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# healthline

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GUJARAT CHAPTER**

## Letter to Editor

### Editorial

#### **Bio-medical waste management – situation analysis and rule update-2011.**

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A recent news headline read – ‘6 people were battling for their lives in Mayapuri, scrap-yard area of New Delhi.’ The culprit was the radio active cobalt 60 isotope which was found in scrap area. Later it was found that the waste came from a hospital<sup>1</sup>.

It was estimated by pollution control board that the amount of biomedical waste generated per year in the country amounted to more than 12000 metric tons. But only half of this bio-medical waste is reported to be treated.<sup>2</sup>

These two citations illustrate the present scenario of health care waste management in India. The Government of India has enacted the Bio-medical Waste - BMW (Management and Handling) Rules 1998, more than 12 year of implementation. Under these rules, it is mandatory for all hospitals and health care facilities to ensure that the bio-medical waste be handled and managed without any harm to the human health and the environment<sup>3</sup>. The law has defined the bio-medical waste as ‘any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals, including categories mentioned in Schedule I of the law’<sup>3</sup>.

The health care system in India is very complex and mixed. Where private, government as well as semi-government hospitals are actively involved. All these facilities are generating biomedical waste. The amount of waste generated in each facility depends on type of facility and practice. World Health Organization 1999 report<sup>4</sup> on health care waste composition in Asian countries reported that India generates 0.33 million ton biomedical waste per year, amounting to 1-2 kg per day per bed. Over last 10 years the health care industry of India has grown in a big way. Large number of new big and private hospitals came up including many large research laboratories. Sophistication has resulted in more waste generation. But the most important aspect in hospital waste is that almost 80% of waste generated in hospital is the non-hazardous waste and only 20% of waste is hazardous to human

health and the environment. If hospital takes care of these 20% of hazardous waste, it can surely reduce the toxicity. But unfortunately, majority of hospitals have no system of segregation of waste at source, which is best method of reduction of toxic waste. All hospitals collecting waste in a single container, makes even non-hazardous waste hazardous. A situation analysis in Gujarat in the year 2005 regarding hospital waste disposal brought out certain observations which suggested lack of proper awareness and practices.<sup>6</sup> As per Central Pollution Control Board evaluation report<sup>5</sup> of February 2010, only 50-55% of biomedical waste is segregated, collected and treated as per the said law of Biomedical Management. Similarly, Delhi Pollution Control Committee<sup>7</sup> reported number of illegal dumping sites across the city. The city has reported presence of many hazardous toxic materials and metals in the soil which may endanger the human health.

Another dangerous issue in the quality of biomedical waste is the increasing use of injections. It is estimated that 16 billion injections are used in developing and transitional countries, amounting to 45 million injections per day<sup>8</sup>. India also reports high use of injections. Safe injection practices also matter. Pandit N B<sup>9</sup> reported in his study from Gujarat that almost 77% of health service providers had unsafe injection practices which is very dangerous to the providers as well as community, at large. It was also reported that almost 30% of injection syringes are reused in the country. Such reuse of the material endangers the health and life of patients and even health care staff. The effects of exposure to hazardous health care waste through improper handling are many, like infections, genotoxicity and cytotoxicity, chemical toxicity, radioactive hazards, physical injuries etc. Looking at the above issues, the Central Government has revised the rules in August 2011<sup>10</sup>. The salient features of revised rule are as follows: –

The rules are exclusively applicable to all persons who generate, collect, receive, store, transport, treat, dispose or handle bio-medical

waste in any form. As such, they are not applicable to radio-active waste, covered under Atomic Energy act 1962 and hazardous chemical waste covered under Environment Protection act 1986, and waste covered under Municipal Solid waste (Management and Handling) Rule 2000, Lead acid batteries covered under Batteries (Management and Handling) Rule 2001 and hazardous waste covered under Hazardous Waste (Management, Handling and Transboundary Movement) Rule 2008. Thus, the revised rule is exclusively for hospital and related waste.

The revised rule says that every occupier irrespective of quantum of BMW generation should apply for grant of authorization to prescribed authority.

The revised rules have defined more details about the duty of occupier.

1. Occupier has to take all steps to ensure that BMW is handled without any adverse effect to human health and environment.
2. Occupier is responsible for training all its health care workers and other people involved in handling of BMW.
3. Occupier is responsible for immunizing all his/her staff who are involved in handling BMW against diseases which can be transmitted through it.
4. Occupier has to ensure segregation of waste at origin.
5. Occupier has to ensure occupational health safety by providing all personal protective devices to BMW workers and healthcare staff.
6. Occupier has to arrange health check up of all healthcare staff and workers who are handling BMW.
7. Occupier has to install proper facilities and equipments with regular supply of consumables for proper handling of BMW.
8. He/she has to maintain proper record of BMW generation, segregation, various categories and final disposal as per given schedule in concerned rules.
9. Occupier has to develop the system of reporting of injuries, mercury spill, fire hazards etc and maintain record of same for authority.
10. Occupier has to inform authority, if operator of common treatment facility does not collect waste within 48 hours as per prescribed rule.

The rules also define the specific duty of common biomedical waste treatment facility. They are:

1. To take necessary steps to collect waste from the occupier, its transport, handling, way of storage, treatment and disposal without any adverse effect to the human health and environment.
2. They should ensure timely biomedical waste collection as per prescribed guidelines.
3. They should inform the designated authority about those health care establishments or facilities who are not handing segregated waste to the treatment facility.
4. They should provide training to all workers who are handling BMW.
5. They have to conduct pre-placement examinations and periodic examinations of all workers and also provide the vaccination and related treatment if any accidents occur.
6. They should provide full occupational safety to all the workers working in the treatment facility.
7. The agency should keep accident injury reporting system, mercury spill, fire hazards and other accidents which are likely to occur during handling of the waste.
8. They have to maintain a log book of the waste disposal with all details.

The rules are very open and accepts innovation. It suggests that if any person or any common treatment facility wants to promote new technologies other than listed in the schedule, they are allowed but they need to approach the Central Government or Central Pollution Control Board with sustainability of the proposed new technology, standard operating parameters or standards for that technology. The Ministry would like to know the results of the new technology and if suitable will accept the same and modify the rules. So there are opportunities for innovators.

All new commencing health care facilities or occupiers have to set up the BMW treatment facilities on site or ensure requisite treatment of biomedical waste management through authorized common treatment facility, before starting actual work.

All big hospitals with more than 500 bed capacity have to install incinerator or suitable disposal facility as per location of hospital and environmental situation.

Under new rules, the use of chlorinated plastic bags for handling BMW is strictly prohibited. And if used, they should not go in for

incineration. It was a long standing demand of environmental activists, as the chlorinated bags are known to cause emission of carcinogens on incineration.

It was really a challenging move, accepting the recycling of plastic waste in the new regulations. The occupier of the hospital can dispose recyclable waste like plastics and glasses through the authorized recyclers who have consent of respective pollution control board. But the precondition is proper disinfection and mutilation of the plastics and glass wares before handing over to such recyclers. The occupier has to keep record of such waste and submit with annual report to the pollution control board. This may help the common treatment facility people to reduce bulk of waste disposal.

The non-biomedical waste and properly treated biomedical waste, which need to be disposed in municipal waste will be collected by respective municipal corporation or body and will be disposed at final disposal site.

For supervision and monitoring of BMW implementation, the Government of every state will constitute an Advisory Committee under Chairmanship of State Health Secretary. The committee will be comprised of representatives of departments of health, environment, urban development, animal husbandry and veterinary science, state pollution control board or pollution control committee, local bodies (urban or corporation), Indian Medical Association representatives, representative of common biomedical waste treatment facility and Non-Government Organization representatives.

Every state will make district level monitoring committee under Chairmanship of Chief District Medical Officer. This committee is the key to monitor and supervise the compliance of BMW rules in the district. This committee will monitor day to day activities of BMW generation by various health care facilities and final treatment by common treatment facility. They will submit biannual reports to the State Advisory Committee. Annual report submission procedure is same as previous BMW rule 1998.

About common treatment facility, the revised rule has made it very clear that municipal corporation or local bodies will be responsible for providing common disposal facility for waste generated in areas under their jurisdiction. So, now local bodies have special responsibility in small town or villages for disposal.

The revised rules have also defined the liability of occupier and operator of common treatment facility. They are liable for all the

damages caused to environment or public due to improper handling of BMW or disposal. They are also liable for punitive action under section 5 and 15 of Environment (Protection) Act 1986.

The revised rule has reduced the categories of waste from 10 to 8 as categories 9 and 10 are removed. It is clearly mentioned that the liquid waste generated from laboratory washing, cleaning, house keeping and disinfecting activities should be treated properly and should meet the prescribed discharge standards before final drainage. Incinerated ash should be disposed with secure land filling. The rule has also clearly stated that disposal of BMW under category 1 & 2 should not be done by deep burial method in towns and cities. Deep burial is allowed only in rural areas where there is no common treatment facility available. All plastics in waste collection should be non-chlorinated plastic material.

The color code for BMW is more specific and clear in the new regulations. Yellow color container with non-chlorinated plastic bag is for human anatomical waste (cat-1), Animal waste (Cat-2), discarded and out dated medicine (cat-5) and soiled waste contaminated with blood, material like cotton, dressing materials, soiled plaster linen other material which could be incinerated (cat-6). The red color container should be preferably non-plastic, (if plastic, it should be non-chlorinated bags) and should be puncture proof. In this container, microbiological and laboratory waste (cat-3), sharp waste (cat-4) and infectious contaminated solid waste like blood bags, catheters, tubing, saline bottles, IV tubes, and other contaminated plastic (cat-7) will be collected. Blue color container is for chemical waste (cat-8) and the black color container is meant for municipal and kitchen waste i.e general waste.

The revised rules are more specific with clear guidelines. The role and responsibilities of occupier and treatment facility are very well defined. This will ensure improvement of the quality of waste management in health care establishment or facilities. There are designated agencies who can provide guidance for proper implementation, day to day monitoring, training, management and evaluation of the whole biomedical waste management. If strictly and properly implemented, these revisions of regulations of BMW management could minimize many potential health hazards.

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## **CME**

### **Evidence based medicine- utilizing existing databases**

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#### **INTRODUCTION**

Many research questions can be answered quickly and efficiently using data that has already been collected. There are 3 general approaches to using existing database. Secondary data analysis utilizes existing data to answer research questions other than the main one for which the data was actually collected. Ancillary studies are the other ones that add one or more measurements to a study often in a subset of the participants, to answer a separate research question. Evidence Based Medicine (EBM) utilizes existing data base systematically by summarizing and applying information from the literature to answer specific research questions. The main advantages of using existing data are speed and economy of obtaining answers to the research questions.

This paper discusses Evidence Based Medicine in terms of strengths and weaknesses of such studies. So that researchers get an insight into creative use of existing data to answer important research questions. EBM demands the use of information from clinical trials to direct medical care. Systematic reviews and Meta analysis studies are the building blocks of EBM. The statistical aspects of a systematic review that is; calculating summary effect estimates and variance, statistical tests of heterogeneity and statistical estimates of publication bias are called meta-analysis.

#### **SYSTEMATIC REVIEWS (S.R.)**

A systematic review can be a good opportunity to researchers for identifying completed studies that address a research question and evaluate the results of these studies to arrive at conclusions about a body of research.

Here are some of the strengths of systematic reviews. In contrast to other approaches to reviewing the literature, systematic reviews use a well-defined and uniform approach to identify all relevant studies, display the results of eligible studies and when appropriate, calculate a summary estimate of the overall results. As it combines the results of

multiple studies of a given research question, often including calculation of a summary estimate of effect that has greater precision than the individual study estimate. The findings with power enhanced by larger sample size available from the combined studies and peculiarities of individual study findings as compared with others often represent an important scientific contribution. Here the investigator becomes familiar with the literature regarding the research question. SR does not require substantial financial or other resources as it uses existing data. Also time of doing research is reduced. Systematic review findings can be particularly useful for developing practice guidelines for medical as well as health care providers.

However, like other studies it has certain weaknesses. The biggest drawback to a systematic review is that the researchers do not have control over the quality of the studies on which it is based for instance, the selection of the population to study, which data to collect, quality of data gathered, and how variables were measured and recorded are all predetermined. Moreover the process of assessing quality is complex and problematic. Important confounders and outcomes may not have been recorded or measured in the studies on which SR is based. Nevertheless the SR has established itself as a good scientific tool in the hierarchy of evidence in medicine.

#### **META-ANALYSIS (M.A.)**

As said earlier, it is the statistical aspect of systematic reviews. It is for the purpose of drawing global conclusion concerning the safety and efficacy of that treatment. It is an observational study in which the units of observation are the individual trial results. Sometimes the terms systematic review, overview and meta-analysis are used interchangeably. Meta-analysis can give a quantitative (statistical) approach to summarizing information in multiple studies complementing expert “overviews”.

This approach has its own strengths even as it increases sample size and thereby potentially enhances statistical power. It provides more rigorous review of literature. A key advantage is that it enhances the statistical significance of subgroup analysis and hence enhances scientific credibility of certain observations. A MA may help put into focus the results of a controversial study and it can resolve uncertainty when reports disagree. MA also improves estimates of effect size. It becomes particularly valuable in answering questions that were not posed at the start of individual trials, but are later suggested by the trial results.

Although, generally regarded as highest level of evidence in research setting, sometimes it is viewed to be authoritative. Sometimes it is viewed as equivalent to a large multi-center study but it is better to view it as an observational study in which the ‘observations’ are not under control of the meta- investigator and have not been obtained through a randomized and blinded technique. Moreover, it has to be assumed to have certain statistical properties which it actually may not have. MA is also prone to certain biases e.g. Systematic bias: bias in individual studies flows to the meta-analysis and causes overall bias. Selection bias arises when studies are preferentially included or excluded influenced by the meta-investigator’s prior beliefs or when studies are included based upon recognized authorities. Publication bias would creep in when selective studies are published based on the direction and magnitude of their results. This is a real concern and some effort to account for it is needed. The magnitude of this bias tends to be greater for observational studies than for RCTs.

Inferences can also be inaccurate if we do not allow and account for heterogeneity. Heterogeneity needs to be accounted for in inclusion and exclusion criteria; handling of withdrawal, dropouts or crossovers; quality of design and execution; different control or treatment interventions; differences in outcome measures; follow up times; outcome definitions; different base line states of patients and different settings. Investigator bias would occur when the investigators who conducted individual studies included in the meta-analysis introduce their own bias<sup>1</sup>.

#### A CASE STUDY<sup>2</sup>

A meta analytic review which was conducted to examine whether the behavioral

interventions addressing adherence to Highly Active Anti- Retroviral Therapy (HAART) are successful in increasing the likelihood of a patient attaining 95% adherence or an undetectable HIV-1 RNA viral load, is interesting. The authors searched electronic databases from January 1995 to September 2005, consulted with experts in the field and hand searched reference sections from the research articles. 19 studies with a total of 1839 participants met the selection criteria of describing a randomized controlled trial among adults evaluating intervention with HAART adherence or viral load as an outcome. Random-effects models indicated that across studies, participants in the intervention arm were more likely to achieve 95 % adherence than those in control arm (Odds Ratio = 1.5 and 95 % CI 1.16 to 1.94). The effect was nearly significant for undetectable viral load (Odds Ratio = 1.25 and 95 % CI 0.99 to 1.59). The intervention effect for 95 % adherence was significantly stronger for studies that used recall periods of 2 weeks or 1 month vs. < 7 days. No other stratification variables (i.e. study, sample, measurement, methodological quality, intervention characteristics) moderated the intervention effect. This is a good example of using EBM for use of information from clinical trials to direct medical care.

It could be concluded that, in an extensively researched disease area if a systematic review has to be planned it should be designed with a complete written protocol before the study begins. The protocol should include the research question, methods of identifying all eligible studies, methods of abstracting data from the studies and statistical aspect of systematic review that is calculating summary effect of estimates and variance, statistical tests of heterogeneity and statistical estimates of publication bias to be done as meta-analysis. Say, for instance, to begin with the researchers at Medical Colleges can start with a systematic review and meta analysis of the research area using the available database of all PG dissertations of last few exams.

#### ACKNOWLEDGEMENT

I acknowledge the learning from online course in “Clinical Investigation” which I was pursuing from University of south Florida (USF) in 2008. I render my sincere thanks to Dr. R. K. Baxi, Professor in the department, and acknowledge his incessant motivation and encouragement to prepare this article.

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**SURRENDER ?**

- **In first industrial revolution, man was forced to sell his (surrender his) muscle power to terms dictated by machines.**
- **In second industrial revolution, man was forced to sell his brain power to terms dictated by machines (computer).**
- **In third industrial revolution, man shall have to surrender his muscle power and brain power to terms dictated by robotics.**

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**OVER THE CENTURIES**

- **17<sup>th</sup> century was century of enlightenment. Man was always wondering what was happening around him?**
- **18<sup>th</sup> century was century of reasoning. Man tried to find out (reason out) why things were occurring?**
- **19<sup>th</sup> century was century of progress, i.e. industrial revolution.**
- **20<sup>th</sup> century was century of neurosis - Anxiety neurosis.**
- **While 21<sup>st</sup> century shall be century of psychosis.**

**Dr. Dinesh Shah**

## Original article

# Psycho-socio-demographic correlates of school problems in adolescent males in Amritsar district of Punjab

Manmeet Kaur Sodhi<sup>1</sup>, Gurpreet Singh Chhabra<sup>2</sup>, Sorabh Goel<sup>3</sup>

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### ABSTRACT:

**BACKGROUND:** Success at school increases self-esteem. Any difficulty will have consequential effects on the psychological health of the subject.

**OBJECTIVE:** To assess prevalence of school problems in male adolescents and to study role of psycho-socio-demographic factors.

**STUDY DESIGN:** cross sectional study

**METHODS:** 500 adolescents were interviewed using a pre-tested, structured, questionnaire to elicit the information about problems faced by them in school, academic performance, role of friends and family in studies, association with psychological problems, substance abuse and sexual activity.

**RESULTS:** The predictors of school problems in male adolescents were education status of parents, family/household income and a large family. The academic problems were associated with depression, substance abuse and disturbed family environment.

**CONCLUSION:** Considering the preponderance of school problems in male adolescents from families with lesser education and lower income, the policy makers and health professionals require to target this group with consolidated efforts.

**KEY WORDS:** Adolescents, School problems, Family

### INTRODUCTION

Adolescence is defined by WHO as the age group of 10-19 years<sup>1</sup>. Today India has a population of adolescents that is among the largest in the world. People in the age group of 10-19 years, comprise 22% of the Indian population<sup>2</sup>. Looking at the future, the New Delhi office of the Population Council estimates that by 2015, India will have a population of 240 million adolescents<sup>3</sup>. The literal meaning of adolescence is to 'grow up'. Adolescence is generally divided into three stages of development: early (10-13

years), middle (14-15 yrs), and late adolescence (16-19 years) stages<sup>4</sup>.

The School constitutes a large part of an adolescent's existence. School problems during the adolescent years may be the result of rebellion and a need for independence. Poor school performance predicts health-compromising behaviors and physical, mental and emotional problems<sup>5</sup>. Teachers play an important role in providing information and advice to the adolescents. School is the place where adolescents get opportunity to share many personal issues with their peers.

The conditions now prevailing in the educational institutions like mass schooling without any individual orientation oblige the teenager to submit to teaching methods and to the school system<sup>6</sup>. School can reveal the subject's personal problems (anxiety, phobia or depression), but may equally create pathology by not recognizing the heterogeneity of individual development and differences in cognitive functioning.

Maithly and Saxena<sup>7</sup> observed in a study in Uttaranchal that about 34% adolescents dropped from school, the main reason being financial difficulties. Lack of quality education, imposition of parents choices upon adolescents, lack of privacy and toilet facilities for girls in school and security reasons were few other reasons cited by adolescents for dropping out. The significant correlates of interpersonal violence were male gender, lower age, and number of close friends, having seen role models smoke/drink and residing in resettlement colonies, slums or villages.<sup>8</sup>

Munni and Malhi<sup>9</sup> reported that the adolescents exposed to violence had poorer school performance and adjustment scores. Daniel et al<sup>10</sup> found that suicidal tendency and school dropouts were strongly associated with each other. Mohan et al<sup>11</sup> found that low educational performance predict tobacco use among adolescent boys in Kerala.

Cox et al<sup>12</sup> reported in their study that gender, race, frequent smoking and marijuana use were statistically significant factors associated

with increased odds for low academic performance. Havas et al<sup>13</sup> did a study in Netherland and found that less educated adolescents had substantially higher odds of having mental health problems regardless of their parents' education.

With this background, the present study was conducted with an objective to assess the prevalence of school problems in male adolescents, and to study the association of school problems with socio-demographic and psychological factors.

