

Fig 2: Frequency of breast lesions diagnosed by FNAC



Out of 61 cases, the most common lesion was fibroadenoma comprising 47.54% and the malignant cases were few comprising only 13.11%. Cases categorised as suspicious for malignancy which required biopsy for confirmation of diagnosis were 1.6%.

Table 1: Biopsy status of the breast lesions after FNAC diagnosis

Biopsy status after FNAC	Frequency	Percentage
Biopsy not done	46	75.4%
Biopsy done	15	24.6%
Total	61	100%

Out of 61 cases of FNAC only 15 (24.6%) undergo biopsy examination.

Table 2: Correlation of FNAC diagnosis with biopsy diagnosis

Fibrocystic disease	Biopsy(DX)		Total
	Invasive ductal carcinoma NOS	Fibroadenoma	
Fibroadenoma	0	0	6
Fibrocystic disease	1	0	1
Suspicious for malignancy	0	1	0
Positive for malignancy	0	6	0
Total	1	7	7

Out of 15 cases, one case diagnosed as suspicious for malignancy by FNAC was confirmed by biopsy and it came out to be malignant.

Fig 3: Fibroadenoma (Giemsa 100X) (Smears show both epithelial component in cohesive clusters and nests along with fibromyxoidstroma in the background of bare nuclei)

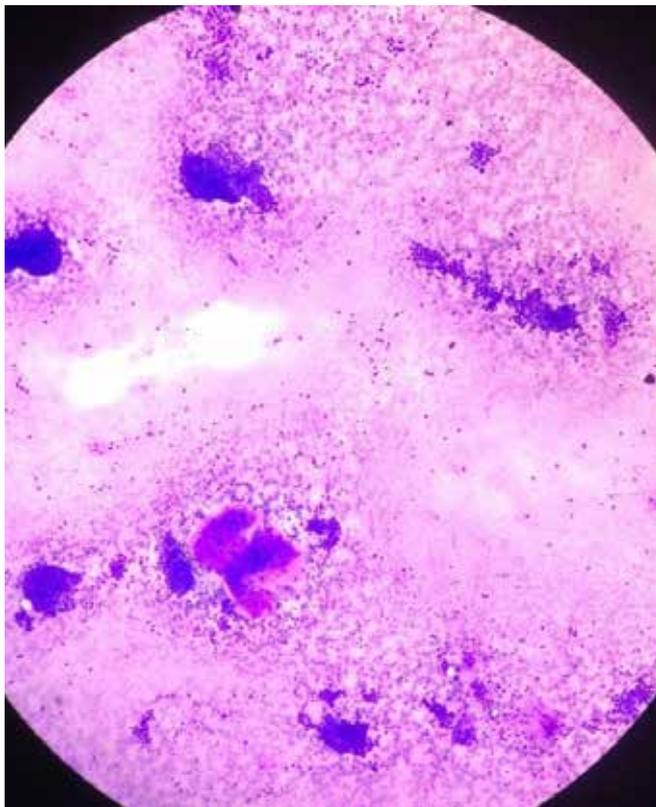


Fig 5: Fibroadenoma (H & E 100X) (Section shows pericanalicular and intracanalicular pattern of ducts along with stromal proliferation)

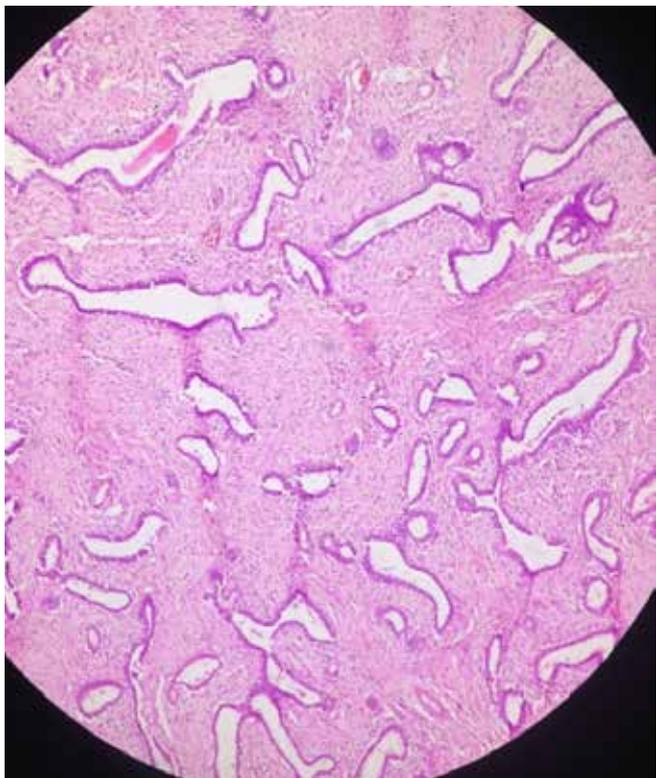


Fig 6: Positive for malignancy (Giemsa 100 X) (Cellular smear with highly pleomorphic cells, high nucleus to cytoplasm ratio, hyperchromatic nucleus, prominent nucleoli and moderate amount of cytoplasm. Absence of myoepithelial cells)

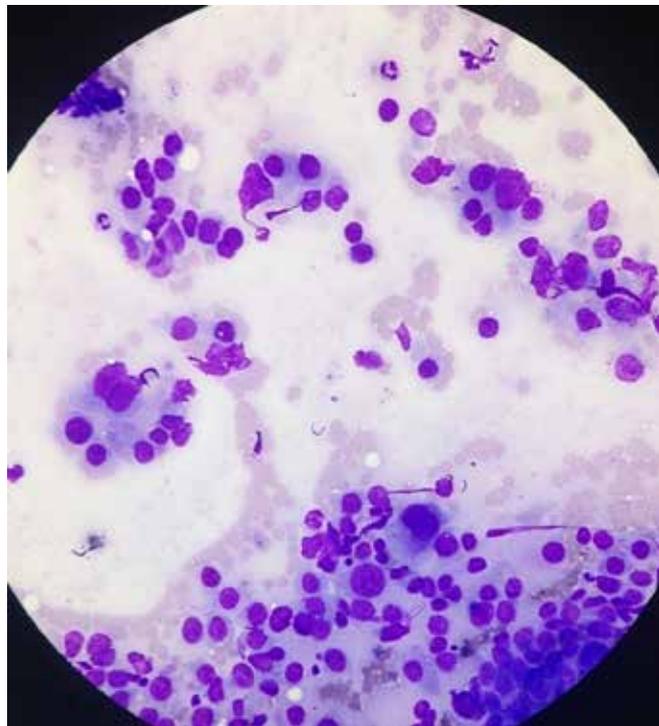
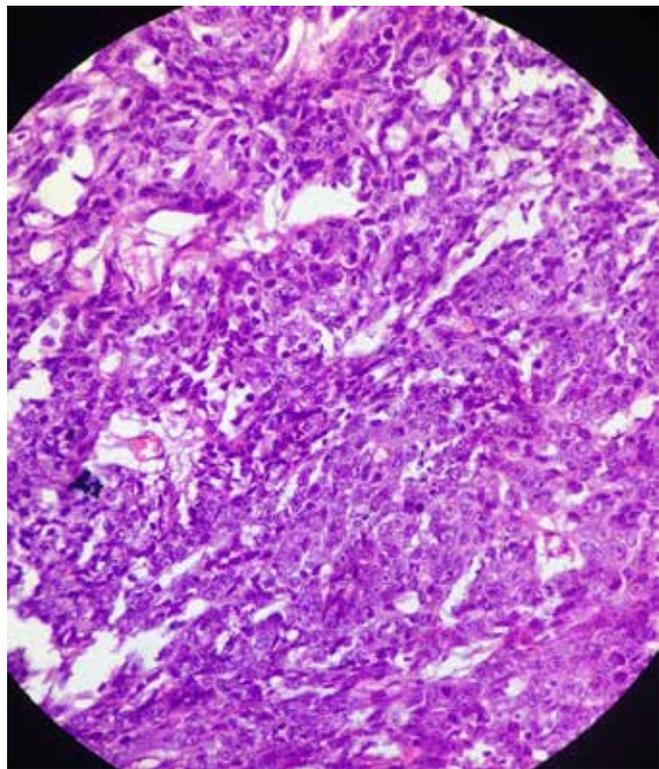


Fig 7: Invasive carcinoma NOS breast (H & E 400X) (Tumor cells infiltrating desmoplasticstroma)



DISCUSSION

Fine-needle aspiration cytology is a rapid and effective method for the primary categorization of palpable breast lumps into benign, malignant, atypical, suspicious, and unsatisfactory categories⁶. The most significant advantage of FNAC is the high degree of accuracy, rapid results, and a less invasive procedure than a tissue biopsy⁷. The breast lesions (benign or malignant) were common among females when compared to males. In our study 96.72% were female patients. The most common age group presented with breast lump was 11 - 30 years and all of the lumps were benign which is similar to the study done by Pudasaini S⁸. The most common benign breast lesion was fibroadenoma comprising 47.54% of cases studied. These findings are justified by similar findings stated by Panjavni SI *et al*⁹. The smears show both epithelial and stromal component as a diagnostic component and all being benign (Fig 3). According to a study conducted by Elmadhoun WM *et al*¹⁰ and Islam A¹¹, as compared to benign lesions, the malignant lesions were few and occurs commonly after 35 years of age. In our study also, as compared to benign lesions the malignant lesions comprised of only 13.11%. The malignant breast lumps were seen after the fourth decade of life. The cytomorphology of malignant lump show pleomorphic cells with high nucleus to cytoplasm ratio, hyperchromatic nucleus, prominent nucleoli and absence of myoepithelial cells (Fig 6).

The other lesions diagnosed by FNAC were fat necrosis, benign cystic lesions, breast abscess, gynaecomastia etc. Cases categorized under suspicious for malignancy that requires histopathological examination for the confirmation of diagnosis were 1.64%.

Out of 61 cases of FNAC, only 15 cases undergo biopsy which comprises 24.6% of total cases. The role of FNAC in diagnosing the malignant cases is very effective. In our study the sensitivity and specificity of FNAC in diagnosing malignant lesions were 100% and 85.7% respectively. There were no false positive cases while false negative cases accounted for 14.3%. These findings are similar to other studies^{2,12,13}. The FNAC results are more reliable regarding malignant lesions; however the category of "suspicious for malignant lesions" needs histopathological evaluation before performing surgical measures⁷. In our study, the histopathology features of fibroadenoma and invasive carcinoma NOS are demonstrated in figures 5 and 7 respectively.

CONCLUSION

FNAC is the safest and the most economical pre-operative diagnostic test for palpable breast lump. There is predominance of fibroadenoma among the benign breast lesions and it is seen mainly in the young population. The malignant breast lumps were seen after the age of 40 years in our study. Though the number of cases that underwent histopathology examination were few, our study showed that, there was no significant difference between the diagnosis made by FNAC and histopathology examination.

REFERENCES

1. Islam SRM. Fine needle aspiration cytology of palpable breast lump: A study of 1778 cases. *Surg Curr Res*. [Internet] 2013; [cited 2016 Aug 10]; s12(01). Available from: <http://www.omicsonline.org/fine-needle-aspiration-cytology-of-palpable-breast-lump-a-study-of%201778-cases-2161-1076.S12-001.php?aid=12017>
2. Rahman MZ, Sikder AM, Nabi SR. Diagnosis of breast lump by fine needle aspiration cytology and mammography. *Mymensingh Med J*. 2011 Oct; 20(4): 658-64.
3. Tiwari M. Role of fine needle aspiration cytology in diagnosis of breast lumps. *Kathmandu Univ Med J*. 2007 Jun; 5(2): 215-7.
4. Poudel S. Cytopathological evaluation of thyroid by fine needle aspiration cytology and correlation with T3 T4 and TSH levels. <http://www.ucms.com.np/images/journals/issue12/08.pdf> [Internet]. [cited 2016 Aug 10]; Available from: <http://www.ucms.com.np/images/journals/issue12/08.pdf>
5. Chandanwale SS, Gupta K, Dharwadkar AA, Pal S, Buch AC, Mishra N. Pattern of palpable breast lesions on fine needle aspiration: A retrospective analysis of 902 cases. *J Life Health*. 2014; 5(4): 186-91.
6. Sankaye SB, Dongre SD. Cytological study of palpable breast lumps presenting in an Indian rural setup. *Indian J Med Paediatr Oncol*. 2014; 35(2): 159-64.
7. Bukhari MH, Arshad M, Jamal S, Niazi S, Bashir S, Bakhshi IM *et al*. Use of Fine-needle aspiration in the evaluation of breast lumps. *Pathol Res Int*. [Internet] 2011 Jun 21; [cited 2016 Aug 10]; 2011. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3135154/>

8. Pudasaini S, Talwar OP. Study of fine needle aspiration cytology of breast lumps and its histopathological correlation in Pokhara Valley. *Nepal Med Coll J*. 2011 Sep; 13(3): 208–12.
9. Panjvani SI, Parikh BJ, Parikh SB, Chaudhari BR, Patel KK, Gupta GS *et al*. Utility of fine needle aspiration cytology in the evaluation of breast lesions. *J Clin Diagn Res*. 2013 Dec; 7(12): 2777–9.
10. Elmadhoun WM, Almobarak AO, Ibrahim AM, Bushara S, Noor SK, Husain NEOS *et al*. Cytomorphology of palpable breast lesions: Diagnostic utility of FNAC in a developing country. *Diagn Cytopathol*. 2015 Oct; 43(10): 825–9.
11. Islam A, Khondker NS, Rahman S, Reza E, Mahamud MM, Shaon SA *et al*. A Comparative Study between FNAC and histopathology in diagnosis of breast lump. *Mymensingh Med J*. 2015 Jul; 24(3): 486–91.
12. Muddegowda PH, Lingegowda JB, Kurpad R, Konapur P, Shivarudrappa A, Subramaniam P. The value of systematic pattern analysis in FNAC of breast lesions: 225 cases with cytohistological correlation. *J Cytol Indian Acad Cytol*. 2011; 28(1): 13–9.
13. Saleh FM, Ansari NP, Alam O. Comparison between fine needle aspiration cytology with histopathology to validate accurate diagnosis of palpable breast lump. *Mymensingh Med J*. 2012 Jul; 21(3): 450–5.

An Overview of Sexual Assault Cases in Nepal

Hirachan N^{1*}, Limbu D²

¹Lecturer, Forensic Medicine Department, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

²MBBS, MS (Orthopedics)

ABSTRACT

Background: Sexual assault is defined as any sexual act performed by one (or more) person(s) on another without consent. It may include the use of threat or force. In some cases, the person cannot give consent to sex because he/she is unconscious or otherwise incapacitated. A person may be raped by a stranger, an acquaintance or date or a family member.

Methods: The study was a retrospective and descriptive analysis of cases of sexual assault victims examined by the author in the Forensic Medicine departments at Institute of Medicine, Maharajgunj and Gandaki Medical College Teaching Hospital, Pokhara, Nepal over a period of four years (2012 to 2016). This includes information regarding the age group of the victim at the time of sexual abuse, relationship of the victim to the perpetrator, genital and extra-genital injuries present over the victim's body and number of cases attended as an expert witness by the author in various courts of Nepal.

Results: In the four years period, a total number of 55 cases were examined as sexual assault cases. It was observed that majority were of the 13 - 15 years of age group (46%) followed by <10 years (20%), 16 - 20 years (16%), >20 years (11%) and 10 - 12 years (7%). Regarding the relationship of the victim to the alleged perpetrator, 87% cases (48 out of 55) were related to acquaintances compared to 13% due to strangers. Surprisingly, 3.6% cases (2 out of 48) were due to the biological fathers of the victims. On physical examination of the victim's body, 36% cases showed genital injuries compared to only 15% with extra genital injuries. The author attended the court as an expert witness in 33% of these cases. Only 7% of the cases were mentally challenged.

Conclusion: Young adults remain the most vulnerable group, so education related to sex, morality, humanity and different life skills training should be provided to these groups from their school years itself. The benefits of early intervention and comprehensive care of survivors with the use of standardized protocols along with shorter and lesser traumatic period of court processing to the survivors of these cases should be encouraged.

