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Review Article

Thirdhand Smoke- A Covert Threat

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Abstract

It has been observed that cigarette smoking whether it is Firsthand Smoke (FHS) or the Secondhand Smoke (SHS) have caused an colossal quantum of morbidity or mortality in all low income, middle income and high income countries all over the world that has prompted the World Health Organization , Major Health Agencies, Governments and Non-Governmental agencies to declare Tobacco use as a problem of immense public health importance. Very less is known or attempts have been made to create awareness about yet type of smoking due to tobacco use ie. The Thirdhand Smoke (THS). This review paper rightly focuses on the relatively new problem of THS and what can be really done to mitigate this problem.

Key words: *Firsthand Smoke, Secondhand Smoke, Thirdhand Smoke*

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Introduction

It took decades to prove that cigarette smoking causes cancer, heart disease and early death.[1] The smoke inhaled by the smoker by burning of tobacco encased in cigarette, pipes and cigar is called 'Firsthand Smoke' (FHS). 'Secondhand Smoke' (SHS) is the smoke we inhale when others smoke. It is also called 'environmental tobacco smoke'. It is of two kinds. One is the smoke given off by the burning end of a cigarette, pipe or cigar which is called 'the side-stream smoke'. The other is the smoke exhaled by the smoker, called the 'mainstream smoke'. [2] It took additional years to establish that secondhand smoke also kills. Now scientists are worried about another cigarette-related phenomenon: 'Third hand Smoke' (THS). It's real, and it's ubiquitous. Without knowing it, indoor smokers have left a toxic legacy that continues years after their last butt was stubbed out.[1] It is also known as 'residual' or 'aged tobacco smoke'. THS is, in the words of *The New York Times*, "the invisible yet toxic brew of gases and particles clinging to smokers' hair and clothing, not to mention cushions and carpeting that lingers long after secondhand smoke [SHS] has cleared from a room."

How does SHS differ from THS

SHS is a mixture of the side stream smoke (i.e., smoke emitted from the burning cigarette, pipe, or cigar) and the mainstream smoke exhaled from the lungs of smokers. SHS contains more than 4,000 chemicals, many of which are known or suspected contributors to adverse health effects. These chemicals include ammonia, acrolein, carbon monoxide, formaldehyde, hydrogen cyanide, nicotine, nitrogen oxides, polycyclic aromatic hydrocarbons (PAHs), and sulfur dioxide, as well as other chemicals that are eye and respiratory irritants, mutagens, carcinogens, and cardiovascular and

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

reproductive toxicants (U.S. Department of Health and Human Services 2006).[3,9]

THS consists of residual tobacco smoke pollutants that remain on surfaces and in dust after tobacco has been smoked, are re-emitted into the gas phase, or react with oxidants and other compounds in the environment to yield secondary pollutants. The constituents of THS identified to date include nicotine, 3-ethenylpyridine (3-EP), phenol, cresols, naphthalene, formaldehyde, and tobacco-specific nitrosamines (including some not found in freshly emitted tobacco smoke) [4-9]

Historical perspective of THS

THS was a topic of interest long before it received its present name. The seed of the idea that cigarette smoke toxicants might linger on room and car surfaces long after the smoke itself was gone was planted in 1953, when it was reported that smoke condensate painted onto mice caused cancer.[11]

In 1991 the house dust of smokers' homes was first found to be contaminated with nicotine.[12] Later, in 2004, nicotine was quantified in the dust of nonsmokers' homes and homes in which mothers smoked in the house over the preceding 3 months. In homes with the highest SHS exposure, in which the mothers smoked in areas where their children were present, nicotine in dust averaged 64.0 μg/m^2 in living rooms and 15.8 μg/m^2 in infants' bedrooms. Surfaces in living rooms and infants' bedrooms averaged nicotine coatings of 73.05 μg/m^2 and 56.26 μg/m^2, respectively. The same study showed the dust and surfaces of homes in which smokers had tried to limit their children's exposure (for instance, by sometimes smoking outdoors) were also contaminated, although to a lesser degree. However, no nicotine was found in the dust or on the surfaces of homes never exposed to tobacco smoke.[13]

In 2008 similar findings were reported for cars.[14] Nicotine was detected in significantly greater quantities in the dust (mean 19.51 μg/g) and on the dashboards (mean 8.61 μg/m^2) of 78 vehicles belonging to people who smoked in their vehicles than in the dust (mean 3.37 μg/g) and on the dashboards (mean 0.06 μg/m^2) of 20 vehicles of nonsmokers. Eight smokers had imposed a smoking ban in their vehicles for at least 12 months. Their vehicles nevertheless were contaminated with nicotine (mean 11.61 μg/g in dust and 5.09 μg/m^2 on the dashboard). The authors point out, however, that the cars may have been contaminated by smoke that entered the car from outside and that smoking bans may not have been complied with 100% of the time.

A 2010 study showed THS also remains after smokers move out of their homes, even after being vacant for two months and being prepared for new residents, sometimes with new carpeting and paint.[15] Meanwhile, other lines of research have confirmed some smoke compounds adsorb onto surfaces and then desorbs back into the air over time, providing a source of tobacco toxicants that lingers long after people finish smoking.[5,6]

The term *thirdhand smoke* may have first appeared in print in 2006,[16] but it became more widely known in 2009 when it was used by Jonathan Winickoff, an associate professor of pediatrics at Harvard Medical School, and colleagues in a paper published in *Pediatrics*.[17] In that work, the researchers reported that 65.2% of nonsmokers and 43.3% of smokers believed THS could harm children and that such beliefs were independently associated with the imposition of home smoking bans. The authors also wrote that emphasizing the potential dangers of THS to children's health might be important in encouraging parents not to smoke around their children.

A new development emerged when Mohamad Sleiman, a chemist with the Indoor

Environment Department of the Lawrence Berkeley National Laboratory (LBNL) Environmental Energy Technologies Division, and colleagues reported that nicotine adsorbed onto surfaces reacted with nitrous acid—an air pollutant found in vehicle exhaust and produced by improperly vented gas stoves and burning tobacco—to form tobacco-specific nitrosamines (TSNAs) including 1-(*N*-methyl-*N*-nitrosamino)-1-(3-pyridinyl)-4-butanal (NNA), 4-(*N*-nitrosomethylamino)-1-(3-pyridinyl)-1-b utanone(NNK), and *N*-nitrosonornicotine (NNN).[18] There is some evidence NNA is mutagenic.[19] NNK and NNN are classified by the International Agency for Research on Cancer as human carcinogens [20] and by the National Toxicology Program as reasonably anticipated to be human carcinogens.[21]

Later in 2010 Sleiman et al. reported that ozone, another indoor air pollutant, reacted with some 50 compounds in SHS to produce ultrafine particles smaller than 100 nm, the compositions of which are yet to be determined.[22] The effects of ultrafine particles are thought to vary depending on their composition and characteristics, but their tiny size likely facilitates their uptake and distribution throughout the body to potentially sensitive target sites including the bone marrow, lymph nodes, spleen, heart, and central nervous system.[23]

Sleiman et al. also speculated these ultrafine particles may be capable of depositing on surfaces and later resuspending into the air.[18] In the same year, another research team provided the first preliminary quantitative data showing these particles did just that, although reaching airborne concentrations 100 times lower than levels in SHS.[24]

By the latter part of 2010, with *thirdhand smoke* an established moniker, researchers began to define the phenomenon with a "three Rs" description: "Thirdhand smoke consists of residual tobacco smoke pollutants that remain on surfaces and in dust after tobacco has been smoked, are re-emitted back into the gas phase, or react with oxidants and other compounds in the environment to yield secondary pollutants," Sleiman says.[25]

SHS exposure results from the involuntary inhalation of sidestream and exhaled mainstream smoke. In contrast, THS exposure results from the involuntary inhalation, ingestion, or dermal uptake of THS pollutants in the air, in dust, and on surfaces. Such exposure includes inhalation exposure to compounds re-emitted into the air from indoor surfaces and particles resuspended from deposits and dermal and ingestion exposure to compounds partially derived from cigarette smoke and resulting particles that have settled, deposited, and accumulated on surfaces.

Although the term THS is relatively new [10] , the chemical aging of tobacco smoke, the evidence THS leaves behind in indoor environments (e.g., cigarette butts, unpleasant odor, smelly clothes), and its aversive impact on nonsmokers have long been recognized. We favor the term "thirdhand smoke," rather than alternative terms such as aged tobacco smoke or residual SHS, to stress that THS is the legacy of tobacco smoke, it evolves from SHS and, similar to SHS, it leads to involuntary exposure to tobacco smoke pollutants. Although it is important to distinguish SHS from THS because of significant chemical, toxicological, and behavioral differences, SHS and THS are closely related and coexist during the early period of THS formation and in contaminated environments in which smoking takes place episodically.[9]

Based on our definitions of SHS and THS, total tobacco smoke exposure is the cumulative involuntary exposure to tobacco smoke pollutants during and after the time in which cigarettes are smoked. The exposure risk does not end when a cigarette has been extinguished and may persist in the absence of further

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

smoking, because THS pollutants trapped and deposited on surfaces and in dust, persist in environments in which smoking took place at some earlier points in time.[9]

Those affected by THS

No one knows, in this relatively new field of research, how long the compounds created by smoke and environmental pollutants last. "In homes where we know no smoker has lived for 20 years, we've still found evidence of these compounds in dust, in wallboard," says Neal Benowitz, chief of the Division of Clinical Pharmacology at the University of California, San Francisco. Benowitz leads the California Consortium on Thirdhand Smoke, started in 2010.Scientists do know that babies, toddlers, and children are most vulnerable to the toxic effects of tobacco smoke residue. They crawl on rugs, fall asleep on carpets, and teethe on furniture, all of which could be saturated with thirdhand smoke.Researchers aren't just worried about the risk of cancer. Thirdhand smoke could be responsible for other health problems, including asthma attacks and allergic reactions. Hotel workers who sweep, vacuum, change linens, and dust the rooms of smokers are exposed to higher doses of thirdhand smoke than are the guests who stay a few nights in smoking rooms. Science hasn't yet quantified the amount of exposure that poses a health risk, and hasn't determined with certainty what those health risks might be. But any bar, casino, rental car, or indoor space that welcomed smokers in the past could still have ample amounts of thirdhand smoke. Those who move into houses or apartments formerly owned by smokers might be exposed as well. And thirdhand smoke is difficult to eliminate. "So far, we have not found an exposed environment where you cannot measure it anymore," says Georg Matt, chair of the Department of Psychology at San Diego State University in California. "It's virtually impossible to remove this stuff unless you remove the flooring and drywall." [1]

Clinical significance of THS

Human exposure to constituents of THS has not been well characterized, and it is therefore premature to assess the health risk of THS. Given this caveat, one can consider how some of the known THS components could affect human health. The chemicals that mediate adverse health consequences can be considered in categories such as irritants, carcinogens, and mutagens (e.g., TSNAs, PAHs, heavy metals, nicotine).Nicotine plays multiple roles in carcinogenesis through inhibition of apoptosis and cell proliferation.[26-28] It is known to affect oxidative stress and to have adverse effects on brain and lung development in children. [28] Nicotine may have adverse effects on vascular function and might promote inflammation. [29] Because nicotine and other THS constituents may be transformed into new toxicants[18,22], concerns about potential health risks of THS must include compounds created through secondary reactions.

An important question is how many of the known carcinogens identified by the International Agency for Research on Cancer (IARC) that are found in mainstream and sidestream smoke are continuously or intermittently present in THS.[30] TSNAs, such as NNK, are potent lung carcinogens, and some TSNAs form from nicotine on indoor surfaces through chemical reactions with ambient nitrous acid [31]. See for an initial effort to quantify the potential exposure to NNA and NNK via dermal transfer.[32] PAHs in tobacco smoke, particularly benzo[a]pyrene, are also carcinogenic[30]. Particles and oxidant gases produce free radical species and oxidant injury that can promote inflammation, affect immune function, and activate thrombotic mechanisms.[33,34] Oxidant and irritant gases can trigger allergic symptoms and asthma. [35]

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Public Health Implications

Risk assessment will require the development of biomarkers of THS exposure. A logical initial focus for a selective biomarker might be metabolites of NNA, because NNA is the major TSNA formed from the reaction of nicotine and nitrous acid and has not been found in tobacco smoke. Likely metabolites are *iso*-NNAL [1-(*N*-methyl-*N*-nitrosamino)-1-(3-pyridinyl)-4-butanol) and iso-NNAC (4-(*N*-methyl-*N*-nitrosamino)-4-(3-pyridinyl)-butanoic acid], which might be measurable in urine. NNA or other substances derived from it might be suitable as markers of THS in dust or surfaces.[9]

Risk assessments will benefit from careful consideration of sensitive populations (e.g., young children, medically compromised persons) and at-risk environments (e.g., low-income housing). Because of the immature stage of their biological and behavioral development, the level of exposure and health risks are likely to be greatest for young children who are in direct contact with polluted surfaces and house dust.[9]

Prevention and Control of THS

Even though THS is a dynamic mixture of chemical compounds, it is important to remember that it is a consequence of smoking behavior, which is a modifiable human activity with well-understood harmful health outcomes.[9]

Experts have precious few suggestions for ridding an indoor environment of thirdhand smoke. A pretty thorough cleaning up with detergent is important. Sealing and repainting the room where smoking was done. The best approach is to replace the sofa and carpets, replacing sometimes the contaminated wall board and clean up the ventilation system. All this could help. Much more work needs to be done on the extent of the problem, the health risks, and effective ways to clean up the compounds. Parents are advised not to expose their children to thirdhand smoke, not to rent hotel rooms or cars used by smokers. It is better to avoid if one can avoid it.[1]

Knowledge about THS could be used clinically to encourage home and car smoking bans among individuals and to promote cessation.[9]

Policy Implications of THS for Overall Tobacco Control

Although it is premature to formulate public policies in response to potential THS health risks, it is important noting that numerous voluntary private policies have emerged over the past 10 years targeting THS. Major international, national, and local hotels (e.g., Marriot, Westin) and car rental companies (e.g., Avis, Enterprise, Hertz) have adopted complete or partial smoking bans to protect nonsmokers from the effects of lingering tobacco smoke. These policies grew out of complaints and concerns about unpleasant odor, respiratory symptoms, and eye irritation among hotel guests and customers of rental cars. Similar consumer preferences for smoke-free environments are also noticeable in the used car and real estate markets. Research conducted in southern California has shown that used cars of smokers were valued 8–9% lower than were the equivalent priced cars owned by nonsmokers [36], and rental apartments remained vacant longer and required higher maintenance costs [37] when they were occupied by smokers rather than nonsmokers.

Public Health Concerns of THS in India

Though the Government of India has in place warnings, regulations and legislations for the control of smoking and other forms of tobacco use, very little has translated into action. Smoking among the people both young and old alike continues unabatedly in public places with sheer lack of concern for others. Government of India and other Non-Governmental Agencies have created enough awareness on effects of

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

smoking (FHS) and passive smoking (SHS) on health. Even the World Health Organization on World No Tobacco Day on 31st May exhorts governments to raise taxes on tobacco products to such an extent so as to discourage people of low income groups and young people from using tobacco. Now that the threat of THS looms large it is high time one should think and reflect before smoking the damage he or she does to the people especially young generation and the environment alike. Awareness on THS should be brought into the public domain and mass media communications, school children, college students and professionals should be actively involved for this.

Conclusion

The various studies on THS provide new insights about understanding the long term effects of tobacco use and also on the modus operandi of prevention and retrenchment of tobacco use. The existing evidence on THS provides a formidable support to pursue a programmatic research agenda to plug important lacunae in our current understanding of the chemistry, toxicology, pollution, exposure, clinical significance, and policy implications of THS. A research program on these lines is therefore mandatory to highlight the role of THS in the present and future tobacco control efforts to decrease smoking initiation and smoking levels, to increase cessation attempts and sustained cessation, and to reduce the cumulative effects of tobacco use on morbidity and mortality.

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Review Article

Massive Open Online Course

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Introduction

MOOC stands for a Massive Open Online Course. They are similar to university courses, but do not tend to offer academic credit. A number of web-based platforms (initiatives) supported by top universities, colleges and organizations offer MOOCs in a wide range of subjects.

History

A massive open online course (MOOC) is a free Web-based distance learning program that is designed for the participation of large numbers of geographically dispersed students. The word *MOOC* was coined in 2008 by Dave Cormier, from the University of Prince Edward Island for a course offered by the University of Manitoba, "Connectivism and Connective Knowledge." [1]

Approach

A MOOC is a gathering of participants, of people willing to jointly exchange knowledge and experiences for each of them to build upon. A MOOC is by itself a non-defined pedagogical format to organize learning/teaching/training on a specific topic in a more informal collaborative way.

Features

MOOCs are a group of online classes that share several key features. The most obvious is that all content is delivered online, either through video, slideshows, discussion boards, or any combination thereof. Courses are usually developed by well-known figures in the field from large research institutions, but in reality anyone can create a MOOC. Participants pay no enrolment fees and there are no restrictions on who may register, although there may be suggested prerequisite knowledge[2]. The inherent openness and user-friendliness of the format means that incredible educational resources are available to anyone with the time to devote to learning. MOOCs offer real opportunity to people without access to traditional education.

Participation in organic discussions

The instructor actively participates in the discussion forums but students are leading the conversations by posing questions, commenting on the materials, and helping one another. The instructor mostly reacts to the students' posts and comments that emerge organically as the students work their way through the course.

Leading planned discussions

the instructor guides the discussion forum activity by posing questions, assigning discussion exercises, and sometimes steering organically emerging conversations toward course learning objectives.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Mediated participation

Instructors do not participate in regular direct interaction on the discussion forums. Instead, TAs or other staff monitor and participate in the forums on a daily basis and gather interesting questions and comments for the instructor. At regular intervals, the instructor then responds in a collective message with their own thoughts and reactions[3].

Various products of MOCC

Virtual classroom

Course management system

Video streaming

Content library

Online tests

Chat

Podcast

Blog

Advantages

MOCC are low cost routes to accessing quality courses and it can be combined with other study or work. They are accessed from any computer at any location including your home or wherever connectivity available. One can organize it in any language by using various online tools that are relevant to your target region or that are already being used by the participants. Learning is possible beyond time zones and physical boundaries. It can be organized as quickly as you can inform the participants. Contextualized content can be shared by all. One can connect across disciplines and corporate/institutional walls. Improve lifelong learning skills can be possible. Absorption[4]. Patient education can be done through this medium through videos

Disadvantages

Online courses do not help us to interpret non-verbal cues. MOOCS do not feed into a degree or other qualification but are self-contained. Few students complete the courses. Content from a MOOC offered by a university outside your home country may not match cultural and other conditions with which you are familiar**.** It feels chaotic as participants create their own content**.** It demands digital literacy and time and effort from the participants**.**

Courses list

MOOC List is an aggregator (directory) of Massive Open Online Courses (MOOCs) from different providers (http://www.mooc-list.com/). In this page we can view the Upcoming courses (for the next 30 days), view the Last submitted or updated courses and also browse by Course Categories, Course Length, Estimated Effort and Tags[5]. Other such sites are also providing these details such as. http://mooc.ca/ , https://www.class-central.com/ , http://www.openculture.com/free_certificate_courses etc.

MOOC RESOURCES

The list of some important providers is given below.

Coursera

Udacity

edX

Kahn Academy

Udemy

Canvas Network

iversity

OpenLearning

FutureLearn

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

MOOEC

Novoed

WizIQ

The National Programme on Technology Enhanced Learning (NPTEL) etc.

Conclusion

MOOCs have the potential to bring education to millions who otherwise would not have access. The combination of short video lectures, frequent comprehension testing, and active participation in an online community can be an effective learning tool for some students, but the registration-to-completion ratio is likely to remain low. Personal interest is plays a vital role in completing the course. Some mechanism like providing credit points for CME can be done. But monitoring of learning or evaluation of MOOC is quite difficult.

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NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Original Research Article

Comparative Study on Risk Factors for cardiovascular Diseases between Urban and Rural Population in Tamil Nadu

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Abstract

Introduction: The Cardiovascular disease (CVD) burden of India is expected to double in the next two decades, making it the single largest cause of death by the year 2020 with an enormous burden of CVD among urban communities. Further, the prevalence of CVD in rural and semi-urban areas is expected to increase substantially**. Objective:** To compare the prevalence of Cardiovascular risk factor among urban and rural population in Kancheepuram district in Tamil Nadu.**Subjects and methods:** This cross sectional study was carried out in tertiary care hospital service area of urban and rural health centre. Individuals over the age of 20 years who were present on the day of visit were interviewed in person with a structured interview schedule. **Results:** A total of 1001 individuals in the rural field practice area and 432 individuals in the urban field practice area over the age of 20 years were included in the study. The fruit and vegetable intake of more than 3 days per week was higher for urban area 206(47.7) and 376(87.1) compared to rural area 278(27.8) and 758(75.7). Doing light work was higher for urban area93 (21.3%). No differences was found in proportion of smokers and alcoholics both in urban (4.9%) and (3.7%) and rural (4.8%) and (6.2%) population respectively. The proportion of participants having overweight (BMI >23) was 73.8% and 40.6% in urban and rural area respectively. Nearly 37.2% and 23.6% of the urban population and 6.9% and 9.0% of the rural population had systolic and diastolic hypertension respectively. **Conclusion:** In conclusioncardiovascular risk factors such as reduced intake of vegetables and fruits were more prevalence in rural population and reduced physical activity, increased body mass index, systolic and diastolic hypertension was noticed in urban population with no differences in the prevalence of smoking and alcoholism.

Key *words:* *cardiovascular diseases, overweight, obesity, hypertension. Smoking, alcohol*

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Introduction

Non-communicable diseases (NCD) like hypertension, diabetes mellitus, dyslipidaemia and overweight/obesity are the major risk factors for the development of cardiovascular diseases (CVD). CVD continue to be the major cause of mortality representing about 30 percent of all deaths worldwide. NCDs are caused, to a large extent, by four behavioral risk factors that are pervasive aspects of economic transition, rapid urbanization and 21st-century lifestyles: tobacco use, unhealthy diet, physical activity and the harmful use of alcohol. The greatest effects of these risk factors fall increasingly on low- and middle-income countries.[1] India contributes substantially to the worldwide burden of NCD's. By 2020, it is estimated that the NCD deaths would rise sharply in India and most of these deaths would happen in the middle age group.[2] Modern lifestyle associated with easy access to food, lack of exercise, sedentary lifestyles, calorie dense foods, and excessive television viewing contribute to development of NCDs.[3] The

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Indian Migration Study done in 1,600 villages from 18 states of India revealed the high prevalence of certain NCD risk factors such as tobacco use, low intake of fruits and vegetables, obesity, dyslipidemia, diabetes, and hypertension in the rural areas. The risk factors were found to be higher in the south Indian states compared to the north Indian states.[4] The CVD burden of India is expected to double in the next two decades, making it the single largest cause of death and the second largest cause of disability by the year 2020.[5] This will be characterized by an enormous burden of CVD among urban communities. Further, the prevalence of CVD in rural and semi-urban areas is expected to increase substantially.[6.7] While the exact etiology of this predisposition to CVD in Indians is still debated, from a public health point of view it is clear that the rapid transition in diet and lifestyles with urbanization has contributed to increasing levels of potentially reversible CVD risk factors.[8]A major reduction in the burden of NCDs will come from population-wide evidenced based cost effective NCD prevention interventions. The current study was conducted to compare the prevalence ofcardiovascular risk factor among urban and rural population in Kancheepuram district in Tamil Nadu.

Subjects and Methods

This cross sectional study was carried out in a tertiary care hospital service area of urban and rural health centre. The rural health centre caters a population of 11331 in nine villagesof which three villages were randomly selected. The urban health centre caters a population of 15227 with areas namely NH1, NH2 and NH3 of which NH1 was randomly selected. Individuals over the age of 20 years who were present on the day of visit were interviewed in person with a structured interview schedule to elicit information on select socio-demographic variables, tobacco and alcohol use, dietary intake, physical activity and treatment history for diabetes and hypertension. Physical examination such as measurements of height, weight and blood pressure were done for all participants. Written informed consent was obtained from all individual. The study was approved by the Institutional Ethics Committee. Standard methods were used to measure weight & height.**[8]** Body mass index (BMI) was calculated and standard cut-offs for Asian adults were used to define overweight and obesityaccording to which, overweight is defined as BMI of more than 23. Overweight is further classified as at-risk of obesity (BMI = 23 – 24.9), obesity grade 1 (BMI = 25 – 29.9) and obesity grade 2 (BMI ≥30). [9] Blood pressure was recorded in the sitting position in the left arm to the nearest 1 mm Hg using an electronic OMRON blood pressure measuring device (Omron Corporation, Tokyo, Japan). Two readings were taken: first one before starting the interview and the second one at the end of the interview and the mean of the two readings was used for analysis. Hypertension was diagnosed using the JNC-7 criteria**.[10]** All current smokers and those who had quit smoking within the past 1 year were considered smokers. Similarly, all current alcoholics and those who had quit alcohol less than 1 year before the assessment were considered alcoholics. Based on the physical activity the participants were classified into light work, moderate work and heavy work. In case of women home makers with electrical and electronic appliances at home like grinder, mixer and oven were classified as light worker and home makers without these were classified as moderate workers. Those who were involved in manual labour work were classified as heavy work. Data were entered on Microsoft Excel spread sheet and analysed using standard statistical software packages. Descriptive data were presented as measures of central tendency and dispersion. Chi square test was used for analyses of categorical variables.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Results

Table 1 depicts the baseline characteristics of study population. A total of 1001 individuals in the rural field practice area and 432 individuals

Table 1.Demographic characteristics of study population

Variable	Urban			Rural		
	Men	Women	Total	Men	Women	Total
Age group						
20-29	23(16.8)	54(18.3)	77(17.8)	58(14.9)	169(27.6)	227(22.7)
30-39	20(14.6)	74(25.1)	94(21.8)	122(31.4)	184(30.1)	306(30.6)
40-49	27(19.7)	55(18.6)	82(19.0)	93(23.9)	101(16.5)	194(19.4)
50-59	23(16.8)	60(20.3)	83(19.2)	54(13.9)	82(13.4)	136(13.6)
>60	44(32.1)	52(17.6)	96(22.2)	62(15.9)	76(12.4)	138(13.8)
Total	137(31.7)	295(78.3)	432(100)	389(38.8)	612(61.2)	1001(100)
Marital status						
Married	117(85.4)	266(90.2)	383(88.7)	367(94.5)	519(84.8)	886(88.5)
Unmarried	18(13.1)	14(4.7)	32(7.4)	4(1.0)	10(1.6)	14(1.4)
Widow / widower	2(1.5)	15(5.1)	17(3.9)	18(4.5)	83(13.6)	101(10.1)
Education						
Primary	6(4.4)	29(9.8)	35(8.1)	174(44.7)	242(39.5)	416(41.6)
Middle	10(7.3)	54(18.3)	64(14.8)	28(7.2)	31(5.1)	59(5.9)
High / higher	54(39.4)	115(38.9)	169(39.1)	28(7.2)	44(7.2)	72(7.2)
Graduate	61(44.5)	74(25.1)	135931.2)	591.3)	9(1.5)	14(1.4)
Illiterate	6(4.4)	23(7.8)	29(6.7)	154(39.6)	286(46.7)	440(44.0)
Occupation						
Professional	12(8.8)	10(3.4)	22(5.1)	3(0.7)	1(0.2)	4(0.4)
Clerical	25(18.2)	4(1.4)	29(6.7)	11(2.8)	3(0.5)	14(1.4)
Semiskilled	36(26.3)	5(1.7)	41(9.5)	83(21.3)	18(2.9)	101(10.1)
Unskilled	11(8.0)	2(1.4)	13(3.0)	258(66.3)	153(25.0)	411(41.1)
Home maker	0	246(83.4)	246(56.9)	0	359(58.7)	364(36.4)
Student	5(3.6)	3(1.0)	8(1.9)	2(0.5)	4(0.7)	6(0.6)
Retired	36(26.3)	7(2.4)	43(9.9)	9(2.3)	3(0.5)	7(0.7)
Unemployed	12(8.8)	18(6.1)	30(6.9)	23(5.9)	71(11.6)	94(9.4)
Checked Blood Pressure						
Yes	75(54.7)	164(55.6)	239(55.3)	69(22.8)	145(23.7)	214(21.4)
No	62(45.3)	131(44.4)	193(44.7)	320(77.2)	467(76.3)	787(78.9)
Checked Blood sugar						
Yes	26(18.9)	49(16.6)	75(17.4)	10(2.6)	14(2.3)	24(2.4)
No	111(81.1)	246(83.4)	357(82.6)	379(97.4)	598(97.7)	977(97.6)
Total	137(31.7)	295(78.3)	432(100)	389(38.8)	612(61.2)	1001(100)

in the urban field practice area over the age of 20 years were included in the study. In urban area 31.7% were men and 78.3% were women and in rural area 38.8% were men and 61.2% were women. All age group were more or less equally distributed in urban area and in the rural slightly higher percentage of 30.6% representing the age group of 30-39. Nearly 6.7% were illiterate in urban area and 44% in rural area. About 56.9% were home makers in urban area and 36.4% in rural area. In urban area 55.3% of the participants had checked their

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

blood pressure in last one year and 21.4% of the rural participants had checked their blood pressure. In urban area 17.4% of the participants had checked their blood sugar in last one year and 2.4% of the rural participants had checked their blood sugar.