**MATERIALS AND METHODS**

A cross-sectional study was conducted in schools and colleges located in rural and urban field practice areas of Department of Pediatrics, Sri Guru Ram Das Hospital, Amritsar. A total of 500 male adolescent students from age 12-18 years were selected by systemic random sampling so that 250 males were from rural areas and 250 were from urban areas. The families of adolescents were divided into 3 groups based on total number of family members (< 4 family members, 4-8 family members and >8 family members). Socio-economic status was evaluated on the basis of Kuppuswamy's socioeconomic index<sup>14</sup> which is an important tool in hospital and community based research in India. The study tool consisted of self developed, semi structured proforma containing questions regarding adolescents' socio demographic background and adolescents' school, family, psychosocial and personality problems and history of substance abuse and sexual activity. The data was collected and analyzed using SPSS-17. Multivariate analysis of association was also done between school, family, psychosocial, substance abuse and sexual activity among themselves using chi square test. For all statistical tests, a p-value of >0.05 was considered non significant, p-value of <0.05 was considered significant and p-value of <0.001 was considered highly significant.

**RESULTS AND DISCUSSION**

Table I shows the socio demographic profile of the male adolescents in the study group. Maximum numbers of males belonged to the age group of 14-16 years, constituting 40% of the adolescents followed by 31% and 29% in the age groups of 16-18 and 12-14 years, respectively with 69.2% of adolescents studying in schools and 30.8% in colleges. Maximum number of adolescents (51.4%) were from middle sized

families of 4-8 members and majority (46.8%) of them were from low income families having family income of less than Rs 4000/month. 43% adolescents were from middle socioeconomic class (II and III) and 36.8% adolescents were from lower socio economic status (IV and V). About 20.2% adolescents belonged to upper socio economic status (I).

**TABLE I**  
**SOCIO DEMOGRAPHIC PROFILE OF MALE ADOLESCENTS IN STUDY GROUP**

Variable of adolescents	Sub group	No. of adolescents	Percent-age %
Age group	12-14 years	145	29
	14-16 years	200	40
	16-18 years	155	31
Educational institution	School	346	69.2
	College	154	30.8
Residence	Rural	250	50
	Urban	250	50
Total family members	<4	103	20.6
	4-8	257	51.4
	>8	140	28
Total family income (in rupees)	<4000	234	46.8
	4000-8000	166	33.2
	>8000	100	20
Socio economic status	Upper SES	101	20.2
	Middle SES	215	43
	Lower SES	184	36.8

**TABLE II**  
**DISTRIBUTION OF SCHOOL PROBLEMS OF**  
**MALE ADOLESCENTS IN STUDY GROUP**

Variable of adolescents	Sub group	No. of adolescents	Percentage %
Academic performance (n=500)	Good	181	36.2
	Bad	319	63.8
Reason for academic decline (n=319)	Self	123	38.6
	Family	116	36.4
	Teachers	49	15.3
	Others	31	9.7
Seeking help regarding academics (n=500)	Parents	128	25.6
	Teachers	42	8.4
	Friends	146	29.2
	No one	184	36.8
Decision of career (n=500)	Self	272	54.4
	Parents	148	29.6
	Close friends	80	16.0
Satisfaction with education system (n=500)	Yes	153	30.6
	No	347	69.4
Changes suggested in case of non satisfaction (n=347)	Correspondence system education	79	22.8
	Grading system instead of marks	152	43.8
	Decreased school hours	116	33.4

Table II shows that in our study of 500 male adolescents 63.8 % adolescents perceived that they were bad in studies. A good number of adolescents (36.8%) did not seek any help in their studies. Similar finding was shown by Arun and Chavan<sup>15</sup> who found academic decline in 45% of the adolescents. Both personal (38.6%) and

family factors (36.4%) were cited equally as the reason for academic decline and only 15.3% males attributed academic problems to teachers. In our study, parents (25.6%) and friends (29.2%) were asked for help in academic problems by youngsters thus emphasizing the role of family and peers in adolescence. This is similar to study done in Japan which showed that self-determined friendship, motivation and parental guidance were associated with the academic help-seeking attitudes among adolescents<sup>16</sup>. Teachers were the least (8.4%) to be asked for help in studies by adolescents and this may be due to the reason that most of the adolescents in the present study were from government schools and colleges where there is a trend of mass schooling without any significant teacher student interaction<sup>6</sup>. Another interesting finding was that about 184 (36.8%) adolescents did not seek any help in their studies which is an important fact undermining the psychology of the adolescents.

Majority of adolescents (272; 54.4%) wanted to decide their career by themselves and only 153 (30.6%) adolescents were satisfied with the current education system in contrast to 347 (69.4%) adolescents who wanted reforms in the system. Among those who were not satisfied with the education system, 152 (43.8%) adolescents wanted grading system to replace the current system of awarding marks, 116(33.4%) were in favor of decreased school hours and 79(22.8%) wanted correspondence system education where daily attendance was not necessary. In contrary, children of countries like Finland reported high satisfaction level with the education system<sup>17</sup>. This can be explained by the fact that in these countries, the education system is more standardized and updated. In light of this, the recent decision by the Central and State boards of education regarding change to grading system is a welcome step for improving academic performance of adolescents.

Table III shows the socio demographic profile of adolescents with school problems. These were prevalent in 55.8% of the adolescents in 12-14 years and 67% in both 14-16 and 16-18 years of age showing all the age groups were having high incidence of school problems and age was not a significant factor( $p>0.05$ ) with regard to academic difficulties. This was in contrast to study done by Sharma et al<sup>8</sup> in Delhi where lower age was associated with higher incidence of school problems. One of the reasons could be the trend of mass schooling without any individual orientation prevailing in Current educational

**TABLE III**  
**SOCIO DEMOGRAPHIC PROFILE OF MALE ADOLESCENTS WITH SCHOOL PROBLEMS**

Variable	Sub group	No. of adolescents with academic problem	%	Statistical analysis
Age group	12-14 years (n=145)	81	55.8	NS
	14-16 years (n=200)	134	67.0	
	16-18 years (n=155)	104	67.0	
Residence	Urban (n=250)	107	42.8	HS
	Rural (n=250)	212	84.8	
Socioeconomic status	Upper SES (n=101)	21	20.7	HS
	Middle SES (n=215)	164	76.2	
	Lower SES (n=184)	134	72.8	

institutions making adolescents vulnerable in all age groups. 84.8% adolescents from rural areas were having school problems in comparison to 42.8% adolescents from urban areas showing a significant association ( $p < 0.001$ ) of school problems with the place of residence. This could be due to more number of government schools in the rural areas where most of the teachers are either absent or not available as found by Kremer et al<sup>18</sup> in a survey done in 3700 schools of rural India where 25% of teachers were absent and those who were present, only half were found engaged in teaching. Regular posts in rural schools remain unfilled as the state is not in a fiscal position to hire additional teachers and thus

teacher absenteeism remains a serious problem in developing countries like India<sup>19</sup>.

**TABLE IV**  
**ASSOCIATION OF SCHOOL PROBLEMS WITH OTHER ADOLESCENT PROBLEMS IN THE STUDY POPULATION**

Variable	Sub group	Adolescents with academic problems (n=319)	%	Statistical analysis
Family dispute	Yes (n=165)	118	71.5	S
	No (n=335)	201	60.0	
Parents looking after needs	Yes (n=353)	205	58.0	HS
	No (n=147)	114	77.5	
Domestic violence	Yes (n=145)	99	68.2	NS
	No (n=355)	220	61.9	
Depression	Yes (n=198)	140	70.7	S
	No (n=302)	179	59.2	
Substance abuse	Yes (n=94)	72	76.5	S
	No (n=406)	247	60.8	
Sexual activity	Yes (n=78)	68	87	HS
	No (n=422)	251	59.4	

Only 20.7% adolescents from upper socioeconomic class were having school problems in comparison to almost three-fourth of adolescents from middle and lower socioeconomic class who were facing problems in schools ( $p < 0.001$ ). This could be due to the fact that most students coming from lower socioeconomic strata have little or no access to private tuitions and secondly, parents of these adolescents are not qualified enough to help them in their studies.

Table IV shows the association of academic problems with other adolescent problems. School and academic problems were

higher in adolescents with family dispute ( $p < 0.05$ ), parents not taking care of their children's needs ( $p < 0.001$ ), depression ( $p < 0.05$ ), substance abuse ( $p < 0.05$ ) and greater sexual activity ( $p < 0.001$ ). Domestic violence was not significantly associated with academic underperformance ( $p > 0.05$ ).

On multivariate analysis, academic problems were higher in adolescents with family dispute, depression, substance abuse and sexual activity. It is seen that adolescents with family dispute where parents are not taking care of the basic needs like books and clothes are more vulnerable to academic problems which is in accordance to study done by Arun and Chavan<sup>15</sup> (2009) who found that 24.4% adolescents with academic problems were having stressful parental relationships. Negligence of parents towards the needs of youngsters and decreased interaction with parents has a negative impact in all spheres of adolescent life including academics. 70.7% adolescents with depression were having significant relation with school problems as was also observed by Fergusson et al<sup>20</sup> (1977). Another interesting fact in the present study was that domestic violence (68.2% v 61.9%) was insignificantly related to academic problems in contrast to the finding of Kernic et al<sup>21</sup> (2002) in USA. This may be due to the reason that adolescents in the present study were not forthcoming to discuss their stressful family environment or detail out any event relating to domestic violence. 76.5% adolescents with substance abuse were having academic decline in accordance to Sarangi et al<sup>22</sup> (2005) who found 51.7% adolescent substance abusers to be school dropouts. 87% of the adolescents with sexual activity were having school problems similar to the findings of Lammers et al<sup>23</sup> which is self explanatory as these pursuits sap both energy and time of adolescents leaving academics in distress.

#### CONCLUSION:

One of the most important commitments a country can make for its future economic, social and political progress and stability is to address the health and development related needs of its adolescents. The need of the hour is to recognize the diversity of youth age group spanning between the age of 12 -18 years who vary by age, schooling, residence, family size and socioeconomic status. The policy makers and health professionals need to collaborate to address the need of our target group comprising of rural

boys belonging to extended families of low socioeconomic status.

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**“Negative attitude is like a punctured tyre. You can not reach anywhere till you change it.”**  
**Anonymous**

**“Be careful while reading health related books and articles. You may die of a misprint.”**  
**Mark Twain**

**“The past is a cancelled cheque. The future is a promissory note. The present is the only cash in hand. Use it well and make the most of it”**  
**Sadhu Vaswani**

## Original article

### A study of risk factors of acute respiratory tract infection (ARI) of under five age group in urban and rural communities of Ahmedabad district, Gujarat

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#### ABSTRACT:

**BACKGROUND:** Acute respiratory tract infection is a major cause of morbidity and mortality in developing and also developed countries. About 13 million children under 5 years of age die every year in the world; 95% of them in developing countries and one third of total deaths due to ARI.

**OBJECTIVE:** To study some of the risk factors which are responsible for occurrence of ARI in under five age groups living in urban and rural areas of Ahmedabad district.

**MATERIALS AND METHODS:** A cross sectional study covering 500 under five children in urban (five zone) and rural (five PHC of Sanand taluka) area of Ahmedabad district from September 2008 to March 2009.

**RESULTS:** A significant association was found between ARI and low birth weight, timely initiation of breast feeding, prelactal feeding, timely given complementary feeding and immunization status. No significant association was found between ARI and duration of breast feeding. Occurrence of ARI was found to be 22%. It was more in low birth weight babies (<2.5 kg) (36.18%). Occurrence of ARI was lower in urban area (17.2%) as compared to rural area (26.8%). In rural area, it is more because of lack of basic health services, lack of awareness etc,

**KEYWORDS:** cross sectional study, random sampling method, chi square test and Epi info for analysis

#### INTRODUCTION:

Acute respiratory tract infection is a major cause of morbidity and mortality in developing and also developed countries. About 13 Million children under 5 years of age die every year in the world, 95% of them in developing countries, one third of total deaths are due to ARI. In the developing countries, out of ten, seven deaths in under 5 years of age group are due to ARI. NFHS -3 revealed that two weeks before the survey 6% of children under age 5 had symptoms of an ARI (cough, short and rapid breathing that

was chest related and not due to blocked running nose), out of these children 69% were taken to a health facility or health provider for treatment. Average adult has 2-4 episodes per year and a child has 6-8 episodes per year. It is estimated that at least 300 million episodes of ARI occur in India every year, out of which about 30 to 60 millions are moderate to severe ARI. While every 6<sup>th</sup> child in the world is Indian, every 4<sup>th</sup> child who dies, comes from India. ARI is responsible for about 30-50 % visits to health facilities and for about 20-40 % admissions to hospital<sup>1</sup>. The DALYs lost due to ARI in South East Asia Region are about 3, 30, 26,000.

In spite of increasing public health importance, management and control of ARI remains a neglected entity in most of the national RCH-2 activities including recently introduced Integrated Management of Neonatal and Childhood Illness (IMNCI) programme. Thus ARI is the leading cause of mortality and morbidity in India especially in under fives.

Various factors are quoted as risk factors for ARI like low birth weight, timely initiation of breast feeding, prelactal feeding, timely given complementary feeding and immunization status.

#### OBJECTIVES

To study some of the risk factors responsible for occurrence of ARI in under five age groups living in urban and rural areas of Ahmedabad district.

#### MATERIALS AND METHODS

A cross sectional study was carried out in 500 under 5 children in urban area (five zone) and rural area (five PHC of Sanand taluka) of Ahmedabad district from September 2008 to March 2009. Out of 500 studied children, 250 children for Urban and 250 children for rural areas of Ahmedabad District were studied. For sampling in urban area, Ahmedabad city was chosen for studying urban population. There are 6 zones in Ahmedabad city. By simple Random Technique 5 zones were chosen for the city. Each zone has 7-9 wards. To choose sample from

urban area, simple random technique was applied for each 5 zone. One ward was selected by simple random technique (chit method) for each 5 zone.

Through simple random technique one area of each ward was selected and study was carried out and started from no 1 house till 50 children were found. For sampling in rural area, one Taluka (Sanand) from the total ten Talukas was selected by simple random technique. Five Primary Health Centres of Sanand Taluka were selected by simple random technique. 5 villages of each PHC were selected by simple random technique. Through simple random technique, one area of each village was selected and house to house survey was carried out starting from house no 1 till 50 children were found. Predesigned, pretested questionnaire was used for data collection. The questionnaire included information regarding birth history, birth weight, feeding history, birth order and history of immunization etc. History of episodes of ARI during last one month was enquired for calculating the occurrence of ARI amongst children.

Some definitions used in the study-

Gradation of ARI<sup>2</sup>: According to WHO criteria:

a. Mild ARI: Presence of cough or cold (No pneumonia)

b. Moderate ARI: Past breathing without chest indrawing.

c. Severe ARI : Presence of chest indrawing (severe pneumonia) and signs of very severe disease like convulsions, abnormally sleepy, severe malnutrition, wheezing, grunting, nasal flaring etc.

Immunization: The children were divided into 3 categories fully immunized, partially immunized not immunized.

a. Fully Immunized – A child who had received all vaccines according to National Immunization Schedule as per his/her age at the time of interview.

b. Not Fully Immunized - A child who had not received any or all vaccines according to National Immunization Schedule as per his/her age at the time of interview.

Data was analyzed by Epi-info 2002 package. Chi square test was applied for statistical significance.

## RESULTS

Out of 500 children, 110 ARI cases were found during study. About one third (33.2%) were below 1 year of age 55.2% were between one to four yrs and 11.6% were in 4-5 yrs of age

group. No major difference was found between rural and urban area. Sex wise distribution was almost equal (48% boys, 52% girls). Boys were more in urban area (54%), girls were more in rural area (58%). About 56.3% were males and 43.7% were females. More ARI cases were seen in 4-5 years of age group (47.3%) and in this age group 45.3% were males and 50.0% were females. Overall occurrence of ARI was found to be 22.0%. According to diagnosis, severe ARI cases were more noted in rural area (4.2%) as compared to urban area (2.4%).

Nearly 25.0% of mothers did not know the weight of their children. Children having low birth weight (<2.5 kg) were 39.8%. Low birth weight baby was more in rural area (42.4%) as compared to urban area (37.2%). Birth weight and occurrence of ARI has been found to be correlated. Severity of ARI was very high in low birth weight baby (36.1%) as compared to normal birth weight baby (17.3%). This difference was statistically significant ( $x^2 = 21.32$ ,  $p < 0.001$ )

TABLE I: DISTRIBUTION OF CHILDREN ACCORDING TO INITIATION OF BREAST FEEDING AND URBAN-RURAL COMPARISON

Initiation of breast feeding	Urban		Rural		Total	
	No	%	No	%	No	%
Immediate	171	68.4	75	30.0	243	49.2
1 <sup>st</sup> day	43	17.2	50	20.0	93	18.6
2 <sup>nd</sup> day	25	10.0	40	16.0	65	13.0
3 <sup>rd</sup> day	4	1.6	56	22.4	60	12.0
After 3 <sup>rd</sup> day	7	2.8	29	11.6	36	7.2
Total	250	100	250	100	500	100

According to birth order of children, more than one third (39.8%) were of 2<sup>nd</sup> birth order, 28.6% were of 1<sup>st</sup> birth order and 31.6% were in the 3<sup>rd</sup> or above birth order. Positive correlation was found between birth order and occurrence of ARI. It was lowest among children who were in 1<sup>st</sup> birth order (14.6%), while it was highest in 5<sup>th</sup> birth order (78.5%). This difference was statistically highly significant. ( $x^2 = 36.15$ ,  $p < 0.001$ )

TABLE II: DISTRIBUTION OF CHILDREN ACCORDING TO INITIATION OF BREAST FEEDING

Initiation of breast feeding	Severity of ARI								Children with No ARI		Total	
	Mild		Moderate		Severe		Total		No	%	No	%
	No	%	No	%	No	%	No	%				
Immediate	36	14.8	1	0.4	1	0.4	38	15.4	208	84.5	243	100.0
1 <sup>st</sup> day	18	19.3	2	2.1	0	0.0	20	21.5	73	78.5	93	100.0
2 <sup>nd</sup> day	16	24.6	3	4.6	1	1.5	20	30.7	45	69.3	65	100.0
3 <sup>rd</sup> day	17	28.3	2	3.3	1	1.6	20	33.3	40	66.6	60	100.0
After 3 <sup>rd</sup> day	9	25.0	3	8.3	0	0.0	12	33.3	24	66.6	36	100.0
Total	96	19.2	11	2.2	3	0.6	110	22.0	390	78.0	500	100.0

( $\chi^2 = 16.27$ ,  $p < 0.001$ )

TABLE III: DISTRIBUTION OF CHILDREN ACCORDING TO IMMUNIZATION STATUS

Immunization status	Severity of ARI								Children with No ARI		Total	
	Mild		Moderate		Severe		Total		No	%	No	%
	No	%	No	%	No	%	No	%				
Fully immunized	18	8.2	2	0.9	0	0.0	20	9.1	189	90.8	219	100.0
Partially immunized	33	24.0	4	2.3	1	0.7	38	27.7	99	72.2	137	100.0
Not immunized	45	29.2	5	3.2	2	1.2	52	33.7	102	64.2	154	100.0
Total	96	19.2	11	2.2	3	0.6	110	22.0	390	78.0	500	100.0

( $\chi^2 = 33.87$ ,  $p < 0.001$ )

About half (49.2%) of mothers started breast feeding immediately or within 1<sup>st</sup> hour. Mothers who delayed breast feeding by 1<sup>st</sup> day, 2<sup>nd</sup> day and 3<sup>rd</sup> day or later was 18.6%, 13% and 19.2% respectively (Table-1). 68.4% of urban mothers as compared to 30% in rural mothers started breast feeding immediately. Delayed breast feeding was highest in rural areas (34% on 3<sup>rd</sup> day or later). Significant correlation was found between timely initiation of breast feeding and decreased occurrence of ARI. Occurrence of ARI was lowest in mothers who initiated breast feeding immediately (15.4%) or within one hour (21.5%) as compared to initiated breast feeding on 3<sup>rd</sup> day or beyond it (33.3%). This difference was statistically significant ( $\chi^2 = 16.27$ ,  $p < 0.001$ ) (Table-2). Occurrence of ARI was more in those children who started prelactal feeding (29.3%) as compared to (16.3%) who did not start prelactal

sfeeding. This difference was statistically highly significant ( $\chi^2 = 12.19$ ,  $p < 0.001$ ).

According to duration of breast feeding, out of total mothers, 71% mothers continued breast feeding for more than 6 months after delivery. No difference was observed in urban (35.6%) and rural area (34.4%). 28.1% of mothers continued breast feeding up to 6 months. Only 1.4% of mothers discontinued breast feeding before 3 months after delivery. 33.2% of children excluded below less than one year of age. Occurrence of ARI was higher in children of mothers who continued breast feeding up to 3 months (40.0%) as compared to breast feeding up to 6 months, 9 months and 12 months i.e 29.7%, 27.2% and 30.4% respectively. This difference was not statistically significant.

About 40.8% of children started complementary feeding at 6 months of age, 28.6% of children started after 6 months. 13.0% of children didn't start complementary feeding.