Keywords

Anogenital injury, Rape, Sexual abuse.

Corresponding author

**Dr. Neelu Hirachan, MD*

Lecturer, Department of Forensic Medicine

Gandaki Medical College & Teaching Hospital, Pokhara, Nepal.

Email: drneeluhirachan@gmail.com

INTRODUCTION

Sexual offences are very common, widespread and insidious problem that have serious physical, psychological, emotional and social consequences. An estimated one out of every three women and one out of every six men will be sexually assaulted at sometime in their life. The United States has the world's highest rape rates of all countries that publish such statistics. The U.S. rape rate is four times higher than that of Germany, thirteen times than of England and twenty times than of Japan¹. Due to many related physical, mental, religious, cultural, age and social factors, only an estimated 15 - 20% of women who have been sexually assaulted report to the police; therefore, the real incidence of sexual assault is unknown and, probably, cannot ever be accurately determined. According to the American Medical Association (1995), sexual violence is the most underreported crime. A 2007 Government report in England says that Estimates from research suggest that between 75 and 95% of rape crimes are never reported to the police². In Nepal itself, according to the latest statistics, a woman somewhere in the country is raped every 54 minutes³.

Sexual assault is both a common and a very serious crime which is investigated by the police with an intensity second only to that of murder⁴. The World Health Organization (Krug *et al*, 2002) defines sexual violence as any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts to traffic, or otherwise directed against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting including but not limited to home and work⁵. It includes rape, defined as the physically forced or otherwise coerced penetration of the vulva or anus with a penis, other body part or object. Rape is a legal term. It can have devastating psychological consequences on victims, culminating in post traumatic stress disorder with an array of symptoms, including sleeping difficulties, poor appetite, flashbacks, feelings of numbness, anger, shame and denial, avoidance behavior, and relationship and sexual difficulties. In the most severe cases, depression can lead to suicidal ideation and suicide⁶.

In Nepal, rape is an offense, which can be committed only by man as in sexual intercourse, man is considered to take an active role rather than a woman. Anogenital injuries might have resulted due to the force used e.g. perineal tears, contusions of the labia etc. Other injuries like nail scratches, abrasions, bruises, bite marks etc can also be encountered over the various body parts. These marks of struggle constitute good corroborative evidence in

favor of rape. A male of any age is considered eligible for sexual intercourse (In England, males above 14 years is only deemed to be fit). There is no definite age in a female victim for rape. However, child victims are often preferred by a rapist and reported frequently for the reasons such as they offer little resistance, they can be seduced easily, they can be threatened successfully and keep the event secret and for a "false belief" of curing the venereal diseases, as practiced in some remote villages in rural India even today⁷. General code of our country i.e. Muluki Ain, rape chapter Number 1 explains that if a person enters into sexual intercourse with a woman without her consent or enters into sexual intercourse with a girl below the age of sixteen years with or without her consent shall be deemed to be an offence of rape. The 12th amendment of the Muluki Ain has also included the marital rape as a crime and has kept three to six month punishment to the perpetrator. In the year 2013, a total of 215 women victims of rape, age more than 18 years of age, 52 cases of sexual abuse were recorded. Similarly, among 406 of minor victims of rape aged one to 17 years old, 172 cases of sexual assault were recorded⁸.

METHODS

The study was a retrospective and descriptive analysis of cases of sexual assault victims examined by the author in the Forensic Medicine Departments at Institute of Medicine, Maharajgunj and Gandaki Medical College Teaching Hospital, Pokhara, Nepal over a period of four years (2012 to 2016 A.D.). This article includes information regarding the age of the victim at the time of sexual abuse, relationship of the victim to the perpetrator, genital and extra-genital injuries present over the victim's body and number of cases attended as an expert opinion by the author in various courts of Nepal. The data obtained were entered in microsoft excel worksheet and then analyzed. Observations were depicted in tables and graphs.

RESULTS

In the four years period, a total number of 55 cases were examined as sexual assault cases by the author. It was observed that majority were of the 13 - 15 years of age group (46%) followed by <10 years (20%), 16 - 20 years (16%), >20 years (11%) and 10 - 12 years (7%) (Fig 1). Regarding the relationship of the victim to the alleged perpetrator, 87% cases (48 out of 55) were related to acquaintances compared to 13% due to strangers (Fig 2). Surprisingly, 3.6% cases (Two out of 48) were due to the

biological fathers of the victims. On physical examination of the victim's body, 36% cases showed genital injuries (Fig 3) compared to only 15% with extra genital injuries (Fig 4). The author attended the court as an expert witness in 33% of these cases (Fig 5). Only 7% of the cases were mentally challenged (Fig 6). Majority of the victims were unmarried (89%) and 84% of them were educated less than tenth standard.

Fig 1: Age wise distribution of sexual abuse cases

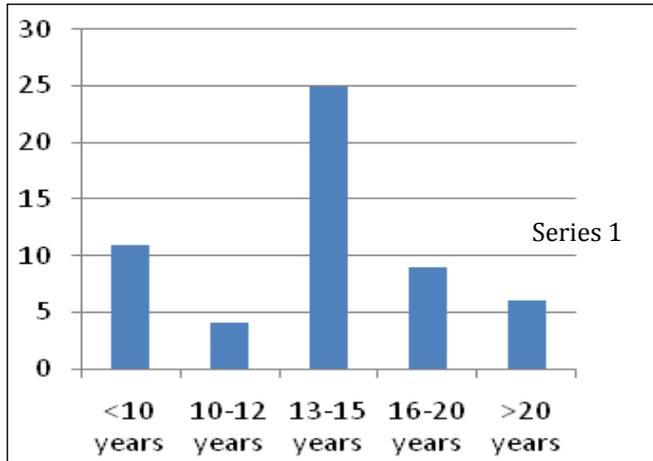


Fig 2: Relationship of the victim to the perpetrator

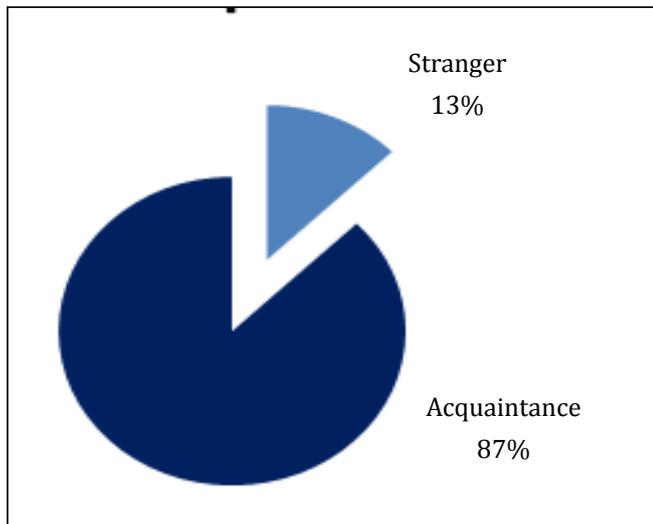


Fig 3: Extra-genital injuries in sexual abuse cases

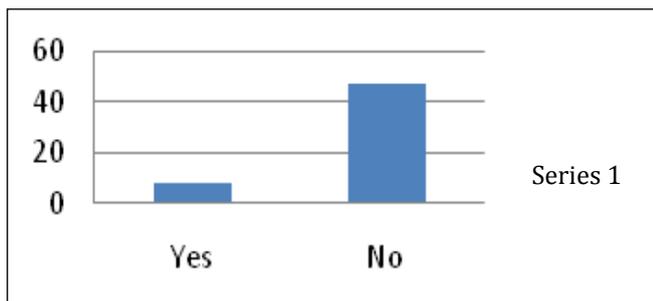


Fig 4: Genital injuries in sexual abuse cases

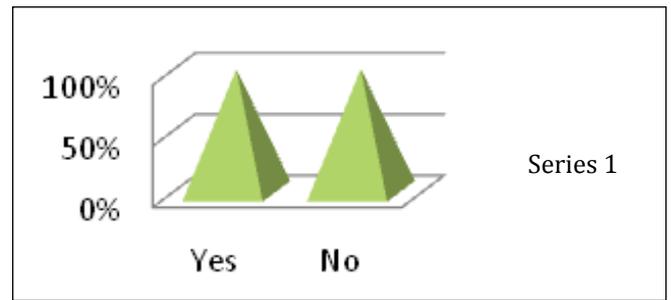


Fig 6: Mentally challenged cases

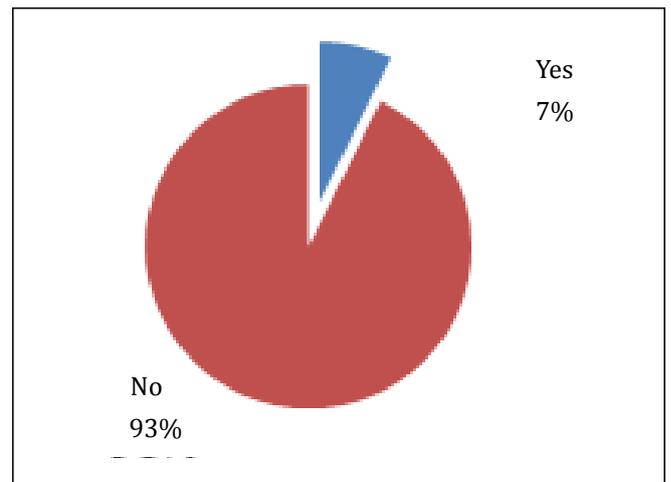
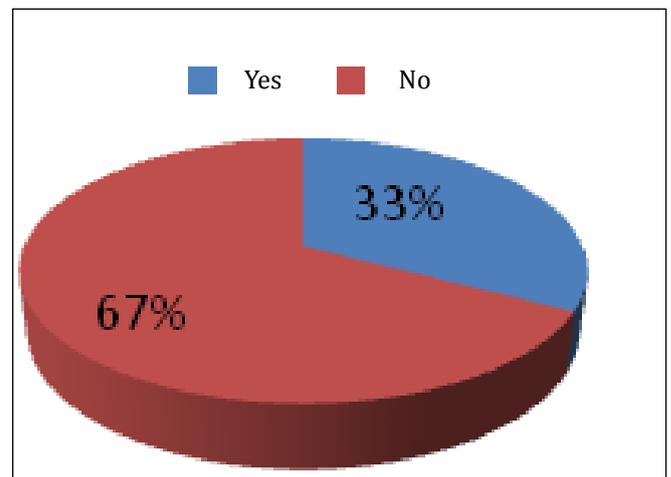


Fig 5: Court attendance as expert witness Chart



DISCUSSION

The majority of victims were of the age group 13 - 15 (46%) followed by <10 years (20%), 16 - 20 years (16%), >20 years (11%) and 10 - 12 years (7%). Similar findings were given by Akinlusi *et al*⁹, Sompur SK *et al*¹² and Palmer CM *et al*¹⁰. Regarding the relationship of the

victim to the alleged perpetrator, majority were related to acquaintances (87%) compared to strangers (13%). Similar findings were given by Akinlusi *et al*⁹, Crime Records Bureau 2013 annual report of India as being 98% of the cases committed by someone known to the victim¹¹ and American study 1992 also gave the data of 80% of them victimized by someone they knew and national sexual violence resource center, USA stated that in eight out of ten cases of rape, the victim knew the assailant¹². On physical examination of the victim's body, 36% of the total cases showed genital injuries compared to only 15% with extra genital injuries. This finding is similar to that of 20% of cases having ano-genital trauma given by Sugar NF *et al*¹³ and 22% cases having genital trauma given by Palmer CM *et al*¹⁰. The finding regarding extra-genital injuries was dissimilar to the findings given as 40% by Geist RF *et al*¹⁴, 52% given by Sugar NF *et al*¹³ and 46% given by Palmer CM *et al*¹⁰. The reason for this dissimilarity could be due to larger number of cases studied by these authors compared to smaller number; i.e., 55 by the author. Only 7% of the cases were mentally challenged which was dissimilar to the data shown by Cybulska B *et al* where 20% of the victims had history of mental health problems, self-harm or learning difficulties. This may be due to large sample size of 62081.

CONCLUSION

Following sexual assault, victims have three main care needs: Forensic, medical and psychosocial. Doctors especially in Emergency Department must be educated and trained enough for handling, documenting and providing proper reports in cases of sexual offence. Young adults remain the most vulnerable group, so education related to sex, morality, humanity and different life skills training should be provided to these groups from their school years itself. The benefits of early intervention and comprehensive care of survivors with the use of standardized protocols along with shorter and lesser traumatic period of court processing to the survivors of these cases should be encouraged.

REFERENCES

1. Crisis Intervention Center: Sexual Assault Statistics. [Online]. Available from: http://www.crisisinterventioncenter.org/index.php?option=com_content&view=article&id=67:sa-statistics&catid=37:sexual-assault&Itemid=77 [Accessed 18th October 2016].
2. Wikipedia. Rape Statistics. [Online]. Available from: http://en.wikipedia.org/wiki/Rape_statistics [Accessed 20th October 2016].
3. The Women's Foundation of Nepal: *Sexual violence*. [Online]. Available from: http://www.womenepal.org/index.php?option=com_content&view=article&id=42&Itemid=43&lang=en [Accessed 20th October 2016].
4. Cybulska B. Sexual assault: Key issues. *J R Soc Med*. 2007; 100: 321–324.
5. Krug EG, eds. (2002). World report on violence and health. Geneva, World Health Organization.
6. Petrak J, Doyle AM, Williams L, Buchan L, Foster G. The psychological impact of sexual assault: A study of female attenders of a sexual health psychology service. *Sexual and Marital Therapy*. 1997; 12: 339–45.
7. Rao NG. Textbook of Forensic Medicine and Toxicology, 2nd edition. New Delhi: Jaypee Brothers Medical Publishers. 2010; 362.
8. Pyakurel SR. Violence against women/girls assessing the situation of Nepal in 2013. Informal Sector Service Centre (INSEC). 2014.
9. Akinlusi FM. Sexual assault in Lagos, Nigeria: A five year retrospective review. *BMC Womens Health*. 2014 Sep 23; 14: 115.
10. Palmer CM, McNulty AM, D'Este C, & Donovan B. Genital injuries in women reporting sexual assault. *Sexual Health*. 2004; 1(1): 55-59.
11. Vasundhara Sirnate. "Good laws, bad implementation". Chennai, India: *The Hindu*. Retrieved 1 February 2014.
12. Sompur SK. Rape Statistics – USA [Online]. Available from: <http://www.911rape.org/facts-quotes/statistics> [Accessed 20th October 2016].
13. Sugar NF, Fine DN, Eckert LO. Physical injury after sexual assault: Findings of a large case series. *Am J Obstet Gynecol*. 2004; 190(1): 71-6.
14. Geist RF. Sexually related trauma. *Emergency Medicine Clinics of North America*. 1988; 6(3), 439-466.

Knowledge of Pressure Ulcer Management among Nurses

Shrestha N^{1*}, Shrestha P²

¹Lecturer, Department of Nursing, ²RN

Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

ABSTRACT

Background: Pressure ulcer (PU) development remains a significant complication among at-risk patients. It is considered “never events” because they are preventable and should “never” happen. It has been associated with increased morbidity, mortality, hospital cost and length of stay in the hospital. Prevention of pressure ulcers is considered a nurse-sensitive indicator hence nurses should have adequate knowledge about current evidence-based prevention and management of pressure ulcer. However, non adherence to these guidelines is frequent and lack of knowledge may act as barriers to using guidelines in clinical practice.

Objectives: The objectives of the study were to 1. assess the knowledge of pressure ulcer management among nurses 2. determine the level of knowledge of pressure ulcer management among nurses 3. assess the association of knowledge of nurses and baseline variables.

Methods: A descriptive cross sectional study was conducted, using pretested self administered questionnaire to assess the knowledge on pressure ulcer management among purposively selected 100 nurses working in Gandaki Medical College Teaching Hospital in 2015. Descriptive statistics as frequency and percentage were used and inferential statistics (Chi-square test) was done to find out association between knowledge and selected baseline variables.

Results: The study revealed that 59% of the respondents had adequate knowledge where as 41% of nurse’s knowledge was found to be inadequate. Significant association was not found between age, working ward, experience, education, training, duration and knowledge of pressure ulcer management among Nurses.