Table 2: Comparing Mean Values of urban and rural population

Factors	Rural Population [n = 1001] Mean *(SD)*	Urban Population [n = 432] Mean *(SD)*	Statistical Significance (Unpaired 't' test)
Mean Age (years)	40.43 *(±14.11)*	46.02 *(±15.70)*	P < 0.0001; t = 6.6479; df = 1431 standard error of difference = 0.841
Mean Body Mass Index (kg/m^2)	22.77 *(±4.07)*	26.19 *(±5.24)*	P < 0.0001; t = 13.3361; df = 1431 standard error of difference = 0.256
Mean intake of fruits (days/week)	2.70 *(±1.95)*	3.88 *(±2.21)*	P < 0.0001; t = 10.0887; df = 1431 standard error of difference = 0.117
Mean intake of vegetables (days/week)	4.72 *(±1.97)*	5.91 *(±1.84)*	P < 0.0001; t = 10.7011; df = 1431 standard error of difference = 0.111
Mean Systolic Blood Pressure (mm hg)	118.07 *(±13.09)*	134 *(±23.20)*	P < 0.0001; t = 16.4832; df = 1431 standard error of difference = 0.966
Mean Diastolic Blood Pressure (mm hg)	76.65 *(± 9.16)*	80.93 *(±11.78)*	P < 0.0001; t = 7.4191; df = 1431 standard error of difference = 0.577

The mean age of study population was 40.43 (±14.11) years and 46.02 (±15.70) years in the rural and urban populations respectively. Between urban and rural area the mean body mass index was 22.77 (±4.07) and 26.19 (±5.24), the mean intake of fruits per week was 2.70 (±1.95) days and 3.88 (±2.21) days, the mean vegetable intake per week was 4.72 (±1.97) days and 5.91 (±1.84) days, the mean systolic blood pressure was 118.07 (±13.09) mm hg and 134 (±23.20) mm hg and the mean diastolic blood pressure was 76.65 (± 9.16) mm hg and 80.93 (±11.78) mm hg. The differences in the mean values between urban and rural area was statistically significant (Table2).

Table 3 shows the prevalence of risk factors for cardiovascular diseases. The fruit and vegetable intake of more than 3 days per week was higher for urban area 206(47.7) and 376(87.1) compared to rural area 278(27.8) and 758(75.7) and it was found statistically significant (χ^2= 53.5,df = 1, p < 0.001) and (χ^2= 23.4,df= 1, p = 0.000) for fruit and vegetable intake respectively. With regards to physical activity participants who were doing light work was higher for urban area93 (21.3%) but participants who were doing heavy work was higher for rural area 136(13.6) and it was found statistically significant (χ^2= 27.6, df = 2, p <0.001). No differences was found in proportion of smokers and alcoholics both in urban (4.9%) and (3.7%) and rural (4.8%) and (6.2%) population respectively. The proportion of participants having overweight (BMI >23) was73.8% and 40.6% in urban and rural area respectively and of obesity was 56.7% in urban and 18.5% in rural area. The difference in proportion of overweight and obesity in urban and rural area was statistically significant (χ^2= 220, df= 3, p <0.001). Nearly 37.2% and 23.6% of the urban population and 6.9% and 9.0% of the rural population had systolic and diastolic hypertension respectively. The differences was

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

statistically significant for both systolic (χ^2= 238,df = 3,p<0.001) and(χ^2= 79.0,df = 3 p < 0.001)diastolic hypertension. The overall prevalence of hypertension was 174(40.27%) in urban area and 103(10.28%) in rural area.

Table 3. Prevalence of risk factor among study population

Variable	*Total*		χ^2 *and P value*
	Urban	*Rural*	
Fruits intake			
<3 days a week	226(52.3)	723(72.2)	χ^2= 53.5, df = 1, p <0.001
>3 days week	206(47.7)	278(27.8)	
Vegetable intake			
<3 days a week	56(12.9)	243(24.3)	χ^2= 23.4, df= 1, p <0.001
>3 days week	376(87.1)	758(75.7)	
Physical activity			
Light	92(21.3)	136(13.6)	χ^2= 27.6 df = 2,p <0.001
Moderate	315(72.9)	729(72.8)	
Heavy	25(5.8)	136(13.6)	
Smoking			
Yes	21(4.9)	48(4.8)	χ^2= 0.286, df = 1, p = 0.957
No	411(95.1)	953(95.2)	
Alcohol			
Yes	16(3.7)	62(6.2)	χ^2= 3.64, df= 1, p = 0.057
No	416(96.3)	939(93.8)	
Body mass Index			
<18.5	24(5.5)	92(9.2)	
18.5-22.9	89(20.6)	503(50.2)	χ^2= 220. df= 3, p < 0.001
23-24.9	74(17.1)	221(22.1)	
>25	245(56.7)	185(18.5)	
Systolic BP			
<130	190(44.0)	792(79.1)	χ^2= 238. df = 3, p < 0.001
130-139	81(18.8)	140(14.0)	
140-159	106(24.5)	56(5.6)	
160-179	55(12.7)	13(1.3)	
Diastolic BP			
<80	283(65.5)	857(85.6)	χ^2= 79.0 , df = 3, p <0.001
80-89	47(10.9)	54(5.4)	
90-99	72(16.7)	72(7.2)	
>100	30(6.9)	18(1.8)	
Total	432(100)	1001(100)	

Table 4 depicts the comparison risk factor for cardiovascular diseases among rural and urban men and women. The proportion of men who take fruit and vegetable for more than 3 days per week was higher for urban 65(47.7%) and 115(83.9%) compared to rural area 112(28.8%) and 310(79.7%) but a statistically significant difference was found for fruit intake (χ^2=15.8, df=1, p < 0.001). Whereas among women statistically significant reduced intake of both fruit and vegetables in rural were observed. Higher proportion of urban men and women were involved in light work, while higher proportion of rural men and women were involved in heavy work. Both were statistically significant. No differences were found in proportion of smokers and alcoholics both in urban and rural men and women. The proportion of overweight and obesity was higher for urban men and on in urban area comapred o men and women in rural area and it was statistically significant. Nearly 66(48.2%)

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

of urban men and 52(8.2%) of rural men had systolic hypertension and 44(32.1%) and 37(11.3%) of men in urban and rural had diastolic hypertension. The differences between urban and rural men was statistically significant (systolic hypertension,χ^2= 119.0, df = 3, p <0.001) and (diastolic hypertension,χ^2= 44.4, df = 3, p < 0.001). About 95(32.2%) of urban women and 37(6.0%) of rural women had systolic hypertension and 58(19.7%) and 46(7.5%) of women in urban and rural had diastolic hypertension differences between urban and rural men was statistically significant (systolic hypertension, χ^2= 131.0, df = 3, p < 0.001) and (diastolic hypertension,χ^2= 46.7, df = 3, p < 0.001).

Table 4 comparison risk factor for cardiovascular diseases among rural and urban men and women

Variable	Men		P value	Women		P value
	Urban	Rural		Urban	Rural	
Fruits intake						
<3 days a week	72(52.6)	277(71.2)	χ^2= 15.8 df = 1 p = 0.000	154(52.2)	446(72.9)	χ^2= 38.0 df = 1 p <0.001
>3 days a week	65(47.4)	112(28.8)		141(47.8)	166(27.1)	
Vegetable intake						
<3 days a week	22(16.1)	79(20.3)	χ^2= 1.18 df= 1 p = 0.277	34(11.5)	164(26.8)	χ^2= 27.2 df = 1 p <.001
>3 days week	115(83.9)	310(79.7)		261(88.5)	448(73.2)	
Physical activity						
Light	37(27.0)	56(14.4)	χ^2= 17.7 df = 2 p < 0.001	55(18.6)	80(13.1)	χ^2= 11.8 df= 2 p = 0.003
Moderate	93(67.9)	273(70.2)		222(75.3)	456(74.5)	
Heavy	7(5.1)	60(15.4)		18(6.1)	76(12.4)	
Smoking						
Yes	21(15.3)	44(11.3)	χ^2= 1.51 df = 1 p = 0.219	0	4(0.7)	χ^2= 1.94 df = 1 p = 0.164
No	116(84.7)	345(88.7)		295(100)	608(99.3)	
Alcohol						
Yes	16(11.7)	55(14.1)	χ^2 =0.52 df= 1 p = 0.469	0	7(1.1)	χ^2= 3.40 df = 1 p = 0.065
No	121(88.3)	334(85.9)		295(100)	605(98.9)	
Body mass Index						
<18.5	8(5.8)	34(8.7)	χ^2= 63.0 df = 3 p < 0.001	16(5.4)	58(9.5)	
18.5-22.9	31(22.6)	195(50.1)		58(19.7)	308(50.3)	χ^2= 153. df = 3 p < 0.001
23-24.9	28(20.4)	92(23.7)		46(15.6)	129(21.1)	
>25	70(51.1)	68(17.5)		175(59.3)	117(19.1)	
Systolic BP						
<130	45(32.8)	293(75.3)	χ^2= 119. df = 3 p < 0.001	145(49.2)	499(81.5)	χ^2= 131. df = 3 p < 0.001
130-139	26(19.0)	64(16.5)		55(18.6)	76(12.4)	
140-159	42(30.7)	26(6.7)		64(21.7)	30(4.9)	
160-179	24(17.5)	6(1.5)		31(10.5)	7(1.1)	
Diastolic BP						
<80	78(56.9)	318(81.7)	χ^2= 44.4 df = 3 p < 0.001	205(69.5)	539(88.1)	χ^2= 46.7 df = 3 p < 0.001
80-89	15(10.9)	27(6.9)		32(10.8)	27(4.4)	
90-99	23(16.8)	34(8.7)		49(16.6)	38(6.2)	
>100	21(15.3)	10(2.6)		9(3.1)	8(1.3)	
Total	137(31.7)	389(38.8)		295(78.3)	612(61.2)	

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Discussion

This study was conducted to determine the prevalence of risk factors for cardiovascular diseases among 432 urban population and 1001 rural population and to look out for the rural-urban differences, if any. This study showed differences in vegetable intake, fruit intake, body mass index, systolic and diastolic hypertension between urban and rural population but not for alcohol consumption and smoking.

Vegetable and fruit consumption

The fruit and vegetable intake of more than 3 days per week was significantly higher for urban men and women compared to rural men and women. Similar findings was reported by AroorBhagyalaxmi, et al with significant difference in the average consumption of fruits and vegetables between urban and rural area and average intake of fruits and vegetables was significantly high among men in both the areas.[11] Similar reports had been reported by IDSP survey in Tamil Nadu that the mean number of days when fruits were Consumed was higher in case of urban (3 days per week) as compared to that of rural population (2 days per week).[12] Approximately 80% of the population does not eat sufficient quantities of fruits and vegetables and half a million deaths in the Region are attributed to low intake of fruits and vegetables Half a million deaths in the Region are attributed to low intake of fruits and vegetables*[13]*.WHO reports the prevalence of inadequate fruits and vegetable consumption was higher among females than males in the south East Asia region.[14]

Physical activity

With regards to physical activity participants who were doing light work was higher for urban men and women. Similar findings was reported by WHO among study conducted in Sri Lanka which showed that prevalence of insufficient physical activity was highest among urban men and women compared to those among the middle and lower-urban categories.[13] Similar findings of low physical activity among urban men and women compared to rural men and women was reported by IDSP survey in Tamil Nadu.[12] A similar finding of more physical inactivity was reported by ThankappanK.R et al. among urban population in Kerala compared to rural population.[15] Approximately 3.2 million people die each year due to physical inactivity. [13] People who are insufficiently physically active have a 20% to 30% increased risk of all-cause mortality. Regular physical activity reduces the risk of cardiovascular disease including high blood pressure, diabetes, breast and colon cancer, and depression. Insufficient physical activity is highest in high-income countries, but very high levels are now also seen in some middle-income countries especially among women.[16]

Smoking

In our study there was a difference in the prevalence of smoking among urban (4.9%) and rural (4.8%) population. In contrast to our findings, NFHS-3, Vivek Gupta et al and Gupta Bhawna had reported higher prevalence of smoking among rural compared to urban area.[17.18.19] Compared to males the smoking was much lesser both in urban and rural women and similar findings were reported by other investigators.[17,18.19] Integrated disease surveillance project in Tamil Nadu reported higher number of smokers with no much difference between urban (25%) and rural (29%) population in smoking and more number of males smoke compared to females.[12]

Alcoholism

In our study the proportion of population consuming alcohol was slightly higher in rural (6.2%) area compared to urban area (3.7%). Similar findings had reported with the more proportion of rural men (33%) consuming alcohol compared to urban men (26%)[12]. K.R.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Thankappan et al reported 13.2% of urban and 10.1% of rural population consume alcohol.[15] Alcohol consumption was higher in males compared to females both in urban and rural areain our study. Similar findings were reported by IDSP, Thankappan et al, WHO 2011 and T.N. Sugathan et al.[12,14,15,20]

Overweight/ obesity

In our study the overall prevalence overweight and obesity among and women of urban area higher compared to men and women in rural area. Similar findings were reported byAroorBhagyalaxmi et al were overweight and obesity was high among the all the age group of urban population compared to rural population.[11] Many cross sectional study support the high prevalence of overweight and obesity among men and women in urban areas.[15,21,22]**Hypertension**

The present study showed higher prevalence of hypertension in urban men and women compared to rural men and women. The findings was supported by other investigator PrasannaSamue et al reported higher prevalence of hypertension in urban men and women compared to rural men and women.[23] Midha T et al reported a prevalence of hypertension of 32.8% in urban population and 14.5% in rural population.[24] Auley De et al reported a prevalence of hypertension of 52.9% in urban and 35% in rural.[25]Gupta R et al reported the prevalence of hypertension to range between 20-40% in urban adults and 12-17% among rural adults.[26]

CONCLUSION

In conclusioncardiovascular risk factors such as reduced intake of vegetables and fruits were more prevalence in rural population and reduced physical activity, increased body mass index, systolic and diastolic hypertension was noticed in urban population with no differences in the prevalence of smoking and alcoholism. The same trend was noticed between urban and rural men and urban and rural women.

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Original Research Article

Behavioral Problems among Preschool children: A Descriptive Study at Solapur

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Abstract

Introduction: Some preschool children show difficult behaviors; identifying and helping these children is a vital task. Researchers are finding that intervening at this time in life can be highly effective in helping children develop better coping skills. In order to intervene, researchers need to identify those at risk earlier so as to provide proper parental counseling & child guidance and create awareness in the public. The present study was undertaken to study the prevalence of behavioral problems among pre-school children, to study association of behavioral problems with some demographic factors and to study awareness of parents about behavioral problems in pre-school children. **Materials and Methods:** A community based cross-sectional descriptive study was carried out during August 2011 – October 2011. By simple random sampling method, from 16 *Anganwadi Centers*, a total of 400 children in the age group of 3-6 years were selected and mothers of these children were interviewed. Chi-square test was applied to find the association of behavioral problems with socio-demographic factors. **Results:** Prevalence of behavioral problems among pre-school children was found to be 24.8%. There is significantly higher prevalence of behavior problems among male children [29.6%], eldest child [38.4%], children belonging to families with low maternal education [38.1%] and working mothers [35.7%] & less duration of breast feeding [45.7%]. Most of the mothers [38.4%] didn't know the reason for behavioral problems. **Conclusion:** The types of socio-demographic groups which are more vulnerable to these problems are male, eldest child, belonging to families with low maternal education, working mothers & less duration of breast feeding. There is need for education of parents about identifying and managing behavioral problems in childhood.

Key Words: *preschool children, behavioral problems, Descriptive study*

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Introduction

Early childhood, is a time of tremendous growth across all areas of development. Physical changes in early childhood are accompanied by rapid changes in the child's socio-emotional, cognitive and language development. It has been found that young children face mental health problems due to an environment of relationships that can include parents, relatives, caregivers, teachers, and peers[1]. Some preschool children show difficult behaviors, identifying and helping these children is a vital task[2]. Lack of appropriate help and support for emotional difficulties that emerges in early years of life can become more serious disorders over time[1]. Researchers are finding that intervening at this time in life can be highly effective in helping children develop better coping skills[2]. Unlike physical illness, which in most of the cases has clear-cut symptomatology, any deviation from normal mental development or behavior in children may not be easily identified by the parents except from grave observable changes[3]. In order to intervene, researchers need to identify those at risk earlier so as to provide proper parental counseling & child guidance and create awareness in the public.

The present study was undertaken to estimate the magnitude of behavioral problems in preschool children & their relationship to some

socio-demographic variables and to study awareness of parents about these problems.

Materials and methods

A community based cross-sectional descriptive study was carried out from 1st August 2011 – 31st October 2011 in the field practice area of Urban Health Center of Dept. of Preventive and Social Medicine, Dr. Vaishampayan Memorial Government Medical College, Solapur, Maharashtra. The sample size required for the study was estimated based on the prevalence rate of 22% observed by Rai S. et al[4], with an allowable error of 20%. Calculated sample size was 354.

There are total 16 *Anganwadi Centres* in the field practice area. By simple random sampling method, 25 children from each *Anganwadi Centre*, a total of 400 children in the age group of 3-6 years were selected. Data was collected by interviewing the mothers of children using predesigned and pretested questionnaire after taking informed consent. Repeated visits were given to collect data from mothers of children who were absent at previous visits. Data was tabulated and Chi-square test was applied to find the association of probable behavioral problems with socio-demographic factors. "P" value less than 0.05 was considered significant.

Results

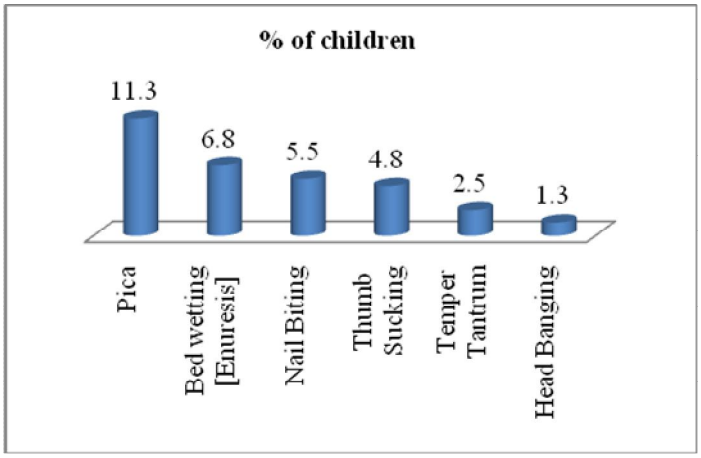
Of the 400 preschool children, 230 [57.5%] were boys & 170 [42.5%] were girls. 99 [24.8%] children had behavioral problems. The prevalence of behavior problems showed a decline with age, 30% of children with behavior problems belonged to the 3-4 years age group, followed by 23.9% in the age group 4-5 years, while only 16.3% were in the age group 5-6 years. This study found that 24.8% children had one or more behavioral disorders such as pica [11.3%], bed wetting [6.8%], nail biting [5.5%], thumb sucking [4.8%], temper tantrum [2.5%] and head banging [1.3%] (Fig. no.1).

Table No. 1 Distribution of children according to age

Age group [year]	Boys	Boys with behavioral problems	Girls	Girls with behavioral problems
3-4	98	34 [50.0%]	72	17 [54.8%]
4-5	80	23 [33.8%]	58	10 [32.3%]
5-6	52	11 [16.2%]	40	4 [12.9%]
Total	230	68	170	31

Table no. 2 shows a significantly higher prevalence of behavior problems among male children, children of illiterate mothers, children of working mothers, first born children, children breast fed for less than six months, children belonging to nuclear/broken family. Fig. no.2 shows most mothers [38.4%] didn't know the reason for behavioral problems, other reasons perceived by mothers were parental quarreling, nutritional deficiency, neglect by parents, evil spirits, familial, etc. Intervention by family members was preferred option by 43.4% mothers. 60.6% mothers gave different punishments like slapping the child, fear of burn injury, locking in the room, omission of meal to children having behavioral problems, 17.2% mothers scold and gave warning.

Fig. No. 1 Distribution of behavioral problems in preschool children



NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table No.2. Distribution of behavioral problems in children in relation to socio-demographic factors

Characteristics		Children with behavioral problems		Total	Chi-square Test Result
		Yes	No		
Gender	Male	68 (29.6%)	162	230	X^2 = 6.74, d.f.=1, p<0.01
	Female	31 (18.2%)	139	170	
Mothers Education	Illiterate	42 (38.1%)	68	110	X^2 = 14.7, d.f.= 1, p<0.001
	Literate	57 (19.7%)	233	290	
Working status of mother	working	76 (35.7%)	127	213	X^2 = 35.6, d.f.= 1, p<0.001
	Non-working	23 (12.3%)	174	187	
Socio-economic status	Class IV	37 (20.8%)	141	178	X^2 = 2.71, d.f.=1, p = 0.1
	Class V	62 (27.9%)	160	222	
Birth order	I	48 (38.4%)	77	125	X^2 = 18.2, d.f.= 1, p<0.001
	II & above	51 (18.5%)	224	275	
Breast feeding duration	< 6 months	43 (45.7%)	51	94	X^2 =37.4, d.f.= 3, p< 0.01
	6months – 1 yr	27 (26.5%)	75	102	
	1- 1.5 yr	19 (19.6%)	78	97	
	1.5 – 2 yr	10 (9.3%)	97	107	
Type of family	Nuclear	50 (30.5%)	114	164	X^2=9.58, d.f.= 2, p<0.01
	Joint / Three generation	38 (18.4%)	168	206	
	Broken	11 (36.7%)	19	30	

Fig. No. 2 Reasons for behavioral problems in children [as perceived by the mother]

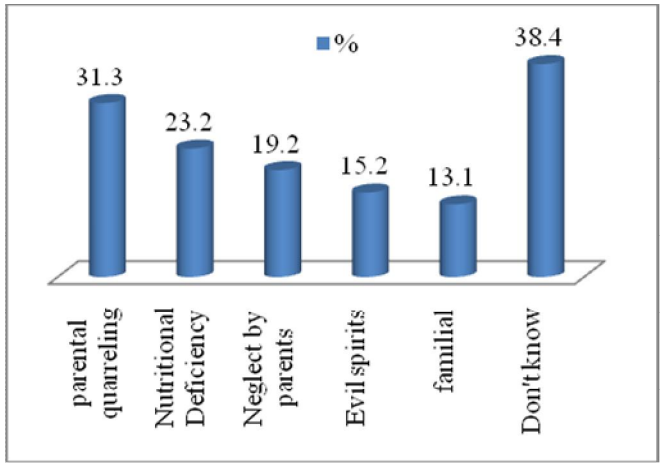
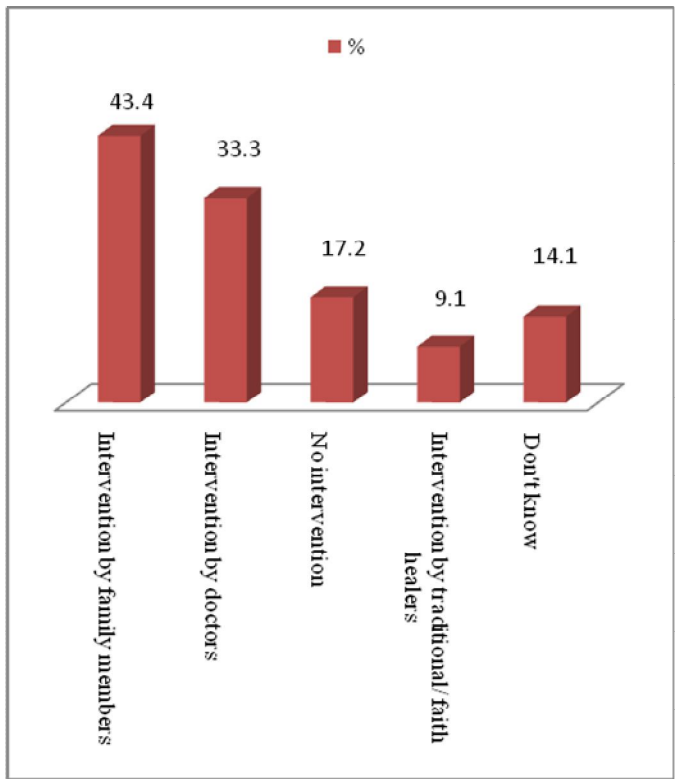


Fig. No. 3 Intervention options as preferred by the mothers



Discussion

Prevalence of behavioral problems among pre-school children was 24.8%. In a study, Rai et al[4] found the prevalence of behavior problems as 22%. The prevalence of behavior problems was more in male children than female children. Similar result has been reported by Rai et al[4]. It is felt that this male preponderance may be due to greater attention paid to male children by parents and noticing any abnormal behavior earlier resulting in early reporting.