Starting of complementary feeding around 6 months or after it was slightly more in urban area (75.2%) as compared to rural areas (63.6%). Observations reveal that timely initiation of complementary feeding protect against ARI. It was least in children who were initiated complementary feeding at age of 4 months (21.3%) and 6 months (13.7%), as compare to delayed start complementary feeding 6 months or after it (30.7%). This difference was statistically highly significant ( $\chi^2 = 14.78$ ,  $p < 0.001$ ). Occurrence of ARI was more in urban area (46.1%) as compare to rural area (19.6%) when complementary feeding started at age of 6 months or after. This difference was also statistically highly significant ( $\chi^2 = 8.1$ ,  $p < 0.05$ ).

According to immunized status, 43.8% were fully immunized, 33.8% were not immunized and 22.4% were partially immunized children. Fully immunized children were higher in urban area (77.1%) as compare to rural area (22.8%). Direct correlation between immunization status of children and occurrence of ARI. It was least in children who were fully immunized (9.1%) as compared to unimmunized children (33.7%). This difference was statistically significant ( $\chi^2 = 33.87$ ,  $p < 0.001$ ) (Table-3). 63.6% children had taken vitamin A. Vitamin A coverage was more in urban (84.0%) area as compared to rural (43.2%) area. Occurrence of ARI was more in those children who are not taking vitamin A prophylaxis (24.1%) as compare to taking vitamin A prophylaxis (20.7%). This difference was not statistically significant ( $\chi^2 = 0.79$ ,  $p > 0.05$ ).

## DISCUSSION

Out of 500 studied children, 110 children were having ARI infection during the study. Overall occurrence of ARI was found to be 22.0%. Birth weight and occurrence of ARI has been found to be correlated. Significant association was found between ARI and birth weight ( $p < 0.001$ ). Severity of ARI was very high in low birth weight baby (36.1%) as compare to normal birth weight baby (17.3%). Similar observations were noted by Nilanjan kumar Mitra,<sup>3</sup> Sudha Yadav<sup>4</sup> and Fonseca W<sup>5</sup> in their study.

There was a positive correlation between birth order and occurrence of ARI as per birth order of child increases, occurrence of ARI also increases. Occurrence of ARI was lowest among children who were in 1<sup>st</sup> birth order (14.6%) and highest in 5<sup>th</sup> birth order (78.5%). Our finding are

similar to the study done by Sudha Yadav<sup>4</sup> and S.singhi<sup>6</sup>.

There is positive correlation between timely initiation of breast feeding and decreased occurrence of ARI. Occurrence of ARI was lowest in mothers who initiated breast feeding immediately (15.4%) or within one hour (21.5%) as compared to initiation of breast feeding on 3<sup>rd</sup> day or beyond it (33.3%). Our findings are comparable with the studies done by Sudha Yadav<sup>4</sup> and Nafstad P<sup>7</sup>.

A significant association was found between ARI and prelactal feeding. Occurrence of ARI was more in those children who started prelactal feeding (29.3%) as compare to (16.3%) not started prelactal feeding. Similar finding was observed in study carried out by Biswas A<sup>8</sup>, Deb SK<sup>9</sup> and M.R.Savitha<sup>10</sup>.

Timely complementary feeding has impact on nutritional status of children which in turn affects occurrence of ARI and other communicable disease during childhood. A significant association was found between ARI and complementary feeding. Occurrence was least in children who were initiated to complementary feeding at the age of 4 months (21.3%) and 6 months (13.7%), as compared to delayed start complementary feeding 6 months or after it (30.7%). Our findings are comparable with the study done by M.R.Savitha<sup>10</sup>.

The child when fully immunized is protected against various respiratory infections like diphtheria, pertussis and also complications of measles. As these children are not fully immunized they are at risk of development of these infections. A significant association was found between ARI and Immunization. It was least in children who were fully immunized (9.1%) as compare to unimmunized children (33.7%). Our finding are compare with the study done by Deb SK<sup>9</sup>, M.R.Savitha<sup>10</sup> and Fonseca W<sup>5</sup>, Nilanjan kumar Mitra<sup>3</sup>, S.singhi<sup>6</sup>.

The present study found low birth weight, delay in initiation of breast feeding, prelactal feeding, delay in giving complementary feeding and immunization status as significant risk factors for Acute Respiratory Infections (ARI) in under fives. The study strongly favours the importance of basic health promotional measures like proper infant feeding practices, proper nutrition of the child in prevention and control of ARI. Health education can change health care seeking behavior and attitude of parents and other family members to take care of the children suffering with ARI in the home itself for preventing

pneumonia death. Strengthening of RCH-2 or IMNCI programme, raising female literacy level will go a long way in prevention of morbidity amongst children. Reorientation of health workers in peripheral area i.e Anganwadi, Subcentres and PHCs regarding identification, management and timely referral cases of ARI and strong supervision, monitoring and evaluation of RCH services specifically ARI component will help bring down the morbidity and mortality in children of under five in cases of ARI.

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**Health is not, in the minds of most people, a unitary concept.  
It is multi-dimensional, and it is quite possible to have 'good' health in one  
respect, but 'bad' in another.  
Blaxter, Mildred (1990), Health and lifestyles. London (Routledge), 35**

**The main health hazard in the world today is people who  
don't love themselves.  
Friedman, Kinky (1993), When the cat's away.  
New York (Wings Books), 531**

## Original article

### Screening of pregnant women for iodine deficiency and iron deficiency during early gestation in Vadodara

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#### ABSTRACT

**BACKGROUND:** Over the past decade, there has been increasing focus on iodine deficiency during pregnancy, yet 38 million newborns in developing countries every year remain unprotected from the lifelong consequences of brain damage associated with iodine deficiency. Pregnant women are often iron deficient and iron deficiency has adverse effects on thyroid metabolism. Hence, to prevent both the mother and baby from the consequences of iodine and iron deficiency, pregnant women should be screened as early as possible.

**OBJECTIVE:** To screen pregnant women for iodine deficiency and iron deficiency during early gestation. **Methods:** Pregnant women ( $\leq 15$  weeks) attending antenatal clinic (January–March 2010) in Jamnabai General Hospital, Vadodara were enrolled for the study. Urine and blood samples were collected from 225 pregnant women for estimation of urinary iodine, haemoglobin and thyroid hormones.

**RESULTS:** Out of the total population ( $n=225$ ), only 52 % had normal thyroid hormone levels. Median urinary iodine concentration (UIC) was 274.82  $\mu\text{g/l}$  and 21.6 % of the population had UIC  $< 150 \mu\text{g/l}$ . Mean TSH and  $\text{FT}_4$  was  $2.29 \pm 1.6 \mu\text{IU/ml}$  and  $10.20 \pm 2.5 \text{pmol/dl}$ , respectively, with 22 % pregnant women having TSH  $> 2.5 \mu\text{IU/ml}$  and normal  $\text{FT}_4$  (subclinical hypothyroidism), 15 % having  $\text{FT}_4 < 8.36 \text{pmol/dl}$  and normal TSH (hypothyroxenemia) and 11 % having both (overt hypothyroidism). Mean haemoglobin was found to be  $9.2 \pm 1.1 \text{g/dl}$ . Out of the total population screened 93 % had haemoglobin levels below 11 g/dl. **Conclusion:** Iodine and iron nutrition in pregnant women (LIG) of Vadodara is observed to be sub optimal, which may compromise the potential development for adequate mental and psychomotor development of the offspring during gestation.

**KEYWORDS:** pregnancy, iron deficiency, iodine deficiency

#### INTRODUCTION

Currently, iodine deficiency is the world's leading cause of preventable mental impairment, affecting an estimated 18 million babies each year. Iron deficiency anaemia (IDA), the most wide-spread nutritional deficiency, can have life-long effects on a child's cognitive development and learning abilities and put women at greater risk of death during childbirth. Iodine is critical for brain development and iron is critical for mental and physical ability<sup>1</sup>.

Iodine is an integral part of thyroid hormones, and thus plays a crucial role in foetal organogenesis, and in particular in brain development. This takes place during early gestation and involves delicate targeting throughout the central nervous system<sup>2</sup>. Iodine uptake by the thyroid is higher in pregnancy and iodine reserve in the thyroid can decrease to approximately 40 % of preconception levels. World Health Organization (WHO) has recently increased their recommended iodine intake during pregnancy from 200-250 microgram/day<sup>3</sup>. Increased requirement of a mother for iodine during pregnancy is caused as a result of an increased requirement for thyroxine ( $\text{T}_4$ ) in order to maintain normal metabolism in the mother, a transfer of  $\text{T}_4$  and iodide from mother to the foetus and increased loss of iodide through the kidneys due to an increase in the renal clearance of iodide.

Thyroid gland stores iodine from the diet, which is independent of maternal iodine status and is not entirely dependent on the current dietary intake during gestation. Adequate pre-conceptional iodine can safeguard sufficient stores of thyroid hormone to support the mother and foetus, at least in the first trimester. However if pre-conceptional dietary intake is deficient the increasing demands of later pregnancy may produce a deficit, this if remained untreated can result in a hypothyroxinaemic state<sup>4</sup>. During the first two trimesters of pregnancy the foetus is entirely dependent on the maternal thyroid hormone supply as the foetal thyroid does not

develop until 13-15 weeks of gestation<sup>4,5</sup>. As the foetus progresses into the third trimester, it develops the ability to produce its own thyroid hormones but it is still dependent on maternal iodine for hormone synthesis<sup>6</sup>.

Iodine deficient status in the mother is associated with impaired foetal development, both mental and physical. Epidemiological studies and case reports show that even a relatively minor degree of maternal hypothyroxenemia during the first half of gestation is potentially dangerous for optimal foetal neurodevelopment.

Pregnant women are often iron deficient and iron deficiency has adverse effects on thyroid function. During the second and third trimester, pregnant women are highly vulnerable to iron deficiency because their increased iron needs are rarely met by dietary sources. Iron deficiency has multiple adverse effects on thyroid metabolism. It decreases circulating thyroid hormone concentrations, likely through impairment of the heme-dependent thyroid peroxidase (TPO) enzyme.

Hence, to prevent foetal brain damage, pregnant women should be screened for iodine deficiency and iron deficiency anaemia as early as possible.

## MATERIALS AND METHODS

### Study area and population:

The study was carried out in Vadodara district of Gujarat state, India. Iodine deficiency disorders (IDD) is a public health problem in Gujarat and Vadodara district is considered as a new pocket of IDD<sup>7</sup>. Many studies have been conducted in different states of Gujarat to study the prevalence of iodine deficiency and thyroid function in school aged children. However, no data is available on prevalence of iodine deficiency and thyroid dysfunction in pregnant women of Vadodara.

Between January–March 2010, 225 pregnant women [low income group (LIG)] who checked in for antenatal assessment in Jambhai General Hospital, Vadodara were enrolled for the study. Only those pregnant women were included for screening that came before 15 weeks of gestation, who were not a known thyroid patient and aged between 18-37 years.

### Data collection:

All the pregnant women were given a consent form (in Gujarati) and the purpose of the study was explained to them. After obtaining consent from them, background information, socio-economic status, medical history and

anthropometric measurements were recorded. The characteristics of the study population are given in table 1.

### Sample collection and storage:

Venous blood was collected using a plain serum separating tube from pregnant women during their first visit to the hospital for thyroid hormone and haemoglobin analysis. Haemoglobin estimation was performed on the spot by hospital staff and results were recorded. Remaining blood sample was used for thyroid hormone analysis. After 30 minutes samples were centrifuged and serum was separated. The samples were then stored at -18 °C till analysis. The analysis was carried out in June 2010 at Radiation Medicine Centre (RMC), Bhaba Atomic Research Centre (BARC), C/o Tata Memorial Annexe, Parel, Mumbai, India.

Haemoglobin was assessed using Acid Heamatin (Sahali's Haemoglobinometer) method. Urinary iodine concentration (UIC) was assessed using Simple Microplate (Sandell-Kolthoff reaction) method<sup>8</sup>. Thyroid function was assessed by measuring the concentration of thyroid stimulating hormone (TSH, Immunotech), free thyroxine (FT<sub>4</sub>, Immunotech), total thyroxine (TT<sub>4</sub>, In-house kit, BARC) and thyroglobulin (Tg, In-house kit, BARC) by radioimmunoassay.

Permission for the study was obtained from concerned health authorities of the state and ethical approval was obtained from Baroda Medical College, Vadodara.

### Statistical analysis:

Simple descriptive analysis of the data was carried out using SPSS (version 14) and the results are expressed as mean  $\pm$  SD and percentages.

## RESULTS

The mean age of study population was 23.31 $\pm$ 3.6 years. All pregnant women were belonging to low socio economic status and most of them had completed their education till primary level only. No alcohol intake and smoking habits were found in the study population. Mean weight and height was found to be 45.65 $\pm$ 8.2 kg and 150.08 $\pm$ 5.3 cm, respectively and 10.4 % pregnant women had height <145 cm. Anthropometric data reveals that 36 % of the pregnant women were thin and nearly 50 % were normal.

### Iron status

For pregnant women, haemoglobin concentration of  $\geq$ 11 g/dl is considered as normal<sup>(9)</sup>. Haemoglobin concentration between 10.0-10.99 g/dl is considered as mildly deficient,

between 7.0-9.9 g/dl is considered as moderately deficient and <7 g/dl is considered as severely deficient. Mean haemoglobin of the study subjects was 9.2±1.1 g/dl at 15 weeks and only 7 % of the pregnant women had normal haemoglobin concentrations. Our observations state that, out of 93 % pregnant women who were anaemic, 26 % were having mild anaemia, 64 % had moderate anaemia and 3 % had severe anaemia. Consumption of iron rich foods was low among the study population (data not presented here). Iodine status:

TABLE I: CHARACTERISTICS OF THE STUDY POPULATION

Characteristics	Percentage
Religion	
Hindu	69
Muslim	31
Occupation	
Housewife	100
Working	-
Education	
Illiterate	7
Primary	69.3
SSCE	22.7
Graduation	1
Parity and abortions	
Primpara	41.8
Multipara	58.2
No abortions	82.2
1 or more abortions	17.8
Smoking habits	
Never	100
Not in pregnancy	-
Alcohol intake	
Never	100
Not in pregnancy	-

TABLE II: THYROID HORMONES OF PREGNANT WOMEN DURING 1<sup>ST</sup> TRIMESTER

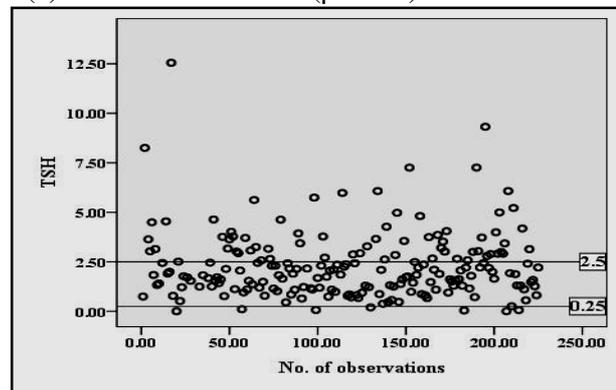
Thyroid hormone	Median (range)	Normal value (kit)
TSH $\mu$ IU/ml	1.95 (0.107-12.55)	0.25-5.10
FT <sub>4</sub> pmol/dl	10.50 (1.54-17.91)	8.36-27.02
TT <sub>4</sub> $\mu$ g/dl	10.24 (5.14-16.34)	4.20-13.0
Tg ng/ml	3.9 (0.1-32.3)	0.0-50.0

Median urinary iodine concentration (UIC) was 274.82  $\mu$ g/l and 21.6 % of the population had UIC <150  $\mu$ g/l, indicating iodine deficiency. Maternal Overt Hypothyroidism (OH) can be defined as TSH concentration >2.5  $\mu$ IU/ml and FT<sub>4</sub> concentration below normal range. In maternal Subclinical Hypothyroidism (SCH), patient may not have symptoms but the concentration of TSH is above 2.5  $\mu$ IU/ml with normal FT<sub>4</sub> concentrations. Maternal Hypothyroxinemia (HT) can be defined as normal TSH concentrations with FT<sub>4</sub> concentration below normal range. Out of the total population (n=225) screened, 52 % had normal thyroid hormone levels. Mean TSH, FT<sub>4</sub>, TT<sub>4</sub> and Tg were found to be 2.29±1.6  $\mu$ IU/ml, 10.20±2.5 pmol/dl, 10.24±2.0  $\mu$ g/dl and 5.6±5.7 ng/dl, respectively. Table 2 gives median values for TSH, FT<sub>4</sub>, TT<sub>4</sub> and Tg.

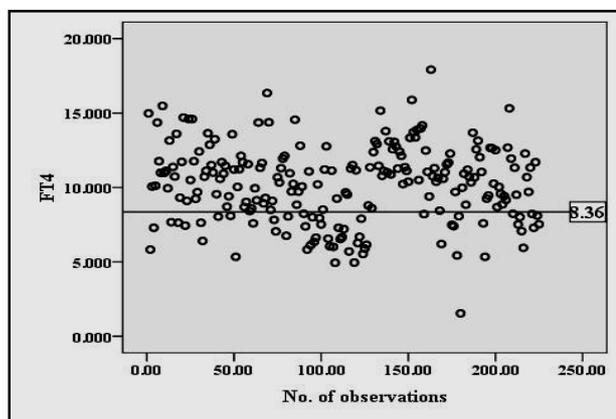
Prevalence of overt hypothyroidism, subclinical hypothyroidism & hypothyroxenemia was found to be 11%, 22% and 15% respectively. Only 1 subject was found with TSH level >10  $\mu$ IU/ml (figure 1a).

FIGURE I: DISTRIBUTION OF TSH AND FT<sub>4</sub> DURING 1<sup>ST</sup> TRIMESTER

I (a) Distribution of TSH ( $\mu$ IU/ml)



I (b) Distribution of FT<sub>4</sub> (pmol/dl)



## DISCUSSION

Our study is the first attempt to provide data on iodine deficiency during early pregnancy in pregnant women of Vadodara. Many studies have been conducted in Gujarat aiming to map the prevalence of iodine deficiency; however most of them have focused on iodine status of children. WHO has increased the iodine requirements of pregnant women, where as the intake of pregnant women remains the same. Hence there is a need to spotlight this vulnerable group. For ensuring adequate iodine intake for pregnant women, besides strengthening the USI programmes, additional complementary strategies should be considered. Early screening of pregnant women for iodine deficiency can play an important role.

Apart from iodine, adequate maternal nutrition is important for the health and reproductive outcomes of women, child survival, and development. Low pre-pregnancy body mass index (BMI) and short stature of women are risk factors for poor birth outcomes and delivery complications. In developing countries maternal underweight is the leading risk factor for preventable death and disease; it also leads to low work productivity. Early detection of underweight pregnant women alarms us regarding the growth and development of the foetus.

Iron requirements are greater in pregnancy than nonpregnant state. It is a known fact that as pregnancy progresses, iron requirements for foetal growth will rise steadily in proportion to the weight of the foetus<sup>(10)</sup>. This may result in increase in severity of IDA unless iron supplementation is initiated for the mother. Iron status of the study population was found to be alarming. Only few of them had haemoglobin levels above 11 g/dl. With such low levels of haemoglobin in the first trimester, there are chances that these pregnant women will become more anaemic during second and third trimester and they might deliver low birth weight babies with low mental and physical ability. Iron deficiency anaemia has important consequences for maternal and child health. In developed countries most women enter pregnancy with normal haemoglobin concentrations and variable amounts of stored iron. In contrast, large numbers of women in developing countries are anaemic at the onset of pregnancy<sup>(11)</sup>. Our findings reflect similar situation, moderate anaemia was found in majority of subjects at the onset of pregnancy. Human foetal ontogeny begins at 10-12 weeks of gestation and continues to develop until delivery, but during early pregnancy, foetal thyroid

hormone requirement is dependent on maternal supply<sup>12,13</sup>. Perinatal outcomes are therefore dependent not only on maternal thyroid status during pregnancy but also on the gestational age at which maternal hypothyroidism occurs. According to Glinoe<sup>14</sup>. When severe enough, iodine deficiency may induce maternal and foetal hypothyroxenemia from early gestation onwards

Several complex physiological changes take place during pregnancy, which tend to modify the economy of the thyroid and have a variable impact at different time sets during gestation. If daily iodine intake is not sufficient, respite an increase in glandular uptake to 60 %, the equilibrium (thyroidal pool of inorganic iodide and two main organs, thyroid and kidneys) remains more or less unbalanced, since the iodine entry resulting from both uptake and recycling is insufficient to fulfil the increased requirements for thyroid hormone production. If iodine deficiency exists during early onset (first trimester), the already low intra-thyroidal iodine stores become more depleted and when iodine deficiency continues during second and third trimester, it tends to become more severe.

In India, the household usage of iodized salt is 71.1 % and in Gujarat it is 71.4 %<sup>15</sup>. WHO has recommended two major approaches to give additional iodine to pregnant women. For countries where household usage of iodized salt is between 20-90 %, pregnant women should be given a daily oral dose of iodine as potassium iodide so that the iodine intake is 250 µg/day, either alone or combined with other minerals and vitamins. The other method is as a single annual oral dose of 400 mg of iodine as iodized oil<sup>3</sup>. In Vadodara, Gujarat Government is providing iodized salt to pregnant women through *anganwadi* [ICDS (Integrated Child Development Services) centres]. Apart from iodized salt, energy dense foods are also provided to pregnant women in the form of *sukhdi*, *upma* and *sheera* under NRHM (National Rural Health Mission) programme.