Conclusion: This result indicates that more than half of the nurses had the adequate knowledge but there is still need of education and training related pressure ulcer management.

Keywords

Knowledge, Pressure ulcer management, Nurses.

Corresponding author

**Nisha Shrestha*

Lecturer, Department of Nursing

Gandaki Medical College, Pokhara, Nepal

Email: nishapkr061@hotmail.com

INTRODUCTION:

Pressure ulcer (PU) remains a significant problem in the healthcare system. In addition to the suffering it causes to patients, it also bears a growing financial burden, human suffering, pain, disfigurement, loss of productive time^{1,2}. Pressure ulcers increase patient morbidity and mortality.

Stage IV pressure ulcers have a high cost, and stopping the progression of early stage pressure ulcers can decrease unnecessary pain impacting thousands of patient lives³.

Despite the fact that pressure ulcers are largely preventable and recent advances in health care sector, pressure ulcer rates are significantly increased in health

care facilities⁴. Studies conducted in Europe, the United States, Canada and Australia provided estimates of pressure ulcer prevalence in hospitals ranging from 8.3% to 25.1%⁵⁻⁸. In Nepal, the incidence and prevalence data regarding pressure ulcer were not available.

The presence or absence of pressure ulcers has been generally regarded as a performance measure of quality nursing care. Nurse, as a primary care giver should have the knowledge on pressure ulcer in order to carry out intervention necessary for prevention and management of complication of pressure ulcer⁹.

Knowledge increases nurses' awareness of problems of pressure ulcer and provides the basis for informed decision making and framework to develop and maintain competency of delivering high quality of nursing care^{10,11}. Pressure ulcer prevention is the responsibility of all health care professionals who are involved in patient care¹². Nursing research is invaluable and an integral part of nursing care, which aids in shaping and delivering quality care regarding prevention and treatment of pressure sores¹³.

OBJECTIVES

The objectives of the study were to

1. Assess the knowledge of pressure ulcer management among nurses
2. Determine level of knowledge of pressure ulcer management among nurses
3. Assess the association of knowledge of pressure ulcer management among nurses and baseline variables.

METHODS

This study was carried out on 100 nurses working in different wards of Gandaki Medical College and Teaching Hospital, using purposive sampling technique. Pretested self administered questionnaire was used to collect data to assess knowledge of pressure ulcer management. The collected data was analyzed using descriptive and inferential statistics in SPSS 16 version. Descriptive statistics (frequency, percentage, mean and standard deviation) was used to describe baseline variables and knowledge of pressure ulcer management. Inferential statistics (chi-square) were used to show association between knowledge of pressure ulcer management among nurses and independent variables. Analyzed data was presented in tables, graphs and figures.

RESULTS

Fig 1: Distribution of respondents based on age (n=100)

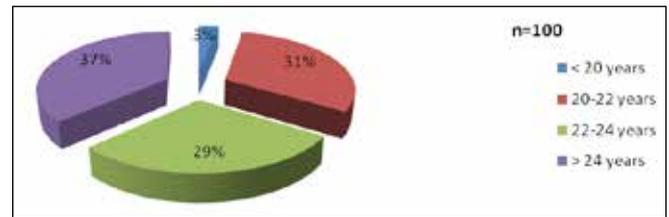


Fig 1 reveals that majority (37%) of respondents were of age more than 24 years, 31% of respondents were of age 22 - 24 years followed by 29% of age 20 - 22 years and least (3%) were of age less than 20 years.

Table 1: Baseline data of respondents (n=100)

Baseline Data	Frequency	Percentage
Experience (in years)		
<1	9	9
1 - 3	71	71
3 - 5	6	6
>5	14	14
Education		
PCL Nursing	92	92
Bachelor in Nursing	8	8
Training		
Yes	7	7
No	93	93
Duration (n=7)		
One day	5	71.4
Two days	2	28.6

Table 1 shows that more than half (71%) of respondents had experience of 1 - 3 years and least (9%) of respondents had less than one year experience. Majority of respondents (92%) had education of PCL nursing and only 8% had bachelor in nursing. Majority of respondents (93%) had no formal training on pressure ulcer management and only 7% had formal training out of which most (71.4%) had one day training and few (28.6%) had two days training.

Table 2: Respondents' knowledge on Pressure ulcer (n=100)

	Frequency	Percentage
Site of occurrence	97	97
Cause	100	100%
Risk factor	92	92%
Complication	71	71%

Majority (97%) of the respondents responded bony sites for occurrence of pressure ulcer. All the respondents (100%) answered friction as a cause and majority (92%) correctly identified risk factor of pressure ulcer whereas 71% identified complication of pressure ulcer (Table 2).

Table 3: Respondents knowledge on prevention of pressure ulcer (n=100)

S.No	Variables	Frequency	Percentage
1	Assessing for risk factors on admission and routinely	78	78%
2	Two hourly position changing	86	86%
3	Positioning of patients	58	58%
4	Use of comfort devices	44	44%

Most of respondents (78%) responded to assess for risk factors of pressure ulcer on admission and routinely. Majority of respondents (86%) correctly answered changing position every two hourly of bedridden patients; 58% answered correct positioning for relieving pressure and 44% of respondents answered use of comfort devices for prevention of pressure ulcer (Table 3).

Table 4: Respondents' knowledge on management of pressure ulcer (n=100)

Variables	Frequency	Percentage
*Patient has discoloration of skin		
Avoiding shearing force	46	46%
Let next nurse know about it	41	41%
Place patient on pressure reducing surface	69	69%
Notify physician	46	46%
Protein rich diet	95	95%
Dressing technique	44	44%
Drug for managing pain	46	46%

*Multiple response

When patient has discoloration of skin, most of the respondents (69%) responded placing patient on pressure reducing surface, followed by 46% answered avoiding shearing force, 46% responded to notify physician and least 41% answered to let next nurse know about it. Majority (95%) of respondents correctly

answered to advice for protein diet, and nearly half of the respondents (44%) correctly answered proper dressing technique. Likewise for managing pain 46% of respondents answered acetaminophen as drug of choice for managing pain (Table 4).

Table 5: Respondent's level of knowledge on pressure ulcer management (n=100)

Knowledge level	Frequency	Percentage
Inadequate (<mean)	41	41%
Adequate (≥mean)	59	59%

Mean 12.99

Almost half of the nurses (59%) of respondents have an adequate knowledge of pressure ulcer management and 41% had inadequate knowledge (Table 5).

Table 6: Association between independent variables and knowledge of respondents (n=100)

Independent variables	df	P-value
Age	3	.050
Working ward	11	.207
Experience	3	.243
Education	1	.167
Training	1	.951
Duration	1	.47

Table 6 shows that there is no significant association between level of knowledge of respondents and independent variables like age, working ward, experience, education, training and duration of training.

DISCUSSION

Majority (37%) of respondents were of age more than 24 years, 31% of respondents were of age 22 - 24 years followed by 29% of age 20 - 22 years and least (3%) were of age less than 20 years. This indicates that most of the nurses were in the early age of their career. More than half (71%) of respondents had experience of one to three years and least (9%) had less than one year experience. This is a clear indication that respondents were not novices in nursing profession. These findings contrast with the study done on 87 nurses of Eric Williams Medical Sciences Complex where majority (86.7%) of the respondents were 39 years or younger, with 73% of them having had only three years of experience or less¹⁴.

Findings also showed 41% of respondents have an inadequate knowledge of pressure ulcer management.

This is less than the study done on 248 nurses of Gondar University Hospital in North West Ethiopia, where almost half (45.5%) had inadequate knowledge¹⁵. Similarly, study done in Ethiopia found 61.2%, in Jordan where 73% had inadequate knowledge¹. The overall low level of knowledge may not be unconnected to their formal educational background and training experience. This study found that majority of respondents (92%) had PCL in nursing and only 8% had bachelor in nursing. This limited formal educational qualification and training is a strong factor related to nurses' low level of knowledge. In addition, majority (93%) of respondents had no formal training and only seven percent had formal training. The lack of opportunity to be trained and get updated on pressure ulcer prevention programs might be the reasons for low level of knowledge regarding pressure ulcer prevention. These findings are similar to previous study in which lack of training in pressure ulcer prevention care in Irish nurses was one of barrier to nurses accessing updated information about pressure ulcer prevention.

The findings of the study showed that there is no significant association between level of knowledge of respondents and independent variables like age, working ward, experience, education, training and duration of training. The findings are similar to the study where results revealed that nurses' knowledge had no relation with nurses' education, age, or years of work experience¹. The findings contrast with the findings of the study done in Nigeria where significant relationship was found between nurses' work experience and knowledge⁶.

CONCLUSION

The major conclusion was drawn on the basis of objectives and study findings. The mean score of correct answer on the knowledge of nurses' result showed that 59% of nurses' knowledge was adequate. However 41% of nurses' knowledge was found to be inadequate which reveals that there is a need of education and training related pressure ulcer management.

REFERENCES

1. Qaddumi J, Khawaldeh A. Pressure ulcer prevention knowledge among Jordanian nurses: A cross sectional study. *BMC Nursing*. 2014; 13(6): 1472-6955. [internet] [cited 2015 Sep 30] Available from: <http://bmcnurs.biomedcentral.com/articles/10.1186/1472-6955-13-6>.
2. Abdel Rahman MS, Abdel Rahman RF, Al Assaf RM, Saleh MYN. Exploring nurses' knowledge and perceived barriers to carry out pressure ulcer prevention and treatment, documentation, and risk assessment. *American International Journal of Contemporary Research*. 2014 Apr; 4(4): 112-9.
3. Albert M, Lewis L. Knowledge and views about prevention and management of pressure ulcer. *Asian academic research journal of multidisciplinary*. 2014; 1: 231-9.
4. Saleh MYN, Saleh JM. Interventional study on effects of pressure ulcer education on Jordanian nurses knowledge. *Social and behavioral sciences*. 2012; 47: 2196-2206.
5. Hulsenboom MA, Bours GJW, Halfens RJG. Knowledge of pressure ulcer prevention: A cross sectional and comparative study among nurses. *Biomedical Research*. 2007; 6: 214-9.
6. Uba M.N *et al*. Knowledge, attitude and practice of nurses towards pressure ulcer prevention in University of Maiduguri Teaching Hospital, Borno state, North-Eastern, Nigeria. *International Journal of Nursing and Midwifery*. 2015; 7(4): 54-60.
7. Islam S. Knowledge, attitude and practice regarding pressure ulcer prevention for hospitalized patients at Rajshahi Medical College Hospital in Bangladesh. Prince of Songkla University. 2010;49-68 [internet] [cited 2016 Aug 25] Available from : <http://kb.psu.ac.th/psukb/bitstream/2010/7830/1/326010.pdf>.
8. Nurhusien N. Knowledge of nurses towards prevention of pressure ulcer and associated factors. *BMC biocentral articles*. 2015; 18: 2338-3734. [internet] [cited 2016 Feb 12] Available from: <http://bmcnurs.biomedcentral.com/articles/10.1186/s12912-015-0076-8>.
9. Mwebaza I Katende G, Groves S, Nankumbi J. Nurses' knowledge, practices, and barriers in care of patients with pressure ulcers in a Ugandan Teaching Hospital. *Nursing Research and Practice*. 2014; 7: 602-5.
10. Miyazaki Margareth Yuri, Caliri Maria Helena Larcher, Santos Claudia Benedita dos. Knowledge on pressure ulcer prevention among nursing professionals. *Rev. Latino-Am. Enfermagem* [Internet]. 2010 Dec [cited 2016 Nov 10]; 18(6):1203-1211. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-11692010000600022&lng=en. <http://dx.doi.org/10.1590/S0104-11692010000600022>.

11. Ayello E. Replication a survey of pressure ulcer context in nursing textbook. *Journal of Wound Ostomy Continence Nursing*. 2003; 266-71.
12. Beeckman D, Defloor T, Schoonhoven L, Vanderwee K. Knowledge of nurses on pressure ulcer prevention. *Worldviews Evid Based Nurs*. 2011 Sep; 8(3): 166-76.
13. Karen L. Cooper. Evidence-based prevention of pressure ulcers in intensive care unit. *Critical care nurse*. 2013; 33(6): 57-67.
14. Onuoha PC, Albert M, Campbell-George L, Lewis L, Montrichard J, Polo-Williams N, Thom S. Knowledge and views about prevention and management of pressure ulcer: A case study of nurses at a Caribbean Teaching Hospital. *Asian Academic Research Journal of Multidisciplinary*. 2014 Apr; 1(20): 2319 - 2801. [internet] [cited 2016 Jan 3] Available from: http://www.asianacademicresearch.org/2014_abstract/april_md_2014/37.pdf
15. Nuru N et al. Knowledge and practice of nurses towards prevention of pressure ulcer and associated factors in Gondar University Hospital, Northwest Ethiopia. *BMC Nursing*. 2015; 14(34).

Prevalence and Factors Affecting Women with Uterine Prolapse in Lekhnath, Kaski, Nepal

Silwal M^{1*}, Gurung R², Shrestha N², Gurung A², Ojha S³

¹Co-ordinator, ²Lecturer, ³Teaching assistant
Gandaki Medical College, College of Nursing Sciences, Pokhara, Nepal

ABSTRACT

Background: Uterine prolapse is the main public health problem of reproductive age women in Nepal. Uterine prolapse (UP), which affects about 10% of women of reproductive age in Nepal, is the most frequently reported cause of poor health in women of reproductive age and postmenopausal women. Currently, women's awareness of UP is unknown, and attempts to unravel the UP problem are inadequate.

Objectives: The objectives of this study was to determine prevalence of uterine prolapse, to explore factors affecting women with uterine prolapse and to find association between selected variables and prevalence of uterine prolapse.

Methods: A community based cross sectional study was conducted from 7th July, 2016 to 7th of August, 2016 among married women with at least one child in the Ritthevani, Ward No 2, Lekhnath. Participants were selected by purposive sampling techniques, and data were collected through structured interview schedule. Frequency, percentage, mean, SD and chi-square test was performed to identify factors associated with prevalence of uterine prolapse.

Results: The major findings were majority 35 (35%) of women were in the age group of 20 to 30 years, followed by 89 (89%) Hindu religion, 48 (48%) belonged to janajati and religious minority which included Newar, Magar, Gurung, Tamang and Muslims. Most of the women 35 (35%) were illiterate, 44 (44%) earn their living by working in agriculture, 57 (57%) respondents had ≥Rs1500 per month income in the family, 58 (58%) belonged to nuclear families, 76 (76%) of the respondents had knowledge about uterine prolapse and they got information mostly from 24 (24%) friends. The prevalence rate of women with uterine prolapse was found to be 13% whereas mean and standard deviation were 0.87 ±0.33. The findings of association between the prevalence of uterine prolapse with age at first child birth, abortion, sexual intercourse immediate after delivery and constipation were found to be significantly associated. Almost all respondents

Keywords

Prevalence, Uterine prolapse, Women.

Corresponding author

**Ms Muna Silwal
Coordinator, Nursing programme
Gandaki Medical College,
College of Nursing Sciences,
Lekhnath, Kaski, Nepal
Email: munasilwal@hotmail.com*

replied that uterine prolapse can be prevented by avoiding strenuous activities during antenatal and postnatal period followed by avoiding giving birth to too many babies, taking nutritious diet, deliver the baby in health institution by health personnel, avoiding long term coughing and chronic constipation.

Conclusion: Uterine prolapse was observed among women of Ritthevani ward no 2; among them most of them were age group between 20 - 30 year early married illiterate. The perceived service was taken by less number of eligible women. Women awareness towards the problem, limiting frequent pregnancies and provision of educational opportunities are recommended for the prevention of uterine prolapse.

INTRODUCTION

"The deepest experience of the creator is feminine for it is experience of receiving and bearing"

-Rainer Maria Rilke

Uterine prolapse is a condition in which the muscles and supporting ligaments holding the uterus in place gets too weak to keep the uterus in position. Risk factors with uterine prolapse are seen among women with improper delivery techniques, heavy work during and soon after pregnancy and heavy lifting. According to the United Nations Population Fund (UNFPA), the high number of affected women in Nepal is due to the lack of skilled birth-attendants, women carrying heavy loads during pregnancy, lack of contraceptives and giving birth to many children¹.