In the present study prevalence of pica was 11.3%. Gupta RK[5] found that prevalence of pica was 32% in children aged 1.5 to 10 years. The difference in the prevalence can be attributed to the fact that in the latter study, children less than three years of age were also included. In the present study, prevalence of temper tantrum was 2.5% Bhatia MS et al[6] mentioned that 22.8% children aged 3-12 years were found to be having temper tantrum.

Maternal education was significantly associated with behavioral problems in children, prevalence being highest in offspring's of illiterate mothers. Education and awareness increases mothers' perception of any developmental or behavioral deviance of the child at an earlier stage when it is still amenable to treatment rather than at a later stage when a deviance becomes established.[3] Working status of mother was significantly associated with behavioral problems among children. Sharma NL[7] mentioned that maternal lack is a very important factor in causation of these problems. This maternal lack being present in situations like divorced, dead, at work, etc. In this study, though majority of mothers were illiterate they were engaged in work like mill worker, laborer, etc. Rahi M et al[3] found that working status of mother did not have any significant effect on psychological development of a child.

In the present study, prevalence of behavioral problems was significantly more in first born children. Rai et al[4] found higher prevalence of behavioral problems among girls whereas among boys it was commonest in second born. The eldest child in the family is believed to be at a greater risk of developing behavior problems especially in lower socio-economic strata because he is introduced to adult responsibilities with little or no transitional period left between childhood and adulthood.[4]

In the present study, it was found that less duration of breast feeding was significantly associated with behavioral problems in children. Fang LIU et al[8] found that the fewer amounts and the shorter duration of breast feeding are risk factors for behavioral problems occurrence in children aged 4-5 years. Heikkila K et al[9] found that longer duration of breast feeding is associated with fewer parent rated behavioral problems in children aged 5 years. In the present study, prevalence of behavioral problems was more in children from broken followed by nuclear family compared to children from joint family. Rai et al[4] found similar result in his study. It could be due to fact that in the former, children get less time and care of the elders. Often both parents are working or the mother is busy with household chores and the children are left alone, whereas in a joint family, the rearing of children is shared by a number of people.

Though the prevalence of behavior problems was quite high, only 1/3rd of the mothers were aware about intervention by doctors is helpful for children with behavioral problems.

Conclusions

Findings suggest a need to educate community about relationship between behavioral problems in children and various risk factors such as low maternal education, working mothers & less duration of breast feeding. It is revealed that about 60% of parents give punishment to children if they misbehave. There is need for education of parents about managing behavioral problems in childhood by preparing a plan to understand and make a change in child's behavior without punishment leading to better

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

health. It is appropriate to counsel children regarding different behavioral problems and reinforce positively by a reward in case of improvement.

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Original Research Article

A Study On Factors Associated With Immunization Status Of Children Aged 12-23 Completed Months In Nellore City – A.P

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Abstract

Background: The Government of India launched Universal Immunization Program on 19th November, 1985, with the main objective of covering at least 85% of all infants against the six preventable diseases i.e., polio, tuberculosis , diphtheria , pertussis,tetanus and measles by 1990 Universal immunization of children against the above mentioned preventable diseases is crucial in reducing child and infant mortality which is considered to be a good indicator of the health status of the population. According to the National Family Health Survey-III (2005-06) only 43.5 % of eligible children were fully vaccinated and 5% have not received any vaccination at the national level.Various other survey results also show the glaring gap between the target and achievement even after several years. This disappointing performance of the child immunization programme compels us to investigate the determinants of immunization. **Objectives:** To study various factors associated with the immunization status of the children. **Materials and methods:** The present study is conducted in a sample of 500 children in the age group 12-23 months residing in Nellore city. 10 children are selected from each ward by systematic random sampling method. A pre-tested structured questionnaire was used to collect the information. The data was analyzed using proportions and chi-square test. **Results and Conclusion:** education and occupation of parents, socioeconomic status, place of delivery, age at marriage are found to be significantly associated with immunization status of the child.

Key words: *Immunization status, educational status, socioeconomic status, age at marriage.*

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Introduction

The World Health Organization launched the Global Programe of Immunization in 1974.[1] GoI launched the same in India on 1st January, 1978, with a view to provide protection to the children against disease and to reduce infant mortality rate.[2,1] The Government of India launched Universal Immunization Program on 19th November, 1985, with the main objective of covering at least 85% of all infants against the six preventable diseases by 1990 and also to achieve adequate production of vaccines and the manufacture of cold chain equipment, indigenously, so that country becomes self-reliant.[3] Universal immunization of children against the above mentioned preventable diseases is crucial in reducing child and infant mortality which is considered to be a good indicator of the health status of the population.[4] According to the National Family Health Survey-III (2005-06) only 43.5 % of eligible children were fully vaccinated and 5% have not received any vaccination at the national level.[5] Unmistakably, various other survey results also show the glaring gap between the target and achievement even after several years. This disappointing performance of the child immunization programme compels us to investigate the determinants of immunization.Given the regional as well as cultural diversity of large nation like India, socioeconomic characteristics like education,

occupation, religion, wealth, health etc, play an important role in the issues of accessibility, availability and affordability of immunization services. In India, these factors have an effect at the individual and community level. Above all, the characteristics of the parents along with various other social factors like sex, birth order, religion, type of family, place of delivery, availability of immunization cards and parental knowledge regarding vaccines along with the reasons for non immunization were known to influence the immunization coverage.

Hence this study is conducted in Nellore city of Andhra Pradesh to study the factors influencing primary immunization coverage.

Materials and methods

This is a community based study conducted in Nellore city, A.P. from February to July 2011 in a sample of 500 children of 12-23 months age. Children whose informants were not found, Whose Informants did not give reliable data, whose houses were locked and children of relatives and visitors were excluded from study. There are 50 municipal wards in the city and the study was done in all the wards. After reaching each ward, all the lanes were numbered and out of them one lane was selected randomly using currency note method. Within the selected lane all the houses were numbered. The first household was selected randomly using the currency note method. From this house subsequent houses were visited following right hand rule. The same procedure was followed till the desired sample of 10 children is obtained in each ward. The total children studied in all the wards together were 500. When more than one child in the same age group was present in the same house, the younger one was included in the study to have better recall. In the houses having twins, only one of them was selected randomly. The data was collected from the respondents using a pre-tested structured questionnaire after obtaining oral consent. Information was collected on the various socio-demographic factors, about the immunization status of the children. The method used for the determination of the vaccination status was 'the vaccination card and the recall' method. BCG scar was also examined. The primary respondent was the mother of the child and in case of her absence, the father acted as the next respondent. In case of absence of both of them, an adult in the household who remained with the child for most of the time or had taken the child for immunization on at least one occasion was interviewed. A Fully immunized infant was defined as one who has received one dose of BCG, three doses of DPT, Hepatitis-B and OPV each and one dose of Measles before one year of age. Partially Immunized child was defined as the child who has missed even a single dose of vaccine mentioned in the immunization schedule. Non Immunized child was defined as the child who has not received even a single dose of any vaccine. The data was analysed using percentages.

Results

Table 1 shows that out of 500 study subjects, 252 (50.4%) were males and 248 (49.6%) were females. 59.1% of male children and 62.1% of the female children in the study were fully immunized. 75% of the informants were mothers and 13% were fathers. The complete immunization coverage is higher in Christians (64.1%), followed by Hindus (62.9%), Muslims (53.7%) and others (50.0%) .

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table No.1 Distribution of study subjects by gender, informant and religion

Factors		Immunization status				
		Fully Immunized (%)	Partially immunized (%)	Non-immunized (%)	Total	p-value
Gender	male	149 (59.1)	102 (40.5)	1 (0.4)	252	>0.05
	female	154 (62.1)	88 (35.5)	6 (2.4)	248	
Informant	Mother	222 (59.2)	149 (39.7)	4 (1.1)	375	>0.05
	Father	44 (66.7)	21 (31.8)	1 (1.5)	66	
	Other	37 (62.7)	20 (33.9)	2 (3.4)	59	
Religion	Hindu	210 (62.9)	117 (35)	7 (2.1)	334	>0.05
	Muslim	65 (53.7)	56 (46.3)	0 (0)	121	
	Christian	25 (64.1)	14 (35.9)	0 (0)	39	
	Others	3 (50)	3 (50)	0 (0)	6	

Table No.2 Distribution of study subjects by mothers age at marriage, mothers age at the delivery of first child, place of delivery and immunization card

Factors		Immunization status				
		Fully immunized (%)	Partially immunized (%)	Non-immunized (%)	Total	p-value
Mothers age at marriage	18y & above	242 (71.4)	95 (28.0)	2 (0.6)	339	<0.0001
	Below 18y	61 (37.9)	95 (59.0)	5 (3.1)	161	
Mothers age at the delivery of first child	20y & above	234 (72.9)	86 (26.8)	1 (0.3)	321	<0.0001
	Below 20Y	69 (38.5)	104 (58.1)	6 (3.4)	179	
Place of delivery	Institutional	296 (61.2)	185 (38.2)	3 (0.6)	484	<0.0001
	Domiciliary	7 (43.8)	5 (31.3)	4 (25.0)	16	
Immunization card	Yes	135 (70.3)	57 (29.7)	0 (0)	192	0.0006
	No	168 (54.5)	133 (43.2)	7 (2.3)	308	

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table No. 3 Immunization status of children based on mother's education

Mother's education	Fully immunized		Partially immunized		Non immunized		Total
	No.	(%)	No.	(%)	No.	(%)	No.
Illiterate	50	45.9	54	49.5	5	4.6	109
Primary sch.	17	77.3	5	22.7	0	0	22
Mid school	70	57.4	51	41.8	1	0.8	122
High school	75	57.7	54	41.5	1	0.8	130
Intermediate/ post high sch. Diploma	37	71.2	15	28.8	0	0	52
Graduate/ Post graduate	52	83.9	10	16.1	0	0	62
Professional honours	2	66.7	1	33.3	0	0	3
TOTAL	303		190		7		500

χ^2 = 37.366 df = 12 P <0.001 Highly significant

Table No. 4 Immunization status of children based on father's education

FATHER'S EDUCATION	FULLY IMMUNIZED		PARTIALLY IMMUNIZED		NON IMMUNIZED		TOTAL
	No.	(%)	No.	(%)	No.	(%)	No.
Illiterate	40	39.6	56	55.4	5	5.0	101
Primary sch.	23	62.2	14	37.8	0	0	37
Mid school	50	57.5	36	41.4	1	1.1	87
High school	87	64.9	46	34.3	1	0.7	134
Intermediate/ post high sch. Diploma	31	58.5	22	41.5	0	0	53
Graduate/ Post graduate	62	81.6	14	18.4	0	0	76
Professional honours	10	83.3	2	16.7	0	0	12
TOTAL	303		190		7		500

χ^2 = 44.635 df = 12 P < 0.001 Highly significant

The coverage of immunization is lower in children of mothers who married before the age of 18 years than elder mothers. 5 (71.4%) of the non immunized children belong to the younger mothers .The coverage of immunization is lower in children of mothers delivered before 20 years

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

of age than elder mothers. 6(85.7%) of the non immunized children belong to the younger mothers. The complete immunization coverage is more (61.2%) in institutional delivery than in domiciliary delivery where it is 43.8%. The complete immunization coverage was more (70.3%) where immunization cards are maintained than where they were not available (54.5%) (Table 2).

The highest coverage (83.9%) is seen in the children of Graduate / Post graduate mothers. The least coverage (45.9%) is seen in children to illiterate mothers (Table3). The highest complete immunization coverage (83.3%) is in the children with fathers with professional honours followed by those of graduates/post graduates (81.6%) and lowest coverage (39.6%) is seen in children with illiterate fathers.71.4% of non immunized children are of illiterate fathers(table 4). This shows immunization coverage increases with father's education.100% coverage is seen in the children with mothers belonging to semi professional and skilled working group followed by professional group with 88.9%. The least coverage is seen the group of self employed with 42.9% (table 5). This portrays influence of Mother's occupation on immunization coverage and is statistically significant. Highest coverage of 87.5% was seen in the children whose fathers were professionals followed by those of semi professional group (83.3%). Lowest coverage was seen among the group of skilled worker (38.1%) followed by unskilled workers. Better occupation of father positively associated with complete immunization coverage. The association is significant (Table 6)**.**

Table 7 shows the relation between socio-economic status and immunization status of children. Lowest coverage in group V followed by group VI and highest coverage in group II followed by group I .This shows that higher socio economic status of the family has significant positive influence on immunization coverage.

Table No. 5 Immunization status of children based on mother's occupation

Mother's occupation	Fully immunized		Partially immunized		Non immunized		Total
	No.	(%)	No.	(%)	No.	(%)	No.
Unemployed	278	60.0	180	38.9	5	1.1	463
Unskilled worker	6	46.2	5	38.5	2	15.4	13
Skilled worker	2	100.0	0	0	0	0	2
Clerical/ shop owner/ farmer	3	42.9	4	57.1	0	0	7
semiprofessional	6	100.0	0	0	0	0	6
Professional	8	88.9	1	11.1	0	0	9
TOTAL	303		190		7		500

χ^2 = 28.430 df = 10 P < 0.005 Significant

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table No. 6 Immunization status of children based on father's occupation

Father's occupation	Fully immunized		Partially immunized		Non immunized		Total
	No.	(%)	No.	(%)	No.	(%)	No.
Unemployed	7	63.6	4	36.4	0	0	11
Unskilled worker	194	57.2	138	40.7	7	2.1	339
Semi skilled worker	0	0	0	0	0	0	0
Skilled worker	8	38.1	13	61.9	0	0	21
Clerical/ shop owner/ farmer	48	64.0	27	36.0	0	0	75
semiprofessional	25	83.3	5	16.7	0	0	30
Professional	21	87.5	3	12.5	0	0	24
TOTAL	303		190		7		500

χ^2 = 22.899 df = 10 P < 0.05 Significant

Table 7: Socio economic status

Socio economic status	Fully immunized		Partially immunized		Non immunized		Total
	No.	(%)	No.	(%)	No.	(%)	No.
I	11	84.6	2	15.4	0	0	13
II	25	86.2	4	13.8	0	0	29
III	48	69.6	21	30.4	0	0	69
IV	128	61.2	78	37.3	3	1.4	209
V	82	48.8	82	48.8	4	2.4	168
VI	3	50.0	3	50.0	0	0	6
Didn't reveal income	6	100	0	0	0	0	6
TOTAL	303		190		7		500

χ^2 = 28.645 df = 12 P < 0.05 Significant

Discussion

In our study, 59.1% of male and 62.1% of female children were fully immunized. But this difference was not statistically significant. Basher Gaash, et al, in their study among 538 children in Kargil district, Kashmir, reported that the immunization coverage rates were similar in boys and girls. [6] Nirupam S, et al, in their study done in 1990 among 210 children at Nagar Palika of Sitapur, UP, reported gender bias in immunization coverage .

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Vaccination coverage was found to be higher for male children as compared to females for every vaccine. [7]

In the present study, immunization coverage in Christians is slightly higher with 64.1% followed by Hindus with 62.9%, Muslims with 53.7% and others with 50.0%. This difference was not statistically significant. Yadav RJ, Singh P, in their study (1999) among 1400 children in the state of Madhya Pradesh reported that coverage levels for different religions were 100% for Christians, 61.5% for Hindus, 50.5 % for Muslims and 66.7 % for Sikhs. [8] Kar M, et al, in their study (n=100, 2001) at South Delhi reported that 69.9 % of Hindus and 66.7% of non Hindus were completely immunized. [9]

The coverage of immunization is lower in children of mothers who got married before the age of 18 years. 5(71.4%) of the non-immunized children are born to the younger mothers. This difference is highly significant statistically. In the present study immunization coverage was high (72.9%) in the children with mothers who gave birth to their first child at or above 20 years of age than those with mothers who gave birth to their first child below 20 years of age. 6 (85.7%) of the children among non-immunized were of the mothers who gave delivery to their first child below 20 years of age. This was found to be statistically significant and which shows that young mothers are unaware of immunization. Basaleem HO, et al, in their study at Aden, Yemen, among 680 children reported that, children with older aged mothers were more likely to have complete immunization. [10] Ibnouf AH, et al, in their study among 412 children at Khartoum State, Sudan found children of older mothers were more likely to have had the correct vaccinations. [11] Similar to the findings of our study the above studies show children of elder mothers had better immunization status.

In the present study, 96.8% of mothers had institutional deliveries and only 3.2% of mothers had domiciliary delivery. Immunization coverage is 61.2% in institutional deliveries and 43.8% in domiciliary deliveries. 25% of children from domiciliary deliveries were non-immunized while only 0.6% of children from hospital deliveries were non-immunized. The difference is highly significant statistically. Bhola Nath, et al, in their study among 510 children in urban slums of Lucknow district reported that home delivery was associated with the unimmunized status of the child. [12] Pragti Chhabra, et al, in their study among 635 children in the urbanized villages of East Delhi reported that place of birth was an important determinant of immunization status. [13] Devendra Kumar, Anju Aggarwal, Sunil Gomber in their study conducted at a tertiary-care hospital, New Delhi, reported that the immunization status varied significantly with place of delivery. [14] All the above studies show institutional deliveries were associated positively with complete immunization, which is similar to our study.

In the present study, only 192 (38.4%) families could show immunization cards. Immunization coverage is high (70.3%) where immunization cards were available, compared to 54.5% where they were not available. The figures were statistically significant. Pragti Chhabra, et al, in their study among 635 children in the urbanized villages of East Delhi reported that presence of immunization card was an important determinant of immunization status. [13] Basaleem HO, et al, in their study at Aden, Yemen among 680 children reported that children with immunization cards were more likely to have complete immunization. [12] Similar to our study the above studies also show that presence of immunization card indicates better immunization.

In the present study, children with illiterate mothers had lower coverage of 45.9%. These figures were found to be statistically highly significant. Among non-immunized children, 71.4% of children were found in this group.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Comparing illiterates with all literates also the figure was statistically highly significant. This shows that education level of the mothers plays a crucial role in the immunization status of the child. Coverage evaluation survey in 2009 conducted by UNICEF in India reported that only 45.3% of the children of illiterate mothers were fully immunized compared with 76.6% of children of mothers who had completed at least higher secondary. [14] Kurudi P. Neeraja and Prakasamma M in their study of 545 children, done in 1993 at Somandealli Mandal, Ananthapur Dist, A.P, reported a significant association between mothers' education and immunization status of children.[15] Dhadwal D, et al, in their study among 257 urban and 339 rural children at Shimla hills reported that complete immunization was positively associated with maternal education. [16]

In the present study, children with illiterate fathers had the lowest immunization with just 39.6%. Among non-immunized children, 71.4% were found to be in this group as well. Immunization coverage increased with literacy. This was found to be statistically highly significant. Comparing illiterates with literates the figure was statistically highly significant ($P < 0.001$). It shows that education level of the fathers plays a crucial role in the immunization status of the child. Pragti Chhabra, et al, in their study in the urbanized villages of East Delhi reported that higher education of father was an important determinant of immunization status. [13]

In the present study, the coverage is 100% among children whose mother's are semi professionals followed by professionals. The coverage is lowest in self employed/farmer group (42.9%) followed by unskilled workers (46.2%). All the non-immunized children belong to the groups of unemployed (71.4%) and unskilled workers (28.6%). These figures were significant statistically. Malini Kar, et al, in their study among 100 children of South Delhi reported that no difference in the immunization between housewives and working mothers. [9] Kurudi P. Neeraja and M. Prakasamma in their study of 545 children, done in 1993 at Somandealli Mandal, Ananthapur Dist, A.P, reported that no significant association between mother's occupation and immunization status. [15]

In our study highest coverage of 87.5% was seen in the children whose fathers were professionals followed by those of semi professional group (83.3%). Lowest coverage was seen among the group of skilled worker (38.1%) followed by unskilled workers. Father's occupation significantly influences immunization coverage **.** Malini Kar, et al, in their study among 100 children of South Delhi reported that children of labourers had a relatively less immunization coverage compared to other occupations. [9] Pragti Chhabra, et al, in their study among 635 children in the urbanized villages of East Delhi reported that father's occupation was an important determinant of immunization status. [13]

In the present study, the immunization coverage is lowest in socio-economic Group V. In this group 48.8% were fully immunized, 2.4 % were not immunized against any disease. 86.2 % of children in socio-economic status group II were fully immunized. This association of socio-economic status with immunization coverage was found to be statistically significant. Coverage evaluation survey in 2009 conducted by UNICEF in India reported that at all India level, only 47.3% of children from the lowest wealth quintile were fully immunized compared with 75.5% of children from the households with the highest wealth quintile. [14] Bhola Nath, et al, in their study among 510 children in urban slums of Lucknow district reported that low socioeconomic status is associated with the unimmunized status of the child. [12] Mosiur Rahman, et al, in their study (2004) conducted in Bangladesh among 3530 children reported that families with the highest wealth index were more likely to fully immunize their children. [17]

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Original Research Article

Can Personal Hygiene determine Health? : Study amongst School Children in a tribal area of Thane District

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Abstract

Background: Health education is one of the cheapest & most effective means to prevent majority of the health problems affecting school children. **Objectives:** A study was undertaken to find out the level of personal hygiene & it's association with nutritional status & morbidity profile of school children in a tribal area of Thane district. **Materials & Methods:** A Cross-sectional study was conducted in a Mumbai Municipal Corporation school situated in Vaitarna, a tribal field practice area under Rural Health Training Centre (RHTC), Department of Community Medicine of a tertiary care hospital in Mumbai. **Results:** A total of 141 students were studied. The participants included 83 boys & 58 girls, with a mean age of 10.4 yrs. Most of the boys (84.33%) & girls (84.48%) were under nourished as per the W.H.O. growth standards. Over 87.94% of the children were suffering from one or more morbidities, the most common morbidity in both the sexes being anaemia, followed by dental caries. **Conclusion:** School health programme along with teachers and parents should imbibe good personal hygiene practices amongst students.

Keywords: Morbidity, personal hygiene, school children

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Introduction

India has large number of school going children. There are about 6.3 lakh primary & upper primary schools in India. But only 8% of the schools have sanitation facilities, only 44% have water supply facilities.19% schools have separate urinals & 4% have separate lavatory facility for girls.[1] Such unhygienic school environment badly affects not only the physical health but also social & emotional development of school children.[2] Majority of the morbidities caused by these conditions are largely preventable by promotion of hygienic practices among school children through health education by the teachers, who are their first contacts.[3,4]

Children are easily affected by their external environment, so childhood is the best time to educate children about good habits. Therefore sanitation of school and education about personal hygiene have been given importance in the Total Sanitation Campaign, which recognizes that children can rapidly grasp and spread health information to their parents & thereby to the whole community.[3]

School is the most appropriate place where child's behaviour can be shaped & healthy habits can be incorporated among children. If child is healthy, then only he or she can actively participate in various activities. Health is a key factor in school entry, as well as continued participation & attainment in school. [5] School provides an opportunity to educate the child regarding important aspects of hygiene, environment & sanitation.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

In the present study, an attempt has been made to find out the level of personal hygiene & its association with nutritional status & morbidity profile of school children in a tribal area of Thane district.

Materials & Method

A cross sectional study was designed amongst school children in a tribal area of Thane district. Objectives were to find out the status of personal hygiene & to ascertain its association with nutritional status & morbidity profile amongst the tribal school children.

The present study was undertaken in a Mumbai Municipal Corporation school, of Vaitarna, district Thane, a tribal field practice area under RHTC, Department of Community Medicine of a tertiary care hospital in Mumbai, Maharashtra. A Health assesment programme was organized by the researchers over a period of 2 months (July & August 2011) for the school children after taking necessary permission. The school comprised of class I to VII, where children mainly from neighbouring padas like Vaitarna pada, Mengal pada, Kothe pada, Varli pada, Khair pada, Bhos pada, Tembha Village etc. study. According to the formula, $z_\alpha^2 pq/d^2$, a sample size of 96 is required to prove the association of personal hygiene with nutrition & morbidity profile of school children. In this area, there are 8 schools with classes I to VII. Using cluster sampling method, one school was randomly selected by lottery method. All the students of the selected school were taken for the health check-up during the study period. A total of 217 children were enrolled from the seven standards, of which there were 76 absentees. Thus a total of 141 students participated in the study with age ranging from 5 to 15 years.

The tools included pre-tested & pre-designed questionnaire, weighing machine & measuring tape. General & systemic examinations of the students were conducted. The children were also interviewed about personal hygiene practices using the Global school Health Survey Questionnaire.[6] Nutritional status was assessed by using W.H.O. Growth standards.[7] Any morbidity suffered by the students during the last 15 days was recorded, like diarrhoea, worm infestation or cough & cold. The data thus collected was entered & analyzed using suitable statistical tests with the help of Microsoft Excel 2007 & epi-info version 2.

Results

The study included 83 boys & 58 girls. Majority (76.6%) of the participants were aged between 8 & 12 years, with a mean age of 10.4 years. Boys were more (58.9%) than girls (41.1%). 59.6% of the students were from upper primary whereas 40.4% were from primary class. Most (96.5%) of the students belonged to tribal caste (Table 1).

Table 1: Socio demographic profile of school children (N=141)

Age structure	Frequency	Percentages
≤10 Years	53	37.60%
>10 Years	88	62.40%
Sex Composition		
Male	83	58.90%
Female	58	41.10%
Education		
Primary	57	40.40%
Upper primary	84	59.60%
Category		
Tribal*	136	96.50%
Non tribal**	5	3.50%

*****Varli, Thakur, Mahadev Koli, Katkari ****** Kanadi, Kunbi, Brahmin

The status of personal hygiene was considered either favourable (score of 1) or unfavourable (score of 0) [Table 2].

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 2: Distribution of the study population according to state of personal hygiene (n=141)

Indicators	Favourable (%) (Score 1)	Unfavourable (%) (Score 0)
Hair	121(85.82)	20(14.18)
Nail	65(46.1)	76(53.9)
Uniform	88(62.41)	53(37.59)
Hands & feet	103(73.05)	38(26.95)
Oral cavity	75(53.19)	66(46.81)

The favourable score for state of personal hygiene was found to be maximum in Hair followed by Hands & feet followed by Uniform & Oral cavity. Nail showed least favourable response. This difference was found to be statistically significant (P<0.05).

The results regarding habits/practices related to personal hygiene, a score=0 corresponded to "never practicing"; a score=1, to "sometimes practicing"; and a score =2, to "practicing most of the times" are shown in Table 3. Therefore, overall, the maximum & minimum possible scores were 13 & 0, respectively

Hand washing after toilet was significantly (P<0.05) more practiced than other health practices like regular bathing, brushing by toothpaste and brush & hand washing before meal.