Kapil et al have carried out a study on pregnant women in three urban slum communities of Delhi. They aimed to identify the prevalence of micronutrient deficiencies and found that 15.1 % of pregnant women were having combined prevalence of IDD and IDA<sup>16</sup>. In our study both IDD and IDA were found. A combination of iodine and iron deficiency anaemia can result in decrease thyroid hormone production as iron is an important component of TPO enzyme. Iron deficiency may block a child's ability to use

iodide and iodide prophylaxis may be of no use if iron is not constituted simultaneously.

#### CONCLUSION AND RECOMMENDATIONS

Iodine and iron deficiency may affect infant's development that are irreversible such as eye-hand co-ordination, manipulation, understanding of object relations, imitations, early language development and motor development if not taken care at an early stage. Hence, it is very important and crucial that the pregnant women attain sufficiency of iodine and iron before pregnancy. Rather it is recommended that during adolescence the girls should be supplemented with adequate iodine and iron. So that they enter pregnancy with sufficient enough stores to give birth to a healthy baby and herself remains healthy. Iodine and iron nutrition in pregnant women (LIG) of Vadodara is observed to be sub optimal, which may compromise the potential development for adequate mental and psychomotor development of the offspring during gestation. Iodized salt and iron supplements have a beneficial impact on thyroid status of both the mother and the newborn. Prevention of fetal iodine deficiency is feasible, provided that iodine requirements of the mother are met both, before and throughout gestation and continued through lactation. It is suggestive that public health experts should review these situations and provide appropriate recommendations countrywide.

#### ACKNOWLEDGEMENT

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## Original article

# A Study of investigation report on death audit due to malaria in New Civil Hospital, Ahmedabad City, Gujarat, India

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## ABSTRACT

**BACKGROUND:** Malaria mortality is a public health challenge that has been met with various solutions. Malaria eradication is still a day dream for our country and perhaps for our future generation too.

**AIMS AND OBJECTIVES:** To find out the cause of death of 17 deaths due to *P. Falciparum* and *P. Vivax*(Mix Infection) and associate co-morbidities in New Civil Hospital, Ahmedabad, Gujarat

**METHODOLOGY:** A retrospective study was done on 17 malaria death patients in New Civil Hospital, Ahmedabad. Detailed history from starting of first symptom to death with their laboratory investigation was taken in preformed, structured proforma and analyzed in Microsoft Excel and compared with State and National mortality data.

**RESULTS:** During our study period of October 2006 to November 2007, 17 deaths were recorded in Hospital due to malaria. 5 patients died due to complications of *Plasmodium Vivax* infection and 12 patients died due to *Plasmodium falciparum*. Maximum patients (88.2%) presented with fever (Intermittent and Continuous). Immediate cause of death due to complication was maximum with Acute Renal Failure (29.4%) followed by Acute Respiratory Distress Syndrome (23.5%) and Septicemia (23.5%). Our death data are contradictory from state and national mortality data due may be to under reporting of malaria deaths by authority.

**KEY WORDS:** Death audit, *P. Falciparum*, *P. Vivax*, Malaria mortality

## INTRODUCTION

Malaria and other vector borne diseases remain one of the major tropical health challenges in the world today<sup>1</sup>. Vector borne diseases, mainly malaria, remains a leading cause of morbidity and mortality, world-wide, at present about 100 countries in the world and 40% population are considered malarious, almost half of which are in Africa, south of Sahara. More than 2400 million of the world's population is still at risk. The incidence of malaria worldwide is estimated to be 300–500 million clinical cases each year, with about 90% of these cases occurring in Africa,

south of Sahara—mostly caused by *Plasmodium falciparum*<sup>2</sup>. Approximately 1.1-2.7 million people die every year due to malaria globally<sup>3</sup> including one child in every 30 sec<sup>4</sup>. Malaria is still the most important cause of morbidity and mortality in India with approximately 2 to 3 million new cases arising every year<sup>5</sup>. If we look at the epidemiological trends of India there is a trend towards increasing proportion of *Plasmodium falciparum* cases<sup>6</sup>. The true effect of the malaria burden in India remains uncertain, but evidence is increasing that the scale of the burden has been greatly under-estimated—which is particularly surprising for a country that boasts of a space programme and is an emerging global economic leader<sup>7</sup>. The mosquito-borne diseases result in avoidable ill-health and death which also has been emphasized in National Health Policy<sup>8</sup> and Millennium Development Goals (MDGs)<sup>9</sup>. National Vector Borne Disease Control Programme (NVBDCP)<sup>10</sup> under the aegis of National Rural Health Mission (NRHM)<sup>11</sup> is one of the most comprehensive and multifaceted public health activities in India including prevention and control of mosquito-borne diseases.

Ahmedabad is rapidly developing into the main industrial city of Gujarat, India. It is situated on the bank of river *Sabarmati* and *Narmada* river canal passes through it. Unplanned urbanization and development is going on throughout the city. Because of this, there are many slum areas in the city. Most of the time, atmosphere here is hot and humidity is around 60% to 70%, favorable for mosquito breeding. Ahmedabad is endemic for urban malaria and *An.culicifacies*<sup>12</sup> is most abundant in the villages situated on the bank of rivers. In Ahmedabad, average Monthly Blood Examination Rate (MBER), Slide Falciparum Rate (SFR) and Slide Positivity Rate (SPR) were 7.6%, 0.2% and 0.05% accordingly in 2010<sup>13</sup>.

## MATERIALS & METHODS

The retrospective study on 17 malaria death patients was conducted in New Civil Hospital, Ahmedabad with over 3000 beds capacity which is apex level tertiary care hospital of Gujarat and also serves the neighboring states.

Around one year survey and death record data due to malaria was collected in structured proforma from all the wards of the hospital during October 2006-November 2007. The deaths were confirmed by clinical and laboratory findings.

**RESULTS**

In 17 malaria death patients, 4 patients were <12 years and 13 patients were >12 years. 7 patients were male and 10 were female, as depicted in Table I. Average age for male patient was 36.8 years and for female it was 21.8 years. 5 patients were migrants from other cities. In death analysis, average days of occurrence of symptoms from 1<sup>st</sup> symptom to death was 8.4 days. 5 patients died due to complications of *Plasmodium Vivax* infection and 12 patients died due to *Plasmodium falciparum*. The deaths in our study and subsequent, suggest failure of authority to take preventive steps during monsoon and pre monsoon era.

**TABLE I: SEX WISE DISTRIBUTION OF STUDY DEATHS AND RECENT DEATHS IN NEW CIVIL HOSPITAL DUE TO MALARIA**

AGE (YEARS)	SEX			
	MALE (%)		FEMALE (%)	
	Oct 2006-Nov 2007	2011*	Oct 2006-Nov 2007	2011*
Less than 12	0 (0)	1 (9)	4 (40)	2 (25)
More than 12	7 (100)	10 (90)	6 (60)	6 (75)
Total	7 (100)	11 (100)	10 (100)	8 (100)

\*Data of August and September, Figures in parenthesis indicate percentage.

**TABLE II: PRESENTING SYMPTOMS OF PATIENTS AT THE TIME OF ADMISSION**

PRESENTING SYMPTOM	NO. OF PATIENTS * (%)
INTERMITTENT FEVER	9 (52.9)
CONTINUOUS FEVER	6 (35.3)
RIGORS	11 (64.7)
VOMITING	2 (11.8)
UNCONCIOUSNESS	9 (52.9)
ABNORMAL BEHAVIOR	7 (41.8)
HEADACHE	4 (23.5)
URINE SUPPRESSION	2 (11.8)
CONVULSIONS	1 (5.9)

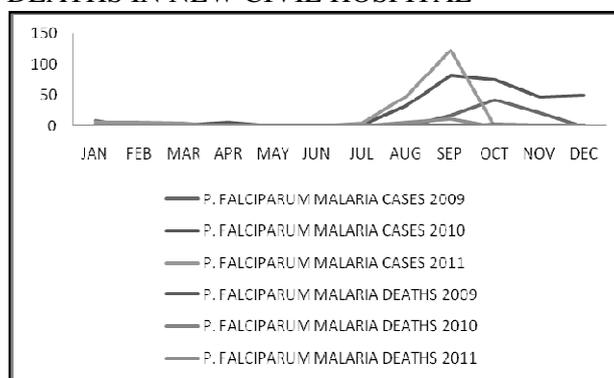
\*Multiple symptoms present, Figures in parenthesis indicate percentage.

**TABLE III: IMMEDIATE CAUSE OF DEATH DUE TO P. FALCIPARUM AND P. VIVAX MALARIA**

CAUSE OF DEATH	NO. OF PATIENTS (%)
ARDS	4 (23.5)
Acute Renal Failure	5 (29.4)
Hepatic Failure	1 (5.9)
Septicemia	4 (23.5)
Cerebral Malaria	2 (11.8)
Pulmonary Edema	1 (5.9)
Total	17 (100)

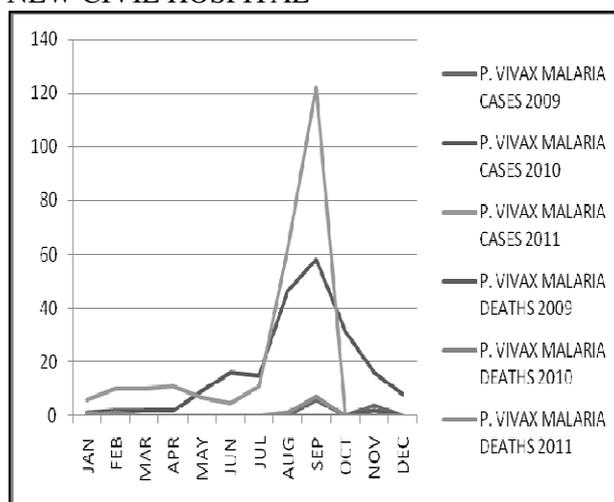
\*ARDS=Acute Respiratory Distress Syndrome, Figures in parenthesis indicate percentage.

**FIGURE 1: MONTH WISE LAST THREE YEAR P. FALCIPARUM CASES AND DEATHS IN NEW CIVIL HOSPITAL\***



\*up to September 2011

**FIGURE 2: MONTH WISE LAST THREE YEAR P. VIVAX CASES AND DEATHS IN NEW CIVIL HOSPITAL\***



\*up to September 2011

Various classical symptoms with which patients were presented at the time of admission are depicted in Table II. Fever and rigors were the main symptoms. 9 patients presented in unconscious condition which shows seriousness of disease and associated severe complications.

Table III shows the immediate cause of death due to complications of malaria. 5 (29.4%) patients died due to Acute Renal Failure. 2 (11.8%) patients died due to very severe complications of cerebral malaria. Rest of the patients died due to other complications like Acute Respiratory Distress Syndrome (ARDS), liver failure, septicemia and pulmonary edema (co-morbidities) as shown in the table.

Figure I depicts monthly reported cases and deaths in New Civil Hospital, Ahmedabad

during last three years due to *P. Falciparum*. Data shows increased cases and deaths during June-September month means during monsoon and post monsoon season which shows the seasonal trends of disease. Recent cases and deaths showing epidemic like situation compared to previous months.

TABLE IV: LAST THREE YEAR MALARIA CASES AND DEATHS IN GUJARAT AND INDIA<sup>14\*</sup>

Year	GUJARAT			INDIA		
	MALARIA CASES	PF CASES (%)	DEATHS (%)	MALARIA CASES	PF CASES (%)	DEATHS (%)
2009	45902	8485 (18.9)	34 (0.4)	1563574	839877 (53.7)	144 (0.02)
2010 <sup>P</sup>	64730	13170 (20.3)	10 (0.08)	1495817	779549 (52.1)	767 (0.09)
2011 <sup>P</sup>	12808	2073 (16.2)	0 (0)	336545	180894 (53.7)	75 (0.04)
TOTAL	123440	23728 (19.2)	44 (0.2)	3395936	1800320 (53.01)	986 (0.05)

\*up to May 2011, p = provisional, Figures in parenthesis indicate percentage.

Figure II depicts monthly reported cases and deaths in New Civil Hospital, Ahmedabad during last three years due to *P. Vivax*. Data show same pattern like *P. Falciparum* malaria means increased cases and deaths during particular months. Here, deaths are due to mixed infection with *P. Vivax*.

NVBDCP data of last three year cases and deaths due to malaria in Gujarat and India are depicted in Table 4 which is contradictory than the cases and death in New Civil Hospital, Ahmedabad alone which lighting on the issue of weak reporting from bottom to top in India.

## DISCUSSION

In our study, mean age of patients who died due to malaria was 28 year which was 23 years in Papua<sup>15</sup> study. The most commonly reported complaints were fever (88%), vomiting (12%) and headache (24%) which is also comparable with Papua<sup>15</sup> study. Most of the burden of malarial mortality is borne by the economically productive age<sup>16</sup> which is true in our study, also. Deaths in children are 23% in our study, almost same as another study<sup>15</sup> in which it was 16%. Male: Female death ratio in our study was 1: 1.4 which is contradictory to Kumar A<sup>16</sup> study. This difference could be due to less number of death data in our study. When we examined the

risk of severe diseases among people having quantitatively equal risk of infection, adults were seen to be at significantly higher risk which is comparable to other studies<sup>17,18</sup>. Falciparum malaria showed distinct seasonal peaks<sup>16</sup> which correlates with our study. Deaths due to complications are also comparable with another study<sup>15</sup>. The emergence of resistance to chloroquine in *P. falciparum* in many pockets of the country and reports of reducing sensitivity in *P. Vivax* are major causes of concern<sup>19-22</sup> and it is reflected in our study too. Another important issue seen in our study was possibility of under reporting from New Civil Hospital and NVBDCP by authority as mentioned in few other studies<sup>16, 23, 24</sup> and it is also published in the recent article in the 20 November 2010 issue of *The Lancet*<sup>25</sup> which estimates the number of malaria deaths annually in India to be between 125000 and 277000 (average 205000), numbers substantially different from the official figures of about 1000 and 15000 deaths by WHO. The findings of this article force us to sit back and mull over this wide disparity. It also forces a comment on the malaria mortality counts as reported officially, as also the current malaria policy and its future direction.

## CONCLUSION

In conclusion, it may be appropriate to look beyond the numbers (malaria deaths) as rightly pointed out by the article published in *the Lancet*<sup>25</sup> which also urges us to wake up to the problem of malaria in India rather than the mortality count alone. Counterfeit drugs and drug resistant to malaria is also a burning problem in India which must be tackled by strong hands. A good investment on malaria control not only makes public health sense but also economic sense in the present era of economic liberalization in India. Firm malaria control is imperative for human resource development, which in turn is important for equitable and sustained economic growth.

## LIMITATION

Limitation of our study is the limited number (17) of deaths due to *Plasmodium falciparum* and *Plasmodium Vivax* during one year period. There may be limitation to generalize the findings major community or whole population.

## ACKNOWLEDGEMENT

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## Original article

# Health seeking behavior and utilization of health services by pregnant mothers in Vadodara slums

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## ABSTRACT

**OBJECTIVES:** To study the health seeking patterns of women for Antenatal care during pregnancy & to study the utilization of delivery services by women and the utilization of child health care during first month of life of new born.

**METHODOLOGY:** Present study is a longitudinal qualitative study. 30 Anganwadis were selected by systemic random sampling. Total 60 women from 30 Anganwadis in third trimester of pregnancy were enrolled in the study after their consent by in-depth. They were studied for their pregnancy perception and health seeking behavior during pregnancy (Phase I). They were then followed up after one month of delivery for the childbirth experience (Phase II).

**RESULTS :** Around (87%) of the women were registered in Anganwadi as the Anganwadi worker had come and registered. More than half (54%) of the women were registered by the end of first trimester. Most of them preferred to go in Private hospitals. Almost all women (97%) used to go for Antenatal Care for their baby's good health and safe delivery. Majority preferred Private Hospital for delivery. Only few (8%) went for home delivery. Around 2/3<sup>rd</sup> of women had their Postnatal Check up (PNC) done.

**CONCLUSIONS:** Majority of women preferred private hospital for delivery in spite of being from lower socio economic group and most of the mothers ignored postnatal care.

**KEY WORDS:** Health seeking behavior, utilization of Health services, longitudinal qualitative study

## INTRODUCTION

Global evidence points out the fact that obstetric health care practice has no effect on reducing maternal mortality rate, which is directly linked to the place of delivery<sup>1</sup>. However, in India, data show that 70% of mothers, who had four or more antenatal check-ups, delivered in institutions compared with 7% for those who had no antenatal check-ups<sup>2</sup>.

The Reproductive and Child Health Programme emphasizes the need for mothers to deliver babies in hygienic conditions under the

supervision of skilled health professionals, but most of the women in India deliver their babies at home without professional help.

Utilization of antenatal care services for the most recent birth among ever-married women has increased substantially over time, from 66 percent (NFHS-2) to 77 percent (NFHS-3).

The percentage of births to ever married women that were delivered in health facilities in the three years preceding the survey showed an increase steadily from 34 percent in NFHS-2 and 41 percent in NFHS-3.<sup>3</sup>

A number of factors have been found to be associated with the utilization of obstetric health care which are directly related with social, cultural and economic factors<sup>4</sup>. Besides socio-economic factors, women's education, birth order and standard of living index have pronounced influence in choosing the health care facility<sup>5</sup>. At the level of community also, there are a number of institutions which have bearings to fertility and reproductive health decision making and reproductive health status.<sup>6</sup>

Non – utilization or under- utilization of maternal health care services, especially among urban slum population are high due to lack of awareness or access to health care<sup>7</sup> and this calls for understanding the health seeking behavior and utilization of services by those in need of them. Identifying the areas that are critical and can be improved upon will help.

Keeping this in mind, present study was designed with the following aims and objectives.

## AIMS OF THE STUDY

To identify the critical area of health seeking behavior and utilization of services during pregnancy and childbirth among women residing in Urban slums of Vadodara.

To identify the modifiable behavior to improve the utilization of services and reduce the morbidity and mortality in the women.

## OBJECTIVES OF THE STUDY

To study the health seeking patterns of women during pregnancy for Antenatal care and understand reasons for the same.

To study the utilization of delivery services by women, their preference for a particular type of service, to identify potential benefits and risks associated with the type of services used.

#### MATERIAL AND METHODS

This is a longitudinal qualitative study. As the aim was to focus on identifying those women and reasons, which contribute to under utilization of services and/or faulty practices, the study was limited to slum areas of Baroda city. From designated 300 ICDS Anganwadi with Vadodara Municipal Corporation areas, we selected 30 Anganwadis by systematic random sampling and from each Anganwadi; pregnant women in their third trimester of pregnancy were identified and after their consent, were enrolled in the study. Total of 60 women could be enrolled. They were studied for their pregnancy perception and health seeking behavior during pregnancy (Phase I). They were then followed up after one month of delivery for the childbirth experience (Phase II). Study was conducted from August'06 to January'07. We had obtained information regarding following:

##### PHASE I

Health seeking behavior during pregnancy and perceptions regarding

Anganwadi services - whether the women have registered the pregnancy at Anganwadi, if yes, whether they avail the services provided to the pregnant mothers.

Nutritional status – what kind of diet pattern women follow during pregnancy,

Antenatal checkup – whether antenatal care was obtained or not, who provided antenatal care, number of antenatal check up, etc.

Difficulties experienced in seeking health care during pregnancy

##### PHASE II

Health seeking behavior after delivery and perceptions regarding

Nutritional status – Information was taken pertaining to change in diet pattern after delivery.

Post natal check up – whether postnatal care was obtained or not, who provided, number of postnatal check up, etc.

Post natal difficulties – what difficulties they faced after delivery

Care taken after delivery

Initiation of breastfeeding, feeding of colostrum, exclusive breast-feeding (Exclusive BF)

Vaccination – which vaccinations (BCG, OPV) were given to the baby

All interviews were conducted at women's house. Each interview lasted for about 45 minutes to 1 hour and was conducted in the language preferred by them. Information was collected in form of notes, which were then expanded and translated into English, coded and entered into Computer. The verbatims used by the women were noted and then highlighted in the notes.

#### STUDY TOOLS

This qualitative study was carried out using semi-structured interview technique facilitated by the guidelines prepared. Semi structured interviews were conducted by research assistants trained in qualitative research methods. To provide training to the research assistants, the initial semi structured interviews were conducted by the investigators. Pre – testing of the questionnaire was done and the necessary changes were made so that complete information could be obtained without any difficulty. All the instruments were translated in the vernacular (Gujarati) for ease of application when required.

#### ANALYSIS OF DATA (STATISTICS)

Though essentially proposed study was qualitative in nature; the number of data set, allowed some quantitative analysis.

The qualitative data was entered into computer using group codes and numbers so that it would lend itself to regrouping as required to understand the emerging patterns and, it will also be helpful in locating “verbatim” relevant to each one of them.

