

A National Journal of Indian Association of Preventive and Social Medicine

HEALTHLINE



pISSN 2229-337X / eISSN 2320-1525

VOLUME : 9 ISSUE: 1 JANUARY-JUNE - 2018

For more details visit : www.healthlinejournal.org

HEALTHLINE JOURNAL

A National Journal of

Indian Association of Preventive and Social Medicine managed by IAPSM-GC

Volume 9 Issue 1 (January-June 2018)

Editorial Board

Editor in Chief, Managing Editor and Publisher : Dr. K. N. Sonaliya

Executive Editor : Dr. Viral R. Dave

Joint Editor : Dr. Bhavik M. Rana

Editorial Board Members

Dr. A. Bhagyalaxmi, *Ahmedabad*

Dr. A. M. Kadri, *Rajkot*

Dr. Abhiruchi Galhotra, *Raipur*

Dr. Amit Kumar Singh, *Srinagar*

Dr. Amita Kashyap, *Jaipur*

Dr. Anurag Srivastava, *Moradabad*

Dr. Atul Trivedi, *Bhavnagar*

Dr. B. M. Vashisht, *Rohtak*

Dr. Bhavesh Modi, *Gandhinagar*

Dr. C. M. Singh, *Patana*

Dr. D. S. Martolia, *Kannauj*

Dr. Damodar Bachani, *New Delhi*

Dr. Dilip Kumar Das, *Kolkata*

Dr. Dinesh Kumar Pal, *Bhopal*

Dr. Dipesh Parmar, *Jamnagar*

Dr. Harivansh Chopra, *Meerut*

Dr. Jitendra Bhawalkar, *Pune*

Dr. K. C. Premarajan, *Puducherry*

Dr. Meenu Kalia, *Chandigarh*

Dr. Paresh Dave, *Gandhinagar*

Dr. Prakash Patel, *Surat*

Dr. Prakash Vaghela, *Gandhinagar*

Dr. Rakesh Kakkar, *Dehradun*

Dr. Rashmi Sharma, *Ahmedabad*

Dr. Renu Agarwal, *Agra*

Dr. S. K. Bhasin, *New Delhi*

Dr. Shalabh Sharma, *Udaipur*

Dr. Shalini Nooyi, *Banglore*

Dr. Sheetal Vyas, *Ahmedabad*

Dr. Sonal Parikh, *Ahmedabad*

Dr. Sunil Nayak, *Himmatnagar*

Dr. V. S. Mazumdar, *Baroda*

Overseas Members

Dr. Samir Shah, *Oman*

Dr. Kush Sachdeva, *USA*

Correspondence

Editor in Chief, Healthline Journal, Community Medicine Department, GCS Medical College, Hospital and Research Center, Opp. DRM Office, Nr. Chamunda Bridge, Naroda Road, Ahmedabad-380025, Gujarat. Telephone: 07966048000 Ext. No. 8351, Email: editorhealthline@gmail.com.

Disclaimer

Views expressed by the authors do not reflect those of the Indian Association of Preventive and Social Medicine-Gujarat Chapter. All the opinions and statements given in the articles are those of the authors and not of the editor (s) or publishers. The editor (s) and publishers disclaim any responsibility for such expressions. The editor (s) and publishers also do not warrant, endorse or guarantee any service advertised in the journal.

Healthline journal is indexed with

Index Copernicus, DOAJ, OPENJGATE, CABI, Index Medicus-SEAR

HEALTHLINE JOURNAL
A National Journal of
Indian Association of Preventive and Social Medicine managed by IAPSM-GC
Volume 9 Issue 1 (January-June 2018)

INDEX

Page No.

Editorial

Spirituality in Health and Disease

D. V. Bala 03

CME

Evidence to Guidelines: The Roadmap

Bobby Paul, Indranil Saha 06

Internal Assessment

Devang Raval, N J Talsania 13

Original Articles

A Study on Non-Adherence to Medication, Self-care Practices and Health Related Quality of Life of Type-2 Diabetic Patients in Field Practice Areas of B.J. Medical College, Ahmedabad

Norma Bhanat, Anjali Mall, Grishma Dixit 17

A Study on Quality check on Multiple Choice Questions (MCQs) using Item Analysis for Differentiating Good and Poor Performing Students

Jatin Chhaya, Hitesh Bhabhor, Jayna Devalia, Ullas Machhar, Abhay Kavishvar 24

A Study on Impact of Radiotherapy on Functional and Radiological Changes on Irradiated Lung in Breast Cancer Patients

Abhay Javia, Pradeep Pithadia, R. Paliwal, Dipesh V. Parmar 30

Assessment of Knowledge and Skill of Counseling among Counselors of Sexually Transmitted Disease (STD) Urban Project

Bansari Chawada, Jayendrakumar Kosambiya, Vipul Chaudhari 36

HEALTHLINE JOURNAL

A National Journal of

Indian Association of Preventive and Social Medicine managed by IAPSM-GC

Volume 9 Issue 1 (January-June 2018)

INDEX

Content	Page No.
Use of WHO Anthro Software for Assessing Under Nutrition (Wasting, Stunting & Underweight) Amongst Under-Five Children of District Ahmedabad, Gujarat <i>Swarna Rastogi, Chaitanya Maheshwari, Santosh Kr. Raghav, M. K. Lala</i>	44
Prevalence of Hypertension Among Reproductive Age Group Women in Study District of West Gujarat A Community Based Cross Sectional Study <i>Mittal Rathod, Dipesh Parmar, Mehul Kaliya, Sumit Unadakat, Amrita Sarkar, Trusha Kansagra</i>	53
Association between Blood Pressure and Cognition among Old Age People <i>Pranay Jadav, Neha Bavarva</i>	61
A Cross Sectional Study on Health Profile of Post-Menopausal Women of Urban Area of Gujarat <i>Divyankumar N Patel, Jatin Chhaya, Hiral Dobaria, Pooja Jha, Pinkal Chaudhary</i>	70
Respiratory Morbidities Among Workers Employed in Cotton Industries in Surendranagar City <i>Shashwat Nagar, Hiren Patel, Noopur Nagar</i>	76

Spirituality in Health and Disease

D. V. Bala

Ex. Professor and Head, Department of Community Medicine, Smt. NHL Municipal Medical College, Ellisbridge, Ahmedabad, Gujarat, India

Correspondence : Dr. D. V. Bala, E mail: baladv@rediffmail.com

“Aum, may all be happy,
May all be free from illness,
May all see what is auspicious
May no one suffer
Aum, may peace pervade the entire universe”
-Brihadaranya Upanishad

Introduction:

In a much earlier time in the history of the world, the priest and the medicine man were one and the same in most cultures, until the development of scientific medicine led to a division between the professions.

The technological advances of the past century tended to change the focus of medicine from a caring, service oriented model to a technological, cure-oriented model. Technology has led to phenomenal advances in medicine and has given us the ability to prolong life. The mainstream modern medicine, (allopathic system) has given yeoman contribution by preventing and controlling many deadly infectious diseases in the form of vaccinations and antibiotics.

Spirituality has gained increasing attention in the medical literature over the past few decades. Spiritual or compassionate care involves serving the whole person - the physical, emotional, social, and spiritual. Allopathic medical professionals in developed nations have started to collaborate with traditional, complementary, and alternative medicine to enquire on the role of spirituality in patient care. However, there is scant evidence of such movement in the Indian medical community.

What is spirituality?

Although there remains no clear consensus on definitions, there is growing acceptance of a broad definition of spirituality as a multidimensional aspect of the human experience encompassing:(1)

cognitive/existential aspects (beliefs, values, meaning and purpose);(2) emotional aspects (need for connection, love, hope, inner strength and peace); and(3) behavioral aspects (specific spiritual practices and life choices). Spirituality often plays a positive role in patients' illness experience.

As such, spirituality is not open to the normal methodologies of scientific investigation. It is the quality of being concerned with the human spirit or soul as opposed to material or physical things. *“Spirituality is recognizing that we are all inextricably connected to each other by a power greater than all of us and that our connection to that power and to one another is grounded in love and compassion. Practicing spirituality brings a sense of perspective, meaning, and purpose to our lives.”*

Mental Responsibility for Chronic Diseases and Evaluation of Curative Methods:

The subconscious idea of disease or health exerts a strong influence. Stubborn mental or physical diseases always have a deep root in the sub consciousness. Illness may be cured by pulling out its hidden roots.

Disease is generally considered a result of external material causes. Few people recognize that it comes through the inaction of the life force within. When the cell or tissue vehicle of life energy is seriously damaged, the life energy withdraws from that place and trouble consequently starts. Medicine, massage, physiotherapy and electric treatment merely help to

stimulate the cells in such a way that the life energy is induced to return and resume its work of maintenance and repair. Medicine and food have a definite chemical action upon blood and tissues. They are useful so long as the material consciousness in man is uppermost. They have their limitations, however, because they are applied from outside. The best methods are those that help the life energy to resume its internal healing activities.

The modern world is facing a pandemic of lifestyle disorders that require changes to be made consciously by individuals themselves. As the holistic art and science of yoga is the best lifestyle ever designed, it has potential in the prevention, management and rehabilitation of prevalent lifestyle disorders. Interestingly, modern research has begun to focus on the psycho-physiological beneficial effects of yoga which need to be understood as more than merely a form of physical exercise.

Some Indian Systems of Traditional Medicine in Practice:

Ayurveda defines health as a complete one involving physical (bodily), mental, and spiritual well-being. The yogic way of living is a vital tool that helps attain that "state" of health as described by Ayurveda and WHO as well. It is more important to have both a sense of "being" healthy as well as "feeling" healthy. Hence, the qualitative aspect of health, the spiritual nature of the human life, is rightly considered more important in yoga and other Indian systems of traditional medicine.

Yoga:

Yoga has been with humanity since times immemorial and has stood the test of time. Yoga is one of the most researched interventions. Researchers are generating more and more scientific evidence to support the use of yoga. However, for introducing yoga in mainstream medical practice, clinical trials are required. This poses challenges. Major benefits of yoga may occur due to its lifestyle components (healthy diet, activity, relaxation, and positive attitude) as well as psychosomatic harmonizing effects of pranayama and yogic relaxation.

Yoga implies both the process as well as the attainment of a state of psychosomatic, harmony, and balance (samatvam yoga uchyate - Bhagavad Gita) and this restoration of physical, mental, emotional, and spiritual balance may be the prime factor behind the changes seen across all short- and long-term studies. Pranayamas (awareness of breathing) also produce a sense of relaxation.

According to Swami Kuvalayananda, founder of Kaivalyadhama, positive health does not mean mere freedom from disease but is a jubilant and energetic way of living and feeling that is the peak state of well-being at all levels – physical, mental, emotional, social and spiritual. They emphasized that yoga helps cultivation of positive health through three integral steps as follows:

1. Cultivation of correct psychological attitudes (maitri, karuna, mudita and upekshanam toward those who are sukha, dukkha, punya and apunya)
2. Reconditioning of neuromuscular and neuroglandular system – in fact, the whole body – enabling it to withstand stress and strain better
3. Laying a great emphasis on appropriate diet conducive to such a peak state of health, and encouraging the natural processes of elimination through various processes of nadi shuddhi or mala shuddhi.

Some prominent studies conducted prospective, randomized controlled trials on angiographically proven coronary artery disease patients with yoga intervention and demonstrated that yoga-based lifestyle modification helps in regression of coronary lesions and improvement in myocardial perfusion. The effect of yogic lifestyle on some of the modifiable risk factors could probably explain the preventive and therapeutic beneficial effect observed in coronary artery disease.

Meditation

Medicine and meditation come from same root word 'medere' – making whole. Even Healing and Holy have the same origin. Meditation is found in all cultures, religions and regions, both East and West.

Meditation has been with humanity for thousands of years and it is highly relevant today in the management of myriad illnesses. The standard dictionary definition is 'thinking deeply or spiritually about a subject.' It is a technique or method of freeing one's mind from emotions and other distractions to allow deeper insights into ourselves and the world around us. The ultimate goal is illumination, and while this may not be fully achieved, along the way peace and relaxation, quietening of emotions, insights and perspectives may be accomplished.

The mind during meditation connects us with our inner selves, the 'Master Within'. It may be focussed (using a mantra) or non-directional. Spirituality may be a component of some meditational practices, although certain meditation techniques may be practiced without any underlying spiritual belief system.

Well-known meditations include Raj Yoga, Mantra, Mindfulness, Vipassana, Transcendental Meditation, Kundalini, Sudarshan Kriya, Kirtan Kriya, Sahaj Samadhi, Osho's Meditations, Silence, and Pranayama.

Conclusions:

Emphasis should be laid on the total care of the suffering person rather than attention simply to the patho-physiology of disease. When a disease has an unpredictable course and the fact that the drugs have limitations, one should try complementary alternative therapies. Regular prayers, meditation, positive attitude, yoga, pranayama and exercise should be added to life style along with healthy diet. All these can certainly reduce the stress and provide enough courage and strength to face unavoidable stress and disease. Moreover, these therapies help boost immune system and are helpful in enrichment of physical, mental, and emotional health.

Health care professionals are required to respect the patient values and beliefs and develop competent communication skills. Inclusion of spirituality in the health care system is the need for Indian medical students, professionals as well as their patients. This could form the basis for integrating traditional,

complementary, and alternative medicine and allopathic medical systems in our country.

References:

1. Avdesh Sharma (2008) "Meditation : the future Medication", email: avdeshsharma@rahat.org / sharmaavdesh@gmail.com
2. Bhavanani AB. Role of yoga in prevention and management of lifestyle disorders. Yoga Mimamsa [serial online] 2017 [cited 2018 May 21];49:42-7. Available from: <http://www.ymkdham.in/text.asp?2017/49/2/42/220184>
3. Brain & Neurological Disorders, A Simplified Health Education Guide by Dr. Sudhir V Shah and Dr. Heli Shah. First Edition 2017; Publishers, Jaypee Brothers Medical Publishers (P) Ltd.
4. Gangadhar B N. Yoga for better health. Yoga Mimamsa [serial online] 2017 [cited 2018 May 21];49:41.
5. Gowri Anandarajah, (2014) "Introduction to Spirituality and Medical Practice" Guest editor,
6. Advisors E. Rhode Island Medical Journal [Internet]. Rimed.org. 2018 [cited 16 March 2018]. Available from: <http://www.rimed.org/rimedicaljournal-archives.asp> <https://dictionary.cambridge.org/dictionary/english/spiritual-healing>
7. Brown B. Defining Spirituality | Brené Brown [Internet]. Brené Brown. 2018 [cited 27 March 2018]. Available from: <https://brenebrown.com/blog/2018/03/27/defining-spirituality/>
8. Culliford L. What Is Spirituality? [Internet]. Psychology Today. 2018 [cited 16 March 2018]. Available from: <https://www.psychologytoday.com/us/blog/spiritual-wisdom-secular-times/201103/what-is-spirituality>
9. Kavalayananda, S. & Vinekar, S. L. (1971). Yogic Therapy: Its Basic Principles and Methods. India, New Delhi: Central Health Education Bureau, Ministry of Health.
10. Manchanda, S. C., Narang, R., Reddy, K. S., Sachdeva, U., Prabhakaran, D., & Dharmanand, S, Bijlani, R. (2000). Retardation of coronary atherosclerosis with yoga lifestyle intervention. The Journal of the Association of Physicians of India, 48 (7), 687-694.
11. Ornish, D., Brown, S. E., Scherwitz, L. W., Billings, J. H., Armstrong, W. T., & Ports, T. A., Gould, K. L. (1990). Can lifestyle changes reverse coronary heart disease? The Lifestyle Heart Trial. Lancet, 336 (8708), 129-133.
12. P. Ramakrishnan, A. Dias, A. Rane, A. Shukla, S. Lakshmi et al, (2014), Perspectives of Indian Traditional and Allopathic Professionals on Religion/Spirituality and its Role in Medicine: Basis for Developing an Integrative Medicine Program, Journal of Religion and Health, August 2014, Volume 53, Issue 4, pp 1161-1175
13. Scientific Healing Affirmations by Sri Sri Paramahansa Yogananda, Second edition, 1970, Eighth Impression, 2002, Published by Yogoda Satsanga Society of India, Dakshineswar, Kolkata
14. Thomas R. McCormick, (2014), Spirituality and Medicine, Clerkship material: General Curriculum, Department of Medical History and Ethics, University of Washington.
15. Yogendra, J., Yogendra, H. J., Ambardekar, S., Lele, R. D., Shetty, S., & Dave, M. Husein, N. (2004). Beneficial effects of yoga lifestyle on reversibility of ischemic heart disease: Caring heart project of International Board of Yoga. The Journal of the Association of Physicians of India, 52, 283-289.

Evidence to Guidelines : The Roadmap

Bobby Paul¹, Indranil Saha²

¹ Assistant Professor & Head of the Department of Preventive & Social Medicine, All India Institute of Hygiene & Public Health, Kolkata, West Bengal, India ²

²Professor, Community Medicine, IQ City Medical College, Durgapur, West Bengal, India

Correspondence : Dr. Indranil Saha, E mail: drsahaindranil@gmail.com

Abstract :

Evidence based practice deals with current best medical evidence in conjunction with clinical expertise and patient values to guide health care decisions. This paper intends to draw attention of the readers to the brief history of Evidence Based Medicine and the different methods of evidence appraisal in quantitative research like “hierarchy of evidence” which lists a range of study designs ranked in order of decreasing internal validity and may vary according to research question. There are other methods like integrative methods, network meta-analysis, quantitative modeling and infectious disease modeling that are also used for evidence appraisal. There are various approaches of quality assessment of research evidence amongst which GRADE approach (Grading of Recommendations Assessment, Development and Evaluation) is discussed in a nutshell to outline the roadmap from evidence generation in research to guideline formulation. Fundamentally the GRADE approach provides guidance for rating quality of evidence and grading strength of recommendations in order to aid in evidence based health care decisions.

Keywords: Decision making, Evidence-Based Medicine/methods, Evidence-Based Medicine/ history, Policy making, Practice guidelines as topics, Public Health

Introduction :

Evidence based practice is the conscientious and judicious use of current best medical evidence in conjunction with clinical expertise and patient values to guide health care decisions and involves the rigorous process of tracking down the available research evidence, assessing its validity, and then using the “best” Evidence to medical decision making. The need for Evidence Based Medicine (EBM) is reiterated by the quote of Bernard Russell: “It is not what the man of science believes that distinguishes him, but how and why he believes it. His beliefs are tentative, not dogmatic; they are based on evidence, not on authority or intuition.^[1] Now the formidable task is to navigate the evidence with critical evaluation skills and identify studies that should influence decision making and policy, keeping in minds the strengths and weaknesses of study designs in the medical literature i.e. internal validity, external validity, confounding, bias etc. The commonly used

tool in this regard is the “hierarchy of evidence” or the levels of evidence, which lists a range of study designs ranked in order of decreasing internal validity. With this background, this paper intends to draw attention of the readers to the methods of evidence appraisal in quantitative research and the approaches of its quality assessment. Furthermore, the GRADE approach (Grades of Recommendation, Assessment, Development and Evaluation) which provides guidance for rating quality of evidence and grading strength of recommendations in health care is also explained in a nut shell in order to outline the roadmap from evidence generation in research to guideline formulation, an essential aid for clinical decision making.

Brief history of EBM :

The origin of EBM can be traced back to a report by the Canadian Task Force on the Periodic Health Examination in 1979. ^[2] The authors developed a

system of rating evidence generated from available research on the effectiveness of a particular intervention and further formulated a grading of recommendations based on the levels of evidence to prioritize the implementation of interventions in real world scenario. For example, Grade A recommendation was given if there was good evidence to support a recommendation that a condition can be included in the periodic health examination. This was subsequently adopted by the US Preventive Services Task Force and included methods for assessing the strength of evidence for public health decision making.

The foundation for evidence based practice was laid down by David Sackett, regarded by many as “the father of evidence based medicine” who defined it as a systematic approach to clinical problem solving which allows the integration of the best available research evidence with clinical expertise and patient values.^[3] In the late 1960s, David Sackett, the professor of Medicine at McMaster University, in Ontario, Canada, along with his colleagues started teaching the students and internists the methods of critical appraisal of research as they believed that “A 21st century clinician who cannot critically read a study is as unprepared as one who cannot take a blood pressure or examine the cardiovascular system.”^[4] This was the beginning of a new era of treatment approach. Gordon Guyatt, the Director of the internal medicine residency program at McMaster University in 1990, further facilitated to usher in this era by asking the physicians to manage patients not on the basis of what authorities told them to do but on what the evidence showed worked, therein coining an appropriate terminology to this methodology as “Evidence Based Medicine.”^[5]

Evidence Appraisal in Quantitative Research

The hierarchy of evidence necessary for clinical decision making places higher value on study designs that focus on outcomes based on experiments and lower value on unsystematic clinical observation. Figure 1 depicts the hierarchy

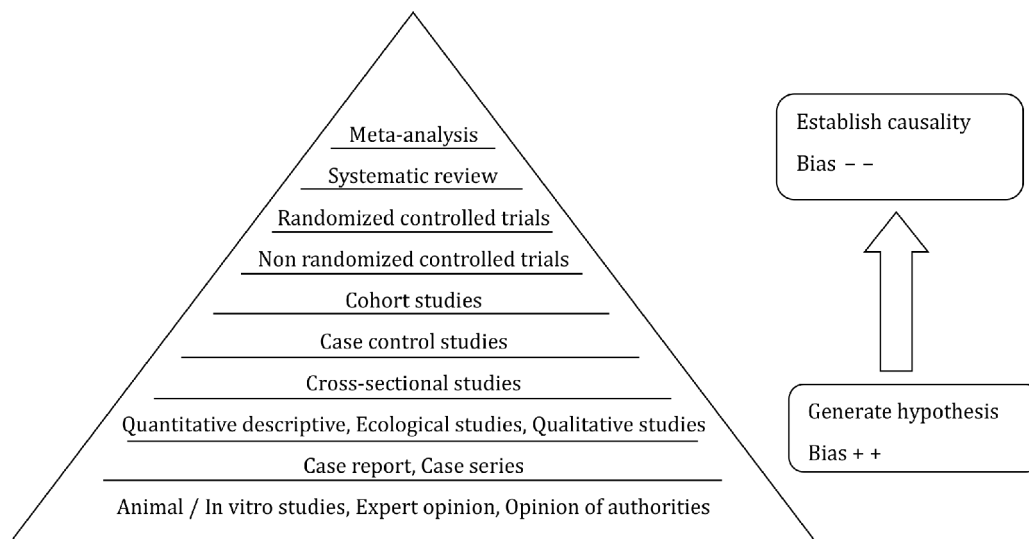
commonly used in quantitative research.^[6] Although best suited for questions of therapeutic efficacy, it is either limited or no value for many other research questions such as appraisal of evidence for social or public health interventions, cost effectiveness of therapies etc. (Table 1).^[7,8]

However there are other methods like Integrative Methods (Secondary or synthesis methods) that comprehensively consolidate findings of existing relevant research in order to resolve inconsistencies or ambiguities among existing studies and yield findings that may not have been apparent or significant in individual studies.^[9] The findings from systematic literature review, meta-analysis, modeling (e.g., decision trees, state-transition models, infectious disease models), group judgment (“consensus development”), unstructured literature review and expert opinion may be combined or considered in a holistic manner to explore the broader social and economic contexts which will not only help in choosing the best treatment option for a disease, but also help to inform policies and guidelines, as the case may be, pertaining to the research question.^[9]

Network meta-analysis (also known as multiple-treatment or mixed-treatment comparisons meta-analysis), which is an expansion of conventional pairwise meta-analysis, is also currently used for development of clinical guidelines. This process analyzes simultaneously by both direct comparisons of interventions within randomized controlled trials (RCTs) and indirect comparisons across trials based on a common comparator (e.g. placebo or some standard treatment) when there are limited or no available direct (“head-to-head”) trials of those interventions.^[10]

Another important quantitative tool of EBM is quantitative modeling which is used to answer “What if?” questions i.e. the modeling techniques evaluate the clinical and economic effects of health care interventions. For example, decision analytic

Figure 1 : Hierarchy of evidence generation



modeling can be used to represent alternative sequences of clinical decisions for a given health problem. The probabilities are then calculated in terms of expected health outcomes and the cost effectiveness that would result from each strategy can also be computed. Decision models, often, are shown in the form of "decision trees" with branching steps and outcomes with their associated probabilities and values.^[9]

Infectious disease modeling is yet another tool which is used to understand the spread of an infectious disease in a population with the help of a mathematical model. The disease in question is at first described in terms of transmission of the pathogen among hosts, depending on patterns of contacts among infectious and susceptible individuals, the latency period from being infected to becoming infectious, the duration of infectiousness, the extent of immunity acquired following infection, and other related factors. All the factors are then formulated in a complex mathematical model and the outcomes are used to make predictions about the number of individuals who are expected to be infected during an epidemic, the duration of the epidemic, the peak incidence, expected number of cases at each point in time and, indeed, the entire epidemic curve can be drawn.^[11] It is especially useful to assess impact of control strategies and in situations

when a randomized control trial is not possible because the disease of interest has not yet occurred in the specific population for which preventive/therapeutic strategies are to be formulated.

Assessment of Evidence Quality:

Quality of evidence is defined as the “extent to which one can be confident that an estimate of the effect or association is correct.”^[12] Many approaches have been used to assess the quality of a body of evidence since the 1970s. David Sackett emphasized on the importance of estimating types of errors and the power of studies when interpreting results from RCTs. For example, a poorly conducted RCT may report a negative result when in fact a real difference exists between treatment groups.^[13] Different instruments are used to assess the reporting of different study designs which help to maintain the quality check in generating research evidence e.g. STROBE (Strengthening The Reporting Of Observational Studies), CONSORT (Consolidated Standards of Reporting Trials), PRISMA (Preferred Reporting Items of Systematic Reviews and Meta-Analyses Instrument), CHEERS (Consolidated Health Economic Evaluation Reporting Standards) etc.

However in recent years, there has been some convergence in these approaches, the efforts being put in this regard by many organizations such as the

Table 1: Hierarchy of best evidence according to research question

Research question	Hierarchy of best evidence
Effectiveness	RCT > Quasi-experimental > Analytic studies
Diagnosis	Studies of test accuracy among consecutive patients > studies of test accuracy among non consecutive patients > diagnostic case control studies
Prognosis	Inception cohort studies > studies of all or none > cohort studies
Economic evaluation	Decision model > Economic evaluation studies > expert opinion on incremental cost effectiveness of intervention and comparator
Meaningfulness	Qualitative or mixed method systematic review > Qualitative or mixed methods synthesis > Expert opinion
Safety	RCT > Quasi-experimental and analytic studies
Process of service delivery	Qualitative > Surveys > Evaluation studies (non experimental)
Acceptability of services	Qualitative > Experimental designs and surveys
Appropriateness of services	Qualitative research and cross section surveys
Systematic review of the above mentioned study designs are placed at the top of each hierarchy level	

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group, the Cochrane Collaboration, the US Agency for Healthcare Research and Quality Evidence-based Practice Centers (AHRQ EPCs), the Oxford Centre for Evidence-Based Medicine, and the US Preventive Services Task Force (USPSTF).^[9]

GRADE Approach for Guideline Development:

The GRADE approach (adopted by the Cochrane Collaboration, WHO and many others) provides the roadmap for grading the quality of evidence and develop and report recommendations to the

guideline development group based on a common, transparent and sensible system. Fundamentally the GRADE approach is based on the philosophy of evidence based health care decisions that include the integrations of three domains namely 1) the health state (low or high income country) and circumstances that the patient presents with where decision making takes place; 2) the patient's populations or societal values and preferences how important are certain outcomes for decision making and 3) the actual underlying research evidence. These three domains are finally integrated to health care decision making.

Guidelines are recommendations intended to assist providers and recipients of health care and other stakeholders to make informed decisions. Recommendations are judgments based on quality of evidence, tradeoffs between benefits and harms, values and preferences of end-users, implementers and policymakers and with an implication on optimal resource use.