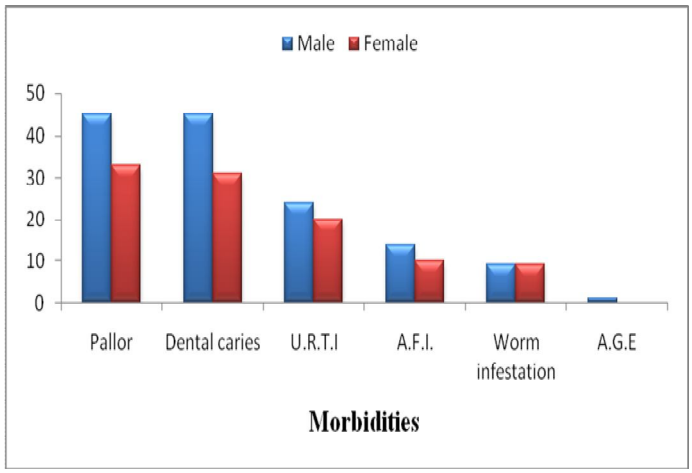

Fig. 1 Sex wise morbidity distribution

55.31% of the study population regularly used soap for hand washing after visiting toilet while 68.79% students used soap regularly for bathing. Majority (72.34%) of students use toothpaste & brush most of the times. The rest unfortunately followed unhygienic practices like using fingers, toothpowder, salt & coal powder. Running water was used for hand washing by 62.4% of the children before eating while at school. Almost 44.68% of the children never used soap for hand washing after toilet & 31.2% of the children never used soap for bath.

Table 3: Distribution of the study population according to practices related to personal hygiene (n= 141)

Practices related to personal hygiene	Never practiced (%) (Score 0)	Sometimes practiced (%) (Score 1)	Practiced most of the time (%) (Score 2)
Hand washing before meal	5(3.55)	48(34.04)	88(62.41)
Hand washing after toilet	3(2.13)	29(20.57)	109(77.30)
Bathing	0	34(24.11)	107(75.89)
Brushing	3(2.13)	34(24.11)	104(73.76)

X^2 12.86, P value 0.04

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 4: Relationship of sex with personal hygiene

Personal hygiene	Male	Female	Total
Good (score≥8)	71	51	122
Poor(score<8)	12	7	19
Total	83	58	141
Mean ± S.D.	9.77 ± 2.23	10.39 ± 1.91	10.02 ± 2.12

Table 5: Relationship of personal hygiene with nutritional status & morbidity of the study population

Personal hygiene	Nutrition		P value (Fisher exact test)
	Under nutrition	Normal nutrition	
Poor (score <8)	17	2	**0.796**
Good (score ≥8)	102	20	
Total	119	22	
	Morbidity		**0.1449**
	Present	**Absent**	
Poor (score<8)	19	0	
Good (score≥8)	105	17	
Total	124	17	

The overall mean score of the study population was 10.02 ± 2.12. The mean score for girls (10.39 ± 1.91) was higher than that for boys (9.77 ± 2.23). Majority (76.6%) of the study participants scored in the range of 8-12(Table 4).

Table 5 shows that by & large the study population that did not suffer from any morbidity over the last 15 days had higher personal hygiene scores as compared to those that suffered from one or more morbidities.

In general, the study populations that were normally nourished had higher personal hygiene scores as compared to those that were under nourished. Under-nourished comprised of 89.5 % of all the students getting poor score (< 8) as against 83.6 % of those getting good score (≥ 8). This difference was not statistically significant (p>0.05). It could be due to large number of under-nourished over all. (Table 5). In regard to morbidity, all those having poor score were with morbidities whereas 86 % of those with good score were with morbidities. This difference was not statistically significant (p>0.05). It could be because of high number of students with morbidities.(Table 5).

It was found that 76% of the boys & 74% of the girls were suffering from one or more morbidities. History was elicited for the last 15 days to avoid recall bias. This was followed by thorough clinical examination of each student. For boys, the most common morbidity was under nutrition (84.48%), followed by dental caries & clinically detected pallor (54.21% each) and upper respiratory tract infection (28.91%). The most common morbidity for girls was, again, under nutrition (84.33%), followed by clinically detected pallor (56.89%), dental caries (53.44%) & upper respiratory tract infection (34.48%) as shown in fig.1. Other morbidities detected were acute febrile illness, worm infestation & acute gastroenteritis.

Discussion

A similar study [8] was carried out in a school in Wardha district. In this study, 27.6% of the students had clean / combed hair which was far less than that reported in the present study (84.8 %). Similarly 29.7% of the students had clean / cut nails as opposed to 45.9 % in the present study. Over 62.41% of the children irrespective of sex wore clean uniform in the present study as compared to 42.8% of the children in the Wardha study. The percentage of children with

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

good oral hygiene came out to be about 53.19% in the present study as compared to 33.8% in the Wardha study. The most common morbidities among the children in the Wardha study were diarrhoea, fever, upper respiratory tract infections(URTIs) (56.6%), followed by head lice (42.8%), scabies (36.6%), multiple boils (8.9%) & dental caries (8.3%). However, the present study revealed that the commonest morbidity among boys as well as girls was Anaemia. History of worm infestation was elicited in 28.9% of the children in the Wardha study as compared to 13.2 % in the present study. Clearly the findings of the present study were better than that of Wardha study; the reason for the same could be continued health education session being conducted by the department of Community Medicine in the schools of their field practice area of Vaitarna along with the services provided by the School Health Programme of Mumbai Municipal Corporation. Another study[9] carried out among school-going (aged 6-14 years) children in Dhotra (Kasar) in Wardha district of central India revealed the prevalence of intestinal parasites to be 17.8% which was also higher than that reported in the present study (12.76%).

Conclusion & Recommendation

The present study revealed the poor state of personal hygiene among primary school children in the study area. It was observed that the overall status of personal hygiene was better among girls as compared to boys, although boys fared better than girls in some aspects, like clean/combed hair. Morbidity & under nutrition were higher in group with low personal hygiene score. In India, school health services, including health education, clinical assessment & monitoring of nutritional status & treatment of minor illnesses are provided by the primary health centres in rural areas. These services in the place of the present study are provided mainly by the School Health Programme of Mumbai Municipal Corporation and partly by the Rural Health Training Centre, department of Community Medicine. Hence care should be taken to improve the nutritional status & awareness about common morbidities among school children, their parents and teachers through coordinated primordial & primary preventive measures like health education. We have imparted health education to these students as well as teachers of the school following the study. But the responsibility also lies on teachers & parents. In this aspect, not only parents but also school teachers need to be trained adequately. Besides, there should be parent teacher meetings at least twice in a year so that teachers could give their feedback to parents & vice versa. In order to combat malnutrition & improve the health of the school children, it is important to provide them a good nourishing mid day meal under supervision. Health education about role of specific nutrients in preventing some morbidity like malnutrition, dental caries, anaemia etc. should be imparted to school children & their parents. Simple measures like improvement of personal hygiene & following safe, hygienic practices by these children as well as healthy dietary habits by parents & children can go a long way in reducing morbidities & thus break the vicious cycle of infection & malnutrition.

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Interest of conflict: Nil

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Original Research Article

Sexual Behaviour Pattern of Married Men in Rural Puducherry

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Abstract

Introduction: Sexual behaviour of men influences the reproductive health of women. Understanding the sexual behaviour pattern of men is imperative for effective impact of reproductive health programs of women. **Material and Methods:** A community based cross sectional study was conducted among 100 married men, selected randomly from the eligible couple registers of a Rural Health Training Centre attached to a Medical College in Puducherry. Information regarding knowledge and practice about sex, contraception and sexually transmitted diseases were collected from the respondents. Descriptive statistics were applied in analysis of the data using SPSS 17.**Results:** The mean age of the respondents was 24.2 ± 3.1 years. The mean age of awareness about sexual intercourse was 16.55 ± 2.5 years. The sources of information related to sex included friends (72%), movies (24%) and books (24%). Twenty one percent admitted having premarital sex. Among them, 57% reported unprotected sexual activity during their adolescent period. While all (100%) had heard about Acquired immuno-deficiency syndrome (AIDS), awareness about other sexually transmitted diseases was less. Condom usage and knowledge about correct procedure while using condom was found to be poor among the respondents. **Conclusion**: The study highlights the inappropriate source of information about sex, unprotected sexual activity of men in their adolescent period and inadequate knowledge about contraception among men. There is a need for effective behaviour change communication strategies to target men.

Keywords: AIDS, contraceptive, premarital sex behaviour, sexually transmitted diseases

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Introduction

Sexual behaviour of men depends on socio-cultural factors, life experiences, knowledge, attitudes, and biological factors[1,2]. It influences the reproductive health of women[3]. Failure to assess men's sexual behaviour weakens the impact of reproductive health programs of women[4,5,6]. The National Population Policy 2000 had emphasized the need to focus on men in reproductive health programs[6,7,8]. This study was a preliminary effort to understand the contemporary male sexual knowledge and its related practices in a rural area, where no previous similar studies had been done. The results would provide baseline information to plan for better reproductive health services in the area.

Materials and Methods

A community based cross sectional study was conducted among 100 married men during the period May 2012 to October 2012, in the service areas of a Rural Health Training Centre (RHTC), attached to Community Medicine Department of a Medical College in Puducherry. The Centre has been providing outpatient as well as outreach services to the surrounding 30 villages at a radius of 10 – 16 kms. Home based care programs are conducted periodically for the medical students in these villages. During these programs, demography, morbidity, maternal & child health and Family planning data of the households are collected and documented in the respective registers of each village.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

For the present study, a structured questionnaire which included sections on general information, socioeconomic status assessment (BG Prasad method[9]), sexual behaviour, knowledge about sexually transmitted diseases (STDs), contraceptive methods etc. was designed. It was pretested with male patients in the outpatient department of RHTC and necessary modifications were made. From the Eligible Couple Register of five villages in the service area of RHTC, the required sample was randomly selected. The men were identified with the help of field workers, informed about the study, assured confidentiality and enrolled, after obtaining verbal consent. Privacy was maintained during the interview. Statistical analysis of the data was done using SPSS 17.

Results

The mean age of the respondents was 24.2±3.15 years (range: 21-35 years). Sixty two percent were young adults (20-24 yrs). All were literates. Among them, 78 % had an education of high school and above. Majority (60%) belonged to Upper Lower and Lower Lower class.

The age at which the respondents came to know about sexual intercourse ranged from 11 – 21 years, with a mean age of 16.55±2.57 years. Most of the respondents (72%) said that their main source of information was friends (Table1). Twenty one percent of men had premarital sexual contact. The sexual partners were either acquaintance or sex workers. Fifty seven percent of premarital exposure was during adolescent period (Table 1).

Table 1: Knowledge and Practice related to Sex of the Study population

Age group (years) with respect to knowledge about sexual intercourse (n = 100)	**No (%)**
Oct-14	18 (18.0)
15 -19	68 (68.0)
20 -24	14 (14.0)
Mean (± SD) : 16.55 (±2.5)	
Source of information (n = 100)	
Friends	72 (72.0)
Cinema / TV	24 (24.0)
Books	18 (18.0)
School books	6 (6.0)
Premarital Contact (n =21)	
Partners	
Relative/ Acquaintance	7 (33.3)
Sex workers	14 (66.7)
Reason	
Curiosity	8 (38.1)
Uncontrolled Desire	7 (33.3)
Peer pressure	6 (28.6)
Frequency	
<5 times	15 (71.4)
>5 times	6 (28.6)
Age group (years) at first sexual intercourse (n = 21)	
16-19	12 (57.1)
20-23	8 (38.1)
24-27	1 (4.8)
Mean (± SD) : (20.4±2.27)	

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 2: Knowledge about STDs & Condom

Awareness about AIDS / STDS (n = 100)	**No (%)**
AIDS	100 (100)
Genital Ulcer / Urethral Discharge	14 (14)
Spread of AIDS (n = 100)	
Multiple partners	56 (56)
Unprotected Sex	81 (81)
Use of Condom (n = 100)	
Contraceptive	24 (24)
STD prevention	23 (23)
AIDS	70 (70)
When to use Condom? (n = 100)	
After erection of Penis	74 (74)
Uncertain	26 (26)
Disposal of Condom (n =100)	
Throw	38 (38)
Bury	18 (18)
Burn	29 (29)
DK	15 (15)
Procedure (n = 28)	
Condom should not have tears or holes	28 (100)
Press the tip of the condom to let out the air	11 (39.2)
Unroll the condom on erect penis	19 (67.8)
Withdraw immediately after ejaculation	20 (71.4)
Do not reuse condom	28 (100)

All had heard about Acquired immuno-deficiency syndrome (AIDS). Half of the respondents (56%) mentioned unprotected sex as a possible way of getting the infection. Single partner was considered as a preventive measure against AIDS by all the respondents. Regarding other STDs, only 14% mentioned about syphilis and discharge per urethra (Table 2). While 24% respondents considered Condom as a contraceptive method, 70% mentioned it prevents HIV infection. Only a few respondents (23%) mentioned that it protects against other STDs (Table 2). Twelve men had used condom after marriage. Regarding the precautions to be adopted while using a condom, only 28% were aware of necessary precautions. All of them mentioned that the condom should not have holes and not to be reused. Only 37% said that air at the tip of the condom should be pressed and let out before unrolling on the penis (Table 2).

Discussion

Reproductive health of men and adolescent sexuality in particular are poorly addressed in India. An important observation in the present study was that the knowledge about sexual intercourse was reported to be as early as 11 years. The sources on information were friends, cinema and books. The reliability of these sources is questionable. Parents in a rural area seldom provide right information about sexual matters to their adolescent children. Hence a better source of information could be schools where sex education could be imparted to the adolescent students[10,11]. In the present study, 69% respondents had expressed that sex education curriculum could be introduced in higher secondary schools.

Nearly one-fifth of respondents had premarital sexual exposure. A hospital based study among 260 men in Puducherry[2] had reported this practice among 38.8% of the subjects. A community based study among 41 unmarried men in West Bengal[5] had reported a prevalence of 14% for premarital sex. These differences might be due to the fact that sexual behaviour varies from individual to individual in a society and within different societies[7]. Although premarital sexual activity is not approved legally in India, the opportunities are more for men and so it is not uncommon to find high prevalence of premarital sex among them. Men are likely to engage in premarital sex and more likely to be excused for such behaviour[2]. Relatives, acquaintance and sex workers had been mentioned as the female partners in previous studies[2,5]. A similar observation was seen in this study.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Another interesting observation in this study was that more than 50% of premarital sexual contact had occurred during adolescent period. Prevailing norms of masculinity expect men to be more knowledgeable and experienced about sex. The young men are at more risk of infection, as these norms prevent them from seeking information or admitting their lack of knowledge about sex or protection and drive them into experimenting with sex in unsafe ways to prove their manhood[12]. The sex education and HIV prevention programs often focus on young women and do not address the needs of young men[13].

AIDS awareness was high compared to other STDs in the present study. All had heard about HIV/AIDS testing facility in the government hospitals. This could be attributed to the intensive AIDS awareness programs being conducted by government and non government organisations through various media. Except for condom, knowledge about other temporary methods was less. In this study, 42% men had reported that either they or their wives had adopted some kind of contraception. Tubectomy was the most common method compared to other methods. No case of vasectomy was reported among the respondents. This could be due to fear and misconceptions about vasectomy and temporary contraceptives. Through information and education campaigns, these issues could be addressed [4,8].

Condom usage was less in the study population. About 63% of men with premarital contact had not used condom. Reasons could be either psychological, problem in buying or disposal of condom. In this study, among the condom users, many disliked it as they felt it to hinder pleasure. The used condoms had been thrown out indiscriminately. None of the condom users could mention all the steps to be followed while using a condom. Special efforts should be made to sensitise young men about proper use of condom.

Conclusion

Knowledge about sexual behaviour of men is imperative, in order to design effective reproductive health intervention programs. The study highlights the inappropriate source of information about sex, unprotected sexual activity of men in their adolescent period and inadequate knowledge about male contraception among men. There is a need for effective behaviour change communication strategies to target men.

Sources of Support : Nil

Conflicting Interest : Nil

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Original Research Article

Knowledge and Practice of Menstrual Hygiene among School Going Adolescent Girls

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Abstract

Background: Menstruation, generally considered as unclean in the Indian society and have reinforced a negative attitude towards this phenomenon. Good hygienic practices such as the use of sanitary pads and adequate washing of the genital area are essential during menstruation. **Aim and Objectives:** To assess the knowledge and the practice of menstrual hygiene among school going adolescent girls. **Materials and Methods:** A descriptive cross sectional study was conducted in 2012 among 435 school going girls of 8th - 12th standards. A pre-designed, pretested and structured questionnaire was used in the study. Descriptive statistics, Pearson Chi-square test and Kruskal Wallis test were applied in data analysis. **Results:** The mean age of menarche in the study group was 12.9 $\pm$ 1.2 years. Only 28.2% girls were aware of menstruation before menarche. More than three fourth of the girls were not aware of the cause and the source of bleeding. Only 49.5% girls knew that practicing good hygiene during menstruation would prevent reproductive tract infections. Sanitary pads were used by 90.5% of the study population. Nine percent girls used old clothes as the absorbents. Satisfactory cleaning of the external genitalia with soap was practiced by only 14.5% girls. **Conclusion:** Awareness regarding the need for information about healthy menstrual practices is very important. It is essential to design a mechanism to address and gain the access of hygienic menstrual practices for adolescent girls.

Key words: Menstruation, Awareness, Healthy practices

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Introduction

Adolescence is a period of transition from childhood to adulthood. They are the formative years when maximum amount of physical, psychological and behavioral changes take place. The World Health Organization (WHO) defines adolescents as individuals between 10 & 19 years of age[1]. Adolescent girls constitute about one fifth of the female population in the world. Adolescence in girls has been recognized as a special period in their life cycle that requires specific and special attention. This period is marked with onset of menarche[2]. The girl experiences several problems during adolescence, and menarche is one among them. Menstruation is generally considered as unclean in the Indian society[3,4]. The silence of menstruation does not allow an open discussion on the subject even today, resulting in adolescent girls remaining ignorant of the scientific facts and hygienic health practices necessary for positive reproductive health[4]. Menstrual hygiene deals with the special health care needs and requirements of women during monthly menstruation or menstrual cycle. Menstruation Hygiene Management (MHM) focuses on practical strategies for coping with monthly periods. MHM refers to ways women themselves keep clean and healthy during menstruation and how they acquire, use and dispose of blood-absorbing materials.

Poor menstrual hygiene is a risk factor for reproductive tract infection and cervical

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

neoplasia[5,6]. Learning about hygiene during menstruation is a vital aspect of health education for adolescent girls as patterns that are developed in adolescence are likely to persist into adult life[7]. It was against this background that this study was planned to evaluate adolescent school girls' knowledge of menstruation and menstrual hygiene, as well as their practices of menstrual hygiene.

Materials and Methods

A cross-sectional study was conducted on a study population of 435 school going adolescent girls studying in the grades of 8^{th} to 12^{th} standards. The sample was derived from a Government Girls Higher Secondary School which is located in the service area of Urban Health Training Centre, Rajah Muthiah Medical College & Hospital, Chidambaram. Using a prevalence rate of 40% deficiency of knowledge about menstruation from previous studies amongst Indian school girls[10]. Sample size was determined using a standard formula: Z^2 pq/d^2 with absolute precision of 5% (d). Applying the above formula, the minimum sample size required was 369. However, a sample of 435 students was selected to accommodate the refusals or non-response. Only those girls who have attained menarche were eligible and participated in the study.

The study was carried out between June and September 2012. After obtaining permission from the school authority, the class teachers and physical education teachers were explained about the objectives of the study. A good rapport was built up with the girls and their verbal consent was obtained. They were also informed about the confidentiality of the information collected so as to get more reliable answers from them.

A pre-designed, pretested and structured questionnaire was designed by the investigator and the questionnaire was translated to the local language Tamil, which included the demographic information like parent's education, occupation, family monthly income, latrine facility and water facility. Personal information like chronological age, age at menarche, menstrual pattern, awareness before menarche and source of information about menstruation were also documented. Questions on awareness and physiology of menstruation were asked to assess the knowledge about menstruation. To assess the menstrual practices, the questions were about the use of sanitary pads, number of pads per day and genital hygiene during menstruation.. A pilot study was conducted on 40 students for content validation. Minor changes were made in the questionnaire after pretesting. The results of pretesting were not included in the main study Adequate time was given to the students to fill up the questionnaire.

Data was entered in Microsoft excel 2007 and Statistical analysis was done using descriptive statistics, Pearson Chi-square test and Kruskal Wallis test by using SPSS 18 package.

Results

The mean age of the girls was 14.9 ± 1.1 years and the mean age at menarche was 12.9 ± 1.2 years. Out of 435 individuals surveyed, only 123 girls (28.2%) were aware about menstruation before menarche. Nearly 45.7% girls were frightened and 30.5% were worried on seeing the first menstruation (Table.1). The main source of information about menstruation and menstrual hygiene were their mothers and elder sisters among 38.2% girls. About 61.3% girls reported that menstruation refers to bleeding from stomach. Only 30.5% girls answered that it is cyclical uterine bleeding. Nearly 62.7% girls did not know the reason for menstruation but 68.1% of girls responded correctly the duration of the menstrual cycle. (Table. 2).

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 1: Various reactions during menarche

Reaction to first menstruation	No (%)
Frightened	199 (45.7)
Worried	132 (30.5)
Casual	73 (16.7)
Happy	11 (2.5)
Felt ashamed	20 (4.6)
Total	435 (100)

Table 2: Knowledge about menstruation among Adolescent girls (n=435)

What is menstruation?	No (%)
White discharge	23 (5.5)
Cyclical uterine bleeding	133 (30.5)
Urethral bleeding	12 (2.7)
Bleeding from stomach	267 (61.3)
Reason for menstruation	
Hormonal change	148 (34.1)
Social change	14 (3.2)
Don't know	273 (62.7)
Normal Menstrual cycle duration	
<20 days	72 (16.5)
28-30 days	296 (68.1)
>45 days	67 (15.4)
Nutrient lost during periods	
Vitamins	13 (2.8)
Iron	50 (11.8)
Fat	25 (5.7)
Don't know	347 (79.7)
Effect of Hygienic practices	
Drive misfortune from the house	220 (50.5)
Prevent Reproductive tract infections	215 (49.5)

Most of the girls (90.5%) were using disposable sanitary pads as absorbents. Only 37.7% were following good practices for maintaining menstrual hygiene. About 46.2% girls were using only three pads in a day (Table.3). Regarding storage place of the unused absorbents, 54.4% girls stored inside bathroom itself, while 40% girls stored in dress cabinet.

Table 3: Practice of menstrual hygiene among Adolescent girls using Sanitary pads (n=394)

No of pads used in a day	No (%)
One	7 (1.6)
Two	138 (31.7)
Three	201 (46.2)
Four and more	48 (11.5)
Habit of changing absorbent in night	
Before going to sleep	382 (97.5)
In midnight	12 (2.5)

Table 4: Storage place and mode of disposal of the absorbents (cloth/pad). (n=435)

Storage place	No (%)
Bathroom	237 (54.4)
Dress cabinet	174 (40.0)
Open shelves	24 (5.6)
Mode of disposal of absorbents	
With domestic wastes	140 (32.0)
Burn	85 (19.5)
Burry	148 (34.0)
Throw in open places	62 (14.5)

Thirty four percent girls disposed the used absorbents by burying while 32.0% girls disposed along with domestic wastes (Table.4). Only 14.5% girls were using soap or antiseptics to maintain the genital hygiene. There is significant association between mother's educational status and knowledge of the adolescent girls about menstruation. Practice of menstrual hygiene becomes relatively poor as the age advances. About 98.6% of the girls were not allowed to go to temple during menstruation. Ninety seven percent girls were not allowed to enter the pooja room at home. Eighty percent girls were not allowed to touch grains and other members of the family before taking bath. Ninety three percent girls were not allowed to take rest in daytime during menstruation. Eighty one percent girls

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

experienced leg cramps and 75.6% girls had lower abdominal pain during menstruation.

Discussion

Though menstruation is a natural and normal physiological process for all healthy women, it has been surrounded by secrecy and myths in many societies. Very few mothers are ready to share the information which is of paramount significance to their daughters. Only 28.2% girls were aware of menstruation before menarche. Mothers were the commonest source (38.2%) of information on menstruation as reported by the girls which is in concordance with findings of similar studies done in other parts of India[1,6] . This is expected as mothers are usually the closest confidant teacher of most of the growing adolescent girls in our environment.

In the present study, 45.7% respondents expressed fear and 30.5% girls expressed worry on seeing first menstruation. Similarly studies conducted in India and Nigeria, the adolescent girls have expressed fear at the first experience of Menstruation[9,10]. Social prohibitions and negative attitude of family members in discussing the related issues openly has blocked the access of adolescent girls to right kind of information which reflected on their reaction to first menstruation. The reason for fear and anxiety may be attributed to inadequate or wrong knowledge about menstruation among girls and low levels of education among the mothers.

In the present study only 30.5% girls knew that menstruation is due to cyclical uterine bleeding and 34.0% girls knew that hormonal changes are responsible for it. Similar low level of knowledge was recorded by the studies carried out in different areas among the adolescent girls[11 - 14]. It was distressing to observe that in the present study most of the girls (65.9%) did not know the cause of the menstrual bleeding. The type of absorbent used during menstruation is of paramount importance since reusable materials could be a cause of infection if improperly cleaned and poorly stored. In the present study 90.5% of the respondents used disposable sanitary pads and only 9.5% girls used old piece of cloth as absorbents[15]. This finding is in contrast with the study conducted in Maharashtra, where only 15.6% girls used sanitary napkins[10] . The increased use of sanitary pads might be due to publicity through mass media and hence most of the girls have started using disposable sanitary pads as absorbent right from their menarche.

Only 14.5% girls in the present study practiced good genital hygiene during menstruation. Other similar studies by Dasgupta[6] (28%); Omidvar[1] (22%) had recorded that less than one third of the study participants practicing good genital hygiene. This shows that personal hygiene practices were unsatisfactory in the study population. Poor menstrual hygiene is a risk factor for reproductive tract infection and cervical dysplasia[5,6]. The practices like burning and burying of the used could be attributed to the cultural taboo that blood stained pads will attract witches and other persons who would use the blood for rituals.

Restrictions of various forms have been placed on the menstruating girl in different societies. In the present study, majority 98.6% of the girls reported that they were not allowed to pray or enter the pooja room during menstruation. This practice is in concordance with findings of the similar studies conducted in India[1,5,8]. Different restrictions were practiced by most of the girls due to the different rituals in their communities; the same were practiced by their mothers or other elderly female in the family due to their ignorance and false perceptions about menstruation. At the end of the session, health education regarding physiology of menstruation and the menstrual hygiene was given to the adolescent girls.

Limitations of the study were that the accuracy of respondent's answers on menstrual practice cannot be independently verified as it was assessed by using self administered

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

questionnaire. Due to wide social and cultural diversity it must be admitted that generalization of the outcome of this study may be limited.