#### ETHICAL ISSUES

The women who gave consent were selected for in-depth interviews. During the course of study, they were free to respond to all, some or more of the questions posed. Complete confidentiality was assured to them. Their identity was protected and only dummy names were written for computer data entry.

#### RESULTS

In accordance with the objectives of the study results of the study are presented under the following heads:

1. Perceptions of mothers during pregnancy
2. Perceptions of mothers after delivery
3. Child care

In this study 60 pregnant mothers in third trimester were enrolled from 30 Anganwadi in urban slums of Vadodara. Most of the women belonged to the age group of 20 to 24 years. Percentage of women in the age group of less than 19 years was least.

TABLE I. REGISTRATION AT ANGANWADI

Month of registration	N=26	%
1st trimester	14	53.85
2nd trimester	9	34.61
Don't remember	3	11.54

Socio demographic profile:

4 out of the 60 women were illiterate. Most of the women (50%) at least had primary education. Around 43% of the women had total family income between Rs. 1001 to Rs. 2000.

#### PHASE I. HEALTH SEEKING BEHAVIOR AND PERCEPTION DURING PREGNANCY REGISTRATION

##### AVAILING ANGANWADI SERVICES

Around (87%) of the women were registered in Anganwadi as the Anganwadi worker had come to their houses to do the same. More than half (54%) of the women were registered during their first trimester (Table 1). 12% of them don't know about Anganwadi and the services provided through it. In spite of belonging to low socio-economic class, most of the women preferred to go to Private hospitals (Table II).

TABLE II : PLACE OF REGISTRATION

Registration	N=30	%
Only Govt. set up	3	10
Only Private set up	1	3.33
Only at Anganwadi	2	6.67
Both at Anganwadi & Hospital	24	80
Both at Anganwadi & Govt. Hospital	7	29.17
Both at Anganwadi & Private Hospital	17	70.83

For nutritional supplementation, most of the women occasionally visited Anganwadi (Table III). They seldom consumed the supplementary food given at Anganwadi. They either gave it to their children or shared with family members. The nutritional supplements given to them at Anganwadi included "Chana, Lapsi, Sheero, Mug, Upama, Bataka poha".

Sonuben, a 21 years old working woman says, "I get the nutritional supplement daily as my neighbor gets it for me but I occasionally consume it".

TABLE III. FREQUENCY OF VISIT TO ANGANWADI

Visit to Anganwadi	N	%
Yes	26	86.66
Daily	9	34.62
Sometimes/Frequently	10	38.46
Rarely	1	3.85
Never	6	23.08

##### ANTE-NATAL CHECK UP

All most all women used to go for Antenatal Care for their baby's good health and safe delivery.

Ushaben, a 29 years old woman going to private hospital for Antenatal check up says: "We get to know if the child has any problem or not so that immediately corrective action can be taken, that is why I get check up done".

Most of them had undergone Antenatal check up for more than 3 times. Doctors conducted the Antenatal check up (Table IV).

Almost all had gone through basic Antenatal check up i.e Height and Weight measurements, Blood and Urine examination, Blood pressure, T.T. Vaccination and physical examination which is required. Majority had taken adequate doses of T.T vaccines (Table V). But only a few knew its importance.

TABLE IV. ANTENATAL CHECK UP

Antenatal Checkups Done	N	%
Yes	29	96.67
No	1	3.33
Frequency of visit (29)	N	%
< 3 times	2	6.9
≥ 3 times	27	93.1
Conducted by (29)	N	%
Doctor	28	96.55
Nurse/ Midwife	1	3.44

TABLE V. CARE DURING PREGNANCY RECEIVED BY WOMEN

B.P. Measured during Pregnancy (29)	N	%
Yes	28	96.55
No	1	3.44
T. T. Vaccination (29)	N	%
Adequate dose	29	100

All had been given iron folic Acid tablets either by doctors or Anganwadi workers. Not all these tablets were consumed. When enquired about actual consumption almost 80% had consumed less than 100 and about 20% had consumed less than 90 tablets (Table VI). Reasons given for not complying fully with the treatment were side effects encountered because of the tablets like nausea and altered taste.

TABLE VI. NO. OF WOMEN RECEIVING IFA TABLETS AND COMPLIANCE

Iron Folic Acid Tablets Given (30)	N	%
Yes	30	100
No	0	-
No. of IFA Tablets Given	N	%
Less than 90	0	0
Less than 100	30	100
No. of IFA Tablets Consumed	N	%
Less than 90	3	10
Less than 100	23	76.66

PHASE II : POST NATAL CARE

On follow up of the same mothers after 1 month of delivery we were able to meet only 48 women out of 60. 4 women had stillbirth and 8 of them had gone to their mother's home and couldn't be traced. All the mothers had good health after delivery. Majority of mothers were happy irrespective of their desire.

Kavita, 30 yrs old having 2 children says: "I wanted a baby boy, and I got. I am very happy as my wishes are fulfilled".

Umaben, 22yrs old having a male child 2 years of age says: "I am very happy as I wanted a girl child and got so. And in today's world, girls only take care of their parents".

Another woman, Faridaben 23 yrs old, says: "I wanted a girl child, as already had a baby boy. But I am happy as its God's gift".

TABLE VII. PLACE OF DELIVERY

Place of delivery	N=24	%
Government set up	9	37.5
Private	13	54.2
Home	2	8.3

TABLE VIII. POSTNATAL CHECK UP

No. of visits	N=24	%
<3	15	62.5
≥3	3	12.5
No visits	6	25

HEALTH SEEKING BEHAVIOR AND PERCEPTIONS AFTER DELIVERY

DELIVERY

Majority preferred the same health set up for delivery where they were seeking ANC (Table 7). Only few (8%) had home delivery. Trained persons using sterilized equipment conducted the home deliveries. Most (70%) of them had normal delivery and duration of stay at hospital was 3-4 days. Few had to stay for more than a week, which costed them more than Rs 5000. In spite of being from low socio economic group, they preferred private set up.

## NUTRITIONAL STATUS

Majority of mothers had increased their diet and frequency of eating in order to feed the baby well. They avoided some foods which they believed would cause problem to their child especially digestive problems.

## FOODS PREFERRED AND AVOIDED

They used to have rab, sheero, vasano, kodhari, GLV and fruits, which are nutritious and good during lactation period. One third of the mothers avoided sour vegetables and spicy foods. They believe that eating these foods could cause indigestion to baby and interfere with healing of stitches.

Faridaben, 23 years old Muslim woman, says: "Elders have advised me to avoid eating Asofoetida (hing), Chickpea (choli) and banana (kela) till my child grows up as they can cause digestive problems".

## POST NATAL CHECK UP

Around two third of women had their Postnatal Check up (PNC) done, of which only 13% went for adequate PNC visits. (Table 8) Very few women had problems during postnatal period. Most common problem faced was backache.

## DISCUSSION

Maternal mortality is the outcome of a complex web of causal factors that include social, economic, educational, political and cultural causes as well as issues such as gender inequity, state of physical infrastructure, geographic terrain and the health system. Evidence from parts of India and elsewhere demonstrates that it is possible to substantially reduce maternal mortality by addressing health factors alone to ensure that all women have access to safe delivery services.<sup>1</sup>

The Reproductive and Child Health programme emphasizes the need for mothers to deliver babies in hygienic conditions under the supervision of skilled health professionals but most women in India deliver their babies at home without professional help. Antenatal check up is a means to encourage women by the health professionals to deliver in an institution.<sup>8</sup>

A review of literature shows that women who do not avail of antenatal care are more likely to suffer from problems during pregnancy. ANC is one of the most important pillars of safe motherhood along with family planning, safe delivery and essential obstetric health care. RCH programme recommends that as part of Antenatal

care, women receive two doses of Tetanus toxoid vaccine, adequate amounts of Iron and folic acid tablets, and at least three antenatal checkups that include blood pressure checks and other procedures to detect pregnancy complications.<sup>9</sup> In the present study, ANC registration is early and largely complete. Services as measured by B.P. and T.T coverage are satisfactory. IFA tablets are well tolerated and compliance is good.

The recommended protocol for Post partum care in the current RCH programme is three postpartum visits in the first eight weeks after birth. NFHS 2 data shows that despite of postpartum complications (bleeding in 11% and high fever in 13%), only 16.5% of women received any form of postpartum care during 1<sup>st</sup> eight week after delivery<sup>(1)</sup>. In present study also, only 2/3<sup>rd</sup> of women had their Postnatal Check up (PNC) done, of which only 13% went for adequate PNC visits.

ANC registration is early and largely complete in Vadodara slum area. Utilization of Anganwadi Services can be further improved in the field of Nutritional advice and Early Childhood Care.

As majority of the women enrolled in the study preferred private hospital for delivery in spite of being from lower socio economic group, it can be concluded that the facilities need to be improved in government set up to generate confidence among women to use government set up as envisaged in National Health Policy (2002). Most of the mothers ignore PNC. So, the Anganwadi worker should create awareness and importance of postnatal care.

It is felt that proper health educational program should be launched to address issues such as faulty food beliefs and practices. However this can be promoted by improving nutritional knowledge and dietary practices of population in general and vulnerable groups in particular through Anganwadi worker and ANM.

To overcome the above problems, counseling and creating awareness among communities as envisaged in guidelines of IMNCI are:

Promote healthy behaviors regarding Antenatal and Postnatal care, proper breastfeeding practices, New born care, illness recognition in child, early care seeking and its management etc. IEC campaigns for generating awareness regarding the nutritional care during pregnancy and lactating period.

Caregivers and families should be counseled for management of the sick child.

Formation of self-help groups and use of the existing platform of Mahila Mandals should be used for health education including neonatal care in health and sickness.

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**Public health practice embraces all those actions that are directed to the assessment of health and disease problems in the population; the formulation of policies dealing with such problems; and the assurance of environmental, behavioral, and medical services designed to accelerate favorable health trends and reduce the unfavorable.**

**Affi, Abdelmonem A. & Breslow, Lester (1994), The maturing paradigm of public health. In: Annual Review of Public Health, Vol. 15, 223-235, here: 232**

**Clearly, health and disease cannot be defined merely in terms of anatomical, physiological, or mental attributes. Their real measure is the ability of the individual to function in a manner acceptable to himself and to the group of which he is a part.**

**Dubos, René (1987), Mirage of Health. Utopias, progress, and biological change. New Brunswick (Rutgers University Press), 261**

## **Original article**

# **A Bayesian approach in agreement analysis: An application in Artemisin Combination Therapies (ACTs) for malaria patients**

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## **ABSTRACT**

The World Health Organization (WHO) announced phasing out artemisinin as a single drug therapy for oral treatment of malaria from the market and has started advising prescription of Artemisin Combination Therapies (ACTs) in 2010. The objective of this work is to study the ACTs practice pattern by the doctors and selling pattern by the chemist in Varanasi city market. A Bayesian approach is used to perform agreement analysis between doctors and chemists drug practice in this regard. It has been found that the agreement level between doctors and chemist towards ACTs is higher in case of pregnant mothers in comparison to the other population.

## **INTRODUCTION**

The drug malpractice is one of the greatest problems in the control of malaria. To deal with such problem, WHO in 2010<sup>1</sup> has announced phasing out the single-drug artemisin for oral treatment of malaria from the market and recommended Artemisin Combination Therapies (ACTs). The reason was that single-drug artemisin treatment (monotherapy) generates resistance in the malarial parasites whereas ACT is nearly 95% effective to curing complicated malaria. The WHO has appealed to all companies to stop marketing single drug oral artemisin and to re-direct their production towards the ACTs.

In last few decades agreement analysis has become one of the important statistical tools for data analysis [Coleman (1966), Light (1969), Von and Eye Mun (2005) and Liebetrau (1983)]. It is a widely applied tool in categorical data analysis where the different raters provide different rating to the same subject. The analysis is performed to study the level of agreement between two performers. In this work, we observed the drug prescription and selling pattern on the same patients by doctors and chemist respectively. We performed the agreement analysis to compare the prescription pattern and selling pattern between doctor and chemist. The small sample size observed was due to the limitation of funding. The Bayesian approach in the agreement analysis has been applied to

overcome the small sample size observation. In the Bayesian approach, the MCMC simulation techniques has been used and compared with doctors and chemist practice pattern.

## **OBJECTIVES AND STUDY DESIGN**

The objective of this study was to compare the prescribing and selling practice pattern by the doctors and chemist towards the ACT versus artemisinin monotherapy. The WHO has strictly recommended stopping the artemisin monotherapy in the pregnant women. What is practiced in reality by chemists and the doctors is a matter of concern. This work is a cross sectional study design and the data has been collected from the patients who visited three dispensaries in Varanasi city during the period between December 2009 and November 2010. The patient prescription and the drug-purchase record of the same patient was scrutinized from the chemist. The Bayesian approach has been applied in this work to overcome the bias due to small sample size.

## **DATA METHODOLOGY**

The secondary data was obtained from the cross sectional study by Insitute of Medical Science, Banaras Hindu University, Varanasi in 2010. A period of 12 months was taken to study the artemisin monotherapy and combined therapy practice pattern by the health care professionals. The calculated sample size to conduct the study was 54. A total of 54 prescriptions and chemist practice pattern were studied. The Bayesian approach with Markov Chain Monte Carlo (MCMC) technique was applied to obtain the statistical inferences.

## **METHODS OF THE STUDY**

Over the last four to five decades, the agreement analysis has become one of the most explored and useful area in statistical science. The agreement analysis is dependent on the identification of the raters and subjects. Belloso et al. (2003) have applied the agreement analysis to obtain the abnormalities in the body fat in HIV patients.

McNicholas et al. (1999) have applied the kappa statistics to assess the inter and intra-observer agreement on the osteoarthritis patients. Planche et al. (2001) compared the results of application of one touch glucose meter with reference glucose meter in malaria patients with agreement analysis. In the designing stage, it is very important to look into the relationship between two groups' raters and subjects. It is assumed that there is no difference between the two raters and if the differences exist, some steps need to be used to take care of it. To find out the inter and intra observation between two raters, the Bayesian approach in the agreement analysis can be useful. It is well accepted that difference between two health professionals will always exist due to the difference of experiences and training but many times this differences creates inescapable problems in drug practice. In the categorical observation, the well accepted indicator is the kappa statistics. The expected proportion of chance of agreement between the observed frequencies can be denoted by,

$$\frac{a+c}{n} \times \frac{a+b}{n} \times \frac{c+d}{n} \times \frac{b+d}{n} \quad (1)$$

The kappa statistics can be formulated by,

$$k = \frac{\text{simple agreement} - \text{expected agreement}}{1 - \text{expected agreement}} \quad (2)$$

with the simple agreement by

$$\frac{a+d}{n} \quad (3)$$

Scott (1955) defined the Kappa through the marginal distribution of k by

$$k = [(\theta_{00} + \theta_{11}) - (\theta_{0.}\theta_{.0} + \theta_{1.}\theta_{.1})] / [1 - (\theta_{0.}\theta_{.0} + \theta_{1.}\theta_{.1})] \quad (4)$$

where  $\theta_{ij}$  stands for the two different rater dichotomous rating.

The Kappa statistics further has been modified from the ordinal scoring to multiple scoring. Fleiss et al. (1966) have used the indices  $A_1$  and  $A_2$  in agreement analysis by

$$A_1 = \frac{(\theta_{00} + \theta_{00} + \theta_{11} + \theta_{11})}{4} \quad (5)$$

$$A_2 = \frac{\theta_{11}}{(\theta_{1.} + \theta_{.1})} + \frac{\theta_{00}}{(\theta_{0.} + \theta_{.0})} \quad (6)$$

In the null hypothesis, it is assumed that

$A_1 = A_2 = 1/2$ . If the both raters have independent scores by  $\theta_{ij} = \theta_{i.}\theta_{.j}$ .

For the two indices,  $0 \leq A_1, A_2 \leq 1$

In this work, we have computed the posterior mean of  $A_1$  and  $A_2$  with the uniform prior assumption. The data structure has been selected at random from the multinomial experiment. The concept of conditional agreement have been proposed by Coleman (1966) and there after by Light (1969), Von and Eye Mun (2005) and Liebetau (1983). Here, the Bayesian approach has been applied to get the posterior distribution of the conditional kappa. Kappa is considered as one of the popular indicator in agreement analysis and it is comprehensive for both ordinal scores and for multiple raters and scores and it is unavoidably present in medical sciences.

#### APPLICATION

The Bayesian approach in agreement analysis has been used to find out the prescription of the doctors and drug marketing pattern by chemist to the same patients having malaria. 50 subjects have been selected randomly from the population in the presence of multinomial experiment structure. The outcomes of the experiment are mutually exclusive and distributed with uniform prior. As a result, the Dirichlet distribution has been found in place of posterior. In different categories of outcomes, gamma prior has been proposed. The score is interpreted by 1="ACT given" and 2=" ACT Not-given". The Bayesian approach with a uniform prior for  $\theta_{ij}$ ,  $i$  and  $j = 1, 2$  has been observed with posterior mean (20, 6, 14, 14) respectively. The above description of the posterior analysis is based upon the 24,000 observations with a burn of 1000 observations with a refresh of 100.

The kappa statistics is 0.26 with posterior mean and the indices  $A_1$  has a posterior mean of 0.5555 and the indices  $A_2$  has the posterior mean of 0.49. Overall agreement is fair but not considered strong for the general population. The plot of the posterior density of conditional kappa for the score of 1 implies only a fair agreement for the Non ACT category. The kappa statistics and the indices  $A_1$  and  $A_2$  have been applied through Bayesian approach. In both the cases, uniform gamma prior has been assumed for different cell values in the contingency table. The posterior mean and standard deviation based on 24,000 observations have been generated by WINBUGS. In the sample of 10 pregnant women, 6 women have received ACT therapy from both doctors and chemist followed by 2 women who received non-ACT therapy from both chemist and

doctors and one woman who received "ACT" from chemist in place of "non-ACT" prescribed by doctor and inversely one woman received "non-ACT" by chemist that was prescribed by doctors in "ACT" therapy.

The results through the contingency table for the general population and pregnant women on the prescribed drug are given in the Table I and Table III respectively. The WINBUGS program has been originally developed to make the Bayesian analysis of the data to provide the statistical analysis of the drug prescribed pattern among the population of Uttar Pradesh.

TABLE I: CONTINGENCY TABLE PRESCRIPTION PATTERN

	Doctors	Chemist	Total
ACT given	20	6	26
Non ACT given	14	14	28
Total	34	20	54

The summary statistics for the parameter of interest in the model has been applied after discarding 24,000 initial updates. The required amount of iteration has been finalized by the MC error of the parameters and the iteration was continued until the MC error dropped down to less than 5% of the sample standard deviation. Three chains have been run for each parameter in the program. The monitored values of six nodes are given in the Table II. The posterior mean value of the kappa statistics is found to be 0.26 and for the pregnant women it is raised in 0.36. The higher kappa statistics value confirmed the strong agreement of same drug practice by doctors and chemists.

TABLE II: ESTIMATED PARAMETER FOR THE SAMPLE SIZE 54.

Parameter	Mean	SD	HPD (2.5%, 97.5%)
Kappa	0.26	0.12	(0.01, 0.49)
A <sub>1</sub>	0.63	0.06	(0.45, 0.75)
A <sub>2</sub>	0.49	0.01	(0.36, 0.54)

TABLE III: ESTIMATED PARAMETER FOR THE PREGNANT WOMEN.

Parameter	Mean	SD	HPD (2.5%, 97.5%)
Kappa	0.38	0.26	(-.12, 0.87)
A <sub>1</sub>	0.68	0.12	(0.43, 0.71)
A <sub>2</sub>	0.67	0.12	(0.42, 0.89)

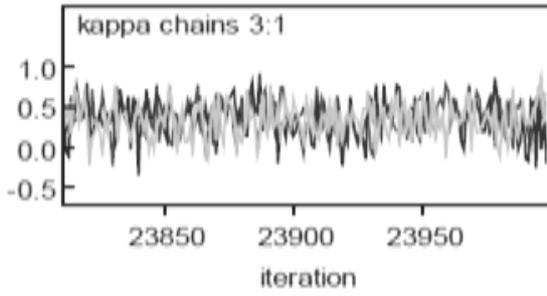
The confidences of the convergences has been taken from the three chains for all the nodes in this model that is shown in Figures I to VI by trace plot. The trace plot gives the value of the convergences for all six parameters. The posterior density of the different nodes become asymptotically normal.

### DISCUSSION

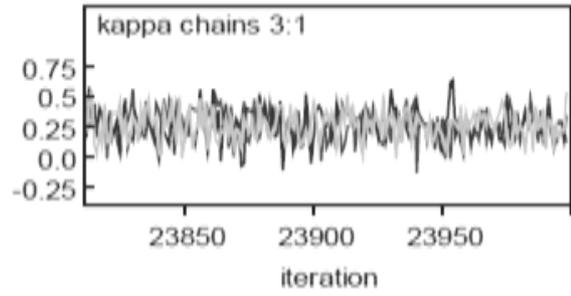
Poor awareness about the effective and useful drug treatment among health care provider in the country is a hindrance in the control of Malaria in spite of several efforts from the government and NGOs. The Varanasi City's status on malaria drug treatment practice has been covered with the application of agreement analysis. Such city wise malaria drug treatment practice can be helpful in providing necessary guidelines for planning the course of action for the State specific malaria control programme.