The guideline developers initially formulate the question which drive the evidence search usually in PICO (patient, intervention, comparator, outcome) format e.g. in babies born to HIV-positive women (P), does screening with a new rapid diagnostic test (I), compared with standard diagnostic methods (C) accurately detect disease (O)?^[12] Then comes the task of evidence retrieval from published body of evidence

for choosing the best possible outcome to be used for recommendation in the guideline. The outcomes retrieved from medical literature search are considered in terms of desirable (e.g. lower mortality, reduced hospital stay, reduced duration of disease, reduced resource expenditure etc) and undesirable effects (e.g. adverse reactions, development of resistance, costly treatment etc.) on patients and are then rated in order of importance by the guideline development group, the external review group and relevant stakeholders. The critically important outcomes, as chosen by the ratings are then further evaluated in GRADE. The starting point for rating the quality of evidence in GRADE is always the study design from which the outcome has been retrieved, which is broadly classified into two types:

Table 2 : Significance of the four levels of evidence

Quality	Definition	Implications
High	The guideline development group is very confident that the true effect lies close to that of the estimate of the effect	Further research is very unlikely to change confidence in the estimate of effect
Moderate	The guideline development group is moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate
Low	Confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the true effect	Further research is very likely to have an important impact on confidence in the estimate of effect and is unlikely to change the estimate
Very low	The group has very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of the effect	Any estimate of effect is very uncertain

Table 3 : Determinants of strength of recommendation

Determinants	Comment
Quality of the evidence	The higher the quality of evidence, the more likely is a strong recommendation
Balance between desirable and undesirable effects	The larger the difference between the desirable and undesirable consequences, the more likely a strong recommendation is warranted. Weak recommendation is warranted for smaller net benefit and lower certainty for that benefit
Values and preferences	The greater the variability/ uncertainty in values and preferences, the more likely is a weak recommendation
Costs (resource allocation)	Strong recommendation is less likely to be warranted in case of higher costs of an intervention / higher resource consumption

- Randomized controlled trials (RCTs)
- Observational studies, including interrupted time-series (or quasi-experimental design), cohort studies and case-control studies, and other types of design such as case series and case reports.

Evidence based on randomized controlled trials is given a high-quality rating and evidence from observational studies is given a low-quality rating. These initial ratings are adjusted by the following factors, the presence of which can upgrade or lower the evidence.

The presence of factors that lowers the evidence quality are:^[12]

1. Risk of bias
2. Inconsistency (heterogeneity),
3. Indirectness (lack of external validity)
4. Imprecision (when studies include relatively few patients and few events and thus have wide confidence intervals around the estimate of the effect.)

5. Reporting bias

The factors that increase the evidence quality are:^[12]

Magnitude of effect (no major threat to validity, consistent and direct evidence)

1. All plausible residual confounding may have reduced the demonstrated effect or increased the effect if no effect was observed
2. Large dose-response gradient

Once all outcomes that are critical for decision making have been evaluated, an evidence profile for each outcome is generated that provides estimates of the magnitude of desirable and undesirable consequences of an intervention and the confidence in those estimates to support a recommendation. Thereafter an overall GRADE of the quality of evidence is assigned for each outcome and categorized in four categories; high, moderate, low or very low (Table 2).^[12]

This information is then provided back to the guideline panel who then formulate recommendations in a clear and unambiguous manner using

standardized wording, such as using the term “recommend” for strong recommendations and “suggest” for conditional or weak recommendations. The factors considered at this stage are summarized below (Table 3).^[14]

Conclusion :

EBM tries to bring out the best practices from the best quality evidences. The roadmap from evidence generation through various study designs and the utilization of these evidences for guideline formulation is time consuming and complex. Nevertheless, the final outcome i.e. the evidence-based guideline is a scientific document, that categorizes the recommendations into strong and weak, is of utmost use to the evidence users i.e. the patients, clinicians, and policy makers. For patients, strong recommendation means that most people would want the recommended course of action; for clinicians / health care providers it means that most patients should receive the recommended course of action and for policy makers, the strong recommendation could be adapted as a policy in most situations and act as a guiding tool for planning, commissioning, and purchasing of healthcare services.^[14] Finally the quality of guidelines can also be judged by using the AGREE II instrument (Appraisal of Guidelines Research and Evaluation) which judges the quality with the help of 23 items in 6 domains (scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, editorial independence) and two overall assessment domains.^[15] Last but not the least, adaptation of trustworthy guidelines would not only improve patient outcomes by promoting beneficial interventions while discouraging those that are ineffective or possibly dangerous but also provide practitioners with credible guidance on appropriate, evidence based, and ethical practice and bring uniformity in patient management.

References :

1. Pai BH M, G Rajesh, Shenoy R. Research design hierarchy: Strength of evidence in evidence-based dentistry. *Journal of Interdisciplinary Dentistry* 2012; 2(3): 158-163.

2. Burns PB, Rohrich RJ, Chung KC. The Levels of Evidence and their role in Evidence-Based Medicine. *Plast Reconstr Surg.* 2011; 128(1): 305-310.
3. Evidence-based Medicine Working Group. Evidence-based medicine: A new approach to teaching the practice of medicine. *JAMA* 1992; 268(17): 2420-2425.
4. Glasziou P, Burls A, Gilbert R. Evidence based medicine and the medical curriculum. *BMJ* 2008; 337: a1253.
5. Smith R, Rennie D. Evidence-based medicine - an oral history. *BMJ* 2014; 348:g371.
6. Saha I, Paul B. *Essentials of Biostatistics*. Second Edition. Kolkata. Academic Publishers 2016. p. 168.
7. New JBI Levels of Evidence. Developed by the Joanna Briggs Institute Levels of Evidence and Grades of Recommendation Working Party October 2013. Available from: joannabriggs.org/assets/docs/approach/JBI-Levels-of-evidence_2014.pdf. Last accessed on June 5, 2018.
8. Petticrew M, Roberts H. Evidence, hierarchies, and typologies: horses for courses. *J Epidemiol Community Health* 2003; 57(7): 527-529.
9. Goodman CS. *HTA 101: Introduction to Health Technology Assessment*. Bethesda, MD: National Library of Medicine (US); 2014. Available from: <https://www.nlm.nih.gov/nichsr/hta101/ta10106.htm>. Last accessed: June 5, 2018.
10. Kanters S, Ford N, Druyts E, Thorlund K, Mills EJ, Bansback N. Use of network meta-analysis in clinical guidelines. *Bulletin of the World Health Organization* 2016; 94(10): 782-784.
11. Huppert A, Katriel G. Mathematical modelling and prediction in infectious disease epidemiology. *Clin Microbiol Infect.* 2013; 19(11): 999-1005.
12. WHO handbook for guideline development. Second edition. World Health Organization. Geneva. 2014. Available from: <http://apps.who.int/medicinedocs/documents/s22083en/s22083en.pdf>. Last accessed June 5, 2018.
13. Sackett DL. Rules of evidence and clinical recommendations on the use of antithrombotic agents. *Chest.* 1989; 95(2 suppl): 2S-4S. Schünemann HJ
14. Oxman AD, Akl EA, Brozek JL, Montori VM, Heffner J et al. Moving from evidence to developing recommendations in guidelines: article 11 in Integrating and coordinating efforts in COPD guideline development. An official ATS/ERS workshop report. *Proc Am Thorac Soc.* 2012; 9(5): 282-92.
15. Brouwers MC, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G et al. AGREE II: Advancing guideline development, reporting, and evaluation in health care. *Preventive Medicine.* 2010; 51(5): 421-424.

Internal Assessment

Devang Raval¹, N J Talsania²

¹Associate Professor, ²Ex-Professor & Head, Community Medicine Department,
B J Medical College, Ahmedabad, Gujarat, India.

Correspondence : Dr Devang Raval, daraval1963@yahoo.co.in

Introduction :

The strengths of internal assessment (IA) are threefold. One, there is an opportunity to provide timely corrective feedback to students. Feedback is recognized as the single-most effective tool to promote learning.^[1,2] Two, IA can be designed to test a range of competencies, such as, skill in performing routine clinical procedures (giving injections, suturing wounds, performing intubation etc.), professionalism, ethics, communication and interpersonal skills, which are hardly assessed in the final examinations.^[3] Three, the continuous nature of this assessment throughout the training period has the potential to steer the students' learning in the desired direction over time. The focus is on the process, as much as on the final product of learning. Internal assessment is a continuous process rather than a snapshot observation. Its key features are its ongoing nature and the use of multiple examiners; both help to minimize subjectivity in the assessment procedure.

Formative or Summative

A number of teachers get entangled in the formative or summative debate. Formative assessment has a major influence on Learning.^[1-3] the educational utility of a summative or year-end examination is limited since it usually involves a single encounter with assessment of a limited number of competencies, mostly knowledge-based, with no opportunity for feedback and improvement. Internal assessment provides a very useful opportunity to not only test acquisition of knowledge but also provide feedback to make learning better.^[4-5]

Emphasis on a wide range of competencies

While the acquisition of knowledge and skills is an important focus of IA, it also encompasses other competencies and qualities that are difficult to assess

through a year-end examination. These include regularity, participation in learning Activities, preparation for seminars, skills in history taking / case study, case presentation, and performance in community projects, research projects (e.g. short term Indian Council of Medical Research projects) and quiz programmes. Importance is also given to communication skills, professionalism, ethics, academic honesty and interpersonal skills

Proposed Graduate Medical Regulations

“Indian Medical Graduate” (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, shall function appropriately and effectively as a physician of first contact of the community while being globally relevant. The draft of the 2012 revised Regulations on Graduate Medical Education (GME) released by the Medical Council of India (MCI) stipulates that undergraduate students should have passed in their IA to be eligible to appear in the final university examinations.^[6] The recommendation is for IA to be based on day-today records.

Problems with Internal Assessment in India

The major issues with internal assessment in India are: improper implementation, lack of faculty training, misuse or abuse, lack of acceptability among all stakeholders and perceived lack of reliability.^[7-8] Objectivity refers to the consistency of marking between different examiners and is, therefore, a measurement issue. Reliability, on the other hand, refers to the confidence that we can place in the judgments we make and is, therefore, a decision-making issue

Improper implementations: Implementation has a strong bearing on any assessment and its educational utility.

Lack of faculty training: Faculty development is prerequisite to proper implementation of any educational method. Lack of training is often the reason for poor implementation, lack of transparency, and inadequate or no provision of feedback to students.

Misuse/Abuse: IA is often misused as an examination without external controls.^[9-10]

Lack of acceptability: The issues that lower the acceptability of IA from all its stakeholders are: variability in marking by institutions, too much 'power' bestowed to single individuals (often departmental heads), too much weight age to single tests and a perceived lack of reliability. Reliability (also sometimes described as reproducibility) is commonly seen as 'consistency of marking'. The utility of any assessment is dependent upon its validity, reliability, acceptability, feasibility and educational impact.^[11-14] The purpose of IA is to provide feedback to students and teachers, and to improve student learning. It is proposed to be a longitudinal program spread throughout the MBBS training. IA is expected to be complementary to the end-of-training assessment (ETA) carried out by the affiliating Universities to test for attainment of intended competencies.

Organize and Conduct Internal Assessment:⁽¹⁾ For uniformity, Institutional Curriculum Group with several subcommittees dealing with Design and

Implementation, Assessment, Student liaison, Clinical trainings, Ethics, Human care (one week induction/ orientation program at the beginning of MBBS course.⁽²⁾ To allow greater spread of marks, each subject may be assessed out of a maximum of 100 marks (50% for theory and 50% for practical/clinical component) in the ITA. IA can be divided into- Day to Day assessment, Internal/terminal exam. and Preliminary exam; with 40%, 30%, 30% weight age respectively. ITA should make use of a number of assessment tools. For theory: (essay) questions, short answer questions (SAQ), multiple choice questions (MCQ), extended matching questions and oral examinations should be used. For practical/clinical assessment: Project work and its presentation, Field visit viva, village study, experiments, long cases, short cases, spots, objective structured practical/clinical examinations (OSPE/OSCE), mini-clinical evaluation exercise (mini-CEX) and objective structured long examination record (OSLER) should be used. Viva in practical/clinical assessment should focus on the experiments actually performed or cases actually seen rather than being a general viva.

All results should be declared within two weeks of the assessment. Students should sign on the result sheet in token of having seen the results. The results should also be uploaded on the college website within two weeks of being put up on the notice board. Students who do not pass in any of the assessments

Table 1 : Division of Marks

Theory (Max. marks 50)		Practical/clinical (Max. marks 50)	
Knowledge tests: using multiple tools	40	Practical and clinical skills (Including communication Skills, bedside manners): using multiple tools	35
Preparation, participation, regularity, sincerity	8	Regularity, sincerity, professionalism' presentation	8
Other academic activities: quiz, seminar etc.	2	Log books	5
		ICMR or other projects, community work, etc.	2

should have the opportunity to appear for it again – however, any repeat assessment should not be conducted earlier than two weeks of the last to allow students to meaningfully make good their deficiencies. Only one additional assessment may be provided to make good the deficiency. If a student is unable to score 50% even after an additional assessment, he should repeat the course/posting and appear for University examinations 6 months later.

Teachers should provide feedback to students regarding their performance. A group feedback session should be organized within a week after declaration of results. However, for persistently low achieving students, one-to-one feedback sessions may be organized. To use the power of assessment meaningfully for better learning and to ensure stability in assessments, all colleges should appoint a Chief Coordinator. All the teaching departments should also appoint a teacher as coordinator to plan and organize ITA. Departments should coordinate among themselves and with the Chief Coordinator to ensure that students do not have assessment in more than one subject during the same week. As far as possible, all ITAs should be scheduled on Monday mornings so that students get the weekend to prepare and do not miss classes. For clinical subjects, the practical component of the ITAs should be scheduled at the end of clinical postings. The minimum number of ITAs for each subject should be specified in the beginning of the term. The plan and tentative dates of assessment should be put up on the notice board within the first month of starting that phase of training. The ITA plan of each department should be developed as a standard operating protocol (SOP) document, approved by the Curriculum/ Assessment committee of the college and reviewed (and revised if required) annually. This document should be made available to the students at the beginning of each phase.

Record keeping: It is important to maintain a good record of performance in ITA to ensure credibility. Students should have access to this record and should sign it every three months

Currently, faculty development is carried out through the basic course workshops on medical education; this needs to be scaled up for capacity building of medical teachers. It is also imperative that the students be sensitized to the ITA program for MBBS during the proposed foundation course (the first two months before Phase I of MBBS). Medical competence is an integrated whole and not the sum of separate entities. No single instrument will ever be able to provide all the information for a comprehensive evaluation of competence.

Conclusion :

The successful use of IA as a tool for promoting learning entails the following:

1. IA has to be based on day-to-day observation of the student.
2. It should focus on the process of learning as much as on the amount of learning.
3. It should evaluate competencies which are difficult to assess through term-end examinations.
4. All teachers of the department should be involved in the assessment process to make for greater reliability.
5. The results should be used not only to document the student's progress, but also to provide feedback while the student still has time to improve on the basis of the feedback.
6. Meticulous record-keeping is essential for the efficacy and credibility of the process.

References :

1. Rushton A. Formative assessment: a key to deep learning. *Med Teacher*. 2005; 27:509-13.
2. Hattie JA. Identifying the salient facets of a model of student learning: A synthesis of meta-analyses. *Int J Educ Res*. 1987; 11:187-212.
3. Singh T, Nat MV. Examination reforms at the grassroots: Teacher as the change agent. *Indian Pediatric*. 1997; 34:1015-9.
4. University Grants Commission. Action Plan for Academic and Administrative Reforms. New Delhi. Available from: URL:<http://ugc.ac.in/policy/cmlette2302r09.pdf>. Accessed 24 June, 2012.

5. National Accreditation and Assessment Council. Best Practice Series-6. Curricular Aspects. Available from URL: <http://naac.gov.in/sites/naac.gov.in/files/Best%20Practises%20in%20Curricular%20Aspects.pdf>. Accessed 24 June, 2012.
6. Medical Council of India Regulations on Graduate Medical Education 2012. Available from: URL: http://www.mciindia.org/tools/announcement/Revised_GME_2012.pdf. Accessed 24 June, 2012.
7. Singh T, Anshu. Internal assessment revisited. *Natl Med J India*. 2009;22:82-4.
8. Medical Council of India Regulations on Graduate Medical Education 1997. Available from: URL: <http://www.mciindia.org/RulesandRegulations/GraduateMedicalEducationRegulations1997.aspx>. Accessed 24 June, 2012.
9. Gitanjali B. Academic dishonesty in Indian medical colleges. *J Postgrad Med*. 2004;50:281-4.
10. RGUHS does it again, alters MBBS marks. Available: URL: http://articles.timesofindia.indiatimes.com/2006-04-25/Bangalore/27804396_1_internal-assessmenttrguhs-medical-colleges. Accessed 24 June, 2012.
11. Feldt LS, Brennan RL. Reliability. In: Linn RL, editor. *Educational Measurement*. 3rd edn. New York:Macmillan; 1989.p.105-46.
12. Van der Vleuten CPM, Scherpbier AJJA, Dolmans DHJM, Schuwirth LWT, Verwijnen GM, Wolfhagen HAP. Clerkship assessment assessed. *Med Teacher*. 2000; 22:592-600.
13. Van der Vleuten CPM, Norman GR, De Graaff E. Pitfalls in the pursuit of objectivity: Issues of reliability. *Medical Education*. 1991;25:110-8.
14. Van der Vleuten CPM, Schuwirth LWT. Assessing professional competence: from methods to programmes. *Medical Education*. 2005;39:309-17.

A Study on Non-Adherence to Medication, Self-care Practices and Health Related Quality of Life of Type-2 Diabetic Patients in Field Practice Areas of B.J. Medical College, Ahmedabad

Norma Bhanat¹, Anjali Mall², Grishma Dixit¹

¹Resident Doctor, ²Assistant Professor, P.S.M Department, B.J. Medical College, Ahmedabad, Gujarat, India

Correspondence : Dr. Anjali Mall, E mail: singhanjali2@rediffmail.com

Abstract :

Introduction : Glycemic control plays the main role in diabetes management which mainly depends upon patient adherence to the treatment plan. Accurate assessment, adherence to medications, diet care, foot care and exercise is necessary for effective management of diabetes, as non-adherence leads to development of short-term risks as well as long-term complications which declines the quality of life of diabetic patients. **Objective :** The present study was conducted to study socio-demographic profile of diabetic patients, to find out prevalence rates of non-adherence to medications, diet care, foot care, exercise among type-2 diabetic patients and to find out association between non-adherence to medication, self-care practices and health related quality of life based on five domains among type-2 diabetic patients. **Method :** A cross sectional study was conducted from October to November 2016 in field practice areas of B. J. Medical College, Ahmedabad to find out prevalence rates of non-adherence to medications, diet care, foot care, exercise among type-2 diabetic patients. Total 130 diabetic patients diagnosed since at least 1 year and age >25 years were interviewed using a predesigned schedule adapted from EQ-5D questionnaire. **Results :** High non-adherence rate was found for exercise (76.8%) followed by foot care (70.7%), medication (56.1%), blood glucose monitoring (46.9%) and diet care (25.3%). There is significant association between mobility problem and poor foot care practices ($p<0.05$); between discomfort/pain and poor foot care practices ($p<0.05$); between anxiety/depression problem and medication non-adherence ($p<0.05$). **Conclusion :** In the present study high rate of non-adherence was found and it also reflected that non-adherence patient had poor quality of life.

Key words : EQ-5D, Health related quality of life (HR-QoL), Medication, Non-adherence, Self-care practices, Type-2 diabetes

Introduction :

In current century, globalization and industrialization, has led to a paradigm shift in the patterns of disease worldwide with life-style related/chronic diseases such as diabetes becoming more prevalent. Prevalence of diabetes in India is 7.8% (males-7.9% and females-7.5%)^[1] and proportional mortality due to diabetes in India in 2016 is 2%^[1]. India has become diabetic capital of the world.^[2]

Diabetes Mellitus (DM) and its prevalence are rising rapidly all over the globe at an alarming rate. This prevalence continues to climb, because of an

ageing population and rising obesity rates across the world.

Previously a disease of the middle aged and elderly, type 2 diabetes has recently escalated in all age groups, including adolescents.^[3] This means, in developing countries most diabetic patients acquire the disease during the most productive period of lives. This will have major implications with respect to health care needs and costs as they will live up to an older age to develop chronic complications of diabetes.

It is clear that chronically ill individuals have lower mean health related quality of life (HR-QoL) when compared to healthy adults.^[4] Thus type2 diabetics

have to face many problems which may have an impact on their HR-QoL. Increasing burden of morbidity and mortality due to diabetes warrants urgent attention towards measures to control it. Because of its chronic nature and multi-organ involvement diabetes also affects the costs of treatment and quality of life both in patients and people around them.

The definition of adherence, according to the WHO is the extent to which persons' behaviour – taking medication, following a diet, and/or performing lifestyle changes – corresponds with agreed recommendations from the health care provider.^[5] Non-adherence to medication and self care among diabetic patients lead to short-term risks and long-term complications as well as declines the quality of life. This study aims to find out the association between non-adherence to self-care practices, medication and health related quality of life among type-2 diabetic patients.

Method:

A cross-sectional study was conducted during October-November 2016 in field practice areas of B.J. Medical College, Ahmedabad. Being a purposive sampling, 130 diabetic patients diagnosed since at least 1 year and age >25 years and patients who were able to give proper medication history were selected by purposive sampling method from field practice areas of B. J. Medical College, Ahmedabad.

A three – part questionnaire was designed. The first part consisted of socio demographic information and family history of diabetes. Part two contained questionnaire of self – care practices related to diabetes (Blood glucose monitoring, diet, foot care, exercise, smoking and medication) and part three consisted of the EQ-5D questionnaire (EuroQol Group, 2009).^[6] EQ-5D questionnaire has five domains – mobility, self-care, usual activities, pain/discomfort and anxiety/depression.

They were interviewed using a predesigned schedule adapted from EQ-5D (EuroQol Group, 2009) questionnaire, based on five domains after being duly informed. Patient who were unable to answer a short

list of simple questions (e.g. age, address, self care behaviour practice, medication history) were excluded.

The health care providers write subsequent date of testing on the case sheet of the patient. A patient was considered non-adherent if they missed and did not get their blood glucose monitoring done on the prescribed date.

For diet, a patient was considered non -adherent if they did not follow the recommended dietary intake and advised quantity and quality of food by their doctors.

Non-adherent to foot care was defined as, not following the basic foot care principles such as daily examination, cleaning, wearing correct size and shape shoes and cutting nails regularly.

Non-adherent to exercise was defined as not doing daily exercise <45 min/day.

Non-adherent to medication was positive if any of the following choices is present: don't observe the time of intake, change the prescribe amount and dose, change the dose according to their convenience. In addition, cross check was done by checking their prescription.

Informed consent was obtained from all respondents after full explanation of the nature, purpose and procedures used for the study.

Data analysis was done by using Microsoft Excel 2016 and appropriate statistical tests were applied.

Results:

A total of 130 diabetic patients were included in the study. Among total diabetic patients, 50.7% were male and 49.2% were females. Mean age of the patients was 56.71 ± 10.97 years.

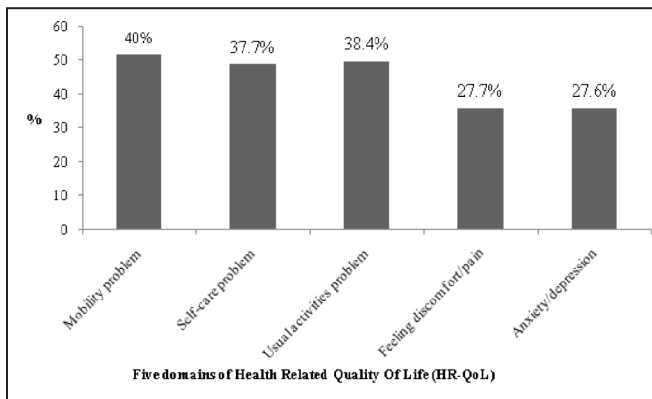
Approximately half of the patients were either illiterate or attended primary school (50.6%) followed by one fourth of the diabetic patients who are educated up to high school (26.9%). Most of the diabetic patients (66.1%) were from class III and class IV socio economic class as per modified Prasad classification (May-2016). (Table 1)

Table 1: Socio-demographic profile of diabetic patients

Variable	Frequency	Percentage
Education		
Illiterate	34	26.0
Primary school	32	24.6
Secondary school	18	13.8
High school	35	26.9
Graduate	11	08.4
Socioeconomic status*		
I	2	01.5
II	26	20.0
III	45	34.6
IV	41	31.5
V	16	12.3

*Modified Prasad classification for socio-economic status (May-2016)

Figure 1 : Profile of the Health Related Quality of Life (HR-QoL) among patients based on five domains.



In the present study 64.6% diabetic patients were overweight or obese according to WHO BMI classification 2016 while Mean BMI was 26.1 (\pm 6.7) kg/m². Figure 1 show that 40% diabetic patients were having mobility problem, 37.7% were having self-care problem, 38.4% were having problem in doing usual activities, 27.7% were having discomfort/feeling pain and 27.6% were having anxiety/depression.

Table 2: Non-adherence rate for different variables

Variables	Frequency	Percentage
Diet care	33	25.3
Foot care	92	70.7
Exercise	100	76.8
Medication	73	56.1
Regular blood glucose monitoring	61	46.9

The non-adherence rate among patients is shown in Table 2. Around 76.8% diabetic patients did not adhere to exercise. Non-Adherence to foot care was 70.7%, to diabetic medication 56.1%. Non adherence to regular blood glucose monitoring was 46.9% while 25.3% non- adhered to diet care.

Table 3 shows the relationship between levels of non-adherence to self care practices and Health Related –Quality of Life among the patients. Significant association was found between mobility problem and non-adherence to foot care practices ($p < 0.05$) and medication ($p < 0.05$). Significant association was also found between non-adherence to foot care and problem in usual activities.

Significant relationship existed between discomfort/pain and non-adherence to foot care practices ($p < 0.05$). Significant association was also found between anxiety/depression problem and exercise non-adherence ($p < 0.05$) and medication non-adherence ($p < 0.05$). Relationship between non-adherence to regular blood glucose monitoring and mobility also depicted significant difference.

A simple logistic regression analysis is presented for each of the health related quality of life in relation to socio-demographic, clinical features and adherence to self care practices (Table 4) and it was found that except adherence to foot care no other variables had effect on quality of life. The model explained 2% variability in the scores.

Table 3 : Relationship between non-adherence to self-care practices and health related quality of life (N=150)

HR - QoL	Non- adherence to				
	Diet (n=33)	Foot-care (n=92)	Exercise (n=100)	Medication (n=73)	Regular blood glucose monitoring (n=61)
Mobility					
Problem	13(40%)	47(51%)	44(44%)	36(49.3%)	30(49.2%)
No problem	20(60.6%)	45(48%)	56(56%)	37(50.6%)	31(50.8%)
χ^2/p	0.01/0.934	16.12/0.001	2.89/0.089	6.02/0.014	0.69/0.407
Self care					
Problem	13(39.3%)	44(47.8%)	39(39%)	31(42.4%)	25(41%)
No problem	20(60.6%)	48(52%)	61(61%)	42(57.5%)	36(59%)
χ^2/p	0.055/0.815	13.763/0.001	0.316/0.574	1.615/0.204	0.530/0.467
Usual activities					
Problem	17(51.5%)	44(47.8%)	43(43%)	32(43.8%)	27(44.3%)
No problem	16(48.4%)	48(52%)	57(57%)	41(56.1%)	34(55.7%)
χ^2/p	3.184/0.074	11.661/0.000	3.771/0.052	2.031/0.154	1.63/0.201
Pain/discomfort					
Problem	12(36.3%)	32(34.7%)	29(29%)	24(32.8%)	19(31.1%)
No problem	21(63.6%)	60(65.2%)	71(71%)	49(67.1%)	42(68.9%)
χ^2/p	1.661/0.197	7.902/0.005	0.370/0.543	2.235/0.135	0.685/0.408
Anxiety/depression					
Problem	11(33.3%)	27(29.3%)	32(32%)	28(38.3%)	19(31.1%)
No problem	22(66.6%)	65(70.6%)	68(68%)	45(61.6%)	42(68.9%)
χ^2/p	0.703/0.402	0.431/0.512	4.016/0.045	9.455/0.002	0.685/0.408

Discussion :

Diabetes involves multiple organs and it is chronic in nature so proper management of diabetes is needed to improve the quality of the life of the patients. Successful management depends upon the extent to which a person's adherence of keeping appointments, regular monitoring of his/her

glycemic status, taking medication and making lifestyle changes. This study was done to assess the association between non-adherence to self-care practices, medications and health related quality of life.