Conclusion: The present study has highlighted the need of adolescent girls to have accurate and adequate information about menstruation. Personal hygiene practices were also found to be unsatisfactory. It is important to educate adolescents about the issues related to menstruation, so that they could safeguard themselves against various infections and diseases.

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Original Research Article

Learning Styles Among III Year Medical Students of Meenakshi Medical College

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Abstract

Back ground: Learning styles refer to the ways you prefer to approach new Information. Each of us learn and process information in our own special way though, we share some learning patterns, preferences and approaches. Using multiple learning styles for learning is a relatively new approach. If the student's primary learning style is visual, we can ask them to draw pictures in the margins, look at the graphics & read the text that explains the graph. Envision the topic or play a movie in their thoughts of how he will act out the subject matter. If the student's learning style is auditory, encourage them to listen to the words they read by recognizing and understanding the individual learning style of students we can use techniques better suited for majority in a class. We can encourage the students to boost their learning potential depending on their own style. Hence we want to assess the learning styles among the medical students. **Methodology:** III year medical students were selected for the study for convenience. A pre designed questionnaire was administered to the individual students. **Results:** We have collected data from 100 students. The sample consists of 63% females and 37%males. 18% of them from rural area and 82% from urban area. Among them, 65% of students are learning by visual style, 19% of students by auditory style and rest 5% by tactile style. 6% of them learn by visual as well as auditory style. 3% of them learn by visual and tactile style. One person learns both by auditory and tactile & one person learn by all the three styles. **Conclusion:** Majority of the students learn by visual style, we can include pictures and graphics in our teaching techniques to enhance their learning potential.

Keywords: Learning style, graphics, tactile style, teaching techniques

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Introduction

Learning style is defined as the composite of cognitive, effective, and physiological characteristic that serve as relatively stable indicators of how a learner perceives, interacts with and responds to the learning environment[1,2] Learning is not intelligence level (or) personality trait of the individual but the association of intelligence with personality[3] Educational researchers supposed that everyone has different learning styles.[4,5,6] Some like to learn by seeing, some by hearing and some by demonstration. Further students' learning style and their approach to study have a significant impact on both Quality of learning and their future academic success[7,8]. By understanding the learning styles and adopting them with teaching and learning process may lead to learning satisfaction, higher level of learning and increased confidence. When there is a mismatch between teaching style of the faculty and learning style of most of the students in a class, the students get bored and inattentive to the class and perform poorly and get discouraged. Hence it is very important to understand the learning styles of the students by the faculties in order to prevent frustration among students and improve their academic performance. With this in mind a cross sectional study was carried out to determine the learning style preferences by the III year medical students of our college. To assess the learning style among the III year medical students was the objectives of the study.

Methodology

This descriptive study was done at Meenakshi Medical College and Research Institute,

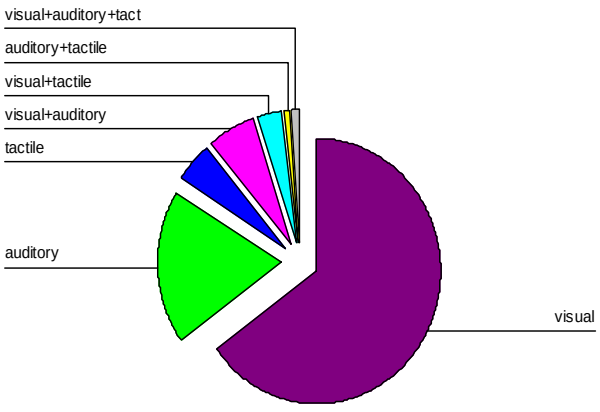
NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Enathur, Kanchipuram. A pretested questionnaire[9] was administered to the IIIrd year Medical students. Among 115 students 100 students responded.The questionnaire contain 12 questions and an instruction for how to answer questions. The way of answering to the questions is that the participants in the study should score the three options on the scale. The first option corresponds to visual style, second option corresponds to auditory style and third option corresponds to tactile / kinesthetic style. At the bottom of each column total score should be entered. The column with highest total is the primary processing style and the column second most choices is the secondary style. Data were collected from hundred students and analyzed.

Results

Among the hundred participants 63% were females and 37% were males. Majority (82%) from urban area and 18% of them from rural area. 65% of them follows visual style and 19% follows auditory style (Figure 1)

Figure – 1 Learning style



The presence of tactile or kinesthetic style was more among males 60% and compare to females 40% (Table 1)

Table – 1: Learning Style Sex Wise Distribution

Learning style	Male	Female	Total
Visual	25(38.5%)	40(61.5%)	65
Auditory	3(15.8%)	16(84.2%)	19
Tactile	3(60%)	2(40%)	5
Visual + auditory	3(50%)	3(50%)	6
Visual + tactile	2(66.7%)	1(33.3%)	3
Auditory + tactile	1(100%)	0(0%)	1
Visual + auditory + tactile	0(0%)	1(100%)	1

There is no difference in learning style between students from rural and urban area (Table 2)

Table - 2: Learning Style – Locality Wise

Learning style	Rural	Urban
Visual	12(66.6%)	53(64.6%)
Auditory	3(16.7%)	16(19.5%)
Tactile	1(0.05%)	4(0.04%)
Total	18(100%)	82(100%)

Discussion

This study was conducted to learn the learning style preferences among III year medical students. In our study majority of them(65%) learn by visual style ,19% auditory,5% by tactile and others by multimodal but in study done by Anu at al showed that 76% learn by multiple learning style.[10]

A study done by in Gujarat showed 41.3% learn by unimodal style others by multimodal. Among unimodal also50% by auditiory,42% kinesthetic and only 3% by visual.[11] A study done at Saudi Arabia among medical students revealed that 5.5%, 11.6%, and 8.2% of students preferred the visual, aural and kinesthetic modes, respectively and majority (72.6%) preferred multimodal style[12].

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Conclusion

To get best out of the students, teachers need to understand the learning styles of students in order to facilitate them in their own style. This study gives some idea about the ways by which the medical students learn. Since most preferred learning style is visual we can teach them by using pictures, graphics and images.

Conflict of Interest: Nil

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Original Research Article

A Cross-Sectional Study for The Detection of The Level of Driver's Anger Using a Driver Anger Scale (DAS) Administered on Non Professional Drivers of Indore City

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Abstract

Introduction: Road rage is a term to describe a range of anti-social behaviors and/or acts of aggression which occur on the road. **Objective**: The study aims to assess the level of anger while driving, which is a prevalent condition in today's society due to motorist's frustrations during heavy traffic volumes and various factors affecting it. **Methodology**: The present study was done in 200 people of Indore city which includes medical students and faculties /staff. A pre designed Pre-Tested, Semi-Structured Questionnaire was administered to participants. Questionnaire comprises of biographic data and Driving Anger Scale (DAS). **Observation**: The mean DAS of in the study population of Indore city was found to be 2.896 (s.d. =636) with Males 2.875 (s.d.=.627) & Females 2.930(s.d.=.627) having no significant gender difference. The people who were still unemployed/ students got the maximum anger 3.105(s.d. =.659), and are mostly driving two wheelers. The study population responded most to Hostile Gesture with mean anger level of 3.27, followed by Traffic obstruction (mean =3.10), more common in females (mean=3.25). Anger level was high during peak hours of traffic but was not affected on increasing frequency of usage of vehicles and or distance travelled. **Conclusion**- The mean anger level in population of Indore City was found to be high (2.896) especially in youngsters (3.105) who contribute significantly for rise in Road Traffic Accident in the City.

Key Words: Driving Anger Scale, Road Rage, Accident, Hostile Gesture.

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Introduction

The rapid and unplanned urbanization in India along with rise in number of motor vehicles lead to an alarming increase in morbidity and mortality owing to road traffic accidents (RTA) over the past few decades. Currently motor vehicle accidents rank ninth in order of disease burden and are projected to be ranked third in the year 2020[(1)].In India, more than 70,000 people get killed due to RTA every year, and this needs to be recognized as an important public health issue. The road traffic accidents cause sudden and unexpected loss of lives and earnings more common in metro cities. The causes are many but loss of temper/ rise in anger of the drivers can`t be excluded from the list. An early address of this problem is urgently required to bring down the general stress level and to effectively contribute to social and economic stability. "Road rage" is a term coined by the media to describe a range of anti-social behaviors and/or acts of aggression which occur on the road. It includes minor instances such as gestures and use of the car horn, through to more serious violent acts such as assault or even murder"

Activities associated with road rage include: Beeping the horn flashing head lights, forcing a car off the road, verbal abuse ,threatening another driver ,applying brakes or slowing suddenly suddenly, damaging another vehicle intentionally, deliberate obstruction, Physically assaulting another driver and such similar acts.[(2)]

This study was focused on general population who drive daily in Indore to assess the anger level among the drivers using a Driver Anger Scale.[3]

Methodology

Present study is a cross sectional study done on population who drive on a regular basis i.e. at least 2 hours per day for four days a week in Indore city. Period of study was for three months from September –December 2013. Purposive sampling was done ,where a pre-decided sample size of 200 people were selected for the study which included 50 medical students, 50 faculties of medical college and 100 of the general population around a radius of 5 kilometer around Mahatma Gandhi Memorial Medical College, Indore, who first gave consent for the study. The public transport drivers and people residing outside Indore city were excluded from the study. Thus study population was all non professional drivers considering professionals as those relating to or engaged in an driving as one's main paid occupation.

The tool for study was a pre-designed, Pre-tested, Semi-structured Questionnaire Comprising of Demographic data (Name, Age, Sex, address etc) and DAS, the 33 item, original DAS (Deffenbacher et al, 1994) with the exclusion of two questions which were not applicable to Indore. The subscales were: Hostile gestures, illegal driving, slow driving, Traffic obstructions, Discourtesy and Police presence. The participants were required to record the amount of anger they would experience in response to each item (1- not at all angry, 2- a little angry, 3- some anger, 4- much anger, 5- very much angry).

The questionnaire was administered to the medical faculties and students and people residing around MGMMC (Part 1- Demographic data and Part 2- DAS) during their free time with their consent. The collected data was entered into MSEXCEL spreadsheet and analyzed using SPSS (Statistical package for social sciences). Statistical tests like Mann-whitney U and Kruskal – Wallis were applied.

Results

The study comprised of 123(61.5%) males and 77(38.5%) females, with maximum persons of the age group 15-24 years (36%). Among these 200, 142 (71%) drive two wheeler and 18(9%) drive both two and four wheelers.

The mean anger level of the study population was found to be 2.8969 with (s.d. =.6364). This did not vary significantly with gender (males - 2.875 and females -2.930, **p value-**0.558). Level of anger was found higher in younger age compared to elder age groups (mean 3.116 with s.d.= 0.668,p value=0 .009) as seen in the table 1.

Table 1: Mean level of anger in different age groups (N=200)

S. No	Age group	Mean	Number	Std. Deviation
1.	15-24	3.116618	72	.6688542
2.	25-34	2.820323	64	.6026090
3.	35-44	2.792571	37	.5935404
4.	45-60	2.680000	26	.5516013
5.	More than 60	2.130000	1	.6371891
	Total	2.897604	200	

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 2: Subscale mean and Gender distribution (n=200)

S. No	Subscale	Sex	Mean	Std. Deviation	P value
1.	Slow driving	Male Female	2.603707 2.601688	.7546314 .7743204	0.986
2.	Illegal driving	Male Female	3.0920 2.9103	.95038 .82429	0.155
3.	Discourtesy	Male Female	2.987317 2.987273	.7244241 .7022345	1.00
4.	Traffic obstruction	Male Female	3.004797 3.257922	.8456643 .7557453	0.029
5.	Police presence	Male Female	2.2415 2.2570	.94141 .87236	0.906
6.	Hostile gestures	Male Female	3.2598 3.2912	.93242 1.09890	0.835

(Mann-whitney U test applied).

Anger level in motorcyclists (2.985, s.d. =0.607) was significantly higher compared to car drivers (2.708,sd=702)(p-value=.008. People who were not driving habitually during in peak traffic hours (mean, s.d. = 3.03, .627), had significantly higher anger level(p-value=.050) compared to those who were driving regularly in peak hours (mean,s.d.=2.8,0.63) . Persons driving occasionally had higher anger level (mean,s.d.= 2.95,.63), than the regular/ daily drivers, but the difference was not significant(p-value=.589. Level of anger did not significantly vary with the distance travelled per day(p-value=.675).

Table 3: Mean anger level according to different subscale in different groups of Study Population

S. No	Subscale	No. of items	Students (mean, s.d.)	Faculties (mean, s.d.)	General population (mean, s.d.)
1.	Slow driving	6	2.81, 0.88	2.39, 0.60	2.60, 0.73
2.	Illegal driving	2	3.01, 0.97	2.67, 0.63	3.02, 0.94
3.	Discourtesy	8	3.16, 0.82	2.76, 0.55	2.98, 0.71
4.	Traffic obstruction	7	3.45, 0.81	2.97, 0.69	3.10, 0.84
5.	Police presence	3	2.38, 0.89	2.27, 0.93	2.24, 0.91
6.	Hostile gestures	3	3.63, 1.03	2.79, 0.77	3.27, 0.99

Higher anger level was found in persons with type A personality (mean, s.d. = 3.052,0.639,)as compared to type B personality(mean, s.d. =2.78,0.61, p-value=.004). As seen in the table below (Table 2) people registered higher level of anger for hostile gestures and illegal driving and lower levels in the police presence.

There was no significant difference in anger level in male/ female (p-value=.558) and on different subscales of DAS except in Traffic obstruction where Females showed higher level of anger (p-value=.029) as seen in Table 2.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Students of MGM Medical College and General population around MGMMC responded most to Hostile Gesture with mean anger level of 3.63 and 3.271 whereas faculties of MGMMC showed high level of anger in traffic obstruction 2.97.

Table 4 shows item wise distribution of means and standard deviation of various items on the DAS scale.

Table 4: Reasons (item-wise) Mean and Standard Deviation in the study population (n=200)

S.No	Items(in the DAS scale)	Mean	SD
1.	Someone in front of you does not move off straight away when the light turns green.	2.29	1.014
2.	Someone is driving too fast for the road Conditions.	2.90	1.107
3.	A pedestrian walks slowly across the middle of the street, slowing you down.	2.46	1.147
4.	Someone is driving too slowly in the outside lane and holding up traffic.	3.03	1.134
5.	Someone is driving very close to your rear bumper	2.76	1.187
6.	Someone cuts in and comes right in front of your motorway.	3.74	1.090
7.	Someone cuts in and takes the parking spot you have been waiting for.	3.45	1.142
8.	Someone is driving more slowly than is Reasonable for the traffic flow.	2.42	1.237
9.	A slow vehicle on a winding road will not pull over and let people pass.	2.62	1.146
10.	You see a police car watching traffic from a hidden position.	1.82	1.099
11.	Someone backs out right in front of you Without looking.	2.99	1.173
12.	Someone coming towards you does not dim their headlight at night.	2.97	1.166
13.	At night someone is driving behind you with bright lights on.	2.48	1.268
14.	Someone speeds up when you try to pass them.	2.70	1.173
15.	Someone is slow in parking and holds up traffic.	2.81	1.171
16.	You are stuck in traffic jam.	3.28	1.265
17.	Someone makes up an obscure gesture Towards you about your driving.	3.48	1.232
18.	You hit a deep pot-hole that was not marked.	3.12	1.201
19.	A police car is driving in traffic close to you.	2.27	1.223
20.	Someone beeps at you about your driving.	3.16	1.212

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

21.	Someone is driving well above the speed limit.	2.81	1.278
22.	You are driving behind a truck which has material flapping around in the back.	2.84	1.295
23.	Someone shouts at you about your driving.	3.20	1.340
24.	A cyclist is riding in the middle of the lane and slowing traffic.	2.95	1.177
25.	A police officer pulls you over.	2.64	1.245
26.	You are driving behind a vehicle that is smoking badly or giving off diesel fumes.	3.42	1.196
27.	A truck kicks up sand or gravel on the car you are driving.	3.50	1.232
28.	You are driving behind a large truck and cannot see around it.	2.96	1.253
29.	You encounter road construction and detours.	2.65	1.172
30.	Someone runs a red light or stop sign.	2.87	1.351
31.	Someone is weaving in and out of traffic.	3.42	1.225

Table 5: Subscale Means of Indian public vehicle drivers Australian Drivers, UK and US Drivers compared to general population in Indore

Subscale	**Public vehicle Drivers, India**	**Australia**	**US**	**UK**	**General population in Indore**
Discourtesy	3.27	3.1	3.9	2.7	2.98
Traffic Obstruction	3.09	2.3	3.3	2.0	3.10
Hostile Gestures	3.49	2.8	3.2	2.3	3.27
Slow Driving	2.89	2.3	3.2	2.0	2.60
Police Presence	2.3	1.9	3.0	1.4	2.24
Illegal Driving	3.02	2.6	2.7	2.3	3.02

The mean DAS value for all question lied in the range of 3.48(s, d. =1.090) maximum for the question “Someone cuts in and comes right in front of your motorway” to) minimum for the question “You see a police car watching traffic from a hidden position” 1.82(s.d.=11.82)).

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Discussion

Alarming rise in death toll due to RTA and serious loss of productive population is of major concern. Hence it is important for the drivers to remain calm and composed while driving, however unpleasant be the situation. This study was conducted on the 200 people (50 students, 50 faculties of MGMMC and 100 people residing around MGMMC in Indore city to find out their driving anger using DAS scale. It was found that the mean DAS score in the selected study population of Indore city was high (2.896).

As expected the mean anger level was found to be less in older age group persons. The driving anger level did vary significantly with age (p-value-0.009).

Surprisingly it was found that the persons not driving during peak traffic hours showed more mean anger level (p-value=0.050) This may be because they were not adapted to the heavy traffic conditions.

Among different subscales Slow Driving, Discourteous Driving, Illegal Driving, Police Presence, Traffic Obstruction and Hostile Gestures, Students of MGM Medical College and General population around MGMMC responded most to Hostile Gesture with mean anger level of 3.63 and 3.271 whereas faculties of MGMMC showed higher level of anger in traffic obstruction (2.97).

On comparison with Previous studies conducted in India on public vehicle drivers and drivers of US,UK and Australia, the results were as follows:

The Australian, U.S. and U.K. study people responded more to discourtesy (3.1, 3.9, and 2.7 respectively) whereas in Indian study people showed more anger towards Hostile Gesture(3.27)[4][5]The public drivers of Indore had maximal response to hostile gestures which is most responded subscale in the present study also. Surprisingly public drivers had higher mean DAS (3.42) compared to general population (3.27).[6]This may be because of long working hours of drivers as compared to the general population of Indore city.

To avoid the high anger level while driving the people should plan ahead for your regular works- Avoid rush driving; Turn down the loud music while driving; Get proper sleep in preceding night.

Apart from this the government may also take certain steps to reduce the anger level among drivers and general population by taking stringent measures to enforce the already existing legislative measures like higher fines, loss of license, warning letters, and mandatory jail. This will act as an effective barrier towards aggressive driving. Finally we can't change the road conditions or other drivers, with whom we share the road, but we can change and control our own behavior – we can drive defensively and safely.

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Interest of conflict: None

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Original Research Article

Lecture delivery-an empirical investigation of undergraduate medical student's perceptions and preferences

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Date of Submission: 04.12.2013 **Date of Acceptance: 29.05.2014**

Abstract

Different methods of lecture delivery for teaching are being used for medical students. The methods mainly used are blackboard (BB), transparency over head projector (TOHP) or PowerPoint (PPT) presentations. Each method has its own advantages or disadvantages. to find out student's preferences regarding different lecture delivery methods for undergraduate medical teaching and also to know their perceptions about teaching in medicine. A descriptive cross sectional, questionnaire based study on the comparison of different teaching methods for undergraduate medical students was conducted at the MIMS medical college, Vizianagaram. Study group included 56 students attending Community Medicine classes on medical entomology topic. The performance of students was assessed after each of the teaching style with the help of a structured questionnaire. At the end of the lecture series, students were asked to fill a feedback regarding their preferences about various methods of teaching. Data was analysed to know the significance. It was observed that students preferred the use of PowerPoint presentation in lectures (53%) than blackboard and overhead projector. Over head projector was the least preferred (5%) method. Maximum students agreed that lectures and clinical postings both enhance understanding of the subject but duration of lecture should not be more than 1 hour.

Key-words: Lecture, undergraduate medical students, Power point, Black board, Over head projector

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Introduction

Lectures can be traced as far back as the Greeks of the fifth century BC, and lectures were the most common form of teaching[1]. Many instructional tools are identified for effective transfer of information to students, but as a rule lectures remain an important component of medical education[2]. In the early years of undergraduate medical education students attend more lectures than they see patients. Lectures are a substantial part of the learning experiences of students and so merit our attention[3]. The most common method of teaching for medical students is lecture. Though small group learning is the best way for teaching, still we prefer lecture as we have a large numbers of students. Hence, it is immensely important that lecture should be as effective as possible[4].

Use of teaching aids in medical education technology is swiftly changing from blackboard to virtual simulations and teaching methods range from lectures to integrated teaching[5]. However, the optimum use of audiovisual aids for lecture delivery is essential for deriving their benefits [6]. Although the maximum benefit of visual aids is obtained only in conjunction with a well structured lecture, comparison of the recall of visually and verbally presented lecture information has shown a clear superiority of visual information over verbal information for both immediate and long-term recall[7]. At present, the most common ways of lecture delivery include the lectures using power point (PPT) presentations, lectures utilizing the transparency and overhead projector (TOHP) besides the traditional 'chalk and talk' by the Blackboard method[5].

There is a mixture of views based on various studies and it is not clear whether a particular lecture delivery method is superior to others8. Limited research, specifically from medical education, exists on this subject in India. With this background, the present study was undertaken to find out student's preferences regarding different lecture delivery methods for undergraduate medical teaching and also to know their perceptions about teaching in medicine.

Material and Methods

The study was conducted at the Maharajah's Institute of Medical Sciences (MIMS) medial college, Nellimarla during November-December 2012. It was a descriptive cross-sectional type of study undertaken among second year MBBS students (n=56). The students were explained regarding the nature and purpose of the study. Data collection was done with the aid of printed pre-designed and pre-structured questionnaires for comparison of lecture delivery methods and feedback. The study was carried out in two phases: viz, 1. Lectures delivered in three different methods and 2. Feedback from the study participants. Initially 3 different classes were taken on different days using different lecture delivery methods. To minimize the bias, same teacher delivered these lectures to same students. The lecture series was on medical entomology topic with subtopics as follows: (a) Diseases transmitted by mosquitoes and control measures against mosquitoes, covered with the aid of Chalk & talk, (b) Fly transmitted diseases and control measures taught with the aid of Over head Projector and (c) Tick, mite & flea transmitted diseases and control measures which was taught with aid of liquid crystal display (LCD) Projector using a power point presentation. During each class, students were asked to write answers for 10 questions related to that particular topic as a pre-test and a post-test. Each student was given marks out of 10 and mean for that particular method for lecture delivery was calculated. The marks of students in each of the three methods were taken for obtaining the final assessment score regarding each of the lecture delivery method. The mean scores of these lectures were statistically compared. After the completion of this lecture series, feedback from the study participants was obtained on a printed questionnaire with close ended questions about their preferences and perceptions of medical teaching. Data entry was done in Microsoft office excel 2007 and analysis was done with the help of SPSS version 20.0 to calculate mean, standard deviation (SD) and p-value.

Results

Total number of study participants was 56, of which male students were 17 and female students were 39 in number. Results regarding performance of students by different lecture delivery methods are summarized in table 1.

Table 1. Students marks by different lecture delivery methods

Teaching aid	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD
Chalk & talk	2.92	1.87	8.5	1.22
OHP	3.03	1.92	7.2	1.68
LCD	3.09	1.96	8.2	1.33

Table 2. Usefulness of classroom teaching for better understanding of the subject

Usefulness in understanding	Theory No. (%)	Clinics No. (%)
25 - 50%	4(7.14)	2(3.57)
50 - 75%	38(67.86)	34(60.71)
75 - 100%	14(25.0)	20(35.71)

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There was an improvement in mean scores during the post-test as compared to the pre-test for chalk & talk (p value <0.0001), OHP (p value <0.0001) and LCD (p value <0.0001). As seen from the table 1, the SD of the scores was less for the post-test as compared to the pre-test by each of the method, thus making it obvious that the post test scores of the students did not vary as much as their pre-test scores. One way Analysis of varience (ANOVA) test was applied to detect significance of differences in the students' mean scores during the pre-test as well as post-test for each of the teaching methods used in the study. The results of the ANOVA test indicated no significant difference between the mean scores of the different methods during the pretest (F=0.113, p value =0.893). However a highly significant difference was noted between the mean scores by teaching methods (F=12.803, p value <0.001) for the post test. The difference in scores between lectures using Blackboard and LCD was statistically not significant (p value =0.215) for post test. But the difference in scores between lectures by Chalk & talk and OHP was statistically highly significant (p value < 0.001). Similarly, the difference in the scores between lectures with OHP and LCD was statistically significant (p value < 0.001).

Table 3. Preferred duration of theory class

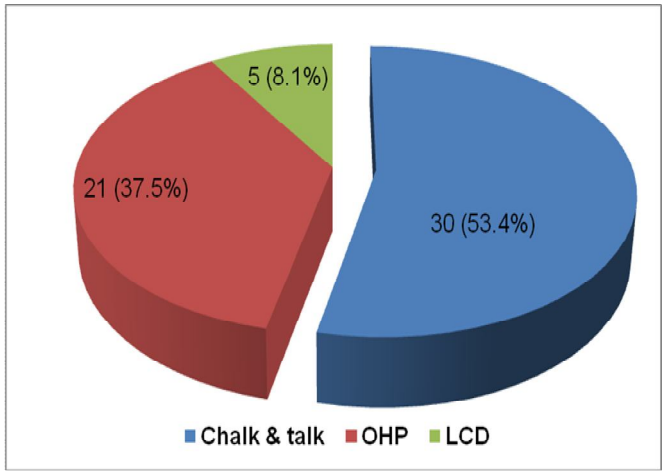
Duration	Number	Percentage
30 min - 1 hour	24	42.86%
1 – 1.5 hour	3	5.36%
Depends on topic & teacher	29	51.78%

Table 4. Active involvement in learning by students

Seminars & tutorials	Male students	Female students	Total students
Yes	5	26	31
No	12	13	25
Total	17	39	56

Chi square=6.6, p value = 0.009916

Figure 1. Preferred method of teaching from feedback



The preferences and perceptions of the students regarding teaching as obtained from feedback are represented ahead.

In the written feedback students were asked to mention the method of their preference from amongst Chalk and talk, OHP or LCD. This is shown in figure 1.

All thestudents responded that find teaching during theory classes as well as the clinincs useful in understanding the subject. The usefulness was graded as shown in the table 2.