Uterus (or uterine) prolapse (UP) is a widespread chronic problem among women in Nepal, particularly in hilly areas. It is defined as falling of the womb, when the muscles of the pelvis are strained to a point where they can no longer support the positioning of the uterus. The uterus drops from its normal position in the pelvic cavity, descending into and eventually, in extreme stages, out of the vagina. It is a progressive condition that typically occurs in post menopausal women in most countries. However, it can also occur in younger age group and frequently does in Nepal. Some evidences suggest that there are extensive problems of uterus prolapse among women but these remain unexposed due to shyness and negligence to the health of women².

Many women with prolapse experience symptoms that impact daily activities, sexual function, and exercise. The presence of POP can have a detrimental impact on body image and sexuality.

In Nepal, reproductive ill health is a major health problem and is least articulated by the general public because of lack of knowledge and it is a cultural taboo. The Government of Nepal's (GON) strategy reflects the commitment to the ICPD. Although the Government and donors have recently given more attention to safe motherhood issues, many have raised concerns that UP is still a neglected and often overlooked problem. The Government has adopted several policies and taken measures to make RH services available to all Nepalese citizens through the primary health care system.

According to 'WHO' estimation, the reproductive ill health accounts for 33% of the total disease burden among the women globally³. The global prevalence of uterine prolapse is 2 - 20%. Internationally according to Oxford Family Planning Association UK, the hospital admission for uterine prolapse is 20.4%, surgery for prolapse is 16.2%⁴. The incidence of uterine prolapse in USA is 11.4%, Egypt 56%, Italy 5.5%, Iran 53.6%, California 1.9%, and Pakistan 19.1%. It is estimated that more than 60,000 women in Nepal are suffering from uterine prolapse out of which 18,600 are in need of surgical repair³.

OBJECTIVES

- To determine the prevalence of uterus prolapse among women
- To explore factors affecting women with uterine prolapse
- To find association between selected variables and affecting factors of uterine prolapse

RESULTS

1. Description of sample characteristics

Table 1: Frequency and percentage distribution of demographic characteristics (n=100)

Demographic characteristics	Frequency	Percentage
Age (Years)		
a. 20 - 30	35	35%
b. 30 - 40	21	21%
c. 40 - 50	18	18%
d. 50 - 60	18	18%
e. 60 - 70	5	5%
f. 70 - 80	3	3%
Religion		
a. Hindu	89	89%
b. Buddhist	8	8%
c. Christian	1	1%
d. Muslim	2	2%
Ethnicity		
a. Brahmin	22	22%
b. Chhetri	20	20%
c. Janajati/religious minority	48	48%
d. Dalit	10	10%
Educational status		
a. Illiterate	35	35%
b. Primary	19	19%
c. Secondary	25	25%
d. Higher secondary	10	10%
e. Bachelor and above	11	11%
Occupation		
a. Housewife	36	36%
b. Agriculture	44	44%
c. Business	14	14%
d. Service	4	4%
e. Others	2	2%
Income per month		
a. ≤5,000	15	15%
b. 5,000 – 10,000	10	10%
c. 10,001 – 15,000	18	18%
d. ≥15,001	57	57%
Type of family		
a. Nuclear	58	58%
b. Joint	42	42%
Knowledge about uterine prolapse		
a. Yes	76	76%
b. No	24	24%
Sources of information about uterine prolapse		
a. Media	14	14%
b. Health personnel	15	15%
c. Friends	24	24%
d. Family members	23	23%

Table 1 shows that, the majority of women, 35 (35%) were in the age group of 20 to 30 years, follows 89 (89%) Hindu religion, 48 (48%) belonged to janajati and religious minority which includes Newar, Magar, Gurung, Tamang and Muslims. Most of the women 35 (35%) were Illiterate, 44 (44%) earned their livelihood by agriculture, 57 (57%) respondents had ≥ Rs15,001 monthly income in the family, 58 (58%) belonged to nuclear families, 76 (76%) of the respondents had knowledge about uterine prolapse and they got information mostly from 24 (24%) friends.

2. Prevalence of uterine prolapse

This section describes the findings related to prevalence of uterine prolapse among women of reproductive age.

Fig 1: Prevalence of uterine prolapse (n=100)

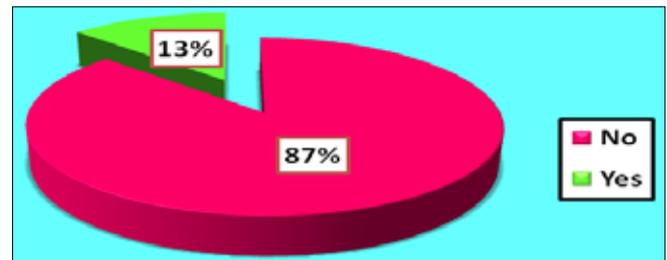


Fig 1 shows that among 100 respondents, 13% of the respondents were suffering from uterine prolapse whereas mean and standard deviation were 0.87 ± 0.33 .

Table 2: Factors affecting the uterine prolapse (n=100)

Associated factors	Frequency (f)	Percentage (%)
Age at marriage (Years)		
<20	58	58%
≥20	42	42%
Number of children		
One	25	25%
Two	39	39%
Three	15	15%
More than three	21	21%
Age at first child birth (Years)		
<20	41	41%
≥20	59	59%
Abortion		
Yes	11	11%
No	89	89%
Type of 1st delivery		
Normal	92	92%
Cesarean section	7	7%
Instrumental	1	1%
Physical workload during antenatal period		
Normal as prepregnancy	57	57%
More than prepregnancy	22	22%
Less than prepregnancy	21	21%
Rest and sleep during day time in postnatal period after 1st child		
≤2 hrs	14	14%
2- 4 hrs	41	41%
≥4 hrs	38	38%
No rest and sleep	7	7%
Sexual intercourse after delivery		
<42 days	11	11%
≥42 days	89	89%
Constipation		
Yes	30	30%
No	70	70%

The above Table 2 shows that, majority 58 (58%) of the women got married below 20 years of age, 39 (39%) had two children, 59 (59%) gave birth to first child ≥ 20 years. Out of 100, 11 (11%) had abortion, 92 (92%) women had normal vaginal delivery, 57 (57%) women worked normal as pre-pregnancy state in antenatal period. 41 (41%) women had taken rest and sleep between two to four hours in postnatal period during day time, 89 (89%) women had sexual intercourse ≥ 42 days and about 30 (30%) women had constipation.

3. Association between prevalence of uterine prolapse with associated factors

This section analyzes the association between prevalence of uterine prolapse with associated factors such as age, religion, ethnicity, educational status, occupation, income per month, types of family, age at marriage, age at first child birth, birth interval, birth assistant, type of delivery, number of children, abortion, constipation, workload during pregnancy, rest and sleep during day time in postnatal period, sexual intercourse after delivery etc. The association was observed by cross tabulation, Chi Square test and ANOVA test. Specific findings were as follows.

Table 3: Association between prevalence of uterine prolapse with associated factors (n=100)

Factors associated with uterine prolapse	Pearson Chi-square χ^2	df	P value
Age at first child birth			
<20	7.971	1	0.005
≥ 20			
Abortion			
Yes	38.984	1	0.000
No			
Sexual intercourse after delivery			
<42 days	18.862	1	0.000
≥ 42 days			
Constipation			
Yes	10.951	1	0.001
No			

The above Table 3 illustrates the effect of age at first child birth on uterine prolapse. The χ^2 value is 7.971 ($p = 0.05$) which showed that there was significant association between prevalence of uterine prolapse and age at first child birth. The effect of abortion on uterine prolapse showed that there was significant association between prevalence of uterine prolapse and abortion with χ^2 value is 38.984 ($p < 0.05$). The effect of sexual intercourse on uterine prolapse showed that there was significant

association between prevalence of uterine prolapse and sexual intercourse after delivery with χ^2 value is 18.862 ($p < 0.05$). The effect of constipation on uterine prolapse showed that there was significant association between prevalence of uterine prolapse and constipation with $\chi^2 = 10.951$ ($p < 0.05$).

Table 4: Uterine prolapse by birth assistant (n=100)

Birth assistant	Source of variation	Sum of Squares	df	Mean Square	F	Sig.
First child delivery	Between groups	.861	1	.861	1.580	.212
	Within groups	53.379	98	.545		
	Total	54.240	99			
Second child delivery	Between groups	.544	1	.544	.782	.380
	Within groups	48.733	70	.696		
	Total	49.278	71			
Third child delivery	Between groups	1.261	1	1.261	1.502	.229
	Within groups	26.857	32	.839		
	Total	28.118	33			
Fourth and more then four children delivery	Between groups	7.606	1	7.606	12.509	.002
	Within groups	10.944	18	.608		
	Total	18.550	19			

There was significant association between prevalence of uterine prolapse with birth assistant in fourth and more then four children delivery with the onset of uterine prolapse whereas there was no association between other groups like birth assistant in first, second and third delivery (Table 4).

4. Health services related findings

This section presents the treatment seeking practices of respondents suffering from uterine prolapse and their perceived satisfaction towards the services received for its treatment.

Table 5: Respondents by treatment status and services centers for treatment of UP (n=100)

Treatment Received Status	Frequency	Percentage
Yes	6	46.15%
No	7	53.84%
Total	13	100%
Services centers for treatment of uterine prolapse		
Hospital	4	66.66%
Private clinics	2	33.33%
Total	6	100%

The treatment practices of respondents suffering from uterine prolapse are depicted in Table 5. Out of 13 cases, six (46.15%) women received services of uterine prolapse and four (66.66%) women received services from hospitals while only two (33.33%) received from

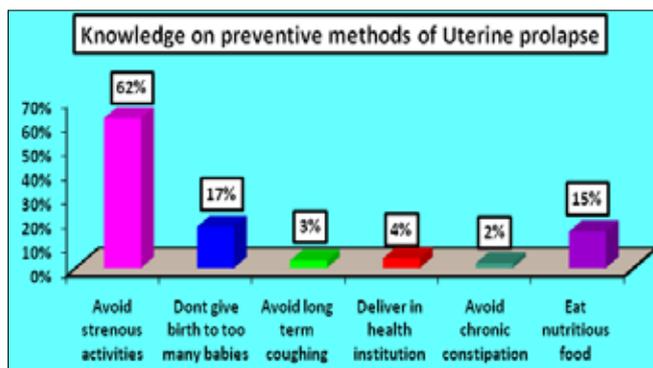
private clinics showing the culture of silence and poor accessibility of service.

Table 6: Nature and feeling of treatment received (n=100)

Treatment	Frequency	Percentage
Ring pessary	1	16.66%
Medicine intake on advice of health workers	3	50%
Operation	2	33.33%
Total	6	100%

The above table 6 shows that those who received the services for uterine prolapse, most of them three (50%) women were treated by intake of medications on advice of health workers followed by two (33.33%) women had undergone operation. From the respondents who have received health services, 100% of the women's health status was improved after the treatment and were satisfied with the services they received against uterine prolapse.

Fig 2: Knowledge on preventive methods for uterus prolapse among women (n=100)



*Multiple responses

The above figure 2 shows that the idea of respondents for the prevention of uterine prolapse. Almost all respondents replied that uterine prolapse can be prevented by avoiding strenuous activities during antenatal and postnatal period followed by avoiding giving birth to too many babies, taking nutritious diet, deliver the baby in health institution by health personnel, avoid long term coughing, avoid chronic constipation respectively.

DISCUSSION

The main objective of the study is to find out the prevalence and associated factors of uterine prolapse among women in Rithepani, ward no 2, Lekhnath.

The major findings of this study reveal that majority of women, 35 (35%) were in the age group of 20 to 30 years,

follows 89 (89%) Hindu religion, 48 (48%) belonged to janajati and religious minority which includes Newar, Magar, Gurung, Tamang and Muslims. Most of the women 35 (35%) were Illiterate, 44 (44%) earn their living by working in agriculture, 57(57%) respondents had ≥ Rs15,001 monthly income in the family, 58 (58%) belonged to nuclear families, 76 (76%) of the respondents had knowledge about uterine prolapse and they got information mostly from 24 (24%) friends. Similar study was conducted by B. Thapa, G. Rana and S Gurung in Chitwan, Nepal in 2014, the finding of this study reveals that the majority of the women were illiterate and they were involved in agriculture⁷.

In this present study the prevalence rate of women with uterine prolapse found to be 13% whereas mean and standard deviation were 0.87 ±0.33. Similar study was conducted by Tamrakar A⁶ in Pokhara in 2010 where the prevalence rate of uterine prolapse was 11.7%.

In this study the findings of association between the prevalence of uterine prolapse with age at first child birth, abortion, sexual intercourse immediate after delivery and constipation are found to be significantly associated.

CONCLUSIONS

This study was conducted in Lekhnath, to findout the prevalence rate of the uterine prolapse and its associated factors among women in 2016.

The major findings were majority of women, 35 (35%) were in the age group of 20 to 30 years, followed 89 (89%) Hindu religion, 48 (48%) belonged to janajati and religious minority which includes Newar, Magar, Gurung, Tamang and Muslims. Most of the women 35 (35%) were Illiterate, 44 (44%) earn their living by working in agriculture, 57 (57%) respondents had Rs ≥15,001 monthly income in the family, 58 (58%) belonged to nuclear families, 76 (76%) of the respondents had knowledge about uterine prolapse and they got information mostly from 24 (24%) friends.

The prevalence rate of women with uterine prolapse found to be 13% whereas mean and standard deviation were 0.87 ±0.33.

The findings of association between the prevalence of uterine prolapse with age at first child birth, abortion, sexual intercourse immediate after delivery and constipation are found to be significantly associated.

Among six women with uterine prolapse, majority of the four (66.66%) women received services from hospitals while two (33.33%) received from private clinics, three

(50%) were treated by intake of medications on advice of health workers followed by two (33.33%) women had undergone operation. From the respondents who have received health services, 100% of the women's health status was improved after the treatment and were satisfied with the services they received against uterine prolapse.

About the prevention of uterine prolapse, almost all respondents replied that uterine prolapse can be prevented by avoiding strenuous activities during antenatal and postnatal period followed by avoiding giving birth to too many babies, taking nutritious diet, deliver the baby in health institution by health personnel, avoid long term coughing, Avoid chronic constipation respectively.

Based on research finding researchers concluded that women awareness towards the problem, limiting frequent pregnancies and provision of educational opportunities are recommended for the prevention of uterine prolapse.

Acknowledgement

We would like to express our sincere gratitude whole heartedly to Ms. Rakshaya Bhattarai co-ordinator, Tol Bikash Sanstha, Ward no 2, Ritthevani for her support, and valuable help throughout the data collection.

We would like to acknowledge Ms. Radha Kafle, Female Community Health Volunteer Ward no 2, Ritthevani, for providing us support, help throughout data collection.

We express our heartfelt thanks to all the participants who actively participated in the study for extending their co-operation without which it would have been impossible to conduct the study.

We express our thanks to all our BSc Nursing first year, first batch students for their help throughout the data collection.

REFERENCES

1. Broms I, Ingvarsson AK. Nepalese women suffering from uterine prolapse. A participant observational study in a maternity hospital in Nepal 2012.
2. Bonetti *et al.* GTZ/MOHP/UNFPA: Reproductive morbidity: A neglected issue? Report of a clinic-based study in Far-Western Nepal. Kathmandu 2002.
3. Anata Raj Bajracharya. Uterine prolapse: A hidden tragedy for women [Online]. [2007 Nov 23]; Available from: URL: http://www.Shvoong.com/medicine_and_health/gynaecology/1711392-Uterine_prolapse_hidden_tragedy_-_Women.
4. Anjum Doshani, Roderick EC Teo, Christopher J Mayne, Douglas G Tincello. Uterine prolapse – Clinical review. *BMJ*. 2007; 335: 819-823.
5. Pradhan S. Unheeded agonies - A Study on uterine prolapsed: Prevalence and its causes in Siraha and Saptari Districts. Women's Reproductive Rights Program (WRRP), Centre for Agro-Ecology and Development (CAED), Kathmandu, Nepal 2007.
6. Tamrakar A. a study on prevalence of uterine prolapse and its associated factors in Kaski district. online, JHAS, Pokhara University. <http://pu.edu.np/university/wp-content/uploads/2013/03/JHAS-2012-Vol-2-10.pdf>. 2012.
7. Thapa B, Rana G, Gurung S. Factors of utero-vaginal prolapse among women attending in Bharatpur Hospita. Online, JCMC. www.jcmc.cmc.edu.np

Sealing Ability of Resin Based Root Canal Sealers: An *In Vitro* Study

Rijal S^{1*}

¹Assistant Professor

Gandaki Medical College, College of Dental Sciences, Pokhara, Nepal

Keywords

Coronal sealing, Dentine, Obturation, Root canal, Sealer.