In present study sample size was less (130) as compared to the other studies done by Farzana Saleh

Table 4 : Logistic regression analysis of predicting variables for health related quality of life.

Health related quality of life (domains)										
Socio- demographic, clinical characteristics and self-care practices	Mobility problem		Self-care problem		Usual activity problem		Pain/discomfort		Anxiety/ depression	
	β	P-value	β	P-value	β	P-value	β	P-value	β	P-value
Sex	-0.92	0.10	-1.20	0.03	-1.30	0.02	-1.47	0.01	1.96	0.00
Education	0.08	0.87	-1.15	0.03	-0.19	0.72	-0.66	0.22	-0.73	0.17
Occupation	0.53	0.34	0.32	0.56	1.23	0.04	1.37	0.02	-1.62	0.03
Duration of having DM(years)	-0.63	0.21	-0.09	0.85	-0.61	0.21	-0.39	0.44	-0.09	0.87
Family H/O of DM	-0.83	0.06	-0.32	0.45	-0.24	0.59	0.06	0.89	-0.09	0.84
H/O having Hypertension	-0.13	0.76	-0.58	0.17	-0.73	0.09	-0.69	0.13	-0.15	0.75
Exercise	0.37	0.50	-0.27	0.62	0.68	0.22	0.05	0.94	0.86	0.20
Diet care	-0.49	0.35	-0.17	0.75	0.77	0.13	0.75	0.17	-0.19	0.73
Regular BG monitoring	-0.05	0.91	-0.58	0.23	-0.74	0.14	-0.63	0.22	0.28	0.60
Foot care	1.92	0.00	2.26	0.00	1.58	0.01	1.67	0.02	-0.74	0.25
Knowledge of DM	0.62	0.23	0.40	0.44	0.95	0.07	0.12	0.83	0.20	0.73
DM Medication	0.68	0.12	0.12	0.79	0.29	0.51	0.30	0.53	1.84	0.00
	R ² =0.21		R ² =0.20		R ² =0.21		R ² =0.16		R ² =0.22	

β = standardized regression coefficient

R²=coefficient of determination

et al in Bangladesh^[7] and Taruna Sharma et al in Dehradun, Uttarakhand.^[8]

In present study mean age \pm SD of diabetic patients was 56.71 ± 10.97 years almost similar to a study done by Farzana Saleh et al^[7].

In the present study more than half of the patients were either overweight or obese according to WHO BMI classification 2016 while the study done by Farzana Saleh et al had 78.8% patients being overweight or obese according to Asian BMI cut-off value^[7]. The present study depicts the lack of physical exercise and modern life style adaptation by diabetic patients in our study which leads to various morbidity and mortality.

In the present study non adherence to exercise and foot care was highest followed by blood glucose monitoring and diet modification. However, in the study done by Farzana et al the rate of non-adherence was very low.^[7] A study done in Uttarakhand by Taruna Sharma et al, non-adherence to diet and exercise was 31.7% and 23.3% respectively.^[8] Compared to other studies the rate of non-adherence was relatively high for different self care practices.

In present study approximately, half of the diabetic patients did not adhere to diabetic medication and did not had diabetes disease knowledge while in study done by Waleed M Sweileh in Palestine and Joan N Kaliyago et al in Uganda revealed that (42.7%) and (28.9%) diabetic patients did not adhere to medication respectively.^[9,10] A study done by Taruna Sharma et al in Dehradun, Uttarakhand revealed that 16.6% diabetic patients were non-adherent to diabetic medication.^[8] This explains there is low education level, lack of awareness and lack of disease knowledge among the participants.

In the present study 40% of the diabetic patients had problem in mobility, in self care, in usual activity and one fourth had discomfort/pain whereas a study done by Farzana Saleh et al in Bangladesh, half of the patients had problem in mobility, majority had

pain/discomfort and anxiety/depression which explains that diabetic patients those who do not adhere to diabetic medication and different self-care practices have lower quality of life.^[7]

Conclusion :

In present study non-adherence rate was reflected by poor health related quality of life based on five domains among study subjects. High prevalence for non-adherence rate was found for exercise and foot care followed by medication, regular blood glucose monitoring and diet care. Significant association was seen between non-adherence to various self care practices and health related quality of life based on five domains.

Recommendations :

Diabetic patients should be educated regarding importance of adherence to medication, exercise, diet care, and foot care practices to live healthy life. Individuals with diabetes disease should make major lifestyle changes and learn to live with regular blood glucose monitoring, taking medications regularly and dealing with complications of the disease and self care. It is recommended that all effort should be made to promote behavior change and to improve quality of life in people with diabetes. To achieve this, an appropriate, strong and effective patient education, motivation programs and patient-doctor relationship should be planned.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. WHO diabetes country profile; Available at: http://www.who.int/diabetes/country-profiles/ind_en.pdf?ua=1. Last Accessed on: 26th August, 2017.
2. Diabetes foundation of India; Available at: <http://www.diabetesfoundationindia.org/about.htm>. Last Accessed on: 26th August, 2017.
3. WHO (Geneva2003), Technical Report Series N916 – [PDF] Diet, nutrition and prevention of chronic diseases: report of a joint WHO/FAO expert consultation, Geneva, 28 January – 1 February 2002:72; Available at : <http://apps.who.int/iris>

- /bitstream/10665/42665/1/WHO_TRS_916.pdf. Last Accessed on: 26th August, 2017.
4. Bonomi AE, Patrick DL, Bushnell DM, Martin M: Validation of the United States' version of the World Health Organisation Quality Of Life (WHOQOL) instrument. *J Clin Epidemiol* 2000, 53:19-23.
 5. Christine K, David S: Diabetes. In adherence to long term therapies: Evidence for action. 1st edition. Edited by Kalpan S. Switzerland: WHO; 2003:71.
 6. EuroQol group: EuroQol – a new facility for the measurement of health related quality of life. *Health Policy* 1990, 16:199-208.
 7. Farzana Saleh, Shirin J Mumu, Ferdous Ara, Md Abdul Hafez and Liaquat Ali: Non-adherence to self-care practices and medication and health related quality of life among patients with type 2 diabetes: a cross-sectional study. *BMC Public Health* 2014, 14:31.
 8. Taruna Sharma, Juhi Kalra, DC Dhasmana, Harish Basera: Poor adherence to treatment: A major challenge in diabetes. *J IACM* 2014; 15(1):26-9
 9. Waleed M Sweileh, Sa'ed H Zyod, Rawan J Abu Nab'a, Mohammed I Deleq, Mohammed I Enala, Sana'a M Nassar and Samah W Al-Jabi: Influence of patients' disease knowledge and beliefs about medicines on medication adherence: findings from a cross-sectional survey among patients with type 2 diabetes mellitus in Palestine. *BMC Public Health* 2014, 14:94.
 10. Joan N Kalyango, Erisa Owino, and Agatha P Nambuya: Non-adherence to diabetes treatment at Mulago Hospital in Uganda: prevalence and associated factors. *Afr Health Sci*. 2008 Jun; 8(2):67-73.

A Study on Quality check on Multiple Choice Questions (MCQs) Using Item Analysis for Differentiating Good and Poor Performing Students

Jatin Chhaya¹, Hitesh Bhabhor², Jayna Devalia³, Ullas Machhar⁴, Abhay Kavishvar⁵

¹Assistant professor, Community Medicine Department, Smt B. K. Shah Medical College, Sumandeep Vidyapeeth, Waghodia, Gujarat, India

²Tutor, ⁵Associate Professor, Community Medicine Department, Government Medical College, Surat, Gujarat, India

³Tutor, Physiology Department, Smt B. K. Shah Medical College, Sumandeep Vidyapeeth, Waghodia, Gujarat, India

⁴Assistant Professor, Microbiology Department, Stem cell Therapy Institute, New civil hospital, Surat, Gujarat, India

Correspondence : Dr. Hitesh Bhabhor, E mail: hitesh1357@yahoo.co.in

Abstract :

Introduction : Single best answer MCQs (Multiple Choice Questions) are becoming a popular form of formative as well as summative assessment in educational institutes, not only but including medical field. Formation of MCQs with appropriate level of difficulty and excellent level of discrimination power is a huge task and failing in it, results in failure of test and by that we end up with poor discrimination among high and low performing students. Difficulty index (p-value) and Discrimination Indices (DI) are tools that enable us to choose appropriate MCQs while planning the assessment of students. **Method :** The cross-sectional study was conducted in the department of Community Medicine of Government Medical College, Surat in June-July 2016, with 103 medical students of third year. As a routine practice formative assessment was planned with 40 MCQs, each have 4 options with one single best response as a key answer. The MCQs were analyzed for difficulty index, discrimination index. **Result :** Analyzed item with p-value and DI showed half of the items were at appropriate difficulty level (p-value between 30% - 70%), with excellent discrimination power (>0.24) and substantial proportion of item had poor discrimination ability. Two items found to have negative discrimination value while another two had zero discrimination power. **Conclusion :** Item analysis is an excellent tool that help us in formation of proper MCQs that have average Difficulty Index (DIF) with excellent Discrimination Index (DI). Poorly formed MCQs should be revised or discarded for future assessment.

Key words: Difficulty index, Discrimination index, Item analysis, MCQs

Introduction :

“Multiple Choice Questions (MCQs)” is a common practice to assess the knowledge of the MBBS students as a class room exam and even as an entrance test for post graduation. It made up of a question and a set of options. Each question has only one correct answer and usually, right answer gets set number of marks towards total marks while wrong answer earns nothing or it will be penalized, to discourage guessing.^[1,2]

MCQs are superior over the written exam as, (1) it can be scored rapidly and (2) it provides quick result (3) it is proved efficient to assess the knowledge of

large number of students together and (4) it is also possible to test the candidates at the desired level of difficulty by varying the difficulty of questions.^[3] Written test has lots of drawback like; (1) handwriting of students is not neat and clean (2) way of presentation of students has lots of differences (3) supplementary use is very high as compared to MCQs to evaluate status of children's knowledge and (4) teachers' appreciation over written answer is quite different.^[4] Bloom's taxonomy also mention that well framed MCQs are able to access cognitive domains such as analysis, synthesis and application of knowledge, instead of just remembering isolated information.^[5]

The purpose of MCQs is to differentiate students into good and poor performing students. So it becomes utmost important that quality of MCQs is also maintained at high standard, because poorly framed MCQs may be confusing evaluation tools, and it affects performance of high ability students.^[6] So, before giving MCQs for formative or summative assessment it is good to find out that; (1) How much are you sure that the MCQs are appropriate level of difficulty? (2) How will you know that the test efficiently separates between students who do well on the overall test and those who do not?

The long term objective of this study was to frame good quality of MCQs to set up a question bank for reference in future.

Method:

As a routine practice, formative assessment of 103 students of 3rd year part I MBBS was held in the subject of Community Medicine at the Department of Community Medicine, Government Medical College, Surat, Gujarat. There were 40 MCQs, each have 4 options with one single best response as a key answer. One mark was awarded for each correct answer and there was no penalty (negative markings) for incorrect response. The time allotted was one minute for each MCQ. Students were instructed that any discussion or otherwise inappropriate communication between them was not accepted. After the completion of exam, answer sheets were checked and data was entered in to excel sheet. Score of the students set in highest to lowest order. Afterward, the 27% of the students at the top and the 27% at the bottom were separated for the analysis, which was called high and low achieving students respectively.

Item Analysis was used to analyze:^[7-9]

- **Difficulty index (DIF or p-value):** It was also called ease index, and used to determine whether the item was of suitable level of difficulty for the batch of students tested. It ranges between 0 and 100%. Difficulty index was a misnomer as bigger was the value, easier was the item and vice versa.

$$p \text{ value} = [(H + L)/N] \times 100$$

Where, H - Correct response given by high performing students

L - Correct response given by low performing students

N - Total number of students in both groups

Interpretation of p-value as under:

- p-values > 70% - very simple questions.
- p-values < 30% - very hard items.
- p-value is between 30% to 70% - average items.
- **Discrimination index (DI):** It described the capability of a question to discriminate between students of good and poor performing. It ranged between 0 and 1. Higher the value of DI, question was more proficient to discriminate between students of higher and lower abilities.

$$DI = 2 \times [(H - L)/N]$$

Where, H - Correct response given by high performing students

L - Correct response given by low performing students

N - Total number of students in both groups

Interpretation of discrimination index was as under:

- 0.35 or higher - Excellent discrimination ability
- 0.25 to 0.34 - Good discrimination ability
- 0.15 to 0.24 - Marginal discrimination ability
- < 0.15 - poor items

Ethical consideration: ethical permission for the study was not taken from the institute. Our study was insight to change assessment of students and no any harmful technique was required to complete entire study.

Results:

A total of 103 students appeared in the formative assessment which consisted of 40 - single best

Table 1 : Descriptive analysis of 40 one-best answer MCQs

Sr no	Item description	Values
1	Total number of students	103
2	Total MCQs	40
3	Minimum score obtained for correct answer	10
4	Maximum score obtained for correct answer	33
5	Total mean score achieved	23 ± 4.52
6	Mean score of higher achieving students	28.5 ± 1.91
7	Mean score of low achieving students	17.57 ± 2.42
8	Mean of difficulty Index (DIF)	57.62 ± 25.14
9	Mean of discrimination Index (DI)	0.27 ± 0.22

Table 2 : Difficulty index and discrimination index of the 40 one-best respond MCQs

Q. No.	p-value	DI		Q. No.	p-value	DI
1	34	0.39		21	52	0.54
2	36	0.00		22	88	0.04
3	61	0.50		23	39	0.00
4	29	0.21		24	34	0.61
5	71	0.36		25	82	0.36
6	96	0.07		26	93	0.07
7	41	0.6		27	57	0.25
8	39	0.14		28	63	0.46
9	14	0.21		29	41	0.61
10	11	-0.07		30	80	0.32
11	91	0.11		31	50	0.50
12	57	0.57		32	84	0.11
13	41	0.39		33	91	0.11
14	63	0.32		34	16	0.04
15	61	0.79		35	59	0.39
16	64	0.21		36	91	0.11
17	75	0.36		37	91	0.11
18	16	0.25		38	59	0.46
19	18	-0.29		39	88	0.11
20	63	0.39		40	66	0.25

Table 3 : Assessment of 40 MCQs based on Difficulty index

Difficulty index	No.	%	Action
> 70% (too easy)	13	32.5	Revised/ Discard
30% - 70% (average difficulty)	21	52.5	Store
< 30% (too hard)	6	15	Revised/ Discard
Total	40	100	-

Table 4 : Assessment of 40 MCQs based on Discrimination index

Discrimination Index	No	%	Action
≥ 0.35 (Excellent discrimination)	17	42.5	Store
0.25 - 0.34 (Good discrimination)	5	12.5	Store
0.15 - 0.24 (Marginal discrimination)	3	7.5	Revised/ Discard
<0.15 (Poor discrimination)	15	37.5	Revised/ Discard
Total	40	100	

Table 5 : Inter-relationship of difficulty index and discrimination index for 40 one-best respond MCQs

Discrimination Index	Difficulty Index		
	too hard	average	too easy
$D < 0.00$	2 (revise/ discard)	2 (revise/ discard)	0 (revise/ discard)
$0 < D < 35$	4 (revise/ discard)	5 (store)	10 (revise/ discard)
$D \geq 35$	0	14 (store)	3 (store)

response from the subject of community medicine. Descriptive analysis for each item consist of range of correctness, mean score in upper, middle and lower group, mean of DIF and DI given in table 1.

(Table 2) The p-value and DI were calculated for each MCQ. Question no. 10 and 19 has negative discrimination value while question no. 2 and 23 has zero or no discrimination ability.

(Table 3) The difficulty index was worked out and it showed that 52.5% of question had moderate or average difficulty index (30% - 70%). It also revealed that 15% of MCQs were too much hard while 32.5% MCQs were considered too easy.

(Table 4) Out of 40 MCQs, 22 had excellent to good

discrimination ability, while 18 had marginal to poor discrimination ability.

(Table 5) The inter-relationship of the two index revealed that 22 (55%) items were 'perfect' having a p-value from 30 to 70, as well as a DI > 0.24.

Discussion:

One correct response out of many type of MCQ is most efficient tool for formative assessment of medical students; however this competence exclusively depends on quality of MCQ. Properly constructed multiple choice questions assess higher-order cognitive processing of Bloom's taxonomy such as interpretation, synthesis and application of knowledge, instead of just testing recall of isolated

facts.^[5] Poorly framed MCQs were not able to distinguish students who performed well from their counterpart and our test became a failure attempt. Item analysis is one of that tools that would protect us from that failure. Tarrent and Ware also validated that flawed MCQ items affected the performance of high-achieving students more than borderline students.^[10]

In the present study, the mean p value was 57.62 ± 25.10 , which was in the range of excellent level of difficulty (p=30 to 70 %). Our finding was corroborative with that of Mukherjee P and Mehta G who reported mean p value of 61.92 and 63.06 respectively.^[11,12] However few studies have reported lower mean p values.^[13,14]

DI is ability of item to distinguish between students of higher and lower abilities. Noteworthy, more difficult questions were answered incorrect by every student and too easy question answered correct by each student. So this type of questions has no discrimination power and we have to remove such type of questions from the test. Add to that, the question with negative discrimination index produce inverse result that it can be answer right by poor performing student and wrong by good performing student. Wrong answer key, vague framing of questions or generalized poor preparations of students are most responsible explanation for negative discrimination index. Further, item of having zero DI that means either it answered right by all or answered wrong by all, needs to be removed from assessment.

The mean DI found in this study was 0.27 ± 0.20 which is considered practically well, yet considerable proportion of items (47.5%) had poor DI. Earlier studies of Mukherjee P and Hingorjo MR reported mean of DI 0.31 ± 0.27 and 0.46 ± 0.08 respectively.^[11,15]

One study in our literature reported lower mean DI of 0.14 ± 0.19 .^[8] Items with DI > 0.35 were 42.5%, DI between 0.25 and 0.34 were 10%, DI 0.15 - 0.24 were 10% and DI <0.15 were 37.5%, which shown that almost 47.5% of MCQ in our study need to be

revised. Earlier study of Hingorjo MR^[15] reported, items with DI > 0.35 were 62%, DI between 0.25 and 0.34 were 14%, DI 0.15 - 0.24 were 12% and DI <0.15 were 12% (24% of MCQ need to be revised). Two items (4%) in our study had negative DI and two items (4%) had zero DI. Few studies reported higher proportion of negative DI.^[11,13,15]

We found 22 items (44 %) to be 'ideal' having a good p value (30 to 70%), as well as good to excellent DI (≥ 0.25). Hingorjo MR^[15] found 32 items (64%) as ideal having a p - value from 30 to 70, as well as a DI > 0.24. Other researchers have reported 24%, 30% and 46% items to be ideal in their studies.^[11-13]

Conclusion :

Items analyzed in the study showed that half of the items in assessment tool had poor or marginal discrimination power and half items had average difficulty level with excellent discrimination index. Results from this study highlighted the importance of item analysis. Items having average difficulty and excellent discrimination should be incorporated into forthcoming tests. This would also improve the general test score and appropriately discriminate among the students

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. Cizek GJ, O'Day DM. Further investigations of nonfunctioning options in multiple-choice test items. *Educ Psychol Meas* 1994; 54(4):861-72.
2. Skakun EN, Nanson EM, Kling S, Taylor WC. A preliminary investigation of three types of multiple choice questions. *Med Educ* 1979;13:91-6.A
3. Khan M-Z, Aljarallah BM. Evaluation of Modified Essay Questions (MEQ) and Multiple Choice Questions (MCQ) as a tool for Assessing the Cognitive Skills of Undergraduate Medical Students. *International Journal of Health Sciences*. 2011;5(1):39-43.
4. McAllister, D., and Guidice, R.M. (2012). Advantages and Disadvantages of Different Types of Test Questions. *Teaching in Higher Education*, 17 (2),193-207. [internet] Available from: <https://www.facultyfocus.com/articles/educational-assessment/advantages-and-disadvantages-of-different-types->

- of-test-questions/
5. Carneson J, Delpierre G, Masters K. Designing and managing MCQs: Appendix C: MCQs and Bloom's taxonomy. (Online) 2011 (Cited 2017 Sep 2). Available from URL: <http://web.uct.ac.za/projects/cbe/mcqman/mcqappc.html>.
 6. Christian DS, Prajapati AC, Rana BM, Dave VR. Evaluation of multiple choice questions using item analysis tool: a study from a medical institute of Ahmedabad, Gujarat Int J Community Med Public Health 2017;4:1876-81.
 7. Item difficulty item discrimination. [Internet] [cited 2017 July 5]. Available from: <http://www.omet.pitt.edu/docs/OMET%20Test%20and%20Item%20Analysis.pdf>
 8. Varma S. Preliminary item statistics using point-biserial correlation and p-values. [Internet] [cited 2017 July 6]. Available from: http://www.eddata.com/resources/publications/EDS_Point_Biserial.pdf
 9. Bhoopatiraj C, Chellamani K. Analysis of test items on difficulty level and discrimination index in the test for research in education. IRJC 2013; 2 (2):189-93.
 10. Tarrant M, Ware J. Impact of item-writing flaws in multiple-choice questions on student achievement in high-stakes nursing assessments. Med Educ 2008; 42: 198-206.
 11. Mukherjee P, Lahiri SK. Analysis of Multiple Choice Questions (MCQs): Item and Test Statistics from an assessment in a medical college of Kolkata, West Bengal. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 14, Issue 12 Ver. VI (Dec. 2015), PP 47-52
 12. Mehta G, Mokhasi V. Item analysis of multiple choice questions - an assessment of the assessment tool. Int J Health Sci Res. 2014;4(7):197-202.
 13. Gajjar S, Sharma R, Kumar P, Rana M. Item and test analysis to identify quality multiple choice questions (MCQS) from an assessment of medical students Ahmedabad, Gujarat. Indian J Community Med 2014; 39:17-20.
 14. Karelia BN, Pillai A, Vegada BN. The levels of difficulty and discrimination indices and relationship between them in four response type multiple choice questions of pharmacology summative tests of year II MBBS students. IeJSME 2013; 7(2): 41-6.
 15. Hingorjo MR, Jaleel F. Analysis of One-Best MCQs: the Difficulty Index, Discrimination Index and Distractor Efficiency. J Pak Med Assoc; Vol. 62, No. 2, February 2012: 142-147.

A Study on Impact of Radiotherapy on Functional and Radiological Changes on Irradiated Lung in Breast cancer Patients

Abhay Javia¹, Pradeep Pithadia², R. Paliwal³, Dipesh V. Parmar⁴

¹Consultant Pulmonologist, Sterling Hospital, Rajkot, Gujarat

²Assistant Professor, ⁴Professor and Head, Department of Community Medicine, M P Shah Govt. Medical College, Jamnagar, Gujarat

³Professor, Department of TB and Chest, Pramukh Swami Medical College, Karamsad, Anand

Correspondence : Dr. Pradeep Pithadia, E mail: pradeep280683@gmail.com

Abstract:

Introduction : The invention of therapeutic use of radiation in various carcinomatous lesions lead to injuries of adjacent normal tissues, especially radiation induced fibrosis after administration of radiotherapy in patients of carcinoma breast. **Objectives** : The present study aims to find out prevalence of radiation induced fibrosis and evaluate impact of radiation therapy on functional and radiological parameters of pulmonary tissues in patients of carcinoma breast using spirometry and HR CT scan. **Method** : A total of 38 patients of carcinoma breast were evaluated with subsequent follow-up visits after administration of radiotherapy to assess changes in physiological function, type of radiological reaction etc. **Results** : The prevalence of radiation induced fibrosis in carcinoma breast patients was 13.16% with majority (80%) of cases with apical lateral involvement of lung tissue. Moreover, frequency of radiation induced fibrosis is directly proportional to mean lung dose and percent irradiated lung volume.

Key Words : Breat Cancer, Irradiation, Lung, Radiotherapy

Introduction :

Carcinoma breast has been ranked number one cancer among Indian women with age incidence and mortality rate as high as 25.8 and 12.7 per 1 lakh women. Better awareness and availability of modern diagnosis and treatment facilities would cause a favorable clinical picture in the country.^[1]

Radiotherapy is believed to reduce mortality and improve life expectancy of carcinoma breast patients. Studies on meta-analysis revealed that there was little effect of radiotherapy on early deaths, but for later deaths, analysis observed reduced annual mortality rates from carcinoma breast.^[2]

The success of radiotherapy hinges on delivering radiation selectively to the sites of malignancy while sparing the adjacent normal tissues. Although radiotherapies are carefully planned to include the smallest possible amount of healthy tissue, some normal tissues surrounding malignancy are irradiated, which result in symptomatic injury.^[3] For

example, the lungs are particularly radiosensitive and are susceptible to radiation pneumonitis and fibrosis.^[4] Therefore, the total dose that can be safely be delivered to patients with tumors in the thoracic cavity has to be limited because of risk of these complications.

In community medicine perspective, it is essential to know effect of radiation on adjacent tissues especially highly sensitive tissues like lungs in patients of carcinoma breast. Dose and duration of radiotherapy in carcinoma breast patients are predictors of structural and functional damage to pulmonary tissues in form of radiation pneumonitis and pulmonary fibrosis and knowledge of it can be useful in prevention of such conditions.

In this study, we tried to evaluate lung injury in the patients requiring post-mastectomy radiation therapy (PMRT). Routinely in PMRT underlying lung gets involved. We quantified the changes in lung physiology using pulmonary function tests and

anatomical changes using radiologic investigations (Chest X ray and HRCT Imaging).

Aims and Objectives :

1. To determine the changes in lung functions (detected by spirometry) 0-12 months after treatment for breast cancer with radiotherapy alone or radiotherapy in combination with chemotherapy.
2. To determine the pre and post radiation (0-12 months) anatomical changes in the lungs (detected radiologically)
3. To determine safe dose-response relationship between radiotherapy dosage and lung function.

Method:

It was a prospective observational study including all patients aged 18 years or more having ductal carcinoma in situ or stage I to III invasive carcinoma, who require adjuvant radiation therapy using 3D CT technique to the breast or chest wall (2-field radiotherapy [2FRT]) with or without supraclavicular/post-axillary boost (4-field radio-therapy [4FRT]), to 50.4 Gy in 28 fraction lung DVH parameters (V10, V20, V30, V40).

Baseline investigations were carried out and relevant data collected before administration of radiation therapy (visit 0). Then, these patients were followed-up at 3, 6, 9 and 12 months after completion of radiation therapy.

We excluded patients suffering from bronchial asthma, or other lung diseases like active tuberculosis, lung cancer, cystic fibrosis, lung resection, presence of lung infiltrates or metastasis before initiation of radiation therapy.

We included all patients diagnosed with Carcinoma breast attending OPD between January 2007 to December 2009 at TB and Chest Department, P.S. Medical College, Karamsad, Gujarat, and found 44 cases eligible for our study. Of these, 6 patients were excluded (2 having incomplete treatment, one shifted to another district, and 3 lost

to follow-up as they were NRIs). So, we have 38 patients remaining in our study.

Spirometry was done at baseline and 3, 6, 9 and 12 months after radiotherapy using Cosmed Pony FX Spirometer. FEV1, FVC and FEV1/FVC ratio were measured. Parameters were expressed in percentage of the predicted normal values (adjusted for age, sex, height & weight) as well as in absolute values.^[5] PEF was measured using pulmopeak peak flow meter and was expressed in L/min.

Ethical Clearance :

The study was approved by institutional ethical committee of P.S. Medical College, Karamsad.

Prospective clinical evaluation of pulmonary fibrosis:

All patients were regularly checked at 3, 6, 9 and 12 months after completion of treatment. All the patients were then classified into 3 groups. (a) No reaction: no registered respiratory symptoms. (cough with /without dyspnea, fever), (b) Slight reaction: respiratory symptoms caused by radiotherapy but not treated with corticosteroids and (c) Severe reaction: same as 2 but treated with corticosteroids.

Prospective evaluation of chest radiograph :

X-ray chest was done at baseline and 3, 6, 9 and 12 months after radiotherapy and Chest X-ray findings were divided into four grades viz., grade 1 – Linear streaks, grade 2 – Patchy consolidation, grade 3 – Confluent consolidation and grade 4 – Atelectasis. The untreated side was used as a control and also information from pre-treatment chest x-ray and CT chest were collected.