The study participants were asked about their perception regarding field posting as a part of clinical posting for Preventive and social Medicine. Total 51 (91.9%) of the students were

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

in favour of field posting and remaining 5 (8.1%) expressed that there should not be any field visits.

Involvement of students in learning increases the understanding. When asked whether such active involvement by students should be included in form of compulsory tutorials and seminar presentations by the students, 31 (55.36%) of them gave a positive response. The details are represented in the table 4.

Discussion

The value of classroom teaching m medical education is being debated over the past few years partly due to the advent of newer technologies for learning such as video-streaming and online lectures, and partly due to disinterest by students reflected as their decreased attendance in classrooms. In this context, feedback from students about adopted teaching methodology is a useful basis for modifying and improving the quality of the educational system.

The post-test scores were higher than the pre-test scores for all the lectures. These were noted to be statistically significant. An increase in the post test scores by lectures has been reported in another study[9] on a large group of non-medical students. Comparison of mean scores by different lecture delivery methods revealed maximum scores by chalk and talk followed by powerpoint and TOHP. Similar finding of statistically significant higher marks by using Blackboard has been reported by other authors in their study[10]. In the present study, the difference among the mean marks of students taught by these three methods was statistically significant (p value < 0.001). This finding coincides with another study showing statistically significant difference in the scores by different methods[10].

The feedback from the students showed that preferred method was powerpoint using LCD. Other researchers[6, 10, 11] also reported a student preference for powerpoint. This is in contrast to observations in yet other studies where medical students expressed that they prefer traditional Blackboard teaching over the multimedia approach of power point using animations[12,13] . In the present study all the students opined that classroom teaching was useful, and three-fourths of the students found classes helpful in understanding the subject by 50-75%. This is coinciding with other studies done earlier where medical students had expressed that theory classes are helpful[11] and lectures develop the ability to understand the topic better[14]. In the present study maximum students perceived that duration of theory class should depend on the topic and the teacher or it should be between 30 min to 1 hour. Preferred duration of theory class as 45 minutes has been reported in another study also[11]. This can be explained based on the fact that the concentration decreases when the duration of the class is longer. This is immensely important in medical education as learning the medical subjects requires a continuity of thought along with full concentration on part of the medical students. Longer duration of theory classes may not fulfil with this requirement. Further teaching skills and ability to communicate with the students vary from teacher to teacher. The same difficult to understand topic when is covered by a teacher in an interesting way, the understanding increases. This might be the possible reason behind the students' preference that duration of class should depend on the teacher. It was observed in the current study that more than half of the students were in favour of active involvement of students in learning. Number of female students having an opinion that students should be actively involved in learning was significantly higher (p value = 0.009916) as compared to male students. Another study also revealed a similar finding wherein 64 % students found active involvement such as revision cum self study as the best form of learning15. But seminars were not preferred by the study group of other workers[11, 15].

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Thus mixed preferences regarding lecture delivery methods, duration of classes and inclusion of seminars were observed in the present study. Inspite of the variations in the preferences and perceptions, one thing which emerged as an important result of the study is that classroom lectures surely help in understanding the subject for medical students. This is noteworthy in the context that the current techno-savy generation is assumed to favour internet based learning.

Conclusions

The present study which shows higher post-test scores as compared to the pre-test scores of the students by all the lecture delivery methods clearly highlights that classroom teaching by lectures still holds an upper hand. Maximum mean score during lecture series was with use of chalk & talk followed by LCD. Feedback from students however revealed LCD as most preferred method. In a nut shell, performance of the students' revealed chalk & talk as the best method of lecture delivery in contrast to power point by LCD as preferred method obtained from feedback. Thus although the students' preferences was for multimedia methods, their actual understanding of the subject was best by use of the traditional method. So it rests in hands of a trained teacher to make teaching more interactive and interesting especially when the medical subject is so vast. Any teaching aid would be effective when it is used by teachers in appropriate way. This underlines the importance of regular teacher training programmes and the need for formal training in teaching technologies to develop good presentation skills.

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Interest of conflict: None

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Original Research Article

Should Doctors Wear White Coat-Patients Perception

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Abstract

Introduction: There is now substantive information that adult patients prefer doctors in clinics and hospitals to be traditionally, or at least smartly, dressed; to wear a necktie; to have short hair; and to wear white coats with a name tag. **Objective**: The objectives of the present study are to determine views of patients attending Sapthagiri medical college hospital on the white coat and to assess patients' opinion on attire and appearance of doctors **Results:**Significantly more of those aged over 50 thought their doctors should wear white coats in comparison with those under 50 ($p<0.05$). 87.9% believed that white coat would aid in ease of identification and about 70.0% thinks doctor were white coat because of tradition. About 205(51.2%) patients strongly believe that wearing white will not interfere in doctor patient relationship. **Conclusion:** most of the patients ranked easy of identification and professionalism as the main reasons for doctor wearing white coat.

Key words: doctors, white coat, patient's perception.

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Introduction

Since the time of Hippocrates doctors have been given advice on the way they should dress[1]. Sometimes this is for functional or hygienic reasons, but usually it is because of a supposed influence on the doctor-patient relationship. Professional appearance of a doctor is an important element affecting the perception of competence of the doctor among patients and their attendees, thus influencing their compliance[2].

Despite attempts to increase the opportunities for doctors to be made aware of patients' views there may still be a discrepancy between patients' opinion and medical practice[3]. In a hectic and demanding clinical environment it is often difficult to provide care of a high academic standard and at the same time provide patients with a service that meets all their needs and expectations. Nevertheless, such goals are within the remit of good medical practice, clinical governance, and the Patient's Charter[4].

There is now substantive information that adult patients prefer doctors in clinics and hospitals to be traditionally, or at least smartly, dressed; to wear a necktie; to have short hair; and to wear white coats with a name tag (5-10).

When doctors' and patients' views differ, it is important to determine the reasons for these differences as these may affect patients'

perceived quality of care and their overall impression of the medical profession[11]. The objectives of the present study are to determine views of patients attending Sapthagiri medical college hospital on the white coat and to assess patients' opinion on attire and appearance of doctors.

This study will help us understand patient's perception on wearing white coat and to assess whether this affects patients' perceived quality of care and whether patient education will alter this view.

Methodology

A cross sectional study was conducted among the adult patients attending outpatient departments of medicine , surgery, O& G, pediatrics, orthopedics, ENT, ophthalmology and dermatology. A total of 400 patients were included in this study. All patients above 18 years attending outpatient departments were included in study. Oral consent was obtained from all participating patients. Questionnaire used in this study was standardized by doing a pilot study on 120 subjects. Likert scale method was used to assess the attitude of patients towards white coat.

Patients were asked to answer "agree" "disagree" or "no response" to the question. They were given an opportunity to qualify their answers by giving their own reasons. For analysis of the Likert ratings, the patient opinion on doctor's wearing white coat was given a numerical value. For negative questions value'1' equated to 'strongly agree' through to the value '5' which equated to 'strongly disagree'. For rest of questions value'1' equated to 'strongly disagree' through to the value '5' which equated to 'strongly agree'. The patients' age, sex, educational qualification, occupation was also noted.

The study was conducted between 9 am to 1pm for a period of 1 month. Data was analyzed using SPSS version 16 to calculate simple proportion and chi-square test.

Results

Altogether 400 patients were included in the study of which 44% of patients were females. The number of patients aged less than 50 was 340(85%); 60(15%) patients were aged more than 50. Mean age of patients was 45.4.

Characteristics of study participants are listed in Table 1. Of the 400 respondents, 175 (56%) patients were male and 225 (44%) female patients. More than 55% patients were from urban area and 33.5% of patients had education up to secondary level, followed by 113(28.2%) patients had education up to graduation. Thirty five percent of participants were housewife and 62(15.5%) participants were in technical jobs.

Significantly more of those aged over 50 thought their doctors should wear white coats in comparison with those under 50 ($p<0.05$) and Patients aged 20–29 were least likely to want their doctor to wear a white coat. There was a significant difference between the patients belonging to various age groups for their views regarding doctors wearing white coat.

Table 2 illustrates that of the 308 patients who said doctors should wear white coats, 87.9% believed that white coat would aid in ease of identification and about 70.0% thinks doctor

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table1. Characteristics of study participants (n=400)

Characteristic	Value
Age (mean, SD)	45.4 ±16.9
Sex (% male)	53.8
Residence (% Urban)	55.5
Occupation(% Services)	40.0
Education (% High School)	60.9

were white coat because of tradition and this view was most prevalent in the oldest age group (50 years and above).

Nearly 169 (42.2%) patients said doctor wear white coat as it provides pocket for books and equipment and more than half of patients think white coat is worn by doctors to keep their cloths clean.

About 205(51.2%) patients strongly believe that wearing white will not interfere in doctor patient relationship.

The Likert rating data showed a significant difference between male and female participants with regard to doctors wearing white coat. Male Patients ranked easy of identification, tradition, professionalism and to inspire confidence among patients as the main reasons above other for doctor wearing white coat compared to female patients who ranked professionalism, easy of identification and tradition as reasons for doctors wearing white coat.

It was interesting to note that male patients ranked difficulty to keep clean and infection risk as the least likely reason for doctors not wearing white coat as compared to female patients who ranked feeling uncomfortable on wearing and difficulty for obtaining as the least likely reason above other for doctors not wearing white coat.

Table 2.Mean Likert Ratings for patients' perception on doctor wearing white coat.

Perception	Male patients	Female patients
Doctor wears a white coat because of tradition	4.05	4.12
Doctor wears a white coat because of peer pressure	2.98	2.92
Doctors do not wear a white coat because of the infection risk	3.1	4.23
Doctor wears a white coat because of easy of identification as doctor	4.75	4.29
Doctors do not wear a white coat as it is hot / uncomfortable	2.7	4.45
Doctor wears a white coat to prevent themselves from infection	2.75	3
Doctors do not wear a white coat because of difficulty in obtaining one	2.94	4.16
Doctor wears a white coat because of the pockets for books/equipment	3.1	3.12
Doctor wears a white coat to keep their clothes clean	2.86	2.87
Doctors do not wear a white coat because they interfere in the doctor-patient relationship	2.87	3.95
Doctor wears a white coat because they look professional	4.05	4.7
Doctors do not wear a white coat because it is difficult to keep it clean	3.14	3.57
Doctors wear a white coat because it inspires confidence and trust among patients	4.35	4.3

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Note. Items rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) for positive questions and from 5 (strongly disagree) to 1 (strongly agree) for negative questions.

Discussion

The present study showed that 77 % of the patients (n=400) favoured doctors wearing white coats. These findings when related to studies done in medical specialties, it was observed that Harnett[12], Tiwari et al [13]and Dunn et al [5] had found 59% of oncology patients (n=180), 62% of inpatients at Harlow hospital (n=160), and 65% of patients at teaching hospitals in Boston and San Francisco (n=200) respectively, favoured white coats. This differs from the more recent findings of Dover [14]and Gooden et al [15] who found that 48% of patients (n=300) and 36% of inpatients (n=154) respectively, favoured white coats. The variation in these results reflects the differing opinions of patients in different countries and time periods.

In this study, it was found that ease of identification was the foremost view of the patients regarding doctors wearing white coat in the oldest age group (75%). This finding is in accordance with a previous study by Harnett[12].

Although medical opinion in different parts of the world is changing away from the white coat, others feel they still have a positive role. However, it has been suggested that in a hospital where other health care workers wear white coats, a name badge would be a better form of identification.

Less than 5% of patients expressed the view that white coats could be a health hazard, while 12% said they help prevent infections. These differences may be related to difference in awareness levels about the risk factors for transmitting hospital acquired infections. However, several studies have documented bacterial contamination of both white coats and nurses' uniforms, suggesting a potential risk [16-19]. Further studies are required to determine if suits, shirts, or ties worn by doctors are similarly colonized and to examine if not wearing white coats reduces hospital acquired infections.

Patients in different age group have considerably different views on doctors wearing white coat. Patients want to be able to identify their doctors and see the white coat as a means of achieving this. It can be suggested that further studies are needed to assess whether this affects patients' perceived quality of care, and whether patient education about infection risk and the fact that other health care workers also wear white coats will alter their view.

Conclusions

Male Patients ranked easy of identification, tradition, professionalism and to inspire confidence among patients as the main reasons above other for doctor wearing white coat compared to female patients who ranked professionalism, easy of identification as reasons for doctors wearing white coat. More patients especially those older than 50 years, feel that doctors should wear white coats for easy identification.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

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Original Research Article

Assessment of Knowledge, Attitude and Practice about leprosy among patients and their families in a rural community in Tamil Nadu

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Abstract

Background: Leprosy as a social disease has been a major public health problem because of the social stigma and ignorance attached to it. This has made it difficult for our health care delivery system in their pursuit for early diagnosis and prompt treatment. This study was done with the objective of assessing the present knowledge, attitude and practice of leprosy affected persons and their family members in a rural setting. **Methods:** This cross sectional study was conducted by using a pre tested, structured questionnaire among 100 registered Leprosy patients and 100 adult members of patient's family in Thiruvallur district of Tamil Nadu. Data collected was analyzed and results were summarized in percentages and presented in tables. **Results:** About 32% of the patients and 37% of family members were aware that leprosy is caused by a germ. Skin patches and loss of sensation as symptoms of Leprosy were known to 55% of patients and 73% of the family members. 84% of Patients and 64% family members said that leprosy was curable. About 90% of the patients and 82% of the family members stated that deformities can be prevented by early and regular treatment. The patients showed a negative attitude after contracting the disease. Most of the family members (73%) did not share articles used by patients. 91% of the family members felt leprosy patients can be employable. About 45% the family members opined that a cured leprosy patient can marry. About 90% of the patients participated in social functions and 64% didn't hesitate to take food along with others. All family members were found to be willing to support their leprosy affected relatives. **Conclusion:** This study revealed inconsistency and deficiencies in the knowledge, attitude and practice among the leprosy affected patients and their family members. The patients and family members had adequate level of knowledge about leprosy, but their attitude toward the disease was average but their practices were not satisfactory.

Keywords: *Leprosy, stigma, knowledge, attitude, practice.*

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Introduction

Leprosy is often referred to as the oldest disease known to man. Of all the communicable diseases, leprosy is the most important for its potential to cause permanent and progressive physical disability. In addition the disease and its visible deformities in particular contribute to intense social stigma and social discrimination of the patients. Leprosy understood as God's retribution, has been present since the colonial times. Stigma attached to leprosy is typically a social process, experienced or anticipated, characterized by exclusion, rejection, blame or devaluation that result from experience, perception or reasonable anticipation of an adverse social judgment about a person or group.[1] The practice of isolating patients which was based on old religious traditions served the purpose of keeping leprosy sufferers part out of sight.[2]

While knowledge is an important factor, there are social and cultural pressures that have an impact on decision making and contribute to the delay in treatment seeking behavior of those affected. Even in situations where social pressures are minimal the individual's own perception of the risks involved in diagnosis is a further pressure on decision making. In his article on Health Related Stigma's, Graham Scambler describes about different forms of stigma especially about "enacted" and "felt stigma", the latter referring to fear of discrimination rather than to actual stigma.[1] As

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

a result of perceived stigma, people may adopt a first choice strategy of non-disclosure and concealment. This had been a deterrent in the early diagnosis, prompt treatment and cure of leprosy in the earlier days.

Family is the source of social support to its members especially to those who are patients of chronic illness and more so stigmatized disease such as leprosy, which is as much a social problem as a medical problem. It was found that knowledge of the affected family about leprosy was significantly associated with their leprosy patient's attendance at treatment clinics. Lack of treatment compliance results in aggravation of the disease and manifestation of deformities causing social, economic and psychological problems to the patients and their family.[3, 4] With this background this study was planned with the main objective of assessing the knowledge, attitude and practice about leprosy among the patients and their family members in a rural community in Thiruvallur District of Tamil Nadu.

Methods

Study design and area: A population based cross sectional study was conducted in the Thiruvallur District of Tamil Nadu State. Most of the leprosy affected patients were residing in the rural villages of Nemam, Thiruninravur, Porur, Kadavur, Kollemedu, Redhills and Manali. This study area falls under the jurisdiction of Office of the Deputy Director, Leprosy Regional Centre, Ponamallee, Thiruvallur District of Tamil Nadu.

Sample size and sampling technique: A convenient sample of 100 leprosy affected patients, who are living in these villages, who had been registered at the Leprosy Regional Centre, Ponamallee, and 100 available adult members of the patient's family who were present at their residence during the data collection had been selected for this study.

Data collection: The data collection was done by using a pre tested, structured questionnaire for this study. The questionnaire was on responses to knowledge, attitude and practice about leprosy by the affected patient and the family members based on materials obtained from previous studies related to this study. Both the patients and the adult member of their family were interviewed by administering the questionnaire personally at their residence. They were briefed about the purpose, importance and usefulness of this study in assessing their understanding about its socio-cultural and medical implications. The informed consent was obtained from those who were willing to participate in the study.

Scoring of knowledge, attitude and practice: Six questions with "yes" (for correct answers) or "no" (for incorrect answers) were presented to assess the knowledge of the patients and family members about leprosy and those responses with score greater than or equal to 70% were considered knowledgeable. A five item question was used to assess participants' attitude towards leprosy patients and those who score 70% and above were considered as having good attitude. To assess the practice of respondents, seven questions were prepared for the patients and three questions were for the family members and those who answered "Yes" to more than 70% of the questions were considered as if they are practicing correctly.[5]

Data analysis: Basic demographic and morbidity details of the respondents such as age, sex, literacy, occupation and disease status etc were ascertained. Data was analyzed and the results were tabulated in the tabular form applying appropriate descriptive statistics.

Ethical consideration: The study was carried out after securing the necessary ethical clearance from ethical committee of our Institution. The study populations were the registered patients with the Regional Leprosy Centre and they were asked to participate in the study after they were explained about the objectives of the study and also after obtaining

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

written consents from study participants. Confidentiality of the study subjects was maintained.

Results

Socio-demographic characteristics of the study group: Out of the 100 Leprosy patients 64 were males and 36 were females. Among the family members 73 were females and 27 were males. Age group of leprosy patients ranged from 16 to 55 years. The age group of family members ranged from 20 to 50 years. In this study both the patients and family members were found to be literate. Majority of the family members completed high school. No patient has studied beyond higher secondary education. 36% of the female patient had high school level of education and 28 % of the male patients had primary school level of education. 55 % of males and 18 % of females were skilled workers (Table-1). According to B.G. Prasad Classification for socioeconomic status, 54% belonged to Class I, 28% to Class II and 18% from Class III.

Knowledge level of the study group about leprosy: Regarding the knowledge level of leprosy, about 32% of the patients and 37% of family members were aware that leprosy is due to infection caused by a germ. But many of these respondents also held other multiple beliefs regarding the causation of the disease like overwork, malnutrition, heredity, tiredness, insect bite, excess heat, sin, alcohol etc. Regarding the presenting symptoms, about 55% of patients and 73% of family members said that patches on the skin and loss of sensation were important symptoms of leprosy. Regarding the mode of spread, about 72 % of the patients and 37 % of family members said personal and close contact was the important mode of spread of leprosy, while 19% of the patients and 45% of the family member also said leprosy is spread through air. Thus a majority of 91% of the patients and 82% of family members answered correctly about the modes of Spread. 82% of the patients and 64% of family members responded correctly for duration of treatment of leprosy. Regarding cure of leprosy it was found that 84% of the patients and 64% of family members answered in the affirmative that leprosy is curable. 90% of the patients felt that the treatment of leprosy was too long. (Table-2)

Table -1 Distribution of the socio-demographic characteristics of the study group

Variables	Patients			Family Members		
	Male	Female	Total	Male	Female	Total
Total	64 (64)	36 (36)	100 (100)	27 (27)	73 (73)	100 (100)
Age (years)						
16-25	18 (18)	27 (27)	45 (45)	0 (0)	10 (10)	10 (10)
26-35	19 (19)	9 (9)	28 (28)	18 (18)	27 (27)	45 (45)
36-45	9 (9)	0 (0)	9 (9)	0 (0)	27 (27)	27 (27)
46-55	18 (18)	0 (0)	18 (18)	9 (9)	9 (9)	18 (18)
Education level						
Primary School	28 (28)	0 (0)	28 (28)	10 (10)	18 (18)	28 (28)
High School	18 (18)	36 (36)	54 (54)	18 (18)	36 (36)	54 (54)
Higher secondary	18 (18)	0 (0)	18 (18)	9 (9)	9 (9)	18 (18)
Occupational Status						
Skilled	55 (55)	18 (18)	73 (73)	27 (27)	27 (27)	54 (54)
Semi-skilled	1 (1)	8 (8)	9 (9)	0 (0)	0 (0)	0 (0)
Unskilled	8 (8)	10 (10)	18 (18)	0 (0)	46 (46)	46 (46)

(Figures in parenthesis are percentages) [Patients =100 Family members=100]

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table -2 Knowledge about Leprosy among patients and Family members

Knowledge Variables	Correct Response (%)
Patients	
1. Causes of leprosy	32.0
2. Presenting Symptoms	55.0
3. Modes of Spread	91.0
4. Duration of treatment	82.0
5. Leprosy is curable	84.0
6. Deformities preventable	90.0
Average knowledge level	**72.3**
Family members	
1. Causes of leprosy	37.0
2. Presenting Symptoms	73.0
3. Modes of Spread	82.0
4. Duration of treatment	64.0
5. Leprosy is curable	64.0
6. Deformities preventable	82.0
Average knowledge level	**67.0**

Table -3 Attitude towards Leprosy among the study group

Attitude towards Leprosy	Yes %	No %
Patients		
1. Informing the family immediately after the diagnosis	9.0	91.0
2. Any form of neglect by family after the information	10.0	90.0
3. Any change in the 'Role' played in the family	0.0	100.0
4. Preference for discreet treatment	100.0	0.0
5. Feeling about duration of treatment considered too long	90.0	10.0
Average level of attitude	**41.8**	**58.2**
Family members		
1. Staying of the patients in the family	82.0	18.0
2. Sharing of articles of the patient	27.0	73.0
3. Employment of the patient	91.0	9.0
4. Sitting beside a cured leprosy patient while traveling	91.0	9.0
5. Marriage of cured leprosy patient	45.0	55.0
Average level of attitude	**67.2**	**32.8**

Table-4 Practices status of the study group about leprosy

Practice status	Yes %	No %
Practices of leprosy Patients		
1. Interruption in the treatment	18.0	82.0
2. Participation in Social Functions	90.0	10.0
3. Taking food along with others	64.0	36.0
4. Changes experienced in the ability to do work	18.0	82.0
5. Avoiding certain foods	18.0	82.0
6. Use of other systems of medicine for treatment	18.0	82.0
7. Difficulty in moving in public places	9.0	91.0
Average practice status	**33.6**	**66.4**
Practices Among family members		
1. Take food cooked by cured leprosy patient	09.0	91.0
2. Avoid cooking certain foods because of affected family member	10.0	90.0
3. Support throughout the duration of treatment of affected family member	100	0.0
Average practice status	**39.7**	**60.3**

Attitude of the study group towards leprosy: The study shows that only about 9% of the patients felt like informing the family members immediately after making the diagnosis that they are suffering from leprosy. There was no change in the role the patient played in the family and only about 10% informed about any form of neglect after the information sharing. All the patients felt the need for discrete form of treatment [not revealing to others] and nearly 90% felt the duration of treatment was too long. 82 % of the family members said that a leprosy patient can stay with them in their house and 73 % of them hesitated to share articles of leprosy patient. 91% of the family members felt that leprosy patients can be employable and doesn't mind sitting beside them. About 45% the family members opined that a cured leprosy patient can marry. (Table-3)

Practice status of the study group about leprosy: This study shows that 90 % of the patients had participated in social functions and

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

91 % did not find it difficult in moving in public places 91 % of the family members answered that they will not eat food cooked by a cured leprosy patient. Ninety one 91% agreed that leprosy patients can be employed and also willing to be seated beside a cured patients while travelling and 45% agreed that they can get married after cure. (Table -4)

Discussion

This study which was conducted on leprosy patients and their family member in rural areas in Tamil Nadu on their knowledge, attitude and practice, shows interesting findings and also revealing a wide gap in their knowledge, attitude and practice levels. Most of the patients in the study group were males (64%) while 73% of the family members were. This male predominance among the patients is found to be comparable to similar studies conducted the patients in a leprosy colony in Mysore. [6,7] Regarding the cause of leprosy about 32% of the patients and 37% of family members informed that that leprosy is due to an infection caused by a germ. But many of these respondents also held other multiple reasons contributing to the causation of the disease like overwork, malnutrition, heredity, tiredness, insect bite, excess heat, sin, alcohol consumption etc. In a study conducted in Mangalore, about 8 % among the community members knew that leprosy was caused by germs. [8]

About 55% of the patients and 73 % of the family members knew that skin patches with loss of sensation were the important symptoms of leprosy. This is in contrast to a study done at Palmoy where it was found that 90 % of the community members stated correct symptoms of leprosy. [9] About 91 % of the patients and 82 % of the family members said personal and close contact and air were the important modes of spread of leprosy. A similar study regarding the knowledge about the mode of spread of leprosy found this knowledge was lacking in the majority of the patients. [10] This study found that 64% of the family members and 84% of the patients said that leprosy was curable. In a study conducted by Shetty found that 86 % of patients and 60% of the family members were of the opinion that leprosy is curable.[8] A study conducted by Raj V [10] revealed that knowledge regarding the duration of treatment was lacking in a majority of patients, while this study showed that nearly 82% of the patients and 64 % of family members stated correctly the duration of treatment of leprosy.

In this study 91 % of the patients did not inform immediately their family members about them being diagnosed as suffering from Leprosy. In a study conducted by Kant VP revealed that 34.2 % of the patient has hidden from their family the fact that they were taking treatment for leprosy. [11] About 82% of the family members stated that a family member affected with leprosy can stay with them. The study conducted in Mangalore revealed that 60% of the patients felt it was necessary to segregate leprosy patients.[8] Regarding continued staying of the patients in the family, it was found that 82% of the family members where in favor of the patients staying with them. In a study done by Raju MS found that 83 % were in favor of retaining patients in their own homes.[4]

Majority (90%) of the patients in this study participated freely in social functions. But 91 % of the family members said they would not take food cooked by cured leprosy patient. As few as 1 to 25% of the respondents in a study done by Raju MS with high knowledge level were willing to accept food cooked by a cured leprosy patient whereas none of them were willing to do so from Orissa [4,7] A study done at Palmoy by Croft RP found that 70 % of the community member said that a leprosy patient could eat with his or her family member.[10] In this study 18 % of the patients used other system of medicine for faster healing of leprosy but in a study conducted in Myanmar revealed

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

that 31.5 % of rural leprosy patient were taking other system of Medicine. [7]

To sum up, this study clearly shows that an average score of about 70% was achieved by the respondents who had a satisfactory level of knowledge of the disease leprosy. But only one-third of the patients and family members were aware that leprosy was due to infection. Regarding the right attitude, the average score was only about 41% for the patients and 67% for the family members towards the disease. The stigmatized attitude towards leprosy such as difficulty in getting marriage proposal, staying away from family members was still persisting in the community. Regarding the correct practices the average score was only about 33% for the patients and 39% for the family members. The social acceptance of the cured patients by the community was still very poor in practice.