Corresponding author

Dr. Sujan Rijal, BDS, MDS.
Assistant Professor,
Gandaki Medical College & Teaching
Hospital, Pokhara, Nepal
Email: drsujanrijal@gmail.com

ABSTRACT

The primary goal is to attain a three dimensional seal, which would lead to an impervious seal. Obturation of the prepared root canal eliminates all avenues of leakage from the oral cavity and the periodontal tissues, sealing any residual irritants that remain within the root canal system after cleaning and shaping. Though the primary goal of obturation has been clearly defined there is still an ongoing research for a sealer and a core material that would provide an apical as well as coronal seal.

INTRODUCTION

A complete three dimensional impervious obturation of the root canal system is of prime clinical importance for the long-term success of endodontic treatment^{1,2}. Although a number of materials are used for obturation, the most common material is combination of gutta-percha cones and sealer. As gutta-percha does not bond to root canal walls, the use of sealers along with well-adapted gutta-percha has been recommended. To date, a great variety of endodontic materials are introduced to the dental community.

It appears that a root canal filling containing gutta-percha is the weak point in endodontic therapy. Filling of the root canal with gutta-percha and sealer even by the most technically proficient operator will not result in a seal that is dependable. Many different materials have been proposed as root canal fillings, but none have replaced

gutta-percha which is universally accepted as the gold standard filling material. Manufacturers have made attempts to develop new products having better physical properties than the commonly used materials. The search of a material which would bond the root dentin and possess the properties of a root canal filling material was required.

Epiphany (Pentron Clinical Technologies, Wallingford, CT) and Real Seal (Sybron Endo, Orange, CA) sealers have similar chemical composition with different brand names and are designed for bonding simultaneously to intra-radicular dentin³. Real Seal exhibited rheological properties suitable for clinical use and defined as a dental resin composite material. There are just a handful of published literatures on long-term evaluations of Real Seal⁴. Studies have reported that the sealing ability of gutta percha / epiphany combinations is superior to that

of the gutta-percha / AH plus combinations⁵⁻⁷

Failure of root-canal treatment can be attributed to a number of causes, but leakage through the root filling itself is thought to be a major factor. Strindberg, in 1956, considered that the most common cause of failure was leakage of tissue fluids apically around inadequate root fillings.

Endodontic leakage research focused mainly on the quality of the apical seal of the root canal system. Coronal leakage of the root canal filled tooth is an important cause in the failure of the root canal treatment. Several studies have shown that root canal fillings are susceptible to leakage when contaminated coronally by artificial saliva and microorganisms⁹⁻¹¹.

OBJECTIVES

The aim of the study was to evaluate the coronal sealing ability of a new obturating sealer; GP/ Real Seal SE sealer and compare it with GP / AH plus sealer by evaluating

1. Sealability of GP / Real Seal SE sealer with coronal radicular dentin by linear dye leakage.
2. Comparing the coronal linear dye penetration in between GP / Real Seal SE sealer and GP / AH plus at various moisture conditions

METHODS

Thirty extracted human teeth with type 1 canal anatomy were selected. The length of all specimens was standardized by sectioning the roots at 17 mm from the apex with the high speed airtor hand piece. The instrumentation was done by RaCe instruments as per the manufacturer's instruction for anterior teeth. After final instrumentation all teeth received a final irrigation of 15 ml 1.25% sodium hypochlorite and 5 ml 17% EDTA. The canals were finally flushed with 10 ml saline to remove any remaining sodium hypochlorite.

The teeth were divided into six groups of five teeth each. Specimens were subjected to three different moisture conditions and were obturated using GP / Real Seal SE sealer and GP / AH plus sealer and Sealer as per their groups

I. Canals dried with ethanol

Group 1 (GP + AH Plus sealer)

Group 4 (GP + Real Seal SE sealer)

II. Canals dried with paper points

Group 2 (GP + AH plus sealer)

Group 5 (GP + Real Seal SE sealer)

III. Moist canals

Group 3 (GP + ZnOE sealer)

Group 6 (GP + Real Seal SE sealer)

The specimens were immersed in a 2% methylene blue dye solution (pH 7.4) for 7 days at 37° C after removal and then they were rinsed with distilled water and stored at 37°C and 100% relative humidity. After removing from the dye solution, the specimens were thoroughly washed with water and dried and were examined under the light microscope. The linear dye penetration from the coronal to apical end was identified and captured by the camera attached. The extent of linear dye penetration of all the images was estimated using *ImageJ* software. The data was analysed using a Kruskal-Wallis test with statistical package SPSS version 11.5.

RESULTS

Coronal leakages for canals obturated with Real Seal and AH plus with different moisture conditions are measured and data collected and subjected to statistical analysis. The data was analysed using a Kruskal-Wallis test with statistical package SPSS version 11.5.

The mean coronal leakage and standard deviation in each for each moisture condition and for each material are shown in the table 1. Group 5 (Gutta percha / Real Seal SE, paper point) showed the best result with the least coronal leakage (2.71 mm and P value 0.008) and Group 6 (GP/ Real Seal SE, moist canal) showed the highest leakage (15.79 mm). None of the experimental groups showed leak proof obturation (hermetic seal). Though all the groups showed some amount of coronal leakage, there was no statistical significance difference between GP / AH plus and GP / RS subjected to moisture condition I and II. However GP / Real Seal SE, paper point (Group 6) in moisture condition III was compared with other moisture conditions showed maximum leakage which was statistically highly with other groups as shown in table 1.

Table 1:

Groups	Sample	Mean	Minimum	Maximum
1. GP / AH plus ethanol group	5	3.75 ±2.18	1.76 mm	6.28 mm
2. GP / AH plus paper point group	5	4.17 ±1.59	2.65 mm	6.39 mm
3. GP / AH plus moist canals	5	5.18 ±3.76	3.75 mm	12.20 mm
4. GP / RS ethanol group	5	3.28 ±0.640	2.64 mm	4.32 mm
5. GP / RS paper point group	5	2.71 ±0.41	2.05 mm	3.19 mm
6. GP / RS moist canal group	5	15.34 ±0.53	15.79 mm	17.00 mm

DISCUSSION

Coronal leakage of the root canal filled tooth is considered to be an important cause in the failure of the root canal treatment⁵. There have been numerous dye leakage, bacterial penetration, and fluid filtration leakage studies that have evaluated coronal leakage. Several studies have shown that root canal fillings are susceptible to leakage when contaminated coronally by artificial saliva and microorganisms⁸⁻¹⁰. Hence the present study was conducted to evaluate the coronal leakage in canals obturated with Real Seal and AH plus.

Dye penetration studies have frequently been used for leakage evaluation^{16,17}, in spite of the fact that their clinical significance has been questioned^{12,18}. Nevertheless, previous studies revealed a good correlation between dye penetration and other leakage evaluation methods^{19,20}. The results of this study demonstrated that the moisture condition of root canals at the time of obturation and the type of sealer that was used had a significant effect on micro leakage. All materials exhibited some amount of leakage. Bondable methacrylate resin-based sealers are better alternatives for root canal obturation than their nonbonding counterparts. This statement does not appear to be open handedly supported by the plethora of *ex vivo* studies. Group 5 (GP / Real Seal SE, paper point) showed the best result with the least coronal leakage. This could be most likely due to, the hydrophilicity of the sealer which allows the penetration of resin tags and the formation of a hybrid layer, resulting in micromechanical interlocking^{13,21}. Similar results were obtained by Patel *et al*¹⁴ in root canals filled with Real Seal (Sybron Endo), a methacrylate-based sealer. The hydrophilic propensity

of these resin-based materials can thus provide more thorough seal than the hydrophobic AH plus sealer. Leakage in root canals filled with GP / Real Seal SE, was significantly less in comparison with the other conditions, when using methacrylate-based resin sealers.

In condition I- ethanol was used to dry the canals, which showed less leakage than in the moist canals. There was no statistically significance between the teeth restored in Group 1 (GP / AH plus) and Group 4 (GP / RS SE). Moisture degree is one of the most important factors affecting Degree of Conversion (DC) of resin-based material. It was previously noted that water could inhibit polymerization of dentin bonding agents²². Wang and Spencer²³ reported that DC of dentin adhesive dropped from 93% to 36% as water content increased from 20% to 60%. In another study, Wan-Cui Wu²⁴ demonstrated that root canal dried with paper points followed by 95% ethanol, which provided drier dentin, favored the DC of Real Seal SE. Recent study by Hosaka *et al*²⁵ revealed that application of ethanol in hydrophilic resin bonding could increase the durability of resin-dentin bonds. It was speculated that ethanol might be able to remove excess water in dentin to prevent suboptimal polymerization of resin. Because suboptimal polymerization of resin represented sites of nano-leakage that decreased the durability of resin-dentin bonds, supplemental use of 95% ethanol in root canal drying might favor the bond between Real Seal SE and root dentin over time.

In condition II, Groups 2 (GP / AH Plus) and Group 5 (GP / RS) only paper points were used to dry the canals, resulting in a greater degree of dryness within the canals. This condition also showed significant differences with condition moist canals. Wong and Spencer²³ demonstrated that dentinal tubules normally remain filled with water unless the canal is thoroughly dried. This condition was more desirable than a totally dry or totally wet canal but was probably not totally sufficient for maximum effective hydrophilic resin penetration. A prescribed amount of water could decrease the viscosity and help increase the degree of conversion of this water-compatible resin. Water is also an essential component to provide the medium for ionization of acidic monomers. In a report by Tay *et al*¹³ the presence of a hybrid layer and resin sealer tags as a result of dentin surface demineralization by EDTA in root canals filled with gutta-percha cones and EndoRez was demonstrated. These observations corresponded well with those of Osorio *et al*²⁷, who showed that the collagen

network of the dentin is better preserved after the use of EDTA as the final rinse. In the current study as well as in the clinical situation, one might expect a similar effect because EDTA was also used in our irrigation protocol. Root canals subjected to moisture condition III (Moist canals) in Groups 3 and 4 showed a higher degree of leakage. In Group 4, water has not completely displaced in spite of the hydrophilic properties of the epiphany sealers.

Self etch primers were developed based on the concept that dentin etching and priming could be accomplished simultaneously. The penetration and demineralization process neutralizes the acidic portions of the molecules. The presence of water within the resin and the continuous supply of water within the dentin/tubules might cause incomplete polymerization of the adhesive, *i.e.*, these water-soluble monomers could be diluted to an extent that there might not be adequate free radicals for polymer chain propagation. The presence of residual water within the adhesive may lead to domains of incomplete polymerization of the adhesive or sequestrations of more hydrophilic oligomers in these particular regions²⁶. Water permeation during the polymerization process might result in the entrapment of water droplets within the sealer-dentin interface. This might result in bond disruption and further increased leakage. Wong and Spencer²³ also reported that excess water can inhibit polymerization of methacrylate-based resins. The present study is in agreement with the critical review done by Young Kyung Kim¹⁵ *et al.* in which they summarized the results of *in vitro* studies that compared the extent of leakage between teeth filled with methacrylate resin-based sealers versus conventional nonbonding sealers and showed the very narrow difference between the two materials.

CONCLUSIONS

GP with Real Seal SE Sealer showed better results than GP / AH plus sealer when the canals were dried with paper points. GP with Real Seal SE showed maximum dye leakage when the root canal was left moist. The objective of obturation of the root canal space is to create an impervious seal. Though the search for a material which provides such a hermetic seal continues, within the limits of this study we can conclude that the sealing abilities of GP / Real Seal SE are better than GP / AH plus sealer;

when canals are dry.

REFERENCES

1. Schilder H. Filling root canals in three dimensions. *DCNA*. 1967; 11: 723-44.
2. Gutmann JL. Clinical radiographic and histologic perspectives on success and failure in endodontics. *DCNA*. 1992; 36: 379-92.
3. Tay FR, Loushine RJ, Lambrechts P, Weller RN, Pashley DH. Geometric factors affecting dentine bonding in root canals: A theoretical modeling approach. *J Endod*. 2005; 31: 584-9.
4. Wang CS, Debelian GJ, Teixeira FB. Effect of intracanal medicament on the sealing ability of root canals filled with Resilon. *J Endod*. 2006; 32: 532-6.
5. Stratton RK, Apicella MJ, Mines P. A fluid filtration comparison of gutta-percha versus Resilon, a new soft resin endodontic obturation system. *J Endod*. 2006; 32: 642-5.
6. Tunga U, Bodrumlu E. Assessment of the sealing ability of a new root canal obturation material. *J Endod*. 2006; 32: 876-8.
7. Saunders WP, Saunders EM. Coronal leakage as a cause of failure in the root canal therapy. *Endod Dent Tramadol*. 1994; 10: 105-108.
8. Swanson K, Madison S. An evaluation of coronal micro leakage in endodontically treated teeth. Part 1. Time periods. *J Endod*. 1987; 13: 56-9.
9. Madison S, Wilcox LR. An evaluation of coronal micro leakage in endodontically treated teeth. Part III. *In vivo* study. *J Endod*. 1988; 14: 455-8.
10. Torabinejad M, Ung B, Kettering JD. *In vitro* bacterial penetration of coronally unsealed endodontically treated teeth. *J Endod*. 1990; 16: 566-9.
11. Ray HA, Trope M. Periapical status of endodontically treated teeth in relation to the technical quality of the root filling and the coronal restoration. *Int Endod J*. 1995; 28: 12-8.
12. Wu MK, Fan B, Wesselink PR. Diminished leakage along root canals filled with gutta-percha without sealer over time: A laboratory study. *Int Endod J*. 2000; 33: 121-5.
13. Tay FR, Loushine RJ, Weller RN, *et al.* Ultrastructural evaluation of the apical seal in roots filled with a

- polycaprolactone-based root canal filling material. *J Endod.* 2005; 31: 514-9
14. Patel DV, Sherriff M, Ford TRP, Watson TF, Mannocci F. The penetration of Real Seal primer and Tubliseal into root canal dentinal tubules: a confocal microscopic study. *Int Endod J.* 2007; 40: 67-71.
 15. Young Kyung Kim, Sui Mai The Self-etching Potential of Real Seal Versus Real Seal SE. *J Endod.* 2009; 35:1264-1269.
 16. Scott AC, Vire DE, Swanson R. An evaluation of the Thermafil endodontic obturation technique. *J Endod.* 1992; 18: 340-3.
 17. Ahlberg KM, Assavanop P, Tay WM. A comparison of the apical dye penetration patterns shown by methylene blue and India ink in root filled teeth. *Int Endod J.* 1995; 28: 30-4.
 18. Oliver CM, Abbott PV. Correlation between clinical success and apical dye penetration. *Int Endod J.* 2001; 34: 637-44.
 19. Delivanis PD, Chapman KA. Comparison and reliability of techniques for measuring leakage and marginal penetration. *Oral Surg Oral Med Oral Pathol.* 1982; 53: 410-6.
 20. Martell B, Chandler NP. Electrical and dye leakage comparison of three root-end restorative materials. *Quintess Int.* 2002; 33: 30-4.
 21. Tay FR, Loushine RJ, Monticelli F, et al. Effectiveness of resin-coated gutta-percha cones and a dual-cured, hydrophilic methacrylate-based sealer in obturating root canals. *J Endod.* 2005; 31: 659-64.
 22. Jacobsen T, Söderholm KJ. Some effects of water on dentin bonding. *Dent Mater.* 1995; 11: 132-6.
 23. Wang Y, Spencer P. Continuing etching of an all-in-one adhesive in wet dentin tubules. *J Dent Res.* 2005; 84: 350-4.
 24. Wan-Cui Wu, Deepti Shrestha, et al. Degree of conversion of a methacrylate-based endodontic sealer: A Micro-Raman spectroscopic study. *J Endod.* 2010; 2: 329-333.
 25. Hosaka K, Nishitani Y, Tagami J, et al. Durability of resin-dentin bonds to water- vs ethanol-saturated dentin. *J Dent Res.* 2009; 88: 146-51.
 26. Tay FR, Pashley DH, Yoshiyama M. Two modes of nanoleakage expression in single step adhesives. *J Dent Res.* 2002; 81:472-6.
 27. Osorio R, Erhardt MCG, Pimenta LAF, Osorio E, Toledano M. EDTA treatment improves resin-dentin bonds' resistance to degradation. *J Dent Res.* 2005; 84: 736-40.