Prospective evaluation of HRCT chest :

High Resolution CT (HRCT) chest was done at baseline and 6 and 12 month following the radiotherapy. The lung density on the treated side was examined using the standard lung window. An increase in density was graded according to a CT –adapted modification of Arriagada's classification i.e., 0 = no change, 1 =low opacity in

Table 1 : Demographic characteristics of study participants (n=38)

Charact eristics	N (%)
Mean age in Years (Range)	50.13 (33-76)
Sex	
Male	2 (5.26)
Female	36 (94.74)
Site of involvement	
Right	23 (60.53)
Left	15 (39.47)
Chemotherapy Received	
Yes	37 (97.37)
No	1 (2.63)
Hormonal therapy Received	
Yes	29 (76.32)
No	9 (23.68)

Table 2 : Changes in pulmonary function in follow-up visits after radiotherapy

Parameters	V0	V3	V6	V9	V12
Average FVC	100.79	100.06	100.61	101.68	103.35
Average FEV 1	98.30	98.80	98.59	100.10	101.58
Average FEV 1/FVC ratio	104.21	104.95	103.88	104.49	104.67
Average PEFr	385.52	383.42	381.56	377.72	374.28

(FVC=forced vital capacity, FEV1=forced expiratory volume at 1 second, PEFr= peak expiratory flow rate)

linear streaks, 2 = moderate opacity and 3 = complete opacity.^[6] The lung was also divided into three regions suggested by Arriagada. i.e. Apical-Lateral (A-L), Central-Perihilar (C-P) and Basal-Lateral (B-L).

Before starting of radiotherapy the average baseline FVC of the patients was 100.79%. Change in FVC after 3, 6, 9 and 12 months of completion of radiotherapy was - 0.73%, - 0.18%, + 0.89% and +

2.56% respectively. Before starting of radiotherapy the average baseline FEV1 of the patients was 98.30%. Change in FEV1 after 3, 6, 9 and 12 months of completion of radiotherapy was + 0.5%, + 0.29%, + 1.8% and + 3.28% respectively.

The average baseline FEV1/FVC ratio was 104.21. Change in FEV1/FVC ratio after 3, 6, 9 and 12 months of completion of radiotherapy was + 0.74, - 0.33, +

Table 3 : HRCT changes of lungs according to arriagada's classification

Arriagada's classification	V 0	V 2	V 4
No reaction	38	27	12
Slight reaction	0	5	2
Moderate reaction	0	0	0
Severe reaction	0	0	0

Table 4 : Radiation field and HRCT changes in patients diagnosed with radiation fibrosis (n=5)

Patient No.	Radiation field	Chest Region involved	Radiation
1	Chest wall +Axilla +SCL region	A - L , B -L	Slight
2	Chest wall +Axilla +SCL region	A - L	Slight
3	Chest wall +Axilla +SCL region	A - L	Slight
4	Chest wall +Axilla +SCL region	B - L	Slight
5	Chest wall +Axilla +SCL region	A - L	Slight

Table 5 : Relationship between radiation fibrosis and percentage irradiated lung volume (PIV)

Mean lung dose (Gy)	Total patients exposed N (%)	Total patients developing Radiation fibrosis N (%)
≤ 5	3 (7.9)	1(33.33)
5.1 - 10	8 (21.05)	0 (0.00)
10.1 - 15	19 (50.00)	3 (15.78)
15.1 - 20	8 (21.05)	1 (12.5)
Total	38 (100)	5 (13.16)

Table 6 : Relationship between radiation fibrosis and mean lung dose

PIV (%)	No. of patients exposed N(%)	No. of patients developing Radiation fibrosis N (%)
< 5	2 (5.3)	0 (0.00)
5 - 9.9	8 (21.1)	1 (12.5)
10- 14.9	7 (18.4)	1 (14.28)
15- 19.9	20 (52.6)	3 (15.0)
≥ 20	1 (2.6)	0 (0.00)
Total	38 (100)	5 (13.16)

0.28 and + 0.46 respectively. The average baseline PEFr was 385.52 L/min. subsequently it was reduced 2.1 L/min, 3.96 L/min, 7.8 L/min and 11.14 L/min after 3, 6, 9 and 12 months of completion of radiotherapy respectively.

There is no any statistically significant reduction in pulmonary function after 12 months of completion of radiotherapy. (P value for FEV1 is 0.96, for FVC is 0.96, for FEV1/FVC ratio is 0.98 and for PEFr is 0.92.)

Prior to initiation of radiotherapy all the patients had normal HRCT (not showing any signs of fibrosis, infiltration or consolidation). On subsequent follow up, 5 patients identified as having radiation induced fibrosis. According to Arriagada's classification all 5 patients had slight radiological reaction.

In two patients, HRCT after six months of completion of radiotherapy showed few linear streaks in the apical region which was cleared on subsequent follow up at 12 months after radiotherapy which is suggestive of either allergic or infective in origin. These findings were not consistent with radiation induced lung damage.

Out of 5 patients with radiation fibrosis 3 patients had fibrotic reaction in apical region (A - L) consistent with the axillary and supraclavicular radiation field, whereas one patient had lesion in both A-L and B-L region. One patient had lesion only in B-L field.

The percentage of irradiated lung volume ranged from 3.2% to 20.05% with average PIV is 13.63% and median is 15.79%. Frequency of radiation induced fibrosis is increased with increase in PIV.

The Mean lung dose range from 2.9 to 20.0 Gy with average mean lung dose 11.76 Gy. Frequency of radiation fibrosis increases with increase in Mean Lung Dose. (Table No. 6)

Discussion:

Classic radiation pneumonitis is characterized by chronic cough, fever, and nonspecific infiltrates within the irradiated lung. It generally appears 4 to 9 months after completion of treatment. Its incidence is 1% to 2% after Whole breast irradiation.^[7,8] In a

study, 21% patients developed radiation induced symptoms.^[9] Whereas as per another study, 14.6% patients developed radiation pneumonitis.^[10] Our study reported prevalence of radiation induced pneumonitis as 13.16% which is at par with other studies.

There is no statistically significant change in pulmonary function parameters as assessed by spirometry like FEV1, FVC and FEV1/FVC ratio in follow-up visits after administration of radiotherapy. All the PFT parameters decreased at 6 to 12 months, but then recovered to almost their previous normal values. These findings correlated with a study having similar findings.^[11] In a study, the median-matched vital capacity (VC), forced expiratory volume in one second (FEV1), and total lung capacity (TLC) were reduced 15%, 9%, and 7%, respectively, at the long-term follow-up ($p < 0.001$).^[12]

Our study observed that most of the subjects (80%) had pulmonary abnormalities as grade-1 (slight radiological reaction showing few linear streaks in apical lung region as per HRCT findings. A study showed that at 3 months after RT, the pulmonary changes were classified at HRCT as follows: 91.8 % were Grade 0, 8.19 % Grade 1, and 0 % Grade 2. At 6 months, 86.98 % were Grade 0, 11.47 % Grade 1, and 1.6 % Grade 2. At 12 months, 88.52 % were Grade 0, 9.19 % Grade 1 and 3.27% Grade 2.^[13]

A study concluded that radiological abnormalities detected on CT images and scored according to the CT adapted modification of Arriagada's classification system can be used as objective endpoints for RT-induced pulmonary complications in breast cancer.^[14] Minimal HRCT findings were evident in half of the patients as per a study including small septal lines, linear and sub-pleural opacities and to a lesser extent, focal-ground glass opacification.^[15]

Conclusion:

We observed 13.16% prevalence of radiation induced lung fibrosis (slight radiological reaction, as per Arriagada classification) in patients of Carcinoma breast who received radiotherapy, majority of them

(80%) having involvement of apical lateral region. There is no change in pulmonary function parameters like FVC, FEV1 and FEV1/FVC ratio except PEFr which decreases in subsequent follow-up visits after radiotherapy. We also observed that frequency of radiation induced fibrosis increases with increase in PIV and mean lung dose.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Malvia S, Bagadi SA, Dubey US, Saxena S. Epidemiology of breast cancer in Indian women. *Asia Pac J ClinOncol.* 2017;13(4):289-295. Available on <https://www.ncbi.nlm.nih.gov/pubmed/28181405>. Last accessed on July 04, 2018.
2. Kurtz JM. Favourable and unfavourable effects on long-term survival of radiotherapy for early breast cancer: an overview of the randomised trials. *The Lancet.* 2000; 355 (9217):1757-1770. available from <https://www.sciencedirect.com/science/article/pii/S0140673600022637>. Last seen on 4thjuly, 2018.
3. Helen BS, C. Norman Coleman, Mitchell S Anscher, William H MccBride. Effects of radiation on normal tissue: Consequences and mechanisms. *The Lancet Oncology.*2003;4(9):529-536.
4. Charles B, Simone MD. Thoracic radiation and normal tissue injury. 2017;27(4):370-377. Available from www.sciencedirect.com/science/article/pii/S1053429617300401. (last seen on October 30, 2017).
5. Fajardo LF, Berhrong M. Radiation injury in surgical pathology. *Am J SurgPathol.* 1978;159(2).
6. Arriagada R, Ladron DG, Mouriessse H, Hanzen C, Couanet D, Ruffle P. Limited small cell lung carcinoma treated by combined radiotherapy and chemotherapy: evaluation of a grading system of lung fibrosis. *RadiotherOncol.* 1989;14:1-8.
7. Lingos TI, Recht A, Vicini F, et al: Radiation pneumonitis in breast cancer patients treated with conservative surgery and radiation therapy. *Int J RadiatOncolBiolPhys* 21:355-360, 1991
8. Lind PA, Marks LB, Hardenbergh PH, et al: Technical factors associated with radiation pneumonitis after local +/- regional radiation therapy for breast cancer. *Int J RadiatOncolBiolPhys* 52:137- 143, 2002
9. Marks LB, Munley MT. Physical and biological predictors of changes in whole lung function following thoracic irradiation.
10. Taghian AG, Assaud SI. Risk of pneumonitis in breast cancer patients treated with radiation therapy and combination with paclitaxel. *J Natl Cancer Inst* 2001.
11. Jaen J, Vazquez G, Alonso E, Leon A, Guerrero R, Almansa JF. Changes in pulmonary function after incidental lung irradiation for breast cancer: A prospective study. *Int J RadiatOncolBiolPhysi.* 2006;65(5);1381-88.
12. Blom Goldman U, Svane G, Anderson M, Wennberg B, Lind P. Long term functional and radiological pulmonary changes after radiotherapy for breast cancer. *ActaOncol.* 2014;53(10);1373-79.
13. Fragkandrea I, Kouloulis V. Radiation induced pneumonitis following whole breast radiotherapy treatment in early breast cancer patients treated with breast conserving surgery: A single institution study.
14. Kallol Bhadra, PatraNiladri, Amitabh Manna, ApurbaKabasi, Jayanta Pal, Shyamal K. Sarkar. Abnormalities by pulmonary regions studies with CT and clinical correlation following loco-regional radiotherapy for breast cancer. *South Asian J Cancer.* 2013;2(1):21-25.
15. Plantaniotis GA, Theofanopoulou ME. High resolution CT findings on lung of early breast cancer patients treated by post-operative breast irradiation with a hypofractionated radiotherapy schedule. *Indian J Cancer.* 2005; 42(4):191-6.

Assessment of Knowledge and Skill of Counseling among Counselors of Sexually Transmitted Disease (STD) Urban Project

Bansari Chawada¹, Jayendra kumar Kosambiya², Vipul Chaudhari³

¹ Assistant Professor, Department of Preventive & Social Medicine, Medical College Baroda, Vadodara , Gujarat, India

² Professor (Additional), ³ Assistant Professor, Department of Community Medicine, Government Medical College, Surat, Gujarat, India

Correspondence : Dr. Jayendra kumar K Kosambiya, E mail: jkkosambiya@gmail.com

Abstract :

Introduction : Counselors in STI clinic have roles of educating and counseling for clients of STI clinic. They can help in prevention of STI by their counseling services among attendees of STI clinic. Current study was done to assess pre defined micro- macro counseling skills and knowledge practice gap among counselors working with STI project of city. **Method:** Total 25 counselors working at STI clinics of Urban Health Centers were observed and interviewed for their skill assessment. To assess counseling skills, counselors were observed in a session of counseling with real STI patient. Counseling was rated based on the performance of skill ranges from Worst, Very Poor, Poor, Average, Good and Excellent. Counselor then interviewed to assess their knowledge. **Result:** Majority of the counselors had average and good rate for micro and macro component of counseling. Wide gap of knowledge and practice was noted for use of Information Education and Communication tool and risk assessment. All counselors could mention risk group population for STI/HIV, but only 60% practiced risk assessment in a new diagnosed case of STI. All counselors were able to describe condom as component of STI prevention but 76% actually talked regarding condom in counseling session. Around 92 % of the counselors could introduce investigator's presence during the session to the client. **Conclusion:** There is definite knowledge practice gap among counselors of the urban project. Counselors were having satisfactory micro – macro skills for counseling, but core component of STI like risk assessment and condom promotion were lacking in practice.

Key Words : Counselor, Counseling, STD, STI

Introduction :

'SMC STD Care Project' was introduced in the year 2002 with the objective of providing Sexually Transmitted Infections(STI) services in the city through Urban Health Centers (UHC). Under this project, STI services are integrated with existing urban health set up consist of 43 UHCs/ Maternity Homes and a Medical College and hospital.^[1] Initially the project was executed in 25 UHC clinics and eventually all the UHCs were included for providing services of STI under the project. It was a unique joint venture of Surat Municipal Corporation (SMC) and National AIDS Control Organization (NACO) through state society. Since then SMC keep up the promise to deliver services as sustainable model of health

service delivery. Currently the project gets funds from RCH services of Government of Gujarat.

This project enrolled a new cadre of counselors, who were given job of educating & counseling clients of STI clinic. A counselor is a motivated, paid female or male with a minimum level of education background with Master in psychology or sociology. A counselor is a person trained in the particular skills for the given job. Research has already proved that counseling reduces the occurrence of STDs; increases concern for sexual partners and increases knowledge about use of condoms.^[2] Counselors can help in prevention of STI/HIV by their counseling services among beneficiaries of STI clinic.

Counseling is a confidential dialogue between a client and a counselor aimed at enabling the client to cope with stress and take personal decisions. Counseling has become one of the core services for the prevention, treatment and care for STIs and diseases like HIV/AIDS. Counseling involves a series of sessions as well as follow-up. It can be done in any location that offers peace of mind and confidentiality for the client. Counselor's work via their counseling skills can help a lot for prevention of STI/HIV transmission in this urban area. As counseling is one of the main cornerstones to provide education to clients and prevent further infection like STI, it is necessary to assess the comfort and communication skills of counselors.

The present study was undertaken with the objective of assessing the counseling skills and knowledge-practice gap among counselors working at urban project of city. Study also notes variety of technical issues and practices observed during counseling.

Method :

Ethical permission from the institute was obtained after getting written permission from Commissioner for observation and data collection. Study objectives were discussed with project staff including counselors before data collection. The investigator had received training on counseling components and skills by Center for Operations Research and Training(CORT) – STRC center, Vadodara supported by Gujarat State AIDS Control Society (GSACS).

Sampling: Initial 25 UHCs which were originally started with the project were selected for evaluation as it was expected that these clinics would be better performing units after 10 years of continued services and there would be no other barriers for STI services like availability of clinician, drugs and lab services. These clinics were selected due to better resources availability and having reasonably good STIs client

load. This type of sampling would give the best possible information on counseling skill. All 25 counselors working at UHC - STI clinic were observed and interviewed for their skill assessment. Their knowledge regarding counseling and counseling skills was assessed in two phases for each clinic. First phase was observation based in which counseling skill of the counselor was observed during a session with newly diagnosed STI patient. In second phase, counselors were interviewed to assess their knowledge about counseling skills.

Data Collection: Selected UHCs were visited for real time data collection. New case of STI diagnosed by UHC clinician was followed from clinician throughout counseling. One counseling session was observed at counseling room per clinic. No interference was made during ongoing counseling session. Clinic attendees were contacted at clinic exit and referred back to cover deficient counseling components and treatment if found any. After observing the STI client counseling session, the counselor was interviewed with semi-structured questionnaire to assess knowledge regarding STI counseling and to explore barriers of its care components.

Data collection Tool: The counseling was observed for pre-defined domain of counseling skills. [3] The domains were classified as rapport building, macro-component and micro-components of counseling. Macro components included whether they discussed safe practices and preventive measures, comfort in talking about sex and sexuality, checking comprehension, observation of clients' verbal/non verbal commands to assess satisfaction and condom demonstration. Domains of micro components included ensuring privacy and confidentiality, tone and language, sensitivity in asking question, adequate time given to understand and answer the question, paraphrasing and rephrasing, able to keep conversation alive, demonstrating empathy and concern, encouragement to availing services, giving hope,

Results:

Table 1 : Profile of Counselors working at STI clinic

Parameter	Groups	Frequency (n=25)
Age in completed years	Less than 30	5 (20 %)
	30-40	13 (52 %)
	40-50	7 (28 %)
Mean age = 35.32 years, Median age = 35 years, Mode = 43 years		
Sex	Male	16 (64 %)
	Female	9 (36 %)
Experience in STI counseling (in years)	More than 10	11 (44 %)
	5-10	7 (28 %)
	Less than 5	7 (28 %)
Duration of work in the same UHC (in years)	More than 5	16 (64 %)
	1-5	8 (32 %)
	Less than 1	1 (4 %)
Comfort in counseling for different clients as per responses of Counselor (Separate response for each category were collected)	With opposite sex clients	25 (100 %)
	With clients of all age group	25 (100 %)
	With clients of all language	21 (84 %)
	With clients of core group	20 (80 %)

listening attentively and actively. A score based tool was prepared to measure these defined skills. Each of the domains of counseling skill was assessed with Likert scale ranging from Worst, Very Poor, Poor, Average, Good and Excellent. Score 0 denotes Worst, 1 denotes "Very poor" 2 denotes "Poor", 3 denotes "Average", 4 denotes "Good" and 5 denotes "Excellent". Investigator rated these score while observing counseling session.

Table 1 describes the profile of counselors included in the study. Among the counselors, 62 % were males. Approximate half of (52%) the

Counselors were in age group 30 to 40 years followed by 28% in 40-50 age group and 20% in 20-30 age group. Less than half (44%) of the Counselors were engaged in STI counseling for more than 10 years followed by 28 % for 5 to 10 years and 28 % was for less than 5 years. Around 64% of Counselors were working in the same UHC for more than 5 years, 32% for 1 to 5 years and few of them (4 %) for less than 1 year.

Counselors were assessed for rapport building, their tone and language, command over local language and their various verbal and non verbal

Table 2 : Proportion distribution of Counselors according to their counseling- skills (n=25)

Domains	Worst (%)	Very Poor (%)	Poor (%)	Average (%)	Good (%)	Excellent (%)
Rapport Building						
Make Client and Himself Comfortable	0	0	4	44	32	20
Micro Components of counseling						
Ensure privacy and confidentiality	0	0	28	60	8	4
Tone and language	0	0	4	28	28	40
Sensitivity in asking question	0	0	4	40	44	12
Adequate time given to understand and answer the question	0	4	4	24	52	16
Paraphrasing and rephrasing	0	12	36	32	8	12
Able to keep conversation alive	0	0	8	40	40	12
Demonstrating empathy and concern	0	0	12	40	32	16
Encouraging for availing services	0	0	0	20	56	24
Giving hope	0	0	4	20	52	24
Listening attentively and actively	0	0	8	56	36	4
Macro Components of counselling						
Discussing safe practices and preventive measures	0	0	12	20	44	24
Comfortable about talking sex and sexuality	0	0	4	56	28	12
Checking comprehension	0	0	8	60	24	8
Observation of clients verbal/non verbal commands to assess satisfaction	0	0	12	44	20	24
Condom demonstration	92	0	0	4	4	0

skills of counseling. Specific observations were also noted for each of the participant. The scoring for each domain of counseling is given in table 2. Majority of the participants had average knowledge score in all domains related to skills of counseling. Only few participants had above average skills for majority of the skills. Comprehension skills, use of non verbal commands, demonstration of sympathy and concern towards client was observed to be poor or below average in majority of the participants.

All the Counselors were able to greet and start the session along with satisfactory rapport with the client with skills for ensuring privacy. During observation, it was seen that majority of counselors made use of tone and language effectively. They were also found to be sensitive in asking questions. They provided enough time for the client to understand the question and answer. They were able to keep the conversation alive. Important counseling skills like demonstration of sympathy and concern, encouragement to avail services, giving hope, listening attentively and actively were in a range of excellent, good and average. Paraphrasing-rephrasing skills of the counselors as observed was very poor and poor respectively. The discussion about safe practices and preventive measures were found to be excellent, good and average among majority of the counselors (44%, 20% and 24%). More than half (56%) of the counselors were comfortable in talking about sex & sexuality. Around 60% of the counselors obtained an average score for their comprehension skills in counseling. Use of verbal and non-verbal commands by counselor was found to be 12%, 44%, 20%, 24% in the range of poor, average, good and excellent respectively. In spite of good/ average performance in most of the domains of counseling, only 20% of the counselors assessed client's knowledge on condom and only 8% practiced condom demonstration. It was observed that use of non-verbal communication during counseling was poor. (Table 2) Counselors tried their best to keep the conversation alive.

Table 3 shows the proportion distribution of counselors according to their knowledge and against

which practices were observed. All the Counselors were aware of STI and HIV in general. Almost 96 % of the counselors talked about HIV but only 60 % talked about STI. On observation, only 24 % of the counselors were found to discuss preventive measures against four modes of transmission. Almost 92 % of the counselors were able to mention at least three symptoms of STI under 'Syndromic Case Management'. Counselors were noted talking on symptoms and brief sexual history in one third (76%) of the sessions observed. All counselors could mention risk group population for STI/HIV, but it was noted that 60% practiced risk assessment in a newly diagnosed case of STI. All counselors were able to describe condom as component of STI prevention, but 76% actually talked regarding condom in counseling session and only 8% practiced condom demonstration for the session. All counselors had knowledge of syndromic case management and drug categories and all were well versed with drugs in explaining it to the client to explain drug to client. Around 88% of counselors could mention partner treatment component in complete package of STI treatment while 80% were found practicing advising partner treatment. All counselors were aware of importance of using IEC materials for counseling session but only 36 % of the counselors were found using any form of IEC material for client's education. Out of total 25, 20% of the counselors used IEC for STI and 16% of them use IEC material for HIV education.

At the time of interview with counselor, 80% counselors said that they were able to maintain clients' confidentiality all the time while 20% said that they were able to maintain it only sometime. As observed during the session, 92% of the counselors introduced the investigator present during the session to the client. More than half (68%) Counselors recorded the session findings based on interaction during conversation while 32 % preferred to record it immediately after interaction. Out of 25 clinics, in 9 clinics compromised on the privacy of the clients (auditory, visual) due to the heavy load of patients as the next client was waiting

Table 3 : Gap of Knowledge and Observed Practice

Knowledge of Counselors		Observed Practice	
Parameters	Frequency (%) (n=25)	Parameters	Frequency (%) (n=25)
STI in general	25 (100%)	Talk regarding STI [#]	15 (60%)
HIV in general	25 (100%)	Talk regarding HIV [#]	24 (96%)
Modes of Transmission	25 (100%)	Discussing full range of Safe Practices [*]	6 (24 %)
Symptoms of STI	23 (92 %)	Talking on Symptoms	19 (76%)
Risk Groups	25 (100%)	Risk assessment through sexual history	15 (60%)
Condom as component of Preventive measures	25 (100%)	Talk regarding condom	19 (76%)
Syndromic Case management Treatment of STI	25 (100%)	Explain for drugs given	25 (100%)
Partner treatment Component	22 (88%)	Advice for partner treatment	20 (80%)
Importance of IEC use while counseling	25 (100 %)	IEC used in counseling	9 (36%)
		IEC used for STI education	5 (20%)
		IEC used for HIV education	4 (16%)
Referral service centres	25 (100%)	Supported for needed referral	25 (100%)
Auditory and Visual Privacy as component of counseling	25 (100%)	Compromised privacy	16 (64%)

[#]Talk Regarding STI/HIV: What is STI/HIV? How it is spread?

^{*} Includes Safe sex, Safe injection, blood transfusion and mother to child transmission

for his/her turn. Counseling room building was good and spacious in 23 centres. Only in 2 clinics separate counseling room was not available and temporary arrangement was made in the waiting room by covering it with a curtain.

All (100%) the counselors expressed that they were comfortable to counsel opposite sex clients and all age groups. About 16 % Counselors were uncomfortable in counseling clients from Orissa as language was a barrier. Around 20 % of the counselors were not comfortable in counseling core group (FSW, MSM and IDU) clients counseling. Most of the counselors (96 %) said that they were satisfied with the job and type of work. Out of total, 32 % of the counselors mentioned that they were over burdened and out of them, 87.5 % of the counselors think that they could not devote enough time in counseling. The main sources for their motivation were appreciation received from clients, doctors, co-coordinators and in review meetings. Around 24% of the participant felt that they needed more training pertaining to communication skill while 9.4% felt that they needed training on complex issues of STIs and HIV. Few (9.4%) participants expressed that annual training should be conducted regularly to update their knowledge.

Discussion:

Profile of counselors is reported in Table 1, around 42 % of counselors were engaged in STI services for more than 10 years. More than half (64%) of the counselors were working at the present clinics for more than 5 years. This could give better accountability and familiarity of working area. Around 16% of the counselors faced language barrier in dealing with clients from Orissa and Maharashtra. IEC materials in Oriya and Marathi language can be provided to make conversation easier and simpler. Though job satisfaction was found among most of counselors, reasonable numbers of the counselor were feeling overburdened and not able to do justice to all clients. These things can jeopardize the quality of counseling. In spite of high burden, appreciation

from the staff and clients keeps the counselors high motivated.

Studies done at different set-ups have found improvement in partner treatment by counseling session but only 80% of the counselors talked about partner treatment with the STI clients.^[4-6] Partner treatment being the key component in complete STI case management, this parameter needs constant strengthening under STI counseling.

In a study in Cape Town, Mathews et al finds that only 21% of male and 37% of female patients received some education about STD transmission during the clinic visit, and only 25% of male and 36% of female patients received education about condom use.^[7] In the present study, only 76 % of counselors took sexual history in brief and talked about condom in counseling session. Almost 96 % of the counselors talked about HIV but only 60 % talked about STI, which is higher in contrast to the study done by Mathews.^[7] While IEC utilization is crucial in counseling, only 36 % of the counselors were found to use any form of IEC for client's education and only 24 % of the counselors educated the clients about the preventive measures against the four modes of transmission. A study done by Parmar R et al in 2012 documents considerable gap of counseling and basic disease knowledge among link workers, where as in the present study, basic knowledge of counselors was reasonably good.^[8] This could be due to stringent selection process and regular monthly meeting of counselors. Most of counselors were having average and good counseling skills as performance based score card (Table 2). In the counseling sessions observed, 92% of the counselors didn't practice condom demonstration. A study published in 1997 by Sharma V, Dave S, Sharma A et al finds great proportion of errors in condom use by male in Guajarat.^[9] Condom demonstration during counseling session for STI clinic attendees can serve as best opportunity to educate right method of condom use.

Preventive counseling is of great use and finds an interesting concept of patient centered care, as

discussed by Rietmeijer CA in 2007. People are more likely to adopt STI/HIV preventive behaviors if they are well informed. Rietmeijer CA states that the STI clinic may benefit greatly from the extensive experience of HIV prevention counselors.^[10] Current study finds gap in practices of counselors which needs to be addressed at the earliest to get successful results in program.

Conclusion and Recommendations:

Counselors were having satisfactory micro – macro skills for counseling, but core component of STI like risk assessment and condom promotion were lacking in practice. There is wide gap of knowledge and practice among counselors of the urban project. More such sessions can be observed to generalize results, as counseling is a continuous process.

