

Volume 5. Issue 1. Jan.- Mar. 2016

National Journal of Research in Community Medicine



ISSN: 2277-
1522 (Print)

ISSN:2277-
3517 (Online)

*Official Publication of Community Medicine
Faculties Association*



NJRCM of COMFA
India

Not for sale

www.commedjournal.in

NJRCM- Volume 5. Issue 1. Jan-Mar 2016(001-0081)
Table of Content

Original Research Article

1. Impact of Maternal Anaemia on Newborn Weight in Aligarh Khushboo Juneja, Mohd Haroon Khan, Najam Khalique, M.Athar Ansari, Anees Ahmad	001
2. Prevalence of Obesity and Its Associated Factors among Female Students at AlJouf University, Saudi Arabia Doaa M. Abdel-Salam	006
3. Prevalence of iron deficiency anaemia among adolescents in rural population of Kitahar Bihar Shahin, Bijoy Mukherjee, Mohd Haroon Khan, Mohammad Makhmool Alam, Khushboo Juneja	015
4. Prevalence of Smoking Behavior among the Medical and Dental College Students of Aljouf University Khaled Saud Asharari , Mohammed Assaf AlSharari, Mohammed Abdulrahman AlAli , Thamer Wadi alanazi, Muteb Hassan Almarwani1, Mohammad Hussein Alruwaili, Ali Muqbil Alruwaili , Sultan Faraj Alruwili, Fawaz Aljethi Alsharari ,Ashokkumar Thirunavukkarasu	021
5. Evaluation of Immunization Coverage in Urban Slums of Belgaum City using 30-Cluster Sampling Method Jenyz M Mundodan , Ashwini L Chingale , Chandra S Metgud	025
6. Patterns of Physical activity among degree college students of Mandya City, Karnataka, India Poornima.S , Shivakumar KM	030
7. Menstrual Pattern Among Adolescent Girls In Kancheepuram District Of Tamilnadu Sampath kumari S, Vijayalakshmi N, Prabakaran J	036
8. Prevalence of Pyuria and its associated factors among pregnant women availing antenatal care services at a maternity hospital in rural Karnataka Avita Rose Johnson, Suguna A, Ann Sarah Koshy, Sr. Jincy Joseph, Sr. Irudhaya Maria Vijaya, Sr. Cicy Varghese, Twinkle Agrawal	041
9. Determinants of Quality of life of Elderly in A Rural Population Of Kerala, India Sobha George, K. Leelamoni , Nimitha Paul	046
10. Prevalence and Correlates of Smokeless Tobacco Use: A Cross-Sectional Study among the Employees in a North Indian University Mohammad Shibly Khan, Zulfia Khan, Ali Amir, Abdur Razzaque Siddiqui	052
11. Assessment of Nutritional Status of Under Five Children Residing in Rural Area of Kerala State - A Cross sectional study Chethan T K, Shashank K J	056
12. Assessment of Nutritional Status in School Boys Aged 10-19 Years- A Cross Sectional Study in Aligarh Mohammad Atif , M Athar Ansari, Zulfia Khan, Anees Ahmad	060
13. Bio-Medical Waste management: KAP study on Health Care Personnel working in Private Hospitals of Bangalore city Md Mustafa Ahmed,C Pradeep,Manasa R.V,Suhail Ambi , Vikas Jaiswal	064
14. HIV/AIDS stigma and knowledge among high school students in a rural area of Karnataka Shashank K J, Chethan T K	069
15. Prevalence of risk factors of coronary heart disease among college students in Kanchipuram town G H Midhun Kumar, Kokila Selvaraj, B T Sudhir Ben Nelson	076

NJRCM- Volume 5. Issue 1. Jan-Mar 2016 (001-081)

National Journal of Research in Community Medicine
ISSN - Print: 2277 – 1522, Online: 2277 – 3517

Chief Editor:

Dr.Roseline F William

Associate Editors

Dr.Chinta Kumar
Dr.Mane Abhay Babruwahan
Dr. Mohd. Haroon Khan
Dr.Ravi Kiran E
Dr.Purushottam A. Giri
Dr.Sanjeev Davey
Dr.M.Logaraj

Advisory Board Members

National

Dr.J.Venkatesh
Dr.Chavada V K
Dr.N.Praveen
Dr.Suresh Munuswamy
Dr.R.Balamurugan
Dr.E.Mathan
Dr.Murali Prasad
Mr.A.Ganesan

International

Dr. Rajmohan (USA)
Dr. O Dale Williams (USA)
Dr. J.A Prabha (USA)
Dr. Dr.Sushil Dohare(Libya)
Dr. S. Krishna Kumar(Singapore)

Web Site: www.commedjournal.in
Association Site: <https://sites.google.com/site/comfaoffice/who-we-are>
E-Mail: dopnjrcm@gmail.com

Address:

Community Medicine Faculties Association
(Registered Under The Tamil Nadu Societies Registration Act, 1975)
No: 29/2 (New no.60) Rettaikuzhi Street, Tondiarpet, Chennai – 600 081.

Manuscript Submission:

<http://www.commedjournal.in/man.html>

© Community Medicine Faculties Association.

Impact of Maternal Anaemia on Newborn Weight in Aligarh

Khushboo Juneja¹, Mohd Haroon Khan², Najam Khalique³, M.Athar Ansari⁴, Anees Ahmad⁵

Date of Submission: 26.10.2015

Date of Acceptance: 23.01.2015

Abstract

Background: Anaemia poses a major threat to maternal and child survival, contributes to low birth weight. **Objective:** To assess the Impact of Maternal Anaemia on Newborn Weight. **Study design:** A community based study. **Setting:** Field practice areas of Urban and Rural Health Training Center Department of Community Medicine, Jawaharlal Nehru Medical College & Hospital (JNMCH), Aligarh Muslim University, Aligarh. **Participants:** Registered pregnant women who were in their first trimester and whose Expected Date of Delivery lie within our study period **Study period:** one year. **Statistical analysis:** Data was analyzed using SPSS version 20. Percentages, and Chi Square Test used. **Results:** Prevalence of LBW was found to be 40%. Association was found between haemoglobin level of pregnant females and birth weight of the baby.

Conclusion: Proper antenatal care is the basic requirement for prevention, early detection and treatment of anaemia.

Keywords: Anaemia, Birth Weight, Maternal Haemoglobin.

Authors:

^{1,2} Department of Community Medicine, SHKM Govt Medical College Nalhar (Mewat) Haryana India. ³⁻⁵ Department of Community Medicine, Jawaharlal Nehru Medical College (JNMC), Aligarh Muslim University (AMU), Aligarh, U.P. India.

Corresponding Author:

Dr.Khushboo Juneja
Department of Com Medicine, SHKM Govt Medical College, Nalhar (Mewat)
Haryana-122107
Mail: khushboojuneja22@gmail.com

Introduction

In any community, mother and children constitute a priority group. In sheer numbers, they comprise approximately 71.14 percent of the population of the developing countries. In India, women of the child-bearing age (15-44 years) constitute 22.2 %, and the children under 15 years of age about 35.3 per cent of the total population. Together they constitute nearly 57.5 per cent of the total population. By virtue of their numbers, mothers and children are the major consumers of health services, of whatever form ^[1]. Birth weight is a reliable index of intrauterine growth and is one of the major factors that determine child survival and physical and mental development ^[2].

Many factors affect the duration of gestation and foetal growth and thus the birthweight. Despite increased maternal erythropoiesis during pregnancy, haemoglobin concentration falls progressively until about the 32nd week of gestation (177), owing to even greater increases in plasma volume. Anemia especially if severe, could impair oxygen delivery to the fetus and thus interfere with normal intrauterine growth or pregnancy duration. Iron deficiency even without anaemia, might affect key enzymes (especially cytochromes) and thereby also lead to adverse pregnancy outcomes ^[3].

Materials & Methods

The present community based prospective study was conducted in the field practice areas of the Urban and Rural Health Training Centers, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh. The study subjects included in the study were residents of four registered areas of the urban health training center and seven registered villages of rural health training centre. Study design was approved by Institutional Ethical Committee. A census of current pregnant women in their first trimester was prepared with the help of ASHA and medicosocial worker of our study area. Subsequent pregnancies were identified for next three months by periodic visits. These registered pregnant women who were in their first trimester and whose Expected Date of Delivery lie within our study period of one year were considered for study. Three home visits were made (two in antenatal period, one in post natal period).

- **I visit** (As soon as she gets enrolled) data on socio-demographic factors was collected. Obstetric history was taken. Dietary history was taken. A complete per abdomen examination, clinical profile along with anthropometric measurements and Blood Pressure was undertaken.
- **II visit** (between 32-36 weeks)of gestation. Information regarding any medical illness during course of pregnancy. Data on no of tetvac injections and iron-folic acid tablets consumed during pregnancy was recorded. Weight gain, fundal height, abdominal girth and Blood Pressure was recorded. Females included in study were asked to get their hemoglobin estimation done on our centres.
- **III visit** (after delivery of newborn) questions regarding outcome of delivery and complications during delivery were asked. Sex of the newborn was noted. Examination of both mother and newborn was done to rule out any complications.

Weight of the baby was recorded (Institutional delivery –from record, home delivery-within 48 hrs of birth).Data was analyzed using SPSS version 20. Frequency, means, standard deviation was calculated. Chi square test and Fisher’s exact test was applied wherever applicable. The value of $p < 0.05$ was considered as significant and $p < 0.001$ was considered as highly significant for this study.

Results

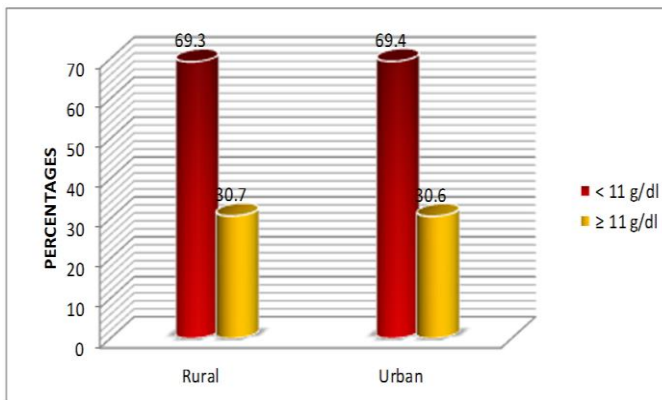
Table1: Socio-Demographic profile of pregnant women

Characteristic	Number (%)
Maternal Age	
< 20	16 (10.0)
20-25	91 (56.9)
26-30	36 (22.5)
31 and above	17 (10.6)
Religion	
Hindu	64 (40.0)
Muslim	96 (60.0)
Type of family	
Nuclear	78 (48.8)
Joint	82 (51.2)
Maternal Occupation	
Working	3 (1.9)
Homemaker	157 (98.1)
Maternal Education	
Illiterate	73 (45.6)
Primary school	29 (18.2)
Middle school	19 (11.9)
Highschool	13 (8.1)
Intermediate	13 (8.1)
Graduate and above	13 (8.1)
Standard of Living Index (SLI)	
Low	60 (37.5)
Medium	77 (48.1)
High	23 (14.4)
Total	160 (100.0)

Table 2: Distribution of newborns according to birth weight

Birth weight (Kgs)	No of newborns	%
< 1.5 kg	4	2.5
1.5-2.4	60	37.5
2.5-3.4	81	50.6
≥ 3.5	15	9.4
Total	160	100.0

Figure-1: Distribution of study subjects according to Anaemia (n=160)



Out of 185 study subjects in their first trimester who planned to deliver in our study areas, 20 (10.8%) subjects had to be excluded as 15 (8.1%) had abortion, and 5 (2.7 %) were lost to follow up. Hence study sample of 165 were followed up with three home visits. Out of these 5 (3.0 %) females were excluded as 2 (1.2 %) had twin delivery and had 3 (1.8 %) still births. Hence statistical analysis was done of 160 subjects. More than half (55%) of respondents were from rural areas and 45% from urban areas. As can be seen from Table 1, majority of mothers were in age group 20-25 years (56.9 %) and approximately same percentage were in age group < 20 and 31 and above category. In our study, 60 % were Muslims and 40 % were Hindus. Considering the family type, it was observed that more number of families are of joint type (51.2%) than nuclear type (48.8%). Very few mothers were working outside their homes (1.9%). Considering

the educational status, 45.6% of females were illiterate. As seen from table, majority of females were of low (37.5%) and medium (48.1%) SLI. . Out of total 160 live newborns, 64 were low birth weight babies. Thus the prevalence of LBW was found to be 40%. In rural areas prevalence was more of LBW babies (54.7%) as compared to urban areas (45.3%). The mean birth weight of all the 160 newborns was 2.58 kg (with SD ± 0.55 kg). As seen from Table-2, maximum newborns (50.6 %) lie within range of 2.5-3.4 kg and only 9.4 % newborns were with birth weigh 3.5 kg or more. More number of males were born in rural areas (56.8 %) whereas in urban areas more females (51.4 %) were born. Most of females both in rural (76.2 %) and urban (76.4 %) areas delivered term babies. The mean haemoglobin value of all pregnant females was 9.4 ± 1.74 g/dl. . As seen from Figure-1, more than two-third of mothers was anaemic in rural (69.3 %) areas. Same pattern was also seen in urban (69.6 %) areas. Table-3 depicts that low birth weight babies were found to be more in case of females with anaemia (haemoglobin level < 11 g/dl) than in females with haemoglobin level ≥ 11 gm % but the difference was not found to be statistically significant.

Discussion

Krammer did meta-analysis of the English and French language medical literature published from 1970 to 1984 and has identified 43 potential factors for low birth weight. The factors vary from one area to another, depending upon geographic, socio-economic and cultural factors. Thus it is necessary to identify factors prevailing in a particular area responsible for low birth weight, so as to plan the strategy to tackle this important problem^[3].

According to NFHS-3, among young women of age 15-19 in Uttar Pradesh, 14 percent have already begun childbearing, a little lower than the national average (16%). Young women in rural areas are twice as likely to be mothers as young women in urban areas (16% and 8%, respectively^[4]. According to Census 2011, the percentage of female literacy rate in rural and urban areas is (U.P.-55.61%, Aligarh-54.60 %) and (U.P.-71.68 %, Aligarh 63.08 %) respectively^[5]. Gawande et al in their cross-sectional study found that more than 50

Table -3: Anaemia and Birth weight of baby (n=160)

Haemoglobin (g/dl)	Birth weight of newborn				Total	
	Low birth weight		Normal birth weight			
	No	%	No	%	No	%
< 11	47	42.3	64	57.7	111	69.4
≥ 11	17	34.7	32	65.3	49	30.6
Total	64	40.0	96	60.0	160	100.0
$\chi^2 = 0.829, df=1, p=0.363$						

% of the babies were born into families belonging to the middle socio-economic strata (classes II & III), 23.3 % and 12.2 % belonged to the lower and upper classes respectively^[6]. Prevalance in our study is approximately similar to prevalence of LBW of Aligarh (37.4 %) according to Annual Health Survey conducted by Government of India (2012-13) but higher than that as estimated by NFHS-3 (22.5 %)^[4,7].

Gosavi et al, Badshah et al, Mumbare et al, Metgud et al found lower percentage of low birth weight than in present study^[8,9,10,11]. However Gogoi et al found higher percentage of low birth weight compared to present study^[13]. Mean Birth Weight is approximately similar to other studies done by Solanki et al, Sachdeva et al, Joshi et al, Biswas et al, Joshi et al^[12,14,15,16,17].

Sachdeva et al in their retrospective study found the incidence of maternal anemia (Hb% < 8.5%) in their study population to be 39.8%^[14]. Severe anaemia in pregnancy impairs oxygen delivery to the foetus and interferes with normal intra-uterine growth, resulting in intrauterine growth retardation, stillbirth, LBW and neonatal deaths. Therefore, anaemia is a major contributor to poor pregnancy and birth outcomes in developing countries as it predisposes to premature delivery, increased perinatal mortality and increased risk of death during delivery and postpartum^[7]. Similar results were shown by some other researchers also.

The proportion of children who were of low birth weight was marginally higher in mothers who had anemia in a prospective study conducted by Kumar et al in Mysooru, Karnataka. The difference was not significant except for anemia in the third trimester. Mean birth weight of babies born to anemic mothers was marginally lower compared to that of babies born to nonanemic mothers. This difference was statistically significant^[18]. However in a study done by Agarwal et al it was reported that anaemia in mother at the time of delivery was not significantly associated with low birth weight of the baby^[19].

On the other hand, Raman et al in their prospective, cross-sectional population found inverse relationship of maternal haemoglobin concentration to birth weight. They have found that for every rise of haemoglobin concentration by 1.0 g/dl the birth weight reduced by 0.3839 kg (highly significant $p < 0.001$)^[20].

The occurrence of maternal anemia (Hb% < 8.5%) in a retrospective study conducted by Sachdeva et al was found to be 39.8%. Also it was observed that the proportion of LBW babies delivered by anemic mothers was significantly high as compared to LBW babies delivered by nonanemic mothers (Hb% > 8.5%)^[14].

Joshi et al (2005) found that out of 76 newborns delivered by anaemic mothers 61.84% were LBW. Strength of association was maximum with severe anaemia ($\chi^2 = 39.68, p < 0.001$)^[17].

Conclusion: Success in prevention and control of anaemia will contribute to reduction of maternal and child mortality and improve health outcomes for population as a whole. Interventions to prevent and correct iron deficiency and IDA, therefore, must include measures to increase iron intake through food-based approaches, namely dietary diversification and food fortification with iron; iron supplementation and improved health services and sanitation.

Acknowledgment: I would like to express my profound gratitude to all the participants for their co-operation and for their immense faith they reposed in me.

Conflict of interest: None to declare

Source of funding: None declared

References:

1. Park K. *Park's textbook of preventive and social medicine*. 22th ed. Jabalpur: M/s Banarsidas Bhanot Publisher; 2013.
2. Ramankutty P, Tikreeti RA, Rasaam KW, et al. A study on birth weight of Iraqi Children. *J Trop Paediatr* 1983;29:5-10.
3. Kraemer MS. Determinants of delivering low birth weight- Methodological assessment and meta analysis. *Bull World Health Organ* 1987;65:663-737.
4. National Family Health Survey-3(NFHS-3). International Institute for Population Sciences (IIPS) and Macro International. 2008. Available at <http://www.hetv.org/india/nfhs/nfhs3/NFHS-3-Chapter-09-Child-Health.pdf>.
5. Government of India. *Census of India 2011, Provisional Population Totals, Paper 1 of 2011, India Series 1*. New Delhi: Office of the Registrar General & Census Commissioner, India; 2011.
6. Gawande UH, Pimpalgaonkar MS, Bethariya SH. Bio-social determinants of birth weight in rural urban Nagpur. *Indian J Community Med* 1994;16:64-7
7. Government of India. *Annual Health Survey (AHS) , 2012-13 fact sheet*. Ministry of Home Affairs. New Delhi; 2012-13.
8. Gosavi SV, Koparkar AR. Predictors of low birth weight: a retrospective study from rural India. *Int J Contemp Pediatr* 2014;1:7-9.
9. Badshah S, Mason L, Mckelvie K, Payne R, Lisboa PJG. Risk factors for low birthweight in the public hospitals at Peshawar, NWFP, Pakistan. *BMC Public Health* 2008; 8:197.
10. Mumbare SS, Maindarkar G, Darade R, Yenge S, Tolani Mk, Patole K. Maternal risk factors associated with term low birth weight neonates: a matched-pair case control study. *Indian Pediatr* 2012;49:25-8.
11. Metgud CS, Naik VA, Mallapur MD. Factors affecting birth weight of a newborn – a community based study in rural Karnataka, India. *Plos One* 2012;7:1-4.
12. Solanki N, Kavishwar A, Chauhari V, Chhasatiya N. The effect of maternal anthropometric characteristics and social factors on birth weight of child in small town hospital of Gandevi block of Navsari district. *Int J Med Sci Public Health* 2012;1:4-9.
13. Gogoi G, Ahmed FU. Effect of maternal nutritional status on the birth weight among women of tea tribe in Dibrugarh district. *Indian J Community Med* 2007;32:100-2.
14. Sachdeva P, Patel BG, Patel B, Bhatt M. A study of factors affecting birth weight. *J Global Pharm Tech* 2010;2:118–23.
15. Joshi HS, Srivastava PC, Agnihotri AK, Joshi MC, Shalini C, Vipul M. Risk factors for low birth weight babies and its medico- legal significance. *J Indian Acad Forensic Med* 2010; 32:212-5.
16. Biswas R, Dasgupta A, Sinha RN, Chaudhuri RN. An Epidemiological Study of Low Birth Weight Newborns in the District of Puruliya, West Bengal. *Indian Journal of Public Health* 2008;52:65-71.
17. Joshi HS, Subba SH, Dabral SB, Dwivedi S, Kumar D, Singh S. Risk factors associated with low birth weight in newborns. *Indian J Community Med* 2005;30:142-3.
18. Kumar KJ, Asha N, Murthy DS, Sujatha MS, Manjunath VG. Maternal Anemia in Various Trimesters and its Effect on Newborn Weight and Maturity: An Observational Study. *Int J Prev Med* 2013;4:193–199.
19. Agarwal N, Reddaiah VP. Factors affecting birth weight in a sub-urban community: A study in a secondary level hospital in Delhi. *Health and Population -Perspectives and Issues* 2005;28:189-196.
20. Raman TSR, Parimala V, Bhalla M, Venkateshwar V, Iyengar A. A correlative of maternal haemoglobin and birth weight. *Medical Journal Armed Forces India* 2001;57:110-3.

Original Research Article

**Prevalence of Obesity and Its Associated Factors among Female Students at
AlJouf University, Saudi Arabia**

Doaa M. Abdel-Salam¹

Date of Submission: 3.11.2015

Date of Acceptance: 3.1.2016

Abstract

Background: Overweight and obesity are rising in both the developing and developed world. Over the past 20 years, the rate of obesity has tripled in developing countries as they become more urbanized and adopt a lifestyle of higher caloric intake combined with a more sedentary lifestyle. **Objectives:** The purpose of the study was to assess the prevalence of obesity and its associated factors among students at AlJouf University in Saudi Arabia. **Methods:** A cross sectional study was conducted between 1st of March to end of May 2015. The study included 340 randomly selected female students enrolled at AlJouf University. Data were collected using a structured self-administered questionnaire. Weight, height, waist circumference (WC) and body mass index (BMI) were recorded for each student. Statistical analysis was done using SPSS version 16. **Results:** The prevalence of overweight and obesity among the studied students was 41.1% (24.7% were overweight and 16.4% were obese). WC based obesity was detected among 20.9% of the studied students. BMI and WC were found to increase with the age of the studied students as there were significant positive correlations between age on one hand and BMI and WC on the other hand. There was statistical significant difference between obesity and father education as high BMI was more frequent among students with low father level of education. Also, it was noted that 75.9 % of the studied students would like to be slimmer and this was significantly higher among overweight and obese students. **Conclusion:** The present study suggests the need for strategies and great efforts at all levels to reduce the tendency of overweight and obesity and to promote healthy eating behaviors in the youth.

Key words: prevalence, obesity, university students, body mass index, Saudi Arabia.

Authors:

¹Department of Public Health and Community Medicine, Faculty of Medicine, Assiut University, 71518 Assiut, Egypt. Department of Family&CommunityMedicine, College of Medicine, AlJouf University, Saudi Arabia.

Corresponding Author:

Dr. Doaa Mazen Abdel-Salam, Assistant Professor of Public Health and Community Medicine, Department of Public Health and Community Medicine, Faculty of Medicine, Assiut University, 71518 Assiut, Egypt.
Email: doodyas2004@yahoo.com.

Introduction

Overweight and obesity are becoming major problems in developed as well as developing countries. Obesity is increasing in children and adults, and true health consequences may become fully apparent in the near future ¹.

The number of overweight and obese people has continued to increase since 1960's a trend that is not

slowing. Obesity increases one's risk of developing conditions such as high blood pressure, diabetes (type 2), heart disease, stroke, gallbladder disease and cancer of the breast, prostate and colon ². Moreover, coronary heart disease constitutes one of the main health problems in Saudi Arabia, representing the third most common cause of

hospital based mortality after accident and senility³. The tendency toward obesity is fostered by the environment such as lack of physical activity combined with high-calorie and low-cost foods. Weight loss of about 10% of body weight, for persons with overweight or obesity, can improve some obesity related medical conditions including diabetes and hypertension when intervened at the earliest². According to a study by the Research and Development (RAND) organization, obesity is more damaging to health than smoking, high levels of alcohol drinking and poverty⁴.

The majority of studies have used body mass index (BMI) as the general obesity index. Central obesity might have higher predictive value with regard to health problems than BMI. It has been established that abdominal obesity, assessed by waist circumference (WC), predicts obesity-related health risks. Abdominal obesity has been recognized as an important risk factor for type 2 Diabetes Mellitus, the metabolic syndrome and cardiovascular disorders⁵. It is hypothesized that socio-demographic, social, nutritional and health behavior variables are associated with BMI and central obesity⁶.

According to statistics from the WHO (World Health Organization), Kuwait ranks 9th in the world and first among Arabic speaking countries in female obesity. The rank order in Arabic speaking countries for obesity in females is Kuwait (55.2%), Egypt (48%) and UAE (42%) which is higher than all the European countries and about the same as USA (48.3%) and Mexico (41%). Countries such as Bahrain (37.9%), Jordan (37.9%), Saudi Arabia (36.4%) and Lebanon (27.4%) have higher obesity rates in females than UK (26.3%) and Greece (26.4%)⁷.

This study was designed to determine the prevalence of obesity among female students enrolled at AlJouf University, Saudi Arabia and investigate some of the epidemiologic risk factors contributing to it.

MATERIALS AND METHODS

1-Design and sampling

A cross sectional study was conducted during the academic year (2014-2015). The study included 340 randomly selected female students enrolled at AlJouf University. Students who agreed to participate were included in the study. Pregnant and

breast feeding students were excluded. Data collection was conducted between 1st of March to the end of May 2015.

2-Instrument

The study tool was self-administered questionnaire prepared by the researcher through a literature scanning. The questions in the questionnaire were tested for structure and clarity by the researcher in a pilot study with 10 students. After the pilot study, a few necessary revisions were made to the questions for clarity. Data from the pilot study were not included in the present study. The questionnaire included sociodemographic data such as age, marital status, parents' education, monthly income and with whom these students live. It included questions about mean sleeping hours per day and whether these students would like to be slimmer or not. Also, the questionnaire included some queries regarding physical activity and whether it was done regularly or not. After filling the questionnaire, participants weights and heights were taken; standing straight, barefoot and minimally dressed on a regularly calibrated bathroom scale and readings were measured to the nearest 0.1 Kg. Whereas, participants' heights were measured from head to toe to the nearest 0.5 cm, while standing on a leveled ground, barefoot with parallel feet and heels, buttocks, shoulders and back of the head touching the wall, head comfortably upright so that the lower border of the orbit would be in the same horizontal plane as the external auditory meatus and the arms would hang relaxed at the sides in a natural manner. WC was measured using a measuring tape to the nearest 0.1 cm. BMI was used as an indicator of overweight and obesity. The formula for BMI is weight in kilograms divided by the square of height (in meters). Subjects were categorized according to their BMI according to the criteria of WHO; (<18.5) underweight, (18.5 to 24.9) desirable weight, (25 to 29.9) overweight, (30 to 34.9) obese I, (35 to 39.9) obese II and (≥ 40) obese III⁸. Abdominal obesity in females was considered if WC 80 cm or more according to WHO⁹.

3-Limitation of the study

The design of the present study was cross-sectional so the temporal consequent relationships between health behavior practices and health scores couldn't be established. Also, certain concepts identified in

Table (1): Socio-demographic characteristics of the studied students

	No. (n=340)	%
Age:		
Mean ± SD (Range)	21.23 ± 1.5 (19.0 – 25.0)	
Marital status:		
Single	281	82.6
Married	59	17.4
Father level of education:		
Illiterate/ Read & write	84	24.7
Completed basic education	66	19.4
Completed secondary school	87	25.6
University graduate/ postgraduate	103	30.3
Mother level of education:		
Illiterate/ Read & write	112	32.9
Completed basic education	94	27.6
Completed secondary school	68	20
University graduate/ postgraduate	66	19.4
Working status of mothers:		
Housewife	247	72.6
Working	93	27.4
Living arrangement:		
Living with family	319	93.8
Living in university housing	8	2.4
Living with friends	13	3.8
Physical exercise:		
Yes	135	39.7
No	205	60.3
Regularity of physical exercise:		
Regular	30	22.2
Irregular	105	77.8
No. of sleeping hours per day:		
≤ 6 hours	103	30.3
7 - 8 hours	141	41.5
9 or more	96	28.2
Family income:		
Sufficient	314	92.4
Insufficient	26	7.6
Would you like to be slimmer?		
Yes	258	75.9
No	82	24.1

Table (2): Distribution of the studied students according to their BMI categories

BMI	No. (n=340)	%
Underweight	17	5
Normal	183	53.8
Overweight	84	24.7
Obesity I	45	13.2
Obesity II	11	3.2
Obesity III (morbid obesity)	0	0

Fig. (1): Distribution of the studied students according to their waist circumference (WC)

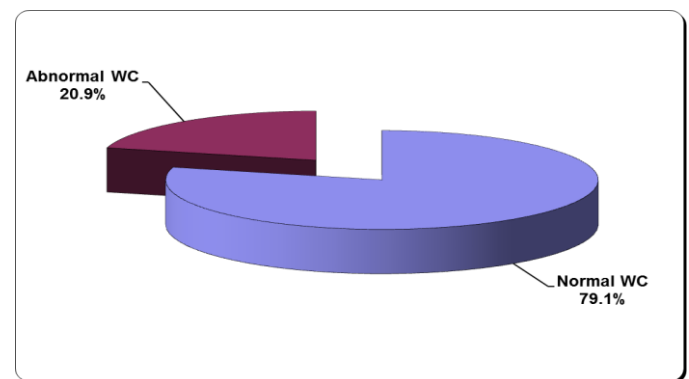
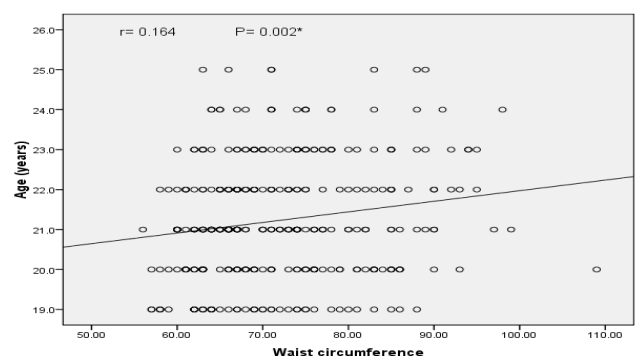


Fig. (2): Correlation between BMI and age of the studied students



other studies to be related to overweight/obesity such as body fat percentage¹⁰, dietary history¹¹, family history of hypertension, diabetes and obesity¹² should be included in future studies.

4-Ethics

The participation in the study was based on verbal consent as the participants expressed their approval for the study. Before data collection, the necessary

Table (3): Distribution of obese and non obese students according to their sociodemographic and lifestyle characteristics

	Non-obese (n= 200)		Overweight/ obese (n= 140)		p-value
	No.	%	No.	%	
Marital status:					
Single	170	85	111	79.3	0.171
Married	30	15	29	20.7	
Father level of education:					0.009*
Illiterate/ Read & write	38	19	46	32.9	
Completed basic education	36	18	30	21.4	
Completed secondary school	56	28	31	22.1	
University graduate/ postgraduate	70	35	33	23.6	
Mother level of education:					0.714
Illiterate/ Read & write	61	30.5	51	36.4	
Completed basic education	57	28.5	37	26.4	
Completed secondary school	41	20.5	27	19.3	
University graduate/ postgraduate	41	20.5	25	17.9	
Working status of mothers:					0.245
Housewife	150	75	97	69.3	
Working	50	25	43	30.7	
Living arrangement:					0.551
Living with family	190	95	129	92.1	
Living in university housing	4	2	4	2.9	
Living with friends	6	3	7	5	
Physical exercise:					0.419
Yes	83	41.5	52	37.1	
No	117	58.5	88	62.9	
Regularity of physical exercise:					0.85
Regular	18	9	12	8.6	
Irregular	65	32.5	40	28.6	
No. of sleeping hours per day:					0.839
≤ 6 hours	63	31.5	40	28.6	
7 - 8 hours	82	41	59	42.1	
9 or more	55	27.5	41	29.3	
Family income:					0.075
Sufficient	189	94.5	125	89.3	
Insufficient	11	5.5	15	10.7	

Would you like to be slimmer?					
Yes	126	63	132	94.3	0.000*
No	74	37	8	5.7	

Table (4): Anthropometric measurements of the studied students

	Non-obese	Overweight/ obese	P-value
	Mean ± SD	Mean ± SD	
Weight	51.92 ± 6.10	71.88 ± 10.78	0.000*
Height	156.82 ± 5.18	155.81 ± 5.59	0.088
BMI	21.09 ± 2.00	29.54 ± 3.61	0.000*
Waist circumference	66.00 ± 4.57	80.47 ± 7.62	0.000*

approval was obtained from the Ethics Committee of the College of Medicine at AlJouf University. Administrators of the University were informed about the study and its purposes.