Outcomes of Medical Education in Nepal

Reddy VD^{1*}, Upadhyay N², Yadav SK², Subedi B²

¹Professor & HOD, ²Lecturer, Department of Physiology,
Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

Keywords

Medical education, Medical students, Medical teachers.

Corresponding author

**Dr. V. Devendar Reddy
Professor & Head, Department of
Physiology
Gandaki Medical College & Teaching
Hospital, Pokhara, Nepal
Email: reddysir4861@gmail.com*

ABSTRACT

The standards of medical education in Nepal and other countries in Asia are improving gradually. The medical education is appeared to be student centered. But a teacher is also responsible to improve the academic standards and overall performance of the students. There is a need to provide short period of practical vocational training to teachers in the subject of their specialty. A better teacher trains the student in a better way than untrained medical personnel. In any class, the students are the best judges, so teachers should get a feedback from students after the class and it leads to better performance by a teacher in future classes.

Medical education in Nepal is improving like in India. There is a large scale expansion in medical educational institutions; but the quality of medical graduates is in question. There is a great need to rectify the deficiencies of medical education system.

There is a change taking place in the curricula of various universities where the instruction is student centered. Faculty qualification requirement is needed; the teachers do not have any practical exposure. In the process, the medical students are receiving training in textual material only in medical graduation. There is a need of practical training to teachers and lab technicians in the subject of their expertise. This will improve the situation because the teachers can teach with practical orientation.

The way, we examine and evaluate the utilization of financial, physical and human resources; the teaching learning process, research output, paper presentation, seminars are to be provided to students for evaluation. Success rate in academics are considered and in the process overall improvement of institution is ensured.

The student is expected to attain necessary practical expertise and this knowledge can be utilized in clinical side. A student must develop the various competencies for

the time of his/her graduation. The five broad categories are

1. The ability to apply knowledge of medicine
2. An ability to design and conduct experiments
3. An understanding of professional and ethical responsibility in dealing with patients
4. An ability to communicate effectively
5. An ability to engage in lifelong learning by utilizing recent advances in medical science

The educational objectives of MBBS program are broadly for preparation of the student to succeed in medical profession or in higher education to acquire competencies and the breadth of knowledge that a student must possess in his branch of medical speciality, so that a student can comprehend, analyze his medical knowledge. Professionalism has to be inculcated in the student with ethical values and effective communication skills.

Still even now the medical education is better than other non-medical institutions. In medical education the students undergo practical training right from their first year to final year and they undergo one full year of internship at the end of graduation. The teachers are

practicing doctors and eventually these fresh medical graduates are able to earn their livelihood soon after their graduation. The better part of program educational objective is that students get exposure to the community field from the first year to the final year which make them (students) to learn the real situation of the condition. This will help students after graduation to treat those people since they are already having some knowledge. Now the medical graduates are not confined to urban area. They get necessary confidence to treat patients. The best solution to improve further into medical education is to train one faculty by experienced teachers in the subject areas which they are going to teach during subsequent semesters. This should be made compulsory and they are to be provided incentives in the lines of paper presentations. One should not forget the importance of class attendance and attention of students in the class rooms. A student who attends the classes regularly; his/her academic performance definitely improves when compared to the student who is irregular to the classes^{1,2}. But we shouldn't forget to improve the quality of students enrolling in medical education. We can improve this by taking the standard proven methods of entrance examination and enrolment in merit basis.

The effective use of audiovisual teaching aids by a teacher improves better understanding of subject even by a below average students. Planning, preparing and using audiovisual teaching aids has an impact in understanding the topic of a subject. Visual perception contributes to about 90% to all human learning. Maximum attention of an adult learner is 40 minutes to sustain attention and interest. Various other stimuli are necessary like asking questions in between, and followed by continuation of lecture. Audiovisual aids will lead to more number of senses used by learner. Explaining and presentation is more effective than only explaining or only presentation. Some thoughts on methodology of using power point presentation are that 90% of information going to brain is through vision, 8% of information going to brain is through hearing, and 2% of information is going to brain through other senses.

One time writing is equal to few times reading. So a student in the class has to write the notes while teacher is taking the class, so that students can remember the subject for longer periods. So ask the student to write the notes. However some below average students may be indulging in copying what has been shown in the power point and may not listen promptly to teacher's explanations in the classroom. In that situation, many important parts may be missed out. Therefore a short note or hands out of the presented topic should be provided to the students at the end of class but before providing short notes or handout, students must be ensured that these notes are only the guidelines not the entire topic because we can't confine medical science in notes, handouts, or even entire book.

A teacher mindset before going to the class should be in such a way that he/she can be capable of handling the class as a well experienced and more knowledgeable person than a student. A teacher should not under estimate himself/herself before going to class room. Practice of teaching and getting feedback from students' leads to effective class room teaching; along with taking feedback with colleagues, subject experts from time to time will be beneficial in improving teacher's skills and helps them to build confidence in that particular topic too.

Two important persons in the medical education is a teacher and a learner that is the students. Teaching ultimately improves teacher's skills, knowledge and is also in turn beneficial to the students. At the end what I wish to express that we have to work hard to improve the standards of medical education.

REFERENCES

1. Robert M. Schmidt. "Who maximizes what? A study in student time allocation". *American Economic Review*. May 1983; 23-28.
2. Kang H, Park and Peter M. Kerr: "Determinants of academic performance: A multinomial logit approach". *The Journal of Economic Education*. Spring, 1990; 101-111.

Study on Epidemiology of Chronic Obstructive Pulmonary Disease (COPD) at Western Regional Hospital, Pokhara

Ghosh V*, Lamichhane S, Thakuri SB, Khadka KCS, Teli SS, Adhikari SS, Shrestha S, Acharya SK, Subedi SS

Interns, Gandaki Medical College & Teaching Hospital, Pokhara, *Group Leader

ABSTRACT

According to the curriculum of Bachelor of Medicine and Bachelor of Surgery (MBBS) program of the Tribhuvan University (TU), Institute of Medicine (IOM), the Department of Community Medicine of Gandaki Medical College (GMC) has been conducting the District Health System Management (DHSM) study for the students of MBBS, third phase (4th year).

This program provides us an opportunity for clinical and community orientation to develop skills to become a competent medical professional to work at different levels of hospitals and district health system. This course enables us to assess resource potentials and constraints, prioritize the health problems and set strategies for solving them. It also enables us to be able to work in promotive, preventive, curative and rehabilitative health services as part of district health team. The program begins with theory classes on management and orientation classes at the college and placement of the students in three different places with rotation along with field supervisions in between.

Here we are presenting our investigations on epidemiology of chronic obstructive pulmonary disease made at Western Regional Hospital during our District Health System Management (DHSM) study in third phase (Fourth year).

Keywords

Chronic obstructive pulmonary disease, Cough, Dyspnea, Sputum

Corresponding author

Dr. Vivek Ghosh

Intern

Gandaki Medical College & Teaching Hospital, Pokhara

Email: vivekghosh53@yahoo.com

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is defined as a disease state characterized by airflow limitation that is not fully reversible. COPD includes **Emphysema**: An anatomically defined condition characterized by destruction and enlargement of the lung alveoli. **Chronic bronchitis**: A clinically defined condition with chronic cough and phlegm. **Small airways disease**: A condition in which small bronchioles are narrowed.

COPD is present only if chronic obstruction occurs; chronic bronchitis without chronic obstruction of airway is not included in COPD. COPD has now become a global

problem. Estimates suggest that COPD will rise from sixth to third common cause of death worldwide by 2020 A.D..

Risk Factors

- Cigarette smoking
- Ambient air pollution
- Increased airway responsiveness
- Increased respiratory infections
- Occupational exposure
- Passive, or second hand, smoking exposure
- Low birth weight

- Low socioeconomic status and nutrition
- Genetic factors

CLINICAL FEATURES

The three most common symptoms of COPD are cough, sputum production and exertional dyspnea. Hemoptysis may complicate exacerbations of COPD. Commonly present in patients over the age of 40 years. On extreme case, patient may also develop resting hypoxemia and requiring institution of supplemental oxygen.

On physical Examination

Current smokers may have signs of active smoking, including an odor of smoke or nicotine staining of finger nails. On severe cases, examination is notable for a prolonged expiratory phase and may include expiratory wheezing. In addition, purse-lip breathing, hyperactivity of accessory muscle of respiration along with sitting in the characteristic “tripod” position to facilitate the actions of the sternocleidomastoid, scalene, and intercostal muscles. Patients may develop cyanosis, visible in the lips and nail beds.

Rationale

COPD is one of the major preventable causes of mortality in Nepalese people.

- COPD is one of the major causes of morbidity and mortality worldwide
- In the context of Nepal, COPD was first cause of in-patient mortality and fourth cause of in-patient morbidity (Annual report, DoHS, 2015/16 A.D. (2070/71 B.S.))
- Number one cause of mortality and number three cause of morbidity as per the annual report of WRH, 2015/16 A.D. (2070/71 B.S.)
- Reliable data was available
- COPD being a non-communicable disease is adding misery along with communicable diseases in our country.

OBJECTIVES

General objective is to conduct an epidemiological study on chronic obstructive pulmonary disease at the Western Regional Hospital, Pokhara.

Specific objectives are to learn to

1. collect relevant secondary data for the purpose of

conducting an epidemiologic study

2. analyze the data collected in terms of time, place and person
3. acquire skills to study the magnitude and changing pattern of disease over years in Western Regional Hospital, Pokhara

METHODOLOGY

Study duration: Two weeks

Study design: Descriptive study

Study method: Quantitative

Study area: Western Regional Hospital, Pokhara

Study technique: Secondary data review, literature review, interview with key informants and focus group discussion

Study Tools: Data collection table

Study variables

Time variable: Month, season and year wise distribution

Place variable: data not available

Person variable: Age and sex wise distribution

Data Collection

Source:

Statistical division, Western Regional Hospital, Pokhara

Annual report, WRH

Annual Report, DOHS

Type: Qualitative and quantitative

Data Processing:

Manual processing

Analysis

Interpretation: indicators, calculation, graphs, figures

Validity and reliability:

Consultation with concerned personnel from Western Regional Hospital and discussion of the findings

OPERATIONAL DEFINITIONS

For epidemiological analysis of COPD at WRH, Pokhara, the cases admitted with diagnosis of emphysema and chronic bronchitis were included. Chronic bronchitis and emphysema are not differentiated as they often co-exist. **Emphysema:** Enlargement of air spaces distal to the terminal bronchioles with destruction of their walls.

Chronic bronchitis: Cough with sputum production on most days for three months of a year for two consecutive years

FINDINGS AND DISCUSSIONS

There are total of 21016, 20474, 20956 inpatient cases in fiscal years 2013/14 A.D. (2069/70 B.S.), 2014/15 A.D. (2070/71 B.S.), 2015/16 A.D. (2071/72 B.S.) respectively among which there were 544, 515, 545 cases of COPD in respective fiscal years.

Population under study was patients of all ages admitted at Western Regional Hospital.

Distribution of COPD according to time

Yearly Trend

Following table shows trend of COPD in past three years.

Table 1: Trend of COPD in past three years

Year	Total cases admitted	Total cases of COPD			% of COPD cases
		Females	Males	Total	
2013/14 A.D. (2069/70 B.S.)	21016	365	179	544	2.58%
2014/15 A.D. (2070/71 B.S.)	20494	289	226	515	2.51 %
2015/16 A.D. (2071/72 B.S.)	20956	325	220	545	2.60 %

The data shows incidence of COPD has slightly declined in year 2014/15 A.D. (2070/71 B.S.) than that of previous year and has increased in fiscal year 2015/16 A.D. (2071/72 B.S.). Also, the incidence of COPD is higher in females in all three consecutive fiscal years than that of males.

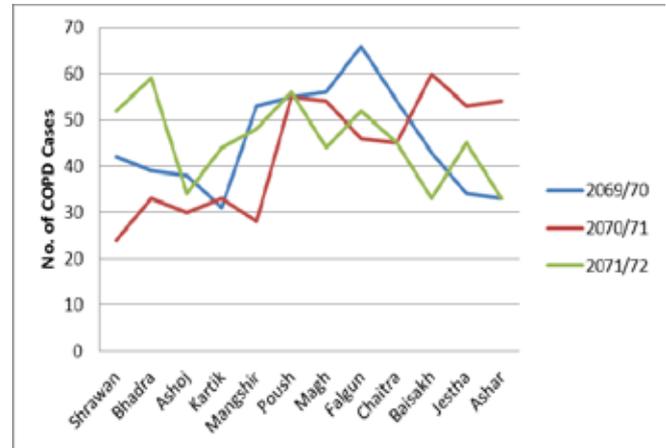
Monthly Trend

Table 2: Monthly trend of COPD

Months	2013/14 A.D. (2069/70 B.S.)	2014/15 A.D. (2070/71 B.S.)	2015/16 A.D. (2071/72 B.S.)	Total
July/Aug (Shrawan)	42	24	52	118
Aug/Sept (Bhadra)	39	33	59	131
Sept/Oct (Ashoj)	38	30	34	102
Oct/Nov (Kartik)	31	33	44	108
Nov/Dec (Mangsir)	53	28	48	129
Dec/Jan (Poush)	55	55	56	166
Jan/Feb (Magh)	56	54	44	154
Feb/Mar (Falgun)	66	46	52	164
Mar/April (Chaitra)	54	45	45	144
April/May (Baisakh)	43	60	33	136
May/June (Jestha)	34	53	45	132
June/July (Ashar)	33	54	33	120
Total	544	515	545	1604

The data shows cases of COPD were reported high during December/January (Poush) months and lowest on September/October (Ashoj) as dusty and cold weather of December/January (Poush) precipitates the exacerbation of COPD.

Fig 1: Graph showing monthly trend of COPD



Quarter wise Distribution

The study period was divided into four quarters comprising three months each:

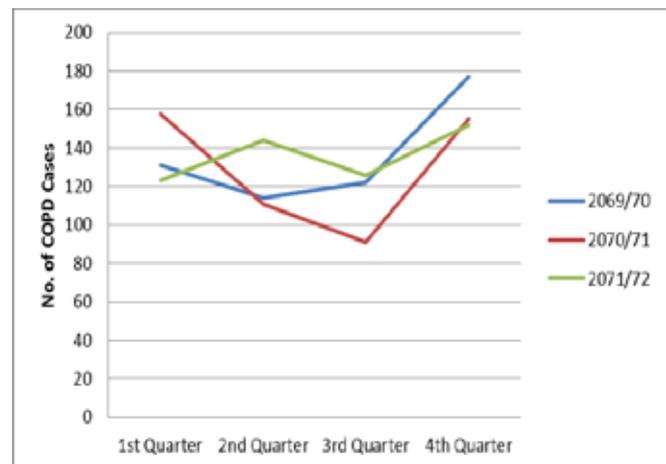
First quarter: March/April to May/June (Chaitra to Jestha)

Second quarter: June/July to August/September (Ashar to Bhadra)

Third quarter: September/October to November/December (Ashwin to Mangsir)

Fourth quarter: December/January to February/March (Poush to Falgun)

Fig 2: Quarter wise distribution of COPD



The distribution of the disease has decreased towards the third quarter in each fiscal year. It has then increased in the fourth quarter of each fiscal year. COPD is found more

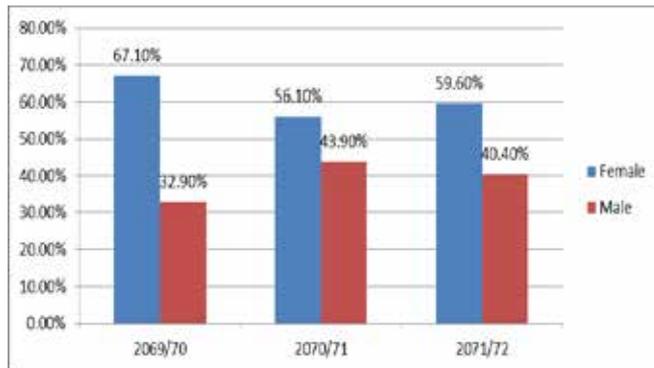
in the months December/January (Poush), January/February (Magh), February/March (Falgun), March/April (Chaitra) and April/May (Baisakh) when the environment is cold and dusty.