However, in case of pregnant women, the posterior mean of the A<sub>1</sub> and A<sub>2</sub> obtained are 0.68 and 0.67, respectively and in general population, the posterior mean of A<sub>1</sub> and A<sub>2</sub> generated are 0.63 and 0.49. It can be concluded that the level of agreement between doctor and chemist for drug practice on the pregnant women is better in comparison to the general population. The comparative posterior mean value of the kappa statistics can be seen in Table I and Table II. It can also be confirmed that the agreement level is higher in case of pregnant women as compared to general population.

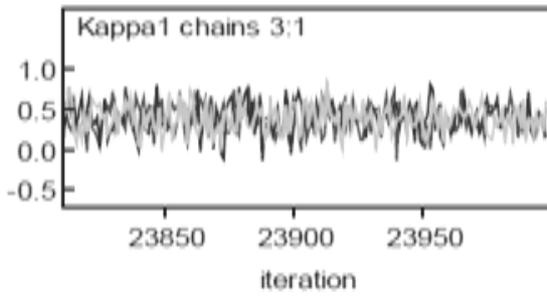
However, in both the cases (pregnant women and general population) the kappa statistics value is not found sufficient enough to say that the doctors and chemists follow the same strategy for ACT. It can be confirmed that the specific strategy is required to stop Artemisin monotherapy. It is also important to promote the prescribing and selling of ACT to the malaria patients.



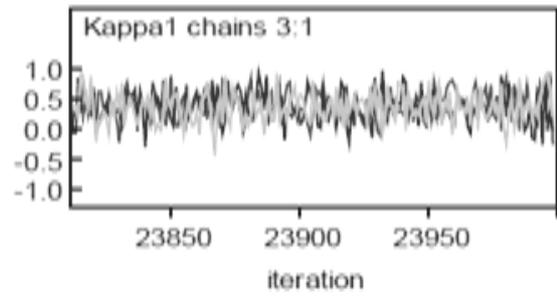
(Ib)



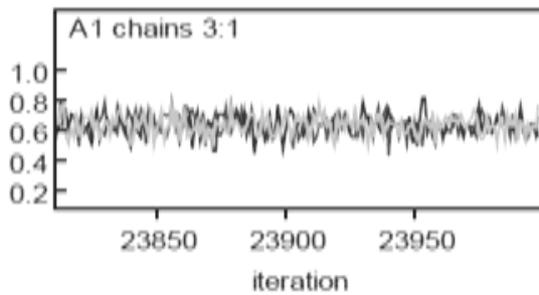
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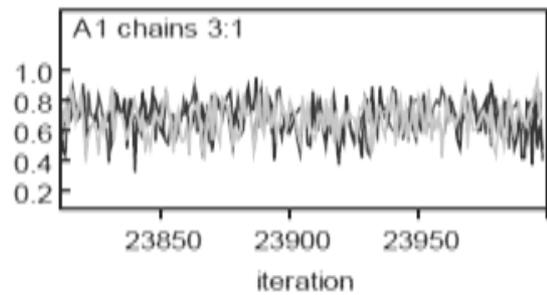
(IIIb)



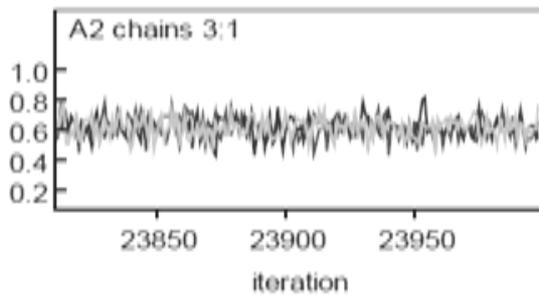
(IVb)



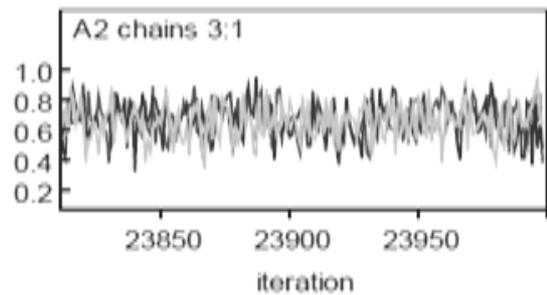
(Vb)



(VIb)



(VIIb)



(VIIIb)

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**Health can be defined negatively, as the absence of illness, functionally, as the ability to cope with everyday activities, or positively, as fitness and well-being. It has also been noted that in the modern world, health still has a moral dimension.**  
**Blaxter, Mildred (1990), Health and lifestyles. London (Routledge), 14**

**Health is something which should be enjoyed, not abused. A long painless life to a ripe old age, culminating in a death replete with life, is still outstanding, has constantly been planned. As if newborn: this is what the outlines of a better world suggest as far as the body is concerned. But people cannot walk upright if social life itself still lies crooked.**  
**Bloch, Ernst (1995), The principle of hope. Cambridge, Mass. (MIT Press), 471**

## **Original article**

### **Changing role of Anganwadi workers, A study conducted in Vadodara district.**

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#### **ABSTRACT**

The Integrated Child Development Scheme (ICDS), was initiated nearly 35 years ago, in October 1975, in response to the evident problems of persistent hunger and malnutrition especially among children. The role of Anganwadi Worker (AWW) MahilaMandal and Village Health Committee. To understand this changing roles, the present study was initiated with the objective to study the changing role of Anganwadi worker in present scenario.

**METHOD-** The study was a cross sectional study. It was conducted at Wagodiya block of Vadodara district which is situated in central Gujarat. It was a purposive sampling and convenient selection. The Wagodiya block has 124 Anganwadis. It was decided to select 25% of Anganwadis from each PHC of Wagodiya block, so that the sample represents all the geographic areas.

**RESULTS-** Total 30 (25%) Anganwadi were visited. The mean age of Anganwadi workers was 33.8 years (range – 20-53 years). Almost 87% Anganwadi workers were from same village where the Anganwadi is located. All the AWWs were getting incentive for participation or serving in National Health Programme apart from ICDS. Almost 80% AWWs participated in other National Health Programmes like PPI, house to house survey, selection of patients for TL in family planning programme etc. 67% AWWs worked as DOT provider for Tuberculosis patients. 33% AWWs believed that they had a load or cannot give enough time to basic activity at Anganwadi due to participation in other National Health Programmes.

**DISCUSSION -** The anganwadi worker and helper, who are the basic functionaries of the ICDS, are not treated on a par with other government employees, but are called "social workers" or "voluntary workers". They are not paid "wages" (which would provide them with some minimum service conditions) but only an "honorarium"<sup>2</sup>. The present study suggest the AWWs are overworked and not able to justify their routine work. The government health authorities and other authorities need to keep in mind that they have generated second similar

cadre in each village that is ASHA (Accredited Social Health Activist) under National Rural Health Mission (NRHM). They should be utilized properly. So the AWWs will cater the services as per need of community.

#### **INTRODUCTION:**

The Integrated Child Development Scheme (ICDS), was initiated nearly 35 years ago, in October 1975, in response to the evident problems of persistent hunger and malnutrition especially among children<sup>1,5</sup>. Since then, ICDS has grown to become the world's largest early child development programme<sup>2</sup>.

Each Anganwadi is catering to population of around 1,000 in rural and urban areas and to around 700 in tribal areas<sup>3,5</sup>. The Anganwadi Worker and helper, are the basic functionaries of the ICDS. They are not government employees, but are called "social workers" or "voluntary workers"<sup>2</sup>. Each Anganwadi worker is getting remuneration of around Rs 2500 Per month<sup>5</sup>. Despite this low remuneration, the activities these workers and helpers are required to perform are very extensive<sup>2</sup>. The worker and helper in such centre who receive the paltry "honorarium" are seen as "part-time workers" in the centres that they are supposed to open for only four hours a day. Yet, they have been found to be among the most dedicated and committed of public servants who have developed grassroot contacts and are able to identify particular individuals and groups in any community, easily. The key functions of anganwadi is to provide supplementary nutrition to the children below six years of age and nursing and pregnant mothers from low income families; immunization of all children less than six years of age and immunization against tetanus for all the expectant mothers, provide nutrition and health education to all women in the age group of 15-45 years, as well as basic health check-up, which includes antenatal care of expectant mothers, postnatal care of nursing mothers, care of newborn babies and care of all children under six years of age. They are supposed to be able to refer serious cases of malnutrition or illness to hospitals, Community Health Services (CHS) or

district hospitals. In addition, the same two workers on their own are to provide non-formal pre-school education to children in the three to five age groups.<sup>4,5</sup>

But now, the role of Anganwadi Worker is not limited to the basic ICDS programme activity. They play important role in other National Health Programme like DOT provider for tuberculosis patient (RNTCP), Pulse Polio Immunization (IPPI), motivator for Tubal ligation cases (Family Planning), House to House Survey in health and election duties and many more. They are also the member of Sakhimandal, Matrumandal, MahilaMandal and Village Health Committee.

To understand this changing role, the present study was initiated with following objectives:

To study the changing role of Anganwadi worker in present scenario.

To study the Knowledge of Anganwadi Workers.

#### MATERIALS AND METHODS

The study was a cross sectional study. It was conducted at Wagodiya block of Vadodara district which is situated in central Gujarat. It was a purposive sampling and convenient selection. The Wagodiya block has 124 Anganwadis. It was decided to select 25% of Anganwadi from each PHC of Wagodiya block, so the sample represents all the geographic area.

It was undertaken to take interview of selected Anganwadi workers at Anganwadi centre during their working hours (11am-3pm). After getting ethical clearance for the project, all selected Anganwadi workers were interviewed. After taking oral consent from study population the pre-tested questionnaire was used by investigator for data collection. It was a pilot pre-tested questioner which was used for this study. The study was conducted during October to December 2010.

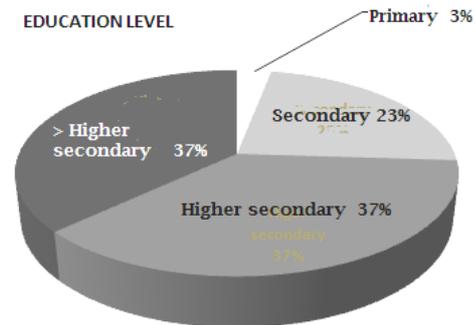
The collected information was compiled in Microsoft excel and analyzed with the help of SPSS software.

#### RESULTS

There are 124 Anganwadis in Waghodiya block. Total 30 (25%) Anganwadis were visited. The mean age of Anganwadi workers was 33.8 years (range – 20-53 years). 37% AWWs studied up to secondary level, 37% up to higher secondary level, 23% up to more than higher

secondary level. Only 3% AWWs studied up to primary level.

FIGURE : I



Almost 87% Anganwadi workers were from same village where the Anganwadi is located. All AWWs get about Rs 2500 as remuneration per month. The mean years of working as AWW were  $7.30 \pm 6.33$  years. The mean population served by study AWWs were  $1082.05 \pm 366.82$ . The working hours are 11am to 3 pm and then they go for home visits. They visit 5 houses every day. All AWWs get guidance from ANM.

As per rule, AWWs have 15 days of summer vacation and 8 days of Diwali vacation. 80% reported that they are working even during vacation to register maintenance and other record keeping. The list of various registers included survey register, Bal-bhog register, Shiro-Upama register, Masala register, school health register, visiting register, student register, pre-school children register and many others. More over for record keeping, they have to conduct some specific activities like childrens' health competition, pregnant women' health competition, parents' meeting, dishes' competition, mothers' meeting, fathers' meeting and more. They organized "Annaprasan Day" on every 4<sup>th</sup> Friday of month, in which they teach about weaning practices to postnatal mothers.

AWWs work in liaison with Auxillary Nurse Midwife and refer the cases of grade 2-3 children to primary health centre, pregnant women for registration and lactating women. They regularly measure weight of all children, every month and every 15 days for grade 2-3 malnourish children.

Almost 25 (80%) Anganwadi Workers had taken Integrated Management of Neonatal Childhood Illness (IMNCI) training. All AWWs had opinion that there is improvement in their knowledge and practice after getting IMNCI training.

All the AWWs were getting incentive for participation or serving in National Health Programmes apart from ICDS.

TABLE-I INCENTIVE GIVEN TO ANGANWADI WORKERS DUE TO PARTICIPATION IN NATIONAL HEALTH PROGRAMME

Programme	Incentive (Rs.)
IPPI	75 per Day
Mamta Divas	50 per Day
RNTCP – drug provider	250 per Patient
Motivator of TL cases	150 per case

FIGURE – II : ADDITIONAL DUTIES

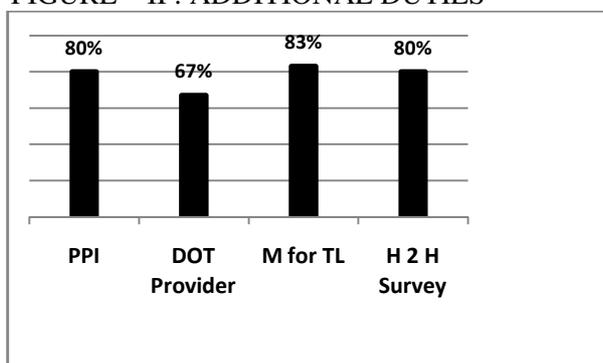
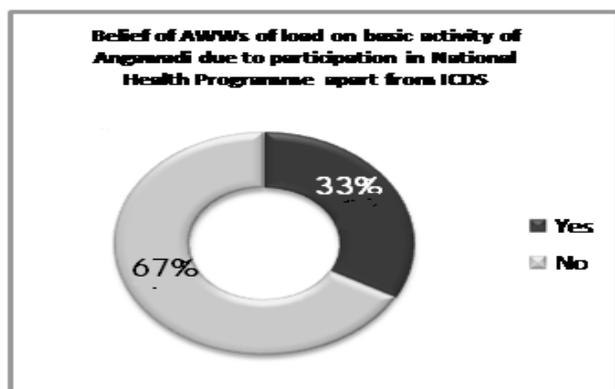


FIGURE III : PREOCCUPIED WITH EXTRABURDEN?



Almost 80% AWWs participated in other National Health Programme like PPI, house to house survey, selection of patients for TL in family planning programme. 67% AWWs worked as DOT provider for Tuberculosis patients.

33% AWWs believed that they were over-loaded or cannot give enough time for basic

activity at Anganwadi due to pre-occupation with other assignments, whereas 67% AWWs had not felt that.

DISCUSSION

The study was conducted with a small sample and in one block of the district, but the results suggest that there is need to conduct large scale study. The study participants' mean age was 33.8 years in present study, which was quite younger than the study conducted at Pondichery by Datta S<sup>6</sup> et al where the mean age of AWWs was 42.64 ± 7.19 years.

The education level in Datta S et al<sup>6</sup> study was 27% up to secondary level, 54% up to higher secondary level, 18% up to more than higher secondary level. In this study, it was 37%, 37%, and 23% respectively. The mean Population served by AWWs was 1082.05 ± 366.82 in present study, where study by Datta S et al<sup>6</sup>, it was 1202.40 ± 562.82 people. As the present study population was younger, the years of experience (mean experience of study population - 7.30 ± 6.33) was also less compared to Datta S et al<sup>6</sup> (16.14 ± 10.44) study.

Though majority (80% ) of AWWs were from local community, it is desirable to be 100%. This need to be kept in mind at the selection process. Education norms for selection is minimum 8<sup>th</sup> standard pass but in the preset study except 3% AWWs who had primary education, all others were "over-qualified".

It was good that almost 80% AWWs were trained for IMNCI training and they believe that there is improvement in their knowledge and practice like measurement of weight, identification of diseases state and all other component of IMNCI. Almost 80% AWWs participate other national health programme like IPPI, RNTCP, Family Planning, house to house survey and others and they got incentive for participation in other national health programme apart from ICDS.

One important observation was that 33% Anganwadi workers felt load on basic activity of Anganwadi due to participate in other National health programme and other activities. Underpaid and overworked Anganwadi workers are the real providers of many basic services for the poor Indian citizens. The anganwadi worker and helper, who are the basic functionaries of the ICDS, are not treated on a par with other government employees, but are called "social workers" or "voluntary workers". They are not paid "wages" (which would provide them with

some minimum service conditions) but only an "honorarium"<sup>2</sup>. The present study suggests the AWWs are overworked and not able to justify their routine work. The government health authorities and other authorities need to keep in mind that they have generated second similar cadre in each village that is ASHA (Accredited Social Health Activist) under National Rural Health Mission (NRHM). They should be utilized properly. So the AWWs will cater the services as per need of community.

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**“The only way to keep your health is to eat what you don't want, drink what you don't like, and do what you'd rather not.”**

**~ Mark Twain ~**

**“Every human being is the author of his own health or disease.”**

**~ Buddha ~**

**“Health is the greatest gift, contentment the greatest wealth, faithfulness the best relationship.”**

**~ Buddha ~**

## Original article

### A Study of sex ratio in relation to birth order in Bhopal city

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#### ABSTRACT:

**BACKGROUND:** Declining sex ratio is an issue of grave concern in India. Son preference is a major impediment to population stabilization as it makes couples opt for larger number of children in order to ensure at least one male child in the family. The use of ultrasound procedures is largely determined by birth order and sex of the previous child. The ratios become unfavorable for females when the birth order is more than one and the previous child is female. The present study documents previous sex of the child with the present birth order and the possible role of prenatal sex determination.

**OBJECTIVES:** 1) To study the relationship of sex ratio with birth order. 2) To study the status of sex ratio with increasing birth order. 3) To ascertain the contribution of Prenatal Sex Detection in the selective abortion as measured by previous birth sex to the observed sex ratio.

#### MATERIAL AND METHODS:

**STUDY DESIGN:** Cross-sectional study

**STUDY POPULATION:** 1000 women who were residing in the old Bhopal were interviewed.

**SAMPLING:** Bhopal city was divided into four quadrants and from each quadrant, 250 women were interviewed thus comprising sample size of 1000.

**STUDY DURATION:** August to September 2011.

**DATA COLLECTION:** A pre-tested and pre-structured questionnaire was used to collect information on their socio-demographic profile, sex of child & their ANC status and it's outcome, no. of still births, abortions & contraception used.

**RESULT:** In the present analysis, sex ratios at birth did vary significantly by religion, although Sikhs have the most gender biased child sex ratio followed by Jains. Muslims showed a relatively favorable female child sex ratio. The role of education in improving sex ratios is dubious. Mothers who had a higher educational status had more gender preferences. Education and higher per capita income has actually empowered couples to access newer technology to practice sex-selective foeticide. A remarkable finding observed was that if the birth order is female, the sex ratio in the subsequent birth order for females decreases as the difference between male &

female child increases. The unmet need was very high amongst the study group. This article reiterates the fact that the practice of sex determination could explain missing females at birth, though indirectly. It is difficult to demonstrate its role directly owing to the sensitive nature of the issue.

**KEY WORDS:** Birth order, sex of the child, abortion, still births, religion, contraception

#### INTRODUCTION

Skewed sex ratio is an issue of grave concern in India. Family and social pressures to produce a son are immense. Son preference is a major impediment to population stabilization as it makes couples opt for larger number of children in order to ensure at least one male child in the family.

Indirect evidence on the role of prenatal sex determination and sex selective abortion has been explored by ruling out other factors influencing sex ratio at birth. The use of ultrasound procedures is largely determined by birth order and sex of the previous child. The ratios become deplorable for females when the birth order is more than one and the previous child is female. The present study documents sex of the previous child with the present birth order and the possible role of prenatal sex determination.

#### OBJECTIVES

To study the relationship of sex ratio with birth order.

To study the status of sex ratio with increasing birth order.

To ascertain the contribution of selective abortion in relation to the previous birth sex with observed sex ratio.

#### MATERIALS AND METHODS:-

**Study Design:** A cross-sectional study.

**Study population:** 1000 women residing in old Bhopal

**Sampling:** Bhopal constitutes of 70 wards, divided geographically into quadrant and the selected wards were representative of each quadrant and 250 women were interviewed from these, thus comprising sample size of 1000.

Study duration: The study was carried out from August 2011 to September 2011.

Data collection: A pre-tested and pre-structured questionnaire was used to collect information on the socio-demographic profile, sex of child, ANC status and it's outcome, No. of stillbirths, abortions & contraception used.

**RESULTS**

The sex-ratio is 946 for the first birth order, which is declining to 788, 731 and 525 as the birth order is increasing.