5-Statistics

Statistical analysis was performed using the Statistical Package of Social Science (SPSS) version 16. Descriptive statistics and chi-square test were performed. A level of $p < .05$ was considered statistically significant.

RESULTS

The sociodemographic characteristics of the studied students are displayed in Table (1). The total number of the students was 340 students and their ages ranged from 19 to 25 years with a mean of 21.23 ± 1.5 . The majority of the students were single (82.6%). Concerning father's education, 30.3% of their fathers had attained university education or above. However, 32.9% of their mothers were illiterate or only read & write. Regarding living arrangement of the students, most of them (93.8%) live with their families and only small percentage live in the university housing or with friends. Table (1) also showed that 39.7% of the students practiced physical exercise and it was done on regular basis among 22.2% of them. The number of sleeping hours per day was 7-8 hours among 41.5%. As many as 75.9% of the students expressed their willing desire to be more slim. Family income was

considered sufficient by most of the students (92.4%).

The distribution of the studied students according to their BMI categories showed that 41.1% of the students were overweight and obese (24.7% overweight and 16.4% obese) and 58.8% non obese as shown in Table (2).

Fig. (1) revealed that 20.9% of the studied students had central obesity as their $WC \geq 80$ cm. There was a significant positive correlation between BMI of the studied students and their ages ($r = 0.147$, $p = 0.007$), indicating that BMI increases with increasing age of the students (Fig. 2).

Also, there was a significant positive correlation between WC of the studied students and their ages ($r = 0.164$, $p = 0.002$), indicating that WC increases with increasing age of the students (Fig. 3).

Distribution of overweight or obese and non obese students according to their sociodemographic characteristics are presented in Table (3), 23.6% of the overweight or obese group reported that their fathers had completed university education or above versus 35% of the non obese group with statistical significant difference ($p = 0.009$). Also, 94.3% of the overweight or obese group would like to be slimmer against 63% of the non obese group with statistical significant difference ($p = 0.000$). However, Table (3) didn't show any statistical significant differences between the studied groups regarding marital status, mother education, working status of mothers, living arrangement, physical exercise, number of sleeping hours per day and family income.

The mean anthropometric measurements of the

studied students are presented in Table (4); statistically highly significant differences were found between the studied groups regarding their weight, BMI and waist circumference ($p < 0.001$).

DISCUSSION

Obesity is becoming a worldwide problem affecting all levels of society and is thus being described as a global epidemic. Economic development of Saudi Arabia during the last decades has changed the nutritional and lifestyle behaviors. Food has become more affordable to a large number of people with the substantial decrease in the price relative to income and the concept of food has changed from a means of nourishment to a determinant of lifestyle and a source of pleasure. The accompanying decrease in the physical activity has likely contributed to the increase in the prevalence of overweight and obesity¹³. The aim of the present study was to determine the prevalence of obesity and its associated factors among female students at AlJouf University in Saudi Arabia. Based on BMI classification of weight status, the prevalence of overweight and obesity in the present study was 41.1% among the studied students, where overweight and obese students represented 24.7% and 16.4% of the sample respectively. The results of the present study nearly agreed with another study conducted among university students in Saudi Arabia as 34.5 % of the students were overweight and 10.3 % were obese¹⁴. However, the results of this study is much higher if compared with another study carried out among Umm Al-Qura University female students in Makkah, Saudi Arabia where the prevalence of overweight and obesity was 25% among the studied students¹. In another study done in three cities of Saudi Arabia (Al-Khobar, Jeddah and Riyadh), the prevalence of overweight and obesity were 43.6% and 34.8% among males and females respectively¹⁵. The results of this study are higher than another study conducted in Khartoum which found that the prevalence rate of obesity among medical students as 26.2% (classified as 16.8% overweight and 9.4% obese)¹⁶. Also, the results of the present study are higher than a study conducted among Iranian male college students which showed that only 7.9% were above the normal body weight¹⁷. A study was done among Chinese college students and revealed that

the prevalence of overweight and obesity was 2.9% which is very low if compared with the results of this study¹⁸. The findings of the present study were much lower if compared with another study carried out in Jordan which revealed that the prevalence of overweight and obesity was 76% (39% overweight and 37% obese)¹⁹. The prevalence of overweight and obesity was 50.4% among college students in Kuwait which is also higher than that reported in the present study²⁰.

Abdominal obesity is assessed through measurement of WC. An increase in WC carries a greater risk of development of future cardiovascular events and diabetes than increased BMI²¹. The cut-off points for defining abdominal obesity are arbitrary. Abdominal obesity in the present study was defined as WC 80 cm or more in women according to WHO⁹. Abdominal obesity was detected among 20.9% of the students in the present study. Prevalence of abdominal obesity among a sample of university students in India was 16.4% which is lower than that reported in this study²¹. However, the findings of the present study were much lower if compared with other studies conducted in Arabic speaking countries. Waist circumference based obesity was detected among 41.5% of college students in Kuwait²⁰. Also, a study conducted among adults in Egypt showed that the overall prevalence of abdominal obesity was 24.1%²². Surveys have demonstrated a high prevalence of abdominal obesity in western populations. The prevalence of obesity in the US men (WC > 102 cm) and women (WC > 88 cm) was 36 and 52 % respectively in 1999-2000²³. In European men and women, abdominal obesity defined according to cut-off values between 90-102 cm for men and 80-92 cm for women was 8 and 13% in France²⁴, 23 and 65% in Spain²⁵ and 18 and 39% in Turkey²⁶. In Cameroon, there is a prevalence of abdominal obesity of 18% in men (WC > 94 cm) and 66% in women (WC > 80 cm)²⁷.

In the present study, BMI and waist circumference based obesity have tended to increase with age. Similar results were reported in the other studies regarding waist circumference based obesity²⁸⁻³⁰. Also, BMI of urban girls in Nigeria was found to be significantly correlated with age³¹.

There is significant association between the level of father education and obesity as higher percentage of the fathers of non obese group were highly educated than the obese and overweight group, in agreement

with a study conducted in Poland³².

As many as 94.3% Of overweight and obese group wanted to lose weight and this was significantly higher than in non-obese group in the present study. This is consistent with a study done in Poland³², where 92% of overweight woman denote positive attention to lose extra weight. Also, a study conducted in India showed that 36.7% of overweight students wanted to bring desirable changes in their body weight. Whereas, all the obese wanted this³³.

CONCLUSION

Obesity is considered a problem among AlJouf University students. Nearly half of the studied students were overweight and obese. Obesity was found to increase with the age of the studied students. Illiteracy among fathers was recognized as a risk factor for obesity morbidity. Also, most overweight and obese students would like to be slimmer.

ACKNOWLEDGEMENT

The author would like to acknowledge Dr. Naif Alwakid, the Dean of the College of Medicine, AlJouf University, AlJouf, Saudi Arabia, for facilitating conduction of the present study. Sincere thanks are due to Mrs. Khiriah Almthroud for her assistance in data collection and to the university students who participated in this study.

REFERENCES

- [1] Abdelhafez, A. and Al-Mashi, S., 2013, *Prevalence of obesity and some related attributes among Um Al-Qura University female students in Makkah, Saudi Arabia. Pakistan Journal of Nutrition, 12(3): 275-284.*
- [2] Gopalakrishnan, S., Ganeshkumar, P., Prakash, M. and Christopher, V., 2012, *Prevalence of overweight / obesity among the medical students, Malaysia. Med J Malaysia, 67 (4):442-444.*
- [3] Al-Shehri, S., Saleh, Z., Salama, M., Yehia, M. and Hassan, Y., 2004, *Prevalence of hyperlipidemia among Saudi school children in Riyadh. Ann. Saudi Med., 24:6-8.*
- [4] Sturm, R., 2002, *The effects of obesity, smoking, and drinking on medical problems and costs. Health Aff (Millwood), 21(2): 245-253.*
- [5] Pischon, T., Boeing, H., Hoffmann, K., Bergmann, M. and Schulze, MB., 2008, *General and abdominal adiposity and risk of death in Europe. N Engl J Med, 359(20):2105-2120.*
- [6] Misra, R., Misra, A., Vikram, NK., Gupta, NS. and Sharma, SS., 2011, *Difference in prevalence of diabetes, obesity, metabolic syndrome and associated cardiovascular risk factors in a rural area of Tamil Nadu and an urban area of Delhi. Int J Diabetes Dev Ctries, 31:82-90.*
- [7] World Health Organization (WHO), 2010, *WHO global infobase [online], Available at : Hyperlink "https://apps.who.int/infobase/Comparisons.aspx [Accessed 5 December 2011].*
- [8] Gee, M., Mahan, L. and Escott-Stump, E., 2008, *Nutrition for health and fitness. In: Krause's Food and Nutrition and Diet Therapy. Mahan L. and Escott-Stump E. (Eds.), 12th Edn., W.B., Saunders Publishers, Philadelphia, USA., pp: 532-557.*
- [9] World Health Organization (WHO), 2008, *Waist circumference and waist-hip ratio report of a WHO expert consultation, Retrieved at http://whqlibdoc.who.int/publications/2011/9789241501491eng.pdf [Accessed 15 November 2012].*
- [10] Yahia, N., Achkar, A., Abdallah, A. and Rizk, S., 2008, *Eating habits and obesity among Lebanese University students. Nutr J, 7:32.*
- [11] Gunes, FE., Bekiroglu, N., Imeryuz, N. and Agirbasli, M., 2012, *Relation between eating habits and a high body mass index among Freshman Students: a cross-sectional Study. J Am Coll Nutr, 31(3):167-174.*
- [12] Al Qauhiz, NM. , 2010, *Obesity among Saudi female university students: dietary habits and health behaviors. J Egypt Public Health Assoc, 85(2):45-59.*

- [13] Amin, T., Sultan, I. and Ali, A., 2008, *Overweight and obesity and their association with dietary habits and sociodemographic characteristics among male primary school children in Al-Hassa, Kingdom of Saudi Arabia. In. J. Community Med., 33: 172-181.*
- [14] Allam, A., Taha, I., Al-Nozha, O. and Sultan, I., 2012, *Nutritional and health status of medical students at a University in Northwestern Saudi Arabia. Saudi Med J, 33(12):1296-1303.*
- [15] Al-Hazzaa, H., Abahussain, N., Al-Sobayel, H., Qahwaji, D. and Musaiger, A., 2012, *Lifestyle factors associated with overweight and obesity among Saudi adolescents. BMC Public Health, 12:354.*
- [16] Abdalla, S. and Mohamed, E., 2010, *Obesity among medical students of the national Ribat University, Khartoum . Sudan J. Public. Health, 5: 16-19.*
- [17] Nojomi, M. and Najamabadi, S., 2006, *Obesity among university students, Tehran, Iran. Asia Pac. J. Clin. Nutr., 15: 516-520.*
- [18] Sakamaki, R., Toyama, R., Amamoto, C. and Shinfuku, N., 2005, *Nutritional knowledge, food habits and health attitude of Chinese university students: a cross sectional study. Nutr. J., 4: 1-5.*
- [19] Abbas, A., Houry, S., Masad, D. and Karabsheh, S., 2003, *Prevalence of overweight and obesity in adult Jordanians aged 25 years and over: results of a national survey. J. Arab Board Med. Specializations, 4: 90-97.*
- [20] AlMajed, H., AlAttar, A., Sadek, A., AlMuaili, T., AlMutairi, O., Amna, S., Shaghoul, A. and AlTorah, W., 2011, *Prevalence of dyslipidemia and obesity among college students in Kuwait. Alexandria Journal of Medicine, 47: 67-71.*
- [21] Pengpid, S. and Peltzer, K., 2014, *Prevalence of overweight/obesity and central obesity and its associated factors among a sample of university students in India. Obesity Research & Clinical Practice, 8:558-570.*
- [22] Abolfotouh, M., Soliman, L., Mansour, E., Farghaly, M. and El-Dawaiaty, A., 2008, *Central obesity among adults in Egypt: prevalence and associated morbidity. Eastern Mediterranean Health Journal, 14(1): 57-68.*
- [23] Ford, E., Giles, W. and Mokdad, A., 2004, *Increasing prevalence of the metabolic syndrome among US adults. Diabetes Care, 27:2444-2449.*
- [24] Balkau, B., Vernay, M. and Mahmd, L., 2003, *The incidence and persistence of the NCEP (National Cholesterol Education Program) metabolic syndrome, The French D.E.S.I.R study. Diabetes Metabol, 29:526-532.*
- [25] Lorenzo, C., Serrano-Rios, M. and Martinez-Larrad, M., 2003, *Central adiposity determines prevalence differences of the metabolic syndrome. Obes Res, 11:1480-1487.*
- [26] Erem, C., Arslan, C. and Hacıhasanoğlu, A., 2004, *Prevalence of obesity and associated risk factors in a Turkish population (Trabzon City, Turkey). Obes Res, 12:1117-1127.*
- [27] Fezeu, L., Minkoulou, E. and Balkau, A., 2006, *Association between socioeconomic status and adiposity in urban Cameroon. Int J Epidemiol, 35:105-111.*
- [28] Sibai, A., Hwalla, N., Adra, N. and Rahal, B., 2003, *Prevalence of and covariates of obesity in Lebanon: finding from the first epidemiological study. Obes Res, 11:1353-1361.*
- [29] Azadbakht, L., Mirmiran, P., Shiva, N. and Azizi, F., 2005, *General obesity and central adiposity in a representative sample of Tehranian adults: prevalence and determinants. Int J Vitam Nutr Res, 75:297-304.*
- [30] Veghari, G., Sedaghat, M., Joshaghani, H., Hoseini, A. and Niknajat, F., 2010, *The prevalence and associated factors of central obesity in Northern Iran. Iranian Cardiovascular Research Journal, 4: 164-168.*
- [31] Ifeoma, F., Lawrence, U. and Nene, U., 2015, *The relationship among body composition and body mass index in a population of adolescents in Enugu State, Nigeria. Int.J.Curr.Microbiol.App.Sci, 4(1):884-897.*

- [32] Pawlinska-Chmaraa, R., Wronkab, I., Suligac, E. and Broczek, K., 2007, Socio-economic factors and prevalence of underweight and overweight among female students in Poland. *Journal of Comparative Human Biology*, 58: 309–318.
- [33] Tiwari, P. and Sankhala, A., 2007, Prevalence of obesity, weight perception and dietary behaviour of urban college going girls. *J. Hum. Ecol.*, 21(3): 181-183.



Prevalence of iron deficiency anaemia among adolescents in rural population of Kitahar Bihar

Shahin¹, Bijoy Mukherjee², Mohd Haroon Khan³, Mohammad Makhmool Alam⁴, Khushboo Juneja⁵

Date of Submission: 03.11.2015

Date of Acceptance: 23.01.2015

Abstract

The main nutritional problems affecting adolescent population include undernutrition and iron deficiency anaemia besides other factors. **Objective:** To estimate the prevalence of iron deficiency anaemia among adolescents. **Study design:** A Community based cross sectional descriptive study. **Setting:** at Hajipur village, a rural field practice area of Department of Community Medicine, Katihar Medical College, Katihar, Bihar. **Participants:** 400 adolescents (213 boys and 187 girls). **Sampling:** Systematic random sampling technique was used. **Statistical Analysis:** Data collected was entered in Microsoft Office Excel and analysed by using SPSS version 20.0. **Results:** Among 400 adolescents the largest number of adolescents 41.25% belong to 10-14 years of age group followed by 32.5% and 26% in the age group 15-17years, and 18-19 years respectively. Overall prevalence of anaemia was 55%. Out of total anaemic, 40.25% were adolescent girls and 14.75% were adolescent boys. Mean haemoglobin was 9.51 gm/dl, and 12.51gm/dl in anaemic and non anaemic adolescents respectively. Standard deviation and standard error of mean haemoglobin was found \pm SD1.63, \pm SE.11 and \pm SD0.7, \pm SE0.052 in anaemic and non-anaemic adolescents respectively. The prevalence of mild, moderate and severe anaemia among adolescent girls was found to be 10.75%, 25% and 4.5% respectively and among adolescent boys was 9.5%, 4.25% and 1% respectively. Girls are anaemic significantly more 40.25% ($p < .0001$) as compared to boys 14.75%. **Conclusion:** It was concluded that girls were anaemic significantly more 40.25% ($p < .0001$) as compared to boys 14.75%. Age of adolescents had been found a significant relation ($p < .0001$) with severe anaemia.

Keywords: adolescents, Iron deficiency anaemia, Mean haemoglobin, Preveence.

Authors:

^{1,3,5} Department of Community Medicine, S.H.K.M., Govt. Medical College Nalhar (Mewat), Haryana India. ⁴Department of Ophthalmology, S.H.K.M., Govt. Medical College Nalhar (Mewat), Haryana India. ²Department of Community Medicine, Katihar Medicall college & Hospital Katihar ,Bihar.India.

Corresponding Author:

Dr Shahin, Department of Community Medicine, SHKM Govt Medical College Nalhar (Mewat) Haryana 122107
Email: shahin_rahman2008@yahoo.com

Introduction

Adolescent is the future generation of any country. Anaemia in adolescent female is a major nutritional deficiency disorder in India. In adolescents girl anaemia may lead to delayed menstrual cycle, poor growth, reduced work capacity and poor

reproductive outcome. It reduces their concentration and school performances. Their nutritional needs are critical for the well being of a society but for many years, their health has been neglected because they are considered to be less vulnerable to diseases compared to relatively young children or the old people.^[1] If the adolescents are well nourished, they

can make optimal use of their skills, talents and energies and would be healthy and responsible citizens. Poor nutrition starts before birth and goes into adolescence and adult life and can span into generations.

National Family Health Survey 3 (2005-06) reported anaemia in women of 15-19 years as 55.8 percent with moderate and severe anaemia of 16.6 percent and chronic Energy Deficiency was found as 46.8 percent. The prevalence of anaemia among female adolescent (15-19 years) is higher in Bihar.^[2]

In the District Level Health Survey (DLHS) during 2002-04, prevalence of anemia in adolescent was found as 72.6. % with severe anaemia of 21.1%.^[3]

Data from the District Nutrition Project (Indian Council of Medical Research) in 16 districts of 11 States on prevalence of anaemia in nonpregnant adolescent girls is (11-18 years) showed rates as high as 90.1 percent with severe anaemia (Hb.<79/dl.) in 7.1 percent.(Toteja GS et al,2002).^[4] Rawat CMS et al (2001)^[5] reported prevalence of anaemia in girls between the age group of 10-18 years as 34.5 percent in rural area of Meerut. Study conducted among adolescents in rural North Indian revealed the prevalence of anaemia 27.8 percent in young boys (12-14 years) and 41.3 percent in older boys (15-18 Years). Aneamia was present in 51 percent of young girls compared to 38.5 percent in older girls.^[6]

So the present study will be undertaken among adolescents girls and boys in the rural community of Katihar district with the Objective to estimate the prevalence of iron deficiency anaemia among adolescents of rural population of Katihar.

Material & Methods

The present population based, cross sectional, descriptive study was undertaken among adolescents (10-19 Years) in Hajipur village of Katihar district, Bihar.The population of the Hazipur village is about 10000. The numbers of houses were approximately 1800. Data will be collected from adolescents (10 - 19 Years) of Hajipur village in Katihar district, Bihar. The study was undertaken during January to December (2012). Permission for the study was obtained from the College authorities prior to commencement.

Sample Size: On the basis of this prevalence of undernutrition among adolescents the sample size of the present study has been calculated by adopting the formula:

$$n = \frac{Z^2 \alpha / 2 \times PQ}{\sum^2}$$

Where P = Prevalence rate of the disease = 50 % = 0.50 Q = 1 – P, = 0.50

α = level of Significance (type 1 error)

$Z\alpha / 2 = 1.96 = 2$ (at $\alpha = 0.05$

$= Z^2 \alpha / 2 = 4$

\sum = Allowable error 10% of P

$= 0.05 \sum^2 = .0025$

Then $n = \frac{4 \times 0.50 \times 0.50}{.0025} = 400$

.0025

Hence the required study sample size is 400 adolescents (10-19 Years).

Sampling technique: Houses that are having at least one adolescent or more will be numbered serially. Then the houses were selected by systematic random sampling technique.

Inclusion Criteria for sampling: The study will be conducted on adolescents who were of both the gender (Adolescent boys and girls), willing to participate in the study and apparently healthy on general physical examination.

Exclusion Criteria for sampling: The study exclude adolescents who were above 19 years of age and below 10 years of age group, not willing to participate in the study, with chronic illness or receiving long term allopathic or indigenous drugs and with history of any severe illness within the past 2 weeks for which they required hospitalization.

Data Collection Method: Written informed consent was taken from the head of the household of adolescents who were below eighteen years, and direct written informed consent was taken from girls who were eighteen years and above. After establishing good rapport with the family, detailed

information about socio-demographic characteristics/profile (age, education and occupation of parents, socio-economic status of the family, types of family, family size), dietary intake and contributory factors in relation with health were recorded in the predesigned and pretested questionnaire. Subject suffering from severe morbidity symptoms like URTI, ENT, Eye problems were referred to Katihar Medical College, Katihar for proper treatment.

Table-1: Distribution of Adolescent Boys and Girls According to age Group

Variables (in Years)	Description	Boys (%)	Girls (%)	Total (%)
10-14	Early adolescent	99 (24.75)	67 (16.75)	166 (41.5)
15-17	Mid adolescent	71 (17.75)	59 (14.75)	130 (32.5)
18-19	Late adolescent	43 (10.75)	61 (15.25)	104 (26)
	Total	213 (53.25)	187 (46.75)	400 (100)

Haemoglobin Estimation: Hemoglobin (Hb) estimation was done by cyanomethemoglobin method^[7] using Sahli's haemoglobinometer. For haemoglobin estimation, 20 µl of capillary blood was taken in a haemoglobinometer pipette and transferred to a pre numbered glass bottle. Haemoglobin estimation was done at rural primary health centre, department of Community Medicine, Katihar Medical College, Katihar. Anaemia was assessed by the WHO criteria of anaemia. The results of haemoglobins were conveyed to the subjects and subject's parent and anaemic subjects were given proper treatment and counseled on dietary intake of iron and other micronutrients. And subject suffering from severe anaemia were referred to the Department of paediatrics, Katihar Medical College, Katihar, Bihar.

Table-2: of Adolescent Boys and Girls According to Anaemia

Gender	Anaemia (%)	Normal (%)	Total (%)
Boys	59(14.75)	154(38.5)	213(53.25)
Girls	161(40.25)	26(6.5)	187(46.75)
Total	220(55)	180(45)	400(100)

Table-3: Prevalence of Anaemia in Adolescents

Adolescents	Number of Cases	Percentage of anaemia	Mean Haemoglobin (gm/dl)	Standard Deviation (±SD)	Standard Error (±SE)
Anaemic	220	55	9.51	1.63	0.11
Non-Anaemic	180	45	12.51	0.7	0.052
Total	400	100	10.71		

Table-4: Prevalence of Anaemia in Adolescents Boys and Girls

Haemoglobin (gm/dl)	Boys (%)	Girls (%)	Total (%)	χ ² , P-value
Mild Anaemia (10.1-12)	38(9.5)	43(10.75)	81(20.25)	26.50, <.0001
Moderate Anaemia (7-10)	17(4.25)	100(25)	117(29.25)	
Severe Anaemia (<7)	4(1)	18(4.5)	22(5.5)	
Total	59(14.75)	161(40.25)	220(55)	

Categorization of anaemia: The subjects were categorized as per WHO standards for anaemia into mild, moderate and severe categories. Subjects having haemoglobin level between 10.1-12.0 gm/dl will be considered to be suffering from mild anaemia, 7-10 gm/dl from moderate anaemia and below 7 gm/dl from severe anaemia.^[8,9]

Data analysis: Data collected was entered in Microsoft Office Excel and analysed by using SPSS version 20.0. Dependent variable frequencies, percentage, mean, range and proportion were calculated. Chi-square test and Yate's correction were used for statistical analysis. The differences were considered as significant at a p value of <0.05.

Results: It is observed from table-1 that among 400 adolescents (213 boys and 187 girls) the largest number of adolescents 41.25% belong to 10-14 years of age group followed by 32.5% and 26% in the age group 15-17years, and 18-19 years respectively. Out of them 53.25% and 46.75% are boys and girls respectively. And 24.75% boys and 16.75% girls are in age group of 10-14 years followed by 17.75% boys ,14.75% girls and 10.75% boys, 15.25% girls in age group 15-17 years and 18-19 years respectively.. (Table 1) It is observed from table-2 that among 400 adolescents overall prevalence of anaemia was 55% (220adolescents).

Table-5: Prevalence of Anaemia in Adolescents According to Haemoglobin level

Haemoglobin (gm/dl)	No. of Adolescents	Percentage (%)	Mean Haemoglobin (gm/dl)	Standard Deviation (±SD)	Standard Error (±SE)
<7	22	5.5	6.69	0.146	0.031
>7-10	117	29.25	8.27	0.707	0.0654
10.1-12	81	20.25	10.88	0.5	0.055
Normal (>12)	180	45	12.71	0.433	0.32
Total	400	100	10.71	2.18	0.11

It is seen that the overall prevalence of anaemia among 400 adolescents was 55%, and 45% were found to be non anaemic and mean haemoglobin was 9.51 gm/dl, and 12.51gm/dl in anaemic and non anaemic adolescents respectively. Standard deviation and standard error of mean haemoglobin was found ±SD1.63, ±SE.11 and ±SD0.7, ±SE0.052 in anaemic and non-anaemic adolescents respectively (table 3).

It appears from the table-4, that the prevalence of mild, moderate and severe anaemia among adolescent girls was found to be 10.75%, 25% and 4.5% respectively and among adolescent boys was 9.5%, 4.25% and 1% respectively. Girls were anaemic significantly more 40.25% (p<.0001) as compared to boys 14.75% and the finding is more significant with anaemia.

From table-5 it can observe that the total mean haemoglobin was 10.71±SD2.18 gm/dl. Prevalence of mild ,moderate and severe anaemia among adolescent was found to be 20.25%, 29.25% and 5.5% respectively. And the mean haemoglobin level and Standard deviation in mild, moderate and severe anaemia was 10.88 gm/dl SD±.5, 8.27 gm/dl SD±.707, 6.69gm/dl SD±.146 respectively. And standard of error(SE) was found ±.055, ±.0654 and ±.031 in mild, moderate and severe anaemic adolescents respectively.

Discussion

Among 400 adolescents the largest number of adolescents 41.25% belong to 10-14 years of age group followed by 32.5% and 26% in the age group 15-17years, and 18-19 years respectively. Where as Patil SN et al. (2009)^[10] stated that 5.3 % of adolescent girls were in age group 11-14 years, 32.7% in the age group 15-17 years, 61.9 % were in the age group of 17-19 years. Out of 400 adolescents, 53.25% were boys and 46.75% were girls. Dambhare DG et al. (2010)^[11] found in a study that 68.97% were boys and 31.03% were girls.

In present study among 400 adolescents overall prevalence of anaemia was 55%. Out of total anaemic, 40.25% were adolescent girls and 14.75% were adolescent boys. Kanani S (1994)^[12], Pathak P et al. (2003)^[13], Kumar VS et al. (1997)^[14] conducted studies from different states of rural India, reported that prevalence of anemia was from 46% to 98%. Choudhury P et al. (1994)^[15] in their study found that prevalence of anemia was 38-72% in India. El-Sahn F et al. (2000)^[16] in their study found that prevalence of anemia was 46.6 % in Egypt. Basu S et al. (2005)^[17] reported that overall prevalence of anemia

among adolescents was 16.25%. Prevalence of anemia was significantly higher ($P < 0.01$) amongst girls (23.9%) as compared to the boys (7.7%). Shah BK et al. (2002)^[18] reported that prevalence of anemia was found to be about 68.8%.

In the present study, mean haemoglobin was 9.51 gm/dl, and 12.51gm/dl in anaemic and non anaemic adolescents respectively. Standard deviation and standard error of mean haemoglobin was found \pm SD1.63, \pm SE.11 and \pm SD0.7, \pm SE0.052 in anaemic and non-anaemic adolescents respectively. The prevalence of mild, moderate and severe anaemia among adolescent girls was found to be 10.75%, 25% and 4.5% respectively and among adolescent boys was 9.5%, 4.25% and 1% respectively. Girls are anaemic significantly more 40.25% ($p < .0001$) as compared to boys 14.75%. Whereas Rawat CMS et al.(2001)⁵ observed that the prevalence of mild, moderate and severe anaemia among adolescent girls was 19.0%, 14% and 1.4% respectively. Thakur et al. (2011)^[19] reported that lower prevalence of severe anaemia 3.2% in adolescent girls. Kaur S et al. (2006)^[20] reported the prevalence of severe, moderate and mild anaemia was 0.6%,20.8% and38.4% in adolescent girls of Rural Wardha.The prevalence of severe anaemia is quite low as compared to the present study.

Conclusion: It was concluded that girls are anaemic significantly more 40.25% ($p < .0001$) as compared to boys 14.75%.This may be due to early marriage, inadequate iron rich food intake, reduced bioavailability of dietary iron, chronic blood loss etc.

Age of adolescents had been found a significant relation ($p < .0001$) with severe anaemia. As age increases the prevalence of severe anaemia also increases. This may be accounted for as repeated menstrual blood loss with each cycle and lack of proper iron, vitamin B12 and folic acid in the diets, use of low bioavailability of iron which results in drainage of iron reserves ending in anaemia.

Acknowledgment: I would like to express my profound gratitude to all the participants for their co-operation and for their immense faith they reposed in me.

Conflict of interest: None to declare

Source of funding: This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

References

1. Rao VG, Aggarwal MC, Yadav R, Das SK, Sahare LK, Bondley LK; *Intestinal Parasitic infections: Anaemia and Under-nutrition among Tribal adolescents of Madhya Pradesh; Indian Journal of Community Medicine*, 2003; 28 (1) : P- 26 – 29.
2. IIPS 2007 National Family Health Survey (NFHS-3) 2005-06 IIPS, Mumbai
3. Park's Text Book of Preventive and Social Medicine, K. Park. M/s Banarsidas Bhanot, Jabalpur.
4. Toteja GS, Singh P, *Micronutrient profile in Indian population (Part I)*. New Delhi, Indian Council of Medical Research. 2002; P 131-140.
5. Rawat CMS, Garg SK, Singh JV, Bhatnagar M, Chopra H, Bajpai SK; *Socio Demographic Correlates of Anaemia among adolescent girls in rural area of district Meerut (UP) Indian Journal of Community Medicine*. Vol 26 No. 4, 2001Oct-Dec.
6. World Health Organization, *Programming for Adolescent Health and Development*. Technical Report Series 886, 1996; P - 2.
7. Gopaldas T, Seshadri S; *Method for determination of blood hemoglobin*. In: *Nutrition. Monitoring and Assessment*. Eds.

- Gopaldas T, Seshadari S. Delhi, Oxford University Press,1987; p 205.
8. World Health Organization 1968, Technical report series no.405.
9. DeMaeyer EM; Preventing and controlling Iron deficiency anaemia through primary health care.A guide for health administrators, WHO, 1989; P-26.
10. Patil SN, Wasnik V, Wadke R; Health Problems Amongst Adolescent Girls in rural areas of Ratnagiri District of Maharashtra, India. 2009 October; Volume: 3 Issue: 5: 1784-1790.
11. Dambhare DG, Bharambe MS, Mehendale AM, Garg BS. Nutritional Status and Morbidity among School going Adolescents in Wardha, a Peri-Urban area. Online J. Health Allied Scs. 2010; 9 (2): 1-3.
12. Kanani S; Combating anemia in adolescent girls : a report from India. Mothers Child 1994; 13: 1-3.
13. Pathak P, Singh P, Kapil U, Raghuvanshi RS; Prevalence of iron, vitamin A and iodine deficiencies among adolescent pregnant mothers. Indian J. Pediatr. 2003;70: 299-301.
14. Kumar VS, Rajaratnam A; Prevalence of anaemia and hook worm infestation among adolescent girls in one rural block of Tamil Nadu. Indian J. Matern Child Health. 1997; 8: 73-75.
15. Choudhury P, Vir S; Prevention and strategies for control of iron deficiency anaemia. 1st ed. Nutrition in children: Developing Country Concerns. 1994; p. 492–524.
16. El-Sahn F, Sallam S, Mandil A; Anemia among Egyptian adolescents: prevalence and determinants. East Mediterr Health J. 2000 Sep-Nov; 6 (5-6): 1017- 25.
17. Basu S, Hazarika R, Parmar V; Prevalence of Anemia Among School Going Adolescents of Chandigarh. Indian Pediatrics. 2005; 42: 593-597.
18. Shah BK, Gupta P; Anaemia in adolescent girls- A preliminary report from semi urban Nepal. Ind. Paed. 2002; 39: 1126-1130.
19. Thakur A, Bhardwaj AK, Parashar A, Sharma D; Epidemiological correlates of Nutritional Anaemia among Adolescent Girls of Hilly State, Indian Journal of Maternal and Child Health, 2011.
20. Kaur S, Deshmukh PR, Garg BS; Epidemiological correlates of nutritional anaemia in adolescent girls of rural Wardha. Ind J Community of Medicine, 2006 Oct-Dec; Vol.31(4).