Distribution of COPD according to person

Distribution according to sex

Following bar graph shows cases of COPD were drastically high in females compared to males on each fiscal year.

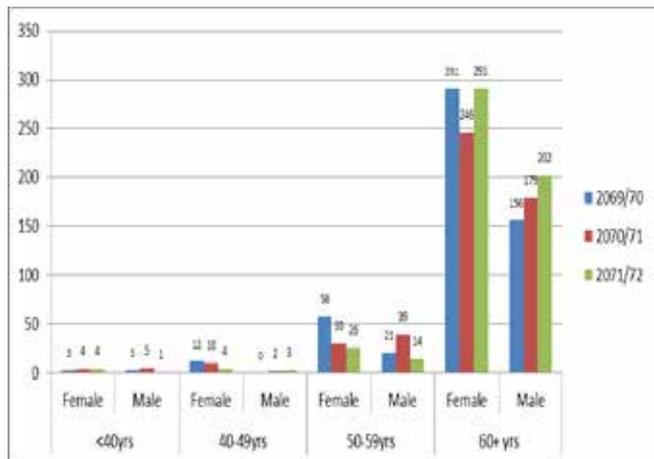
Fig 3: Distribution of COPD according to sex



In each of the fiscal years, the incidence of COPD was high in females compared to males. This is due to the higher number of female patient flow in Western Regional Hospital which is a government hospital and hence cheaper.

Distribution according to Age

Fig 4: Distribution of COPD according to age



Distribution of COPD has drastically increased in the age group of 60+ in both females as well as males i.e. 447 out of 544 in 2013/14 A.D. (2069/70 B.S.), 425 out of 515 in 2014/15 A.D. (2070/71 B.S.) and 493 out of 545 in 2015/16 A.D. (2071/72 B.S.). It is because it is a chronic disease and the effect of smoking also presents in later life. The graph also shows that the disease is least common in <40yrs age group.

Recovery Ratio of inpatient COPD cases

Among 1604 total admitted COPD cases in the fiscal years 2013/14 A.D. (2069/70 B.S.), 2014/15 A.D. (2070/71 B.S.) and 2015/16 A.D. (2071/72 B.S.), 1508 recovered fully and 96 died. This makes the overall recovery ratio 94.01% of all COPD cases in Western Regional Hospital, Pokhara.

Table 3: Recovery ratio of inpatient COPD cases

Year	Total COPD cases	Total Recovered Cases	Total Deceased Cases	% of COPD patients recovered
2013/14 A.D. (2069/70 B.S.)	544	507	37	93.19%
2014/15 A.D. (2070/71 B.S.)	515	487	28	94.56%
2015/16 A.D. (2071/72 B.S.)	545	514	31	94.31%

CONCLUSIONS

Due to increasing burden of COPD, it is stated as one of the major public health problem in Nepal. In Western Regional Hospital, COPD is the number one cause of mortality and number three cause of in-patient morbidity. The epidemiological study conducted on COPD by review of secondary data provided, major findings that we made were:

- COPD is identified as the number one cause of mortality and in third place in morbidity in the hospital in fiscal year 2015/16 A.D. (2071/72 B.S.).
- Highest number (166) of cases were reported in the month of December/January (Poush), followed by 164 cases in the month of February/March (Falgun) in three consecutive fiscal years.
- The prevalence of COPD is found to be high in females than in males in all the three fiscal years.
- COPD prevalence was highest in 60+ age group while it was least in <40 years age group.
- The overall recovery ratio of in-patient COPD cases in three consecutive fiscal years is 94.01% in Western Regional Hospital, Pokhara

REFERENCES

1. K. Park. Park's Textbook of Preventive and Social Medicine, 22 Edition. 2013. Banarsidas publishers, Jabalpur (MP), India.

2. AH Suryakantha. Community medicine with recent advances. Third edition. Jaypee. 2014.
3. Mahajan & Gupta. Text book of preventive and social medicine. Revised by Rabindra Nath Roy, Indranil Saha. Fourth edition. 2013. Jaypee.
4. Sunder Lal, Adarsh, Pankaj. Text book of community medicine. Preventive and social medicine. CBS publishers. 2011.
5. Lalita D. Hiremath, Dhananjaya A. Hiremath. Essentials of community medicine: A practical approach. Jaypee. 2010.
6. Annual Report. Department of health services. 2008/2009 (2055/66). Government of Nepal. Ministry of Health and Population, Department of health services, Kathmandu.
7. Kenneth J Rothman, Sanda Greenland, Timothy L. Lash. Modern epidemiology. 2014. Lippincott Williams & Wilkins.
8. Wences Arvelo, Zeinab Gura, Samuel Amwayi, Petra Wiersma, Jared Omolo, Steven Becknell, Donna Jones, Dismas Ongore, Richard Dicker. Establishing a field epidemiology elective for medical students in Kenya: A strategy for increasing public health awareness and workforce capacity. *Journal of Epidemiology and Global Health*. 2015;5(1): 33-39.

Family Health Exercise: Follow-up of an Extra-pulmonary Tuberculosis Patient

Thapa K*, Sharma D, Karki D, Sharma D, Gurung FK, Tanwar J, Pariyar L

MBBS 4th year (2012 batch), Gandaki Medical College & Teaching Hospital, Pokhara, Nepal, *Group Leader

Keywords

Family health exercise, *Mycobacterium tuberculosis*, Tuberculosis.

Corresponding author

Mr. Kavindra Thapa
MBBS 4th year (2012 batch)
Gandaki Medical College & Teaching
Hospital, Pokhara, Nepal
Email: thapakavindra@gmail.com

ABSTRACT

During the third year of MBBS program, we had a course of family health exercise in community medicine. This course was designed to produce competent family physicians; to enable us to understand the social, cultural, psychological, gender and economical aspects of illness, the interactions of ill persons with different members of the family and community health service, role of family members and family environment in patient care. It helped us to understand the natural history of the disease and importance of patient follow up. We were able to differentiate the nature of the problems while seeing the patients in the family from the nature of the same problems when the patient is seen in clinic or hospital. Here we present a follow-up of extra-pulmonary tuberculosis patient in our family health exercise during third year MBBS program.

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease which is remained as public health problem in Nepal. Tuberculosis is mostly caused by *Mycobacterium tuberculosis*. It mostly affects the lungs (pulmonary tuberculosis) and intestines, bones, joints, bone marrow, bone, liver, urinary bladder and almost all organs of the body (extra pulmonary tuberculosis). Due to the co-morbid with HIV it has become a global problem. TB is not only a public health problem it is also a social and economic problem.

CLINICAL FEATURES OF TUBERCULOSIS

- Cough for >3weeks
- Sputum production
- Weight loss
- Night sweating
- Loss of appetite
- Low grade fever
- Hemoptysis

However, manifestations may differ according to organs affected.

PROBLEM BURDEN

- *Mycobacterium tuberculosis* infects one third of world's population.
- Globally 1.7 to 2 billion people are infected with tubercle bacilli.
- About 8 million people develop active TB disease every year.
- About 1.3 million people die every year.
- Asia (SEAR and Western Pacific region) accounts for 55% of the global TB cases.

STATUS IN NEPAL

According to annual report 2014/15 A.D. (2070/71 B.S.), about 45% of the total population is affected with the TB of which 60% are adults. Every year 45,000 people develop active TB, out of which 20,500 develop infectious pulmonary disease. Treatment by DOTS has reduced the number of the deaths however 5,000 - 7,000 people are still dying per year by TB despite of the DOTS implementation.

Epidemiological Determinants

A. Agent Factors

a. Agent:

- *Mycobacterium tuberculosis*, also *M. bovis*, *M. avium*, *M. microti* and *M. africanum*.
- An acid fast bacilli, non-motile, non-spore forming and non-capsulated, arranged singly or in groups.

b. Source of infection:

There are two source of infection

- Human source: Most common is the human case whose sputum is positive for tubercle bacilli and cases who has either received no treatment or has not been fully treated.
- Bovine source: Infection from infected milk (zoonotic).

c. Communicability:

- Patients are infective as long as they remain untreated.
- Effective antimicrobial treatment reduces infectivity by 90% within 48 hours and non-infective in 15 days.

B. Host Factors

- Age:** Affects all ages; developing countries show a sharp rise in infection rates from infancy to adolescence and extreme ages.
- Sex:** More common in males than in females.
- Nutrition:** Malnutrition one of the major cause as it predisposes to TB.
- Immunity:** No inherited immunity against TB infection. Immunity acquired as a result of natural infection or BCG vaccination.

Percentage of children under one year immunized with BCG was 99% (according to annual report 2014/15 A.D. (2070/071 B.S.).

C. Environmental Factors

- Poor quality of life, low socio economic status, poor housing, over crowding
- Under nutrition
- Lack of education
- Lack of awareness of causes of illness
- Occupation: People with pneumoconiosis especially silicoses are more prone to TB and also common in medical professionals. Tuberculosis thrives in condition of poverty and can worsen poverty.

Incubation Period

It may be weeks, months or years. It takes three to six weeks for the development of positive tuberculin test after infection.

Mode of Transmission: Droplet infection and droplet nuclei.

SELECTION OF THE CASE/ CASE STUDY

As TB is a public health problem in Nepal, it not only affects the health of the person but its surrounding contacts and also affects in economy and social aspects of people. We explained about our family health program and requested for the support. They agreed to help us. As we are going through the files in OPD for the selection of case, we came to know this case that could fit in the category of Infectious disease. We collected the information about the patient from duty staff, contacted her family.

CASE HISTORY

Patient's profile

Name: Maya Bhusal [*name changed*]

Age: 58 years

Sex: Female

Marital Status: Married

Religion: Hindu

Occupation: Housewife

Address: Nagdhunga, Pokhara

Date of Diagnosis: 13th January, 2016 A.D. (2072/09/29 B.S.)

Chief complain

- Lesions over the right seventh inter-costal space for six days.
- Fever for three days.

History of present illness

According to the patient she was apparently well eight days back. Then she developed a lesion over the right seventh inter-costal space. The lesion was red over its margin and she felt pain all the time and while touching, the pain increases. Then she developed fever which was intermittent with chills and sweating especially at the evening. Also she developed vomiting two to three times a day which was non-projectile, non-billous, food contents and no blood in vomitus. Then she developed diarrhea two to three times a day but no blood present in diarrhea. Then she was admitted to Gandaki Medical College and Teaching Hospital. While she was under-treatment she developed cough with sputum mucopurulent and no blood stain in cough also she had difficulty in coughing out.

Past history

There was the history of uterus infection due to which she had to undergo hysterectomy in January 2015 A.D. (Magh, 2071 BS). Then after she had body swelling with non-projectile cough and sputum production, which

increased in night and difficulty in breathing, vomiting and fever after body swelling decreased in April, 2015 A.D. (Baishak, 2072 B.S.).

Personal history

She is non-smoker, non-alcoholic and non-vegetarian. Presence of BCG scars on left deltoid region.

Allergy history

No known allergy to any drug.

Surgical history

Hysterectomy

Family history

There is no history of tuberculosis, diabetes, hypertension and epilepsy in the family.

Socio-economic history

She belongs to middle class family.

PHYSICAL EXAMINATION

General condition

- Patient was ill looking, conscious and well oriented to the time, place and person and cooperative.
- Weight: 38 kg

Vitals

- Pulse: 86/min.
- B.P.: 160/90 mmHg
- Temperature: 100.4°F
- Respiratory rate: 16 breaths/min

General condition

- Pallor – present
- Icterus – absent
- Clubbing – absent
- Cyanosis – absent
- Lymphadenopathy – absent
- Edema – absent
- Dehydration – absent

Systemic Examination

Respiratory system

- Bilateral clear bronchial breath sound and no wheeze or added sound.

Cardiovascular system

- Normal first and second heart sounds. No added heart sound.

Per abdomen

Inspection:

- Scaphoid shape

- Skin seems to be dark n pale in color
- Umbilicus is inverted, centrally located and spherical in shape.
- No any scars mark.
- No venous engorgement

Palpation:

- Superficial: No local rise of temperature.
- Deep: No tender on palpation.

Percussion:

- Tympanic sound heard over the abdominal surface and dull over liver area.

Auscultation

- Normal bowel sound and absence of bruits.
- Bowel sounds present two per minute.

INVESTIGATIONS

1. Complete blood count.
 - Hb: 12.4 gm%
 - WBC: 9400/mm
 - Neutrophils: 67%
 - Lymphocytes: 30%
 - Monocytes: 00%
 - Eosinophils: 03%
 - ESR: 94mm in first hour
 - Platelets: 320,000/ mm³
2. Sugar: Random 93 mg/dl
3. Chest x-ray: Normal
5. USG abdomen: Normal USG scan.

Diagnosis

Extra-pulmonary TB (Granulomatus with chronic suppurative mastistis)

Treatment

Medication	Dose	Duration
Isoniazide	75 mg	2 months + 4 months
Rifampicin	150 mg	2 months + 4 months
Pyrazinamide	400 mg	2 months
Ethambutol	275 mg	2 months

FAMILY VISIT

First visit 24th, June, 2014 A.D. (2072/09/03 B.S):

Objectives:

- To locate the house, introduce ourselves and rapport building
- To explain them about the purpose of our visit
- To perform key informant interview and/or in-depth interview with head of household

- To explore the family background
- To collect data on physical facilities, socioeconomic environment around the house through observation checklist
- To collect data on compliance of treatment and progress of health status

Activities:

After all necessary arrangements, we headed towards Nagdhunga which about 10 minutes from our living area. We requested Mrs. Bhusal's daughter to receive us at the main road. After walking for five minutes leaving the small road, we reached a double storeyed house. The home was their own. Due to the patient's request we sat comfortably inside the living room. We observed the surrounding environment and after objectives of our first visit were met, we left reminding her to go to DOTS centre and take medicine and assuring her to visit again next week.

Outcomes:

- **Family profile**

S No	Relation with patient	Age	Educa-tion	Occupation
1.	Husband	60	Grade 7	Retired Indian army
2.	Son	32	Bachelor	Abroad
3.	Daughter-in-law	27	+2	Housewife
4.	Daughter	30	SLC	Housewife
5.	Daughter	28	Bachelor	Housewife
6.	Son	26	+2	Abroad
7.	Daughter-in-law	24	Bachelor	Housewife
8.	Son	24	+2	Student
9.	Granddaughter	10	Grade-5	Student
10.	Grandson	8	Grade-2	Student
11.	Grandson	6	-	-

months

Socioeconomic Status

The patient belongs to the upper middle class family (score-18) according to Kuppusswamy's socio-economic status scale. The main source of income for the family was the rent of the house and agriculture. Since the incident four days ago he hasn't gone to the workplace and his wife is busy taking care of him so the shop is also closed for four days.