Conclusion

This study has revealed inconsistency and deficiencies in the knowledge, attitude and practice among the leprosy affected patients and their family members among the study population. A significant number of participants in this study had poor knowledge of the cause, mode of transmission, symptoms, referral pattern, cure and prognosis of leprosy. Continued health education and behavior change activities are still the only tool to increase awareness regarding leprosy to get rid of misconception about the medical causes and social issues related to leprosy at community level. This will help the affected persons realize the importance of correct knowledge, attitude and practice to make them socially adaptable, acceptable and independent.

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Original Research Article

A Study on Childhood Obesity and Breastfeeding Practices in Chennai

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Abstract

Introduction : The prevalence and intensity of childhood obesity has been increasing with an alarming rate globally and now it is considered to be at epidemic level. Childhood obesity has now become an important health problem in developing countries particularly India, which is currently experiencing a rapid epidemiological transition. **Objectives :** To find the association between childhood obesity and breastfeeding practices, childhood obesity and socio-economic status and prevalence of childhood obesity among study population. **Methods :** A case –control study was conducted among 128 children (12 cases and 116 controls) by a predesigned and a pretested questionnaire using convenience sampling . Data was analyzed using SPSS version 17 for windows. Proportions ,t test and Chi-square test and Odds ratio were calculated for the study variables . **Results :** Of the total 128 children studies majority (59.4%) were males and maximum (53.9%) were aged 5 years. Prevalence of childhood obesity was 9.4%. Exclusive breast feeding and giving colostrum was not associated with childhood obesity. **Conclusion :** The present study showed that exclusive breast feeding and giving colostrum was not associated with childhood obesity. So as to reduce childhood obesity awareness has to be created in schools about obesity and its incumbent health problems presently and subsequently, lifestyle and behaviour modifications like walking or cycling to school, increasing physical activity, improving quality of diet and avoidance of junk ,energy dense and micronutrient poor food. For realisation of this , a commitment by all sectors of society is required .

Key words : *Childhood obesity, Exclusive breastfeeding , Colostrum.*

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Introduction

The prevalence and intensity of childhood obesity have been increasing with an alarming rate globally, and it is now considered to be at epidemic level. This nutritional problem has become an issue of international concern, which is common not only in developed but also in developing countries. It is associated with mortality and morbidity, including hypertension, cardiovascular, gastrointestinal, endocrine, respiratory and orthopaedic diseases as well as psychosocial problems both in adults and children. Obesity and its consequences account for huge costs for health and social care .[1] The impact of childhood obesity was the most extensively studied theme in this period in the selected journals. It is already known that obesity rates in the younger strata of society are progressively increasing; however, the greatest concern regarding this finding is the high frequency of overweight children who become obese adults. Furthermore, childhood obesity has early effects on the cardiovascular and metabolic health of the individual. [2] The most acceptable definition is given by World Health Organization and International Obesity Task Force is in terms of Body Mass Index. [3] Available data on prevalence of obesity from different published studies suggest that the prevalence ranged from 10 to 50 percent. The prevalence of obesity in Chennai urban population indicates that 22.8% males and 31.8% females were obese respectively and in children it is 17% .[4] There is evidence that breastfeeding may have protective effect against obesity, however, more recent studies[1,5] have reported null effects.

Childhood Obesity has now become an important health problem in developing countries particularly in India, which is currently experiencing a rapid epidemiological transition. Due to the consequences of industrialization and urbanization which lead to rise in standards of living, promoting weight gain, leading to rapid rise in rates of obesity, thus posing a growing threat to the health of the nation. [1]

Very few community based studies conducted on childhood obesity in Tamil Nadu are available in various scientific journals or in the internet. In Chennai city, very few community based case-control studies were done on childhood obesity and its association with breast feeding practices. Therefore a case-control study was designed and undertaken to find out childhood obesity and its association with breastfeeding practices and to estimate its proportion in children in the age group of 4-10 years in a private school in Chennai.

Materials and methods

A case-control study was conducted among the children of 4-10 years of a private school in Chennai city from July 2013 to August 2013 for a period of 2 months. The present case-control study was conducted after approval from Institutional Ethics committee and after taking consent from the participants.

A total of 140 children aged between 4-10 years, data was collected from July 2013 to August 2013. Data of 12 students were excluded from the study due to incomplete information, and so the remaining 128 students' data was used in the analysis. Out of 128 study subjects, 12 children were found to be obese and were considered as cases and remaining 116 children who were not obese were considered as controls. Children with BMI $\geq 85^{th}$ percentile for age and gender were considered as obese and children with BMI in the range of 5^{th} - 85^{th} percentile for age and gender were considered as non-obese . Both cases and controls are matched by age.

Inclusion criteria : Children in the age group of 4 – 10 years accompanied by their mothers.

Exclusion criteria : Children with chronic illness, chronic infections and children without mothers accompanying them.

A brief self administered pre - designed and pre-tested objective questionnaire was prepared in consultation with the experts in the field, and administered to all the mothers of 140 children. Pilot study was done in April 2013 among 30 children of an urban school, in area other than study setting area. Only minor changes were made in the questionnaire following the pilot study and they were included in the main study. All the mothers of the study subjects were explained in detail about the purpose and methodology of the study and were fully assured of strict confidentiality. Informed consent was obtained.

Relevant demographic data like age and sex of the child , educational status of mothers [6] , socio-economic status of the family, anthropometric measurements of child like height [7] , weight [7] was ascertained by using stadiometer and weighing machine and BMI [7] was calculated. Modified B.G.Prasad's socio-economic status scale was used to classify socio-economic status of mother study subjects. It is updated for per capita income according to the All India Wholesale Price Index (AIWPI) for the month of June 2013. AIWPI for the month of June 2013 was 231. [8]

Breastfeeding practices pertaining to the study subjects were obtained. The collected data was analyzed with SPSS (version17.0 for windows). Proportions , t test, were estimated. Chi-square test and Odds Ratio was done to find out association of childhood obesity with breast feeding practices.

Results

A sample of 128 school children aged 4-10 years of a private school in Chennai city was chosen to study childhood obesity and breastfeeding practices. Of these, 12 (9.4%) were obese children who were considered as

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

cases and 116 (90.6%) non-obese children who are taken as controls. The proportion of obesity in the study population was 9.4%.

Table 1 : Literacy status of mothers of study population (n=128)

Literacy	Obese (%)	Non-Obese (%)	Total (%)
Illiterate	0	0	0
Primary school	0	1 (0.9%)	1 (0.8%)
Middle school	0	1 (0.9%)	1 (0.8%)
Secondary school	0	13 (11.2%)	13 (10.2%)
PUC	0	14 (12.1%)	14 (10.9%)
Degree	5 (41.7%)	56 (48.3%)	61 (47.7%)
Professional	7 (58.3%)	31 (26.7%)	38 (29.7%)
Total	12 (100%)	116 (100%)	128 (100%)

$\chi^2 = 6.760$; df =5 ; p= 0.239

Table 2: Socio Economic Status of mothers of study population (n=128):

Socio-economic status	Obese (%)	Non-Obese (%)	Total (%)
Upper high	3 (13%)	20 (87%)	23 (18%)
High	3 (10%)	27 (90%)	30 (23.4%)
Upper middle	2 (15.4%)	11 (84.6%)	13 (10.2%)
Lower middle	3 (7.5%)	37 (92.5%)	40 (31.3%)
Poor	1 (5.9%)	16 (94.1%)	17 (13.3%)
Very poor or BPL	0	5 (100%)	5 (3.9%)
Total	12 (9.4%)	116 (90.6%)	128 (100%)

$\chi^2 = 1.858$; df =5 ; p = 0.868

Out of total 128 study population, 76(59.4%) were males and 52(40.6%) were females. Maximum numbers of study subjects 69(53.9%) were in the age group of 5years. On examining the literacy status of study subjects maximum proportion 7(58.3%) of the mothers of the obese children were professionals. Majority 56(48.3%) mothers of the non-obese children were educated up to degree. There was no statistical association between literacy of the mother and childhood obesity. (p= 0.239). (**Table-1**).

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 3: Relation of Obese and Non-Obese group with mean values of Age, Height, Weight and BMI of study subjects

Variable	Obese Children		Non-Obese Children		Mean difference	t value	df	significance
	Mean	SD	Mean	SD				
Age	5.21	0.782	5.13	0.0673	0.079	0.382	126	$p > 0.05$
Height	1.20	0.063	1.12	0.060	0.075	4.088	126	$p < 0.001$
Weight	27.02	3.46	16.30	3.66	10.72	9.705	126	$p < 0.001$
BMI	18.63	1.17	12.73	1.89	5.90	10.549	126	$p < 0.001$

Table 4 : Association between Childhood Obesity and Exclusive Breast feeding practices

Exclusive breastfeeding	Case	Control	Total
Yes	9 (9.2%)	89 (90.8%)	98 (76.6%)
No	3 (10%)	27 (90%)	30 (23.4%)
Total	12 (9.4%)	116 (90.6%)	128 (100%)

$\chi^2 = 0.018$; df =1 ; p = 0.893

Table 5 : Association between giving Colostrum during the initial few days after birth and Childhood Obesity.

Colostrum given	Cases	Controls	Total
Yes	11	102	113
No	1	14	15
Total	12	116	128

$\chi^2 = 0.147$; df = 1 ; p = 0.702

As per socio-economic status of mothers was concerned, the proportion of obesity in children was 13% in mothers belonging to upper high class, 10% in high class, 15.4% in upper middle class, 7.5% in lower middle class, 5.9% in poor class and 0% in BPL class. Highest obesity was seen in the children of mother of upper middle class and was nil in that of very poor class. The differences in the prevalence of childhood obesity among these socio economic groups was statistically not significant, (p = 0.868). Therefore in this study socioeconomic status was not associated with the childhood obesity. (**Table-2**). In the present study the mean values of height (1.20 m), weight (27.02 kg) and BMI (18.63 kg/m^2) of obese children was greater than the mean values of height (1.12 m), weight (16.30 kg) and BMI (12.73 kg/m^2**)** of non-obese children and the difference was statistically highly significant. (p<0.001). (**Table-3**). It was observed that 9 (75%) children out of 12 cases had Exclusive breast feeding (breastfeeding $\geq$ 6 months) . Exclusive breast feeding was seen not to have any significant association with childhood obesity .(p = 0.893) (OR = 0.910 , 95% CI = 0.23 , 3.6). (**Table-4**). Out of 12 cases 11 (91.7%) children were given colostrum in the intial few days. There was no significant association between children given colostrum and childhood obesity.(p = 0.702) (OR = 1.509 , 95% CI = 0.181 , 12.60). (**Table-5**).

Discussion

In the present study, there was no statistical association between literacy of the mother and childhood obesity. It was observed that most of the cases of childhood obesity were found in mothers in higher literacy groups i.e. in degree 5(41.7%) and professional 7(58.3%) groups.

Vafa M et al(2008) conducted a cross-sectional study using a multistage sampling technique on healthy children (n=511) aged 7 years from

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

government elementary schools in Tehran, the capital city of Iran noted that in his study parental education was not significantly associated with child's obesity by multiple linear regression.[1] These findings are similar to the present study.

Similar observations were recorded in a study where Body Mass Index (BMI) was calculated annually from 2004 to 2007 in a subsample of 136 children from the Jintan Child Health Project in China. Parental factors were assessed through a self-administered questionnaire. Overweight was not associated with maternal parental education level, maternal age at birth, or breast-feeding. [5]

It was inferred from the present study that childhood obesity was found to be more in the higher educational level because they might be spending more money for dietary items like junk foods, bakery items, fried items, micronutrient poor and energy dense foods . This may be due to increasing purchasing power. Similarly in the lower educational level and illiterates none of the cases of obesity were found and it may be due to low income among them .The limited small sample size was also one of the reasons for no cases of obesity which is a limitation of the study .

In the present study, the proportion of childhood obesity was 13% in upper high class, 10% in high class, 15.4% in upper middle class, 7.5% in lower middle class, 5.9% in poor class and Nil in children of mothers of below poverty line . Highest obesity was seen in the upper middle class and was nil in very poor class. The differences in the proportion of childhood obesity among these socio-economic groups was statistically not significant, ($p = 0.868$) and therefore socio economic status was not associated with the childhood obesity.

In developed countries levels of obesity is higher in the lower socio-economic groups. In developing countries this relationship is reversed. The transition from a rural to an urban lifestyle is associated with increased levels of obesity which has been linked with dramatic changes in lifestyles (e.g. increased consumption of high energy dense foods and decrease in physical activity). [9]

In a study by Vafa M et al (2008) conducted among healthy children (n=511) aged 7 years from government elementary schools in Tehran noted that socio-economic status was not significantly associated with child's obesity using multiple linear regression. [1]

Ramchandran et al. (2002) reported obesity to be 4.5 percent in low income schools and 22 percent in better- off schools of Chennai.[10] These observations are similar to the findings of the present study.

In the present study the proportion of childhood obesity/overweight among the study population (n=128) of 4-10 years age group is 9.4%. A cross- sectional study conducted in Mysore city showed the prevalence of overweight and obesity in school children aged between 5 to 16 years to be 8.5 percent of overweight and 3.4 percent of obesity in urban area respectively.[11] Obese conditions were reported from different corporations and well off schools from Delhi and Pune and were found to be 7.4 percent and 6 percent respectively. Kapil et al. (2002), Bhave et al. (2004), and Anju et al. (2007) also reported prevalence of overweight and obesity in affluent adolescent school girls in Bangalore as found to be 13.1 percent and 5.0 percent respectively. [11] These observations favour the findings of the present study.

In India, very few studies have been carried out to study the overweight/obesity in school children and majority of them have been carried out in metropolitan cities in high income schools.(Subramanyam et al. 2003 ; Kaur et al. 2005 ; Sidhu et al.2005 ; Kaneria et al. 2006 ; Laxmaiah et al. 2007; Aggarwal et al. 2008). Ramchandran et al. (2002) reported obesity to be 4.5 percent in low income schools and 22 percent in better- off schools of Chennai. [11]Among above findings some results were higher than the present study and this may be due to the study being conducted among better-off schools only.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

In a Delhi school with tuition fees more than Rs. 2,500 per month, the prevalence of overweight was 31%, of which 7.5% were frankly obese. In a similar study in Pune showed prevalence of overweight children in well off school is 24% and 6% in a "corporation" school (unpublished data). [12] These findings differ with the observations of the present study.

A study was conducted among 24,000 school children in south India. It showed that the proportion of overweight children increased from 4.94% of the total students in 2003 to 6.57% of the total students in 2005 demonstrating the time trend of this rapidly growing epidemic. A study from north India reported a childhood obesity prevalence of 5.59 % in the higher socio economic strata when compared to 0.42 % in the lower socio economic strata.[13] These observations are not similar with the present study as the study was conducted 8 years ago .

In the present study Exclusive breastfeeding was not seen to have any association with childhood obesity(p = 0.893) (OR = 0.910 , 95% CI = 0.23 , 3.6).

Vafa M et al (2008) in his study on children aged 7 years in Tehran found that the association between duration of Exclusive breastfeeding was not significantly associated with child's BMI status. (p=0.184) [1]

The Child Development Supplement (CDS) of the Panel Study of Income Dynamics (PSID), the first two waves of which were conducted in 1997 and 2002, respectively. The data provided information on 3,271 children and their mothers and showed that, the causal link between duration of breastfeeding and childhood obesity has not been established. Any recommendation of promoting breastfeeding to reduce childhood obesity is premature.[14] This was similar to the findings of the present study.

The analysis in Sydney, Australia in 2012 revealed interesting evidences in favor of breast feeding. Of the children aged 1-6 years, decreasing BMI was associated with increasing duration of breast-feeding. Each month increase in breast-feeding was associated with an average BMI decrease of 0·04 kg/m2 and 0·03 kg/m2 among children aged 1-2 years and 3-4 years, respectively. In 1-2-year-old children, each month increase in breast-feeding duration was associated with a 0·06 cm decrease in waist circumference. Significant associations were not observed among 5-6-year-old children. Children who were breast-fed versus those never breast-fed were less likely to be overweight/obese.[14]

Scott JA et al made a secondary analysis of the 2007 Australian National Children's Nutrition and Physical Activity Survey data involving 2066 males and females aged 6 to 16 years from all Australian states and territories. The effect of breastfeeding duration on weight status was estimated using multivariate logistic regression analysis. Compared to those who were never breastfed, children breastfed for ≥ 6 months were significantly less likely to be overweight (adjusted odds ratio: 0.64, 95%CI: 0.45, 0.91) or obese (adjusted odds ratio: 0.51, 95%CI: 0.29, 0.90) in later childhood, after adjustment for maternal characteristics (age, education and ethnicity) and children's age, gender, mean energy intake, level of moderate and vigorous physical activity, screen time and sleep duration.[15] The observations of the above studies do not favour with the findings of the present study.

Conclusion

The study attempts in a modest way to show that breastfeeding does not have a role in reducing childhood obesity. Studies on a larger scale, better sampling methodology and for a prolonged period in different settings have to be done to further prove or disapprove the findings of the preset study. Though there are studies to show that breastfeeding is associated with reduced childhood obesity the exact mechanisms to explain this association has yet to be discovered fully. Even in the absence of strong evidence for protection against obesity, breastfeeding requires continued promotion and support because of its other well-known protective effects for mothers and children.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Limitation of the study is no sampling method was adopted to mark the sample for the study, younger age group (2-4 years) children could have been enlisted to avoid recall bias among mothers, non inclusion of dietary habits and physical activity among the children in the questionnaire and a cross-sectional study to estimate the prevalence .

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Original Research Article

Prevalence of Cardiovascular risk factors among children in a rural school in Bangalore district, India

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Abstract

Background: Globally, Chronic non-communicable diseases are the leading causes of mortality globally. Among them, Cardiovascular disease is the single largest killer. Lifestyle habits formed during childhood have a profound impact on cardiovascular risk in later life. ***Objective*:** To assess the prevalence of risk factors for CVDs among children in a rural school. **Methods:** *Design:* Cross-sectional. *Area:* one school in a rural area, Anekal taluk, Bangalore. **Population:** All children studying in the 8th std were included in the study. Children absent on the day of our visit and those who did not give consent or assent were excluded from the study. **Tool:** A questionnaire was developed for the purpose of this study using the WHO STEPS questionnaire as the base. Data collected were analysed and presented using descriptive and inferential statistics. **Results:** Of the 283 children, 52.6% were girls and 47.3% were boys with a mean age of 12.9 yrs. A majority (58.3%) of the study population used extra salt in the diet while 50.9% did not consume adequate quantities of fruits and vegetables daily. A majority (60%) was involved in high physical activity. A higher proportion of boys (74.6%) were involved in high intensity physical activity as compared to girls (46.9%) but a higher proportion of boys (64.2%) also followed sedentary lifestyle as compared to girls (47.7%). A mere 2.5% of the children gave a history of tobacco use while 1.1% gave a history of alcohol use. Passive smoking was seen among 40.6% of the children. The prevalence of pre-hypertension was found to be 4.9% and that of hypertension was 5%. **Conclusions:** There is a high prevalence of modifiable cardiovascular risk factors among rural school children which needs to be addressed if we intend to prevent the epidemic of cardiovascular diseases in India.

Key Words: *Risk factors, Cardiovascular, school, children*

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Introduction

Globally, chronic non-communicable diseases (NCDs) are the leading causes of mortality and morbidity. Among NCDs, Cardiovascular disease (CVD) is the single largest killer and is a major public health problem. In the year 2008, NCDs contributed 63% of the 57 million global deaths; CVDs accounted for 17 million of those deaths (48% of the NCDs)[1]. In India, NCDs accounted for 53% of all deaths in the year 2005 while CVDs contributed 29% of these deaths[2]. Lifestyle habits such as smoking, dietary habits and physical activity are formed during childhood, which have a profound impact on later life of the individual. It has also been found that atherosclerotic and hypertensive disease process starts early in life[3]. Therefore, it has been postulated that intervention strategies must begin early in childhood to control the current epidemic of CVDs. The World Health Organization (WHO) promotes school health programmes as a strategic means to prevent important health risks among youth and to engage the education sector in the efforts to change the educational, social, economic and political conditions that affect risk[4].

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Traditionally, in India, the lifestyles of the urban societies had been different from that of the rural societies. The urban societies were closer to the western culture while the rural societies were more 'Indian'. However, due to urbanization and globalization, the urban culture is rapidly infiltrating in to the rural societies of India. This obviously has had an impact on the lifestyles of the populations which in turn might affect the prevalence of risk factors for CVDs. Also, over 70% of India's population resides in rural area. So, this study was done with the objective of assessing the prevalence of risk factors for CVDs among children in a rural school.

Methods

This was a cross sectional study conducted in a selected school situated in a rural area in Anekal taluk, Bangalore district. All children studying in the 8th standard in this school were included in the study. Those children who were absent at the time of our visit were automatically excluded from the study. Written informed consent was obtained by the parents of every student while assent was obtained from each student. The study was approved by the institutional ethical review board of St. John's National Academy of Health Sciences.

A questionnaire was developed for the purpose of this study using the WHO STEPS questionnaire[5] as the base. The questionnaire had 2 sections; first section was used to collect the socio-demographic details of the children while the second section assessed the cardiovascular risk factor profile of each child. The questionnaire was administered in the local language.

With respect to the dietary factor assessment, the questionnaire captured data regarding the use of extra salt, cooked foods, servings of vegetables and fruits per day, the consumption of junk food in the form of chips, fried foods and aerated drinks as well as other food items. The quantity of fruits and vegetables was ascertained using standard measures in which one standard serving equals 80 grams. This was translated into cups of standard sizes. Standard cup measures available locally were shown to the children to estimate the servings of fruits and vegetables consumed. Consumption of other foods were measured as being ingested daily, three to five days a week, at least once a week, once a month, occasionally or rarely, and never.

Physical activity of the children was assessed using the Global Physical Activity Questionnaire (GPAQ)[6] developed by the WHO for physical activity surveillance which collects information on physical activity based on participation in three domains: activity at work; travel to and from places and leisure time activities.

Family history of diabetes mellitus, hypertension, overweight and obesity, as well as the use of tobacco and alcohol by family members was collected. The questionnaire asked if the children had ever used tobacco and alcohol, as well as the frequency of use of specified tobacco products. Anthropometric measurements (weight, height and waist circumference) were taken using standard techniques[7].

Body mass index and central obesity were calculated. Based on their body mass index, children were classified into underweight (<5th percentile), normal (5th – 85th percentile), at risk of overweight (85th – 95th percentile) and overweight (>95th percentile)[8].

If waist circumference of any child was more than the 90th percentile for his or her age and gender, then it was considered to be central obesity[9]. Blood pressure was measured with the help of a mercury sphygmomanometer using standard techniques. Based on blood pressure recording for the corresponding height for age in months, children were classified into normal (<90th percentile), pre-hypertension (90 – 95th percentile), stage 1 hypertension (95th – 99th

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 1: Risk factor profile for Cardiovascular Diseases

Cardio Vascular Risk Factors	Boys (%) N = 134 (47.3%)	Girls (%) N = 149 (52.7%)	Total N = 283	'p' value
Dietary Factors				
Use extra salt in food	80 (59.7)	85 (57)	165 (58.3)	p > 0.05
Not consuming five servings of fruits & vegetables per day*	57 (42.5)	87 (58.4)	144 (50.9)	p = 0.01
Physical Activity				
Low & Moderate Physical Activity	34 (26.1)	79 (53.0)	113 (39.9)	p = 0.002
High Physical Activity	100 (74.6)	70 (46.9)	170 (60.1)	
Sedentary Lifestyle				
Sedentary activity <4hrs	48 (35.8)	78 (52.3)	126 (44.5)	p = 0.005
Sedentary activity ≥4hrs	86 (64.2)	71 (47.7)	157 (55.5)	
Family History				
Diabetes mellitus	81(60.4)	104 (69.8)	185 (65.4)	p > 0.05
Hypertension*	58 (43.3)	85 (57)	143 (50.5)	p = 0.02
Obesity*	75 (56)	108 (72.5)	183 (64.7)	p = 0.004
Tobacco use	48 (35.8)	44 (29.5)	92 (32.5)	p > 0.05
Alcoholism	60 (44.8)	69 (46.3)	129 (45.6)	p > 0.05
Tobacco and Alcohol Use				
Tobacco use	5 (3.7)	2 (1.3)	7 (2.5)	p > 0.05
Alcohol use	2 (1.5)	1 (0.7)	3 (1.1)	p > 0.05
Passive smoking	47 (30.1)	68 (45.6)	115 (40.6)	p > 0.05

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Weight				
'At-risk' of overweight / Overweight / Central Obesity	2(1.5)	2(1.3)	4(1.4)	p > 0.05
Blood Pressure				
Pre-hypertension	4 (3)	10 (6.7)	14 (4.9)	p > 0.05
Stage 1 Hypertension*	0 (0)	9 (6)	9 (3.2)	p < 0.05
Stage 2 Hypertension	0 (0)	5 (3.4)	5 (1.8)	p > 0.05

'*' = Statistical significance was noted; 'p' value was found to be less than 0.05

percentile + 5 mm hg) and stage 2 hypertension (>99th percentile + 5 mm hg)[10].

Data were collected by trained doctors. They were entered on Microsoft excel and analysed. Results were presented using descriptive statistics initially. Chi square analysis was used to lend statistical support where appropriate.

Results

A total of 283 children were studied of which a majority (52.6%) were girls (47.3% boys). Mean age of the sampled children was 12.9 (±0.82) years. A majority (76.6%) of the children were in the age group of 13-16 years while 23.3% were in the age group of 10-12 years.

Table 1 depicts the risk factor profile of the students. It was found that 58.3% of the study population used extra salt in their diet while 50.9% did not consume adequate quantities of fruits and vegetables daily. A significantly higher proportion of girls (58.4%) did not consume adequate quantities of fruits and vegetables daily as compared to the boys (42.5%).

A high proportion of the study population (60%) was involved in high physical activity. A significantly higher proportion of boys (74.6%) were involved in high physical activity as compared to the girls (46.9%). Even though they were involved in high physical activity, a significantly higher proportion of boys (64.2%) also had a sedentary lifestyle (i.e. sitting for more than 4 hours every day) as compared to girls (47.7%).

A high proportion of children gave a positive family history of diabetes mellitus (65.4%), hypertension (50.5%), obesity (64.7%), tobacco use (32.5%) and alcohol use (45.6%). A small proportion of the study population gave a history of tobacco use (2.5%) and alcohol use (1.1%). Passive smoking was seen among 40.6% of the study population. Even though a higher proportion of girls (45.6%) were exposed to passive smoking as compared to the boys (30.1%), the difference was statistically not significant. A small proportion of the study population was found to be overweight (0.7%) and all of them were girls. The prevalence of pre-hypertension was found to be 4.9% and that of hypertension was 5% (3.2% was in stage 1 hypertension while 1.8% was in stage 2 hypertension). Only girls were found to be hypertensive.