Original Research Article

Prevalence of Smoking Behavior among the Medical and Dental College Students of Aljouf University

Khaled Saud Asharari¹, Mohammed Assaf AlSharari¹, Mohammed Abdulrahman AlAli¹, Thamer Wadi alanazi¹, Muteb Hassan Almarwani¹, Mohammad Hussein Alruwaili¹, Ali Muqbil Alruwaili¹, Sultan Faraj Alruwili¹, Fawaz Aljethi Alsharari², Ashokkumar Thirunavukkarasu³

Date of Submission: 10.01.2016

Date of Acceptance: 24.01.2016

Abstract

Introduction: Health professionals such as doctors play a major role for the success of smoking control programs. Since medical and dental students are the future physicians and public health managers, they must be the main target of smoking prevention programs. **Methods:** The objectives were to identify the prevalence and predictors of smoking behavior among the medical and dental college students of Aljouf University. A cross sectional study with the predesigned questionnaire was carried out among male students of college of medicine and college of dentistry from Aljouf University. Data were analyzed by using SPSS 17 version. **Results:** The prevalence of smoking was 42.6% for medical and 39.4% for dental college students. Major proportion (61.4%) of the smokers started their smoking behavior at earlier age (16 – 18 years of age). The predictors to start and continue the smoking behavior among the students were family history of smoking, stress and social factors such as leisure time with friends. **Discussion:** Smoking behavior prevalence is very high among the medical and dental college students. Several studies in Saudi Arabia found the same kind of prevalence among the medical students but less among other college students. This is most likely due to stress perceived by the medical and dental college students. **Conclusion:** Target oriented smoking cessation sessions need to be organized for the students with the smoking behavior. There is significant number of students starts smoking at early age. Hence, regular health education campaigns should be organized at the school level regarding health hazards of smoking.

Key words: Smoking behavior, Predictors, Medical and Dental students

Authors:

¹Intern, College of Medicine, Aljouf University.
²Medical Student, College of Medicine, Aljouf University. ³Assistant Professor, Department of Family and Community Medicine, College of Medicine, Aljouf University. Saudi Arabia

Corresponding Author:

Khaled Saud Asharari,
Intern, College of Medicine,
Aljouf University,
Sakaka 72388, The Kingdom Saudi Arabia
Email: k.asharari@gmail.com

Introduction

The World Health Organization (WHO) has stated that smoking as an epidemic¹. The global smoking epidemic is expected to remain as one of the greatest causes of premature death, disease, and suffering for decades to come. It also describes that smoking kills around six million people in a year. Of the 6 million people, around 5 million deaths are the result of direct tobacco use. The smoking also causes more than 600 000 for the passive smokers². Smoking is

one of the leading causes of ill health, disability and premature deaths due to non communicable as well as communicable diseases³.

Despite the several smoking prevention program⁴ implemented in the Kingdom of Saudi Arabia, there is very high prevalence of smoking behavior among Saudi nationals⁵⁻⁷. In Saudi Arabia there is a recent trend toward increased Shisha smoking^{8 - 10}. Saudi adolescents nowadays spend part of their leisure

time smoking shisha in cafes and restaurants. Previous studies⁸⁻¹⁰ at the Saudi Arabia have found that shisha smoking is practiced more frequently among the Saudi nationals. Several smokers consider shisha is less harmful than cigarette smoking¹². But the content of nicotine and its toxicity is as similar as to cigarette smoking. Hence, shisha smoking carries many of the same health risks as cigarettes¹³⁻¹⁴.

Health professionals such as doctors are one of the prime sources to give health education for their patients and public on the hazards of smoking. Health professionals play a major role for the success of smoking control programs implemented by the ministry of health (MOH), Saudi Arabia. The health educator must be an example in the things he is teaching. If he is explaining the hazards of smoking, he will not be very successful if he himself smokes.

Since medical and dental students are the future physicians and public health managers, they must be the main target of smoking prevention programs. It is essential to identify the prevalence and pattern of smoking among medical and dental students for the successful implementation of smoking prevention program for them.

Objectives:

1. To determine the prevalence of smoking among the medical and dental college students of Aljouf University and
2. To identify the risk factors of smoking behavior among them

Materials and Methodology:

This cross-sectional survey was carried out from August 2013 to October 2014. The participants involved in this study were all medical and dental students of first three years of College of Medicine and dentistry of Aljouf University, the kingdom of Saudi Arabia. The fourth and fifth year students were excluded due to their training involves outside the college campus also. Hence they were not accessible during the time of the study. The data were collected by using self administered questionnaire. The data were analyzed by using SPSS version 17. The results were expressed in number and proportions. The chi square test was

used to identify the risk factors for the smoking behavior.

Results:

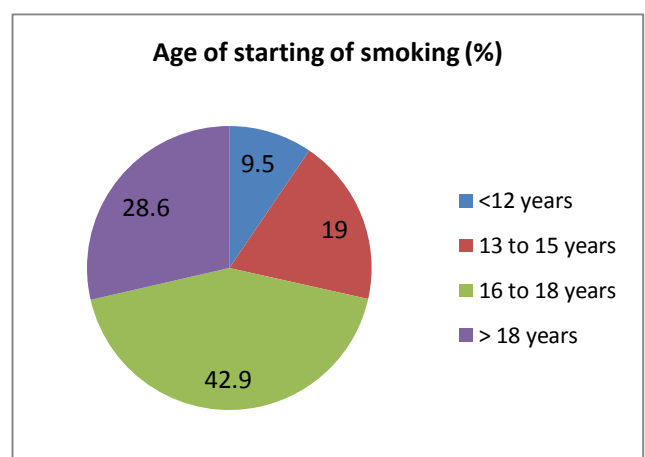
Table 1 illustrates that 41.6% of the study population were smokers. It was found that smoking were prevalent among 42.6% of medical and 39.4% dental students.

Table 1: Prevalence of smoking behavior (n=101)

College	Smoking status		
	Smoker No (%)	Non Smoker No (%)	Total No (%)
College of medicine	29 (42.6)	39 (57.4)	68 (100)
College of dentistry	13 (39.4)	20 (60.6)	33 (100)
Total	42 (41.6)	59 (58.4)	101 (100)

Figure 1 shows that major proportion of the study population started their smoking behavior between 16 and 18 years of their life. The age 16 to 18 were significantly (p value <0.05) higher risk of starting the cigarette smoking among the students.

Figure 1: Age at starting of the smoking (n=42)



This study identified (table 2) that the prevalence of smoking is significantly high (p<0.05) among the students who had the family history of smoking (64.3%) compared to the students who do not have family history of smoking.

Table 2: Smoking status of family members

Family member smoking status	Smoking status		
	Smoker No (%)	Non Smoker No (%)	Total No (%)
*Yes	27 (64.3)	21(35.6)	48 (47.5)
No	15 (35.7)	38 (64.4)	53 (52.5)
Total	42 (100)	59 (100)	101 (100)

* P Value <0.05. Statistically significant

Table 3: Smoking preferences among the smokers

Category	No (%)
<u>Smoking preferences</u>	
Cigarettes	26 (61.9)
Shisha	12 (28.6)
Cigar	4 (9.5)
<u>Preferred location</u>	
Any place with friends	14 (33.3)
Café or Restaurants	10 (23.8)
Home	8 (19)
Open places	6 (14.3)
Others	4 (9.5)

Table 4: Stress status vs Smoking habit of students

Stress status of the students	Smoking status		
	Smoker No (%)	Non Smoker No (%)	Total No (%)
Yes*	28 (66.7)	15 (25.4)	43 (100)
No	14 (33.3)	44 (74.6)	58 (100)
	42 (100)	59 (100)	101 (100)

* P Value <0.05. Statistically significant

Most of the students (61.9%) in this study preferred cigarette smoking than other forms of smoking. There is sizable proportion (28.6%) of the students preferred to use shisha smoking also. It was found that students preferred to smoke at any place with friends (33.3%) and café or restaurants (23.8%).

This study found that the prevalence of smoking is significantly high ($p < 0.05$) among the students who had the stress compared to the students who do not have it.

Discussion:

Using the data from representative sample of medical and dental students of Aljouf university this study found 41.6% of students were smoker. Several studies^{5,7} have found that prevalence is lesser than our study. This difference in prevalence is explained by their unit of sample and shisha behavior is not included in their study. Also perceived stress is very high among the medical and dental students. The present study also aimed to assess the risk factors for the smoking behavior. The risk factors to start and continue the smoking behavior among the students were family history of smoking, stress and social factors such as leisure time with friends. These findings are consistent with the findings of other studies⁸⁻¹⁰. In similar to other studies^{5,6 & 11}, it was found that most of the smokers start this behavior at early age.

Recommendation:

1. There is high prevalence of smoking behavior among the medical and dental college students. Hence, target oriented smoking cessation sessions need to be organized for the students with the smoking behavior
2. There is large number of student starts smoking at early age. Hence, regular health education campaigns should be organized at school and preparatory level onwards regarding health hazards of smoking.
3. Smoking behavior among the students is significantly influenced by family member smoking status. Hence, community oriented health education campaign are needed. This can be achieved by community involvement
4. The future physicians and health care professionals generations must be urgently protected from the devastating health, social, environmental and economic consequences of tobacco consumption and exposure to tobacco smoke.

Conflict of Interest: Nil

Source of funding: None

References:

1. World Health Organization. WHO report on the global tobacco epidemic, 2015 [Internet]. 2016 [cited 1 December 2015]. Available from: http://www.who.int/tobacco/global_report/2015/report/en/
2. World Health Organization| Tobacco [Internet]. 2016 [cited 1 December 2015]. Available from: <http://www.who.int/mediacentre/factsheets/fs339/en/>
3. Gavin A. Smoking is a major cause of premature death worldwide. *Evidence-based Healthcare*. 2004;8(2):95-96
4. Al-Lehiany O, Stanley D. Smoking Cessation Program Targeting Adolescents: Saudi Arabia. *Journal of Smoking Cessation*. 2009;4(01):3-9.
5. Siddiqui S, Ogbeide D. Profile of smoking amongst health staff in a primary care unit at a general hospital in Riyadh, Saudi Arabia. *Saudi Med J* 2001; 22:1101-04.)
6. Hashim T. Smoking habits of students in college of applied medical science, Saudi Arabia. *Saudi Med J* 2000;21:76-80
7. Al-shahri M, Al Almaie S. promotion of non-smoking: The role of primary health care physicians. *Ann Saudi Med* 1997;17:515-17
8. Behbehani N, Hamadeh R, Macklali N. Knowledge and attitude towards tobacco control among smoking and non smoking physicians in 2 Gulf Arab States. *Saudi Med J* 2004;25:585-91.
9. Abol Fotouh M, Abdel Aziz M, Alakija w, Al-Safy A, Khattab M, Mirdad S, et al. Smoking habits of King Saud university students in Abha, Saudi Arabia. *Ann Saudi Med* 1998;18:212-16
10. Al Turki Y. Smoking habits among medical students in central Saudi Arabia. *Saudi Med J* 2006;27(5):700-703)
11. Abdalla A, Hassan H, Mustafa A, Al-Kaabba A, Saeed A. Prevalence and associated factors of cigarette smoking among medical students at King Fahad Medical City in Riyadh of Saudi Arabia. *J Fam Community Med*. 2011;18(1):8.
12. Taha A, Sabra A, Al-Mustafa Z, Al-Awami H, Al-Khalaf M, Al-Momen M. Water pipe (shisha)

smoking among male students of medical colleges in the eastern region of Saudi Arabia. Annals of Saudi Medicine. 2010;30(3):222.

13. Cobb C, Vansickel A, Blank M, Jentink K, Travers M, Eissenberg T. Indoor air quality in Virginia waterpipe cafes. *Tobacco Control*. 2012;22(5):338-343.

14. MayoClinic.org. Hookah smoking: Is it safer than cigarette smoking? - Mayo Clinic [Internet]. 2016 [cited 2 January 2016]. Available from: <http://www.mayoclinic.org/healthy-lifestyle/quit-smoking/expert-answers/hookah/faq-20057920>



Original Research Article

Evaluation of Immunization Coverage in Urban Slums of Belgaum City using 30-Cluster Sampling Method

Jenyz M Mundodan¹, Ashwini L Chingale², Chandra S Metgud³

Date of Submission: 30.12.2015

Date of Acceptance: 23.01.2016

Abstract

Introduction: Universal Immunization Programme (UIP) was launched in India in 1985, with the aim of averting morbidity and mortality due to six childhood diseases. The coverage in the state of Karnataka was 77.4% and 78.3% in Belgaum District according to District Level Household and Facilities Survey (DLHS-4) in 2012-13. Urban slums, where nearly 25% of the Indian urban poor live, constitute one of the high risk areas for the vaccine preventable diseases. **Objective:** To evaluate the Immunization Coverage in urban slums of Belgaum city and to know the factors associated with partial and non-immunization. **Methods:** A cross sectional study was conducted among 600 children using the World Health Organization (WHO) 30-Cluster Sampling Technique from 1st to 30th December 2012. The mothers of the children were interviewed using Questionnaire designed by WHO, with modifications to suit our study. **Results:** Of the 600 children surveyed 69.3% of the children were fully immunized, while 29.8% were partially immunized and 1.17% were unimmunized. Immunisation status of the child was found to be significantly associated with literacy status of mother, socio-economic status of the family, the type of house they lived in and the immunisation status of the mother against Tetanus during her pregnancy. The reason most often given by the parent for partial immunisation was ill-health of the child; and for non-immunisation it was fear of adverse events following immunisation.

Keywords: Children, Cluster sampling, Immunization coverage, Urban Slums

Authors:

1 Assistant Professor, Community Medicine, Amala Institute of Medical Sciences, Thrissur, Kerala, India, 2 Assistant Professor, Community Medicine, Belagavi Institute of Medical Sciences, Belagavi, Karnataka, India, 3 Professor, Community Medicine, J N Medical College, Belagavi, Karnataka, India

Corresponding Author:

Dr. Jenyz M Mundodan, Department of Community Medicine, Amala Institute of Medical Sciences, Thrissur 680555

Email: jenyz.ali@gmail.com

Introduction

Universal Immunisation Programme (UIP) was launched in India in 1985 with the objective of averting morbidity and mortality due to six childhood vaccine-preventable diseases (VPDs). The aim was to achieve 100% coverage of pregnant women with 2 doses of tetanus toxoid (or a booster dose), and at least 85% coverage of infants with 3 doses each of Diphtheria-Pertussis-Tetanus (DPT) vaccine and Oral Polio Vaccine (OPV), one dose of

Bacillus Calmette Guerin (BCG) and one dose of measles by 1990.¹ Hepatitis B was added to the UIP schedule as a pilot project in 2002, and then expanded to all districts of 10 states, including Karnataka.

Immunisation coverage has been steadily increasing, but the average levels remain far less than desired. As per National Family Health Survey-3 (NFHS 3) during 2005-06, the UIP coverage in India was 44%,

which is much less than the desired level of 85%. The coverage in urban areas was reported to be 58%, while that in rural was 39%. The coverage in the state of Karnataka was 55%.² About 25% of the Indian urban poor currently live in slums. These are pockets of low coverage areas for immunisation. Urban slums are high-risk areas leading to a high rate of disease transmission, particularly for VPDs. Maternal and Child Health indicators in slums indicate health in slums to be 2-3 times worse than other.³

The importance of knowledge / awareness about routine immunisation as a factor for its success is brought about by previous studies that “not aware of the needs of vaccination” is the main reason for children not being fully immunised.⁴ This study was formulated against this background with an objective of evaluating the immunisation coverage in the slums of Belgaum city, and determining the factors associated with partial and non-immunisation.

Methodology

This cross sectional study was conducted in the urban slums of Belgaum city over a period of one month from 1st to 31st December 2012. As per the data from Directorate of Municipal Administration, Government of Karnataka, there were 51 slums identified with Belgaum City Corporation limits, with a total population of 57214 in the year 2010.⁵ This constitutes about 11% of the city population. World Health Organization (WHO) 30-Cluster sampling technique was used to collect the study sample.⁶ The 30 clusters were selected by Probability-Proportional-to-Size sampling. From each cluster selected, 20 children aged between 12 to 23 months were chosen, giving a total sample size of 600.

Mothers of the children identified for the study were interviewed using Infant Immunisation Cluster Questionnaire by WHO after making necessary modifications. Informed consent was taken from the mothers prior to administering the questionnaire. Immunisation status of the child was assessed by checking the immunisation card and BCG scar; and in cases where the immunisation card was not available, data given by the mother was relied upon. Immunisation during Pulse Polio Campaign 2012 was ascertained by asking the mother.

The Following criteria were used to categorise child's immunisation status. *Fully Immunised*: A Child between 12 to 23 months of age who has received 1 dose of BCG, 3 doses each of OPV, DPT and Hepatitis B Vaccine and at least 1 dose of Measles Vaccine. *Partially Immunised*: A child who has missed at least one of the above mentioned vaccines, but not all. *Unimmunised*: A child who has not received any of the vaccines mentioned above. Socio-demographic data of the study participants was obtained. Distance from the nearest urban health centre (UHC) and Anganwadi centre (AWC) was also assessed. In cases where the child was found not to be fully immunised, reasons for the same was enquired for.

Ethical Clearance for the study was obtained from the Institutional Ethics Committee of J N Medical College, Belgaum. The data collected was coded and entered using Microsoft Excel software. Analysis was performed in Statistical Package for Social Sciences (SPSS) software 16.0 (trial version). The proportions of fully immunised, partially immunised and unimmunised children were calculated. Chi-square test was used to determine the association between various factors and immunisation status.

Observations

A total of 600 children were studied from 30 clusters. Of them, 313 (52.16%) were males and 47.84% were females. The mean age of infants and mothers was 17.14 (\pm 3.41) months and 22.6 \pm 2.8 years respectively (Table 1). Immunisation card was available in case of 64.17%; 55 (9.17%) mothers claimed that they were not provided with Immunisation cards.

Immunisation Coverage: Of the total 600 children, 418 (69.7%) were fully immunised, 175 (29.2%) were partially immunised and 7 children (1.17%) were found to be unimmunised. The coverage for BCG was 98.5%. BCG scar was not visible in 14 (2.37%) of the 591 children who had been reportedly immunized with BCG; this included 10 children who had Immunisation records that stated that they had received BCG vaccine. The coverage for DPT declined from 97.2% for first dose to 85.5% for third dose; similar was the case for OPV (from 96.7% to 85.0%) and Hepatitis B vaccine (from 94.3% to 82.5%). The coverage was much lower for measles vaccine (71.3%). DPT and OPV dropout

Table 1: Socio Demographic Profile of Study Participants (N = 600)

Variables	No. (%)
Birth Order	
1	267 (44.5)
2	213 (35.5)
3	89 (14.8)
4 and above	31 (5.2)
Religion	
Hindu	364 (60.7)
Muslim	230 (38.3)
Sikh	6 (1.0)
Type of Family	
Nuclear	278 (46.3)
Joint	318 (53.0)
Broken	4 (0.67)
Socio-Economic Class (Mod. B. G. Prasad)	
I	1 (0.17)
II	13 (2.17)
III	94 (15.7)
IV	320 (53.3)
V	172 (28.7)
Living within 2km of UHC	222 (37.0)
Living within 500m of AWC	472 (78.7)
Mother	
Literacy status	
Illiterate	106 (17.7)
Primary	286 (47.7)
High School	188 (31.3)
Secondary School and higher	20 (3.33)
Working	94 (15.7%)

Table 2: Association between immunization status and socio demographic factors

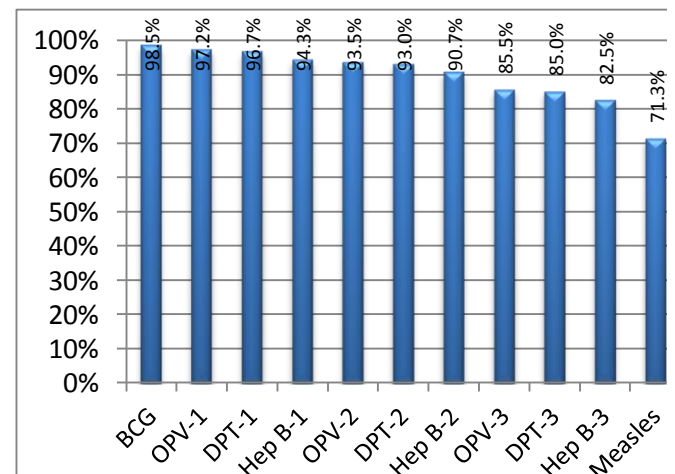
Variables	Fully Immunised (n=418)	Partial/ Unimmunised (n=182)	p-value
Socio Economic Class			0.01
I – IV	311 (72.7%)	117 (23.7%)	
V	107 (62.2%)	65 (37.8%)	
Type of House			0.03
Pucca/Semi-pucca	313 (72.3%)	120 (27.7%)	
Kachha	105 (62.9%)	62 (37.1%)	
Literacy Status of Mother			0.01
Illiterate	65 (61.3%)	41 (38.7%)	
Primary School	193 (67.5%)	93 (32.5%)	
High School	142 (75.5%)	46 (24.5%)	
Higher Secondary and above	18 (90.0%)	2 (10.0%)	
Immunisation of Mother against Tetanus during pregnancy			0.01
Adequately immunised	350 (72.0%)	136 (28.0%)	
Not Adequately immunised	68 (59.6%)	46 (40.4%)	

rates from the first to third dose were 11.7% and 14.2%, respectively. The dropout from BCG to measles vaccine was 27.2% and that from DPT-1 to measles vaccine was 25.9% (Graph 1). Only 351 children (58.5%) had received at least one dose of Vitamin A supplement. The coverage for OPV-0 dose was 80.7%, while only 49.0% received birth dose of Hepatitis B Vaccine.

It was observed that 486 (81.0%) of the mothers had received adequate number of doses of Tetanus Toxoid injections, 74 (12.3%) had received inadequate number of doses (i.e. only one dose while they should have received two), while 40 (6.7%) of the mothers had not received even a single dose of the vaccine. Majority (93.2%) of the children had received both doses of OPV during the National Immunisation Days in February and April 2012. While 30 (5.0%) children had received at least one dose of OPV during either month, 11 children had not received a single dose of OPV during the Pulse Polio Campaign.

Factors influencing Immunisation Status: The association between Immunisation status and

Graph 1: Vaccination coverage



various socio-demographic factors have been depicted in Table 2. Immunisation status of the child was found to be significantly associated with literacy status of mother, socio-economic status of the family and the type of house they lived in. Immunisation status of the child also showed significant association with the immunisation status of the mother against Tetanus during her pregnancy. Factors such as distance from UHC or AWC, age and occupation of parents, religion and type of

Table 3: Distribution of Study Participant According to Reasons for Partial Immunisation

Reasons for Partial Immunisation	No. (%)
Ill health of the child	76 (43.4%)
Out of station for a period of time	49 (28.0%)
Refusal to take more than one injection a day (Hep-B)	15 (8.6%)
Unaware of 2 nd /3 rd doses or that of 10 months	17 (9.7%)
Experience of Adverse Event Following Immunization in previous dose	5 (2.9%)
Forgetfulness of the parent	9 (5.1%)
Advised against by practitioners of Other Streams (Homeopathy)	2 (1.1%)
Vaccinator rude/ uncooperative	2 (1.1%)
Total	175 (100%)

Table 4: Distribution of Study Participant According to Reasons for Non Immunisation

Reasons for Non-Immunisation	Number
Fear of Adverse Effect	2
Past experience of Adverse Event Following Immunization in neighbourhood	2
Advised against by practitioners of Other Streams (Homeopathy)	1
Advised against by religious leaders	1
Vaccinator Uncooperative/ Rude	1
Total	7

family were found to have no significant association with the immunisation status of the child. Similarly no significant association was seen with age, sex and birth order of the child, or retention of immunisation card.

Reasons for partial/non immunisation: A total of 175 children were found to be partially immunised and seven unimmunised. The reason most often given by the mother for partial immunisation was ill-health of the child (Table 3). The most common reason for non-immunisation was fear of or a previous experience of adverse event following immunisation in a child they knew (Table 4).

Discussion

The overall immunisation coverage for vaccines under UIP was found to be 69.7% which is much below the target to be achieved (85%). According to DLHS – 4 (2012-13), the coverage of immunisation was 77.4% in Karnataka state and 78.3% in Belgaum district.⁷ Similar studies done in slums of other cities of India showed comparable results; the coverage was 61.9% in Bareilly, 71.7% in Ahmedabad and 72.4% in Rewa, while it was much less in Surat (29.9%).⁸⁻¹¹ There appeared to be no significant difference in the immunisation coverage with respect to sex of the child, similar to the studies from Bareilly, Ahmedabad and Surat.^{8,9,11} In the study in Rewa by Trivedi R, et al, immunisation coverage was significantly better among male as compared to females.¹⁰ The study was restricted to slums listed under the Belgaum City Corporation. This led to the exclusion of non-enlisted slums, where the scenario may have been worse considering the fact that the Government-initiated Intensified Immunisation campaigns were largely restricted to slum areas listed under the City Corporation.

Factors influencing the immunisation status included literacy status of mother, socio-economic status of the family and the immunisation status of the mother against Tetanus during her pregnancy. No significant association was seen with age, sex and birth order of the child, retention of immunisation card, or religion. Chaudhary V. et al, found that the immunisation coverage was significantly lower among the Muslim community in slums of Bareilly.⁸ The reason most often given by the parent for partial immunisation was ill-health of the child. The most common reason for non-immunisation was fear of or a previous experience of adverse event following immunisation in a child they knew. Similar reasons were stated in most of the other studies.^{8,10}

Conclusion

In spite of intensified campaigns to improve the immunization coverage, we have not been able to reach the target of 85%, especially in high risk areas such as urban slums. Further efforts are required to remove the ignorance and fear that the public harbours with regards to vaccines, and thereby improve the immunisation coverage. Mechanisms need to be strengthened to follow up and identify children who miss their vaccination.

Source of Funding: None

Conflict of interest: None declared

Ethical approval: Ethical clearance was obtained from the Institutional Review Board of J. N Medical College, Belagavi.

References

1. Government of India, Annual Report 2007-08, Ministry of Health and Family Welfare, New Delhi 2010.
2. India National Family Health Survey (NFHS III) 2005-06 Key findings. Ministry of Health and Family welfare, Government of India, International Institute for Population Science Deonar, Mumbai 2007: 9.
3. Rao BT, Thakur JS. Vulnerability assessment in slums of Union Territory, Chandigarh. *Indian J Community Med* 2007; 32: 189.
4. Jain SK, Chawda V, Gupta N, Gupta RS, Venkatesh S, Lal S. Child survival and safe motherhood programme in Rajasthan. *Indian J Pediatr* 2006; 73: 43-7.
5. Government of Karnataka. City sanitation report Karnataka Draft report Belgaum. Administrative Staff College of India, Hyderabad 2010
6. World Health Organization. WHO Immunization Coverage Cluster Survey Reference Manual. Available from www.who.int/vaccines-documents [last accessed on 2012 October 12]
7. District level Household and Facility Survey (DLHS 4). 2012-13 State fact sheet Karnataka Ministry of Health and Family welfare, Government of India, International Institute for Population Science Deonar, Mumbai 2014. Available from www.nrhm-mis.nic.in/SitePages/DLHS-4.aspx [last accessed on 2015 September 2]
8. Chaudhary V, Kumar R, Agarwal VK, Joshi HS, Sharma M. Evaluation of Primary Immunization coverage in an urban area of Bareilly city using cluster sampling technique. *National Journal of Integrated Research in Medicine*. 2010; 1(4): 10-5
9. Kadri AM, Singh A, Jain S, Mahajan RG, Trivedi A. Study on immunization coverage in

urban slums of Ahmedabad city. *Health and Population* 2010; 33(1), 50-4.

10. Trivedi R, Singh S, Adhikari P, Jatav DP. Coverage evaluation of primary immunization and the associated determinants in an urban slum of Rewa. *Ind J Comm Health*. 2014;26(1):37-40.
11. Sharma R, Desai VK, Kavishvar A. Assessment of Immunization Status in the Slums of Surat by 15 Clusters Multi Indicators Cluster Survey Technique. *Indian J Community Med*. 2009 April; 34(2): 152–5.



Original Research Article

Patterns of Physical activity among degree college students of Mandya City,
Karnataka, India

Poornima.S¹, Shivakumar KM²

Date of Submission: 01.11.2015

Date of Acceptance: 23.01.2016

Abstract

Introduction: Physical activity has significant benefits for healthy living. **Objectives:** To describe the patterns of physical activity, and to list the factors influencing physical activity among the degree college students of Mandya city. **Materials and methods:** A cross-sectional study was undertaken in all the degree colleges of Mandya city using a modified English Short Version of International physical activity questionnaire (IPAQ). A total of 1448 students participate in the study. **Results:** Physical activity pattern among male students was cycling 267 (43.27%), sports and games 143 (23.18%), farming 98 (15.88%), where as the pattern among female students was household chores 308 (37.06%), walking 168 (20.22%), farming 109 (13.12%) and dancing 88 (10.59%). 669 (46.20%) students were involved in vigorous physical activity and 779 (53.80%) in moderate physical activity. 520 (84.28 %) male students reported to be involved in vigorous physical activity and 682 (82.07%) female students involved in moderately intense physical activities. Only 457 (31.56%) students had the ideal physical activity pattern as prescribed by the WHO of 150 minutes of physical activity per week. **Conclusion:** In our study almost 4 out of every 5 male students were involved in vigorous physical activity where as almost same numbers of female students were involved in moderate physical activity. Nearly 20% of the students had an average physical activity duration above that recommended by the World Health Organisation Nearly two third of the subjects quoted Healthy life and Exams and or tests as the single most important motivating and hindering factor to indulge in physical activities.

Key words: Physical activity, Exercise pattern, College students, Urban areas

Authors:

1 Assistant Professor, Department of Community Medicine, 2 Professor, Department of Medicine, Mandya Institute of Medical Sciences, Mandya, Karnataka.

Corresponding Author:

Dr. Poornima. S,
#75, Ganesh Krupa, 1stcross, JP nagar,
Bangalore 560076
e-mail: docspoornima@gmail.com

Introduction

“Physical activity” can be defined as any bodily movement / movements produced by skeletal muscles that requires energy expenditure. World Health Organisation has identifies and labelled Physical inactivity as the fourth leading risk factor for mortality worldwide leading to estimated 3.2 million deaths globally.¹ Regular physical activity – either moderate intensity activities like walking,

cycling, or vigorous intensity like participating in sports – has significant benefits for health.² The benefits of physical activity include reduce the risk of high blood pressure, stroke, cardiovascular diseases, type 2 diabetes mellitus, metabolic syndrome, colon and breast cancer, and depression. Physical activity also helps to maintain body weight, cardiac and muscle fitness, hence healthy Body mass

index. Moreover adequate levels of physical activity will decrease the risk of a hip or vertebral fracture and help control weight.³ The rising levels of physical inactivity or insufficient physical activity along with unhealthy nutritional habits can be attributed as most important causes of the rising prevalence of diabetes, obesity and cardiovascular mortality in India and other developing countries.

Objectives

1. describe the patterns of physical activity among Degree College students of Mandya City.
2. list the factors influencing physical activity as perceived by Degree College students of Mandya City.

Material and methods

Study setting: Mandya city has a total of 15 degree colleges including government and private colleges. There are 8 colleges offering bachelors and masters degrees in sciences, commerce and arts, 5 nursing colleges, 1 engineering college and 1 medical college. All the colleges' principals were contacted for permission for the study. A total of 12 colleges that consented were enrolled in the study. 3 college managements refused permission as exams were in progress at the time of the study

Study subjects: All students aged more than or equal to 18 years of age studying in the degree colleges of Mandya city and consenting to participate in the study were included.