**TABLE I : SEX RATIO IN RELATION TO BIRTH ORDER**

Sr. No.	No. Birth order	Sex Ratio
1	First	946
2	Second	788
3	Third	731
4	Fourth	525

**TABLE II : SEX RATIO IN FAMILIES WITH SUCCESSIVE BIRTH ORDER**

Birth order	Male Child	Female Child
Second	928	965
Third	905	623
Fourth	833	423

**TABLE III : SEX RATIO ACCORDING TO SOCIOECONOMIC CLASS**

Sr. No.	Socio-economic class	Sex Ratio
1	Class – I	697
2	Class – II	806
3	Class – III	1020
4	Class – IV	1333

**TABLE IV : SEX RATIO ACCORDING TO RELIGION**

Sr. No.	Religion	Sex Ratio
1	Hindus	724
2	Muslims	864
3	Christians	966
4	Sikhs	564
5	Jains	666

**TABLE V : SEX RATIO ACCORDING TO EDUCATION OF MOTHER**

Sr. No.	Literacy status	Sex Ratio
1	Illiterate	847
2	Primary	1138
3	Middle	969
4	Higher secondary	983
5	Graduate	691
6	Post graduate	640

The results shown in the tables are self explanatory

**TABLE VI : TREND OF BIRTH ORDER WITH SUBSEQUENT BIRTHS**

Birth Order	Families with first order birth was male (559)					Families with first order birth was Female (441)				
	Male		Female		Total	Male		Female		Total
	No	%	No	%		No	%	No	%	
2 <sup>nd</sup> Child	197	51.8	183	48.2	380	174	50.9	168	49.1	342
3 <sup>rd</sup> Child	23	46.0	27	56.0	50	54	62.1	33	37.9	87
4 <sup>th</sup> Child	4	44.4	5	55.6	9	12	70.6	5	29.4	17

TABLE VII : EFFECT OF SEX OF PREVIOUS CHILD ON NO. OF CHILDREN

No. of Children	MALE	FEMALE
1 <sup>st</sup>	559	441
2 <sup>nd</sup>	380 (67.97%) 197	342 (77.55%) 168
3 <sup>rd</sup>	50 (25.38%) 23	87 (51.78%) 33
4 <sup>th</sup>	9(39.13) 4	17 (51.51%) 5

TABLE VIII : TYPE OF ABORTION

Type of abortion	No. of abortion	Percentage
Induced	99	45.21
Spontaneous	120	54.79
Total	219	100.00

TABLE.NO. IX.  
TREND OF ABORTION WITH SUBSEQUENT PREGNANCIES IN SEX OF CHILD

Families	Frequency of abortion	Percentage (N= 219)	Type of abortion	
			Induced	Spontaneous
Families where 1 <sup>st</sup> child was male	44	20.09 %	10 (8.62%)	34 (33%)
Families where 1 <sup>st</sup> & 2 <sup>nd</sup> child was male	22	10.04 %	7 (6.03%)	15 (14.5%)
Families where 1 <sup>st</sup> child was female	62	28.31 %	27 (37.9%)	35 (17.4%)
Families where 1 <sup>st</sup> & 2 <sup>nd</sup> child was female	81	36.9%	52 (44.8%)	29 (28.1%)
Families where 1 <sup>st</sup> child was male & 2 <sup>nd</sup> was female	10	4.56%	3 (2.58%)	7 (6.7%)

Sex ratio with increasing birth order in families having first male child was 928, 905 and 833 where as in families having first female child was 965, 623 and 423, this shows the remarkable decline in sex ratio in 3<sup>rd</sup> & 4<sup>th</sup> order in female child as compared to male child which again shows the preference for male child.

Sex ratio was poorest among the higher socio-economic class I and II (697 and 806), which shows that the sex ratio is remarkably low in higher socioeconomic classes as compare to middle and lower income classes thus confirming the assertion that the economically better of are the leaders in this new form of discriminations against the girl child.

Christians And Muslims had sex-ratio of 966 and 864 and Jains and Sikhs had a notably low sex ratio. Sex ratio thus calculated according to religion wise is apparent & observational , but not conclusive.

Literacy wise sex ratio shows that education of women empowers them sufficiently to ensure their say in decision making and were more engaged in this activity. Graduate [691] & PG [ 640 ] mothers had a low sex ratio as compared to illiterate [847] & Primary[1138]

The effect of sex of child in the subsequent births. was calculated. The families having female child were 441 and they were more hopeful for getting male child in second, third and fourth pregnancies so this led to increase the family size. Ch sq -9.81 ,P<.01 (Table.VII)

Out of 219 abortions, spontaneous abortions was 120 (54.79%) and induced abortions was 116 (45.21%) (Table.VIII)

Families having first female child were showing more abortions (28.31%) than the families with first male child(20.09%). Similarly families having 2 female child were showing more no. of abortions (36.9%) than families with 2 male child. This distortion was very lightly due to use of sex selection techniques which helped parents to get rid of unwanted daughters or due to avoiding having children once the minimum desired no. of sons were born. (Table.IX)

## DISCUSSION

The study showed that the overall sex ratio was 788 girls to 1000 boys. We found that the sex ratio in the third babies, if the first two were girls, was even lower at 623. The sex ratio was 928 girls to 1000 boys if the first was a boy. The previous retrospective study showed a similar trend where sex ratio was 716 (CI = 672 to 762) if the first two children were girls and 1140 (CI = 1072 to 1212) if the first was a boy. The data in this study validated the finding of previous retrospective study and suggests that parents tend to manipulate sex of their offspring. 722 mothers had had two previous children and of these 168 had two previous girls and 197 had two previous boys. The remaining 365 had one boy and one

girl. Sex ratio for newborns in families with three previous girls was as low as 423 girls to 1000 boys and this empathically underlines the inference of human interference. There were only 50 mothers with 2 previous boys who went on to have a third child compared to 87 who had 2 previous girls. The fact that there were more mothers with two previous girls than there were mothers with two previous boys suggests a tendency among mothers with girls to have more children in the hope of having a boy, while mothers with boy children tend to stop having more babies. In the natural course of events where sex ratio is not manipulated by human intervention, if there is a preference for males, the overall sex ratio will favor girls. This is because of the biological heterogeneity which results in families tending to have children of same sex. This phenomenon is not evident in India which suggests that there is more direct manipulation of the sex ratio in India.

Sex ratio in mothers with 905 previous two boys was compared to 928 in those with one previous boy. Our findings are similar to the findings of Jha et al who studied sex in second children in a household survey.

In the present analysis, sex ratios at birth did vary significantly by religion, although Sikhs have the most gender biased child sex ratio followed by Jains. Muslims and Christians showed a relatively favorable female child sex ratio of 864 & 966.

Economic prosperity has a major role in the reversing the sex-ratio. Our study thus confirms the assertion that the economically better off are the leaders in this new form of discrimination against the girl child.

The role of education in improving sex ratios is dubious. Mothers who had a higher educational status had more gender preferences. Education and higher per capita income has actually empowered couples to access newer technology to practice sex-selective feticide.

Abortions were likely due to the use of sex selection techniques which help the parents get rid of unwanted daughters.

## CONCLUSION

In conclusion, the present study has shown that there is a preference for male child in the community .

The study shows that the ratio became unfavorable for female when the birth order is more than one and the previous child is female.

Son preference makes couple to opt for larger number of children in order to ensure at least one male child in family thus increasing the family size.

Though not measured directly, the study concluded that the most likely explanation for the adverse female to male sex ratios reported at birth was prenatal sex determination followed by selective abortion.

## LIMITATIONS

Since the sample size of the study is not adequate to comment precisely on the factors responsible and hence this data cannot be said to be representative of India.

## RECOMMENDATIONS

Studies to this end should be undertaken in a large scale so that the process of reversing the declining CSR is understood better.

Monitoring and counseling of Families with previous two girls should be done at the community level.

There is need to bring about change in attitude and mind set of society to draw their attention to the lurking danger of skewed sex-ratio.

The urgent need of the hour is not only to reverse the trend but to achieve a healthy sex ratio in the entire country.

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**If you doubt you can accomplish something, then you can't accomplish it. You have to have confidence in your ability, and then be tough enough to follow through.**

~ ROSALYNN CARTER ~

**It is true that you may fool all the people some of the time; you can even fool some of the people all the time; but you can't fool all of the people all the time.**

~ ABRAHAM LINCOLN ~

## Original article

# A Study on socio-demographic and obstetric profile of MTP seekers at Guru Govind Singh Hospital, Jamnagar

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## ABSTRACT

**AIMS AND OBJECTIVES :** To explore the socio demographic and obstetric profile of women undergoing medical termination of pregnancy (MTP) at Guru Govindsingh Hospital, Jamnagar and the reasons for MTP.

**METHODOLOGY:** Cross sectional study of 152 women undergoing MTP at Guru Govindsingh Hospital, Jamnagar.

**RESULTS AND DISCUSSION:** Of the 152 women studied, more than one third females were multipara, more than or 3, indicating unmet need of contraception. 13% of the women were undergoing MTP second time or more indicating failure on the part of healthcare services to reach these women in need. 42% of the women who had MTP second time or more were doing so within one year indicating failure on the part of health providers who conducted MTP earlier. Only 5% of these women knew regarding emergency contraceptives indicating need for wider dissemination of information regarding this emergency measure. Reasons for undergoing MTP by these women were “family size completed” in 63%, “previous baby too young” in 20%, “economic reason” in 18%, and “contraceptive failure” in 9% and 29% were evasive for the reply on being asked the reason for undergoing MTP.

**CONCLUSIONS:** Inadequacy of family planning services reaching these women in need. Based on the observation, it is highly recommended that health workers should proactively make efforts to reach these women in need of family planning. This will avert undesired pregnancies and also help in preventing these women from exposure of dangers of undergoing MTP.

**KEYWORDS:** MTP, Obstetric profile, Socio-demographic profile, Knowledge of emergency contraception, Unmet need of contraception

## INTRODUCTION

In India, many females die due to pregnancy and related complications despite the efforts of Government to reduce maternal

mortality through various schemes and facilities. With the legislation of the Medical Termination of Pregnancy (MTP) Act in 1971, India became one of the first countries legalizing abortion on moderately liberal grounds – particularly “failure of contraceptive use” for termination of pregnancies, yet unsafe abortion is among the leading causes of maternal mortality and morbidity in India.

Many of the females are not aware of the legal and safe abortion facilities, and many of them are forced to seek unsafe abortions for cultural reasons. Apprehension, denial and ignorance to contraceptive usage lead to unwanted pregnancies which are terminated in unhygienic and unsafe conditions by untrained personnel leading to maternal mortality and morbidity. Unsafe abortion is the termination of an unintended pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards or both.

The actual incidence of abortion estimated worldwide, ranges from 30 – 55 million a year or about 40 -70 per 1000 women of reproductive age, with an abortion ratio of 260 – 450 per 1000 live births. Of the estimated 211 million pregnancies that occur every year, about 46 million end in induced abortion, of which only approximately 60% are carried out under safe conditions. More than 18 million induced abortions each year are performed by people lacking the necessary skills or in an environment lacking the minimal medical standards or both<sup>(1)</sup>.

In India, it has been computed that about 6 million abortions take place every year, of which 4 million are induced and 2 millions spontaneous. Since abortion has been legalized, the number of legal and registered induced abortions has been increasing steadily<sup>(2)</sup>. A conservative estimate places the number of abortion-related deaths in a year in India at 15,000 – 20,000<sup>3</sup>.

Unsafe abortions constitute about 13% of the maternal deaths<sup>4</sup>. Additional consequences of unsafe abortion include loss of productivity,

economic burden on public health systems, stigma and long-term health problems, such as infertility.

**OBJECTIVES**

To study the socio demographic and obstetric profile of women undergoing MTP in Guru Govind Singh Hospital, Jamnagar.

To assess the reasons the women had to undergo MTP

**MATERIALS & METHODS**

Type of study: Cross section study.

Place of study: Guru Govind Singh Hospital which is the teaching institute of M. P. Shah Medical College, Jamnagar.

Duration of study: June 2008 to August 2008.

Sample size: 152 pregnant women seeking MTP.

Sampling Technique: Purposive sampling

Every second female admitted in Post Partum Unit for MTP was included in the study.

Data Collection: Data was collected using a pre tested and pre structured questionnaire which included questions regarding the socio-demographic & obstetric profile of these women.

Informed verbal consent was taken from all participants.

**RESULTS**

Most of the women were between 20 – 30 years of age (68.42%). 23.03% of the women were between 30-35 years of age. Almost half of the women (46.05%) were from urban slums, 29.61% were from urban area and 24.34% were from rural setup. More than one third (36.18%) of the women were illiterate. 34.87 % had primary education, 18.42% had secondary education and only 5.26% each had higher secondary education and were graduate and above. (Table I)

According to Modified Prasad’s classification, around three-fourth (73.68%) of the women belonged to lower social class (IV and V), 21.05% belonged to social class III, 3.95% belonged to social class II and 1.32% belonged to social class I. (Table I).

Of the 152 women studied, more than one third (36.18%) of the women who underwent MTP had 3 or more live births, around half (47.37%) had 2 live births, 15.13% had 1 live birth while only 1.32% had no live births.

Majority (84.21%) of the women were having 2 or more number of living children, 14.47% had 1 living child and 1.32% had no child. (Table II). 12.50% of the women were undergoing MTP second time or more, while majority (87.50 %) respondents were not having a history of MTP ever. Out of the 19 women having a history of previous MTP, 10.52% MTP were

done by Quack and 57.90% in private hospitals. Only 31.58% of the previous MTP were done in Government Hospital. (Table III)

**TABLE I: SOCIO-DEMOGRAPHIC PROFILE OF MTP SEEKERS (BASED ON MODIFIED PRASAD’S CLASSIFICATION)**

Socio-demographic characteristics	Frequency	Percentage
Age		
15-20	6	03.95
20-25	51	33.55
25-30	53	34.87
30-35	35	23.03
≥ 35	7	04.60
Place of residence		
Urban	45	29.61
Urban slum	70	46.05
Rural	37	24.34
Educational status		
Illiterate	55	36.18
Primary	53	34.87
Secondary	28	18.42
Higher - secondary	8	05.26
Graduate & above	8	5.26
Social class		
I	2	01.32
II	6	03.95
III	32	21.05
IV	92	60.52
V	s20	13.16

**TABLE II: DISTRIBUTION OF WOMEN ACCORDING TO NUMBER OF LIVING CHILDREN**

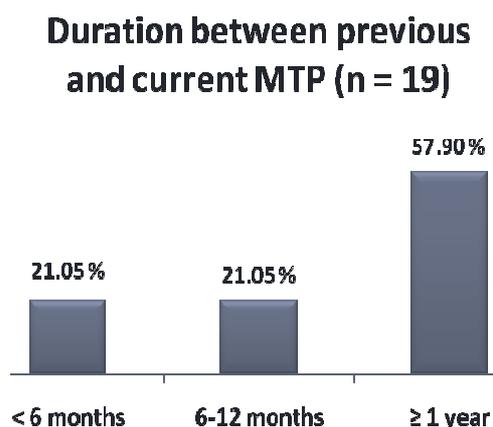
No. of living children	Frequency	Percentage
0	2	1.32
1	22	14.47
≥2	128	84.21

**TABLE III: DISTRIBUTION OF WOMEN ACCORDING TO PLACE OF PREVIOUS MTP**

Place of previous MTP	Frequency	Percentage
Government Hospital	6	31.58
Private Hospital	11	57.90
Quack	2	10.52

More than two third (68.42%) of the women sort MTP again within 2 years only & among these, 21.05% MTP were within 6 months only which indicates failure on the part of healthcare services to reach these women in need and MTP as a resort of family planning for these women. (Figure I)

FIGURE I: DISTRIBUTION OF WOMEN ACCORDING TO DURATION BETWEEN PREVIOUS & CURRENT MTP (N=19)



Most common reason given for terminating the pregnancy was “completed family size” (63.16%). Other reasons given were, “previous baby too young” (20.4%), “economic” (17.76%), “medical” (4.61%) & 0.66% each was “humanitarian” & “eugenic”. 9 % of the total MTP were due to contraceptive failure, of which 64% were due to failure of condoms & 36% were due to failure of Copper T. 29% of the women were evasive for the reply on being asked the reason for undergoing MTP. (Table IV)

TABLE IV: DISTRIBUTION OF WOMEN ACCORDING TO REASONS FOR MTP

Reason for MTP	Frequency	Percentage
Family completed	96	63.16
Previous Baby too young	31	20.40
Economic	27	17.76
Contraceptive failure	14	9.21
Medical	7	4.61
Eugenic	1	0.66
Humanitarian	1	0.66
Did not reply	45	29.61

Majority of the women (98%) accepted post abortion contraception. Of these, 34 % women accepted Copper T and 64 % accepted permanent sterilization method. (Figure II)

FIGURE II: DISTRIBUTION OF WOMEN ACCORDING TO ACCEPTANCE OF CONTRACEPTION AFTER MTP

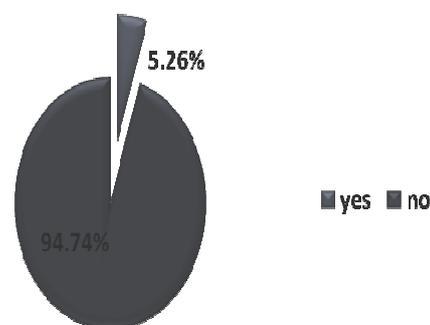
### Acceptance of contraception after MTP



Only 5.26% of the females were having knowledge of emergency contraceptives. This indicates the lack of awareness for contraceptives. (Figure III)

FIGURE III: DISTRIBUTION OF WOMEN ACCORDING TO KNOWLEDGE OF EMERGENCY CONTRACEPTIONS

### Knowledge of emergency contraceptives



### DISCUSSION

In the present study, around two-third of the women (68.42%) were between 20 – 30 years of age. While women of all age groups seek abortion in India, a recent review suggests that the majority of those seeking abortion are in the age group: 20-29 years.<sup>5</sup> A substantial number of adolescents, both married and unmarried, also seek abortion services. Between 1-10% of abortion-seekers are adolescents<sup>5</sup>. Khokhar and Gulati<sup>6</sup> in their study at urban slums of Delhi had similar observations where 68.57% of the total women who had undergone one or more induced abortions were 20 – 29 years of age. Dhillon et al<sup>7</sup>

in their study in 13 states of India found that three-fifths of the induced abortion seekers were between 25-34 years.

71.05% of the women were either illiterate or had primary education indicating that the lower educational status makes the women more vulnerable to unwanted pregnancies. Similarly Ganguli G et al<sup>8</sup> in their study on "Profile of women undergoing medical termination of pregnancy in hospital" found that 44.4% MTP seekers were illiterate, 48.2% cases were educated up to primary school and only 7.3% cases up to high school and above.

Three-fourth (73.68%) of the women seeking MTP was of the lower socio economic class (IV and V). Lower educational and lower social status of the women are the reasons for their repeated and unwanted conceptions making them vulnerable to all the possible risks of morbidity and mortality due to abortions.

Majority of the women (70.39%) undergoing MTP were from urban slums and rural areas signifying that these women have more unmet need for contraception. Mehra et al<sup>9</sup> in their similar study at Chandigarh found that 70% of the women seeking abortion were of urban background and 30% were from rural set up.

Majority (84.21%) of the women were having 2 or more living children revealing the fact that inspite of the completed family size, these women got unwanted pregnancy and sought MTP. There is a need to make the women aware of the various contraceptive measures available. Ram et al (2000)<sup>10</sup> in their study on unmet need for family planning among married women in Calcutta reported that 31% women had 2 or less children while 69% had more than 2 children. Padhy (1996)<sup>11</sup> reported that 30% had two or less children in their study on attitude of women towards family planning in an urban area of Orissa.

In the study on fertility indicators in Ahmedabad done by Puwar et al (2009)<sup>12</sup>, 21.35% of women had two children, while 43.67% had more than two children.

12.50% of the women were undergoing MTP second time or more which is a failure on the part of health care providers to counsel these women in need of contraception. Patnaik et al (2007)<sup>13</sup> in their study on socio clinical profile of abortion cases in Brahmapur observed history of previous abortion for one time in 19% of cases and for twice or more in 4.7% of cases.

Only 31.58% of the previous MTP were done in Government Hospital. 10.52% of the

previous MTP were done by Quack and 57.90% in private hospitals (qualification of the doctor performing MTP unknown). Probably, as many as 69% of the previous MTPs were unsafe. Dhillon et al<sup>7</sup> in their study in 13 states of India found that the most common place for abortion was "private clinic" (45.6%). Other places included "hospital" in 37.1%, "Primary Health Centre/Community Health Centre" (PHC/CHC) in 14.0%, and "other" in 3.3%.

Khokhar and Gulati<sup>6</sup> in their study at urban slums of Delhi noted that the most common reasons for the abortion stated by the women undergoing MTP were Unplanned pregnancy (last child very small) (62.50%), Inadequate income - (52.08%), Family complete (31.25%), Contraceptive failure-(10.41%), Female foetus-(2.08%), Health problems-(2.08%). Dhillon et al<sup>7</sup> in their study found that the most common reason given for terminating the pregnancy was "did not want any more children" (42%). Other reasons included "child too young" (23.4%), "exposure to X-ray/illness" (13.4%), "pregnancy due to contraceptive failure" (7.8%), and "others" (4.6%). In 12.4 per cent women the reason for abortion was specifically mentioned "do not want any more daughters". Several other studies indicate that most abortions are sought to limit family size or space the next pregnancy.<sup>5, 14, 15</sup> In a study in Madhya Pradesh, women reported the achievement of desired family size as the reason in 41% of attempted abortions, and the need for spacing in 30% of abortion attempts.<sup>15</sup> Mukhopadhyay et al<sup>16</sup> in their study on fertility regulation at Kolkata found that 35.8% accepted Copper T and 30% accepted permanent sterilization after MTP as a mode of contraception.