Basic knowledge on counseling and its skill is the cornerstone for counseling. All counselors already had received induction training after their selection. This was reflected in their knowledge component regarding counseling, but regular refresher training is required as few were found to be uncomfortable with one or the other domain of counseling. Regular and supportive supervision by project supervisors may help to reduce the knowledge practice gap.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. Surat Municipal Corporation. Partnership for Sexual Health Project [Internet]. [cited 2012 Apr 25]. Available from: <http://www.suratmunicipal.org/content/Health/pshproject.shtml>
2. Wynendaele B, Bomba W, M'Manga W, Bhart S, Fransen L. Impact of counseling on safer sex and STD occurrence among STD patients in Malawi. *Int J STD AIDS*. AIDS Task Force, Brussels; 1995;6(2):105–9.
3. Desai B, Parmar R, Kosambiya J, Solanki P, Prajapati S, Kantharia S. Assessment of knowledge and skills of counseling among link workers of link workers ' scheme for HIV /AIDS in rural areas of Surat district. *Natl J Community Med*. 2012;3(2):348–51.
4. Alam N, Streatfield PK, Shahidullah M, Mitra D, Vermund SH, Kristensen S. Effect of single session counseling on partner referral for sexually transmitted infections management in Bangladesh. *Sex Transm Infect*. 2011 Feb 1;87(1):46–51.
5. Alam N, Chamot E, Vermund SH, Streatfield K, Kristensen S. Partner notification for sexually transmitted infections in developing countries: a systematic review. *BMC Public Health*. BioMed Central; 2010;10(19):19.
6. Faxelid E, Tembo G, Ndulo J, Krantz I. Individual counseling of patients with sexually transmitted diseases. A way to improve partner notification in a Zambian setting? *Sexually Transmitted Diseases*. 1996.
7. Mathews C, Van Rensburg A, Schierhout G, Coetzee N, Lombard CJ, Fehler HG, et al. An assessment of care provided by a public sector STD clinic in Cape Town. *Int J STD AIDS*. 1998;9(11):689–94.
8. Parmar R, Desai B, Kosambiya J, Priti S, Shailesh P, SI K. Are care takers of link worker's scheme of HIV/AIDS knowledgeable enough? Assessment study of link workers scheme in Surat district. *Natl J Med Res*. 2012;2(2):173–5.
9. Sharma V, Dave S, Sharma A, Chauhan P. Condoms: Mis-use=non-use. The condom equation in Gujarat, India. *AIDS Care*. Taylor & Francis Group; 1997 Dec 27;9(6):707–14.
10. Rietmeijer CA. Risk reduction counseling for prevention of sexually transmitted infections: how it works and how to make it work. *Sex Transm Infect*. BMJ Group; 2007;83(1):2–9.

Use of WHO Anthro Software for Assessing under Nutrition (Wasting, Stunting & Underweight) amongst Under-Five Children of District Ahmedabad, GujaratSwarna Rastogi¹, Chaitanya Maheshwari¹, Santosh Kr. Raghav², M. K. Lala³¹ Assistant Professor, ² Lecturer cum Statistician, Department Community Medicine, MMC Muzaffarnagar, Uttar Pradesh, India³ Professor, Department Community Medicine, B. J. Medical College, Ahmedabad, Gujarat, India**Correspondence :** Dr. Swarna Rastogi , E mail: dr.swarnarastogi@gmail.com**Abstract :**

Introduction : A child is future of nation. Malnutrition is a big public health problem in India as it can be attributed for more than half (54 percent) of all under five mortality in India. **Aim :** To assess prevalence of malnutrition among urban and rural population of Gujarat using newly developed WHO growth standards.

Method: Community based cross-sectional study was done, in which 504 under-five children were studied from Anganwadis in both urban and rural area of Ahmedabad. Z-score was used to determine underweight, stunting, and wasting based on WHO Growth Standard - 2007 using WHO Anthro 2011 software version 3.2.2. **Statistical Analysis:** Analysis was done by using Epi-info version 7. Chi-square test & Z-test were used to test the significance. **Results :** Overall in our study, in urban area, 36.9% of under-fives were underweight, 41.7% wasted and 31.4% stunted compared to that, under-fives of rural area 56.3% were underweight, 35.3% wasted and 54.3% stunted. Both male and female children were found undernourished in both urban and rural areas. Among socio demographic factors, maternal educational, working status of the mother, socioeconomic status and rural background of the family had greater impact on nutritional status of the child.

Conclusion : We found that almost one third of our under five children are underweight. For attainment of best possible nutrition and growth in children, targeted short-term strategies addressing underlying risk factors and more long-term poverty alleviation strategies may be needed.

Keywords : Stunting, Underweight, Under-Fives, Wasted, WHO Growth Standard

Introduction :

Malnutrition is one of the major public health problems in the present world. ^[1] In a study entitled "Save the Children" in 2012 malnutrition was found to be one of the major risk factors for childhood mortality and morbidity as well as for Non Communicable Diseases. ^[2-3] Stunting, wasting and underweight rates of under-five children have declined, especially during last decade, but still exceed levels observed in countries at similar income levels. According to recent data from (Rapid Survey On Children) RSOC (2014), 38.7% of Indian children under-fives are stunted, 19.8% were wasted and 42.5% were underweight. ^[4,5]

In India according to NHFS (National Family Health Survey) -4 data (2015-2016), ^[6] 35.7 per cent

children under age of five years are underweight (low weight for age); 38.4 per cent children under five are stunted (low height for age); 21 per cent children under five years of age are wasted (low weight for height); 7.5 per cent of children under five years of age are severely wasted. Another important consideration is the interstate variation in prevalence of under nutrition. As Per the National Family Health Survey-4 (NFHS-4), ^[6] states like Kerala (22.9%), Punjab (24.9%) and Goa (25%) have lower prevalence of underweight. On the other hand, there are states like Gujarat (39.3%), Bihar (55.9%), Jharkhand (56.5%) and Madhya Pradesh (60%) with higher Prevalence of underweight than national average. Gujarat is the 4th worst performing major state for under nutrition in India as per NFHS 4. Underweight prevalence in the state has reduced

only by 1.7% percent from 41% in NFHS 3 05-06 to 39.3% in NFHS 4 of 2015-16.

This research mainly tries to estimate the prevalence of underweight, stunting and wasting in Ahmedabad District of Gujarat using WHO Growth Standard - 2007 using WHO Anthro 2011 software version 3.2.2 and compare the socio-demographic profile of under-five children suffering from malnutrition.

Method:

The present study was conducted in rural and urban area of Ahmedabad District. The total population of Ahmedabad district is 5.82 million out of which 4.66 million (80%) live in urban area and 1.1 million (20%) live in rural area. Ethical committee approval was taken before conducting the study. A community based cross-sectional study was done in 2015-16. Considering the prevalence of under-nutrition as 46 % and allowable error as 10% of estimated prevalence, the calculated sample size is 469.

Upon considering the non-response error as 7.5%, 504 under-fives were taken for the study. Out

of the 504 under-five children studied, 252 were studied in urban and rural areas respectively of Ahmedabad district. Urban area, under Ahmedabad Municipal Corporation has been divided into 6 zones. Each zone had 8 to 10 UHCs (Urban Health Center). From each zone, one UHC had been selected randomly. So total 6 UHC has been selected. From each UHC, 3 Anganwadis were selected randomly to cover roughly 42 under-fives from each zone. Thus total 18 Anganwadis were selected for survey in urban area to cover 252 under-fives. Currency method was used for random selection.

In rural area, Ahmedabad district has 10 taluka excluding corporation area. 10 PHCs were selected randomly (one from each taluka), out of 10 PHC, one PHC (Sanathal), which is situated in Sanand Taluka, was selected using simple random sampling method. From 13 villages of Sanathal PHC, 6 villages were selected randomly. From each village, 3 Anganwadis were selected randomly so total 18 Anganwadis were selected for survey in rural area to cover randomly 252 under-fives (42 under-fives were selected randomly from each Anganwadi). A pre-designed and pre-tested performa was used to

Colour Coding used in Who Anthro 2011 Software

The following colour codes are applied to visually distinguish the different levels of severity

COLOUR	APPLIED TO	Z SCORES (Z)	PERCENTILE
Green	Numeric range Graph line	-1 SD < z < +SD Median	50 th percentile
Gold	Numeric range Graph line	-2 SD < z < + 2SD or +1 < z < +2SD -1 SD and +1SD	15 th and 85 th percentile
Red	Numeric range Graph line	-3SD < z < -2SD or +2 < z < +3SD -2SD and +2SD	3 rd and 97 th percentile
Black	Numeric range Graph line	z < -3SD; z > +3SD -3SD and +3SD	NA #

NA= Not Available

Results:

Table 1 : Socio-demographic profile of studied under five children

Traits	Urban Under-fives (N=252)			Rural Under-fives (N=252)			p-value	
	Under nourished*	Normal*	Total*	Under nourished*	Normal*	Total*		
AGE								
0-12 Months	00 (0.00)	00 (0.00)	00 (0.00)	03 (1.20)	13 (5.16)	16 (6.34)	$\chi^2=59.8$ $P<0.001$ $df=12$	
13-23 Months	28 (11.1)	09 (3.57)	37 (14.7)	22 (8.73)	11 (4.36)	33 (13.1)		
24-35 Months	59 (23.4)	16 (6.35)	75 (29.7)	48 (19.1)	15 (5.9)	63 (25.0)		
36-47 Months	64 (25.4)	20 (7.94)	84 (33.4)	54 (21.4)	32 (12.7)	86 (34.1)		
48-60 Months	43 (17.10)	12 (4.76)	55 (21.86)	43 (17.1)	10 (3.9)	53 (21.0)		
GENDER								
Male	106 (42.1)	36 (14.3)	142 (56.4)	96 (38.1)	32 (12.7)	128 (50.8)	$\chi^2=2.64$ $df=3$ $P<0.05$	
Female	88 (34.9)	22 (8.73)	110 (43.2)	91 (36.1)	33 (13.1)	124 (49.2)		
RELIGION								
Hindu	170 (67.5)	51 (20.2)	221 (87.7)	145 (57.5)	55 (21.8)	200 (79.3)	$\chi^2=13.76$ $df=6$ $P<0.032$	
Muslim	24 (9.52)	6 (2.38)	30 (11.9)	38 (15.1)	07 (2.8)	45 (17.9)		
Others**	00 (0.00)	00 (0.00)	00 (0.00)	04 (1.58)	02 (0.79)	06 (2.37)		
SOCIAL CLASS								
Class-I	07(2.80)	33(13.1)	40(15.9)	$\chi^2=77.7$ $P<0.05$	02(0.80)	05(1.90)	07(2.70)	$\chi^2=53.5$ $P<0.05$
Class-II	12(4.70)	46(18.3)	58(23.0)		11(4.40)	32(12.7)	43(17.1)	
Class-III	54(21.4)	15(5.9)	69(27.3)		57(22.6)	21(8.30)	78(30.1)	
Class-IV	43(17.1)	22(8.7)	65(25.8)		66(26.2)	10(3.90)	76(30.1)	
Class-V	18(7.10)	2(0.8)	20(07.9)		34(13.5)	14(5.50)	48(19.0)	

* Figures in parenthesis denote percentage.

collect baseline data. Anthropometric measurements were taken from randomly selected under-fives of Anganwadis and other required information was collected by performing house to house visit of the concerned child accompanying his/her mother. Analysis was done in Epi-info version 7. Z test and Chi-square tests was used to test the significance. Z

score was used to determine underweight, stunting, and wasting based on WHO Growth Standard-2007 using WHO Anthro 2011 software version 3.2.2^[7]

As per age distribution, in urban area, maximum number of undernourished children were present in the age group of 36-47 months (25.4%) followed by 24-35 months (23.4%), 48 to 60 months (17.10%)

and 13-23 months (11.1%). In rural area, maximum number of undernourished are present in the age group of 36-47 months (21.4%) followed by 24-35 months (19.1%), 48 to 60 months (17.10%), 13-23 months (8.23%) and 0-12 months (1.2%). There is statistical significant difference in the mean age of studied under-fives of urban area (36 ± 10.5 months) & rural area (30 ± 12 months) ($P < 0.05$). Percentage of undernourished males was higher in urban area (42.1%), while in rural area percentage of undernourished females (36.1%) was higher which is statistically significant ($p < 0.05$). More undernourished children were present among Hindus in both urban (67.5%) and rural (57.5%) area followed by Muslim in urban (9.52%) and rural area (15.1%) i.e. more Muslim children were undernourished in rural area, which is statistically significant ($p < 0.05$). As per B. J. Prasad's modified S.E. classification, more undernourished children were in class III (21.4%) in urban area followed by class IV (17.1%), class V (7.1%), class II (4.7%) and class I (2.8%). In rural area more undernourished were present in class IV (26.2%), followed by class III (22.6%), class V (13.5%), class II (4.4%) and class I (0.8%) which is statistically significant ($p < 0.05$) (Table 1).

As per education of mothers of studied under-fives, more undernourished children were present in rural illiterate mothers 118 (46.8%) compared to 8 (3.1%) in urban illiterate. Among literate mothers, more undernourished under-fives were present among urban primary 96 (38.1%), secondary 78 (30.9%) and graduate & post graduates 12 (4.8%) respectively compared to rural primary 40 (15.8%), secondary 27 (10.7%) graduate & post graduates 3 (1.2%) respectively. Finding is statistically highly significant ($p < 0.001$). (Table 2) As per occupation of mothers of studied under-fives, more undernourished under-fives were present in housewife's of urban area 99 (39.3%) compared to 77 (30.5%) in rural area. Same pattern of undernourishment was seen in mothers engaged in business both in urban 66 (26.2%) and rural 67 (26.65) area followed by service in urban

28 (11.25) & rural 16 (6.3%) area. More undernourished children were observed in laborer class of rural area 25 (9.9%) compared to that of urban area 01 (0.4%). Distribution is statistically highly significant ($p < 0.0001$). (Table 2)

In urban area, as per weight/age parameter, 81 (32.14%) children were moderately underweight and 12 (04.76%) children were severely underweight. In rural area as per weight/age parameter was taken 70 (27.7%) children were moderately under-weight and 72 (28.6%) children were severely underweight. Severely underweight under-fives were more in rural area as compared to urban area which was statistically significant ($p < 0.05$). (Table 3(a)) In urban area as per weight/height parameter was taken 51 (20.2%) children were moderately wasted and 54 (21.4%) children were severely wasted. In rural area as per weight/height parameter was taken 54 (21.4%) children were moderately wasted and 35 (13.9%) children were severely wasted. (Table 3(a))

In urban area, as per height/age parameter, 44 (17.5%) children were moderately stunted and 35 (13.9%) children were severely stunted. In rural area, as per height/age parameter, 43 (17.1%) children were moderately stunted and 94 (37.3%) children were severely stunted. Severely stunted were more in rural area as compared to urban area which was statically significant ($p < 0.05$). (Table 3(a)).

Urban and rural area under-five population graphs has shown that in urban area z score was -3.36 according to weight/age and z score was -5.44 according to height/age compared to in rural area z score -4.18 according to weight/age and z score -4.31 according to height/age which is statistically significant ($p < 0.05$). (Figures 1 and 2)

Discussion:

Present study was a community based cross-sectional study covering 504 under-five children from the Anganwadis, which were equally distributed among the urban and rural area of Ahmedabad District of Gujarat.

Table 2 : Distribution of studied under-fives as per education and occupation of mothers in urban and rural area of Ahmedabad district

Urban u nder-fives			Rural under -fives				P VALUE
Traits	Under-Nourished*	Normal*	Total*	Under-Nourished*	Normal*	Total*	
EDUCATION OF MOTHER							
Illiterate	08 (3.10)	02 (0.80)	10(3.90)	118 (46.8)	38 (15.1)	156(61.9)	$\chi^2=193$ $P<0.01$ $df=9$
Primary	96 (38.1)	26 (10.3)	122 (48)	40 (15.80)	15(5.90)	55(21.80)	
Secondary	78 (30.9)	26 (10.4)	104 (41)	27 (10.70)	10(3.90)	37(14.90)	
Graduate & P.G	12 (4.80)	04 (1.60)	16(6.40)	03 (01.20)	01(0.40)	04(01.40)	
OCCPATION OF MOTHER							
Laborer	01 (0.4)	00 (0.00)	01 (0.40)	25(9.90)	08 (3.20)	33 (13.1)	$\chi^2=44.8$ $P<0.001$ $df=9$
Business	66 (26.2)	31 (12.3)	97 (38.5)	67(26.6)	29 (11.5)	96(38.1)	
Service	28 (11.2)	08 (3.20)	36 (14.4)	16 (6.30)	08(3.20)	24(9.50)	
Housewife	99 (39.3)	18 (7.10)	118 (46)	77 (30.5)	22(8.70)	99(39.2)	

*Figures in parenthesis denote percentages

Table 3a : : Anthropometric indicators weight/age, weight/height & height/age [(w/a), (w/h) & (h/a)] prevalence among under-fives in urban and rural areas of Ahmedabad District.

PARAMETER	URBAN[N=252]			RURAL[N=252]		
Underweight (w/a)						
GRADING	Male*	Female*	Total*	Male*	Female*	Total*
Moderate <2SD	47(18.6)	34 (13.4)	81(32.14)	34(13.5)	36 (14.3)	70 (27.70)
Severe <3SD	09(3.57)	03 (1.19)	12(04.76)	42(16.7)	30 (11.9)	72 (28.60)
Normal	86(34.1)	73 (28.9)	159(63.1)	52(20.6)	58 (23.0)	110(43.6)
Wasted(w/h)						
Moderate <2SD	27(10.70)	24 (9.52)	51(20.20)	35(13.9)	19 (7.54)	54 (21.40)
Severe <3SD	31(12.30)	23 (9.13)	54(21.40)	17(6.74)	18 (7.14)	35 (13.90)
Normal	84(33.40)	63 (25.0)	147(58.3)	76(30.1)	88 (34.9)	163(64.7)
Stunted(h/a)						
Moderate <2SD	23(09.13)	21(8.34)	44(17.50)	18(7.14)	25 (9.92)	43(17.10)
Severe <3SD	18(07.14)	17(6.75)	35(13.90)	48(19.0)	46 (18.3)	94 (37.30)
Normal	101(40.1)	72(28.6)	173(68.6)	62(24.6)	53 (21.0)	115 (45.6)
Total	142	109	252	128	124	252

*Figures in parenthesis denote percentage

Table 3(b) : Overall anthropometric indicators [(w/a), (w/h) & (h/a)] prevalence among under-fives in urban and rural areas of Ahmedabad.

PARAMETER	URBAN* (N=252)		RURAL* (N=252)		TOTAL* (N=504)
	<3SD	<2SD	<3SD	<2SD	
Underweight	12(4.76%)	81(32.14%)	72(28.6%)	70(27.7%)	235(46.6%)
Wasted	54(21.4%)	51(20.2%)	35(13.9%)	54(21.4%)	194(38.5%)
Stunted	35(13.9%)	44(17.5%)	94(37.3%)	43(17.1%)	216(42.8%)

* Figures in parenthesis denote percentage

Figure 1: Z-score of subjects in urban areas

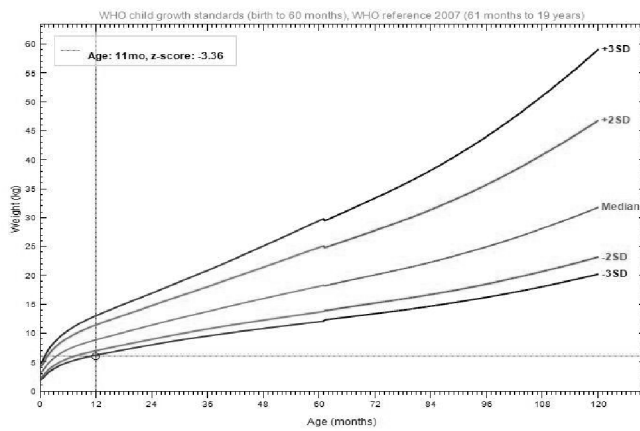
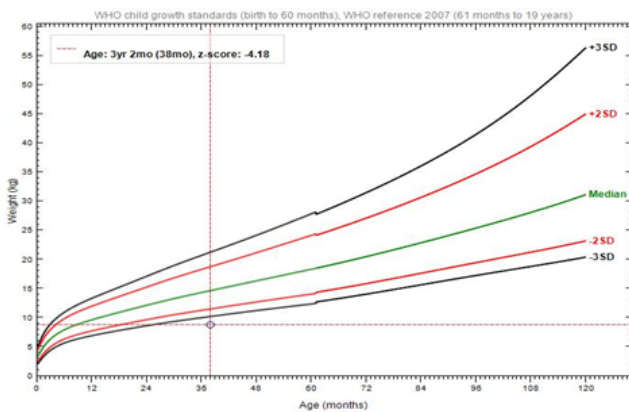


Figure 2 :Z-score of subjects in rural areas



Out of 504 under-fives studied, in urban area maximum number of undernourished under-fives were present in the age group of 36-47 months (25.4%) followed by 24-35 months (23.4%).(Table1) which is similar to rural area, maximum numbers of undernourished children were present in the age group of 36-47 months

(21.4%) followed by 24-35 months (19.1%). In a study by Dinesh et al (2006),^[8] the maximum prevalence of wasting and underweight in age group 37-48 months was similar to our study. The Male: Female ratio of the population under study was 1:0.86 i.e. the sex ratio of the population under study was 860 females per 1000 population. Similar results were found in Bhavnagar urban slums MICS (2006)^[9] in which there were 52.6% males and 47.4% were females in under four year's population. Also sex ratio in Bhavnagar MICS survey,^[9] was 899 females per 1000 males. According to NFHS-4 Report (2015-2016)^[6], there were 53.2% male and 46.8% females, which was similar to our study. Overall girls and boys were equally undernourished. In the present study, undernourished males were higher in urban area (42.1%), while in rural area percentage of undernourished females (36.1%) was higher. The difference may be due to the fact that in urban areas, more attention was also given on nutrition of female children. In this study, maximum number of under-fives belonged to Hindu religion both in urban (88%) and rural areas (79.7%) (Table1). Laxminath A et al (2001) 10 in his study also found that majority of under-five children were Hindus. Similar result was found in NFHS-4 Report (2015-2016) [6], for religion in which 81.6% were Hindus and 12.5% were Muslim. More undernourished children were Hindus in both urban (67.5%) and rural area (57.5%). Religion wise distribution of under nutrition may be due to the fact that in the present study majority of under-fives belonged to Hindu religion. In the present study, more undernourished children were

from class III (21.4%) in urban area followed by class IV(17.1%),class V(7.1%),class II(4.7%) and class I(2.8%) compared to rural area where more undernourished were present in class IV(26.2%),followed by class III(22.6%),class V(13.5%),class II(4.4%) and class I(0.8%). In studies carried out by Laxminath A et al(2001)^[10], Hassan et al (2001)^[11], Biswas et al (1999)^[12] it was noted that a larger percentage of population belong to lower socio economic class(90.6%,82.6% and 77.5%) as compared to present study. This may be due to changing socioeconomic status in present study. Veerbhan Singh et al^[13] depicts that maximum mothers belonged to class III 155(38.75%), followed by 81(20.25%) mothers from socio-economic class V. It may be due to the reason that most of the nutrition programmes were more concentrated towards the lower socioeconomic class.

In our study, overall in urban area out of 252 studied under-fives mother, majority were (89.7%) educated up to primary and secondary level. 3.9% of mothers were illiterate. In rural area, out of 252 studied under five mothers, 61.9% of mothers were illiterate.36.5% was educated up to primary and secondary level. (Table2). According to NFHS 4 (2015-2016)^[6], in India 38.5% were illiterate women and in Gujarat 35.2% were illiterate women, which were more in our study in rural area compared to urban. In study by Veerbhan Singh et al^[13] 37% mother were illiterate, 23.75% mothers were educated up to primary, 18.5% up to middle, 11.25% educated up to secondary level and <10% were educated up to higher secondary and above. Uttekar BP et al^[14] also observed in their study in Rajasthan that majority of Janani Suraksha Yojana beneficiaries were illiterate (68%) or had Studied only up to primary and middle level (22%), <10% had studied above secondary Level which is similar to our study.^[15] In present study, more undernourished children were present in rural illiterate mothers (46.8%) compared to (3.1%) urban illiterate. It may be due to the fact that more mothers were illiterate in studied rural area than urban area. Mother's illiteracy has impact on nutrition of under-fives.

Distributions according to occupation of under-five mothers showed that majority of mothers were housewives both in urban (79.7%) and rural areas (60.7%). 27% of rural mothers were employed as labours as compared to urban mothers (9.5%) (Table 2).In study of Chaterejee Saurav et al. (2008) similar result for occupation of mother was observed in which 90.0% mother were housewife, 3.64% were labour in urban area of Kolkata^[16, 17] In a study by Veerbhan Singh et al^[13] among 400 infants 212 were exclusive breast feed (EBF) of which mothers of 75.47% infants were housewives and 24.53% were working, the relation is being statistically significant. In the present study, more undernourished children were present in housewives of urban area (39.3%) compared to (30.5%) rural area. There is a need to improve child rearing practices in housewives.

Among working mothers almost same pattern of undernourishment was seen in mothers engaged in business both in urban (26.2%) and rural (26.65%) followed by service in urban (11.25%) and rural area (6.3%). More undernourished children were observed in laborer of rural area (9.9%) compared to that of urban area (0.4%) (Table 2). It may be due to the fact that housewives and women laborers were more illiterate than employed woman which was affecting the nutrition of under-fives.

Out of the total 252 under-fives studied according to weight/age criteria, in urban area 32.14% were moderately underweight, 4.76% were severely underweight. In rural area, out of the total 252 under-fives studied according to weight/age criteria, were 27.7% moderately under-weight, 28.6% were severely underweight. Here severely underweight among studied under-fives according to weight/age criteria were more in rural area as compared to urban area which was statically significant (Table 3a). Out of the total 252 under-fives studied according to .weight/height criteria, in urban area 20.2% were moderately wasted, 21.4% were severely wasted. In rural area out of the total 252 under-fives studied according to weight/height criteria, 21.4% were moderately wasted, 13.9% were severely wasted. Here severely wasted among

studied under-fives according to weight/height criteria were more in urban area as compared to rural area which was statically significant (Table 3a). Out of the total 252 under-fives studied according to height/age criteria, in urban area 17.5% were moderately stunted, 13.9% were severely stunted. In rural area as per height/age parameter was taken out of the total 252 under-fives studied in rural area 17.1% were moderately stunted, 37.3% were severely stunted. Here severely stunted among studied under-fives according to height/age criteria were more in rural area as compared to urban area which was statically significant. According to NFHS-4 (2015-2016) in Gujarat^[6], prevalence of underweight, stunting and wasting were 39.3%, 38.5% and 26.4% respectively and in India according to NFHS-4 (2015-2016) prevalence of underweight, stunting and wasting were 35.7%, 38.4% and 21% respectively.

Summary and Conclusion :

More undernourished children were present in Hindus in both urban and rural area 67.5% and 57.5% respectively. More undernourished children were in class III (21.4%) in urban and in class IV (26.2%) in rural area. Out of the 504 under-fives studied overall 46.6% were underweight, 38.5% were stunted and 42.8% were wasted. In urban area, 36.9% were underweight, 41.7% were stunted and 31.3% were wasted compared to rural area in which 56.3% were underweight, 35.3% were stunted and 54.4% were wasted according to New WHO growth standards.

Overall in urban area 89.7% of under-five mothers were educated up to primary and secondary level. Only 3.9% of under-five mothers were illiterate compared to rural area, in which 61.9% of mothers were illiterate which was significant. In urban area more undernourished children were present among fathers pursuing business 32% and service 32% compared to rural area in which more undernourished was seen among fathers working as laborer 34.5% and agricultural workers 17.1%. More undernourished children were present in housewife's of urban area (39.3%) compared to

(30.5%) rural area. This may be due to the reason that housewives were not motivated regarding good feeding practices of under-five children which requires their constant motivation by Anganwadi workers & other grass root workers.

Recommendations :

Short Term Measures :

Considering the high prevalence of underweight, wasting and stunting among under-five children more emphasis should be given on exclusive breast feeding and timely introduction of adequate and safe complementary food in conjunction with continued breastfeeding. Use of the new WHO growth standards should be adopted and encouraged as they make breastfeeding the biological norm and establishes the breastfed infants as the normative growth model. More attention should be given to "infant and young child feeding" and nutritional counseling of mothers of under-five children.

Long Term Measures :

Improving female literacy, improving socioeconomic condition and improving urban and rural living condition is recommended.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. Medhing, Hanlon C, Dewey M, Alem A, Tesfaye F, Worku B, Tomlinson M, Prince M (2010). Prevalence and predictors of under nutrition among infants aged six and twelve months in Butajira, Ehiopia: The P-MaMiE Birth Cohort. BMC Public Health 10: 27.
2. Save the Children (2012). A life free from hunger: tackling child malnutrition. London. Save the Children.
3. Black RE, Allen LH, Bhutta ZA, Caulfield LE, Onis MD, Ezzati M, Rivera J (2008). Maternal and child undernutrition: global and regional exposures and health consequences. Lancet 371: 243-260.
4. Barker DJ, Osmond C, Golding J. Height and mortality in the counties of England and Wales. Ann Hum Biol. 1990 Jan-Feb; 17(1):1-6.
5. India environment portal origin. India environment portal origin. [Online]. Available from: <http://www>.