Study design: A cross-sectional study

Sample size: as per the college records there were a total of 1614 students aged more than or equal to 18 years studying in these colleges. However, 1448 students consented to participate in the study.

Study period: Nov 2012 - March 2013.

Study tool: A pre-designed, pre-tested, semi-structured questionnaire was developed based on the English Short Version of International physical activity questionnaire (IPAQ). The questionnaire was further modified and validated to suit the local scenario and was used by self administration method to all the students consenting to participate in the study.

About the IPAQ: IPAQ is used for most national and regional prevalence studies, was developed by Geneva in 1998. There are three versions of the same. For adolescents aged 15-18 years, adults aged

18-60 years and for elderly aged > 60 years. There are 2 forms - short and long. The short form was used in our study as it was more appropriate for younger individuals as it has only seven questions, which enquires about the time spent in being physically active in last 7 days. World health Organizations physical activity recommendations for healthy living for adults aged 18–64 years (irrespective of race, sex or ethnicity) should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. Keeping this as the reference students were classified to different groups. The study subjects were asked to list all the physical activities undertaken as routine work or part of routine work on a daily or weekly basis. Information regarding work done in the form of transportation to reach the work place or residence, entertainment or leisure time activities and also the physical activities undertaken for generation of income. Also information on duration of physical activity expressed in minutes per week was collected and was used to classify the students into two categories vigorous intensity and moderate intensity physical activity group. A separate provision was made to elicit the total amount of time spent in physical inactivity or low physical activity like watching television, movies, playing games on mobile, in internet gaming centres or video games by students. The questionnaire also had questions to elicit factors that promote or hinder physical activities as perceived by the students themselves.

Students who reported as involving in physical activities like running, cycling, aerobics, swimming, sports and games, manual labour like working in the fields, digging ditches and carrying heavy loads for more than 150 minutes in 7 days or 1 week were classified as Vigorous intensity physical activity group. Students who reported as involving in moderate intensity physical activity like brisk walking, dancing, gardening, household and domestic chores, walking with domestic animals, painting and tailoring for at least 150 minutes in 7 consecutive days or a week were classified as Moderate intensity physical activity group. Examples of low intensity physical activity included

reporting watching television, gaming on mobiles, video games, internet online gaming, watching movies, reading newspaper, office work, studying and writing.

Permission was obtained from the principals of the colleges consenting to participate in our study. Students volunteering to participate were administered the questionnaire. Time given to fill up the questionnaires was 30 minutes. Ethical approval was granted by the Institutional Ethics Committee.

Operational definitions

Physical activities are activities where there are movements which increase heart rate above its resting rate, whether it is done for pleasure, work or transportation. Including walking, gardening, dancing, swimming, cycling, household chores, occupational work, sports

Intensity. Intensity refers to the magnitude of the effort required to perform an activity or exercise. For example; how fast is the activity performed? Faster the activity is performed more is the energy spent on the activity hence higher the intensity of the physical activity.

Duration: The length or amount of time spent on an exercise or activity is performed, expressed in minutes per week or minutes per day.

Exercise: A subcategory of physical activity that is planned, structured, repetitive, and purposive. Maintenance of one or more components of the physical body structure or fitness is the objective.

Moderate-intensity physical activity: subjective assessment score of 5 or 6, as assigned by the subject when asked to score the physical activity on a scale from 0 to 10, where zero being the least tiresome physical activity and 10 being the most tiresome activity.

Vigorous-intensity physical activity: subjective assessment score equal to 7 or more than 7, as assigned by the subject when asked to score the physical activity on a scale from 0 to 10, where zero being the least tiresome physical activity and 10 being the most tiresome activity.

Data collection and analysis

The data was entered in Microsoft excel and analysed using epi info open source software. Data was described using percentages, proportions and represented in the form of charts and tables percentages and proportions. Statistical test like Chi-square test was applied where necessary.

Results

Graph 1: Distribution of most common physical activities undertaken by male and female students

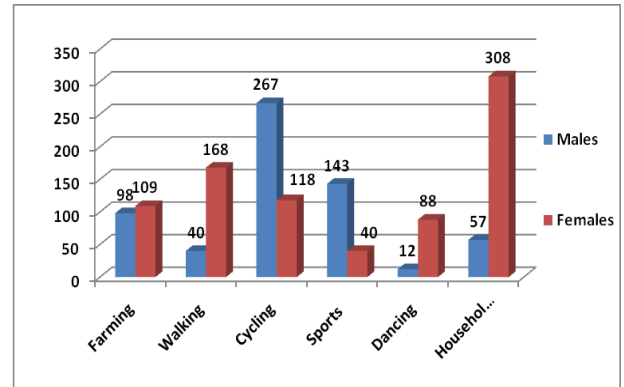


Table 1: Sex-wise distribution of socio-demographic characteristics of the study subjects

Character	Males	Females	Total (%)
Age(completed years)			
18-19	356	445	801 (55.32)
20-21	108	261	369 (25.48)
22-23	131	106	237 (16.37)
24-25	22	19	41 (2.83)
Place of Residence			
Urban	428	625	1053(72.72)
Rural	189	206	395 (27.28)
Type of family			
Nuclear	336	458	794 (54.84)
Joint family	169	136	305 (21.07)
Others	112	237	349 (24.10)
Total Family income(INR)			
< 2000	166	162	328 (22.65)
2001-5000	34	133	167 (11.53)
5001-10000	111	296	407 (28.11)
10001-20000	94	134	228 (15.74)
>20001	212	106	318 (21.96)

*% and figures in parentheses indicates percentages

A total of 1448 students from various degree colleges participated in our study. Of the total 831 (57.39%) were females and 617 (42.61%) were males. Majority of the students 1170 (80.80%) were aged between 18 and 21 years. Only 278(19.20%) were in the age group of 22to 25 years. Most of the students 1053 (72.72%) students were residents of urban area and only 395 (27.28%) reported to be residing in rural areas. Majority of the students 794

(54.84%) reported to be living in nuclear type of family and only 305 (21.07%) lived in joint type of family. Most of the students 953 (65.82%) reported that their monthly family income was above 5000 Indian National Rupees (INR) per month. However, 495 (34.18%) had a family income less than or equal to 5000 INR per month. (As shown in Table 1)

Pattern of commonly performed physical activity among male students as arranged in descending order was cycling 267 (43.27%), sports and games 143 (23.18%), farming 98 (15.88%), household chores 57 (9.24%) & walking 40 (6.48%). However, the pattern among female students was slightly different with majority stating household chores 308 (37.06%), walking 168 (20.22%), farming 109 (13.12%), dancing 88 (10.59%) & sports and games 40 (4.81%). (as represented in graph 1)

Over all 273 (18.85%) students had physical activity duration of >181 minutes which was more than that recommended by the World Health Organisation. However, 718 (49.58%) students had put in inadequate or insufficient duration of physical activity per week at < 120 minutes. Only 457 (31.56%) students had the ideal physical activity pattern as prescribed by the WHO that is an average of 150 minutes of physical activity per week. However the percentage of students with < 60 minutes of physical activity was more among female students 158 (19.01%) as against 38(6.16%) male students.

Also in our study it was noted that 526 (36.32 %) study subjects, 201 (32.57%) males and 325 (39.10%) female self reported to be involved in watching television or movies or gaming on mobile, television or computer for more than 120 minutes every day. This data was not complete as remaining as many students 922 (63.67%) did not respond to the question.

Overall 669 (46.20%) students were involved in vigorous physical activity and 779 (53.80%) in moderate physical activity. 520 (84.28 %) male students reported to be involved in vigorous physical activity as against only 149 (17.93%) female students. However, proportion of female students involved in moderately intense physical activities was 682 (82.07%) as against 97 (15.72%) among male students. (As shown in Table 2)

Table 2: Distribution of study subjects based on characteristics of physical activity undertaken

Characteristic of physical activity	Males (%)*	Females (%)	Total (%)
Duration per week in minutes			
0 - 60	38	158	196(13.53)
61 - 120	159	363	522(36.05)
121 - 180	236	221	457(31.56)
>181	184	89	273(18.85)
Total	617	831	1448(100.00)
Nature or intensity			
Vigorous	520 (84.28)	149 (17.93)	669 (46.20)
Moderate	97 (15.72)	682 (82.07)	779 (53.80)
Total	617	831	1448(100.00)

*% and figures in parentheses indicates percentages

Healthy life was quoted as most common motivating factor to indulge in physical activity by 892 (61.60%) students. The other factors that were listed by the study subjects as motivating to indulge in physical activities are as follows: maintain body figure and fitness 580 (40.05%), friends company 484 (33.43%), to earn money 398 (27.49%) For fun 406 (28.04%), as a hobby in leisure time 312 (21.55%), sports competitions 156 (10.77%).

Exams and or tests at the college or university were the most common hindering factor that was quoted the study subjects for not involving in physical activity which was reported by 1039 (71.75%). Other reason reported as hindering factors for physical activity included need to spend mone 816 (56.35%), heavy rains, snowing 714 (49.31%) and festival 560 (38.67%).

Conclusion:

Majority of the students around 80.80% were aged between 18 and 21 years. Two thirds of the study subjects were residents of urban areas and nearly half of them were living in nuclear type of family. Nearly two third of the study subjects reported to be having their monthly family income above 5000 Indian National Rupees (INR) per month. Most commonly performed physical activity among male students was cycling (43.27%), sports and

games (23.18%), farming (15.88%), household chores (9.24%) & walking (6.48%). However, most female students stated household chores (37.06%), walking (20.22%), farming (13.12%), dancing (10.59%) & sports and games (4.81%) as frequently indulging physical activities.

In our study almost 4 out of every 5 male students were involved in vigorous physical activity where as almost same numbers of female students were involved in moderate physical activity. Nearly 20% of the students had an average physical activity duration above that recommended by the World Health Organisation and less than 10 % had low physical activity profile at <60 minutes per week. Nearly two third of the subjects quoted Healthy life and Exams and or tests as the single most important motivating and hindering factor to indulge in physical activities.

Discussion

In a similar study conducted on medical college students at Mangalore by HN Harsha kumar et. al. (54.75%) of the study subjects were involved in high level physical activity and 68.9% of the students opined that preventing chronic non-communicable diseases is the primary benefits of physical activity.⁹ These finding are similar to our present study.

Also our study findings are similar to the finding of a population-based cross-sectional survey undertaken on 8,042 adult subjects of South India using WHO Global Physical Activity Questionnaire (GPAQ). This survey had reported that 27.2% male, 17.2% female respondents reported low level physical activity and 65.5% male, 80.5% female reported moderate physical activity with mean 4.93 hours (SD 2.09) for males, and 4.90 hours (SD 1.88) for females.¹⁰

The finding of our study are similar to the findings of phase I ICMR study conducted in the 4 states of India which revealed that males were significantly more active than females is similar to this study.¹¹ This study also revealed that the percentage of highly active males was 13.7% which was much less than reported in our study. However, Mandya being an area of wet lands with agriculture as the main occupation of the people may be the reasons. Another study done by Shah et al., in 2005 in six regions of India including Delhi and Ballabgarh in the north, Chennai and Trivandrum in the south, Nagpur in the west and Dibrugarh in the east had

shown that overall inactivity levels were 12.6% in males and 18.9% in females.¹²

A study done on 6198 subjects (3426 men and 2772 women) from eleven cities across India showed that 38.8% of men and 46.1% of women were physically inactive and also a study done in Jaipur City to assess the prevalence of cardiovascular risk factors in 739 subjects (451 men, 288 women), found that 69.6% of men and 52.4% of women were physically inactive these figures were higher than that reported in our study^{13,14}.

A review done by Hallal et al. the prevalence of physical inactivity varied widely between regions of the world; for example it was highest in Eastern Mediterranean and American countries, followed by 34.8% in Europe, 33.7% in Western pacific, 27.5% in Africa, and least in South East Asia at 17% .¹⁵ However, the finding of significant difference among males and females with respect to physical activity, with males being more active was in agreement with our study findings.^{12,13,14,16,17}

Limitations to our study:

In our study assessment of physical activity by using IPAQ by self-reporting is based on the memory of the study subjects hence recall bias is a possibility leading to over-reporting or under-reporting of physical activity. The geographic, economic and cultural variations may also contribute to the differences noted in various studies.

Recommendations from our study:

objective methods of assessment of physical activity with longer and more frequent follow-up using a longitudinal study design would help establish the exact pattern and amount of physical activity performed by the study subjects.

Acknowledgements: Managements of the degree colleges for permitting us to conduct the study. Director MIMS, Mandya for providing us the support to conduct the study. Dr. Prakash GM, Professor of Medicine, MIMS, Mandya, Dr. Ragavendra L, Assistant Professor, and Dr. Shreedhar M, Medical officer of Kyatumgere Primary Health Centre for man power support, volunteers who worked for the study and all the study participants for their co-operation during the study.

Conflict of interest: None declared

References

1. World Health Organisation. Fact sheet on diet, physical activity and health available at <http://www.who.int/dietphysicalactivity/pa/en/> accessed on Dec 14, 2013, 19:23 hrs.
2. World Health Organisation. Information sheet: Global recommendations on Physical activity for health adults 18-64 years old. Available at http://www.who.int/entity/dietphysicalactivity/publications/recommendations18_64yearsold/en/index.html accessed on 12th Jan 2014 at 1:45 pm.
3. Hamilton MT, Hamilton DG, Zderic TW. Role of low energy expenditure and sitting in obesity, metabolic syndrome, type 2 diabetes, and cardiovascular disease. *Diabetes*:2007; 56: 2655–2667.
4. Alison L Marshall, Barbara E Anisworth, Ulf Ekelund, et al. International physical activity questionnaire: 12 country reliability and validity. *Medicine and amp science in sports and amp exercise*: Sep 2003. Available at <http://www.researchgate.net/publication/10627652>.
5. Sallis JF and Saelens BE. Assessment of physical activity by self-report: status, limitations, and future directions. *Res. Q. Exerc. Sport* 71:1–14, 2000
6. Booth ML. Assessment of physical activity: an international perspective. *Res. Q. Exerc. Sport* 71:S 114 –S120, 2000.
7. Pate RR, Pratt M, Blair SN et al. Physical activity and public health. *JAMA* 273:402–407, 1995.
8. Must A¹, Tybor DJ. Physical activity and sedentary behavior: a review of longitudinal studies of weight and adiposity in youth. *Int J Obes (Lond)*. 2005 Sep;29 Suppl 2:S84-96.
9. Harshakumar HN, Neha R, Mayur C, Arpitha J, Mohit Kadian, Vikas Chauhan. A cross-sectional study on patterns, motivating factors and barriers for physical activity among undergraduate medical students. *Int. J Med Pub Health*. 2014: volume 4 (4): 413-416. available at <http://www.ijmedph.org>
10. Chomitz VR, Prabhu SS, Thanikachala S, Vijayakumar H, Chui KKH, Must A, Bermudez O et al. Physical activity and sedentary behavior in South Indian adults: Urbanicity, gender, and obesity. *The FASEB Journal*:2013;27:1055.27.
11. Anjana RM, Pradeepa R, Das AK, Deepa M, Bhansali A, Joshi SR, et al. Physical activity and inactivity patterns in India – results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5]. *Int J Behav Nutr Phys Act*. 2014; 11: 26.
12. Shah B. Development of Sentinel Health Monitoring Centres for Surveillance of Risk Factors of Noncommunicable Diseases in India (April 2003 to March 2005): Collated Results of 6 Centres. Indian Council of Medical Research: New Delhi; 2005.
13. Gupta R, Deedwania PC, Sharma K, Gupta A, Guptha S, Achari V, Asirvatham AJ, Bhansali A, Gupta B, Gupta S, Jali MV, Mahanta TG, Maheshwari A, Saboo B, Singh J, Gupta R. Association of educational, occupational and socioeconomic status with cardiovascular risk factors in Asian Indians: a cross-sectional study. *PloS One*. 2012;7:e44098. doi: 10.1371/journal.pone.0044098.
14. Gupta R, Sharma KK, Gupta A, Agrawal A, Mohan I, Gupta VP, Khedar RS, Guptha S. Persistent high prevalence of cardiovascular risk factors in the urban middle class of India: Jaipur Heart Watch-5. *J Assoc Physicians India*. 2012;60:11–16.
15. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U. for the Lancet Physical Activity Series Working Group. Physical activity 1 – global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet*. 2012;380:247–257. doi: 10.1016/S0140-6736(12)60646-1.
16. Ravikiran M, Bhansali A, Ravikumar P, Bhansali S, Dutta P, Thakur JS, Sachdeva N, Bhadada S, Walia R. Prevalence and risk factors of metabolic syndrome among Asian Indians: a community survey. *Diabetes Res Clin Pract*. 2010;89:181–188. doi: 10.1016/j.diabres.2010.03.010.
17. Kinra S, Bowen LJ, Lyngdoh T, Prabhakaran D, Reddy KS, Ramakrishnan L, Gupta R, Bharathi AV, Vaz M, Kurpad AV, Smith GD, Ben-Shlomo Y, Ebrahim S. Sociodemographic patterning of non-communicable disease risk factors in rural India: a cross sectional study. *BMJ*. 2010;341:1–9.
18. Ramachandran A, Mary S, Yamuna A, Murugesan N, Snehalatha C. High prevalence of diabetes and cardiovascular risk factors associated with urbanization in India. *Diabetes Care*. 2008;31:893–898. doi: 10.2337/dc07-1207.

Original Research Article

Menstrual Pattern Among Adolescent Girls In Kancheepuram District Of Tamilnadu

Sampath kumari S¹, Vijayalakshmi N², Prabakaran J³

Date of Submission: 10.11.2015

Date of Acceptance: 23.01.2016

Abstract

Background: Every woman does experience one or other type of menstrual problems in her lifetime. **Objectives:** To understand the menstrual hygiene and menstrual pattern among adolescent girls in Kancheepuram district. **Methodology:** A descriptive cross sectional study was conducted among 104 adolescent girls aged above 12 years. A pre-tested proforma was used to collect the details of adolescent girls. **Results:** Age at puberty from 11 to 14 years (Mean: 12.44 years). 49% of girls attained puberty in the age of 12 and 37.5% at 13 years. 44.2%(46) of participants had been using the same inner garments around one year and 19.2%(20) using more than one year. 45.2% of participants are changing 2 napkins per day, 34.6% are changing 3 per day, 18.3% are changing 4 per day and 1.9% of participants are changing 1 napkin per day . 84(80.8%) have got regular cycles and 20 (19.2)participants have got irregular cycles. BMI<25 and >25 have influence on, onset puberty and bleeding quantity (p<0.05). **Conclusion:** Menstrual hygiene, personal hygiene are to be improved in adolescent girls. Also proper nutritional care is to be given to this group as low and high BMI are suffering from menstrual disorders.

Key Words: Adolescents , BMI, Menstrual disorder

Authors:

1.Associate professor&2.Assistant professor, Chengalpattu Medical College, Chengalpattu, Kancheepuram District, TN,India 3.PhD Scholar, Symbiosis University.

Corresponding Author:

Dr.Sampath kumari S,
Associate professor ,Department of Obstetrics & Gynaecology, Chengelpet Medical College hospital, Chengelpet, Tamilnadu, India.
E-mail: drskumari@yahoo.co.in

Introduction

Adolescence marks the developmental transition from childhood to adulthood, a time when many important social, economic, biological, and demographic events set the stage for adult life. In India, myriad social, economic, and health factors may undermine the ability of adolescents to lead full and productive lives.¹

The lives of millions of adolescents worldwide are at risk because they do not have the information, skills, health services and support they need to go through sexual development during adolescence.² Young people (aged 10–24) constituted almost 315 million

and represented 31% of the Indian population in 2001. Not only does this cohort represent India's future in the socio-economic and political realms, but its experiences will largely determine India's achievement. In recognition of the importance of investing in young people, several national policies and programmes formulated since 2000, including the National Population Policy 2000, the National Youth Policy 2003, the Tenth and Eleventh Five-Year Plans, the National Adolescent Reproductive and Sexual Health Strategy and the National Rural Health Mission, have underscored a commitment to

addressing the multiple needs of this group in India.³ Despite rapid urbanisation and the trend of migration to cities, more than half the adolescents (10-19 years) and youth (15-24 years) in Tamil Nadu live in rural areas, show Census 2011 figures. There are around 1.24 crore boys and girls in the 10-19 age group and nearly 1.26 crore youths in the state.⁴

Seeking treatment for sexual and reproductive health problems was more limited among young women than young men. Indeed, just two in five young women who had experienced symptoms of genital infection, and half of those who had experienced menstrual problems (51%), had sought care.⁵

Menstruation is a normal physiological phenomenon for females indicating her capability for procreation. However this normal phenomenon is not an easy one. It is often associated with some degree of sufferings and embarrassment. It is common observation that every woman does experience one or other type of menstrual problems in her lifetime.⁶ Menarche is a complex of growing up. The age of onset of the menstrual cycle varies from 9-18 years, about 12 year in India.⁷ Lack of menstrual hygiene was found to result in adverse outcomes like reproductive tract infections.⁸ It is a common observation that girls are rarely informed about menstruation unless they experience it for the first time.⁹

Hence it is better to understand the menstrual pattern in different strata of population.

Objectives: To understand the menstrual hygiene and menstrual pattern among adolescent girls in Kancheepuram district.

Materials and Methods

This descriptive cross sectional study was conducted among adolescent girls aged above 12 years. A convenience sample of 104 was chosen for this study. This study was conducted in a Higher secondary school and degree college in semmanjeri, Chenagalpattu, Kancheepuram district of Tamilnadu.

A pre-tested proforma was used to collect the details of adolescent girls. This includes basic demographic characteristics, nutritional and menstrual details. A detailed instructions about filling the form was

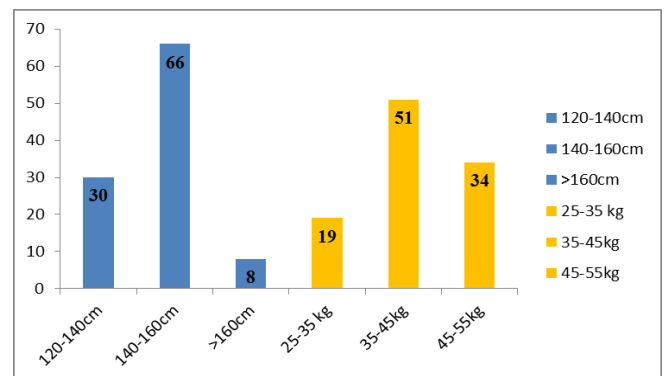
given. Consent was taken individually before conducting the survey. Also necessary approvals were obtained from concerned authorities.

All the parameters were entered in Microsoft excel and analysis done Using SPSS. Tables, Charts presented and proportion and chi-square test were used.

Results

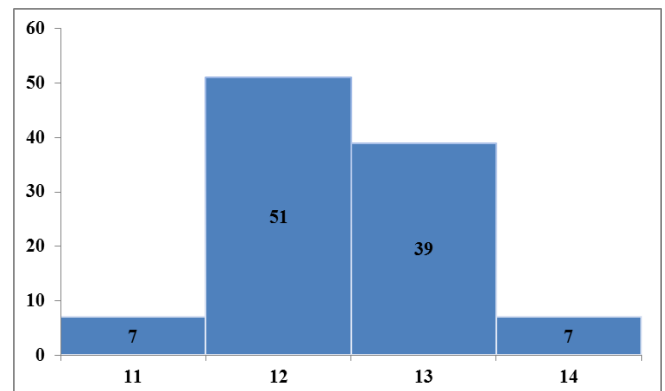
Total adolescent girl participants in this survey were 104 aged ranges from 12-20 years (Mean 15.88 years). Mean weight and height of the participant's were 41.47 kgs and 146.60 cms respectively. Mean BMI was 19.48 kg/m² (SD:3.71)

Figure 1. Height and weight of study participants



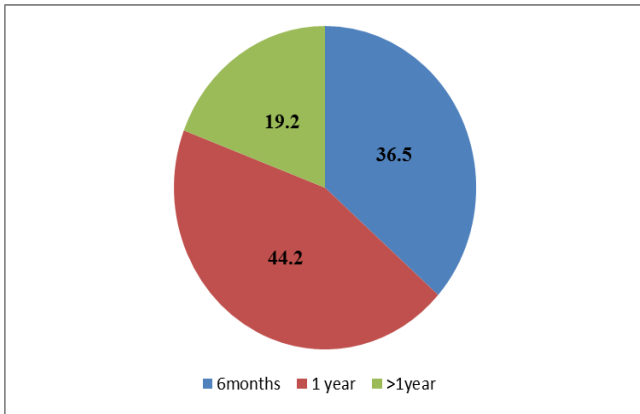
Among participants, 63.5% were in the height of 140-160 cm and 28.8% of 120-140cm and 49% were weight of 35-45kgs and 32.7% of 45-55kgs.

Figure 2. Age at puberty of study population (years)



Age at puberty from 11 to 14 years (Mean: 12.44 years). 49% of girls attained puberty in the age of 12 and 37.5% at 13 years.

Figure 3. Duration of usage of same inner garments



44.2%(46) of participants had been using the same inner garments around one year and 19.2%(20) using more than one year

Table 1. Changing napkins per day during menstruation among adolescent girls

Numbers of Napkins	Frequency	Percent
1	2	1.9
2	47	45.2
3	36	34.6
4	19	18.3
Total	104	100

45.2% of participants are changing 2 napkins per day, 34.6% are changing 3 per day, 18.3% are changing 4 per day and 1.9% of participants are changing 1 napkin per day .

Table 2. Pain timing during menstruation among adolescent girls

pain timing	Frequency	Percent
1st day	26	25.0
all days	6	5.8
one day before mensuration	7	6.7
No pain	39	37.5
Total	104	100

Out of 104 study participants ,7(6.7%) have experienced pain one day before mensus,26 girls(25.0%) have pain on 1st day of cycle and 6(5.8%) have pain during all days of cycle.6.7%(7) Taking tablets. Mostly over the counter drugs were taken.

Table 3. BMI and menstrual cycles among adolescent girls

Characteristics		BMI Group(kg/m ²)			Total	P-value
		<20	20-25	>25		
Age at puberty (years)	11	3	1	3	7	0.04
	12	27	18	6	51	
	13	28	10	1	39	
	14	3	3	1	7	
bleeding quantity	normal	48	21	5	74	0.05
	scanty	13	11	6	30	
cycles frequency - once in (days)	20	2	1	0	3	0.62
	30	47	21	8	76	
	40	7	7	3	17	
	45	0	1	0	1	
	60	5	2	0	7	
Nature of mensus	regular	53	23	8	84	0.16
	irregular	8	9	3	20	
dysmenor-rhea	yes	24	11	5	40	0.78
	no	37	21	6	64	
	Total	61	32	11	104	
pain timing	1st day	14	8	4	26	772.00
	all days	4	1	1	6	
	one day before mensus	5	2	0	7	
	Total	23	11	5	39	

Out of 104 participants 84(80.8%) have got regular cycles and 20 (19.2)participants have got irregular cycles. 74(71.2%) participants have normal bleeding per cycle and 30(28.8%) participants have scanty flow per cycle. Among 104 participants ,76(73.1%) have experienced menstrual cycles once in 30 days, 17(16.3%) girls have once in 40 days cycle frequency ,3(2.9%),1(1.0%) and 7(6.7%) girls have got once in 20, 45 and 60 days cycle respectively In the study group, 40(38.5%) were suffering with dysmenorrhoea and 64(61.5%) were not suffering from dysmenorrhoea. When comparing BMI with menstrual indicators, it is observed that onset puberty and bleeding quantity were statistically significantly (p<0.05).

Discussion

In our study the mean age of menarche was 12.44 years ,61% of participants had dysmenorrhoea. Also this study reveals 63.4% of adolescent were using

one or more than a year of inner garments. Another good sign was that around 99% of participants were using more than 2 napkins per day. Increasing body mass index is statistically significant with menarche and bleeding quantity.

The higher mean age of menarche in one study was found around 13.99 years (S.D. 1.8)¹⁰⁻¹⁴. The reduced mean age of menarche in this region is due to higher BMI and other socio cultural practices, geographical conditions, healthstatus etc¹⁵

The prevalence of dysmenorrhea in our study with same as other studies conducted in various parts of India. Other studies have also found the dysmenorrhea the most common menstrual disorder^{16,17,18} One in eight young women reported experiencing menstrual problems.⁵

According to a multicounty survey, menstrual disturbances were among first and fourth most commonly reported causes of morbidity among adult women.^{19,20} Dysmenorrhoea occurred in students with both regular and irregular cycles.²¹ Accessing medical care is very less in adolescent girls and most of the girls taking over the counter drugs for dysmenorrhoea. One study indicates that exercise can decrease the duration and severity of dysmenorrhea and also using of the sedative tablets in high school girls.²² Hence maintaining an optimal BMI can help in menstrual problem.

Many studies also showing that girls were using old cloths (100%) for sanitary protection.²³

But less usage of cloths seen in one study.²⁴ In our study participants were using sanitary napkins. Govt. of Tamilnadu has a scheme to provide sanitary napkins to school going girls.

Though menstruation is a normal physiological process, an adequate medical care is to be provided to adolescent girls.

Conclusion: Menstrual hygiene is to be still improved in adolescent girls in this region. Awareness regarding personal hygiene like frequent change of inner garments has to be taught through various channels. Also proper nutritional care is to be given to this group as low and high BMI are suffering from menstrual disorders. More experimental studies can be suggested to evaluate menstrual problem in adolescent girls.

Conflict of Interest: None

Source of funding: Nil

References:

1. Population Council & UNICEF Adolescents in India: A desk review of existing evidence and behaviours, programmes and policies." 2013. New Delhi.
2. WHO. Adolescent Sexual and Reproductive Health & HIV/AIDS among Young People Compendium of Institutions in India,2006
3. Population Council, Youth in India: Situation and Needs 2006–2007, New Delhi.
4. Tamil Nadu Population Census data2011 .Available from <http://www.census2011.co.in/census/state/tamil+nadu.html> Accessed on 15-11-15
5. Population Council, Youth in India: Situation and Needs 2006–2007, New Delhi.
6. Narayan K.A. et al: "Puberty Rituals, Reproductive Knowledge and Health of Adolescent Schoolgirls in South India.", *Asia Pacific Population Journal*, Vol. 16, No. 2, 224-236.
7. Khaldilkar VV, Stanhope RG, Khadilkar V. Secular trends in puberty. *Indian Pediatr.* 2006;43:475-8.
8. Naik MK. A study of the menstrual problems and hygiene practices among adolescents in secondary school. *Thiruvanthapuram Indian J Pediatr.* 2012;1:79.
9. WHO and UNICEF define adolescents as those aged 10–19 years (WHO 2012; UNICEF.2005
10. Dr. P.B. Verma, Dr. C.M. Pandya, Dr. V.A. Ramanuj, Dr. M.P. Singh. *Menstrual Pattern of Adolescent School Girls of Bhavnagar (Gujarat)*, *NJIRM* .2011; 2(1).
11. Singh M.M. et al. "Awareness and health seeking behaviour of rural adolescent school girls on menstrual and reproductive health problems", *I.J.M.R.*, 1999;53(10): 439-43.
12. Wasnik VR, Dhumale D, Jawarkar AK. A study of the menstrual pattern and problems among rural school going adolescent girls of Amravati district of Maharashtra, India. *Int J Res Med Sci* 2015;3:1252-6.).