Discussion

A total of 283 children in the age group of 10 – 16 yrs were included in the study. It was found

that a majority (58.3%) of the study population used extra salt in their diet. Addition of salt to food while eating enhances the taste of the food and is a common practice in India. Our finding of a high proportion of children consuming extra salt could still be an underestimate because children may not even know that extra salt has been added to the food that they are consuming, which may be done by their parents.

Our study found that half of the study population (50.9%) did not consume adequate quantities of fruits and vegetables daily. This could range from poor knowledge regarding the importance of fruits and vegetables in the diet to non availability of fruits and vegetables[11]. It was also found that a significantly higher proportion of girls (58.4%) did not consume adequate quantities of fruits and vegetables daily as compared to the boys. It is a well known fact that when it comes to dietary intake, Indian rural girls have always been neglected. They have always consumed a diet that is deficient quantitatively and qualitatively[12].

Adequate physical activity is one of the main primary prevention strategies in the prevention of CVDs. A large majority of the children were physically active and travelling to school contributed maximum to being physical active. Buckelo et al. (2009), in their as yet unpublished study conducted among rural school children in a nearby area, observed that 69% of school children were physically active and 31% were minimally physically active, while none were totally inactive.

Sudeepa et al. also in their as yet unpublished study (2006) found inadequate physical activity among 63% of sampled school children. The difference in the methods used to measure physical activity probably has resulted in the difference in the results. Oliveira TC et al[13] in their study conducted among Brazilian school children also reported that the most common activity contributing to physical activity among children was travelling to school followed by domestic chores which is similar to the findings in our study.

In our study we found that more than half of the students (55.5%) practiced a sedentary lifestyle outside of the school i.e. they spent more than four hours every day doing activities which involved sitting in one place like studying, playing computer and video games and chatting with friends. Involvement in sedentary activities may leave little time for physical activity. Oliveira TC et al[13] reported that Brazilian school children on an average spent 2.66hrs/day in sedentary activities.

A high proportion of children had a family history of diabetes mellitus, hypertension, obesity, tobacco use and alcohol use. Over the past few years, along with an increase in the prevalence of Diabetes Mellitus and Hypertension there has been an increase in the awareness regarding Diabetes Mellitus, Hypertension and other associated NCDs. Hence, a high proportion of children have reported a family history of Diabetes and Hypertension. In the presence of family history (non-modifiable risk factor) the emergence of modifiable risk factors can lead to dangerous consequences. It is also well documented that the incidence of essential hypertension was higher among children that had a family history of essential hypertension[14].

In the present study the prevalence of tobacco use was found to be 2.5% among the study population. Other studies have also shown a prevalence ranging from 2.5% to 11% among Indian rural school children[15-18] in the age group of 11 – 19 years. The difference can be attributed to the differences in the age groups included in the different studies.

In the present study, 1.1% of the sample had consumed alcohol. George A et al reported that 3% of the adolescents interviewed had a habit of drinking alcoholic beverages[19]. The difference between the two studies can be attributed to the difference in the backgrounds i.e. our study was

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

done in a school setting while their study was done among adolescents in a rural community not specifically in a school setting.

Even though the proportion using tobacco (2.5%) and alcohol (1.1%) in this study population is small, this proportion assumes significance, since the foundations for abuse of tobacco and alcohol are laid in childhood and adolescence. Also, since the participants are children, due to the fear and stigma associated with tobacco and alcohol, they may not have answered those questions truthfully and hence these results may be an underestimate.

It is also important to note that more than 40% of the sampled school children were exposed to passive smoking. It has been identified as an important determinant of health status of the population. Also, passive smoking indicates that children are seeing their parents or relatives or friends who are smoking, which might prompt these children to start smoking.

We all know that central obesity is a very strong predictor of cardiovascular risk especially among Asians. It has been reported that 50% - 80% of the overweight and obese children tend to become overweight / obese adults. In our study we found that 1.4% of the rural school children were either at-risk of overweight/overweight/obese. Other studies have reported an obesity/overweight prevalence ranging from 3% – 6%[20-21].

This could be attributed to the difference in the geographical locations. Our study was done in a school where all children come from a rural background and hence the prevalence is found to be lesser. However, it is still a cause for concern since obesity is a strong predictor of cardiovascular risk.

In our study, the prevalence of pre-hypertension, stage 1 hypertension and stage 2 hypertension was found to be 4.9%, 3.2% and 1.8% respectively. Buckelo et al. (2009) in their as yet unpublished study in the same area found that 6.7% of the rural school children had pre-hypertension and 5.7% had stage 1 or stage 2 hypertension. Other studies have also reported a prevalence of hypertension ranging from 3% to 6% among rural school children in India[22-23]. High blood pressure in childhood is a precursor for hypertension and related complications in adulthood. Hence, this proportion assumes significance.

This study was conducted in one school in a rural area close to Bangalore. Even though children attending this school come from the surrounding villages, the place where the school is situated has a considerable urban / peri-urban influence. Hence, the school may not truly be a representative of rural India. However, over the past decade we have seen a very significant urban influence on rural India; hence we are not completely wrong in saying that our findings may not be very different from other schools in rural India. We did not calculate any sample size and included all children in the school in our study population. We included only 8th standard children due to feasibility issues.

From the present study we can draw the following conclusions.

Firstly, the diet of a high proportion of the study population is unhealthy since the diet is rich in salt and poor in fruits and vegetables. The diet of a school girl is worse compared to a boy. Secondly, even though a high proportion of children were physically active, a significantly high proportion of children also had a sedentary lifestyle which does not augur well for their cardiovascular health. Thirdly, a high proportion of children reported a family history of diabetes mellitus, hypertension, obesity, tobacco use and alcohol use. As mentioned earlier, in the presence of family history (non-modifiable risk factor) the emergence of modifiable risk factors can lead to dangerous consequences. Fourthly, a small number of children had tasted tobacco and alcohol and this finding may be an underestimate. Also, this proportion assumes

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

significance, since the foundations for abuse of tobacco and alcohol are laid in childhood and adolescence. We also found that passive smoking was rampant.

Finally, we conclude by saying that there is a high prevalence of modifiable cardiovascular risk factors among rural school children which needs to be addressed if we intend to prevent the epidemic of cardiovascular diseases in India.

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Original Research Article

A Descriptive Study on Knowledge Regarding Biomedical Waste Management Among Health Care Personnel in a Tertiary Care Hospital

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Abstract

Backround: Wastes generated within the hospital are termed as Biomedical wastes(BMWs). It is an important source of infection and various other hazards. Nurses, lab technicians and sanitary workers are exposed to such hazards in their day to day life. So it is necessary that they are aware of the dangers caused by BMWs. This study is done to assess the knowledge regarding handling of bio medical wastes among the health personnel. **Aims and Objectives:** To assess the knowledge regarding handling of the bio medical wastes among nurses, lab technicians and sanitary workers, working in a tertiary care hospital. **Materials And Methods:** A descriptive cross sectional study was conducted in a Vinayaka Missions tertiary care hospital ,Salem,Tamil Nadu, among 200 paramedical workers, which included nurses, lab technicians and sanitary workers. A pretested questionnaire was used for data collection to assess their knowledge on Biomedical wastes handling by interview method. **Results:** A Study was done among 200 healthcare personnel. Among which 67(33.5%) were nurses, 65(32.5%) were lab technicians and 68(34%) were sanitary workers. Nurses had a better knowledge than lab technicians regarding biomedical waste management, such as general awareness of BMW, disposal techniques for sharps, about various disposal methods and maximum storage time after the collection of BMWs and knowledge about types of hazards that can affect on exposure to BMWs and colour coding bags for disposal of Biomedical wastes . Sanitary staff had a very limited knowledge about BMWs. **Conclusion**: Nurses had a better knowledge than lab technicians regarding biomedical waste management. Sanitary staff had a very poor knowledge about it. Still intensive training programme and monitoring at regular time interval is needed for all staff for safe disposal of biomedical wastes.

Keywords : Awareness,Biomedical waste management, health care personnel

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Introduction

Any waste, which is generated during the diagnosis treatment, including operation or immunization of human being, or in research activities including production of biological, etc, is termed as biomedical waste. Day to day activities in Hospitals and other health care facilities generate lots of waste which is of biological in nature or of great concern can transmit infections, particularly HIV, Hepatitis B and C and Tetanus, to the people who handle it or come in contact with it.

Approximately 1.45 kg waste is generated per patient per day in Indian hospitals it is as high as 4.5 kg in developed countries. According to western figures, approximately 15-20% of this total waste is hazardous, whereas, it would be much higher in India because proper waste segregation and waste disposal methods either does not exist or not practiced. [1]

To protect the environment and community health, the ministry of environment and Forest has notified "Bio-medical waste (management and Handling) Rules 1998". All hospitals, clinics, nursing homes, community health

centers, primary health centers, slaughter houses and laboratories have to produce a certificate of safe disposal and environmentally sound management of waste produced by them. Any violation of the norms given in Rules by any person is punishable with fine or imprisonment under the Environment protection Act 1986[2].

Lack of awareness of bio medical waste management and lack of resources for hospital waste disposal have led to the spread of infections, resulting in hospital being turned into a source of infection. Other hazards associated with poor waste management include injuries from sharps, risks associated with hazardous chemicals or drugs and disposables being repacked and sold without being washed. Waste piles also attract variety of disease vectors, including mosquitoes and flies.[3] It is therefore essential for every health care personnel to know about bio medical waste management, its handling and safe disposal. Nurses, medical laboratory technicians and sanitary staff are amongst those exposed to the BMW. Hence awareness is important to prevent themselves as well as the patients from its hazards. This article throws light on the same. Our aim was to assess the knowledge regarding handling of the bio medical wastes among nurses, lab technicians and sanitary workers, working in a tertiary care hospital.

Materials and Methods

A descriptive cross sectional study was conducted in a Vinayaka Mission's tertiary care hospital, Salem, Tamil Nadu. About 200 paramedical workers were participated in the study, which included 67 nurses, 65 lab technicians and 68 sanitary workers.

The study was conducted during Jan-March 2013, by convenient sampling and voluntary participation of the study subjects. A pretested knowledge based questionnaire on biomedical wastes handling, was used for data collection by interview method. The questionnaire had questions regarding general awareness about biomedical wastes(BMWs),knowing of biomedical hazard symbol, the storage time after collection, its disposal techniques like container for needle syringe, colour coding of bags used for disposal and the hazards due to exposure of BMWs. The number of correct responses was assessed and analysed. The study subjects were given health education on safe biomedical waste handling. Answered questionnaire forms were collected and were analyzed by SPSS 15(Statistical Package for Social Sciences) and results expressed in percentages. Chi square test and p-value were also calculated to indicate the level of significance.

Results

This present study was done among 200 healthcare personnel. Among which 67(33.5%) were nurses, 65(32.5%) were lab technicians and 68(34%) were sanitary workers.

Table 1 shows the knowledge about general awareness of health care personnel regarding BMW. BMW concept was known to a total of 136 health personnel out of 200. Among which were 55(40.44%) nurses, 54(39.71%)lab technicians and 27(19.85%) sanitary workers. This difference in knowledge about general awareness of BMW among the health care personnel was found to be statistically significant.($p<0.001$)

Similarly Biohazard symbol was correctly identified by 53(38.13%) nurses, 50(35.97%) lab technicians &36 (25.90%) sanitary workers. This difference in knowledge about bio hazard symbol among the health care personnel was found to be statistically significant.($p<0.001$)

Table 2 shows the knowledge regarding disposal techniques of sharps among healthcare personnel. The knowledge regarding container for needle syringe, such as puncture proof was known to 37(38.95%) nurses,35(36.84%)lab technicians and 23(24.21%) sanitary workers.

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 1. The knowledge about the general awareness of BMW among healthcare personnel

Knowledge parameter	Nurses N= 67 (%)	Laboratory technicians n=65(%)	Sanitary Workers n=68 (%)	Total	Level of significance
BMW concept					
Known	55(40.44)	54(39.71)	27(19.85)	136	X^2=39.151,df=2,p<0.001
Unknown	12(18.75)	11(17.19)	41(64.06)	64	
Bio medical hazard symbol					
Yes	53(38.13)	50(35.97)	36(25.90)	139	X^2=13.401,df=2,p<0.001
No	14(22.95)	15(24.59)	32(52.46)	61	

Table 2. The Knowledge Regarding Disposal Techniques of Sharps Among Healthcare Personnel

Knowledge parameter	Nurses N= 67 (%)	Laboratory technicians n=65(%)	Sanitary Workers n=68 (%)	Total	Level of Significance
Container for needle-syringe					
Puncture proof	37(38.95)	35(36.84)	23(24.21)	95	x^2 = 37.846,df=6,p<0.001
Don't know	07(24.14)	10(34.48)	12(41.38)	29	
Others	23(30.26)	20(26.32)	33(43.42)	76	
Used needle disposal method					
Correct	20(30.36)	36(48.65)	18(24.32)	74	x^2 = 14.128,df=2,p<0.001
Incorrect	47(37.30)	29(23.02)	50(39.68)	126	

Table 3. The Knowledge Of The Hospital Staff About Disposal Methods And Maximum Storage Time after The Collection Of BMW

Knowledge parameter	Nurses N= 67 (%)	Laboratory technicians n=65(%)	Sanitary Workers n=68 (%)	Total	Level of Significance
Disposal methods					
Correctly known	43(38.39)	41(36.61)	28(25.0)	112	x^2=9.204,df=2,p<0.010
Unknown	24(27.27)	24(27.27)	40(45.45)	88	
Max storage time					
<48 hrs	61(39.36)	49(31.61)	45(29.03)	155	x^2= 12.21,df=2,p<0.002
>48 hrs	06(13.33)	16(35.56)	23(51.11)	45	

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 4 . Knowledge about types of hazards that can affect on exposure to BMW and colour coding bags for disposal of biomedical wastes among health care personnel

Knowledge parameter	Nurses N= 67 (%)	Laboratory technicians n=65(%)	Sanitary Workers n=68 (%)	Total	Level of Significance
Hazard due to exposure to BMW					
Correct	41(38.68)	40(37.74)	25(23.59)	106	x^2=10.904,df=2,p<0.004
Incorrect	26(27.66)	25(26.60)	43(45.74)	94	
Colour coded bags					
Correct	57(39.04)	55(37.67)	34(23.29)	146	x^2=27.65,df=2,p<0.001
Incorrect	10(18.52)	10(18.52)	34(62.96)	54	

The difference in the knowledge regarding container for needle-syringe was found to be statistically significant.(p=0.000).

It was found that 20(30.36%) nurses,36(48.65%)lab technicians and 18(24.32%) sanitary workers had knowledge regarding correct used needle disposal methods. This difference in the knowledge was found to be statistically significant.(p<0.001).

Table 3 shows knowledge of the hospital staff about disposal methods and maximum storage time after the collection of BMW.43(38.39%) number of nurses, 41(36.61%) lab technicians & 28(25%) sanitary workers were aware of correct method of disposal of BMW. The difference between two groups was found to be statistically significant.(p<0.010)

Whereas 61(39.36%) nurses, 49(31.61%) lab technicians & 45(29.03%) sanitary workers were aware of the fact that BMW should be disposed in less than 48hrs after its collection. The difference between known and unknown groups was found to be statistically significant.(p<0.002)

Table 4 shows the knowledge about types of hazards that can affect on exposure to BMW and colour coding bags for disposal of Biomedical wastes.41(38.68%) nurses, 40(37.74%) lab technicians & 25(23.59%) sanitary workers were aware that on exposure to BMW there are chances of transmission of HIV & Hepatitis, injury, toxicity and radiation hazards. The difference between two groups was found to be statistically significant.(p<0.004)

Similarly 57(39.04%) nurses, 55(37.67%) lab technicians and 34(23.29%) sanitary workers had knowledge regarding different colour coded bags for disposal of BMW. The difference between known and unknown groups was found to be statistically significant.(p<0.001).

Discussion

Our study found that, around 57(39.04%) nurses, 55(37.67%) lab technicians and 34(23.29%) sanitary workers were aware about the different colour coded bags for disposal of BMW.

A study conducted in Allahabad city hospitals by Vanesh Mathur et al[4] included 60 nurses, 78 lab technicians and 70 sanitary staffs. Study shows that knowledge regarding the colour coding was found to be better among nurses and

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

lab technicians. Knowledge regarding the potential transmission of disease through biomedical waste was observed among only 27% of sanitary workers,which is similar to our study.

A study conducted by Manoj Bansal et al[5] in the district of Madhya Pradesh showed 95% of paramedical staffs were aware of the hazards associated with biomedical waste while only 43% of nonmedical staffs (sanitary workers) were aware of that. Colour coding was known to 44% of paramedical staffs and 6% of nonmedicals. 43% of paramedical staffs and 7% of nonmedical staffs were aware that biomedical waste can be stored for maximum of 48hrs.

Another study done in Bangalore by Suwarna et al[6] studied the awareness about categories and treatment of health care waste. The awareness was present only in about 81%nurses, 27.3% lab technicians and 19.3% housekeeping staff.

The present study found that 41(38.68%) nurses, 40(37.74%) lab technicians & 25(23.59%) sanitary workers were aware that on exposure to BMW there are chances of transmission of HIV & Hepatitis, injury, toxicity and radiation hazards and the difference between two groups was found to be statistically significant.($p<0.004$). Similar study was conducted by the Department of Community Medicine, Gandhi Medical College, Hamidia hospital & Central pollution control board[7] showed that 100% of nurses were aware that injuries are a hazard caused by BMW. While only 6o% of sanitary workers were aware of that. 83.3% of nurses and 46.6% of sanitary workers were aware that diseases are transmitted through biomedical waste.

N. Mathar Mohideen[8] conducted a study to assess the knowledge, attitude and practices of nurses regarding "Bio Medical Waste management in selected hospitals of S.N.R. District Kolar" by using structured interview schedule and he found that very negligible percentage of the nurses had high knowledge (1.7%) one fifths of the nurses had average knowledge (20%) and more than three fourth of the nurses had below average knowledge, this is in contrast to our findings, where majority of nurses had high knowledge of BMW Management.

A hospital-based cross-sectional study was done in 2009 with a view to assess the knowledge , attitude and practices of hospital staff regarding biomedical waste management (BMW) among 500 subjects of 47 randomly selected Hospitals at Karimnagar, Andhra Pradesh. The results revealed that, 131 (26.2%) were housekeeping and 266 (53.2%) study subjects knew about BMW correctly, of which 138 (51.8%) were nurses, 114 (42.85%) were technicians and 14 (5.26%) were housekeepers, which is in par with our study. The nurses were having better knowledge and attitude, and also practiced BMW management better than the housekeeping and technical staff. The study concluded that regular training of nursing, technical and housekeeping staff should be done and system of monitoring should be evolved.[9]

Conclusion: This study showed, nurses having better knowledge than lab technicians regarding biomedical waste management, whereas sanitary staff had a very poor knowledge about it. Hence intensive training programme and monitoring at regular time interval is needed for all staff, along with strict implementation of the guidelines for biomedical waste management.

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Interest of Conflict- None

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Original Research Article

Effectiveness of 'PSG Community radio' in Health Communication, Coimbatore, India

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Abstract

Introduction: Community Radio is a tool for communication to popularize and stimulate scientific temperament among students, women and common people. 'Our Planet Earth' is a Health and Environment awareness Project broadcasted by PSG Community Radio. **Objective:** This study is intended to find out the effectiveness of "Our Planet Earth" 182 episodes radio serial Project through a listener survey. **Conclusion:** Community Radio is an effective tool to propagate knowledge among public as evident by our planet earth as it was liked and listened by 70% of the population.

Key words: *Community radio, broadcast, radio serial, listeners Survey*

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Introduction

Community radio stations are community owned and operated entities that serve either localised geographic communities or communities of interest, such as minorities, religious groups and universities. The management is usually a small team of paid staff with the programming conducted by volunteers. Unlike commercial stations, community stations are not allowed to run for profit. They must be established as voluntary associations, not-for-profits or trusts.[1]

The principal functions of community radio[2] are: To reflect and promote local identity, character and culture by focusing principally on local Content; To create a diversity of voices and opinions on the air through its openness to participation from all sectors; To encourage open dialogue and democratic process by providing an independent platform for interactive discussion about matters and decisions of importance to the community; To promote social change and development; To promote good governance and civil society by playing a community watchdog role that makes local authorities and politicians more conscious of their public responsibilities; To share information and innovation; giving a voice to the voiceless, especially to women and young people

PSG Community Radio (107.8 MHz) is Coimbatore's first Community Radio operating from PSG College of Technology, an Institute of academic excellence run by PSG & Son's and Charities Trust in Coimbatore city, Tamilnadu, South India.[3]

Our Planet Earth –'Namadhu bhoomi' is one of the science and Health awareness projects, broadcasted as 182 episodes since August 2010 PSG community Radio. This Project is proposed and sponsored by the Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad (RVPSP), Department of Science and

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

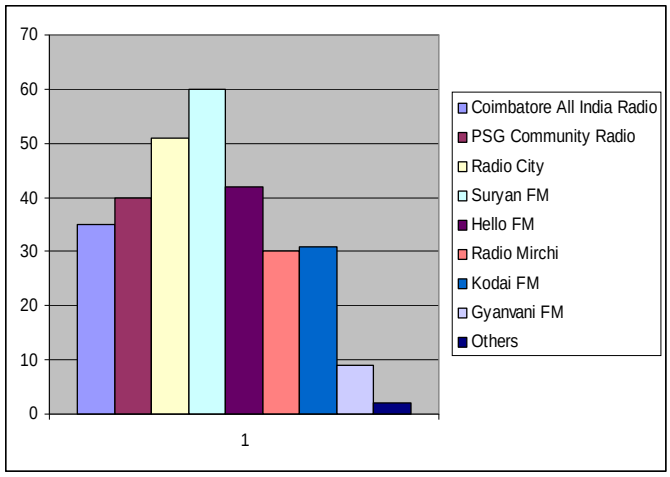
Technology (DST), Government of India, New Delhi. This All India project titled 'Our Planet Earth' inclined to use the Community Radio as a tool for communication to popularize and stimulate scientific temperament among students, women and common people. With the inclination of spreading awareness among general public, PSG Community Radio took 182 episodes All India Radio serial Programme titled 'Our Planet Earth'. In order implement the project, to review the progress of the project, vetting of themes, impact assessment literature for dissemination a Programme Advisory Committee was formed comprising experts from different walks of field under the guidelines of RVPSP-DST.

Initially, a meeting was conducted to identify topics in women's health and Environmental health. PSG Management representatives, Philanthropists, Programme coordinators from PSG Technology, PSG Institute of Medical Sciences and Research and Director of Electronic multimedia research attended the meeting and gave suggestions for designing and proper planning and execution of the programme. Then, the coordinators assigned the topics to the faculty of their institutions. The programmes were recorded and presented in the form of Talk Shows, Interviews, Lectures, Group Discussions, Panel Discussions, Quiz, Skits, Folk Songs, Reviews, Field visit observations, debate, Narratives, Live Discussions, Teleconferencing, and Live Demonstrations. Medical experts from PSG Institute of Medical Sciences and Research, Environmentalists, Social Activists and from other experts of field contributed programmes. The broadcast scheduled from 15th August, 2010 to 15th July 2011 with one origination and two repeat broadcast. This study was intended to find out the effectiveness of the programme through a listener survey.

Methodology: Listeners were interviewed through RVPSP-DST designed questionnaire comprising of 22 questions to obtain feedback. Random sampling technique was used to identify 300 households from the catchment area and one member was interviewed from each household. Then the data was compiled and analyzed.[4]

Results: The Survey reveals that 35 % were listening All India Radio Coimbatore, 51 % were listening Radio City, 60 % were listening Suryan FM, 42 % were listening Hello FM , 30 % were listening Radio Mirchi , 13 % were listening Kodai Rainbow FM , 9 % were listening Gyana Vani Educational FM and 40 % were listening PSG Community Radio**.** (Fig.1)

Fig 1. Frequency of distribution of listeners ipercentage to all Radio channels in Coimbatore



The Survey revealed that 70 % of the PSG Community Radio Listeners were aware of the RVPSP – DST's Radio programme 'Planet earth'. Listeners perception revealed 7.14 % appreciated the style of the presentation, 19.04 % told the topics were interesting, 22.62 % appreciated for using the local people (listener) voices, 20.24 % liked the broadcast timings , 48.81 % told the information was useful, 10.71 % liked the new information, 20.24 % said the language used in the programme was comprehensible. The survey report revealed that 53.6 % of the respondents happily accepted that

NJRCM- ISSN - Print: 2277 – 1522, Online: 2277 - 3517

Table 1. Listeners' Most liked part of the Namadhu Bhoomi (Planet Earth) Programme

S. NO	Items	Percentage
1	Good presentation style	7.14%
2	Interesting topics	19.04%
3	Heard local voices	22.62%
4	Broadcast time convenient	20.24%
5	Useful information	48.81%
6	Information about new things	10.71%
7	Simple Languages/ understandable	20.24%
8	Others	8.30%
9	Did not like the programme	1.19%

Planet Earth radio serial programme changed their behaviors in many ways, 14.3 % respondents not changed and 20.2 % respondents were not sure of it.

Discussion

Linda S et al, study revealed Commercial radio programming decisions are based on audience popularity, however, and entertainment value is the primary consideration in most cases. The current trend in commercial radio appears to favor hosts with controversial rather than well-reasoned views. The present study also revealed commercial radio channels are gained more audience popularity (Fig 1).

Public radio stations have a commitment to public service and educational priorities, and program managers may be more willing to sustain a commitment to health programming. The present study revealed listeners liked because of the useful information (Tab 1.). Conceivably, these audience features might mean that messages have a greater likelihood of being heard by policy makers and thought leaders.

Radio, especially modular segments aired during peak listening times, may be the most cost-effective way to reach large segments of the population [5]. The present study revealed the programme on Planet earth broadcasted in 182 episodes at the listeners' convenient timings.

In Zambia, a community radio project funded by the US Agency for International Development (USAID) is helping local communities adopt safer reproductive health care practices. Traditional birth attendants are taking more precautions because they have heard on the radio that safe practices will prevent infections during delivery," says a member of a village group trained as attendants[6]. The" Planet earth" programme of PSG Community Radio also lead to change of behaviour of 53.6% of its listeners'.

Conclusion: Community Radio is an effective tool to propagate knowledge among public as evident by 'Our planet earth' as it was liked and listened by 70% of the population. The PSG Community Radio thus does its best in disseminating knowledge to the local community

Recommendation: Regular feedback from the listening public is essential in order to identify listeners' preferences. The taste of various listeners (youth, women, men, aged, etc) should be taken into consideration. Programmes should be designed to include environmental issues.

Conflict of interest: Nil

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