- indiaenvironmentportal.org.in/files/file/INDIA-HEALTH REPORTNUTRITION_2015.pdf [Accessed 7May2018].
6. Rchiipsorg. Rchiipsorg. [Online]. Available from: http://rchiips.org/NFHS/pdf/NFHS4/UP_FactSheet.pdf [Accessed 5 July 2018].
 7. Who.int. World Health Organization. [Online]. Available from: <http://www.who.int/childgrowth/software/en/> [Accessed 7May2018].
 8. Kumar Dinesh, Goel N.K., Mittal P.C., Mishra P; influence of infant feeding practices on nutritional status of underfive children, Indian Journal of Pediatrics, volume 73, 417-422, may 2006.
 9. Multi Indicator Cluster Survey (MICS) Report, Bhavnagar, 2006 (unpublished report)
 10. Laxminath A., Rao K.M., Brahman G.N.V., Kumar S; Assess diet and nutritional profile of rural preschool children of Punjab, Index Pediatrics, 39,331-338, January 2001.
 11. Hassan MK, AL-Sadoon I, Risk factors for severe pneumonia in children in Basarah. Trop Doct, 2001;31(3): 139-141
 12. Biswas A, Biswas R, Manna B, Dutta K. Risk factors of acute respiratory tract infections in underfive of urban slum community, Indian Journal of public health, 1999; 43(2):73-5
 13. Veerbhan Singh1, Archana Paliwal, Indu Mohan. THE STUDY OF SOCIOECONOMIC FACTOR AFFECTING BREAST FEEDING PRACTICE AMONG FAMILY OF RURAL AREA OF JAIPUR. www.ijmse.com, Vol.1; Issue: 1; Jan-March 2014
 14. Uttekar BP, Barge S, Khan W, Deshpande Y, Uttekar V, Sharma J et al. Assessment of ASHA and JSY in Rajasthan. 2007.
 15. Devang Raval, A study of knowledge, attitude and practices in prevention and control of common ARI of children living in slum areas of Ahmedabad city. 1990, a dissertation submitted to G.U.
 16. Chatterjee Saurav, Saha Sandhita: A study on KP of mothers regarding infant feeding and nutritional status of under five attending immunization clinic of Medical College, The Internet Journal Nutrition And Wellness, Vol.5, No.1. 2008
 17. Rahman MM, Rahman AM. Prevalence of ARI and its risk factors in underfive children. Bangladesh Medical Research Council Bull, 1997; 23(2):47-50

Prevalence of Hypertension among Reproductive Age Group Women in Study District of West Gujarat : A Community Based Cross Sectional Study

Mittal Rathod¹, Dipesh Parmar², Mehul Kaliya³, Sumit Unadakat⁴, Amrita Sarkar⁵, Trusha Kansagra¹

¹ Tutor, ² Professor & Head, ⁴ Associate Professor, ⁵ Senior Resident Doctor, Community Medicine Department, Shree M.P. Shah Government Medical College, Jamnagar, Gujarat, India

³ Assistant Professor, Medicine Department, Shree M.P. Shah Government Medical College, Jamnagar, Gujarat, India

Correspondence : Dr. Mittal Rathod, E mail: dr.mittal74@gmail.com

Abstract :

Introduction : Non-communicable Disease, are on rise in our country and mean age of incidence is comparative-10 to 20 years lower in India as against western countries. Same holds true for Hypertension. Despite decades of public health education, hypertension awareness remains problematic, with only about two-thirds of adults and the elderly aware of their hypertension status and known differences between men and women. **Aims & objectives :** To assess prevalence of Hypertension and associated factors. **Method :** A community based cross-sectional study was conducted among 450 women of reproductive age group women of Jamnagar district. **Results :** There was even distribution in almost all Age groups of reproductive age group women except for 15-19 years and 40-44 years. Mean systolic Blood pressure was 124.84±13.616 mm of Hg with range of 98- 162 mm of Hg. On diastolic blood pressure measurements, mean value was 77.14±9.574 mm of hg with range of 52- 98 mm of Hg. **Conclusion :** The prevalence of HT in present study was 20.44%. 55.33% fallen on in pre hypertensive stage. There was significant association between various risk factors & occurrence of HT.

Keywords : Hypertension, Reproductive age group, JNC-7

Introduction :

Hypertension a silent killer is a major risk factor for cardiovascular disease worldwide and is one of the most important reasons to visit to physician. ^[1] Good control of blood pressure will result in prolonged survival. ^[2] India and many other developing countries were facing a problem of epidemiological transition from communicable diseases to non communicable diseases. ^[3] Successful implementation of various controlling; preventing and eradication programs gradually decreased the burden of communicable diseases. At the same time globalization brought the life style and behavioural modifications and in turn increased the prevalence of life style disorders such as Hypertension and diabetes mellitus etc. According to ICMR survey report 2007-08, the prevalence of hypertension was varying from 17-21 % in all the states with marginal rural-urban differences. ^[4] But according to rule of halves, Only one half of the patients with high blood

pressure in a population have been diagnosed, only half of those detected have been treated, and only half of those treated have been adequately treated to a normal blood pressure. ^[5] It clearly represented the iceberg phenomena of disease. Despite decades of public health education, hypertension awareness remains problematic, with only about two-thirds of adults and the elderly aware of their hypertension status ^[6] and known differences between men and women. ^[7] While hypertension prevalence is highest in older populations, almost 20 percent of young adults are hypertensive. ^[8] Among young adults (ages 19-24), uninsured persons are more likely to have no contact with a physician or no usual source of care, to delay or miss a medical appointment, and to not fill a prescription because of cost. ^[9] Women are more liable to get undiagnosed because of ignorance, non frequent visits to health care centre & major occupation being home maker. Keeping in view the above stated problems, there is a need of conducting study which can assess of reproductive women.

Objectives :

- Primary Objective: To estimate the prevalence of Hypertension amongst women in the study population.
- Secondary Objective: To study the effect of various determinants on Hypertension amongst the study population.

Method :

Study area and population: The present assessment employed quantitative research methodology in rural areas of Jamnagar (Jamnagar & Dwarka) district of Gujarat.

Type of study: A cross sectional study.

Period of study: 1 year (July 2013- June 2014)

Sample size : A community survey carried out by ICMR during 2007-2008 reported prevalence of HT varying from 17-21% in all the states with marginal rural-urban differences.^[10] As per WHO practical manual on sample size determination in health studies by Lwanga and Lemeshow^[11] $N = Z_{\alpha}PQ/l^2$ Where, $Z_{\alpha}=1.96$ at 5% significance level, N = required sample size, P =proportion or prevalence of interest, $Q=100-p$, l =allowable error. So when absolute error taken as 5%, P is taken as 17%, so as $q=83\%$. Then, sample size would be, $N = (1.96)^2 * 17*83/5^2 = 216.82$. Sampling technique being cluster sampling method, design effect of 2 was taken in considerations. Thus total sample size would come to $216.82*2= 433.63$ participants. It was rounded to 450. Thus final sample size studied was 450 reproductive age group women. Study population: The study group comprised of 450 women of reproductive age group of rural areas of study district.

Inclusion criteria : Ever Married, Reproductive age group women (15-49 years), willing to participate

Exclusion criteria : Pregnant Presently, Not willing to participate

Sampling technique : Study subjects were selected by Cluster sampling. Out of the total 7 blocks in the district, 3 blocks were selected randomly. Five

Primary Health Centres were selected from each of the blocks by simple random sampling. From each PHC three sub centres were selected by simple random sampling method. So total 45 sub centres were selected from 3 blocks. Sub centre was taken as natural cluster. Thus total 45 clusters were selected. From the one geographically identified point, one direction was chosen randomly and from each cluster 10 women were selected and interviewed till the desired number was achieved in each cluster. So total 450 women were recruited from rural area.

Method : Data were collected in a pre-designed and pre-tested Proforma by interviewing woman. The study was carried out by undertaking house to house visits of the area of each cluster. Proforma consisted sociodemographic profile, various risk factors of HT, clinical Examination, BP measurement, & BMI measurement. BP measurement: BP was measured according to the international guidelines. Measurements were taken at the end of the interview using a standard mercury sphygmomanometer with bladder size 12x35 cm. The subject remained at rest in the sitting posture for at least 5 min and then the BP was measured in both arms. For diastolic BP (DBP) Korotkoff phase V was used. In every visit, three BP measurements were taken with at least 1-min interval between them. In the analysis, only the average BP of the was used. If the subjects received antihypertensive medication, the measurements took place without any intervention on it.

Definition : Hypertension was defined as systolic BP (SBP) 140 mmHg or DBP 90 mmHg, or current treatment with antihypertensive drugs, according to the guidelines of the Joint National Committee (JNC) VI in the US⁶ and the WHO – International Society of Hypertension.^[12]

Educational Tool : Self designed educational tool was used to educate and counsel the women for various lacunas associated with Hypertension, found while data collection.

Ethical clearance : The study protocol was reviewed and approved by the institutional ethical committee of the institution. Prior written informed consent

Results:

Table 1 : Socio-demographic profile of study subjects :

Socio-demographic Characteristics	No. (Frequency)	Percentage (%)
Age group		
15-19 Years	9(2%)	2%
20-24 Years	99 (22%)	22%
25-29 Years	81 (18%)	18%
30-34 Years	72 (16%)	16%
35-39 Years	72 (16%)	16%
40-44 Years	36 (8%)	8%
45-49 Years	81 (18%)	18%
Religion		
Hindu	378 (84%)	84%
Muslim	72 (16%)	16%
Social Class		
I	63 (14%)	14%
II	81 (18%)	18%
III	138 (30.7%)	30.7%
IV	111(24.6%)	24.6%
V	57(12.7%)	12.7%
Educational Status of Women		
Illiterate	198 (44%)	44%
Primary	144(32%)	32%
Secondary & Higher Secondary	108(24%)	24%
Educational Status of Husband		
Illiterate	126(28.57%)	28.57%
Primary	140 (31.74%)	31.74%
Secondary & Higher secondary	130(29.47%)	29.47%
Graduate & above	45 (10.20%)	10.20%
Occupation of Women		
Housewife	333 (74%)	74%
Laborer	63 (14%)	14%
Farmer	54 (12%)	12%
Occupation of Husband		
Business	90(20.40%)	20.4%
Service	81(18.36%)	18.36%
Laborer	180(40.81%)	40.81%
Farmer	63(14.81%)	14.81%
Other	27(6.12%)	6.12%

Figure: 1 Distribution of study participants according to systolic & diastolic Blood pressure.

Systolic

Systolic Stem-and-Leaf Plot

Frequency	Stem &	Leaf
1.00	9 .	&
39.00	10 .	000000000000000000224
11.00	10 .	88888
62.00	11 .	00000000000000000000000000000000000022&
10.00	11 .	6888
83.00	12 .	000000000000000000000000000000000000222244444
37.00	12 .	666688888888888888
108.00	13 .	00
7.00	13 .	668
74.00	14 .	00000000000000000000000022222222222222224444
.00	14 .	
10.00	15 .	0000&
8.00	Extremes	(>=158)

Stem width: 10
Each leaf: 2 case(s)

Diastolic

Diastolic Stem-and-Leaf Plot

Frequency	Stem &	Leaf
3.00	5 .	2
5.00	5 .	8&
70.00	6 .	00000000000000222444444444
35.00	6 .	668888888888
40.00	7 .	0000000002244
3.00	7 .	8
207.00	8 .	0022222222222222222222224444444444
63.00	8 .	6666888888888888888888
22.00	9 .	0000024
2.00	9 .	&

Stem width: 10
Each leaf: 3 case(s)

& denotes fractional leaves.

was taken after fully explaining the purpose of the study.

Data entry and analysis: The data entry was done in Microsoft Office Excel 2007. Analysis was done using Epi info and Microsoft office Excel2007 and SPSS. Quantitative variables were subjected to linear correlation and regression where as qualitative variable were subjected to Binary logistic regression. P value<0.05 was considered as statistical significance.

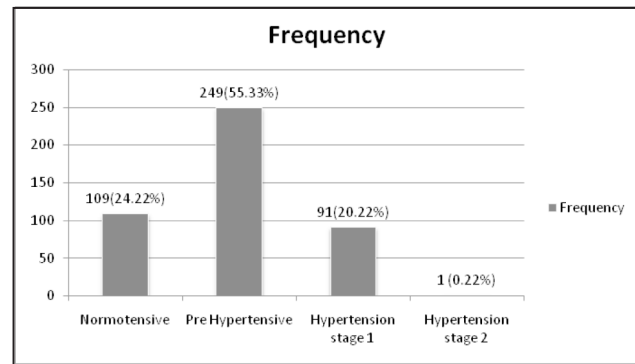
There was even distribution in almost all Age groups of reproductive age group women except for 15-19 years and 40-44 years. Majority belonged to middle and lower socio economical class. Higher literacy rate among husbands of participants (71.43%) than females (56%). Most Women were engaged in house hold activities (74%) where as their husbands were engaged in labour work (40.81%), some kind of business (20.40%), farming (14.81%).

Figure 1 Denotes stem and leaf diagram of study participants according to their systolic and Diastolic blood pressure measurements. Stem and Leaf plots used to analyze data and display data all at the same time. It is a way of showing each data value along with its relationship to other values. "Stem" by listing the largest place- value digits to the left of a vertical line. The remaining digits will be written to the right of the vertical line to create the 'leaves'".

In the stem and leaf diagram of SBP, 1st column is showing frequency in the particular stem. Second column is stem; with systolic blood pressure range of 98- 162 mm of Hg. Mean systolic Blood pressure was 124.84±13.616 mm of Hg. On diastolic blood pressure measurements, stem of diastolic blood pressure range from 52- 98 mm of Hg with mean value was 77.14±9.574 mm of Hg.

In the current study prevalence of Hypertension was 20.44% among reproductive age group women. (Figure 2) But when looked in to another classification of pre hypertensive stage, 55.33% belonged to this group, which suggests that chances

Figure 2 : Prevalence of Hypertension among Reproductive age group women

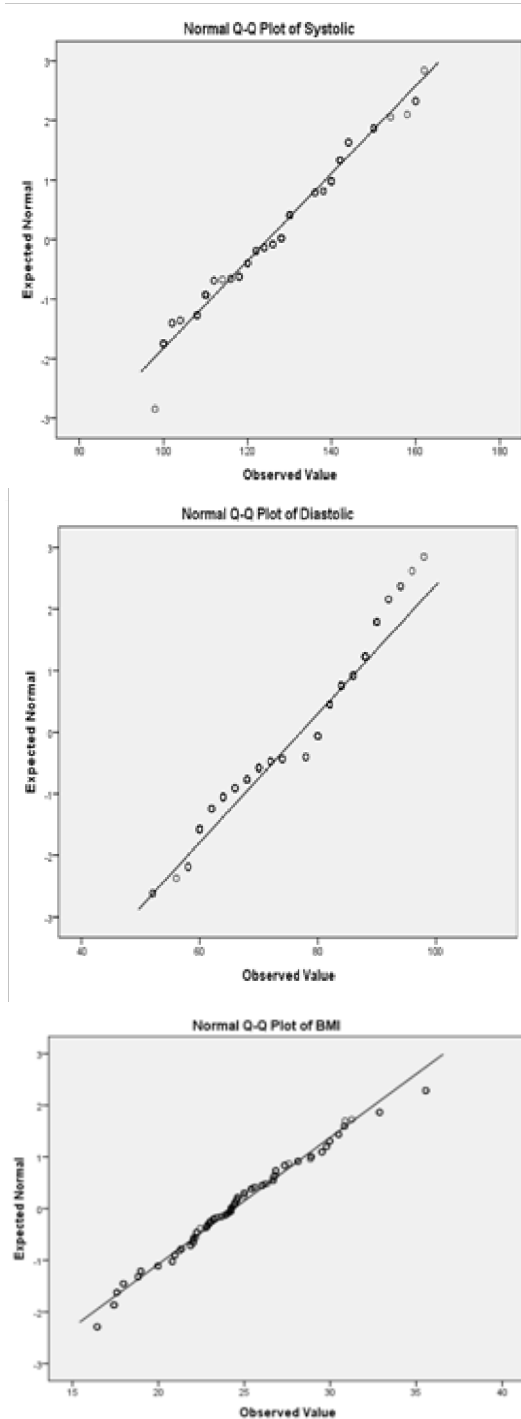


of transition from pre hypertensive stage to Hypertensive stage is high. All the subjects were instructed to have followed up visit and Blood pressure measurement at least once a year. All the participants were educated about the various modalities of prevention and control and treatment protocol of hypertension. Those who were diagnosed as Hypertension were advised to seek medical care immediately and were referred to nearest health care facility. 2.66% had family history of Hypertension. When evaluated about past major illness 8% had Diabetes Mellitus, 12% had HT, and 4% had IHD attack. They were evaluated for treatment protocols and counselled accordingly.

Quantitative variables were tested for normality using Kolmogorov-Smirnov and Shapiro- Wilk test. Age in complete years and BMI were tested and found normality distributed. Thus Pearson's correlation regression (Linear correlation-regression) was applied. There was statistically significant correlation between Ages in completed years, BMI and Hypertension.

There was significant correlation between increasing age and systolic Blood Pressure. One Unit rise in age in completed years, there was 0.921 Unit rise in Systolic Blood Pressure. The same was found for Diastolic blood pressure. One Unit rise in age in completed years, there was 0.585 Unit rise in Diastolic Blood Pressure. One Unit rise in BMI, There was 1.015 Unit rise in Systolic Blood Pressure. One Unit rise in BMI, There was 0.779 Unit rise in Diastolic Blood Pressure.

Figure 3: Scattered diagram of (A) Systolic Blood pressure (B) Diastolic Blood pressure & (C) BMI of Reproductive age group women



Qualitative variables were subjected to Binary logistic regression. Table 2 show logistic regression analysis of various risk factors and presence of

Hypertension. There was statistical significant association between Religion, Nuclear type of family, Socioeconomical class, Educational status of female participants, Educational status of Husband, Occupation and contraceptive usage. But there was no statistical association between Family history of Hypertension, addiction, lack of exercise and presence of Hypertension. No significant association might be due to less no. of the study subjects in respective groups.

While considering Muslim religion as referent, Hindus had 17.594 times higher chances of occurrence of Hypertension than Muslims. The Odds Ratio could be higher because of fewer samples in Muslim religion. Those participants who belonged to Nuclear family had 17.224 higher prevalence of HT compared to Three generation family. Higher chances of occurrence of Hypertension as socio class advances, which is shown in table 2, in which increasing Odds Ratio from class V to class I respectively. Educational status of participants as well as their husbands 'educational status plays important role in occurrence of Hypertension. Higher the educational status lower the chances of hypertension, it may be due to high level of knowledge and awareness about the risk factors of HT & its occurrence and complications. Those who were using Oral contraceptives had 2.09 times higher occurrence of Hypertension than no contraceptive users. Other contraceptive users had 1.44 times more prevalent HT but it was not statistically significant.

Overall prevalence of addiction was 19.1%. Of which 12.66% had addiction of Mava (Pan, Ghutakha, and Masala) Chewing (Tobacco chewing) while rest were using bajar. All those who had addiction were aware of its adverse effects. When asked for quitting the addiction, only 12% were willing to quit it with supplement drugs available in government drugs. Those who were not willing to quite, said that it was habituated so long so it was difficult to quite and other responses were as follows; chewing tobacco less harmful.

Table 2: Association between various risk factors & Hypertension (Binomial Logistic Regression)

Variable	Statistics		
	Hypertension	Adjusted OR	P value
Religion			
Hindu	91(98.91%)	17.594	<0.005
Muslim	1(1.08%)	1	
Type of Family			
Nuclear	38 (41.3%)	17.224	<0.005
Joint	18(19.6%)	0.52	0.33
Three generation	36(31%)	1	
Socio economical class			
I	9(9.3%)	34.54	<0.005
II	11(12%)	24.33	<0.005
III	36(39.1%)	18.64	<0.005
IV	18(19.6%)	17.8	<0.005
V	18(19.6%)	1	
Educational status of Female			
Illiterate	47(51.1%)	34.404	<0.005
Primary	27(29.3%)	37.303	<0.005
Secondary & above	18(19.6%)	1	
Educational status of Husband			
Illiterate	29(31.5%)	2.709	<0.05
Primary	36(39.1%)	3.690	<0.05
Secondary above	27(29.4%)	1	
Occupation			
Housewife	65(70.7%)	2.855	0.002
Farmer	9(9.8%)	2.550	0.006
Labourer	18(19.6%)	1	
Family History			
Yes	1	1.318	0.09
No	91	1	
Contraceptives			
OCPs	52	2.094	0.05
Others	30	1.44	0.33
No	10	1	

Discussion :

According to, JAPI supplement overall prevalence of HT among Urban people was 25% and among Rural people was 15%.^[13] In present study conducted among rural women found higher prevalence of the hypertension than other studies.

Non-communicable Disease, are on rise in our country and mean age of incidence is comparative- 10 to 20 years lower in India as against western countries. Same holds true for According to, Agrawal VK (2006), prevalence of HT among rural female was 17%.^[14]

A community survey carried out by ICMR during 2007-2008 reported prevalence of HT varying from 17-21% in all the states with marginal rural-urban differences. Overall pattern of prevalence was found increasing with age groups in all states.

Tobacco use among women is prevalent in all regions of India and among all sections of society. Overall, 2.4% of women smoke and 12% chew tobacco. In a report from a large teaching maternity hospital in Mumbai (2003) 33.4% of women in reproductive age group were smokeless tobacco users.^[15]

Conclusion :

The prevalence of HT in present study was 20.44%. 55.33% fallen on in pre hypertensive stage. There was significant association between various risk factors and occurrence of HT.

Recommendations :

As HT resembled the iceberg phenomenon, there is need of screening of everyone as a part of opportunistic screening. Whenever patient attends health facility there must be screening for HT. People must be made aware about the BP measurements at least once a year after 30 years age. Which could help in early diagnosis & timely initiation of treatment & thus prevention of the complications occurring from HT as well as mortality?

Limitation of study :

Relatively small sample size could be the limitation, for so such type multicentre study should be conducted with larger sample size. Only variable of interest were included in study.

References :

1. Prospective Studies Collaboration. Agespecific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies. Lewington S et al.: Lancet. 2002 Dec 14;360:1903-13.
2. Impact of high normal blood pressure on the risk of cardiovascular disease. Vasan R et al. N Engl J Med. 2001;345:1291-7.
3. Understanding epidemiological transition in India by Yadav S et al. Global Health Action. 2014(5)-7
4. National Health report by Govt. of India. Ministry of Health and Family welfare, New Delhi:2011:15-27.
5. Text book of preventive & social medicine by K.Park, Bhanot Publication. Ch:23 Health care of the community 2013 Ed22, pg:833.
6. Prevalence, awareness, treatment, and control of hypertension among United States adults 1999-2004. Ong KL et al. Hypertension. 2007;49(1):69-75. [PubMed].
7. Trends in hypertension prevalence, awareness, treatment, and control rates in United States adults between 1988-1994 and 1999-2004. Cutler JA et al. Hypertension. 2008;52(5):818-827. [PubMed].
8. Discordance in national estimates of hypertension among young adults. Epidemiology. Nguyen QC et al. 2011;22(4):532-541. [PMC free article] [PubMed].
9. Uninsurance and health care access among young adults in the United States. Callahan ST et al. Pediatrics. 2005;116(1):88-95. [PubMed].
10. National Health Report by Govt of India. Ministry of Health and Family Welfare, New Delhi:2011.
11. World Health Organization, Geneva. Practical manual on sample size determination in health studies by S.K. Iwanga & S. lemeshow; 1991. p1-5.
12. Current medical diagnosis and treatment by STEPHEN J McPHEE, MAXINE A. PAPADAKIS. A Lange Publication. 2010: Ed49.
13. Supplement to Journal of Association of Physician of India, Feb 2013(61) Indian guidelines on Hypertension (I.G.H.)-111 pg no: 17-25.
14. Coronary risk factors in rural community. Agrawal VK et al. Indian J. Public health 2006 Jan-March;50(1):19-23.
15. WHO global report on trends in prevalence of tobacco, world health organisation, Geneva, Switzerland 2015, pg no: 23 (Table-3).

Association between Blood Pressure and Cognition among Old Age PeoplePranay Jadav¹, Neha Bavarva²¹ Assistant Professor, ² Tutor, Department of Community Medicine, GMERS Medical College, Gandhinagar, Gujarat**Correspondence** : Dr. Neha Bavarva, E mail: nehabavarva@gmail.com**Abstract :**

Introduction : High Blood pressure may lead to memory impairment in old age. Present study had been conducted to know relation between cognition and blood pressure in geriatric people. **Method :** A cross sectional study was conducted among 600 study participants aged of 60 years or more in villages of Vadodara district. Blood pressure was measured by sphygmomanometer and cognition was screened through Mini Mental State Examination (MMSE). **Results:** The overall prevalence of high blood pressure among study participants was 42.7%. Cognitive impairment (MMSE score < 22) was prevalent in 23.5% of study participants. High SBP was significantly associated with low MMSE score even after adjusting potential confounders in multiple linear regression models. **Conclusion:-** SBP is related to poorer performance on Mini-Mental State Exam in the geriatric population aged 60 years and above in absence of any apparent neurological deficit. Diastolic blood pressure does not find any significant relation between MMSE score.

Keywords : Association, Blood Pressure, Cognition, Memory**Introduction :**

No man on earth can escape of growing old. Aging is certain and all you can do is protect it, promote it and extend it. Aging is an integral part of the growth and development which is terminated by death. Old age persons are a valuable asset for any country and community as they are rich in their experience and wisdom. They can guide youth what are dos and don'ts of life. Nowadays there are improvements in health care services which increases life expectancy. The ratio of older persons has changed dramatically from approximately one in fourteen in the fifties as in past to about one in four at present.^[1-3]

Epidemiological studies have indeed demonstrated that mean blood pressure increases with age^[4-9], not only in old age but also in young adults.^[10] Other underlying mechanisms for the increase in blood pressure with age include age-related reductions in blood volume and cardiac output, alterations in the function of and response to the sympathetic nervous system and reduced baroreceptor sensitivity, the latter leading to increased blood pressure variability.^[11-12]

Cardiovascular risk factors like diabetes, hypertension, hyperlipidemia and smoking are modifiable risk factors and highly prevalent, leading to mortality and disability. These risk factors are associated with increased risk of cognitive decline and dementia. There is increasing evidence from India and other countries that cerebrovascular risk factors are associated with an increased risk of cognitive decline and dementia. Hypertension is one of the risk factors that can cause cognitive decline even in the absence of the stroke.^[13]

The relationship between blood pressure (BP) and cognitive outcomes in the elderly has gained attention because of its implications for global healthcare. There is a deficit of regular screening and unawareness about complications of long-term high blood pressure in old age, in rural area. Cognitive decline is one of the major complications of the long standing hypertension.^[13-16] So the purpose of this study was to find the prevalence of hypertension and cognitive decline and the association of cognitive impairment and hypertension in elderly people.

Method:**Study setting, Study type, and study participants:**

-After getting approval from the Institutional Ethical Committee, study was started. A Cross-sectional study was done in the villages of Vadodara district from October 2010 to July 2012. The study included the Geriatric population: person having age ≥ 60 years.

Sample size and sampling : A sample size of 600 was obtained using the formula $Z_{\alpha}PQ/l^2$: Where $Z = 95\%$ confidence intervals (1.96 table value), the prevalence of cognitive decline in geriatric population in a rural area India is (p) 14.89 from the previous study^[17] (so $q=1-p$) and $L= 3\%$ margin of error. The calculated minimum sample had been inflated by 10% to account for anticipated subject non-response. Six Talukas were selected by simple random sampling from the 12 Talukas of the Vadodara district. From each of these selected 6 talukas, 4 villages were selected by simple random technique. From each of the selected village, 25 study participants were selected conveniently by the house to house survey. The survey was started on the right-hand side of the Village Panchayat Office. The village next to that in the random list was selected to fulfill the study subjects if study participants were not enough in a selected village.