13. Joseph GA, Bhattacharji S, Joseph A, Rao PS. General and reproductive health of adolescent girls in rural South India. *Indian Pediatr.* 1997;34:242-5.
14. Verma PB, Pandya CM, Ramanuj VA, Singh MP. Menstrual pattern of adolescent school girls of Bhavnagar (Gujarat). *NJIRM.* 2011 Jan-Mar;2(1):38-40.
15. Waghachavare VB, Chavan VM, Dhumale GB. A study of Menstrual problems among the female junior college students from rural area of Sangli District. *Natl J Community Med* 2013; 4(2): 236-240.
16. Drakshayani Devi K. et al "A study on menstrual hygiene among rural adolescent girls", *IJMS*, 1994;48(6):139-43
17. Ganguly Mukherjee Gita et al "Knowledge of Reproductive Health Issues among the School going Teenagers of Rural Bengal", *J. Obst. Gyne. India.*2001;41(1):115-118.
18. Suresh K. Kumbhar, Mrudula Reddy, Sujana B.3, Roja Reddy K., Divya Bhargavi K., C. Balkrishna. Prevalence Of Dysmenorrhea Among Adolescent Girls (14-19 Yrs) Of Kadapa District And Its Impact On Quality Of Life: A Cross Sectional Study, *National Journal of Community Medicine.* 2011: 2(1).
19. Kumar R, Singh M, Kaur A, Kaur M. Reproductive health behavior of rural women. *J Indian Med Assoc.* 1994;93:128-31.
20. Bhatia JC, Cleland J. Reported symptoms of gynecological morbidity and their treatment in South India. *Stud Fam Plann.* 1995;26:203-16.
21. Maitri Shah¹, Anuradha Monga², Sangita Patel³, Malay Shah⁴, Harsh Bakshi⁵, A study of prevalence of primary dysmenorrhea in young students - A cross-sectional study, *healthline* .2013;4(2)July-December:30
22. A Randomized Control Trial To Assess And Evaluate The Effectiveness Of Pelvic Rocking Exercises In Reducing Dysmenorrhea Among Girls Of Selected Colleges Of Nursing In New Delhi.(*IOSR Journal of Nursing and Health Science (IOSR-JNHS).*2014;3(5) : 22-26
23. Keerti Jogdand, Pravin Yerpude. A community based study on menstrual hygiene among adolescent girls. *Indian J Maternal Child Health.* 2011;13(3):1-6.
24. Haldar A, Ram R, Chatterjee T, Misra R, Joardar GK. Study of need of awareness generation regarding a component of reproductive and child health programme. *Indian J Community Med.* 2004 Apr-Jun;29(2):96-8., Khan A. Perceptions and practices about menstrual hygiene among adolescent girls in a rural area – a cross-sectional study. *Int J Health Sci Res.* 2012;2(8):29-34.



Original Research Article

Prevalence of Pyuria and its associated factors among pregnant women availing antenatal care services at a maternity hospital in rural Karnataka

Avita Rose Johnson¹, Suguna A², Ann Sarah Koshy³, Sr. Jincy Joseph³, Sr. Irudhaya Maria Vijaya³, Sr. Cicy Varghese³, Twinkle Agrawal¹

Date of Submission: 10.12.2015

Date of Acceptance: 23.01.2016

Abstract

Background: Urinary tract infections (UTI) are common during pregnancy and if left untreated can lead to adverse maternal and fetal outcomes. Pyuria on routine urine microscopy is suggestive of UTI. **Objective:** To estimate the prevalence of pyuria among pregnant women attending a rural maternity hospital. **Methodology:** A cross sectional study was conducted at a rural maternity hospital in Solur, Ramanagara District of Karnataka during January to March 2014, with 150 women taken by convenience sampling. A pretested semi structured questionnaire was administered to pregnant women irrespective of period of gestation, which included socio-demographic details, obstetric history, symptoms of UTI and Reproductive Tract Infection. Urine microscopic examination was also done. **Results:** Of the 150 pregnant women who participated in the study, the prevalence of pyuria was 50%. 27% of the women had asymptomatic pyuria. The factors significantly associated with pyuria in pregnancy were burning micturition, dysuria and lower abdominal pain. **Conclusion:** The prevalence of pyuria among pregnant women availing regular antenatal services at a rural maternity hospital was found to be high (50%) with a large proportion of asymptomatic pyuria. It is recommended that Urine Microscopy should be included in routine antenatal care for all pregnant women in rural setting also.

Key words: Pyuria, Urinary Tract Infection (UTI), pregnant women

Authors:

1. MBBS, MD (Community Medicine), Assistant Professor.
2. MBBS, Post Graduate Student.
3. MBBS, Medical Intern

Corresponding Author:

Dr. Suguna
Department of Community Health, St John's
Medical College, Bangalore – 560034,
Karnataka, India
Mail ID- sugucommed87@gmail.com

Introduction:

Urinary tract infection (UTI) and its associated complications account for nearly 150 million cases per year worldwide. It is estimated that nearly 40% - 50% of women and 5% of men will develop UTI during their lifetime¹. After anemia, UTI is the second common complication among pregnant women. Urinary tract infection (UTI) is the most common bacterial infection during pregnancy with a prevalence of 2 - 26%.^{2,3} Pyuria is defined as the presence of 5 or more pus cells per HPF of a centrifuged sediment sample of urine. Pyuria is not a

diagnosis; it is a common laboratory finding in Urinary Tract Infections (UTI). Pyuria usually indicates that bacteria have invaded the upper or lower urinary tract, invoking an inflammatory response of the lining of the urinary tract (urothelium) in that location. An estimated 4% to 10% of pregnant women are diagnosed with asymptomatic UTI.⁴

Urinary tract infection during pregnancy contributes significantly to maternal and perinatal morbidity. Complications related to urinary tract infection

during pregnancy include: abortion, small birth size, pre term labour, maternal anemia, hypertension, phlebitis, thrombosis and chronic pyelonephritis.^{5,6} As one of the most common recurrent acquired infections, UTI has a conspicuous role in increasing the number of stillbirth deliveries.^{7,8,9}

Considering the fact that UTI is common during pregnancy, adversely impacts maternal and fetal well-being, and may be asymptomatic, it is important to document the prevalence of UTI in a resource-poor setting using a simple screening test like routine urine examination. There is paucity of data on UTI among pregnant women in rural and resource poor settings, as most studies have been conducted in tertiary level hospitals. The hospital at which the present study was done does not screen asymptomatic pregnant women for pyuria routinely as a part of regular antenatal care and the results of this study would enable change in hospital policy and practice.

The objectives of this study are to estimate the prevalence of pyuria among pregnant women availing antenatal care services at a rural maternity hospital and to document factors associated with pyuria.

Material and Methods:

This is a cross sectional study, conducted at a rural maternity hospital in Solur, Ramanagara District, Karnataka state during January to March 2014. Institutional Ethical Review Board (IERB) approval was obtained. The questionnaire to be used was translated into the local language i.e., Kannada, and then back translated. A pilot study was undertaken amongst a few pregnant women attending the outpatient department at a tertiary care hospital in Solur, prior to commencing data collection, and some of the questions were modified subsequently. Sample size was calculated to be 150. Non – Probability convenience sampling method was followed. Every woman attending antenatal clinic at this hospital, during the study period, was invited to be a part of the study. After obtaining written informed consent, a pretested semi structured questionnaire was administered to the women to record socio-demographic details, obstetric history, symptoms suggestive of Urinary Tract Infection and Reproductive Tract Infection. Routine urine microscopic examination was done for every subject. Clean-catch midstream urine sample was

collected from each pregnant woman into a wide-mouthed plastic sterile screw capped container. Centrifuged urine deposit was examined microscopically at high magnification for pus cells, red blood cells, epithelial cells and casts. A sample with pus cells equal to or greater than 5 per HPF was considered as pyuria. Women with pyuria both symptomatic as well as asymptomatic were referred to the obstetrician for further evaluation and management. Data was entered and coded in Microsoft Excel and analyzed using SPSS version 16. Descriptive statistics included proportions, frequencies, measures of central tendency and dispersion. Chi-square test was used to test for association between pyuria and various variables. A p value less than 0.05 were considered as significant.

Results:

A total of 150 pregnant women (irrespective of the period of gestation) were included in this study. Mean age of study population was 22 years (SD+/- 2.58). 84(56%) studied up to 10th standard and 83(55.3%) belong to class I socio economic status according to Modified BG Prasad classification. 84(56%) of the subjects were primigravida and most 68(45.3%) were in the second trimester(See table 1). The commonest health problem seen was anemia (37%). Other health problems included hyperemesis gravidarum, bad obstetric history and hypothyroidism. VDRL and Hepatitis B was positive in one woman each. (See table 3).

Of the 150 pregnant women, 75 (50%) women were found to have pyuria in this study based on a diagnostic cutoff of 5 or more pus cells per HPF in urine sample. 36(22.2%) had symptomatic pyuria and 39 (27.1%) had asymptomatic pyuria. The proportion of women with pyuria was highest in the age group of 20-24 years and among women belonging to class 2 socio economic status. But this was not statistically significant. The proportion of women with pyuria was more among multigravida (53%) and those in the first trimester (66.7%). However, this too was not statistically significant. (See table 1)

Pyuria was significantly associated with symptoms like dysuria, burning micturition and lower abdominal pain, but not with fever. Among the 5 women who had dysuria, all of them were found to have pyuria. Of 22 women with burning micturition, 18(81.8%) had pyuria and among the 27

Table1: Association of Pyuria with Demographic and Obstetric variables(n=150)

S No.	Variables	Pyuria		Test statistic	p value
		Present	Absent		
1.	Age in years				
	15-19	10(45.5)	12(54.5)	0.3	0.85
	20-24	51(51.5)	48(48.5)		
25-29	14(48.3)	15(51.7)			
2.	Education				
	< 5 th std	1(50)	1(50)	0.36	0.93
	5 th -10 th std	41(48.8)	43(51.2)		
>10 th std	33(51.6)	31(48.4)			
3.	Socioeconomic status (Modified BG Prasad scale)				
	Class I	36(43.4)	47(56.6)	4.02	0.14
	Class II	37(59.7)	25(40.3)		
Class III	2(40)	3(60)			
4.	Gravida				
	Primi gravida	40(47.62)	44(52.38)	0.43	0.51
	Multi gravida	35(53.03)	31(46.94)		
5.	Gestational age				
	1 st trimester	14(66.67)	7(33.33)	2.71	0.25
	2 nd trimester	32(47.05)	36(52.95)		
3 rd trimester	29(47.54)	32(52.46)			

women with lower abdominal pain, 18(66.7%) had pyuria. Among those pregnant women with past history of UTI, 4(80%) had pyuria and among those with white discharge per vagina, 3(75%) had pyuria, but the associations were not statistically significant. (See table 2)

Discussion:

Urinary tract infections (UTIs) are a serious health problem affecting millions of people each year. During pregnancy, the tendency of UTI increases partly due to the pressure of the gravid uterus on ureters causing stasis of urine flow and is also attributed to the hormonal and immunological changes that occur during pregnancy.^{10,11} A simple routine urine microscopy can determine the presence of pyuria, which is indicative of possible UTI and therefore, should be performed during routine antenatal care.¹²

Table 2: Association of pyuria with Symptoms of UTI and RTI(n=150)

S No.	Symptom	Pyuria	Pyuria	Test statistic	p value
		present	absent		
1	Fever				
	absent	73(50)	73(50)	0	1
	present	2(50)	2(50)		
2	Dysuria				
	absent	70 (48.3)	75 (51.7)	5.17	0.02
	present	5(100)	0 (0)		
3	Burning micturition				
	absent	57 (44.5)	71 (55.5)	10.44	0.01
	present	18(81.8)	4 (18.2)		
4	Lower abdominal pain				
	absent	57(46.3)	66 (53.7)	3.65	0.04
	present	18 (66.7)	9 (33.3)		
5	White discharge per vagina				
	absent	72 (49.3)	74(50.7)	1.03	0.3
	present	3(75)	1(25)		
6	History suggestive of UTI in the past year				
	No	71(49.3)	73(50.7)	0.6	0.4
	Yes	4(66.7)	2(33.3)		

Table 3: Other health problems of study participants

S. No.	Other health problems	Frequency	Percentage
1.	No health problem	87	58
2.	Anemia	56	37
3.	Hyperemesis gravidarum	3	2
4.	Bad obstetric history	1	0.75
5.	VDRL positive	1	0.75
6.	HbsAg positive	1	0.75
7.	Hypothyroidism	1	0.75

In the present study the prevalence of pyuria among the studied pregnant women was 50%. This was found to be much higher than expected.^{2,3} A study done in Al-Mukalla district of Yemen, showed a prevalence of 30% which could be due to variation in the environment, social habits of the community, and the standard of personal hygiene and education.¹³ Our study results are similar to a study done in Agra, India where significant pyuria was found to be 44.73%.¹⁴

Pyuria was most commonly seen in the age group of 20-24 years. This is similar to a study done by Kawser Parveen¹⁵ where there was a high prevalence of UTI among pregnant women in 21–25 years age group. It has been reported that multiparity is a risk factor for acquiring bacteriuria in pregnancy.^{16,17} The present study too showed a higher proportion of pyuria among multi gravida, though not statistically significant.

A study conducted by Arul Prakasam K.C et al¹⁸ found that the proportion of pregnant women with UTI was more among those in the second trimester (61.9%) as compared to the present study where it was more among those in the first trimester (66.7%). As expected, the present study found that pyuria was significantly associated with some of the symptoms of UTI like dysuria, burning micturition and pain in abdomen. There are studies which show that women with Bacterial Vaginosis have significantly increased risk of urinary tract infection¹⁹, whereas in our study we could not find any significant association of UTI with symptoms of RTI. In a study conducted by Rekha Thapa et al²⁰, a past history of UTI was found to be significantly associated with UTI in the current pregnancy. The present study found that those who had a past history of UTI were not significantly more likely to have pyuria in the current pregnancy.

Stasis of urine by gravid uterus, poor genital hygiene by pregnant women, pregnancy-induced glycosuria and aminoaciduria are among the leading reasons for high prevalence of asymptomatic bacteriuria in pregnancy.²¹ It was interesting to note that more than half of the women with pyuria in the present study were asymptomatic, that is 27 % of all the pregnant women had asymptomatic pyuria. This proportion was much higher than that in a study conducted in Agra, India where 8.8% of pregnant females were found to have asymptomatic UTI.¹⁴ This demonstrates that asymptomatic pyuria is an

important entity in the spectrum of urinary tract infections especially among pregnant women. The public health implications of this finding is that if routine urine microscopy is not done for all pregnant women, many women with asymptomatic urinary infections will go untreated leading to adverse maternal and fetal outcomes.

Conclusion: The prevalence of pyuria among pregnant women availing regular antenatal services at a rural maternity hospital was found to be high (50%). 27% of the women were found to have asymptomatic pyuria. The factors significantly associated with pyuria in pregnancy were burning micturition, dysuria and lower abdominal pain. It is recommended that Urine Microscopy should be included in routine antenatal care for all pregnant women in rural settings also, since the ultimate goal is the diagnosis of UTI during pregnancy to prevent complications to the mother and the baby.

Conflict of interest: None

Source of funding: Nil

References:

- ¹Totsika M, Moriel DG, Idris A, Rogers BA, Wurlpel DJ, Phan MD, et al. Uropathogenic *Escherichia coli* mediated urinary tract infection. *Curr Drug Targets*.2012;13(11):1386–99.
- ²Kawser Parveen et al, Prevalence Of Urinary Tract Infection during Pregnancy. *J. Dhaka National Med. Coll. Hos.* 2011; 17 (02): 8-12
- ³Bacak SJ, Callaghan WM, Dietz PM, Crouse C. Pregnancy associated hospitalizations in the United States, 1999-2000. *American Journal of Obstetrics and Gynecology.* 2005;192(2):592–7. doi: 10.1016/j.ajog.2004.10.638.
- ⁴Foxman, B. "Epidemiology of Urinary Tract Infections: Incidence, Morbidity, and Economic Costs." *American Journal of Medicine* 113 Suppl 1A (2002): 5s-13s.
- ⁵Akerele, J Abhlimen, P, and Okonofua, F. Prevalence of asymptomatic Bacteriuria among pregnant women in Benin City, Nigeria. *British Journal of Obstetrics and Gynaecology*.2002; 221 (2). 141-144.
- ⁶Onuh, S O, Umeora, O U J, Igberase, Go, Azikem M E and Okpere E. Microbiological Isolates and sensitivity pattern of urinary tract infection in

pregnancy in BeninCity,Nigeria,Ebonyi Medical Journal.2006; 5(2); 48 –52.

⁷Masinde A, Gumodoka B, Kilonzo A, Mshana SE. Prevalence of urinary tract infection among pregnant women at Bugando Medical Centre, Mwanza, Tanzania. *Tanzan J Health Res.* 2009;11(3):154–9.

⁸Litza JA, Brill JR. Urinary tract infections. *Prim Care.*2010;37(3):491–507.

⁹ Al-Haddad AM. Urinary tract infection among pregnant women in Al-Mukalla district, Yemen.*EastMediterr Health J.* 2005;11(3):505–10.

¹⁰WHO. Share with Women, *Journal of Midwifery and Women's Health*, 2005;50(6):27.

¹¹Zeighmi H, Mota A, Rahmati M. Azad University, Tehran, Iran.Evaluation of Urinary Tract Infection in Pregnant Women.*Journal of Biological Sciences.* 2008; 3(4): 441-3.

¹²Tutuncu L, Ardic N. Urinary Tract Infection in Pregnancy. *Prenatal Journal.*2005,13(4):47.

¹³ Al-Haddad AM. Urinary Tract Infection among pregnant women in Al-Mukalla district, Yemen. *Eastern Mediterranean Health Journal*, 2005; 11(3):505.

¹⁴Goyal Ankur et al. Prevalence of Asymptomatic Urinary Tract Infections in the Three Trimesters of Pregnancy.*Int.J.Curr.Microbiol.App.Sci.* 2015, (1): 110-117

¹⁵KawserParveen et al. Prevalence Of Urinary Tract Infection During Pregnancy. *J. Dhaka National Med. Coll. Hos.* 2011; 17 (02): 8-12

¹⁶Patterson TF, AndrioleVT. Bacteriuria in pregnancy. *Infect Dis Clin North Am* 1987;1:807

¹⁷ Barr JG, Ritchie JW, Henry O, el Sheikh M, el Deeb K. Microaerophilic/anaerobic bacteria as a cause of urinary tractinfection in pregnancy. *Br J ObstetGynaecol* 1985;92:506-10.

¹⁸Arul Prakasam K.C et al. A Cross Sectional Study on Distribution of Urinary Tract Infection and Their Antibiotic Utilisation Pattern In Kerala.*Int.J.PharmTech Res.*2012,4(3)

¹⁹ AH Sumathi et al. Association of Urinary Tract Infection in Women with Bacterial Vaginosis.*J Glob Infect Dis.* 2009 Jul-Dec; 1(2): 151–152

²⁰RekhaThapaetal. Prevalence of extended spectrum beta lactamase producing uropathogens in pregnant women.*Asian J Pharm Clin Res*, Vol 8, Issue 1, 2015, 207-210

²¹Imade, P.E., Izekeor, P.E., Eghafona, N.O., Enabuele, O.I., Ophori, E. 2010. Asymptomatic bacteriuria among pregnant women. *North Am. J. Med.Sci.*, 2(6): 263 266.



Original Research Article

Determinants of Quality of life of Elderly in A Rural Population Of Kerala, India

Sobha George⁽¹⁾, K. Leelamoni⁽²⁾, Nimitha Paul⁽³⁾

Date of Submission: 16.01.2016

Date of Acceptance: 25.01.2016

Abstract

Background : Quality of life is a subjective and multidimensional concept. The trend towards population aging continues, but greater longevity does not translate into good quality of life. Good planning, policy making and action will be based on the determinants of quality of life. **Objective:** To find out the factors which determine the quality of life of elderly in a rural population. **Methods:** A community based cross sectional study done at Njarackal Panchayath in Ernakulam District of Kerala State, India on 200 persons above 60 years. Face to face interview done using SF-36v2 Malayalam questionnaire. Assessment of quality of life performed using Quality Metric Outcomes Scoring software 4.0. Using SPSS, univariate analysis performed to find out sociodemographic determinants of Quality of Life. Regression analysis done to predict factors which determine Quality of Life. **Results :** Presence of current health problems, age group >70 years and low level of education are predictors of poor Physical Component while current health problems, no income security and female sex are predictors of poor Mental Component of Quality of Life. **Conclusion:** Presence of current health problems, no guaranteed income security and low educational level are modifiable and so measures taken to prevent these will improve Quality of Life.

Keywords: Elderly, Kerala, Quality of life.

Authors:

⁽¹⁾ Assistant Prof, Department of Community Medicine , ⁽²⁾ Prof and HOD, Department of Community Medicine ⁽³⁾Statistician, Department of Community Medicine, Amrita Institute of Medical Sciences, Amrita Vishwa Vidyapeetham, Kochi

Corresponding Author:

Dr. Sobha George,
Assistant Professor, Department of Community
Medicine, AIMS, Kochi-682041.

E-mail: sobhageorge@aims.amrita.edu

INTRODUCTION:

Quality of life is a multidimensional concept. It reflects macro societal and micro individual influences. Rather than being a mere rating of health status, it is a uniquely personal perception, denoting the way individual patients perceive and react to their health status and to other nonmedical aspects of their lives. It is a collection of objective and subjective dimensions, which interact together. The World Health Organization Quality of Life group defined quality of life as 'an individual's perception of their position in life in the context of the culture and value systems in which they live and

in relation to their goals, expectations, standards and concerns'.^[1]

The world is undergoing a major demographic transition .Globally the number of persons aged 60 years or over is expected to increase from 673 million in 2005 to two billion by 2050. ^[2] India has acquired the label of "an aging nation" with 7.7% of its population being more than 60 years old.^[3] Kerala seems to be aging fast with people above 60 constituting 13 per cent of the state's population^[4] The trend towards population aging continues, but greater longevity does not translate into healthier lives. For the aged, the goal of health care cannot be

freedom from disease. What can be done is to help them live as good a life as possible despite their decreasing capacities and improve their quality of life. The implications of quality of life are significantly wide : for the family in providing overall care, for the states in terms of generalizing resources and for the civil organizations to prioritize efforts. [5] The quality of life of the graying population has become a matter of concern for planners, health care providers and the common man alike. Good planning, policy making and action will be based on the determinants of quality of life. Quality of life is increasingly being recognized as a useful outcome in health and social care research.

There is only limited data on the quality of life of elderly in Kerala. It is in this context that the present study is being conducted using SF-36 which is the most widely used measure of quality-of-life. [6]

Objective : The objective of this study was to find out the factors which determine the quality of life of elderly in a rural population.

MATERIALS AND METHODS:

A community based cross sectional study was done at Njarackal Panchayath which is a rural area of Ernakulam district in Kerala state. The study population included permanent residents of Njarackal, of both sexes, above 60 years of age who constitute 2345 in number. Those who were unable to answer the questions and those who were unwilling were excluded. A pilot study was done on 50 individuals above 60 years residing in Njarackal panchayath using the SF 36 v2 questionnaire. The mean and SD for the 8 component scores and 2 summary scores were calculated using the Quality Metric Health Outcomes Scoring software 4.0 and the sample size was calculated, with 95% confidence

and 90% power, using the formula $n = \frac{[Z_{(1-\alpha/2)}] \cdot s}{d}$

where 's' is standard deviation, 'd' is allowable error, 'Z_(1-α/2)' is level of significance. Accordingly 200 elderly persons were selected by simple random sampling using computer generated random numbers. The study period was from June 2011 to Jan 2012. Face to face interview of study participants was done in their homes after obtaining consent. A self-designed, pretested semi structured questionnaire was used to collect data related to socio demographic factors and current health

Table1 : Quality of life scores according to SF 36-v2

Variable	Minimum	Maximum	Mean	Standard Deviation
PF-Physical Functioning	14.94	52.82	34.84	9.019
RP-Role Physical	17.67	54.4	35.99	8.297
BP-Bodily Pain	24.93	62.12	45.32	9.266
GH-General health	16.23	55.32	38.27	9.303
VT-Vitality	27.11	64.58	46.75	8.044
SF-Social Functioning	13.22	56.85	41.68	9.393
RE-Role Emotional	9.23	51.99	33.5	8.974
MH-Mental Health	13.4	61.27	38.88	10.437
PCS-Physical Component Summary	19.16	57.59	39.83	8.247
MCS-Mental Component Summary	16.39	58.99	40.29	9.429

Table 2 : Grades of Quality of life according to SF 36 v2 ,PCS and MCS

Grade of QOL	PCS	MCS
Very good	0	0
Good	0	0
Moderate	98	106
Poor	101	90
Very poor	1	4

problems. The Malayalam version of SF -36v2 standard 4 week recall of Quality Metric, which is a previously tested instrument, was used to assess quality of life. Ethical clearance certificate was obtained from the institution before the start of the study.

Assessment of quality of life was performed using the Quality Metric Outcomes Scoring software 4.0 which was downloaded after getting license from Quality Metric. Data entry and analysis was done

using micro soft excel and SPSS version 11. Univariate analysis was performed to find out the sociodemographic determinants of quality of life. Regression analysis was done to predict the factors which determine Quality of Life.

RESULTS:

The age of the respondents ranged from 61 to 92 years, with a mean age of 72.52 ±6.88. Among the 200 respondents, majority 93 (46.5 %) were in the age group of 70 – 79 years, 33 (16.5%) were 80 years of age or above, while 74 (37%) were in the age group 60 – 69 years. 118 (59%) were females while 82 (41%) were males. 107 (53.5%) were Hindus and 93 (46.5%) were Christians. 101 (50.5%) were married and had alive partners. 99 (49.5%) had partners who were dead or were unmarried. 15 (7.5%) were illiterate ,90 (45%) had education up to primary level,76 (38%) had secondary education while 19 (9.5%) had higher secondary education and above. 110 (55%) were unemployed currently, 57 (28.5%) were currently employed and 33 (16.5%) were retired persons. 72 (36%) of the respondents had fully guaranteed income security (not ever dependent on anybody financially), 70 (35%) had partial income guarantee (who were dependent on others financially only when sick or in crisis situation), while 58 (29%) had no income at all. Regarding living arrangement, 26 (13%) were living alone or with spouse or relatives. 85 (42.5%) were living with spouse and children, while 89 (44.5%) were living only with children. Majority of the respondents 169 (84.5%) reported having current health problems while 31 (15.5%) did not report any current health problem. Of the 169 who reported having current health problems, 113 (66.9%) reported having multiple health problems, while 56 (33.1%) reported having only a single health problem. 106 (53%) reported having hypertension, 76 (38%) diabetes, 64 (32%) osteoarthritis, 27 (13.5%) dental problems,21 (10.5%) coronary artery disease ,20 (10%) respiratory problems. Majority 166 (83%) followed Allopathic system of medicine, 20 (10%) Ayurveda and 20 (10%) Homoeopathy. 13 (6.5%) did not follow any system of medicine.

To assess the Quality of life according to SF 36-v2, the mean scores of 200 respondents were calculated for the 8 dimensions of health status and 2 summary areas and the results are as shown in Table No. 1

Table 3 : PCS and MCS scores across sociodemographic variables

Variable	PCS score	P value	MCS score	P value
Sex				
Male	41.5 ± 8.9	0.01	42.4 ± 9.3	0.009
Female	38.9 ± 9.3		38.9 ± 9.3	
Age group				
60 – 69 years	42.5 ± 8.8	<0.001	42.5 ± 8.8	0.03
70 – 79 years	38.9 ± 9.4		38.9 ± 9.4	
≥80 years	35.5 ± 7.6		39.1 ± 10.2	
Marital status				
Partner alive	41.4 ± 8.0	0.008	42.3 ± 8.9	0.003
Partner dead	38.3 ± 8.2		38.3 ± 9.5	
Educational qualification				
Illiterate	35.2 ± 7.6	<0.001	35.5 ± 10.7	0.01
Primary	37.7 ± 7.6		38.9 ± 9.2	
Secondary	42.2 ± 8.0		42.1 ± 8.8	
Higher secondary & above	44.2 ± 8.1		43.4 ± 9.3	
Occupation				
Unemploy ed	38.1 ± 7.4	<0.001	38.7 ± 9.1	0.02
Employed	39.9 ± 8.8		41.5 ± 9.8	
Retired	45.2 ± 7.6		43.3 ± 8.8	
Income security				
Fully guaranteed	42.4 ± 8.1	0.002	43.2 ± 8.3	0.003
Partially guaranteed	39.2 ± 8.1		39.4 ± 9.3	
No income	37.5 ± 7.8		37.8 ± 10.1	
Living arrangement				
Single/with spouse/relatives	40.9 ± 9.5	0.017	41.0 ± 10.3	0.039
With spouse and children	41.4 ± 7.8		42.0 ± 9.4	
With children	37.9 ± 7.9		38.4 ± 9.3	
Current health problem				
Yes	38.7 ± 8.0	<0.001	39.7 ± 9.2	0.04
No	45.9 ± 6.7		43.5 ± 10.0	

Table 4 : Sociodemographic determinants of PCS by bivariate analysis

Variable	Unadjusted Odds Ratio	95% CI
Sex – female	0.55	(0.22 – 1.39)
Age group - >70yrs	2.94	(1.48 – 5.87)
Marital status – partner dead/unmarried	2.11	(0.53 – 8.4)
Educational qualification – illiterate/primary	1.98	(0.98 – 4.0)
Occupation – employed	1.12	(0.50 – 2.49)
Income security – no income/partial guarantee	0.6	(0.29 – 1.24)
Living arrangement – with spouse and children	0.59	(0.18 – 1.96)
Current health problem - yes	8.78	(2.7 – 27.9)

Table 5 : Associates of Poor Physical Component Summary (PCS)

Variable	Adjusted Odds Ratio	95% CI
Current health problem - yes	8.57	(2.8 – 26.3)
Age group - >70yrs	2.72	(1.42 – 5.2)
Educational qualification - illiterate/primary	2.37	(1.27 – 4.42)

The scores on the summed quality of life questions could range from 0 to 100: very good (80 – 100), good (60 – 79), moderate (40 – 59), poor (20 – 39) and very poor (0 – 19). On grading of PCS and MCS, among the 200 respondents interviewed, 98 (49%) of elderly had moderate Physical Component Summary (PCS) while 106 (53%) had moderate Mental Component Summary (MCS). Results are shown in Table No. 2. The PCS and MCS scores across different sociodemographic variables are shown in Table No.3

The Physical Component Summary and Mental Component Summary were changed into dichotomous variable – the poor & very poor grades (score < 40) forming one group and moderate, good

Table 6: Sociodemographic determinants of MCS by bivariate analysis

Variable	Unadjusted Odds Ratio	95% CI
Sex - female	1.69	(0.73 – 3.95)
Age group - >70yrs	1.52	(0.79 – 2.93)
Marital status – partner dead/unmarried	1.02	(0.27 – 3.80)
Educational qualification – illiterate/primary	1.24	(0.64 – 2.40)
Occupation – employed	0.84	(0.39 – 1.79)
Income security – no income/partial guarantee	2.27	(1.14 – 4.53)
Living arrangement – with spouse and children	0.69	(0.22 – 2.22)
Current health problem - yes	2.36	(0.96 – 5.78)

Table 7 : Associates of Poor Mental Component Summary (MCS)

Variable	Adjusted Odds Ratio	95% CI
Current health problem - yes	2.45	(1.03 – 5.83)
Income security – no income/partial guarantee	2.42	(1.30 – 4.50)
Sex - female	2.27	(1.25 – 4.14)

and very good grades (score > 40) forming the second group. The sociodemographic variables which showed a statistically significant association for Physical Component Summary (PCS) were changed into dichotomous variables and unadjusted odds ratio with 95% confidence interval was obtained for Poor PCS score. The results are shown in Table No.4. Binary logistic regression using enter method was applied to determine the significant associates of Poor Physical Component Summary and the final model was obtained as shown in table no. 5. The sociodemographic variables which showed a statistically significant association for Mental Component Summary (MCS) are shown in Table No.6. Binary logistic regression was applied to determine the significant associates of Poor Mental Component Summary and the final model is shown in Table No. 7

DISCUSSION:

In the present study in Njarakal, among the 200 respondents interviewed, 49% of elderly had moderate Physical Component Summary while 53% had moderate Mental Component Summary. 51% had only Poor / Very poor Physical Component Summary and 47% had only Poor / Very poor Mental Component Summary.

The Physical Component Summary was found to be significantly associated with socio demographic variables like sex, age, marital status, educational qualification, occupation, income security, living arrangement and current health problem with a P value of <0.05. Bivariate analysis showed that age group more than 70 years, being a single elderly with partner dead, low level of education, current occupation and presence of current health problem are risk factors for poor physical component summary of quality of life. However on binary logistic regression after adjusting for confounding factors, the final model showed that presence of current health problem, age group >70 years and low level of educational qualification are predictors of poor physical component summary of quality of life.

According to this study, presence of a current health problem increases risk by 8.57 times to have a poor physical component summary of quality of life. A study done in Turkey also showed that quality of life was influenced by presence of chronic diseases.^[7] Presence of health problems can cause physical dependency which limits movements and in turn can lead to economic and mental dependency, resulting in poor quality of life.

This study shows that if age is more than 70 years, there is 2.7 times more chance for poor physical component summary. The aging human experiences a gradual decline in almost all body functions which may be due to structural and functional changes causing dependency and consequently resulting in poor quality of life. Studies in Turkey^[7], Malaysia^[8] and Brazil^[9] support this.

Low educational qualification has 2.37 times increased risk of having poor physical component summary. A study done by Yesim Akyol et al. in Turkey also showed that quality of life was

influenced by educational status.^[7] The association between education and good quality of life can be explained by the fact that education aims to modify lifestyle and nutritional habits predisposing for chronic diseases.