Observation checklist

1. Housing

- Type of house: Pakka
- House: rent

- Rent per month: Rs 8000
- No of rooms: one per person
- No of windows per room: three per room
- Lighting: satisfactory
- Cross Ventilation: No
- Kitchen (separated): Smokeless
- Source of fuel: LPG and wood

2. Assets:

- Television: one
- Refrigerator: one
- Mobile: four sets
- Cooking appliances: Rice cooker, pressure cooker
- Furniture: Bed, cupboard

3. Sanitation:

- Toilet: one
- Type: Watershield
- Distance from water source: 20 meters
- Odor: pleasant
- Flies : Absent
- Mode of disposal of household wastes
- Decomposable: Municipality vehicle
- Non-decomposable: Municipality vehicle
- Kitchen: Clean
- Source of water: Clean
- Cattle shed: Absent
- Ditches around house: Absent

Second visit 25th December, 2015 A.D. (2072/09/10 B.S.):

Objectives:

- To know about the disease progression and compliance of the patient on disease
- To evaluate the role of family in disease and impact in family
- To know about the health seeking behavior and knowledge, attitude and practice (KAP) of disease on the family and the consequent changes in their KAP regarding this
- To evaluate the gender role through the gender analysis

Activities

We went for second visit 10 days later. This time we were with our supervisor. We were focused in asking about disease progression as well as improvement of the patient and the effects of disease on the patient, her family and the society and the role of family in the disease causation, progression and recovery of disease. We also asked about health seeking behavior, KAP and belief system and the

coping strategies of family members. We found that the patient was taking his medications in time and was showing signs of improvement.

Outcomes:

Compliance of patient with the disease:

The patient is taking her daily medications from the nearby DOTS centre. She also consumes a proper diet, as she was advised by his doctor. Also she goes on daily dressing of the abscess. She felt that she is improving and want to take food than before.

Effects of family in the disease:

Role in causation

Since Mrs. Bhusal lives with her family, her daughter and daughter-in-law cook foods and take care of her.

Role in progression and relief:

Her family seems to be worry after her suffering. Family members supported her and took care so much that she was satisfied by her family. Her husband or daughter or daughter-in-law used to take her to hospital and other check up. Her family also encouraged her to take healthy nutrition.

Effects of the Disease

In the patient

The disease has limited the patient from her daily household work which she used to do. Also she seems to be conscious about her health so she regularly attend the DOTS centre

In the family

A considerable amount of money has been spent on her treatment for medication. The total expenditure till now was around Rs 6,00,000/. According to patient, the regular follow and check up needs a lot of money, but it has become difficult to arrange money sometimes.

Knowledge, attitude and practice on disease:

Mrs. Bhusal knew that it would be harmful to her if she did not take the medicine but she did not know about the progression of the disease. Whenever anyone in the family becomes ill they first go to hospital however, they still believe in traditional healing side by side.

Tools for gender analysis:

It seems they have both adapted to their modern life style. Both Mrs. Bhusal and her husband seem to do the household chores of cooking, cleaning and maintaining

the house together. Mr. and Mrs. Bhusal, both are the bread winners.

Activities	Women/ girls	Men/ boys	Both
Breadwinner			++
Source of income		++	
Agriculture	++		
Business		++	
Jobs		++	
Budget allocation		++	
Household chores			++
Cooking	++		
Water related			++
Water collection			++
Water dishes	++		
Cleaning dishes	++		
Marketing			++
Health related activities			++
Decision of the health care			++
Care during illness			++
Taking sick to health care centre			++
Care during illness			++
Taking sick to health care centre			++
Purchasing medicine			++
Immunization of the child			++
Family planning			++
Child care	++		
Maintainence tasks			++

Access and control profile

Particulars	Access		Control	
	Women/ girls	Men/ boys	Women/ girls	Men/ boys
Resources	++		++	
Assets		++		
Cash	++		++	
Education		++	++	
Basic needs		++	++	
Food		++	++	
Shelter		++		++
Clothing		++	++	

Access and control profile shows a difference of zero, which is less than five, so the gender situation is good.

**Third visit 31st January, 2016 A.D. (2072/09/17 B.S.):
Objectives**

- To know about the progress of the disease over the period of time
- To counsel the patient and family members and encourage them for change, if necessary
- To measure the effects of the second visit

Activities

On our last visit we talked to the patient and her husband and family to assess what they absorbed from the last counseling we did on the second visit. It turns out that the patient has been willing to follow the advices given by the doctor and as well as us. We also asked any missing questions, after reviewing our notes of the family. We left the Mr. and Mrs. Bhusal on great terms and even exchanged numbers, just in case she may have any questions for us in the future.

Outcomes:

Counseling the family

We counseled Mrs. Bhusal about following the advice given to him by her doctor. Also, how important it is to take her medications in a timely manner, eating a proper diet, and exercising to cure and be TB free. We also emphasized that if she maintained these factors, she need not worry about future complications of the disease.

Conclusions

Tuberculosis is caused by *Mycobacterium tuberculosis* and its resistance is increasing day by day. Proper DOTS treatment and complete treatment is necessary in order to reduce the complications, resistance and relapse cases in future.

REFERENCES

1. K. Park. Park's Textbook of Preventive and Social Medicine, 23rd Edition. 2015. Banarsidas publishers, Jabalpur (MP), India.
2. AH Suryakantha. Community medicine with recent advances. Third edition. Jaypee. 2014.
3. Mahajan & Gupta. Text book of preventive and social medicine. Revised by Rabindra Nath Roy, Indranil Saha. Fourth edition. 2013. Jaypee.
4. Sunder Lal, Adarsh, Pankaj. Text book of community medicine. Preventive and social medicine. CBS publishers. 2011.
5. Lalita D. Hiremath, Dhananjaya A. Hiremath. Essentials of community medicine: A practical approach. Jaypee. 2010.
6. Drug-resistant tuberculosis management guidelines and manual. Government of Nepal. Ministry of Health and Population, National Tuberculosis Control Programme. November 2011.



कर्मण्येवाधिकारस्ते
My right is to my work



Journal of Gandaki Medical College-Nepal (J-GMC-N)

INTRODUCTION

Journal of Gandaki Medical College-Nepal (J-GMC-N) is an official, open access, peer reviewed, biannual, biomedical, scientific Journal published and owned by Gandaki Medical College Teaching Hospital & Research Centre Pvt Ltd.

SCOPE OF THE JOURNAL

The J-GMC-N publishes scientific articles related to research done in the field of biomedical sciences related to all the disciplines of the Medical Sciences, Public health, Medical education, Health care management, including ethical and social issues pertaining to health. The Journal will publish original articles, systematic reviews and meta-analyses, case reports, editorial articles, images, viewpoint, and letters to the editor.

THE EDITORIAL PROCESS

The editors review all submitted manuscripts initially. Manuscripts with serious scientific and technical flaws, insufficient originality, or lack of a significant message are rejected. If good articles are written poorly then authors will be requested to revise and resubmit according to the J-GMC-N format. Manuscripts are sent to two expert reviewers without revealing the identity of the contributors to the reviewers. Each manuscript is meticulously reviewed by the J-GMC-N editorial board based on the comments from the reviewers and takes a final decision on the manuscript. The contributors will be informed about the reviewers' comments and acceptance/rejection of manuscript. Articles accepted would be copy edited for grammar, punctuation, print style, and format.

The Editor-in-Chief of J-GMC-N reserves the right to accept or reject any article submitted for publication.

GUIDELINES TO AUTHORS

Manuscripts must be prepared in accordance with "Uniform requirement for Manuscripts submitted to Biomedical Journals" developed by the International Committee of Medical Journal editors (October 2006) (<http://www.icmje.org>). The uniform requirements and specific requirements of J-GMC-N are summarized below.

Types of manuscripts

Editorial Articles: These articles are written in each issue by the Editor-in-Chief or members of the editorial board.

Original Articles: Randomized clinical trials, interventional studies, studies of screening and diagnostic tests, outcome studies, cost effectiveness analyses, case-control series and surveys with high response rate will be considered for publication. Articles can be up to 3000 words excluding the abstract (can be up to 250 words), figures, tables, and references (can be up to 30).

Review Articles: Systematic critical reviews of literature and data sources will be accepted. Reviews must not exceed 4000 words, excluding the abstract (can be up to 250 words), figures, tables, and references (up to 100 can be accepted).

Medical education: Articles pertinent to the education process in the medical field will be published in this section. It may be about teaching-learning process in undergraduate, postgraduate or higher levels. Word limit may vary.

Case Reports: Interesting or new or rare cases with clinical significance or implications along with literature review can be reported. Such case reports can be up to 1000 words, excluding abstract (can be up to 100 words), references (can be up to 15), and

photographs (up to 4).

Viewpoint: Articles related to your own point of view or personal views on any issue related to health will be published. Viewpoint can be up to 1000 words excluding references (up to 10).

Letter to the Editor: Letters with reference to articles published in J-GMC-N can be up to 250 words, and must be received within one month after publication of the article. The author must give a full reference of the article published in J-GMC-N while writing the letter to which he is referring. The letters unrelated to a Journal article can be up to 500 words, excluding 5 references.

Images and tables: For all the above mentioned categories, the number of images and tables can be up to one per 400 words

MANUSCRIPT PREPARATION

Manuscripts must be clearly typed double-spaced on one side only on A4 size white paper with Arial Font, size of 12 points, with a margin not less than 25 mm. The pages should be numbered consecutively, beginning with the title page. Uniformity in language is required, with preference to American English.

Numbers less than 10 should be written in words. Words not numbers should begin a sentence. Numbers less than 1, begin with a zero. Use one space between a number and its unit. Generic drug names should be used.

The text of the article should be divided into sections with the headings, and should commence on a new page in the following sequence: title page, abstract, key words, introduction, materials and methods, results, discussion, conclusions, acknowledgement, references, tables and figures. Abbreviations used in standard text books can be used, provided the full form has been given when it first appears in the text.

Title page

The title page should carry

1. Type of manuscript (e.g. Original article, Review article, Case report etc).
2. Title of the article (The simpler the title better; should be concise and informative).
3. Short, Running title should not be more than 45 characters.
4. Author(s) names with highest academic degree(s), designation, name of the department

and institution affiliated (where the research was carried out), postal and email address, phone numbers and facsimile numbers.

Abstract

The abstract should contain the essence of the whole paper. Be clear and concise and avoid unnecessary detail. Abstract must not exceed 250 words and should be presented in prescribed structured format: Background, Aims & objectives (hypothesis), Methods, Results, and Conclusions. Provide three to six key words below the abstract arranged alphabetically. The abstract need not be structured for a review article or case report.

Introduction

Introduction should be short and tell the reader why you undertook the study. Divide the introduction into three paragraphs. The first paragraph should be a very short summary of the existing knowledge of your research area. This should lead directly into the second paragraph that summarizes what other people have done in this field, what limitations have been encountered, what questions still need to be answered? This in turn, will lead to the last paragraph, which should clearly state what you did and why.

Methods

This section should describe how and why a particular study was done in a particular way. Basically, it should include three questions: How was the study designed? How was the study carried out? and How was the data analysed? Mention the following, in order of their appearance, and writing in past tense or passive verb.

1. Study type and study design e.g. randomized clinical trials, cross sectional study, retrospective study, experimental study, cohort study, survey etc. Investigators embarking on Randomized clinical trial reports should present information based on the CONSORT (Consolidated Standards of Reporting Trials) statement (<http://www.consort-statement.org>).
2. Place and duration of the study
3. Setting for the study
4. Sample size and sampling method
5. Inclusion and exclusion criteria
6. Methods of data collection

7. Technical information about methods, apparatus, and procedures should be provided in detail to allow other workers to reproduce the results. Give references to established methods.
8. Ethical approval and patient consent
9. Protocols followed, if any
10. Statistical analysis and computer software used

Ethical approval

Ethics committee approval (for both human as well as animal studies) from respective institution is obligatory for manuscript submission. A statement on ethics committee permission and ethical practices must be included under the 'Materials and Methods' section.

Written informed consent must be obtained from the patient (or parent or guardian) for publication of any details or photographs that might identify an individual.

Results

The main outcome of the study and data obtained should be summarized in the Results section, in logical sequence in the text, tables and graphs. Remember that data and results are not the same thing.

Discussion

Discuss major findings. Describe the new and important aspects of the study. Do not repeat the data or other information given in the introduction or results section. Compare and contrast the results with other relevant studies. State the limitations of the study.

Conclusions

State the conclusions that are linked with the objectives of the study, directly supported by the evidence and explore the implications of the findings for future research and for clinical practice.

Acknowledgements

This section should state person(s)/firms to whom the author has to acknowledge, and should specify the nature of support.

Source of Financial support

Grants, funds, honoraria sanctioned for research, if

any.

Conflicts of Interest

Potential conflicts of interest (e.g. employment, affiliation, consultancy, honoraria, grants or other funding etc.) should be disclosed.

Review Articles

Review article must incorporate various aspects of topic chosen, and should also incorporate latest research and findings. It should not merely be a collection of quotes from text books or very old articles of journals that does not contribute anything new to the scientific literature base already available. The ideal review should be topical, up to date, balanced, accurate, authoritative, quotable, provocative and a good read. The ideal contents of review should contain the problem, historical background, basic science, methodology, human studies, discussion, conclusions, recommendations, and the future. Of course with an abstract (need not be structured).

Case Reports

Case reports should include unstructured abstract with keywords, introduction, case report, discussion, references, tables and figure legends.

Student J-GMC-N

This is a section in the Journal especially provided for students and interns. Students can take the help of an expert from concerned subject in the conception of the topic providing suitable resources, revision and final approval of the write-up to ensure that article submitted to J-GMC-N are authoritative and accurate. Articles in this students section can be on education, medical profession, careers, case reports, viewpoint etc.

References

Number the references by Arabic numerals in superscript consecutively in the order of their appearance in the text. Include the last names and initials of the authors, title of article, Name of publication, year published, volume number, and inclusive pages.

Tables

Tables should be self explanatory and should not duplicate text material. Tables should be numbered

in Arabic numerals, consecutively in the order of their first citation in the text and provide a brief title for each.

Figures (Illustrations)

Figures (Graphs, photographs, x-ray films, images) should be numbered consecutively according to the order in which they have been cited in the text. In case of microphotographs, stains used and magnification should be mentioned. Electronic versions of illustrations should have a resolution of 300 dpi. If a figure has been published previously, acknowledge the original source.

Units of Measurement

Measurements of length, height, weight, and volume should be reported in metric units (meter, kilogram, or liter) or other decimal multiples. Temperatures should be in degrees Celsius. Blood pressures should be in millimeters of mercury (mmHg). Use International System of Units (SI) for laboratory information.

Copyright Transfer

Submission of an original manuscript to the Journal means that the authors agree to assign copyright to J-GMC-N. If accepted for publication, it will not be published elsewhere in the same form, in any language, without obtaining consent from the Editor-in-Chief.

Corresponding Author

The corresponding author should ensure that all appropriate coauthors and no inappropriate coauthors are included on the paper, and that all coauthors have seen approved the final version of the manuscript and have agreed to its submission for publication.

Forwarding Letter

The covering letter accompanying the article must categorize the article type and discipline. It should contain the name and complete postal address of one author as correspondent and must be signed by all authors.

Declaration

A declaration should be submitted stating that the manuscript represents valid and original work, and has not been submitted simultaneously to another

Journal, has not been accepted for publication elsewhere and has not already been published. Declarations should be signed by all the authors in the order in which they are mentioned in the manuscript. Declaration page must be scanned and sent with signature.

In all cases, it is vital that the Journal's integrity, independence and academic reputation is not compromised in any way.

MANUSCRIPT SUBMISSION CHECK LIST

While submitting your manuscript to J-GMC-N, please make sure that you have submitted the following:

1. Forwarding letter
2. Authorship
3. Declaration
4. Title page
5. Abstract
6. Keywords
7. Body of the paper (Introduction/Background, Methods, Results, Discussion, and Conclusions)
8. List of abbreviations used (if any)
9. Source of funding
10. Acknowledgment
11. Conflicts of Interest
12. References
13. Tables and Figures

All manuscripts should be submitted electronically to:

Editor-in-Chief

Prof. Dr. K. Rajeshwar Reddy

Email: journal@gmc.edu.np

Mobile: +977-9819125470

Journal of Gandaki Medical College-Nepal
(J-GMC-N)

Gandaki Medical College Teaching Hospital &
Research Centre Pvt Ltd.

Lekhnath-2, Rittepani, Kaski, Nepal

Gandaki Medical College Teaching Hospital & Research Centre Pvt. Ltd.



Hospital Building



Basic Science Building