Measurement tools:

Measurement of blood pressure: Blood pressure was measured by Random Zero mercury sphygmomanometer and stethoscope in sitting position in right brachial artery after 5-minute of rest. Korotkoff sound 1 and 5 were considered as systolic and diastolic blood pressure respectively. Pulse pressure was calculated as the difference between systolic and diastolic blood pressure. Mean arterial blood pressure was calculated by using following formula: $DBP+1/3$ Pulse pressure. Measurement of blood pressure of all participants was done by a single investigator.

Assessment of cognitive status : The Folstein Mini-Mental State Exam (MMSE) is a widely used and well-

validated tool for the evaluation of cognitive impairment. It briefly measures orientation to time and place, registration, immediate recall, short-term verbal memory, calculation, language and constructs ability.^[15] The MMSE includes following items: the maximum score is 30 points (10 points for orientation, 3 for registration, 5 for attention and calculation, 3 for recall, 4 for naming the objects, 1 for repetition, 1 for following the command, 1 for reading ability, 1 for writing ability and 1 for visuospatial construction). Scores of > 27 are generally considered normal, 22-26 as mild cognitive impairment and those less than 22 as possible dementia. Hindi 16 and Gujarati 17 version of MMSE were used.

Data Collection: House to house survey was done to find the study subjects from the selected villages. After acquiring the study subject the details regarding the study viz. purpose of the study, method of the study was explained in the vernacular language to each participant and head of the family. Written consent was taken from the each subject with assuring that their name was not be disclosed other than the person's concern with the study. The questionnaire was filled by personal interview. Questionnaires were of two parts. The first part included socio-demographic details regarding age, sex, religion, marital status, education, occupation, income, addiction (tobacco and alcohol) and drug using for any chronic illness etc. The second part of the questionnaire was of Gujarati version of minimal state examination for cognitive assessment. Blood pressure was measured at the start of the study after 5-minute rest and again after in between socio-demographic and MMSE interview. The mean of two reading was taken into account.

Statistical analysis : Data were cleaned, validated and analyzed with Epi-info 7. For continuous variables range, mean and standard deviation were calculated and for categorical variables proportion and percentage were obtained. To know the association between two variable, tests of significance were applied. Chi-square test was applied for proportions and t- test was applied for

Table 1: Prevalence of Hypertension and cognitive impairment (MMSE score < 22) among study participants (n=600)

	Hypertension	Impaired Cognition (MMSE <22)
Age group		
60-69 years	198 (46.8%)	93 (22%)
70-79 years	28 (21.9%)	18 (14.1%)
≥ 80 years	30 (61.2%)	30 (61.2%)
Sex		
Male	142 (38.90%)	56 (15.3%)
Female	114 (48.51%)	85 (36.2%)
Total prevalence	256 (42.7%)	141 (23.5%)

Table 2 : Factors affecting impaired cognition among study participants (n=600)

Variables	Cognition in form of MMSE score		p-value
	Impaired cognition (MMSE<22) n=141	Normal cognition (MMSE≥ 22) n=459	
Age			
60-69 years	93 (22%)	330 (78%)	p < 0.001
70-79 years	18 (14.1%)	110 (85.9%)	
≥ 80	30 (61.2%)	19 (38.8%)	
Sex			
Male	56 (15.3%)	309 (84.7%)	p < 0.001
Female	85 (36.2%)	150 (63.8%)	
Marital status			
Unmarried	9 (50%)	9 (50%)	p < 0.0037
Married	94 (21.3%)	347 (78.7%)	
Separated/divorced	0 (0)	10 (100%)	
Widow/widower	38 (29%)	93 (71%)	
Living arrangement			
Living alone	28 (43.1%)	37 (56.9%)	p < 0.001
Living with spouse	38 (39%)	93 (71%)	
Living with children	9 (9.6%)	85 (90.4%)	
Living with both spouse and children	66 (21.3%)	244 (78.7%)	
Education			
Illiterate/ Just literate	102 (47.3%)	111 (52.1%)	p < 0.001
Primary	39 (18.1%)	176 (81.9%)	

Secondary/Higher secondary	0 (0)	37 (100%)	
Graduate/post graduate	0 (0)	135 (100%)	
Occupation			
Working	27 (17%)	132 (83%)	p = 0.024
Not working	114 (25.9%)	327 (74.1%)	
Smoking habit			
Never used	141 (30.5%)	321 (69.5%)	p < 0.02
Ever used	28(20.28%)	110(79.72%)	
Smokeless tobacco use			
Never used	121 (26.4%)	375 (75.6%)	p = 0.26
Ever used	20 (23.5%)	84(76.5%)	
Alcohol consumption			
Never consume	141 (26.3%)	375 (73.7%)	p = 0.01
Ever consume	8(12.5%)	56(87.5%)	
Poly-pharmacy			
No	102(24.3%)	318(75.7%)	p = 0.488
Yes	39(21.7%)	141(78.3%)	
Depression			
Yes	123 (37.8%)	202(62.2%)	p <0.001
No	18 (6.5%)	257 (93.5%)	
Systolic blood pressure			
Normal (<120mm Hg)	9(31%)	20(59%)	p < 0.001
Pre-Hypertension (120-139 mm Hg)	46 (14.2%)	279 (85.8%)	
Hypertension stage 1 (140-159 mm Hg)	77 (43%)	102 (57%)	
Hypertension stage 2 (\geq 160 mm Hg)	9 (13.4%)	58 (86.6%)	
Diastolic blood pressure			
Normal (<80 mm Hg)	27 (41.5%)	38 (58.5%)	p < 0.001
Pre-Hypertension (80-89 mm Hg)	75 (18.3%)	335 (81.7%)	
Hypertension stage 1 (90 -99 mm Hg)	39 (40.6%)	57 (59.4%)	
Hypertension stage 2 (\geq 100 mm Hg)	0 (0)	29 (100%)	

Overall blood pressure			
Normal (<120 and < 90 mm Hg)	9(31%)	20(59%)	p < 0.001
Pre-Hypertension (120-139 mm Hg and/or 80-89 mm Hg)	46 (14.6%)	269 (85.4%)	
Hypertension stage 1 (140 -159mm Hg and or 90-99 mm Hg)	77 (40.7%)	112 (59.3%)	
Hypertension stage 2 (\geq 160 mm Hg and/or \geq 100 mm Hg)	9 (13.4%)	58 (86.6%)	

Table 3: Simple Linear relation between blood pressure and MMSE score among study participants (n=600)

Variables	Correlation coefficient (r)	R²	Constant (Intercept on y axis)	Regression coefficient	p-value
Systolic BP	-0.239	0.0565	37.34	- 0.081	< 0.005
Diastolic BP	0.022	0.0005	25.13	0.014	0.587
Pulse pressure	-0.317	0.0992	33.44	-0.135	< 0.005
Mean arterial blood pressure	-0.284	0.0131	32.65	-0.063	< 0.005

continuous variables. First simple linear regression was done between blood pressure variables and MMSE score. Multiple linear regressions was done for adjustment of age, sex, education, use of anti-hypertensive medications and depression. A p-value < 0.05 was considered as statistically significant.

Results :

The overall prevalence of high blood pressure among study participants was 42.7%. As shown in Table 1 high blood pressure is more prevalent in advanced age and female sex. Cognitive impairment (MMSE score < 22) was prevalent in 23.5% of among study participants. Prevalence was as higher as 61.2% in age group of more than 80 years of the population as compared to other age groups and also high (36.2%) in female sex (Table 1).

While calculating simple linear regression between MMSE score and blood pressure variables, it has been observed that systolic blood pressure, Pulse pressure and mean arterial blood pressure were negatively correlated with an MMSE score which was statistically significant. Diastolic blood pressure has a positive correlation with the MMSE score and it was statistically insignificant (Table 3).

To counter the effect of confounding variables, blood pressure was adjusted for age, sex, education, use of anti-hypertensive medication and depression. In these models, age and depression were inserted as continuous variables while sex, education and anti-hypertensive medication were inserted as dummy variables. From table 4 it has been revealed that systolic blood pressure remains negatively correlated even after adjusting for major

Table 4: Multiple linear regression models of systolic blood pressure as a predictor of the MMSE score after adjusting for major confounding variables.

Variables	Regression coefficient	p value	R2	Constant
Model1				
SBP	-0.078	<0.001	0.08	44.85
Age	-0.118	<0.001		
Model 2				
SBP	-0.069	<0.001	0.21	46.30
Age	-0.139	<0.001		
Sex	-3.368	<0.001		
Model 3				
SBP	-0.067	<0.001	0.31	45.63
Age	-0.177	<0.001		
Sex	-1.955	<0.001		
Education	3.612	<0.001		
Model 4				
SBP	-0.069	<0.001	0.32	45.41
Age	-0.169	<0.001		
Sex	-2.022	<0.001		
Education	3.383	<0.001		
Anti -HT medication	0.729	0.04		
Model 5				
SBP	-0.036	0.001	0.477	36.80
Age	-0.038	0.112		
Sex	-0.402	0.232		
Education	2.604	<0.001		
Anti -HT medication	0.376	0.248		
Depression	-1.014	<0.001		

confounding factors. Model 5 has R2 of 0.477 means 47.7% change in MMSE score can be explained by this model and it is statistically significant ($p < 0.005$)

Discussion

The present cross-sectional study was conducted to know the association between blood pressure and cognition changes among old age population (≥ 60 years). Hypertension is an important cause of

morbidity and mortality in the elderly population and is a risk factor for many other diseases. The present study reports a prevalence rate of hypertension as 42.7% which compares well with other studies carried out by Kokiwaret al^[18] at rural community of central India (38.1%) and Agrawal et al^[13] from Rajasthan (42.1%). While a higher prevalence of 69% was reported among the elderly population aged sixty and above (Bulletin of WHO

2011)^[19] and 54% among persons aged ≥ 40 from Chennai.^[20] Prevalence of hypertension in the present study was as high as 48.5% in females compared to males 38.9%. Similar findings were reported by Hazarika N C et al^[21] and Malhotra P et al^[22] while Gupta R et al^[23] and Guang Hui Dong et al^[24] found it was more in males. A study done in Surat city of Gujarat by Power AB et al reported Prevalence of hypertension among elderly women was 33.3%.

The overall prevalence of cognitive decline was 23.5% (Table 1) in the study population. Prevalence of cognitive decline among male study participants was 15.3%. Prevalence of cognitive decline among female study participants was 36.2%. A hospital based study done by Begda AA^[25] in the same city found the overall prevalence of cognitive impairment 39.2% which was 31.7% in male subjects and 47.9% in female subjects. This may be due to sampling variability. In a rural community-based study from Ballabhdgarh^[26] among non-demented people aged 55 years and above, cognitive impairment was reported to be present in 10.2%. In two communities based study in rural areas, from Spain^[27] and Japan^[28] cognitive impairment was reported to be 7.1% and 8.6% respectively, which was lower than the present study.

It has also been found in present study that the prevalence of cognitive impairment was significantly associated especially with advancing age. The similar association found in a hospital based study done in 2006 in the same city^[25] and also found in other study.^[29] The economic dependence and loneliness are two important factors which are associated with old age and also believed to have an influence on cognitive changes.

This cross-sectional study showed a linear relationship between higher SBP and impaired cognitive levels in individuals without prior history of any neurological damage. This relationship persisted even after adjustment for age, sex, education, use of anti-hypertensive medication and depression, which is consistent with the result from most of the previous studies.^[30-34] Previous studies

have reported mixed results regarding the relationship of cognitive impairment and BP. Cross-sectionally, Scherr et al^[35] found no association between either SBP or DBP and cognitive performance; Wallace et al^[36] and the Tsivgoulisge^[37] at al found that only elevated DBP was associated with poor memory performance, and Budge et al^[38] reported that higher MMSE scores were significantly associated with lower SBP. A prospective study^[39] by found that elevated midlife SBP was a significant predictor of poor cognitive functioning in later life. In a large community-based elderly Swedish cohort, Guo ET al^[38] found that those with lower baseline SBP had an almost 2-fold elevated risk of low MMSE scores at 3-year follow-up. In another cohort study, Glynn et al^[40] showed that those with lower SBP were more likely to have an incident cognitive impairment. In Farmer et al^[41] a found that participants 75 years and older with isolated systolic hypertension had better cognitive performance than those without systolic hypertension, but not after adjusting for confounding variables. In contrast, our findings were significant even after adjusting the confounding variables. In Indo-US cross-national epidemiologic study^[26], every 10 mm HG difference in DBP or SBP was related to more than 10% decrement in cognitive impairment.

Diastolic blood pressure in the present study was not independently associated with cognition while Schmidt R et al^[42] and Deleev F E et al^[43] found that higher DBP (not SBP or PP) was an independent predictor of white matter hyperintensity progression in elderly individuals, both without neuropsychiatric disease and Alzheimer's disease.

The exact mechanism of how hypertension leads to impaired cognition is still unclear but Biologically plausible explanations are: hypertension-induced proliferation of smooth muscle cells, basal lamina alterations, luminal narrowing, endothelial-hyalinosis, and ultimately fibrosis; hypertension-related microvascular degeneration and cerebral amyloid angiopathy can cause alteration in the cerebral endothelium and become an important dementia precursor; hypertension-induced

endothelial dysfunction in the small cerebral vessels may also cause chronic cerebral oxygen deprivation and greater susceptibility to hypoxia^[44-47].

Conclusions :

In conclusion, the findings from the present study provide evidence that increased resting SBP is related to poorer performance on Mini-Mental State Exam in the geriatric population aged 60 years and above in absence of any apparent neurological deficit. Diastolic blood pressure does not find any significant relation between MMSE score.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

- Prakash R, Chaudhry S, Singh U. A study of morbidity pattern among geriatric population in the urban area of Udaipur Rajasthan. *IJCM* 2004; 29(1): 35-40.
- Singh C, Mathur JS, Mishra VN, Singh JB, Garg BS, Kumar A. *IJCM* 1995; 20(1-4):24-27
- Purty A, Bazroy J, Kar M, Vasudevan K, Velialth A, Panda P. Morbidity pattern among the elderly population in the rural area of Tamilnadu, India *TURK J MED SCIENCE* 2005;36:45-50.
- Franklin SS, Gustin Wt, Wong ND, et al. Hemodynamic patterns of age-related changes in blood pressure. The Framingham Heart Study. *Circulation*. 1997;96: 308-315
- Kotchen JM, McKean HE, Kotchen TA. Blood pressure trends with aging. *Hypertension*. 1982;4: III128-134.
- Landahl S, Bengtsson C, Sigurdsson JA, Svanborg A, Svardsudd K. Age-related changes in blood pressure. *Hypertension*. 1986;8: 1044-1049.
- Wolf-Maier K, Cooper RS, Banegas JR, et al. Hypertension prevalence and blood pressure levels in 6 European countries, Canada, and the United States. *JAMA*. 2003;289: 2363-2369.
- Tell GS, Rutan GH, Kronmal RA, et al., for the Cardiovascular Health Study (CHS) Collaborative Research Group. Correlates of blood pressure in community-dwelling older adults. The Cardiovascular Health Study. *Hypertension*. 1994;23: 59-67.
- Burt VL, Whelton P, Roccella EJ, et al. Prevalence of hypertension in the US adult population. Results from the Third National Health and Nutrition Examination Survey, 1988-1991. *Hypertension*. 1995;25: 305-313.
- Oberman A, Lane NE, Harlan WR, Graybiel A, Mitchell RE. Trends in systolic blood pressure in the thousand aviator cohort over a twenty-four-year period. *Circulation*. 1967;36: 812-822.
- Lakatta EG, Levy D. Arterial and cardiac aging: major shareholders in cardiovascular disease enterprises: Part I: aging arteries: a "set up" for vascular disease. *Circulation*. 2003; 107: 139-146.
- Shuaib A. Alteration of blood pressure regulation and cerebrovascular disorders in the elderly. *Cerebrovasc Brain Metab Rev*. 1992;4: 329-345.
- Agrawal H, Baweja S, Haldiya K, Mathur A. Prevalence of hypertension in an elderly population of the desert region of Rajasthan. *Journal of the Indian Academy of Geriatrics*, 2005; 1:14-17.
- Das SK, Bose P, Biswas A, Dutt A, Banerjee TK, Hazra A, Raut DK, Chaudhuri A, Roy T. An epidemiologic study of mild cognitive impairment in Kolkata, India. *Neurology*. 2007 Jun 5;68(23):2019-26.
- Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *Journal of psychiatric research*. 1975 Nov 1;12(3):189-98.
- Ganguli M, Ratclif G, Chandra V, Sharma S, Pandav R. A Hindi version of MMSE: The development of a cognitive screening instrument for a largely illiterate rural elderly population in India. *International of Geriatric Psychiatry* 1995;10:367-77.
- Lindsay J, Jagger C, Mlynik-Szamid A, Sinorwala A, Peet S, Moledina F. The Mini-Mental State Examination (MMSE) in elderly immigrant Gujarati population in the United Kingdom. *International Journal of Geriatric Psychiatry* 1997;12(12): 1155-67.
- Kokiwar PR, Gupta SS, and Dudge PN. Prevalence of Hypertension in Rural Community of Central India. *JAPI* 2012; 60;26-2
- Hypertension Study Group. Prevalence, awareness, treatment, and control of hypertension among elderly in Bangladesh and India: a multicentric study. *Bulletin of the WHO* 2001; 79(6): 490-500. 10.
- Ramachandran A, Snehalatha C, Vijay V, King H. Impact of poverty on the prevalence of diabetes and its complications in urban southern India. *Diabet Med*. 2002; 19(2): 130-5.
- Hazarika NC, Narain K, Biswas D, Kalita HC, Mahanta J. Hypertension in the native rural population of Assam. *Natl Med J India* 2004; 17 (6) :300-304.
- Malhotra P, Kumari S, Kumar R, Jain S, Sharma BK. Prevalence and determinants of hypertension in an un-industrialised rural population of North India. *J Hum Hypertens*. 1999; 13 (7) : 467-72.
- Gupta R, Prakash H, Gupta VP, Gupta KD. Prevalence and determinants of coronary heart disease in a rural population of India. *J Clin Epidemiol* 1997; 50 (2) : 203-209.
- Guang Hui Dong, Zhao Qing Sun, Xin Zhong Zhang, Jia Jin Li, Li Qiang Zheng, Jue Li, et al. Prevalence, awareness, treatment and control of hypertension in a rural Liaoning Province, China. *Indian J Med Res* 2008; 128: 122-127.
- Begda A and Kantharia SL. Screening of Cognitive Impairment and Depression in Elderly Patients. *Indian Journal of Gerontology* 2006;20(4):347-58.
- Pandav R, Dodge HH, DeKosky ST, Ganguli M. Blood pressure and cognitive impairment in India and the United States: a

- crossnational epidemiological study. *Arch Neurol* 2003;60:1123-1128.
27. Coria F, Gomez de Caso JA, Minguez L, et al. Prevalence of age-associated memory impairment and dementia in a rural community. *J Neurol Neurosurg Psychiatry* 1993;56:973-976.
28. Liang J, Borowski-Clark E, Liu X, et al. Transitions in cognitive status among the aged in Japan. *Soc Sci Med* 1996;43:325-337.
29. Swarnalatha N. Cognitive Status Among Rural Elderly Women. *Journal of The Indian Academy of Geriatrics*, 2007; 3:15-19.
30. Seux ML, Thijs L, Forette F, Staessen JA, Birkenhager WH, Bulpitt CJ, Girerd X, Jaaskivi M, Vanhanen H, Kivinen P, Yodfat Y, Vanska O, Antikainen R, Laks T, Webster JR, Hakamaki T, Lehtomaki E, Lilov E, Grigorov M, Janculova K, Halonen K, Kohonen-Jalonen P, Kermowa R, Nachev C, Tuomilehto J. Correlates of cognitive status of old patients with isolated systolic hypertension: the Syst-Eur Vascular Dementia Project. *J Hypertens* 1998;16:963-9.
31. Kilander L, Nyman H, Boberg M, Hansson L, Lithell H. Hypertension is related to cognitive impairment: a 20-year follow-up of 999 men. *Hypertension* 1998;31:780-6.
32. Swan GE, DeCarli C, Miller BL, Reed T, Wolf PA, Jack LM, Carmelli D. Association of midlife blood pressure to late-life cognitive decline and brain morphology. *Neurology* 1998;51:986-93.
33. Starr JM, Whalley LJ. Senile hypertension and cognitive impairment: an overview. *J Hypertens Suppl* 1992;10(Suppl):31-42.
34. Zelinski EM, Crimmins E, Reynolds S, Seeman T. Do medical conditions affect cognition in older adults? *Health Psychol* 1998;17:504-12.
35. Scherr PA, Hebert LE, Smith LA, Evans DA. Relation of blood pressure to cognitive function in the elderly. *Am J Epidemiol*. 1991;134:1303-1315.
36. Wallace RB, Lemke JH, Morris MC, Goodenberger M, Kohout F, Hinrichs JV. Relationship of free-recall memory to hypertension in the elderly: the Iowa 65+ Rural Health Study. *J Chronic Dis*. 1985;38:475-481.
37. Tsvigoulis G, Alexandrov AV, Wadley VG, Unverzagt FW, Go RCP, Moy CS. Association of higher diastolic blood pressure levels with cognitive impairment. *Neurology* 2009;73:589-595.
38. Budge MM, De Jager C, Hogervorst E, Smith AD, for the Oxford Project to Investigate Memory. Total plasma homocysteine, age, systolic blood pressure, and cognitive performance in older people. *J Am Geriatr Soc*. 2002;50:2014-2018.
39. Launer LJ, Masaki K, Petrovitch H, Foley D, Havlik RJ. The association between midlife blood pressure levels and late-life cognitive function: the Honolulu-Asia Aging Study. *JAMA*. 1995;274:1846-1851
40. Glynn RJ, Beckett LA, Hebert LE, Morris MC, Scherr PA, Evans DA. Current and remote blood pressure and cognitive decline. *JAMA*. 1999;281:438-445.
41. Farmer ME, White LR, Abbott RD, et al. Blood pressure and cognitive performance: the Framingham Study. *Am J Epidemiol*. 1987;126:1103-1114.
42. Schmidt R, Schmidt H, Kapeller P, Lechner A, Fazekas F. Evolution of white matter lesions. *Cerebrovascular Disease* 2002;13 Suppl 2:16-20.
43. de Leeuw FE, Barkhof F, Scheltens P. Progression of cerebral white matter lesions in Alzheimer's disease: a new window for therapy? *J Neurol Neurosurg Psychiatry* 2005;76:1286-1288.
44. Perlmutter LS, Barron E, Saperia D, et al. Association between vascular basement membrane components and the lesions of Alzheimer's disease. *J Neurosci Res* 1991;30:673-681.
45. Hardy JA, Mann DM, Wester P, et al. An integrative hypothesis concerning the pathogenesis and progression of Alzheimer's disease. *Neurobiol Aging* 1986;7:489-502.
46. Lukiw WJ, Bazan NG. Cyclooxygenase 2 RNA message abundance, stability, and hypervariability in sporadic Alzheimer neocortex. *J Neurosci Res* 1997;50:937-94.
47. Perkins DJ, Kniss DA. Tumor necrosis factor-alpha promotes sustained cyclooxygenase-2 expression: Attenuation by dexamethasone and NSAIDs. *Prostaglandins* 1997;54:727-743.

A Cross Sectional Study on Health Profile of Post-Menopausal Women of Urban Area of Gujarat

Divyangkumar N Patel¹, Jatin Chhaya¹, Hiral Dobaria², Pooja Jha², Pinkal Chaudhary²

¹Assistant Professor, Community Medicine, Smt. B.K. Shah Medical Institute & Research Centre, Waghodia, Guajrat, India

²Final year MBBS student, Smt. B.K. Shah Medical Institute & Research Centre, Waghodia, Guajrat, India

Correspondence : Dr. Jatin Chhaya, E mail: dr:jatinchhaya@gmail.com

Abstract :

Introduction : Menopause is the inevitable stage of women's reproductive cycle. Indian women spend around a third of their life in post-menopausal period. The common climacteric symptoms experienced by women are vasomotor, physical and psychological symptoms. There is no specific health care programme for post-menopausal women. **Objective:** The objectives are to determine the average age at attaining menopause and the prevalence of various menopausal symptoms among postmenopausal women. **Method:** The present cross sectional study was carried out in four different urban sites of Gujarat. Two stage sampling methods adopted to select participants. Data was collected by personnel interview using a pre-tested structured questionnaire. **Results:** Median age of menopause was 45 years with a range from 35 to 56 years. The most common symptoms present among participants were fatigue (73%), irritability (72%), weight gain (61%), headache (59%), anxiety (52%), joint pain (51%), insomnia (51%). The Vasomotor symptoms like hot flushes, night sweat and urinary incontinence were present respectively in 41%, 35% and 23% of study participants. **Conclusion:** The study shows that postmenopausal women in Gujarat suffer from various vasomotor, physical and psychiatric problems with varied frequencies. This study reveals that Indian urban women attain a menopause at early age. Frequency of the post menopausal symptoms increased when women attain menopause at early age.

Key words : Age at Menopause, Menopausal symptoms, Postmenopausal women

Introduction :

Menarche and menopause are the two important stages of the women's life cycle. The period of in-between is the reproductive phase. Menopause is the stage of permanent cessation of menstruation retrospectively determined after twelve months of amenorrhea. Menopause is the natural course of maturation. It is a unique phase of the woman's reproductive cycle, transition from reproductive to non-reproductive stage. It is resulting from the loss of ovarian follicular activity. Many women pass this phase with little difficulty others faces wide variety of symptoms leads to decrease quality of life.^[1,2]

Eighty five million women in India are above the age of 50 years and certainly in post menopausal period also^[3] In the current scenario life expectancy

of Indians are increasing, so women living longer than before, a majority of them would spend around a third of her life in post menopausal period.^[4]

Among Indian women physiological menopause sets in between 45 to 55 years of age. Studies reported that there is diversity in the menopausal symptoms in Asian and western women. Indian women of different geographical regions are also showing variety in menopausal symptoms and age at menopause.^[5] The immediate clinical symptoms of menopause are the result of change in the hormones in to body and its effect on various organs of body, mainly cardiovascular and muscular-skeleton system.^[2]

The year immediately prior and the decade afterwards of menopause has much clinical

implication.^[6] A wide variety of symptoms are reported among post menopausal women during this transitional period, these symptoms remain present over a period of months to years.^[7] The common climacteric symptoms experienced by women can be grouped into vasomotor, physical and psychological symptoms.^[8]

Hot flushes, night sweats, muscles and joint pains, sleep disturbances, urinary frequency, vaginal dryness, poor memory, anxiety and depression are commonly reported symptoms.^[6] Menopausal symptoms affect the quality of life significantly at various stages of menopause.^[9]

Health problems among menopausal women are significant challenge to public health, taking into consideration that there is no unique separate health program in India to take care of such problems. Rise in geriatric population leads to increase in number of women in menopause. An understanding of menopausal symptoms experienced by these women is essential for designing the appropriate health care delivery services and to ensure an easy transition in peri-menopausal period. There are few studies from the Indian region regarding the health profile of post-menopausal women. This study is an attempt to identify various demographic parameters like mean age at menarche, mean age at menopause, etc., as well as to evaluate the post menopausal symptoms of women aged between 40 and 65 years.

Method :

Ethical approval was obtained from Sumandeep Vidyapeeth institution ethical committee before commencement of this research study. The present community based cross sectional study was conducted among post menopausal women of the urban area of Gujarat. The study has been conducted in a 6 month period from April 2017 to October 2017. A postmenopausal woman aged between 40 to 65 years has been taken as study unit. Women who are not willing to participate, having past history of hysterectomy, women who are taking hormonal replacement therapy and critically ill women are excluded from the study.

The sample size was calculated at a 95% confidence interval and 20% allowable error. If we take P as 50 than sample size for the present study was 96. Total 100 participants who fulfill the inclusion and exclusion criteria were included in the study.

We have collected data from four different urban sites of Gujarat. These are Surat, Ahmedabad, Palanpur and Amreli. All four sites represent different part of Gujarat.

From each site one ward was selected randomly by lottery methods and from each selected ward 25 eligible women were identified by systemic random sampling methods for data collection. The women were explained that the information given by them would be kept confidential. The identified women were interviewed in privacy. From every participant written consent was obtained for the study. Data collected in pre tested, structured questionnaire by personal interview.