A study in Tehran, Iran done by Tajvar M et al. showed that for the physical component summary score of the SF-36, age, gender, education and economic status were significant determinants of poorer physical health-related quality of life.^[10] In a study done in Malaysia by Sazlina SG et al. increasing age, single, presence of co-morbid conditions, and poorer social support were predictors of lower physical health component of quality of life of SF-36.^[8]

In the present study, Mental Component Summary was found to be significantly associated with socio demographic variables like sex, age, marital status, educational qualification, occupation, income security, living arrangement and current health problem with a P value of <0.05. Bivariate analysis showed that female sex, age group more than 70 years, being a single elderly with partner dead, low educational qualification, no income security and presence of current health problem are risk factors for poor mental component summary of quality of life. On binary logistic regression after adjusting for confounding factors, the final model showed that presence of current health problems, no income security and female sex are predictors of poor mental component summary of quality of life.

Presence of current health problem increases the chance of poor mental component summary by 2.45 times. A study by A Lena et al. in Karnataka shows that 48% of the respondents felt sad mainly because of poverty followed by illness (41.3%)^[11]

Having no guaranteed income security increases chances of having a poor mental component summary by 2.42 times. In the present study, 36% were economically independent, while 29% had no income guarantee. NSSO (2004) reports that nearly one third of the elderly population (33.5%) are economically independent. Studies done in Brazil show that there was a positive association between socioeconomic levels and quality of life.^[9]

Being a female increased the chance of having a poor mental component summary by 2.27 times. Majority of females in this study have lower educational qualification and are hence unemployed

and have no income. The poor mental health status may be due to financial and health seeking dependency on their children or other family members.

A study in Tehran, Iran showed that for the mental component summary score only gender and economic status was significant determinants of poorer mental health-related quality of life.^[10] In a study done in Malaysia, older women, Indian ethnicity and poorer social support reported lower mental health component.^[8]

Limitations of the study include recall bias among elderly which may have confounded some findings. Self reporting of diseases may not exactly reflect physician's diagnosis.

Recommendations : According to the present study, it is noted that current health problems, age group > 70 years and low level of educational qualification are significant associates of poor physical component of quality of life while presence of current health problems, no guaranteed income security and female sex are significant associates of poor mental component of quality of life. Presence of current health problems, no guaranteed income security and low level of education are modifiable and hence if we take measures to prevent these, the quality of life can be improved. Current health problems are significantly associated with both poor physical and mental health components. Hence treating current health problems should be a priority.

Knowledge about the determinants of quality of life will increasingly play an important role in promoting active aging. While planning policies and programs for this vulnerable segment of the population, this should be taken into consideration. Contributions of elderly to their families, peers, community and the nation can be ensured if older persons enjoy good quality of life.

Acknowledgement - Quality Metric (SF-36v2 Quality Metric Health Outcomes Scoring software 4.0 downloaded after getting license from Quality Metric for assessment of quality of life.

Conflict of Interest: None

Source of funding: Self

REFERENCES:

1. *The World Health Organization Quality of Life assessment (WHOQOL): position paper from*

2. *UN. The World Population Prospects: The 2006 Revision Executive Summary. United Nations, New York: Dept. Of Economic and Social Affairs; 2007.*
3. *Gopal KI, Nath A. Geriatric health in India: Concerns and Solutions. Indian Journal of Community Medicine 2008;33(4):214-218.*
4. *Kerala An Overview. www.nrega.net/pin/reports*
5. *Munmun J. The Elderly in a Rights Framework: Beyond Tradition, Law or Economics. Indian Journal of Gerontology 2009;23(1) :100 -110.*
6. *Power M. EUROHIS- Developing Common instruments for Health Surveys. WHO 2003, IOS Press ; 145.*
7. *Yeşim A, Dilek D, Cengizhan D, Yüksel B, Ferhan C. Quality of Life and Level of Depressive Symptoms in the Geriatric Population. Turkish Journal of Rheumatology 2010; 25(4): 165-173*
8. *Sazlina SG, Zaiton A, Nor Afiah MZ, Hayati KS. Predictors of health related quality of life in older people with non-communicable diseases attending three primary care clinics in Malaysia. J Nutr Health Aging .2012 May;16(5):498-502.*
9. *Lima MG, Barros MB, César CL, Goldbaum M, Carandina L, Ciconelli RM. Health related quality of life among the elderly: a population-based study using SF-36 survey. Cad Saude Publica 2009 Oct;25(10):2159-67.*
10. *Maryam T, Mohammad A, Ali M. Determinants of health-related quality of life in elderly in Tehran, Iran. BMC Public Health 2008, 8:323*
11. *Lena A, Ashok K et al. Health and social problems of the elderly: A cross-sectional study in Udipi Taluk, Karnataka. Indian Journal of Community Medicine 2009,34(2):131-134.*



Original Research Article

Prevalence and Correlates of Smokeless Tobacco Use: A Cross-Sectional Study among the Employees in a North Indian University

Mohammad Shibly Khan¹, Zulfia Khan¹, Ali Amir¹, Abdur Razzaque Siddiqui¹

Date of Submission: 07.09.2015

Date of Acceptance: 25.01.2016

Abstract

Background: Tobacco is the most preventable risk factor for premature deaths globally. While smoking is the most common form of tobacco use globally, in certain countries such as India, smokeless tobacco use is more popular than the former. **Objective:** To estimate the prevalence and correlates of smokeless tobacco use among study population. **Materials & Methods:** Study Design: cross sectional community based study. Study Population: Employees of Aligarh Muslim University. Sample Size: 540. Sampling Method: Probability Proportionate to Size and simple random sampling. Study Duration: One year (June 2012 to May 2013). Data was presented as percentages and proportions, statistical test such as chi square was applied. **Results:** The current users of chewable tobacco were found to be 17% (92/540) while about 4% (22/540) reported to be past users, so a total of 21% (114/540) study subjects were found to be exposed to chewable form of tobacco, whether in past or present. The most common article chewed was found to be Gutkha. None of the women admitted to be chewing tobacco. Tobacco chewing was found to be significantly higher ($p < 0.05$) in socio-economic classes III and IV while association with educational status, religion and type of family was not found to be significant ($p > 0.05$). **Conclusion:** The study highlights the high prevalence of smokeless tobacco in the study population though it was lower than the national average of smokeless tobacco.

Key Words: Prevalence, smokeless tobacco, chewable tobacco, community based study.

Authors:

1. Department of Community Medicine, JN Medical College, Aligarh Muslim University, Aligarh.

Corresponding Author:

Mohammad Shibly Khan. Address- T6 Azeem Estate, New Sir Syed Nagar, Aligarh. 202002. E mail: shibly001@gmail.com

INTRODUCTION:

Tobacco has emerged as the most avoidable risk factor for premature death in the world, held responsible for 100 million deaths during 20th century¹. Annually it kills nearly 6 million people and the toll is estimated to raise up to 8 million by 2030, if current trends continue². While smoking is still the most common form of tobacco use globally, in certain countries smokeless tobacco use is more popular than the former. Over one third of tobacco consumed in the South East Asia Region is smokeless tobacco³. Tobacco that is consumed without heating or burning at the time of use, is

termed as 'smokeless tobacco'. Various forms used in India include- paan (betel quid) with tobacco, paan masala, Tobacco areca nut and slaked lime preparations, Tobacco and slaked lime (khaini), chewing tobacco etc⁴. According to Global Adult Tobacco Survey (GATS), about one quarter (25.9%) of the adult Indian population uses smokeless tobacco⁵. Similarly, National Family Health Survey (NFHS III) has reported the national average of smokeless tobacco use to be 36.5% among males and 8.4% among females⁶.

However, very few studies have been reported from educational institutions, where it is expected that the use of tobacco is likely to be lower than the general population. Present study was taken up among all the sections of the employees of Aligarh Muslim University, Aligarh, with the objective of estimating the prevalence of smokeless tobacco use and to determine some of the associated socio-demographic correlates, among the study population.

MATERIALS AND METHODS

Present study is part of a larger study that was conducted on the non-communicable disease risk factors among study population. **Study Design:** Cross sectional community based study. **Study Population:** All four categories of employees of Aligarh Muslim University (namely teaching, clerical, technical and grade four staff). **Study Duration:** 1 Year (June 2012 to May 2013) **Sample Size:** 540 {present study is a part of a larger study for which the sample size of 540 was calculated based on the prevalence of smoking tobacco to be 14% in Uttar Pradesh state (GATS 2009-10)⁵, using 95% confidence interval and 3% allowable error} **Non-Response:** If the selected candidate gave no response, or didn't give consent, or was absent on the day of visit then the next candidate in the list was selected. **Sampling Method:** The subjects were taken from all the four categories of university staff (teaching, clerical, technical and grade four staff) as per Probability Proportionate to Size. Individual subject then selected through simple random sampling from the respective lists of these four groups. **Inclusion/Exclusion Criteria:** The employees of Aligarh Muslim University, Aligarh, aged 20-59 years who gave informed consent, were included into the study. **Statistical Analysis:** Data recorded, tabulated and was presented as percentages and proportions. Statistical test such as Chi-square was used whenever applicable. **Ethical Issues:** Study was approved by the Institutional Ethics Committee, JNMCH, AMU, Aligarh. **Definitions:** **Current Tobacco user:** One who uses any tobacco product at the time of survey, daily or occasionally. **Daily Tobacco user:** One who uses any tobacco product at least once a day. People who uses/chew everyday with rare exceptions like not on the days of religious fasting or during acute illnesses were included. **Non-daily or occasional Tobacco user:** One who does not uses/chew daily. **Past**

tobacco user: One who formerly used but has left using/chewing at the time of study.

RESULTS

Table 1: Age-Sex Distribution of Study Subjects

Age Group	Male	Female	Total
20-29 Years	54 (12.7%)	18 (15.9%)	72 (13.3%)
30-39 Years	91(21.3%)	36 (31.9%)	127 (23.5%)
40-49 Years	129 (30.2%)	30 (26.5%)	159 (29.5%)
50-59 Years	153 (35.8%)	29 (25.7%)	182 (33.7%)
Total	427 (79.1%)	113(20.9%)	540 (100%)

Total 540 subjects were included into the study, males (around 79%) outnumbered females while age wise major chunk (63%) completed more than 40 years of age. Among the study subjects current chewers of tobacco were found to be 17% (92/540) while about 4% (22/540) were found to be past users, so a total of 21% (114/540) study subjects were found to be exposed to chewable form of tobacco, whether in past of present. Among the current users majority i.e. 85% (79/92) were found to be daily users and 15% (13/92) were occasional (or non-daily) users. As far as the chewable tobacco items are concerned then majority (62.5%) were found to be chewing Gutkha (a preparation of tobacco, crushed betel nut, catechu, lime and other ingredients), followed by tobacco mixed with betel quid (Pan) (23.8%) while only 10% were reported to be chewing plain tobacco (10%). No woman was found to be using smokeless tobacco.

Frequency of Daily Use, Mean Age of Initiation & Mean Number of Tobacco Items Chewed per day: Majority of the daily users of smokeless tobacco (45.6%) reported chewing 5-9 items per day, followed by less than 5 items per day (34.2%). Mean age of initiation of chewing tobacco was found to be 28±9 years while the mean number of tobacco items chewed per day was found to be 6.6±4.2.

Socio-Demographic Correlates of Chewable Tobacco Use: A significant association was observed between smokeless tobacco use and socio-
Table 2: Current Use of Smokeless Tobacco with respect to Selected Socio-demographic Factors, among Study Population (N=540)

Socio-demographic Factors	Current Use of Smokeless Tobacco		Statistical Significance
	YES (n=92)	NO (n=448)	
1. Occupation			
Teaching Staff (94)	7 (7.6%)	87 (19.4%)	p=0.050 $\chi^2=7.79$
Clerical (106)	22 (23.9%)	84 (18.8%)	
Technical Staff (97)	19 (20.7%)	78 (17.4%)	Not significant
Grade IV Staff (243)	44 (47.8%)	199 (44.4%)	
2. Religion			
Hindu (55)	14 (15.2%)	41 (9.2%)	p=0.124 $\chi^2=4.18$
Muslim (479)	78 (84.8%)	401 (89.5%)	
Others (06)	00 (00%)	06 (1.3%)	Not significant
3. Family Type			
Nuclear (365)	63 (68.5%)	302 (67.4%)	p=0.931, $\chi^2=0.74$, Not significant
Joint (171)	29 (31.5%)	142 (31.6%)	
Living Alone (04)	0	04 (1.0%)	
4. Socio-economic Class (modified BG Prasad)			
Class I (161)	7 (7.6%)	154(34.4%)	p<0.001 $\chi^2=26.4$ Significant
Class II (114)	27 (29.4%)	87 (19.4%)	
Class III (140)	30 (32.6%)	110 (24.6%)	
Class IV (87)	20 (21.7%)	67 (14.9%)	
Class V (38)	8 (8.7%)	30 (6.7%)	

economic class (p<0.001) whereby higher proportion of smokeless tobacco were from the socio-economic classes III and IV. With respect to occupation though the proportion of subjects using smokeless tobacco was found to be highest (47.8%) in grade IV staff and lowest (7.6%) in teaching staff but this was not found to be statistically significant (p=0.05). Strikingly, no significant association was observed with educational status (p=0.204) although smokeless tobacco use found to be more in subjects of higher educational status. Likewise the association with religion and type of family was also not found to be significant (p=0.124, and 0.931 respectively)

DISCUSSION

Present study was conducted among the employees of an academic institution. The prevalence of current use of chewable tobacco was reported to be 17%, much lower than that reported by Global Adult Tobacco Survey India (2009-10)⁵, which has reported it to be 25.9% and 25 % national average and in Uttar Pradesh respectively. The most common form of smokeless tobacco use reported in GATS is Khaini, while gutkha has been reported to be the most common chewed item in the present study. A study conducted by Joshi et al⁷ (2010) in urban population of Jamnagar district of Gujarat had reported the chewable form of tobacco use to be 32.9% which is much higher than the present study. Certain community based studies have reported the prevalence of chewing tobacco lower than the present study. Sharma et al⁸ (2004) have reported the prevalence of current daily smokeless tobacco use to be 11.7% (men 16.4%, women 1.1%) and occasional 13.6% among the school personals in Rajasthan. Gupta et al⁹ (2010) had found the prevalence of daily use of chewed tobacco to be 12% in urban areas of Faridabad district in Haryana. A prevalence of use of Gutkha, Pan Masala etc. to be 15.2% has been reported by Laskar et al¹⁰ (2010). In our study tobacco chewing was found to be significantly associated with lower socio-economic classes. Similar to our study, the association of tobacco use with lower socio-economic classes has been reported by Gupta et al¹¹ (2012). Mohan et al¹² (2001) reported substance abuse to be high among the families belonging to lowest socio-economic classes with an inverse relation with family income. The non-association with educational status in our

study is a finding which deserves some extra attention.

CONCLUSION

The findings of the study highlight the high prevalence of tobacco chewing among the study population. It was found to be significantly higher in socio-economic classes III and IV while the association with educational status, employees' occupation categories, religion and type of family was not found to be significant. The finding of no women reported to be chewing tobacco in our study seems to be encouraging. Further studies should be carried out so as to analyse the factors which promote the continuation of tobacco use. The employees should be motivated for behaviour change. This can be done in the form of organizing lectures and health talks at the regular intervals under the umbrella of Medical Attendance Scheme (MAS) which is in place for providing health care to the employees of the University and their dependent family members.

Limitations: The results shown in the study may not be the real burden of the problem due to the possibility of under-reporting by the participants. Moreover as the study has been conducted on a specific population, the results could not be projected on the general population.

Acknowledgement: We are thankful to the employees of Aligarh Muslim University who participated in the study.

Conflict of interest: None.

REFERENCES

1. Ezzati M, Hoorn SV, Rodgers A, Lopez AD, Mathers CD, Murray CJL. Estimates of global and regional potential health gains from reducing multiple major risk factors. *Lancet* 2003;362:271-80.
2. World Health Organization. *Non-communicable Diseases Country Profiles 2011*. Geneva, Switzerland: WHO; 2011.
3. Gupta PC, Ray CS. Smokeless tobacco and health in India and South Asia. *Respirology* 2003;8:419-31.
4. Government of India. *Report on Tobacco Control in India*. Ministry of Health and Family Welfare, New Delhi; 2004
5. Government of India. *Global Adult Tobacco Survey India 2009-10*. Ministry of Health and Family Welfare, New Delhi; 2010.
6. International Institute for Population Sciences (IIPS), Macro International. *National Family Health Survey (NFHS-3) 2005-06: India*. Mumbai: 2007.
7. Joshi U, Modi B, Yadav S. A Study on Prevalence of Chewing Form of Tobacco and Existing Quitting Patterns in Urban Population of Jamnagar, Gujarat. *Indian J Community Med*. 2010 Jan; 35(1): 105 –108.
8. Sharma R, Pednekar MS, Rehman A U, Gupta R. Tobacco use among school personnel in Rajasthan, India. *Indian J Cancer* 2004;41:162-6
9. Gupta V, Yadav K, Anand K. Pattern of tobacco use across urban, rural and urban slum populations in a north Indian community. *Indian Journal of Community Medicine* 2010;35:245-51
10. Laskar A, Sharma N, Bhagat N. Lifestyle disease risk factors in a North Indian community in Delhi. *Indian Journal of Community Medicine* 2010;35:426.
11. Gupta R, Sharma KK, Gupta A, Agrawal A, Mohan I, Gupta VP, et al. Persistent high prevalence of cardiovascular risk factors in the urban middle class in India: Jaipur Heart Watch-5. *JAPI* 2012;60:11-6
12. Mohan D, Chopra A, Sethi H. A rapid assessment study on prevalence of substance abuse disorders in metropolis Delhi. *Indian J Med Res* 2001; 114: 107-14.



Original Research Article

Assessment of Nutritional Status of Under Five Children Residing in Rural Area of Kerala State

- A Cross sectional study

Chethan T K, Shashank K J

Date of Submission: 02.02.2016

Date of Acceptance: 22.02.2016

Abstract

Background: Malnutrition in children is the consequence of a range of factors like poverty, ignorance, illiteracy etc. and is often related to intake of poor quality food, insufficient food intake and severe and repeated infectious diseases or some combination of these three.

Objectives: To assess the prevalence of under nutrition status of children less than 5 years in the rural field practise area of DMIMS, Wayanad district of Kerala.

Materials and Methods: A community based cross sectional study was conducted in the Waynad district of Kerala from June to July 2015. According to the National family health survey 3, the prevalence of underweight among children is 37.6%³ at 95 % confidence interval, with 5% relative precision the worked out sample size is 360 using the statistical formula $n = \frac{(1.96)^2 \times p \times q}{I^2}$.

Results: In our study the percentage of children classified as underweight, stunted and wasted was 48.4%, 60.9% and 32.8 % respectively.

Conclusion: The majority of children were within the normal range of WHO 2006 growth Charts.

Key words: Under Five, Malnutrition, Underweight, Stunted, Wasted

Authors:

Assistant Professor, Department of Community Medicine, Adichunchanagiri Institute of Medical Sciences, B G Nagar, Mandya -571448 Karnataka

Corresponding Author:

Dr. Chethan T K, Assistant Professor, Department of Community Medicine, Adichunchanagiri Institute of Medical Sciences, B G Nagar, Mandya -571448 Karnataka, India
E-mail: shashank.kj@gmail.com

Introduction:

In the words of the 35th President of the United States, John F. Kennedy, "Children are the world's most valuable resource and its best hope for the future".¹ It is indeed true that the future is in the hands of the children. Hence the health and wellbeing of children go a long way in nurturing them into better adults. Malnutrition is one of the greatest international health problem and the biggest challenge, WHO is facing today. Malnutrition continues to be the biggest health problem of our country today, despite efforts by the Government of India and voluntary health agencies towards eradication of the same. There is growing realization

that adequate nutrition is a necessary first step in the improvement of quality of life. Causes of malnutrition are complex multidimensional and interrelated. Infections, family size, parental education, nutritional taboos, economic status of the family are few of the main causes of malnutrition in children.

Initial days of the child are a dynamic period of physical growth and mental development of the child. The nutritional problem has a wide spectrum, on one end it is represented by Severe acute malnutrition [Marasmus and kwashiorkor], While the other end is represented by obese children. Severe acute malnutrition represents only the tip of

the Iceberg, while a larger population of mild and moderate malnourished cases are hidden. Since the prevalence of malnutrition (mild and moderate) is very high compared to obese children, the word malnourishment is synonymously used for representing various forms of under nutrition. Most effective and simplest way of detecting hidden malnutrition is by anthropometric assessment. Poverty, faulty feeding habits, sex discrimination, large family, illiteracy, ignorance of the family are contributing factors for malnutrition. Indian Government is providing many welfare programs for the children through anganwadi centres, Vitamin-A Prophylaxis Program, Mid- day-meal Program etc. In spite of implementation of all these programs the prevalence of malnutrition among school children is high.

The World Bank estimates (2009) reported that India is ranked 2nd in the world of the number of children suffering from malnutrition & the most growth retardation occurs by the age of two, and the damage is irreversible.² Present study is expected to throw light on undernutrition of children between less than 5 years of age in rural field practise area of DMIMS, Waynad District and will provide a base line data for future research.

Objective:

To assess the prevalence of under nutrition status of children less than 5 years in the rural field practise area of DMIMS, Waynad district of Kerala.

Materials and Methods:

A community based Cross sectional study was conducted in the Waynad district of Kerala from June 2015 to July 2015. According to the National family health survey 3, the prevalence of underweight among children is 37.6%³ at 95 % confidence interval, with 5% relative precision the worked out sample size is 360 using the statistical formula $n = \frac{(1.96)^2 \times p \times q}{l^2}$. 4 villages were selected using simple random sampling and the list of household consisting of at least one child aged less than 5 years was prepared. From the list houses were selected according to population proportional to size to attain the required sample size. Field workers were trained (including anthropometric measurements) for a week's time. Trained field workers then visited all the selected households. If no one was in the home during the initial visit, two repeat visits were made to all eligible households.

The care givers were explained the purpose of the study and those consented to be a part of study was included. A pretested and structured questionnaire was administered to caregivers of children to obtain information on socio-demographics.

WHO 5 (2006) growth charts was used to classify the children as normal (+ 2 SD to – 2 SD), mild to moderate (-2 SD to -3 SD) and severe (less than - 3 SD) malnourished. Underweight (weight for age), Stunting (height for age), Wasting (weight for height) was measured. Weight for height was calculated for the children aged above two years.⁴

Data entry and management was done in excel, pre-determined data format have been introduced as datasets for quantitative data which was incorporated into a single master computer at the base. The data sets were transferred into SPSS version 16 after data cleaning and recoding with data definitions. Results of were summarized with frequencies and percentages. The chi-square test was used for assessing the significance of nutritional indices and various independent variables of interest.

Results:

Table 1: Distribution of children according to age and sex

Age (in years)	Male (%)		Female (%)		Total (%)	
<1 year	25	54.34%	21	45.66%	46	12.78%
1-2 year	28	45.16%	34	54.84%	62	17.22%
2-3 yrs	43	51.19%	41	48.81%	84	23.33%
3-4 yrs	46	46.93%	52	53.07%	98	27.22%
4-5 yrs	26	37.14%	44	62.86%	70	19.45%
Total	168	46.66%	192	53.34%	360	100%

Out of 360 under five children included in our study 168(46.6%) male and 192(53.4%) were females. a total of 46(12.7%) were less than one year of age, 62(17.02%) between 1-2 years of age, 84(23.3%) in 2-3 years of age, 98(27.2%) 3-4 years of age and 70(19.4%) in the 4-5 years of age group.

Table 2: Prevalence of underweight by gender

	Male (%)	Female (%)	Total (%)	
Normal	97 (57.73%)	89 (46.35%)	186 (51.67%)	X ² value = 4.77 P value =0.09
Mild-moderate	46 (27.38%)	64 (33.33%)	110 (30.55%)	
Severe	25 (14.89%)	39 (20.32%)	64 (17.78%)	
Total	168	192	360	

Under weight (weight for age) was calculated using the WHO 2006 Growth Charts, 186(51.7%) were normal, 30.5% (27.4% in male and 33.3% in female) were classified as mild to moderate underweight and 17.8% (14.9% in males and 20.3% in females) were classified as severely underweight falling below the – 3 S D on the growth chart. The difference between the gender was found to be statistically not significant.

Table 3: Prevalence of stunting by gender

	Male (%)	Female (%)	Total (%)	
Normal	108 (64.28%)	105 (54.68%)	213 (59.16%)	X ² value = 4.37 P value =0.112
Mild-moderate	42 (25%)	54 (28.42%)	96 (26.67%)	
Severe	18 (10.72%)	33 (16.9%)	51 (14.17%)	
Total	168	192	360	

Out of the 360 study participants , 213(59.16%) belonged to normal category in the growth chart. 26.7% (25% in male and 28.4% in females) were classified as mild to moderate stunted and 14.2% (10.8% in males and 16.9% in females) were severely stunted and the difference between the male and female was statistically not significant.

Table 4: Prevalence of wasting by gender

	Male (%)	Female (%)	Total (%)	
Normal	78 (67.82%)	92 (67.15%)	170 (67.46%)	X ² value = 0.042 P value =0.97
Mild-moderate	24 (20.86%)	30 (21.9%)	54 (21.42%)	
Severe	13 (11.30%)	15 (10.94%)	28 (11.11%)	
Total	115	137	252	

170 (67.46%) under five children were classified as normal weight for height, 21.42% (20.86% among males and 21.42% among females) were mild to moderately wasted and 11.1% (11.30% in males and 10.94% in females) were severely wasted. The difference was also found to be statistically not significant between male and female.

Table 5: Comparison between growth charts

	Underweight (weight for age)	Stunting (height for age)	
Normal	186	213	X ² value =18.4 P value =0.001
Mild-moderate	110	96	
Severe	64	51	

Using three differences parameter like Weight for Age, height for Age and Weight for Height, for assessing the nutritional status of under five children, it was observed that total number of children being classified as normal, mild to moderate and severe varied from each category. The percentage of children being grouped as normal using the growth charts was higher in Weight for height (wasting) and lower in underweight. More number of children was classified as severely underweight (64). This difference in classifying children as malnourished using three different growth charts was found to be statistically significant.

Discussion:

In our study the percentage of children classified as underweight, stunted and wasted was 48.4%, 60.9% and 32.8 % respectively. More number of children were classified as severely underweight than wasting might be an indicator for the recent infection or illness among the children. Chronic malnutrition among children usually measured using stunting was also much higher in our study. The findings in our study was much higher than the NFHS -3 data were 42.5%, 48.05% and 19.15 of the children were underweight, stunted and wasted respectively.⁵ In a study done by Banerjee B ⁶ the overall prevalence of malnutrition among under five children was around 55.38% (77.6% Females and 31.7% males). They also observed that more number

of girls were malnourished when compared to boys, though this difference was not found to be statistically significant

In the study done by Muralidharan MK⁷ the prevalence of Underweight, Stunting and wasting was 34.6%, 23.3% and 16.19% respectively which is much lesser than our study finding. In another study done in the rural areas of Belgaum⁸, the prevalence of underweight, stunting and wasting was 32.36%, 34.19% and 22.07% respectively. Shashank K J⁹ conducted the study in the rural areas of Bijapur District the prevalence of Underweight, Stunting and wasting was 43.3%, 38% and 28.7% respectively which are almost similar to our study findings. Similar kind of results was also seen in the study done by Sandip Kumar Ray et al¹⁰, Dhananjay Phatak¹¹ and Suman Chakrabarty et al¹².

Limitations:

The limitation of the study were using the WHO growth charts were used to measure the Nutrition status as it was simple easy and time saving . Diet history and various other factors responsible for malnutrition like micro and macro nutrients deficiency couldn't be evaluated.

Conclusion:

The median height and weight of the majority of children were within the normal range of WHO 2006 growth Charts. Female children had high percentage of occurrence of underweight and stunting in our study, may be due to lack of care, frequent illness might be the reason. The percentage of children wasted was almost equal in both boys and girls. IEC activities should be enhanced so as to change the behavior of 100% mothers for Prevention of malnourishment by improving the duration of breastfeeding, initiation of Weaning with protein energy rich diet at proper age and of proper hygienic practices. Prevention of malnourishment by improving the duration of breastfeeding, initiation of Weaning with protein energy rich diet at proper age and of proper hygienic practices.

Conflict of Interest: Nil

Source of funding: Nil

References:

1. Presidential Library and Musuem. Jofn F Kennedy. (Assesed on 28/12/2015). Avialable from

<http://www.jfklibrary.org/Research/Research-Aids/Ready-Reference/JFK-Fast-Facts/Appeal-UNICEF.aspx>.

2. Source: The World Bank. undernourised.chapter 1. (Assesded on 29/12/2015) Available from www.worldbank.org.

3. National Institute for Population Sciences (IIPS) and Macro International.2007. National Family Health Survey (NFHS-3), 2005–06: Government of India: Volume I.Mumbai: IIPS.

4. The WHO Child Growth Standards. World Health Organization. [Internet] 2014 [cited 2015 May 15] . Available From <http://www.who.int/childgrowth/standards/en/>.

5. International Institute for Population Sciences (IIPS) and Macro International.2007. National Family Health Survey (NFHS-3), 2005–06: Government of India: Volume I. Mumbai: IIPS.

6. Banerjee B, Bandyopadhyay L. Gender Difference In Nutritional Status. Indian Pediatrics.2005;42:400.

7. Muralidharan M K. Malnutrition Among Children Aged One to Six Years in a Field Practice Area of J N Medical College, Belgaum –A Cross Sectional Study [MD Thesis]. Bangalore; RGUHS: 2006.

8. KLE University. Assessment of Nutritional Status of under Five Children Residing in Rural Area – A Cross Sectional Study. [M D Thesis]. Belgaum. KLE University: 2013.

9. Shashank K J. A study on gender bias among under five children in rural areas of Bijapur district. [M D Thesis].Bijapur, BLDE university; 2015.

10. Ray S K , Biswas A B, Gupta S D, Mukherjee D. Rapid Assessment of Nutritional Status and Dietary Pattern in Municipal Area. Indian Journal of Community Medicine.2000;25(1):14-18.

11. Pathak D. Gender Disparity in Health and Nutritional Status in Children Under Five Years of Age In a Rural Community: A Cross Sectional Study [MPH Thesis]. Belgaum; KLE University: 2011.

12. Chakraborty S , Gupta S B , Chaturvedi B , Chakraborty S K. A Study of Protein Energy Malnutrition (PEM) in Children (0-6 Year) in a Rural Population of Jhansi District (U.P). Indian Journal of Community Medicine 2006;31(4):291-292.

Original Research Article

Assessment of Nutritional Status in School Boys Aged 10-19 Years- A Cross Sectional Study in Aligarh

Mohammad Atif¹, M Athar Ansari², Zulfia Khan³, Anees Ahmad⁴

Date of Submission: 28.01.2016

Date of Acceptance: 22.02.2016

Abstract

Background: Adolescent is the period between 10 and 19 years. Poor nutritional status during adolescence is an important determinant of health outcome. The adolescents have different needs and have diverse problems and health remains a neglected issue in majority of times by school going adolescents. **Objectives:** To study the nutritional status in adolescent school boys aged 10-19 years. **Material and Methods:** A cross-sectional study was done covering 500 students between 10-19 years of age from rural and urban schools of district Aligarh. Students were interviewed and anthropometric measurements were taken. The data obtained were tested statistically by percentages and Chi-square Test using SPSS 20. **Results:** The overall prevalence of thinness was found to be 20.6 %. Overall 6.0% students were found to be suffering from severe thinness. **Conclusion:** Adolescent is vulnerable age group with high prevalence of malnutrition, therefore should be given priority in national health programs.

Keywords: Anthropometry, adolescents, thinness, nutritional status.

Authors:

1. Demonstrator, Department of Community Medicine, SHKM, GMC, Mewat, Haryana, 2, 3- Professor & 4- Associate Professor, Department of Community Medicine, J.N. Medical College AMU, Aligarh

Corresponding Author:

Dr. Mohammad Atif
Department of Community Medicine, S.H.K.M Govt. Medical College Nalhar (Mewat), Haryana India. 122107
Email: atif6980@gmail.com

INTRODUCTION

The term adolescence meaning “to emerge” or “achieve identity” is a relatively new concept, especially in developmental thinking. The origin of the term is from Latin word; ‘adolescere’ meaning, “to grow, to mature”. However, a universally accepted definition of the concept has not been established.¹ World Health Organisation identifies adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. Human growth and maturation are continuous processes, and transition from childhood into adulthood is not abrupt, the period of adolescence encompasses rapid changes in physical changes and maturation, and in psychological development.²

Nutrition is the intake of food, considered in relation to the body’s dietary needs. Good nutrition comprises an adequate, well balanced diet combined with regular physical activity, is a cornerstone of good health. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity.³

Nutrition is only one aspect of health behaviours and the development of these in relation with chronic disease is better conceptualized in a ‘chain of risk’ framework.⁴

Gillespie⁵ studied nutritional status of adolescents and found the main nutritional issues of adolescents in low- and middle-income countries are -

1. Undernutrition and associated deficiencies, often originating earlier in life
2. Iron deficiency anaemia and other micronutrient deficiencies
3. Obesity and associated cardiovascular disease risk markers
4. Inadequate or unhealthy diets and lifestyles

It has been seen from the earlier studies that there has been considerable neglect of the adolescent phase of life in research, education and health care. Because adolescents are less vulnerable to disease than the very young and very old, health problems specific to their age group have been given little prominence until now especially in developing countries like India.

MATERIAL AND METHODS

The study was done in registered schools of the Department of Community Medicine, JNMC, AMU, Aligarh. The total population of male adolescents in all the schools was 2533, out of which a sample of 512 students (256 from the rural schools and 256 from the urban schools) were selected using Probability Proportionate to Size sampling (P.P.S.). Only 500 students cooperated in the study. The sample size was calculated using the formula –

$$\text{Sample} = \frac{(1.96)^2 PQ}{L^2}$$

where prevalence

(P) = 20%, Q = (1- P), Precision (L) = 9%.

The age of the student was recorded on their last birthday (Gregorian calendar) from the school record. A detailed clinical and dietary history and a thorough physical examination were conducted for each adolescent and clinical impression was made at the end of the examination. Weight (kgs) and height (cms) were taken according to standard protocol.

The present cross sectional study was carried out for a period of one year from 1st of August 2013 to 31st July 2014. Male students between 10 to 19 years were included in the study. Students below 10 & above 19 years, non co-operative, chronic absentee and girl students were excluded. In the study pretested pre-framed proforma, measuring tape and weighing machine were used. Before the starting of

the study approval was taken from Institutional Ethical Committee. Permission was taken from school authority in each and every school. Principal of the schools was the main authority in all schools. If a student was 18 years or old, an informed consent was also taken. Health education & adequate counselling were provided to all the students of concerned class. The data obtained were tested statistically by percentages and chi-square test. SPSS 20 was used for the same.

In the study, thinness was defined as Z value between -2 SD to -3 SD in WHO Z-Score and severe Thinness as Z value < -3SD in WHO Z-Score.

RESULTS

Table 1. Socio-demographic characteristics of the study population

Age group(years)	Place				Total	
	Urban		Rural		No	%
	No	%	No.	%		
Early adolescent (10-13 yrs)	47	18.36	127	52.05	174	34.80
Mid adolescent (14-16 yrs)	143	55.85	69	28.28	212	42.40
Late – adolescent (17-19 yrs)	66	25.79	48	19.67	114	22.80

Table 2. Distribution of the Thinness (-2 SD to -3 SD in WHO Z-Score) according to the age of the study population

Age group	Total No.	Thinness	
		No.	%
10-13 yrs	174	50	28.74
14-16 yrs	212	48	22.64
17- 19 yrs	114	5	4.39
Total	500	103	20.60

Table 3 . Distribution of the Severe Thinness (< - 3SD) according to the age in the study population

Age group	Total No.	Severe Thinness	
		No.	(%)
10-13 yrs	174	18	10.34
14-16 yrs	212	9	4.24
17- 19 yrs	114	3	2.63
Total	500	103	6.00

The age of the study population ranged from 10-19 years. As shown in table 1, maximum 212 (42.4%) students belonged to 14 -16 years age group (mid adolescence) followed by 174 (34.8%) in the 10 to 13 years (early adolescence) and the least population of 114 (22.8%) were in the 17 to 19 years age group (late adolescence).

In urban areas, maximum population was of mid adolescents (55.85%) in compared to rural areas, where maximum population was of early adolescents (52.05%).

The table 2 depicts the distribution of thinness, which in this study has an overall prevalence of 20.6% using WHO Z- score between -2 to -3 SD (BMI for age). The maximum prevalence of thinness i.e. 28.74% was in the age group of 10-13 years followed by 22.64% in mid adolescence (14-16 years) and the minimum prevalence of 4.39% was at the age of 17-19 years. This distribution was highly significant. (Chi-Square – 18.6, degree of freedom – 2 p value = 0.000). Since the height spurt begins in the early adolescence and the weight is put on in the late adolescence, this might be the reason for the more prevalence of thinness in the age groups 10-13 years and 14-16 years than in 17-19 years

The table 3 shows the distribution of severe thinness, which in this study had an overall prevalence of 6.0% using WHO Z-score between < - 3 SD (BMI for age). Severe thinness was most prevalent in early adolescence and that was 10.34%. Least prevalence of severe thinness was seen in late adolescence and was 2.63%. This distribution was significant (Chi square- 8.11, degree of freedom- 2, p value =0.017).

DISCUSSION

In a study done in Aligarh by Ahmad et al showed that in rural area, majority of the population (59%) belonged to 10-13 years age group as compared to (26.5%) of urban area of same age group⁶. This finding is similar to the present study because both studies done in Aligarh but at different times.

Kathawate et al found that prevalence of thinness and severe thinness amongst adolescents was 27% and 23% respectively in Maharashtra⁷. Notably, the rate of severe thinness was significantly higher in early adolescence period.

Srivastav et al studied adolescent age group in Noida. They found that the overall prevalence of thinness was found to be 23.2% and severe thinness was found to be 7.4%. The prevalence of thinness and severe thinness in boys was 24.1% and 8.6% respectively⁸. The findings of this study was similar to the present study. In another study, Rahman⁹ studied school going adolescents in Bangladesh. He found that prevalence of thinness among boys was 32.0% which was higher than our study. Mankar¹⁰ et al did a cross-sectional study in the PHC area of Nere in Panvel. He showed that overall, 50.1% of the adolescents were thin which was much higher than our study and this is an alarming sign. These differences may be because of regional differences. Medhi et al¹¹ studied adolescents in Assam and found that prevalence of thinness in boys was very high and was 59.9%. Mukhopadhyay¹² did a cross-sectional study on Bengali adolescents. He used BMI to assess the nutritional status and showed overall rate of under nutrition was 36.49%. Regardless of sex, the rate of undernutrition progressively increased from 31.88% to 39.80% with the advancement of age.

CONCLUSION

Nutrition is an important aspect of adolescence as it is a rapidly growing period of life. Adolescents are in the process of establishing responsibility for their own health-related behaviours including diet. It is therefore an appropriate time for health promotion programmes based on documented relationships between behaviour in this age group, obesity and other disease risk factors. Adolescents can and should take responsibility for their nutrition and the long-term repercussions on health.

ACKNOWLEDGMENT

I would like to express my profound gratitude to all the participants for their cooperation and for their immense faith they showed in me.

CONFLICT OF INTEREST: NIL

SOURCE OF FUNDING: NIL

REFERENCES

1. Thaker RB, Verma AP. A study of perceived stress and coping styles among mid adolescents. *Natl J Physiol Pharm Pharmacol* 2014;4:25-8.
2. Young People's Health- A Challenge for Society. Report of a WHO Study Group on Young People and "Health for All by the Year 2000" Geneva, World Health Organization, 1986. (WHO Technical Report Series No- 731).
3. Adolescents: Health risks and solutions, SEARO. WHO 2014;(345). accessed on - <http://www.searo.who.int/thailand/factsheet/sfs0027/en/>
4. Kuh D, Power C, Blane D, Bartley M. Social pathways between childhood and adult health. In: Kuh D, Ben-Shlomo Y (eds). *A life course approach to chronic disease epidemiology*. Oxford: Oxford University Press, 1997:169-98.
5. Gillespie S. Improving adolescent and maternal nutrition: An overview of benefits and options. *UNICEF Staff Working Papers, Nutrition Series*;1997.
6. Ahmad A, Khalique N, Azmi SA, Khan Z. Pattern of sexual development and anthropometry in adolescent males. *Delhi Psychiatry Journal* 2011;14:2.
7. Kathawate V, Ghosh S. Nutritional status of adolescents in agrarian crises-affected area of Maharashtra. *Indian J Community Med* 2013;38:180-3.
8. Srivastav S, Mahajan H, Grover VL. Nutritional status of the government school children of adolescent age group in urban areas of district Gautambudh-nagar, Uttar Pradesh. *National Journal of Community Medicine* 2013;4:2-5.
9. Rahman MA. Prevalence of stunting and thinness among adolescents in rural area of

- Bangladesh. *Journal of Asian Scientific Research*, 2014;4:39-6
10. Mankar M, Joshi S, Velankar D, Mankar J. Nutritional status of adolescents in rural area of Panvel. *IJMAHS* 2014; 1.
 11. Medhi GK, Hazarika NC, Mahanta J. Nutritional status of adolescents among tea garden workers. *Indian J Pediatr* 2007;74:343-7.
 12. Mukhopadhyay A, Bhadra M, Bose K. Anthropometric assessment of nutritional status of adolescents of Kolkata, West Bengal. *J.Hum. Ecol* 2005;18:213-6.



Original Research Article

Bio-Medical Waste management: KAP study on Health Care Personnel working in Private Hospitals of Bangalore city

Md Mustafa Ahmed¹ C Pradeep² Manasa R.V³ Suhail Ambi⁴ Vikas Jaiswal⁵

Date of Submission: 13.01.2016

Date of Acceptance: 22.02.2016

Abstract

Aims: The aim of our study was to analyze the knowledge attitude and practice (KAP) of biomedical waste management among health care personnel in private hospitals of Bangalore city in South India. **Materials and Methods:** Study was conducted among 550 health care personnel which included doctors, nurses, housekeeping staff and laboratory technician. The results were obtained and evaluated. **Results:** It was found that there is a significant difference between the knowledge of doctors, nurses, housekeeping staff and laboratory technicians and within each group. 60.5% of the health care personnel had not attended any training and 39.5% had attended training. **Conclusion:** The results of this study reveals that lack of knowledge regarding handling of bio medical waste, to emphasis on this training has to done for the staff in the hospitals, the staff should be trained to improve the practice of safe management.

Keywords: Biomedical waste Management, Health Care Personnel, KAP

Authors:

1.Department of Community Medicine,Gitam Institute of Medical sciences and research,Visakhapatnam. 2. Department of Community Medicine,VIMS & Bangalore.

Corresponding Author:

Dr Md Mustafa Ahmed, quarter number 106, Staff quarters, Gitam University, Rushikonda, Visakhapatnam.530045.
E mail: mujahedchanda@gmail.com

Introduction:

The Government of India (notification, 1998) specifies that Hospital Waste Management is a part of hospital hygiene and maintenance activities. This involves management of range of activities, which are mainly engineering functions, such as collection, transportation, operation or treatment of processing systems, and disposal of wastes.¹The data available from developing countries also indicate that the(range is essentially similar but the figures are on a lower side with 1-2 kg per day per bed. In India, it is estimated to be 2.0 kg/ bed/ day.² The recent developments in healthcare units are precisely made for the prevention and protection of community health. Sophisticated instruments have come into existence in various operations for disease treatment. Such improvement and advances in scientific knowledge

has resulted in per capita per patient generation of wastes in health care units. Waste generated in the process of health care are composed of variety of wastes including hypodermic needles, scalpels, blades, surgical cottons, gloves, bandages, clothes, discarded medicine and body fluids, human tissues and organs, chemicals etc., Other wastes generated in healthcare settings include radioactive wastes, mercury containing instruments, PVC plastics etc., These are the most environmentally sensitive healthcare by products and needs a greater attention which has to be monitored.³ In India, there is about 6,00,000 hospital beds, over 23,000 primary health centers thousands of registered nursing homes, countless unregistered nursing homes and dispensaries, above all a very large number of quacks practicing at every nook and

corner of urban and semi-urban locality¹⁶ Inadequate Bio-Medical waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needles contaminated with human. It becomes primary responsibility of Health administrators to manage hospital waste in most safe and eco-friendly manner⁴.

Material and Methods

Study design: Interventional study

Study area: Private hospitals in Bangalore city.

Study period: One year (January – December 2013)

Study subjects: Health Care Personnel's working in private hospitals- Doctors, Nurses, Housekeeping Staff, Laboratory technicians.

Inclusion Criteria: : health care personnel from private hospitals, nursing homes, poly clinics, day care centres, clinics were taken into study.

Exclusion Criteria: health care personnel from teaching medical college, government hospital, Employee state insurance hospitals , indigenous health system we're not included in the study.

Sample size n = 550

Sampling method: Stratified random sampling technique was used to select study subjects. The private hospitals list was obtained and the Bangalore city was divided into 4 geographic zones (east, west, north, south) and list of the private hospitals was divided according to the zones. Randomly every 10th hospital was selected from the list and every health care personnel in that hospital was included in the study till the sample was achieved from each zone. The list of 153 hospitals was obtained and divided into 4 zones, the North zone had 23.53% of hospitals accounting for 129 health care personnel's, South zone 41.17% accounting for 226 subjects, East zone 15.03%(83 subjects), West zone 20.26% (112 subjects). Data collection was done by interview method as per pre-tested semi-structured questionnaire. Informed consent was obtained from the study participants and ethical clearance was obtained from the institute ethics committee.

Results

Table 1: Frequencies of age, gender ,work experience, training and details of HCPs

Particulars	No of subjects	%
Age in years		
≤40	315	57.27
>40	235	42.73
Gender		
Male	160	29.1
Female	390	70.9
Work experience in years		
<10 years	223	40.5
>10 years	327	59.5
Training Received		
Not received	333	60.5
Received	217	39.5
Details of HCP		
Doctor	165	30
Housekeeping staff	115	20.9
Lab tech	12	2.2
Nurse	258	46.9
Total	550	100

Details of HCP are 30% were doctors, 20.9% were housekeeping staff, 2.2% were Lab technicians, 46.9% were nurses. Findings of this study revealed that 57.3% were in the age group ≤40 years, and 42.7% were in the age group >40. We find 59.5% were in the work experience of >10years, and 40.5% were in the work experience of <10years. And we find 60.5% were not received training, and 39.5% were received training.

Table 2: Comparison of HCP mean among doctors, nurses, housekeeping staff & lab technicians by using ANOVA.

Details of HCP	Mean	F-value	P-value	Inference
Doctors	15.62	120.06	<0.01	HS
Nurse	15.4			
Housekeeping staff	8.63			
Lab technician	12.67			

In table 2 represents there is a significance difference between doctors, nurse, Lab technicians and housekeeping staff (<0.01).

Table 3: Comparison of HCP mean between doctors, nurses, housekeeping staff & lab technicians by using TUKEY test.

Variable		P-value	Inference
Doctor	Nurse	0.91	NS
	Housekeeping staff	<0.01	HS
	Lab technician	<0.01	HS
Nurse	Housekeeping staff	<0.01	HS
	Lab technician	<0.05	S
Housekeeping staff	Lab technician	<0.01	HS

In table 3 represents there is no significance difference between doctors and nurse. Remaining all having significance difference (<0.01).

Table 4: Comparison of mean between Sex, work experience & training by using t-test.

Particulars	Mean	t-value	P-value	Inference
Sex				
Male	14.936	3.881	<0.01	HS
Female	13.438			
Work Experience				
<10 years	14.83	3.715	<0.01	HS
≥10 years	13.419			
Training received				
Yes	14.802	3.506	<0.01	HS
No	13.462			

In table 4 represents there is a significance difference between male and female (<0.01), there is significance difference between <10years and ≥10 years' experience (<0.01). And there is a significance difference in training received (<0.01).

Table 5: Table 5: Correlation between age and KAP score.

Variable	r-value	P-value	Inference
Age	-0.448	<0.01	HS
KAP score			

Table 5 represents that there is a negative correlation between age and KAP score.

Discussion

Findings of this study revealed that 57.3% were in the age group of 21-40 years. The mean age group of the sample was found to be 41.99 years. A similar study revealed that 243(49.59%) were below 25 years of age.⁵ Supporting this statement a study revealed that 123(89.8%) were over 30 years of age.⁶ The present study revealed that 70.9% of the health care personnel were females. Another similar⁶ study revealed that 198(40.32%) were males and 293(59.67%) were females. Similar findings were noted in a study which revealed that 42(30.7%) were males and 95(69.3%) were females.⁷ The present study revealed that 30% of the health care personnel were Doctors, 20.9% housekeeping staff, 46.9% nurses and 2.2% laboratory technicians. A similar study revealed that 289(58.85%) were professionals, 105(21.38%) were paramedical personnel and 97(19.75%) were class IV workers.⁸ Similar findings were observed in a study which revealed that 68(48.57%) were designated as professionals, 20(14.28%) were paramedical personnel and 40(28.57%) were class IV workers.⁹ The present study revealed that 40.5% of the health care personnel had ≤10 years of experience in their present job. 59.5% had ≥10 years of experience in their respective fields. A similar study revealed that 101(43.91%) had ≤10 years of experience.⁹ The findings of a similar study revealed that 29(58%) had experience of 3years.¹⁰

The findings of the present study revealed that 60.5% of the health care personnel had not attended any training and 39.5% had attended training. Similar findings were observed in a study which revealed that 134(91.78%) had not

attended training on biomedical waste handling.¹¹ Another similar study revealed that 121(88.3%) had not undergone any training on hospital waste management.⁸

A review of the literature indicated that the majority (69.9%) of health employees had received training of the subject on medical wastes.¹² Further a study which has been made to evaluate the level of information of hospital health personnel on waste management revealed that, in general, among the professional health employees, 62.1% of medical doctors, 54.5% of nurses and 47.6% of laboratory technicians had more information on the subject.¹³ In a similar manner, a study showed that medical doctors, nurses and laboratory technicians were better informed on waste disposal than the cleaning personnel.¹⁴ Also, a study by Suwarna and Ramesh in 2012 demonstrated that doctors and nurses that had a higher level of information than other hospital personnel.¹⁵ A another survey for the determination of information levels, the factors that affected the information levels on medical wastes, and organizing their training programs conducted among 453 hospital healthcare personnel disclosed that information of 43.5% of the participants averaged at medium level. In the same study, specialist doctors, the interns and nurses were found to be better informed than the other hospital personnel, but the cleaning employees had a significant information deficiency on the subject.¹⁶ Lakshmi and Kumar conducted an analysis among the healthcare workers on the awareness of biomedical waste management. In the study, they detected lack of information and awareness deficiency among the hospital employees as to the legislation associated with biomedical waste management. In this study, performed on qualified hospital employees also indicates that a knowledge and awareness deficiency exist among the qualified hospital personnel about the legislation on biomedical waste management.¹⁷ The results of the present study too are consistent with the conclusions of a multiple number of research study delving into the

information level on medical waste of health workers waste.^{12,15,16,17}

Recommendations: (i) Mandatory training of Health Care Personnel by a competent authority (ii) Hospitals should make sure that their employees have been trained (iii) training of non-technical and housekeeping staff should be specially emphasized, and (iv) To form a BMW team and they report to the pollution control board.

Conclusion: This study shows that there is lack of knowledge regarding segregation & colour coding of waste among HCPs, This is due to the lack of education, awareness and trained personnel to manage the waste in the hospital, as well as the paucity of the funds available to proper waste management system. The results of the study demonstrate the need for strict enforcement of legal provisions and a better environmental management system for the disposal of biomedical waste in hospitals as well as other healthcare establishments. The importance of training regarding biomedical waste management cannot be overemphasized. Intervention should be done by providing training programmes, so that the knowledge on the biomedical waste management can be improved. Constant supervision and implementation at each level of waste management is needed.

Source of funding: Nil

Conflict of interest: Nil

References

1. Govt. of India, Ministry of Environment and Forests Gazette notification No 460 dated July 27, New Delhi: 1998: 10-20.
2. Wallace L.P., Zaltzman R. and Burchinall C. Where solid waste comes from; where it goes. *Modem hospitals* 1972; 121(3): 92-5.
3. Park K. *Textbook of Preventive and Social Medicine*. 20th ed. Bhanot; 2011. p. 694-99.
4. Mathew SS et al. Assessment of biomedical waste management practices in a tertiary care teaching hospital in Ludhiana. *Health line*. Jul- Dec 2011,2(2),28-29.

5. Christensen PJ, Kenny JW. Nursing process application of conceptual models. 3rd ed. Toronto: Mosby; 1990. 146-8
6. Murthy PG, et al. Bio-medical wastes disposal and management in some major hospitals of Mysore City, India. International Journal of the Physical Sciences. Mar 2011; 6(3): 71-78.
7. Sharma S. Awareness about Bio-Medical Waste Management among Health Care Personnel of Some Important Medical Centers in Agra. International Journal of Environmental Science and Development. Aug 2010;1(3): 252-255.
8. SZ Quazi ,Abhay G, Kanchan M, Shanbhag SS , Pandit D D. Universal precaution and safe waste disposal among private medical practitioners in a slum area of Mumbai. Indian Journal Of Occupational Health. 2001 Apr-Jun: 89-94.
9. Sumi N. Study of bio medical waste management practices in a private hospital and evaluation of the benefits after implementing remedial measures for the same. Journal of Communicable Diseases. 2010; 42(1): 39-44.
10. Muduli K, Barve A. Challenges to Waste Management Practices in Indian Health Care Sector. IPCBEE. 2012; 32: 62-67.
11. Akbolat M, Işık O, Dede C, Çimen M: (Sağlık Çalışanlarının Tıbbi Atık Bilgi Düzeylerinin Değerlendirilmesi). (University of Acibadem Health Sciences Journal). Acibadem Üniversitesi Sağlık Bilimleri Dergisi Evaluation of level of knowledge of healthcare professionals about medical wastes. 2011, 2(3):131–140.
12. Vishal B, Swarn L, Mahesh M, Arvind A, Sanjay A, Uma S: Knowledge Assessment of Hospital Staff Regarding Biomedical Waste Management in A Tertiary Care Hospital. Nat J Community Med 2012, 3(2):197–200.
13. Hasçuhadar M, Kaya Z, Şerbetçioğlu S, Arslan T, Altınkaya S: The awareness level among the employees working in Ankara Atatürk Training and Research Hospital about medical wastes. Turk Med J 2007, 1:138–144.
14. MC Yadavannavar, Aditya S Berad, PB Jagirdar. Biomedical waste management: A study of knowledge, attitude, and practices in a tertiary health care institution in Bijapur, . Indian J Community Med 2010;35:170-1
15. Vanesh Mathur, S Dwivedi, MA Hassan, RP Misra. Knowledge, Attitude, and Practices about Biomedical Waste Management among Healthcare Personnel: Indian J Community Med. 2011 Apr-Jun; 36(2): 143–145.
16. Lakshmi BS, Kumar P: Awareness about bio-medical waste management among healthcare personnel of some important medical centers in Agra. Int J Eng Res Tech 2012, 1(7):1–5.
17. Şen I Yeni Açılmış Bir Hastanede Tıbbi Atık Kontrolünün Sağlanması. : Achieving waste control in a newly opened hospital, 2009:513. 6th National Sterilisation Disinfection Congress Proceedings 2009.



Original Research Article

HIV/AIDS stigma and knowledge among high school students in a rural area of Karnataka

Shashank K J, Chethan T K

Date of Submission: 02.02.2016

Date of Acceptance: 22.02.2016

Abstract

Background: Many adolescents around the world are sexually active and because many sexual contacts among them are unprotected, they are at a risk of contracting sexually transmitted diseases (STDs) including HIV/AIDS. Another reason for their vulnerability to STDs is the lack of sex education, including education on the prevention of STD. Stigma is a complex, multifaceted phenomenon felt and manifested both subtly and overtly. Stigma is subjective creating a wall between normal and others. **Objective:** To assess the knowledge and Stigmatization behaviour among High School students in Rural areas of Bijapur, Karnataka. **Materials and Methods:** A cross section study was done from July 2014 to August 2014 in the rural field practice area of SHRI B M Patil Medical College, Bijapur, Karnataka. A total of 238 Students participated in the study. Pretested semi structured Questionnaire was used to collect the data. **Results:** All the students in the Study participants had heard about HIV/AIDS. Television (65.5%) was the main source of knowledge creating awareness among the students. Prostitutes (83.1%) and Truck Drivers (70.16%) were regarded by the students as very high risk group. Majority (74.7%) of the adolescent's population in our study were willing to talk or work with the people suffering from HIV/AIDS. **Conclusion:** The knowledge of the students was satisfactory for most of the variables like modes of transmission of the disease, high risk groups and prevention of the disease. The stigmatization towards the people living with HIV/AIDS is prevalent among all the groups in the society and the only effective way to solve it is by health education to the whole community.

Key words: HIV/AIDS, Adolescents, Stigma, STD

Authors:

Assistant Professor, Department of Community Medicine, Adichunchanagiri Institute of Medical Sciences, B G Nagar , Mandya -571448 Karnataka

Corresponding Author:

Dr. Shashank K J, Assistant Professor, Department of Community Medicine, Adichunchanagiri Institute of Medical Sciences, B G Nagar, Mandya -571448 Karnataka, India
E-mail: shashank.kj@gmail.com

Introduction:

AIDS (Acquired Immuno-Deficiency Syndrome) is a severe disease syndrome that resents the late clinical stage of infection with HIV (Human Immunodeficiency Virus). It is termed "the greatest pandemic of modern times". WHO estimates that with continued escalation of HIV transmission, nearly 9 million HIV-infected people will reside in South-East Asia by the turn of the century.¹ In India, two new infections occur every minute. National Aids Control Organization (NACO) estimates that

by the year 2025 the majority of new HIV infections in the world will occur in Asia and India will probably have the largest number of infected persons of any single country.^{2,3} HIV/AIDS has emerged as the one of the challenge to the public health. With changes in the life style, the proportion of adolescent's getting infected with the virus is on the rise. Most of the adolescents reporting for the Sexual transmitted infection clinics are those suffering the HIV. Adolescents comprise about 22%

of Indian population. Adolescents are defined by the World Health Organization (WHO) as persons between 10 and 19 years of age. Many adolescents around the world are sexually active and because many sexual contacts among them are unprotected, they are at a risk of contracting sexually transmitted diseases (STDs) including HIV/AIDS. Another reason for their vulnerability to STDs is the lack of sex education, including education on the prevention of STD.⁴

Stigma is a complex, multifaceted phenomenon felt and manifested both subtly and overtly. Stigma is subjective creating a wall between normal and others. The individual living with HIV/AIDS may be socially stigmatized with the fear of disease being spread to others and not able to contribute to the welfare of the society and meet the occupational, financial and social obligations imposed on him by the family or society. Many of the individuals react to people living with HIV/AIDS due to discomfort speaking to them in public and fear of the getting the disease, as a result the HIV/AIDS people will be treated as Outcast in the society.^{5,6} The 2006 estimates suggest national adult HIV prevalence in India is approximately 0.36 percent, amounting to between 2 and 3.1 million people. If an average figure is taken, this comes to 2.5 million people living with HIV and AIDS; almost 50 percent of the previous estimate of 5.2 million of India's 35 states and territories, 6 had a high HIV prevalence in 2005, as defined by a rate of HIV positivity of more than 1% among women visiting prenatal clinics and a rate of more than 5% among patients visiting clinics for sexually transmitted diseases. Unfortunately, only an estimated 10 to 20% of those infected know that they are infected, which impedes treatment and prevention efforts. Perhaps 85% of HIV transmission in India is through sexual contact. 25% of the patients attending government STI clinics are younger than 18 years old. Increasing vulnerability to HIV/AIDS, over 50% of all new cases in India are among 10 to 24 years of age.³

Any intervention among the adolescents by increasing their knowledge base regarding the STD's, route of transmission and preventive measure For HIV and the treatment for the same would have a bigger impact in controlling the disease. With young people being more vulnerable to HIV Infection, and often their access to adequate health information and services are limited due to

various socio cultural reasons. In such kind of situations the schools and colleges acts a good source of medium for both the students and health workers to impart the knowledge and create awareness regarding the preventive strategies and the available treatment of all STD's

Objectives:

1. To assess the stigmatizing attitude towards HIV/AIDS among high school students.
2. HIV/AIDS knowledge and awareness of HIV related health resources among the high school students.

Materials and Methods:

A cross-sectional study was conducted in the community with the sampling unit being high school students. Convenient sampling was done for the sampling unit that is the proportion of students present on the day of visiting the High School. The study was conducted for over a period of 3 months from July 2014 to August 2014 in the rural field practice area of Shri B M Patil Medical College, Bijapur, Karnataka. A total of 238 Students participated in the study. A pretested proforma was prepared which was validated for face validity and tested for reliability by conducting a pilot study and the validated questionnaires were used to collect data after obtaining consent by explaining the terms of the study and confidentiality was maintained. The questionnaire was a semi-structured self-administered questionnaire with multiple choice questions, multiple answer questions and a few open ended questions for in-depth qualitative analysis. Proper instructions were given for each question. The questionnaire tested the cognitive, affective and psychomotor domain of the student with regard to HIV/AIDS stigma and knowledge. Data entry and management was done in excel, pre-determined data format have been introduced as datasets which was incorporated into a single master computer at the base. The data sets were transferred into SPSS after data cleaning and recoding with data definitions. Results were summarized with frequencies and percentages whenever necessary.

Results:

In our study total of 238 students participated in the study. Of them 133(55.8%) Male and 105(44.2%)

female children were present. Majority of the parents had minimum education till high school.

Table 1: Social-demographic profile of the students

Socio-demographic details	No. (%)
Sex	
Male	133 (55.88%)
Female	105 (44.22%)
Father's Educational Status	
PUC & Graduate	78 (32.77%)
High Scholl	83 (34.87%)
Primary	54 (22.68%)
Illiterate	23 (9.66%)
Mother's Educational Status	
Graduate	52 (21.84%)
Completed schooling	76 (31.93%)
Incomplete schooling	59 (24.78%)
Uneducated	51 (21.42%)

All the students in the study participants had heard about HIV/AIDS.

Table 2: Source of information regarding HIV/AIDS to students

Source of information about HIV/AIDS	Frequency	Percentage
Television/films	156	65.5%
Friends	26	10.92%
Newspaper	24	10.08%
Radio	17	7.23%
Family	08	3.36%
Hospital staff	07	2.94%

All the students had information regarding the HIV/AIDS through various source of information. Television (65.5%) was the main source of knowledge creating awareness among the students. Though Friends are the second most important source and has a major impact on the knowledge of the students followed by Radio, News Paper and Family members. Only 2.94% of the students had opined that health care professional was the source of information about the HIV/AIDS.

Unprotected Sex is one of the major modes of transmission was opined by all the students, which shows the increased awareness about the disease among the adolescents. In spite of so many programmes and activities by the health workers , NGO's, and various organization to impart

Table 3: Knowledge of Students regarding HIV/AIDS

3-A: Modes of Transmission

Mode of transmission	Yes	No	Don't know
Unprotected sex	198 (83.19%)	00	40 (16.81%)
mosquito bites	12 (5.04%)	178 (74.7%)	90 (37.81%)
sharing injections	146 (61.34%)	38 (15.96%)	54 (22.68%)
sharing toilets	7 (2.94%)	169 (71%)	62 (26.06%)
blood transfusions	183 (76.89%)	4 (1.68%)	51 (21.42%)
sweat and saliva	23 (9.66%)	194 (81.51%)	21 (8.83%)
sex with multiple partners	157 (65.96%)	26 (24.36%)	55 (23.53%)
breast milk	124 (52.1%)	58 (24.36%)	56 (23.5%)
kissing	23 (9.66%)	194 (81.51%)	21 (8.83%)
mother to child	144 (60.5%)	46 (19.32%)	48 (20.16%)

3-B: Transmission from Mother to Child

HIV/AIDS can be transmitted to child from mother during pregnancy. If yes, when → (n=144)	No. (%)
During pregnancy	5 (3.47%)
During breast feeding	124 (86%)
During delivery	15 (6.3%)

knowledge about the HIV/AIDS, few of the students still had misconception and wrong concepts regarding the transmission of the disease like Mosquito bite (5.04%), and Sharing Toilets (2.94%). Mother to Child transmission of the disease can occurs was said by 60.5% of the respondents, Sex with Multiple partners (65.9%) and Blood transfusion (76.8%) were the other major routes of transmission of HIV/AIDS.

Out of the 144 Students responded that HIV/AIDS can be transmitted to child from mother during pregnancy, 124 (86%) said the transmission occurs

during Breast Feeding and 15(6.3%) opined during delivery and only 5(3.5%) said transmission occurs during the Antenatal period.