Collected data compiled in Microsoft office Excel 2007 format. Data was processed using Epi info statistical software. Descriptive and analytical statistical methods were used for the preparation of results. Data is presented in tabulated as well as graphical format.

Result :

Out of 100 participants majority of women were illiterate (24%), or having either primary (18%) or secondary (21%) education. 19% of study participants were either graduate (11%) or postgraduate (8%). 88 % of study participant are married while 6% study participants are widowed. 3% were unmarried and 2% were divorcee. [Table 1]

The median age of study participants are 52 years. The median age of menopause and menarche among participants was 45 and 13 respectively. On and average a woman was remain in reproductive age for around 32 years. There is no agreement on the average age at which Indian women attain menopause, a wide range from 35 to 56 years of age was found as an age of menopause. The age of

Table 1 : Socio demographic profile of study participants

Variable		No.	Percentage (%)
Education	Illiterate	24	24%
	Primary	18	18%
	Secondary	21	21%
	Higher secondary	18	18%
	Graduate	11	11%
	Post Graduate	8	8%
Marital Status	Married	88	88%
	Widow	6	6%
	Unmarried	3	3%
	Divorcee	2	2%
	Separated	1	1%

Table 2 : Age profile of study participants

Variable	Mean	Median	Range
Age	52.65 ±6.83	52.00	40 - 65
Age at menarche	13.86 ±1.50	13.00	11 - 18
Age at marriage	20.64 ± 3.03	20.00	15 - 35
Age at menopause	44.69 ± 4.94	45.00	35 - 56

marriage and age of menopause had a poor positive correlation ($r = 0.154$), and The age of menarche and age of menopause had a poor negative correlation ($r = -0.048$). [Table 2]

Among study participants, those who conceived had a higher mean age of menopause compared to those who not. Those women who conceive one time had the highest mean age of menopause (48 yrs). Those who are never conceived had a mean age of 41 years. [Figure 1]

The most common symptoms present among menopausal women were fatigue (73%), irritability (72%), weight gain (61%), headache (59%), anxiety (52%), Joint pain (51%), insomnia (51%). These symptoms were present among more than 50% of

study participants. The Vasomotor symptoms like hot flushes, Night sweat and urinary incontinence were present in 41%, 35% and 23% of study participants respectively. [Figure 2]

The median age of menopause is 45 years. Here we compare the frequency of symptoms among women who attain menopause earlier (less than median age, ≤ 45 years) compared to those women at a late age (more than median age, > 45 years of age). Those women who attained menopause at ≤ 45 years of age, having more frequent all menopausal symptoms compared to those women who attained menopause > 45 years of age except weight gain and joint stiffness. [Figure 3]

Figure 1: No. of gravid status wise mean age of menopause among study participants

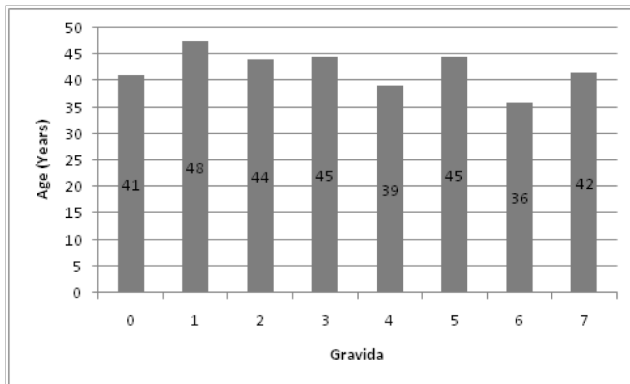


Figure 2: Post menopausal symptoms among participants

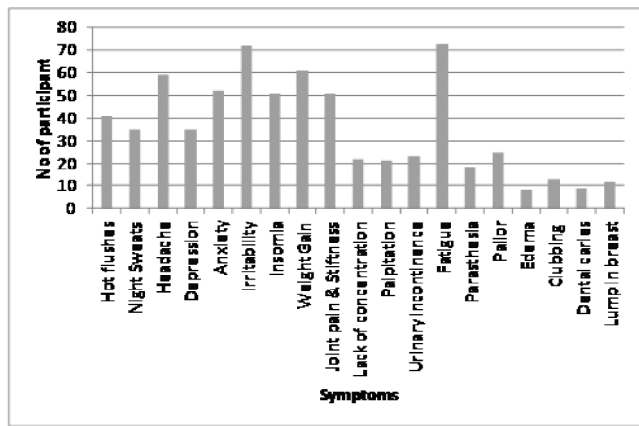
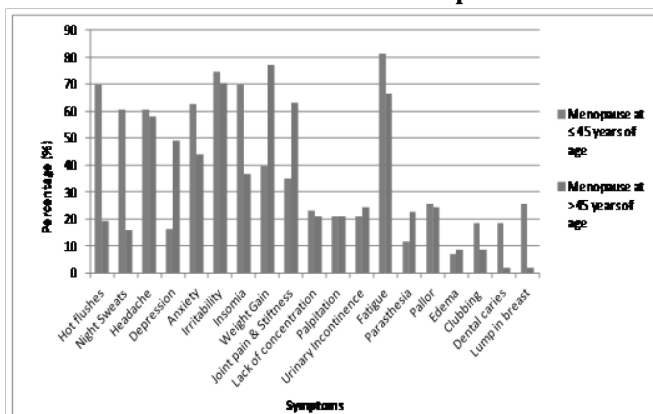


Figure 3: Comparison of post menopause symptoms at the attainment of menopause



Discussion :

Menopause is the cessation of menstruation, this stage is determined by the decrease production of estrogen into the body. The age of attainment of menopause is determined by various factors like race, ethnicity, lifestyle factors and demographic factors^[10] The age at menopause was attain is different in Asian and western countries, also in urban and rural population. Our study resulted, 45 as the median age for attainment of menopause. A study conducted by Ankita Goyal et al shows that mean age of menopause among urban women of Allahabad was 46.32 years.^[11] The median age of menopause among white women from industrialized countries ranges between 50 and 52 years.^[10] A study was conducted by G Ganitha et al among women of rural area Tamilnadu documented that, the mean age of attaining menopause was 45.75 ± 3.83 years. The menopause starts between age 38 years to 53 years. The finding are well correlated with our findings, in India the menopause was attain in comparatively at low age that will lead to prolongation of post menopausal period.^[5] Increasing life expectancy will lead to spend more period of life in post menopausal period among women. Early menopause may be a risk factor for earlier mortality from diseases related to decreased estrogen levels and may promote increased incidence of osteoporosis, heart diseases, diabetes, hypertension and breast cancer.^[12] Women from Rural area attain menopause at late compared to women of urban area. Similar to result document in this study, study conducted by Gold et al also reported that age of menarche is not consistent with the age of menopause.^[10]

Natural menopause was attain late with increasing parity. Pregnancy is an anovulatory phase that decreases the rate of loss of oocyst. Systemic review documented that Increasing parity, has also been associated with later age at natural menopause, that well correlate with the theory that natural menopause occurs after oocytes have been sufficiently depleted.^[10] Study conducted by Romita

Potsangbam et al in Porompat and Manipur area shows that women with high parity >2 has earlier onset of menopause as compared to those having parity of ≤ 2).^[13] Another study of Danish population observed a trend of increasing age at menopause with increasing number of live births.^[14] Inverse to that our study document no consistent trend of the increasing parity with increasing age of menopause. But those who conceive at least one time had a late age of menopause compared to nulligravida women. That might be influencing of other factors like use of oral hormonal pills, nutrition, systemic disorder etc.

Studies conducted in three different part of India (Jamnagar, Kerala and Allahabad) reported that the most common symptoms among post menopausal women are musculo skeleton problems (joint pain, backache), emotional problems (crying spells, depression, irritability), lethargy, burning maturation and forgetfulness.^[2,11,15] That is very consistent with result of this study. The most common symptoms documented among menopausal women in this study were fatigue (73%), irritability (72%), weight gain (61%), headache (59%), anxiety (52%), Joint pain (51%), insomnia (51%).

In a study by Yahya and Rehan^[16], prevalence of hot flushes and night sweats was 32%, which was lower than our study. Study conducted by Ankita goyal et al found that the prevalence of vasomotor symptoms was 34.5% and 39.0% in rural and urban areas respectively.^[11] That was nearly similar to our study result. Another study conducted in rural Kerala shows very high prevalence of classical vasomotor symptoms like hot flushes (46.7%) and sweating at night (50%).^[9] Most of the symptoms at menopause were related with decreased level of estrogen.

Conclusion:

The women in Gujarat area attain menopause at a very early age. Very high prevalence of the various symptoms associated with the post menopausal syndrome documented in current study. The post-menopausal women of Gujarat suffer from various

physical, psychiatric and vasomotor signs and symptoms. The most common symptoms are physical and psychological in nature and some time may be misinterpreted as symptoms of systemic disorders. Early the menopause more frequent are the symptoms irrespective of severity.

Recommendation:

As life expectancy and population of post-menopausal women increases, efforts are needed to educate them and make them aware about various menopausal symptoms. There is a need to address the post menopausal women's group separately as there hasn't been a specific health program for those women yet. Preventive strategies also need to be disseminated well in those women who are approaching their menopause, so that the frequencies and the severity of such symptoms could be minimized. Postmenopausal women should be sensitized for availing the health facilities for their health problems information, education and communication (IEC) and behaviour change communication (BCC).

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. PResearch on the menopause - ScienceDirect [Internet]. [cited 2018 May 9]. Available from: <https://www.sciencedirect.com/science/article/pii/S0378512295009671>
2. Amrita S, Pradeep P, Kakoli G, Sudip B, Naresh M, Sudha Y, et al. A Study on Health Profile of Post-menopausal Women in Jamnagar district, Gujarat. *J Res Med Dent Sci*. 2017 Mar 25;2(2):25-9.
3. Census of India Website : Office of the Registrar General & Census Commissioner, India [Internet]. [cited 2018 Apr 25]. Available from: <http://www.censusindia.gov.in/2011census/C-series/C-13.html>
4. Kumari M, Stafford M, Marmot M. The menopausal transition was associated in a prospective study with decreased health functioning in women who report menopausal symptoms. *J Clin Epidemiol*. 2005 Jul;58(7):719-27.
5. Ganitha G, Premlatha P, Kannan I. A Study of the Age of Menopause and Menopausal Symptoms among Women in a Rural Area of Tamil Nadu, India. *jsafoms*. 5(2):87-91.

6. Nayak G, Kamath A, Kumar P, Rao A. A study of quality of life among perimenopausal women in selected coastal areas of Karnataka, India. *J-Life Health*. 2012;3(2):71-5.
7. Burger H, Woods NF, Dennerstein L, Alexander JL, Kotz K, Richardson G. Nomenclature and endocrinology of menopause and perimenopause. *Expert Rev Neurother*. 2007 Nov;7(11 Suppl):S35-43.
8. Rahman SASA, Zainudin SR, Mun VLK. Assessment of menopausal symptoms using modified Menopause Rating Scale (MRS) among middle age women in Kuching, Sarawak, Malaysia. *Asia Pac Fam Med*. 2010 Feb 22;9(1):5.
9. Subrahmanyam N, Padmaja A. Menopause Related Problems among Women in a Rural Community of Kerala. *ijird*. 5(1):61-4.
10. Gold EB. The Timing of the Age at Which Natural Menopause Occurs. *Obstet Gynecol Clin North Am*. 2011 Sep;38(3):425-40.
11. Goyal A, Mishra N, Dwivedi S. A comparative study of morbidity pattern among rural and urban postmenopausal women of Allahabad, Uttar Pradesh, India. *Int J Res Med Sci*. 2017 Jan 23;5(2):670-7.
12. Perimenopausal risk factors and future health. *Hum Reprod Update*. 2011 Sep 1;17(5):706-17.
13. Age at Menopause and its Determinants [Internet]. [cited 2018 May 14]. Available from: https://www.researchgate.net/publication/309450711_Age_at_Menopause_and_its_Determinants
14. Gold EB, Bromberger J, Crawford S, Samuels S, Greendale GA, Harlow SD, et al. Factors Associated with Age at Natural Menopause in a Multiethnic Sample of Midlife Women. *Am J Epidemiol*. 2001 May 1;153(9):865-74.
15. Borker SA, Venugopalan PP, Bhat SN. Study of menopausal symptoms, and perceptions about menopause among women at a rural community in Kerala. *J-Life Health*. 2013;4(3):182-7.
16. Yahya S, Rehan N. Age, pattern and symptoms of menopause among rural women of Lahore. *J Ayub Med Coll Abbottabad JAMC*. 2002 Sep;14(3):9-12.

Respiratory Morbidities among Workers Employed in Cotton Industries in Surendranagar City

Shashwat Nagar¹, Hiren Patel¹, Noopur Nagar²

¹Assistant Professor, Department of Community Medicine, Parul Institute of Medical Sciences and Research, Vadodara, Gujarat, India

²Assistant Professor, Department of Obstetrics and Gynecology, Parul Institute of Medical Sciences and Research, Vadodara, Gujarat, India

Correspondence : Dr. Hiren Patel, E mail: hirendr85@gmail.com

Abstract :

Introduction : According to a publication in 1986 by the World Health Organization (WHO) on Pneumoconiosis and Smoking, workers in cotton processing industries have the risk of developing obstructive respiratory conditions such as Bysinosis and Occupational Asthma, due to prolonged exposure to inhalable cotton dust particles, bracts and pericarps as well as to bacteria and fungi that may grow on cotton products. **Objectives:** To identify the presence of Respiratory symptoms among those exposed to cotton dust and To associate the findings with the duration of exposure of cotton dust. **Methods :** The study carried out was cross sectional and in 3 cotton industries in Surendranagar city. A total of 144 workers who consented for the study were selected and were interviewed and examined for respiratory signs. **Results :** Nearly 78% of the subjects had respiratory complaints. Most of the workers had had a more than 10 year exposure to cotton dust. Majority of symptoms were dyspnoea and expectorations. Nearly 95% of the subjects had the habit of consumption of smokeless tobacco. **Conclusion:** It can be concluded from the study, that the risk factors for Respiratory diseases are highly prevalent among workers employed in industrial set ups involving respirable dusts. More than 80% of the workers had 10 yrs or more years of exposure to cotton dust and the association of the exposure with the respiratory problems was proved statistically significant.

Keywords : Cotton industry, Periodic medical examination, Respiratory, Tobacco

Introduction :

Occupational Respiratory disease is a lung condition that develops due to worker inhaling harmful substances at his or her place of work. These diseases are a major public health problem all over the world that account for up to 30% of all registered work related Respiratory diseases and 10–20% of deaths are caused by respiratory problems.^[1]

Occupational lung diseases are the most common work - related illness but fortunately many of the Respiratory diseases are preventable or controllable with proper treatment.^[2]

Cotton dust is produced by processing cotton with the use of machines in order to develop textile, fabrics, and final products such as clothes. Exposure of workers to cotton dust at their workplace has been

associated with development of several respiratory symptoms and diseases.^[3]

According to a publication by the World Health Organization (WHO) in 1986, on Pneumoconiosis and Smoking, workers in cotton processing industries have the risk of developing obstructive respiratory conditions such as Bysinosis and Occupational Asthma, due to prolonged exposure to inhalable cotton dust particles, bracts, and pericarps as well as to bacteria and fungi that may grow on cotton products.^[4-5] Exposure to the cotton dust led to respiratory problems, such as cough, phlegm, wheezing, shortness of breath, chest tightness, chronic bronchitis, and byssinosis and has also profound effect on pulmonary function.^[6-8] As Gujarat is known as “Textile State of India” and “Manchester of the East” and “Denim Capital of India” and it

contributes 25% to the country's manufacturing sector.^[9] Because of which, it attracts numerous work forces and the workers are largely exposed to the risk of these diseases. The present study was carried out to establish the quantum of such morbidities and identify the risk the workers are exposed to.

Objective :

1. To identify the presence of Respiratory symptoms among those exposed to cotton dust
2. To associate the findings with the duration of exposure of cotton dust

Method :

The present study was carried out in an industrial setting in Surendranagar city. Out of a total of 24 small and large scale cotton industries in Surendranagar city, a total of 3 industries were selected using simple random sampling using the table of random numbers. A prior permission was sought before the start of the study from the management of the factories who agreed to be a part of the research design. Permission from the Institutional Ethics Committee of C.U Shah Medical College in Surendranagar and oral and written consents from the workers were sought before the start of the study. The total subjects studied were 144 from 3 industries of Surendranagar city. The study carried out was cross sectional and the data was collected by directly questioning the subjects about their socio demographic details and also their physical examination for the presence of respiratory findings in them.

Data Analysis :

The data was analyzed using SPSS Microsoft excel 2007 and the relevant statistics were calculated.

Results :

Table 1 shows the basic socio-demographic profile of the subjects. It can be seen that majority of the subjects were young adults in the age group 20-40 yrs (56.25%) and all the subjects were males. In terms of education, majority of the subjects were educated upto primary (33.33%) followed by those

educated upto secondary (16.66%). Nearly 92% of the subjects were Hindus and 58% were married.

As most of the workers were laborers, majority of them were from social class 4&5. Nearly 82% of the subjects were from joint families, clearly showing the predominance of joint family system still existent in India.

Table 2 shows that majority of the subjects had an exposure of at least 10 years or more showing an increased risk of developing respiratory illnesses.

Figure 1 shows the prevalence of various respiratory symptoms and it can be seen that dyspnea was the most common symptom followed by productive & dry cough (43.2 & 29.5% respectively).

Table 3 shows the positive association of respiratory symptoms with the duration of exposure to cotton dust showing increased prevalence among those exposed for more duration. The association was proved statistically significant using chi squared test. ($p < 0.01$)

Mean duration of intake of tobacco was 14.33 yrs ($SD \pm 9.72$ yrs). Mean frequency of intake of tobacco was 15.5 times a day ($SD \pm 6.78$ yrs). It can be seen that majority of the subjects had the habit of consumption of chewing Tobacco & Guthkha. This habit being predominantly found in this part of the state is clearly reflected in this study too.

*Includes raw tobacco, guthkha, pan masala, bajar

**Includes Cigarettes & Bidi smoking

#Multiple response variable

Discussion :

The present study was carried out in an industrial setting. In the present study, the prevalence of respiratory symptoms was: Cough (29.5%), Expectoration (43.2%), Dyspnea (62.3%), Tightness in chest (25.6%) and Respiratory discomfort (14%). These findings were similar to Ghasemkhani M et al who studied the prevalence of respiratory symptoms among different industries by comparing them (viz. Food, drink & tobacco, Textile, Chemical,

Table 1: Distribution of the subjects as per their Socio-demographic characteristics (n=144)

Variable	Frequency	Percentage
Age (in years)		
20-40	81	56.25
40-60	63	43.75
Sex		
Males	144	100
Females	0	0
Education		
Illiterate	12	8.33
Primary	48	33.33
Secondary	24	16.66
Higher Secondary	36	25
Graduate	12	8.33
Post Graduate	12	8.33
Religion		
Hindu	132	91.66
Muslim	12	8.34
Marital Status		
Married	84	58.34
Unmarried	60	41.66
Type of Family		
Nuclear	27	18.75
Joint	117	81.25
Social Class*		
Class 1	0	0
Class 2	0	0
Class 3	33	22.91
Class 4	51	35.41
Class 5	60	41.66

* Social class as per modified Prasad`s classification of 2009

Table 2 : Duration of dust exposure to cotton among the workers (n=144)

Duration of Exposure	NO.	%
<10 years	21	14.58
10-20 years	69	47.91
>20 years	54	37.5
Total	144	100

Table 3: Association between duration of exposure with the prevalence of respiratory symptoms among the workers (n=144)

Duration of Exposure	Respiratory Symptoms		
	Present	Absent	Total
<10 years	6 (5.40%)	15 (45.45%)	21 (14.58%)
10-20 years	57 (51.35%)	12 (36.36%)	69 (47.91%)
>20 years	48 (43.24%)	6 (18.18%)	54 (37.5%)
Total	111	33	144

χ^2 test = 33.43, DF = 2, P<0.01

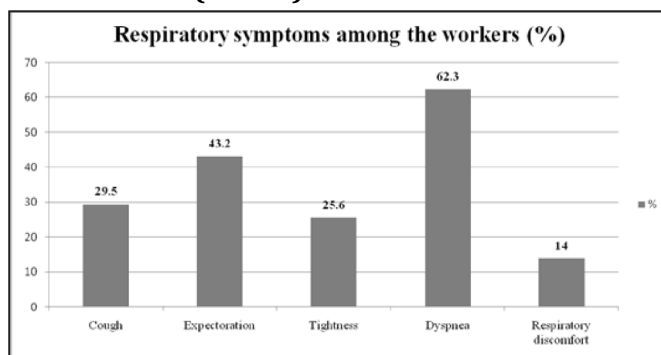
Table 4 : Forms of tobacco consumed by the subjects (n=144)

FORM OF TOBACCO #	No.	%
Smokeless Tobacco (Chewing tobacco) *	138	95.83
Smoky Tobacco **	76	52.77

* Includes raw tobacco, guthkha, pan masala, bajar

** Includes Cigarettes & Bidi smoking

Multiple response variable

Figure 1: Prevalence of Respiratory symptoms among the workers exposed to cotton dust (n=144) #

Multiple response variable

Construction, Metal & other miscellaneous industries).^[10] In a similar study by Al-Neaimi et al of respiratory symptoms among workers in cement factory in a rapidly developing country reported recurrent cough (30%), Phlegm (25%) & dyspnea (21%).^[11]

In the present study, those with longer duration of exposure with dust had higher respiratory symptoms compared with those with duration of exposure lesser than 10 yrs. A similar study conducted by Baser S et al found that there was no such significant association of the symptoms with the duration of exposure of dust particles.^[12] Gasemkhani M et al found similar findings as the

present study showing significant association of duration of exposure and prevalence of respiratory symptoms.

In the present study large number of subjects had a habit of tobacco consumption. Nearly half of them also had a habit of consuming smoky tobacco (Cigarettes, Bidi, Hukka etc.). This could be because of the prevailing practice in this part of the country of more consumption of chewing (smokeless) tobacco as compared to smoky tobacco. In a study conducted by Arumugam et al, 27% of the males had a habit of tobacco consumption.^[13] Shah B et al reported 50-80% subjects as noncurrent smokers.^[14]

Conclusion:

It can be therefore concluded from the study, that the risk factors for Respiratory diseases are highly prevalent among workers employed in industrial set ups involving respirable dusts. More than 80% of the workers had 10 yrs or more years of exposure to cotton dust and the association of the exposure with the respiratory problems was proved statistically significant.

Recommendation:

1. Prevalence studies of similar types to be replicated in areas predominantly having textile and cotton industries.
2. Periodic screening of respiratory illness among the workers employed in these industries should be carried out at regular intervals to ensure workers' safety and health.
3. Early diagnosis and initiation of prompt treatment of the affected remains the corner stone of the control measures.
4. Engineering methods to ensure lesser exposure to the workers employed in these industries by designing research and innovation is the mainstay for prevention of occupational lung diseases.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. Guidelines on occupational safety and health management systems, ILO-OSH 2001 [Internet]. International Labour Office. Geneva; 2009 [cited 2017 Dec 21]. Available from: http://www.worldpsi.org/sites/default/files/attachment/news/ilo_presentation.pdf
2. Rajvir Bhalwar. Text book of Public Health & Community Medicine. 1st edition. Pune: Department of Community Medicine, Armed Forces Medical College : World Health Organization, 2009. Chapter 11:Occupational health; 1277 p.
3. Anyfantis ID, Rachiotis G, Hadjichristodoulou C, Gourgoulianis KI. Respiratory Symptoms and Lung Function among Greek Cotton Industry Workers: A Cross-Sectional Study. Int J Occup Environ Med. 2017;8(1):32-8.
4. WHO global report on trends in prevalence of tobacco smoking 2015 [Internet]. World Health Organization, Geneva; 2015.[Cited 2017 November 10] Available from: <http://www.who.int/tobacco/publications/surveillance/reportontrendstobacco-smoking/en/>
5. Mittal R, Gupta P, Chhabra SK. Occupational bronchiolitis induced by cotton dust exposure in a non-smoker. Indian J Occup Environ Med. 2016;20:118-20.
6. Nagoda M, Okpapi J, Babashani M. Assessment of respiratory symptoms and lung function among textile workers at Kano textile Mills, Kano, Nigeria. Niger J Clin Pract. 2012; 15(4):373-9.
7. Nafees AA, Fatmi Z, Kadir MM, Sathiakumar N. Pattern and predictors for Respiratory illnesses and symptoms and lung function among textile workers in Karachi, Pakistan. Occup Environ Med. 2013; 70(2):99-107.
8. Wang X, Zhang H, Sun B, Dai H, Hang J, Eisen E, et al. A 20-year follow-up study on Chronic respiratory effects of exposure to cotton dust. Eur Respir J. 2005; 26(5):881-6.
9. Textile Sector Profile: Vibrant Gujarat 2017 [Internet]. Industrial Extension Bureau, Government of Gujarat, Gandhinagar; 2017 [cited 2017 Dec 21]. Available from: <http://vibrantgujarat.com/writereaddata/images/pdf/textile-sector.pdf>.
10. Mehdi Ghasemkhani, Masaharu Kumashiro, Mansour Rezaei, Ali Reza Anvari, Adel Mazloumi, Hamid Reza Sadeghipour, et al. Prevalence of respiratory symptoms among workers in Industries of south Tehran, Iran. Industrial Health 2006;44:218-24.
11. Al-Neaimi YI, Gomes J, Lloyd OL. Respiratory illnesses and ventilatory function among Workers at a cement factory in a rapidly developing country. Occup Med (Lond) 2001. Sep; 51(6):367-73.
12. Baser S, Fisekci EF, Ozkurt S, Zencir M. Respiratory effects of chronic animal feed dust exposure. J occup health. 2003;45: 325-30.
13. Arumugam B, Nagalingam S. Non-Communicable Diseases Risk Factors among Leather Factory Workers - A Cross Sectional Study. Journal of Evolution of Medical and Dental Sciences 2013; 2: 4956-4962.
14. Shah B, Mathur P. Surveillance of cardiovascular disease risk factors in India: The need & scope. The Indian Journal of Medical Research 2010; 132(5):634-642.

Corrigendum

In the past volumes of Healthline journal, i.e., No.6, 7 and 8, the front cover displayed the pISSN 2220-337X eISSN 2320-1525. Kindly read the same as pISSN 2229-337X eISSN 2320-1525. The inconvenience caused if any, due to typographical error is regreted.

Call for Papers

Esteemed Reader,

“Healthline” journal is a peer reviewed official publication of Indian Association of Preventive and Social Medicine (IAPSM) managed by IAPSM- Gujarat Chapter. It is an indexed medical journal (with Index Copernicus, DOAJ, OPENJGATE, CABI, Index Medicus-SEAR) published biannually. The “Healthline” aims to promote quality research in the field of Community Medicine and Public health. The editorial board of the journal is committed to an unbiased, independent, and anonymous review of submitted articles.

Papers are invited from aspiring authors for the publication in the upcoming issue of “Healthline” journal. The authors may send the articles in the prescribed format (available in “instructions for authors” section). The articles are freely accessible on the official website of “Healthline” journal, which authors can download at any time. Besides original manuscript, journal also publishes Editorial (only by invite), Review articles, book review, letter to editor, short correspondence and any other important information/updates relevant to Community Medicine and Public Health.

You are requested to send your valuable manuscript or motivate your staff members, colleagues and PG students for publication in “Healthline” Journal.

For any further query or submission of the manuscript, kindly correspond with editorial team at **editorhealthline@gmail.com**. For further details, visit - **www.healthlinejournal.org**

Dr K N Sonaliya
Editor In Chief
Healthline Journal



ટીબી જણાય તો
‘સીધા નિરીક્ષણ હેઠળની ટૂંકાગાળાની સારવાર’
-Sાઈટ્સ અપનાવો



નજીકના સ્વાસ્થ્ય
કેન્દ્રમાં જઈ તપાસ કરાવો
અને તરત જ સારવાર લો.
નિયમિત અને પૂરા સમયની સારવારથી
ટીબી ચોક્કસ મટી શકે છે.

ટીબીનો ઘલાજ છે, Sાઈટ્સ



આરોગ્ય અને પરિવાર કલ્યાણ વિભાગ, ગુજરાત રાજ્ય