3-C: High Risk Group for HIV/AIDS

High risk groups for HIV/AIDS	No.	%
Adolescents	78	32.775
Truck drivers	167	70.16%
Prostitutes	198	83.19%
Drug addicts	146	61.34%
Street children	21	8.82%
Don't know	40	16.8%

Prostitutes (83.1%) and Truck Drivers (70.16%) were regarded by the students as very high risk group for getting HIV/AIDS, followed by Drug Addicts (61.3%) , Adolescents (32.7%) followed by Street Children (8.8%). 16.8% of the respondents didn't knew who were the high risk groups for HIV/AIDS.

3-D: Prevention of HIV/AIDS Transmission

Prevent of HIV/AIDS transmission	No.	%
Condom use	198	83.19%
screening of blood before transfusion	183	76.89%
disposable syringes	138	57.98%
screening of pregnant mothers	144	60.5%
health education	189	79.41%

Usage of Condoms during Sexual intercourse can prevent HIV/AIDS infection was said by 83.1% of the students. Screening of blood during blood donation/ transfusion (76.8%) . using of disposable syringes (57.9%) and Screening of pregnant mothers (60.5%) can prevent HIV/AIDS Transmission. 79.4% said that Health education to all the people can be an effective mode to Prevent Transmission of HIV/AIDS.

Inspite of so many programmes and awareness programmes, still 12 (5.04%) thought HIV/AIDS can be cured completely and 38(16.9%) felt anyone in the society can be infected with it. The disease is

a life threatening condition was known by only 148(62.1%) of the respondents.

Table 4: Attitude of students regarding HIV/AIDS Affected Persons

Questions	Yes		No		Don't know	
	No.	%	No.	%	No.	%
HIV/AIDS can be cured completely	12	5.04	156	65.54	70	29.41
HIV/AIDS can affect anyone	38	15.96	153	64.28	47	19.74
HIV/AIDS will kill people	148	62.18	46	19.3	44	18.48

Table 5: Response of Students regarding Stigmatization of HIV/AIDS Patients

Stigma related questions	Yes		No	
	No.	%	No.	%
HIV/AIDS is a punishment by god to bad people	18	7.5	220	92.5
People who have HIV/AIDS deserves it	44	18.4	194	81.6
Only bad people gets HIV/AIDS	36	15.1	202	84.9
People with HIV/AIDS should be quarantined from the rest of society	27	11.3	211	88.7
People with HIV/AIDS should not be members of the society	27	11.3	211	88.7
Uneducated people will get HIV/AIDS	16	6.7	222	93.3
Only poor people will get HIV/ AIDS	28	11.7	210	88.3
Willing to talk to or work with someone with HIV/AIDS	178	74.7	60	25.3
People with HIV/AIDS should be allowed to mingle and involve in all kind of social and cultural activities	148	62.1	90	37.9
Someone with HIV/AIDS needs physical help , will you help them	137	57.5	101	42.5
Comfortable shaking hands with HIV/AIDS person	219	92	19	8

Stigmatization is one of the major social problems being faced by the People living with HIV/AIDS in the society. 18.4% opined people suffering from HIV/AIDS deserve it due to their actions and 15.1% were of the opinion that only bad people will get HIV/AIDS. Around 11.3% of the student's didn't want to stay together along with the people suffering from the HIV in the society.

Majority (74.7%) of the adolescent's population in our study were willing to talk or work with the people suffering from HIV/AIDS, 62.1% of the respondents said HIV/AIDS should be allowed to mingle and involve in all kind of social and cultural activities. In our study 57.5% of the participants were willing to help the People suffering from HIV/AIDS.

Discussion:

In our study the adolescent population was included as the study subjects as any intervention in the adolescent period has a long lasting impact on the behavioral changes of them. It was very hearting that all the students in the study group had heard about HIV/AIDS by one or the other source of information in their lifetime.

Mass media (85%) like Television, Friends and Newspaper were the major source of information regarding HIV/AIDS among the students in our study. Similarly in the study conducted by Gupta P⁷ et.al in Lucknow the source of information was through the Mass media was 85 %. Singh et al⁸ concluded that 90% of the women in northern India had received knowledge about the Disease through Television. In the study done in Gujarat by Bhalla⁹78% of the students knew about the HIV/AIDS through Television. In the present days Mass media and Social media are two major source of information not only for the students but for the whole community. Television is one source which can be utilized maximum by the health workers to reach the maximum people.

The source of information from the mass media was so effective and efficient in creating awareness about the HIV/AIDS that majority of the students knew the modes of transmission of the HIV, high risk group and the preventive measure to be taken to avoid the infection.

In our study 100 % of the study participants had heard about the HIV/AIDS, whereas only 92.6% of

the respondents heard about it in the study done by Bolla C R¹⁰ in Andra Pradesh , 90.8% in the study done by Abdul Basir¹¹ and 76% in the study done by Gaash B¹² in Srinagar.

In our study unprotected sex, sharing injections, blood transfusion and sex with multiple partners were the major routes of transmission. Similar answers and results was also seen in the study done by Gupta P et al⁷ (93%) in Lucknow, Singh et al⁸ (79.1%) in Northern India and Kotech P V and Patel S¹³ (75%) in Vadodara. In the study done by Sarkar S¹⁴ et al in Pondicherry 83% women knew one or more modes of spread of this disease. 60.5% of the study participants knew that HIV can be transmitted from mother to child if not treated during antenatal period shows the increased awareness among the adolescents.

More than 60 % of the respondents said Prostitutes, Truck Drivers, and drug addicts were the major risk group for the disease in the study done by Giri PA et al¹⁵, Gupta P et al⁷, and Singh et al⁸ the respondents also opined same group of people being high risk group for the disease, but the percentage of the students who knew about the high risk group were much higher in our study when compared to other studies.

Condom usage (83.1%), Screen of blood before Transfusion (76.8%) and using disposable syringes (57.9%) are the major preventive methods to be employed for the prevention of the disease .similar answers were also given in the study done by Gupta et al⁷, Lal et al¹⁶ (72%) , Chakrovarthy A et al¹⁷(51.8%) and Bolla C R¹⁰ (42.8%)et al .

The respondents in our study had very positive attitude regarding people living with HIV/AIDS. In the study done by Pramanik S et al⁶ in New Delhi among high school students 68.8% said HIV/AIDS can affect anyone and 80.6% knew it is a fatal disease, which is much higher when compared to study findings where only 15.9% and 62.1% opined the same respectively.

Getting the HIV/AIDS is a curse from the god and people deserve that was said by 7.5% and 18.4% in our study, which is much lesser than the Pramanik S et al⁶ study in New Delhi, where 37.4% and 30.2% opined the same respectively. 74.7% of the respondents were willing to work with HIV /AIDS affected people and if HIV/AIDS needs physical help and 57.5% would help which was also much lesser than the study done by Pramanik S et al⁶

where 83.9% and 78.1% opined the same respectively.

In our study 92% of the study subjects were comfortable in shaking hands/hugging with HIV/AIDS patients which is much higher when compared to the study done by Bolla C R et al¹⁰ (56.4%), Singh et al⁸ (53.9%), Selcuk Koksall et al¹⁸ (73.1%), Giri PA et al¹⁹ and Bhalla et al⁹ (90.8%).

Conclusion:

The knowledge of the students was satisfactory for most of the variables like modes of transmission of the disease, high risk groups and prevention of the disease. Though majority were aware, the school authorities, health care professionals and the concerned should plan the programme, conduct lecture session, create awareness programme to such an extent that all the students get the correct information about HIV/AIDS. The sources of information should also be strengthened by all the agencies and organizations of the region to spread knowledge and awareness about HIV/AIDS. With television being the most common mass media used and the source of information, the awareness ads about the HIV/AIDS should be aired at regular and frequent interval during the prime time slot, cricket matches and award functions, benefiting not only adolescents but for the whole society. The stigmatization towards the people living with HIV/AIDS is prevalent among all the groups in the society and the only effective way to solve it is by health education to the whole community and to design the programme which reaches a large group of population effectively.

Conflict of interest: nil

Source of funding: nil

References:

1. Park K. *Park's text book of preventive and social medicine. 21st ed. Jabalpur: M/s Banarsidas Bhanot; 2011. Chapter 5, Epidemiology of Communicable Diseases: AIDS. p. 316-29.*
2. Dangerfield Brian "Modelling the Epidemiological consequences of HIV infection and AIDS: A Contribution from Operational Research" *J. Opl. Res. Soc.* 1990;41(4):273-289.
3. National AIDS Control Organization. Department of Health AND Family Welfare. 2015. (assessed on 28/12/2015).

Available from:
<http://www.naco.gov.in/NACO/>

4. Dehne KL, Riedner G. *World Health Organization and Deutsche Gesellschaft Fuer Technische Zusammenarbeit (GTZ) GmbH. Geneva: Sexually transmitted diseases-prevention and control; 2005. Sexually Transmitted Infections among Adolescents: The Need For Adequate Health Services; pp. 11-2.*
5. Cumming J. *On the stigma of Mental illness. Community Mental Health Journal.* 1965;1:135-143.
6. Pramanik S, Chartier M, Koppman C. *HIV/AIDS Stigma and Knowledge among Predominantly Middle –Class High School Students in New Delhi, India. J of Commun. Dis.* 2006;38(1):57-69.
7. Gupta P, Anjum F, Bhardwal P, Srivastava J P and Zaidi Z H. *Knowledge About HIV/AIDS Among Secondary School Students. North American Journal Of Medical Sciences.* 2013;5(2):119-123.
8. Singh A, Khan S, Chaudhary V, Narula K, Zaidi ZH. *Knowledge and awareness about HIV/AIDS among women of reproductive age in a District of Northern India. Natl J Community Med.* 2012;3:417-22.
9. Bhalla S, Chandwani H, Singh D, Somasundaram C, Rasania SK, Singh S. *Knowledge about HIV/AIDS among senior secondary School students in Jamnagar, Gujarat. Health Popul Perspect Issues.* 2005;28:178-88.
10. Bolla C R, Rao A R, Dudala S R and Ravikumar B P. *Knowledge regarding HIV/AIDS among secondary school students in Khammam town, Andhra Pradesh. Int J Res Dev Health.* 2013;1(3):103-108.
11. Mansoor AB, Fungladda W, Kaewkungwal J, Wongwit W. *Gender differences in KAP related to HIV/AIDS among freshmen in Afghan universities. Southeast Asian J Trop Med Public Health.* 2008;39 (3):404-18.
12. BasirGaash, Muzaffar Ahmad, Rehana Kasur and Shabnam Bashir. *Knowledge, Attitude and Chandrasekhar Reddy Bolla et al. Knowledge Attitude and Belief on HIV/AIDS Among the Female Senior Secondary Students in Srinagar District of*

- Kashmir, Health and Population-Perspectives and Issues.*2003;26(3):101-109.
13. Kotech PV, Patel S. *Measuring Knowledge about HIV among youth: Baseline survey for urban slums of Vadodara: Indian J Sex Transm Dis. AIDS.* 2008;29:68–72.
 14. Sarkar S, Danabalan M, Kumar GA. *Knowledge and Attitude on HIV/AIDS among Married Women of Reproductive Age Attending a Teaching Hospital. Indian J Community Med.* 2007;32:82–83.
 15. Giri PA, Hiremath RC, Kasbe AM. *Sexual behaviour, knowledge, attitude and practices regarding HIV/AIDS amongst female sex workers (FSWs) in red light area of Mumbai city. Int J Med Sci Public Health* 2012;1:132-37
 16. Lal P, Nath A, Badhan S, Ingle GK. *A Study of Awareness about HIV/AIDS among Senior Secondary School Children of Delhi. Indian J Community Med.* 2008;33(3):190-92.
 17. Chakrovarty A, Nandy S, Roy R, Senuguotha B et al. *A Study of Awareness on HIV/AIDS among Higher Secondary School Students in Central Kolkata. Indian Journal of Community Medicine.* 2007;32(3):228-229.
 18. SelcukKoksal, NecmiNamal, SuphiVehid and ErayYurtseve. *Knowledge and Attitude towards HIV/AIDS Among Turkish Students. Infectious Diseases Journal of Pakistan.* 2005;4:118-21.
 19. Giri PA, Phalke DB, Deshpande JD. *Impact of training workshop knowledge, attitude and practices about HIV/AIDS among class IV employees at tertiary care teaching hospital Loni in rural Maharashtra. J Commun Dis* 2010;42(4):291-95.



Original Research Article

**Prevalence of risk factors of coronary heart disease among college students
in Kanchipuram town**

G H Midhun Kumar¹, Kokila Selvaraj², B T Sudhir Ben Nelson³

Date of Submission: 17.11.2015

Date of Acceptance: 22.02.2016

Abstract

BACKGROUND: Chronic non-communicable diseases are assuming increasing importance among adult population in both developed and developing countries. Hence this study was conducted among college going students. **OBJECTIVE:** To estimate the prevalence of risk factors of coronary heart disease among college students aged 18 to 22 years in Kanchipuram town **METHODOLOGY:** A cross sectional study was conducted among students aged 18 to 22 years at 4 arts and science colleges in and around Kanchipuram town, a total of 1173 minimum study sample was calculated. **RESULTS:** All most half of the college students were have risk factor of pre-hypertension (40.9%) & hypertension (8.7%), Nearly half of the college going students were have habitual of consumption of junk food (27.5%), alcohol consumption of about (14.8%), and tobacco smoking (8.4%). one quarter of them were not doing any type of physical activity (24.9%), family history of Coronary heart disease (6.8%), overweight (6.7%), high stress levels (4.4%), and abdominal obesity (3.6%). Common risk factors among males were prehypertension (49.9%), consumption of alcohol (33.4%) and physical inactivity (30.1%). The Common risk factors among females were consumption of junk food (39.4%), prehypertension (33.7%) and physical inactivity (20.7%). **CONCLUSION:** Unhealthy lifestyle behaviours start at younger age group, catching in younger age group motivating and giving awareness on various risk factors may reduce the risk of people getting Coronary heart disease in future. **RECOMMENDATIONS:** Students should have continuous reinforcement health educated about the lifestyle diseases and its Preventive measures to Coronary artery disease.

Keywords: Hypertension, Risk factors, coronary artery diseases.

Authors:

¹Assistant Professor, ²Professor & HOD, Department of Community Medicine, Meenakshi Medical College Hospital & Research Institute Kanchipuram, Tamilnadu, India. ³Assistant Professor, Sree Mookambika Institute of Medical sciences, Kulasekharam, Kanyakumari District, Tamilnadu.

Corresponding Author:

Dr. G H Midhun Kumar, Assistant Professor, Department of Community Medicine, Meenakshi Medical College Hospital & Research Institute Kanchipuram, Tamilnadu, India. E-Mail: mithunkumargh@gmail.com

INTRODUCTION:

Chronic non-communicable diseases (NCD) are assuming increasing importance among adult population in both developed and developing countries¹. Life expectancy is increasing in most countries and greater numbers of people are living to older ages and are at greater risk to chronic diseases of various kinds. The lifestyle and behavioural patterns of people are changing rapidly which leads

to onset of chronic diseases¹. Most epidemiologists accept that six key sets of “risk factors” are responsible for a major share of adult non-communicable disease morbidity and premature mortality. These are as follows: 1. Tobacco smoking and other forms of tobacco use. 2. Alcohol abuse. 3. Failure or inability to access preventive health services. 4. Life style changes. 5. Environmental risk factors. 6. Stress factors¹. In 2005, chronic non-

communicable diseases accounted for 60% of all projected deaths worldwide ie, an estimated 35 million people died of non-communicable disease. Some 80% of the deaths from non-communicable diseases occur in low and middle income countries. The five major non-communicable diseases are heart diseases, stroke, cancer, chronic respiratory disease and diabetes².

Cardiovascular diseases (CVD) comprised of a group of diseases of the heart and vascular system. The major conditions are coronary heart disease (CHD), hypertension, cerebrovascular diseases and congenital heart diseases¹. It is estimated that there were approximately 29.8 million patients with cardiovascular disease in India during the year 2003. An estimated 1.5 million people die of cardiovascular disease every year. The burden of common cardiovascular diseases was about 2.4 million coronary heart disease and about 0.93 million stroke cases every year. Compared with all other countries India suffers the highest loss in potentially productive years of life due to deaths from cardiovascular disease in people aged 35-64 years. By 2030, the loss is expected to rise to 17.9 million, 9.4 times greater than the loss in USA¹. Coronary heart disease, also known as coronary artery disease (or) ischemic heart disease is the leading cause of death globally. It became common in the early decades of the 20th century in high income countries. The epidemic have now spread worldwide¹. Coronary heart disease is defined as impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart¹. Coronary heart disease may manifest itself in many forms like myocardial infarction, angina pectoris, and sudden death. Among them myocardial infarction is specific. With 7.2 million deaths and 12.2% of total deaths, coronary heart disease is a worldwide disease. The highest coronary mortality is seen at present in the European region followed by south East Asia region³. Earlier, coronary heart disease has been considered as disease of men. However, currently it is the leading cause of death in both men and women⁴. In India, the pooled estimates from the studies carried out in 1990s up to 2002 shows that prevalence rate of coronary heart disease was high in urban areas (6.4%) when compared to rural areas (2.5%). In that, urban female have high prevalence

(6.7%) when compared to urban males (6.1%) and the same in rural areas with females (2.7%) and males (2.1%)¹. The aetiology of coronary heart disease is multifactorial. Apart from the obvious ones such as increasing age and male sex, studies have identified several important risk factors some of which are modifiable and others are non-modifiable.

Presence of any one of these risk factors places an individual in a high-risk category for developing coronary heart disease. The greater the number of risk factors present, the more likely to develop coronary heart disease. The age presentation of coronary heart disease is being steadily declining these days. Now people who are in the 3rd decade of life itself are undergoing cardiac intervention⁵. The risk of coronary heart disease is 3-4 times higher in Indians than in white Americans, 6 times higher than Chinese and 20 times higher than Japanese. For Indians coronary heart disease occurs 5-10 years earlier than other communities, they also have higher prevalence of type2 diabetes mellitus, abdominal obesity and dyslipidaemia⁶. Most of the studies on risk factors of coronary heart disease are not done in the younger age group and that too few studies are done only in developed countries or in north India that too few decades back. There are poor controls of risk factors during the 2nd and 3rd decade of life which leads to increase chances of coronary heart disease in 4th and 5th decades. So, focusing on this age group will pave a way for planning an early intervention. Taking into consideration these factors, a cross sectional study on prevalence of risk factors of coronary heart disease among arts and science college students of aged 18-22 years in Kanchipuram town was conducted.

MATERIALS AND METHODS

A cross sectional study was conducted during the months of October to December, 2010 to know the prevalence of risk factors of coronary heart disease among arts and science college students of four arts and science colleges students aged between 18-22 years in Kanchipuram town, Tamilnadu. Students who are not willing to participate into the study, those known to be on medication for any of the risk factors, and Pregnant students were excluded from

the study. The prevalence of major coronary heart disease risk factor hypertension, 13.6% was reported in a study conducted among students of a medical college in Belgaum, Karnataka in 2012⁷. Sample size was calculated by using the formula

$$n = Z \alpha^2 \frac{PQ}{d^2}$$

We have estimated 10% nonresponsive so we have taken added 10% extra sample to the calculated sample size of 1085 a total of 1195 finally we have taken a round figure of 1200 students this sample was spread over the four colleges according to the strength of students in each college. Simple random sampling was followed to select the samples from each college separately. The samples to be taken from the each college was as follows, the total strength after excluding the 10% of absentees are 2875, 1973, 1464, 1218 students respectively. The proportion of the samples from this total strength is 459, 314, 233 and 194 respectively from each college. Clearance from the Institutional Ethical Committee was obtained. Informed (in Tamil language) and written explanation (in English language) consent was obtained from each student before the interview (Appendix I). The data collection was done with the help of the post graduates and interns of community medicine after getting orientation about interview schedule. The interview schedule was administered to the subjects by 3 post graduates and the anthropometric measurements and recording of blood pressure was done by interns.

RESULTS

A total of 1173 students were participated in the study. Almost equal representation from both genders was achieved. Females comprised a slightly higher number 652 (55.6%) than males 521 (44.4%). The age of the students were ranging from 18-22 years. The mean age in this study was 19.32 years with the standard deviation of 1.06. Many of the students i.e. 325 (35.3%) belong to the age group of 19 years. This study reveals that majority of the students were having one or more factors which may lead to develop coronary heart disease. The major risk factors in the study was prehypertension with the prevalence of 40.9% followed by consumption

of junk food 27.5%, Physical Inactivity 24.9%, Consumption of alcohol 14.8%, Hypertensives 8.7%, Tobacco Smoking 8.4%, Students having Family History of CHD 6.8%, Overweight 6.7%, High Stress levels 4.4%, Abdominal Obesity 3.6% and Obesity 0.9%. The most common risk factors among males in the study were Pre hypertension (49.9%), followed by Consumption of alcohol (33.4%) and Physical inactivity (30.1%). The most common risk factors among females in the study were Consumption of junk food (39.4%), Pre hypertension (33.7%) and Physical inactivity (20.7%).

Table 1: Age wise prevalence of risk factors

Risk Factors	Age in Years					Total
	18	19	20	21	22	
Smoking	5 1.6%	19 4.7%	47 15.2%	23 22.1%	5 10.6%	99 8.4%
Hypertensive	31 10%	25 6.2%	35 11.3%	5 4.8%	6 12.8%	102 8.7%
Obese	0 0%	4 1%	1 .3%	5 4.8%	0 0%	10 .9%
No physical activity	94 30.4%	99 24.6%	60 19.4%	31 29.8%	8 17%	292 24.9%
Abdominal obesity	9 2.9%	11 2.7%	13 4.2%	4 3.8%	5 10.6%	42 3.6%
H/o CHD	21 6.8%	33 8.2%	19 6.1%	7 6.7%	0 0%	80 6.8%
Fruits consumption	4 1.3%	7 1.7%	9 2.9%	0 0%	2 4.3%	22 1.9%
Vegetable consumption	10 3.2%	10 2.5%	15 4.8%	0 0%	0 0%	35 3%
Junk food	87 28.2%	115 28.5%	78 25.2%	33 31.7%	9 19.1%	322 27.5%
Alcohol consumption	17 5.5%	59 14.6%	67 21.6%	23 22.1%	8 17%	174 14.8%
High aquity?	20 6.5%	18 4.5%	11 3.5%	3 2.9%	0 0%	52 4.4%

Figure 1: Distribution of students according to number of risk factors

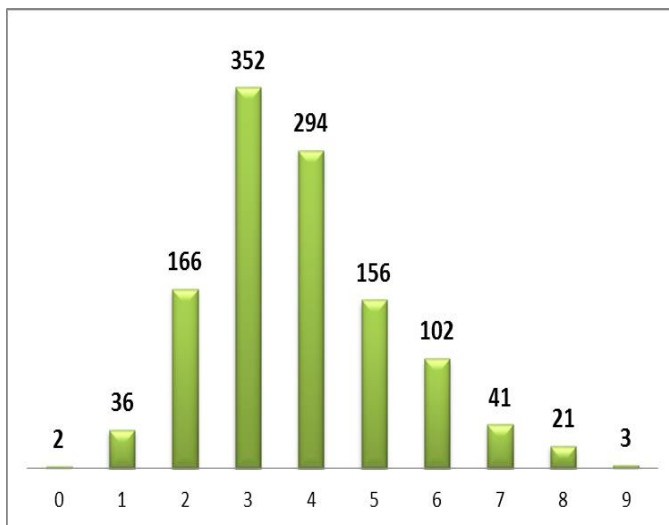


Table 2: Prevalence of individual risk factors

Risk factors	Frequency	Percentage
Pre Hypertension	480	40.9
Consumption of junk food	322	27.5
Physical inactivity	292	24.9
Consumption of alcohol	174	14.8
Hypertension	102	8.7
Tobacco smoking	99	8.4
Family history of CHD	80	6.8
Overweight	79	6.7
Stress	52	4.4
Abdominal Obesity	42	3.6
Obesity	10	0.9

DISCUSSION

The objective of the study was to estimate the prevalence of risk factors of coronary heart disease among arts and science college students aged 18-22 years in Kanchipuram town.

HYPERTENSION - Analysis of the collected data in the study depicts that 40.9% of the students were pre hypertensive and 8.7% were hypertensive. In a study done in rural Kerala in 1991 in 20 years and above age group it was found that 18% of them were hypertensive⁸. Comparatively in our study the prevalence was less, in another study done among out patients in Lucknow medical college aged 18

years and above said the prevalence of hypertension was 44.6%⁹. In this study it was found that 11.5% males and 6.4% females were hypertensive, and there is significant difference between hypertension and gender.

TOBACCO SMOKING- Analysing the data on tobacco smoking 8.4% of the students were current smokers. Among male students 19% of them are reported to be current smokers and among females there was no smokers. As per national family health survey-2 in India said that 29.3% men and 2.3% women were smokers¹⁰, in another study done in the urban population in Tirupathi reported that 22.7% of males and 0.69% of females at the age group of 20-30 years were smokers¹¹, comparing to this study the prevalence is almost similar among males. In our study differences were found to be statistically significant.

ALCOHOL CONSUMPTION- Regarding alcohol consumption, 14.8% of the students said that they consume alcohol. In a study in rural Rajasthan, prevalence of alcohol consumption was 12.7%¹², comparing with our study; the prevalence among rural Kanchipuram students is high. In another study it was reported that in north India the prevalence ranges from 25%-40% and in south India it ranges between 33%-50%¹³. In our study 33.4% of the male students are consuming alcohol and no female students are consuming alcohol. This shows there is a significant difference between alcohol and gender.

DIETARY HABITS- The study shows that most of the students are consuming mixed diet (92.5%). Among gender wise 97.1% males consume mixed diet and 88.8% females consume mixed diet. Regarding consumption of fruits it is said that 1.9% of the total students do not consume fruits and 2.9% of males and females 1.1% do not consume fruits, this shows that there is a significant difference among fruits consumption and gender. 3% of the students do not consume vegetables. In that 3.8% of males and 2.3% females do not consume vegetables, this shows that there is significant difference among vegetable consumption and gender. 27.5% of students consume junk food daily, in that more number of female students (39.4%) consumes junk food daily, whereas 12.5% males consume junk food daily. This gives a significant difference between consumption of junk food and gender.

OBSESITY- The study reveals that 6.7% of the students are overweight and 0.9% obese, among males 6.1% were overweight and 0.2% were obese and among females 7.2% were overweight and 1.4% were obese. It shows that there is significant difference between BMI and gender. Regarding abdominal obesity 3.6% students have truncal obesity. It reveals that 1% males and 5.7% females have abdominal obesity. A study done in Chennai, shows that the prevalence of abdominal obesity is 31% among adult population¹⁴.

PHYSICAL INACTIVITY – In the study 24.9% of the students do not do any physical activity, it reveals that 30.1% males and 20.7% females do not do any physical activity. So there is a significant difference between physical inactivity and gender.

STRESS – The study reveals 4.4% of the students are mentally stress and also shows that 4.4% males and 4.4% females have high stress, moderate stress is more among males (67.9%) compared to females (59.7%), it shows that there is no significance between stress and gender. As per centre for disease control and prevention, the people aged 18-24 years are reported mentally stress with 7.8% males and 12.3% in females¹⁵.

The prevalence of Family history of chronic diseases like CHD, Hypertension and Diabetes Mellitus were reported 6.8%.17.1% and 25.1% respectively.

TOTAL RISK FACTORS - Even though students having one risk factor are considered to have risk of developing coronary heart disease, total risk factors with major risk score was added and a risk group was formed. It shows that 2.6% of students are at very high risk of developing CHD, 50.7% are students at high risk and 46.7% students are at risk group. In the difference between risk group and sex distribution, among male students 5.8% of them are at very high risk of developing CHD, 57.4% are at high risk group of developing CHD and 36.9% are at risk group, among females no one are at high risk group, 45.4% are at high risk and 54.6% are at risk group, it tells that there is a significant difference between risk factors and gender.

NUMBER OF RISK FACTORS - The majority of the students are having 2 to 5 risk factors, in which maximum students have 3 and 4 risk factors, seeing on the overall prevalence of risk factors almost

everyone(99.98%) are having one or more risk factors, exception in only 2 members in a total of 1173 were not having even one risk factors.

RECOMMENDATIONS - In this study group there are 3 major risk factors which may lead to chances of getting coronary heart disease. The prevalence is more in pre hypertension, unhealthy food habits and physical inactivity. Coronary heart disease is primarily a mass disease; the strategy should be based on mass approach focusing on the control of underlying causes in whole population. The following interventions are mainly suggested for students: Students should be motivated upon the importance of balanced diet and advice to consume fruits and vegetables almost every day, advise them to not to have trans fatty acid foods like pizza, burger, carbonated soft drinks, chips etc. Students should be encouraged to take more salads, green leafy vegetables, fresh juices, fresh lime water and for non-vegetarians more of fish and skinned out chicken. To take skimmed milk or curd every day; To have whole grains, wheat roti, whole pulses, partially polished rice; Students should be health educated on smoking and its harms.If the blood pressure decreases by 2-3mmHg it make much difference in reducing the risk of CHD, students should be motivated to have physical activity almost daily or at least 5 days a week. Students should be advised to take reduced salt diet and not to have high intake of alcohol.

CONCLUSION - Unhealthy life style behaviours starts at this age group. By motivating and giving awareness on various risk factors may reduce the risk of people getting coronary heart disease.

LIMITATIONS- As the interview was conducted by the investigator in person, the answers to few sensitive questions like smoking, alcohol use may have resulted in deviation from actual interpretation of the risk status. Few participants invited did not take part in the study. Exclusion of measuring the blood lipid profile and blood glucose level was not possible due to various reasons. The interviewer found it difficult to explain and make the students understand questions related to the stress. Blood pressure measurements obtained on a single occasion only. The relationship between various risk factors described may not be completely true as it

was not based on prospective data. The temporality cannot be established for these relationships.

ACKNOWLEDGMENT

The authors thank Dr Siva Prakasam.P for his valuable suggestions and guidance for this study.

Source of Funding: Nil

Conflict of interest: Nil

REFERENCES

- 1.Park K. Epidemiology of chronic non-communicable diseases and conditions. In Park's text book of preventive and social medicine. 21st ed. Jabalpur: Banarsidas Bhanot; 2011:335-379.
- 2.World Health Organisation. Preventing Chronic diseases: a vital investment. Geneva: WHO; 2005.
- 3.World Health Organisation. Global Burden of Disease: 2004 update. Geneva: World Health Organisation; 2008.
- 4.Mikhail G. Coronary Heart Disease in Women. British Medical Journal. 2005 September; 331(7515): 467,468.
- 5.WHO. 2008-2013 Action plan for the global Strategy for prevention and control of Noncommunicable diseases. Geneva: World Health Organisation; 2009. Report No.: 9789241597418.
- 6.WHO. The World Health Report 2002 - reducing Risks, Promoting Healthy Life. Geneva: World Health Organisation; 2002.
7. KLE University. Prevalence of risk factors of ischemic heart disease of a medical college in Belgaum. Master of public health. Belgaum: KLE University, Department of public health; 2012.
8. Kutty VR , Balakrishnan KG , Jayashree AK , Thomas J. Prevalence of Coronary Heart Disease in the rural population of Thiruvananthapuram District, Kerela, India. International Journal of Cardiology. 1993 April; 39(1): 59-70.
9. Mahmood SE, Prakash D, Bhardwaj P. Prevalence of Hypertension Amongst Adult Patients Attending Out Patient Department of Urban Health Training Centre, Department of Community Medicine, Era's Lucknow Medical College and Hospital, Lucknow. Journal of Clinical and Diagnostic Research. 2013 April; 7(4): 652-656.
10. Rani M , Bonu S , Jha P , Nguyen S N , Jamjoum L. Tobacco use in India: prevalence and predictors of smoking and chewing in a national

cross sectional household survey. Tobacco Control. 2003 September; 12(4).

11. Lathief SA , Subramaniam G. Prevalence of Coronary artery disease and coronary risk factors in Urban population in Tirupathi. Indian Heart Journal. 2007; 59(2): p. 157-164.
12. Gupta R , Prakash H , Majumhers , Sharma S , Gupta V P. Prevalence of CHD and Coronary risk factors in urban population of Rajasthan. Indian Heart Journal. 1995; 47: 331-333.
13. Das SK, Balakrishnan V , Vasudevan D M. Alcohol: Its health and social impact in India. The National Medical Journal of India. 2006 March - April; 19(2).
14. Ramachandran A, Snehalatha C, Satyavani K. metabolic syndrome in urban Asian Indian adults-a population study using modified ATP III criteria. Diabetes research and clinical practice journal. 2003; 60(3): 119-204.
15. National Health Ministries. USA. The University of Illinois web site. [Online].; 2004 [cited 2013 September 2. Available from: <http://www.uic.edu/depts/wellctr/docs/Stress%20and%20the%20College%20Student.pdf>.