Mehra et al<sup>9</sup> in their study at Chandigarh observed that only one woman was aware of Emergency Contraceptive pills while in a study by Tripathi et al<sup>17</sup> in New Delhi, it was found that none of their patients were aware of emergency contraception. This certainly reflects that emergency contraception is an area which needs to be publicized. A definite place of emergency contraception in the family planning programme cannot be denied. There is a need to make more women aware of this method so that unwanted pregnancy can be avoided safely and conveniently, particularly for those who are inconsistent contraceptive users as well as those who have never used a contraceptive method. However, the role of counseling cannot be undermined here to prevent repeated abortions

and to encourage women to adopt suitable method of contraception, encouraging compliance of use.

#### CONCLUSIONS

Females in the young age group, residing in the urban slums, illiterate and of lower socio economic class are more vulnerable to the unwanted pregnancies.

More than 3/4<sup>th</sup> (84%) of the females had completed family size.

Major reasons for termination of pregnancy were: Completed family size, Previous baby too young and Economic.

These unwanted pregnancies which were getting terminated reveal the unmet need of contraception.

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**There is a great deal of difference between the eager man who wants to read a book and the tired man who wants a book to read.**

~ G. K. Chesterton ~

**I would rather lose in a cause that will some day win,  
than win in a cause that will some day lose!**

~ Woodrow Wilson ~

**Original article**

**A cross sectional study of awareness regrading influenza among the urban population of Surendranagar**

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**ABSTRACT**

**INTRODUCTION:** Influenza is well known to cause frequent epidemics. Awareness about it will be the best measure of to avoid “flu” as well as to reduce the complications and resultant morbidities.

**AIMS AND OBJECTIVES:** 1. To find out level of awareness amongst urban population of Surendranagar and 2. To explicate the awareness with the socio-demographic characteristics of the population.

**MATERIALS AND METHODS:** 5% of the ward population in randomly selected ward were subjected to house to house survey. Data was collected using presdesigned, pretested proforma.

**RESULTS:** Majority of males had education upto primary followed by secondary while 34% of females were illiterate. Majority of males were labourers while females were house wives. Majority of the families belonged to Social class IV. Only 58% had heard of influenza, 75% of them, males. Nearly 44% of those who were aware did not know about preventive measures.

**RECOMMENDATIONS:** Large scale I.E.C activities using popular media, group discussions, demonstrations etc to create awareness and spread knowledge of preventive measures should be taken up.

**KEY WORDS:** Influenza, awareness, urban population. Surendranagar

**INTRODUCTION**

Influenza, more popularly known as the seasonal flu, is caused by influenza viruses. It spreads between people and is known to cause mild to severe illnesses. In extreme cases can cause death. Children (<2 yrs of age), elderly and those suffering from chronic illnesses are at a higher risk of complications. The disease is well known to cause epidemics every year. This study was thus aimed at finding out the awareness of influenza among the urban population of Surendranagar.

**AIMS AND OBJECTIVES:**

1. To find out the awareness regarding influenza among urban population of Surendranagar
2. To explicate the awareness with the socio demographic characteristics of the population

**MATERIAL AND METHODS:**

All the wards in urban Surendranagar were enumerated and by simple random sampling, one ward was selected. It was decided to study 5% of the total ward population for the study (which came to 742).

A cross sectional house to house survey was carried out to include all the members of the house hold more than 10 years of age present at the time of the visit.

Data was collected using a pre designed and pre tested questionnaire and was analyzed using SPSS.

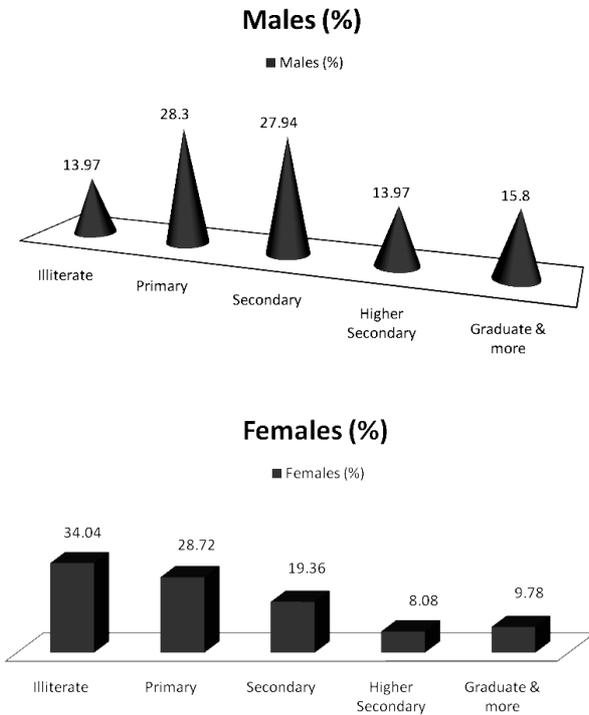
**ANALYSIS AND INTERPRETATION**

**TABLE 1: DISTRIBUTION OF THE SUBJECTS ACCORDING TO THEIR AAGE (N=742)**

Age group	Males		Females		Total	
	No.	%	No.	%	No.	%
<20	58	21.32	61	12.97	119	25.31
20-40	92	33.82	215	45.74	307	41.37
40-60	76	27.94	118	25.10	194	26.14
>60	46	16.91	76	16.17	122	16.44
Total	272	36.65	470	63.34	742	100

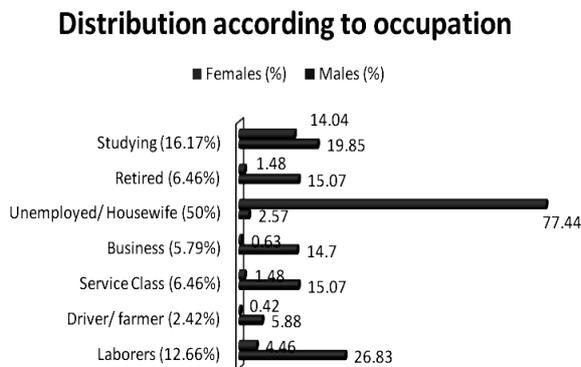
Out of the 742 subjects, 272 were males and 470 females with mean age of 37.31 ± 17.58. The median age was found to be 33. Majority of the subjects were young adults (41.37%) and the percentage of the geriatric population in the study group was found to be 16.44.

FIGURE I: SHOWING DISTRIBUTION OF THE MALE AND FEMALE SUBJECTS ACCORDING TO THEIR EDUCATION



It can be seen from the above diagram that majority of the males were educated upto primary (28.3%) and secondary (27.94%). Females on the other hand in majority were illiterate (34.04%) followed by education upto primary (28.72%) and then upto secondary (19.36%).

FIGURE 2: SHOWING THE DISTRIBUTION OF THE SUBJECTS ACCORDING TO THEIR OCCUPATION (N=742)



Majority of the male subjects were labourers (26.83%) and females were housewives (77.44%). About 16.17% of the subjects were studying in Schools/ Colleges.

TABLE II: DISTRIBUTION OF THE FAMILIES ACCORDING THE MODIFIED PRASAD'S CLASSIFICATION OF 2009, (N= 261, CPI=RS. 741)

Social class	Range (in Rs.)	No. of families	Percentage
1	>3653	17	6.51
2	1826-3652	56	21.45
3	1096-1825	65	24.90
4	548-1095	99	37.93
5	<547	24	9.19

It can be seen that majority of the families were from social class 4 (37.93%) followed by class 3 (24.9%) and class 2 (21.45%)

TABLE III: SHOWING THE PERCENTAGE OF SUBJECTS WHO WERE AWARE OF INFLUENZA (FLU) (N=742).

Sex	Aware of Influenza (flu)				Total	
	YES		NO			
	No.	%	No.	%	No.	%
Male	205	75.36	67	24.63	272	36.65
Female	225	47.87	245	52.12	470	63.35
Total	430	57.95	312	42.04	742	100

Out of the total subjects, only 58% of the subjects had heard of influenza (flu), majority of whom were males (75%). The difference between two proportions of both the sexes regarding the awareness was found statistically highly significant using Z test (P<0.0001).

TABLE IV: SHOWING THE AWARENESS OF THE SUBJECTS REGARDING THE NEWER INFLUENZAS (SWINE, AVIAN FLU, SARS)

Sex	Aware of Newer Influenzas				Total	
	Yes		No			
	No.	%	No.	%	No.	%
Male	190	48.71	82	23.29	272	36.65
Female	200	51.28	270	76.70	470	63.35
Total	390	52.56	352	47.43	742	100

When asked about the awareness of the newer influenzas like H1N1 (Swine) Influenza, Avian Influenza and SARS, it was noted that those who had heard of them had a very minor majority (53%) as compared to those who had not and the difference was statistically not significant (X<sup>2</sup>=0.165-DF=1 P = 0.6847).

FIGURE III: DEPICTING AWARENESS ABOUT THE MODES OF TRANSMISSION (N=430)

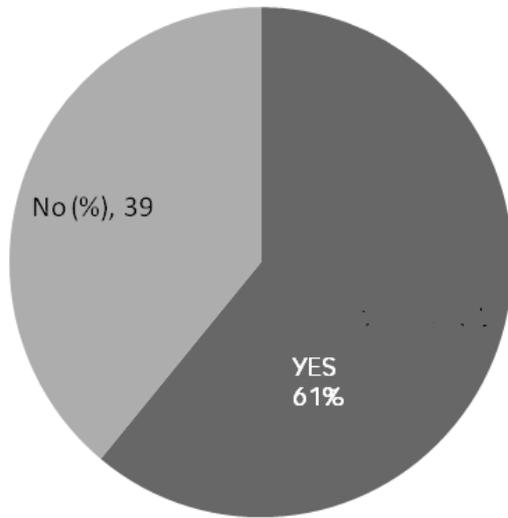
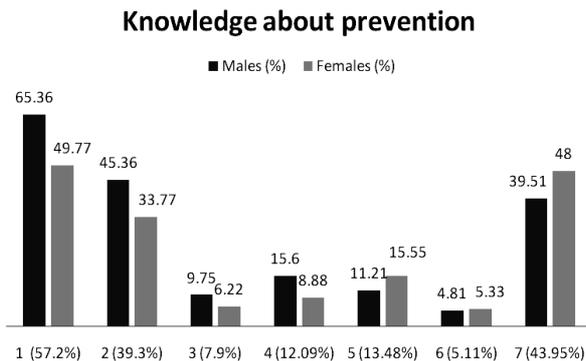


FIGURE IV: SHOWING THE KNOWLEDGE OF THE SUBJECTS REGARDING THE VARIOUS MODES OF PREVENTION (N=430)



As shown in the figure, maintaining a respiratory etiquette, covering nose & mouth during other's cough and sneeze was known to 57.2% (1). Wearing mask while visit to places of overcrowding and public gathering was known to 39.3% (2). Isolation of suspected and known patients during epidemics was known only to 7.9% (3) Improving hygiene and regular hand washing 12.09% (4), avoidance of visit to places with overcrowding 13.48% (5). Other modes of prevention according to their knowledge like Vaccination, Chemoprophylaxis, Staying home at the 1<sup>st</sup> sign of influenza etc was 5.11%. Nearly 43.95% had no idea regarding the prevention of the disease.

It was rather disappointing to know that nearly 44% of the subjects among those who had heard of Influenza (flu or flu like illnesses) had no knowledge regarding the prevention of the disease

though nearly 61% had an idea about the common modes of transmission.

TABLE V: ASSOCIATION OF THE AWARENESS WITH THE SOCIAL CLASS OF THE SUBJECTS (N=742).

S E Classification	Heard of Influenza (flu)		Total
	Yes	No	
Class 1	39	09	48
Class 2	108	51	159
Class 3	80	105	185
Class 4	65	216	281
Class 5	10	59	69
Total	430	312	742

It is very clear from the above table that as we proceed from lower social class to higher, the awareness regarding Influenza got bettered ( $X^2=137.595$ , Df=4,  $P<0.0001$ ).

DISCUSSION AND CONCLUSION:

In the present study 53% had heard of swine flu. Similar study conducted by Kamate et al showed 83% who had heard of swine flu which is much higher than present study of 53%. This difference could be due to difference in the socio demographic characteristics of the two populations.

A study conducted by Caddedu C et al showed similar findings with low level of awareness among the health care workers . Puri S et al showed nearly 96% of the study subjects having knowledge about the transmission which is again higher than the present study.

It can be concluded from the study that the awareness among the general population showed several lacunae. Looking to the seriousness of complications related to the disease large scale IEC activities regarding all the aspects of the disease should be initiated.

RECOMMENDATIONS:

1. Large scale IEC activities for the general population regarding all aspects of the disease transmission and prevention.
2. Use of posters, banners, TV and newspapers for dissemination of the information regarding dos and donts of the disease
3. Group discussion and personal demonstrations by Health workers during the epidemics and pandemics.

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**The human body contains blood, phlegm, yellow bile and black bile. These are the things that make up its constitution and cause its pain and health. Health is primarily that state in which these constituent substances are in the correct proportion to each other, both in strength and quantity, and are well mixed.**

**Hippocrates (1978), Hippocratic writings. Edited with an introduction by G.E.R. Lloyd. Harmondsworth (Penguin), 262**

**The most important characteristic of an organism is that capacity for internal self-renewal known as health.**

**There are two organisms whose processes of self-renewal have been subjected to human interference and control. One of these is man himself (medicine and public health). The other is land (agriculture and coservation).**

**The effort to control the health of land has not been very successful. Leopold, Aldo (1970), A Sand County Almanac. New York (Ballantine Books), here: 272**

## Original short article

### Measuring patient satisfaction: A cross sectional study to improve quality of care at a tertiary care hospital.

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#### ABSTRACT

**BACKGROUND:** What can be done to improve the quality of care delivered to consumers ?

**OBJECTIVE:** To measure the satisfaction of patients attending the OPD in a tertiary care hospital namely SKIMS, Soura, Srinagar.

**MATERIALS AND METHODS:** Pre-structured questionnaire was administered and data collected from patients attending the OPD. The data was later analyzed.

**SETTINGS:** OPD section of SKIMS, Soura.

**RESULTS:** 400 OPD patients were included in the study to know their perceptions towards the said hospital, reason for choosing the hospital, perception towards registration process, basic amenities & perception towards doctors and other staff. The major reason for choosing the health facility was skilled doctors. Majority of patients were satisfied with the facilities available as well as with the behavior of doctors and other health staff.

**CONCLUSION:** The health care delivered at this institute can be improved more and more once the organization, measures the delivery of quality of care on an ongoing basis and continually making small changes to improve the individual processes.

**KEY WORDS:** OPD patients, questionnaire, quality care, tertiary care hospital, pt satisfaction, pt. perceptions

#### INTRODUCTION

Selecting the health care and measuring its quality is very complex and has remained elusive yet the tools of its measurement have increasingly improved. Many factors including poor systems and stress of the caregivers effects the quality along with satisfaction of patients. Patient satisfaction denotes the extent to which general health care needs of the clients are met to their requirements. Patients carry certain expectations before their visit and the resultant satisfaction or dissatisfaction is the outcome of their actual experience.<sup>1,2,3,4</sup> Patients' perceptions about healthcare systems seem to have been largely ignored by health care managers in developing countries<sup>4,5,6</sup>. This is despite the fact

that patient satisfaction surveys are one of the established yardsticks to measure success of the service delivery system functional at hospitals. Also awareness about patient satisfaction is relevant in the sense that satisfied patients are more likely to abide by the treatment advised, to continue using medical services and to promote referrals, thereby increasing the service volumes. Health professionals are also benefited and guided by the outcome of these surveys. The feedback received is likely to help them in identifying potential areas for service improvement<sup>2,3,4</sup> The present paper is based on a cross-sectional study conducted at tertiary care hospital SKIMS in the state of J&K to measure patient satisfaction who have availed services in OPD. OPD of SKIMS is one of the most sought among the various hospitals in Kashmir Valley. It caters to a patient population of roughly 5 lac annually, which amounts to an average OPD rush of about 1500 patients per day

#### OBJECTIVE

To measure satisfaction of the patients attending the OPD

#### MATERIAL AND METHODS

To carry out the proper scientific study, a set of well structured close-ended questionnaire was developed. The questionnaire was pre-tested. The questionnaire covered the information related to patients socio-economic characteristics, patients choice of health facility, registration process, perception towards availability of basic amenities, behavior of doctors and other staff, facilities available in pharmacy and dressing room. Data was collected with the help of interns posted at that time in the department of community medicine. They were duly trained for the data collection. The interns went to the OPD everyday and interacted with the patients, made them comfortable and interviewed them after they consulted the doctor. An informed verbal consent was taken from all the participating patients before start of the interview. The doctors and other staff was kept unaware to avoid any sort of bias. Data was collected for 2 months July and

august 2010.Total of 400 patients were interviewed. After collecting the data, it was subjected to statistical analysis using the SPSS version 12.

**DEFINITION**

OPD: In this study, OPD is defined as the hospital's department where patients received diagnosis and treatment but did not stay overnight.

**OBSERVATIONS AND RESULTS;**

Regarding the general characteristics of the OPD patients (Table I),

**TABLE - I CHARACTERISTICS OF THE OPD PATIENTS N = 400/ (%)**

Sex	
Male	204(51)
Female	196 (49)
Age group(in years)	
0-15	1(0.25)
16-30	85(21.25)
31-50	233(58.25)
50 & above	81(20.25)
Education level	
Illiterate	159(39.75)
Middle pass	70(17.5)
Secondary	88(24)
High secondary	64(16)
Graduated and above	19(4.75)

51% were males and 49% were females. The majority of respondents (58%) were in age group of 31-50 years.39% were illiterate. Skilled doctors was one of the most cited reasons (61%) for choosing the health facility by the OPD patients (Table II).

Main source of information regarding the hospital was family members while as mode of transportation for the majority of interviewed patients was bus/auto(79%).94% patients did not find any problem in locating the hospital or locating different departments within the hospital (70%).Regarding the registration 80% of OPD pts reported that registration counter was overcrowded. However, almost63% (table III) of patients were satisfied with behavior of registration clerk. Majority of patients were satisfied with the basic amenities(table IV) . About 66% of patients reported that doctor's behavior as good and felt that doctor gave adequate time to them (77%). Regarding the

perceptions of patients towards the paramedical staff, majority of patients were satisfied with the behavior of laboratory technicians and other staff though 82% said services were not prompt.

**TABLE - II REASONS FOR SELECTING THE FACILITY 400/ (%)**

Easily accessible	39(9.75)
In-expensive	44(11)
Good infrastructure	72(18)
Skilled doctors	245(61.25)
Committed nursing staff	0
Source of information	
Family members	222(55.5)
Relatives	123(30.75)
Neighbours	40(10)
Others	15(3.75)
Mode of transportation	
On foot	24(6)
Bus/auto	318(79.5)
Scooter/car/cycle	58(14.5)
Source of information	
Family members	222(55.5)
Relatives	123(30.75)
Neighbours	40(10)
Others	15(3.75)
Mode of transportation	
On foot	24(6)
Bus/auto	318(79.5)
Scooter/car/cycle	58(14.5)
Transportation cost (in Rs.)	
Free of cost	21(5.25)
5 – 10	40(10)
11 – 50	179(44.75)
Above 50	160(40)
Time taken to reach the facility	
5 - 15mts	40(10)
16 – 30mts	111(27.75)
31 an above	249(62.25)
Problem in locating the hospital	
Yes	23(5.75)
No	377(94.25)
Problem in locating different department within the hospital	
Yes	120(30)
No	280(70)

**TABLE-III REGISTRATION PROCESS (N=400/(%)**

Was registration counter overcrowded	
Yes	321(80.25)
No	19(19.75)
Behaviour of the registration clerk	
Good	136(34)
Satisfactory	251(62.75)
Poor	13(3.25)

TABLE - IV BASIC AMNETIES

Sitting arrangement for the patients and attendants	
Adequate	282(70.5)
Inadequate	118(29.5)
Cleanliness	
Adequate	314(78.5)
Inadequate	86(21.5)
Lighting arrangement	
Good	215(53.75)
Satisfactory	184(46)
Poor	1(0.25)
Fans /heaters	
Available	366(91.5)
Not available	34(8.5)
Toilets	
Available and clean	117(29.25)
Available but dirty	217(54.25)
Not available	66(16.5)
Drinking water	
Available	53(13.25)
Not available	347(86.75)
Telephone facility	
Available	14(3.5)
Not available	386(96.5)

TABLE - V PERCEPTION OF OPD PATIENTS TOWARDS DOCTORS 400 /(%)

Behaviour of the doctor	
Good	267(66.75)
Satisfactory	125(31.25)
Poor	8(2)
Time taken by the doctor to attend the patient (in min)	
5 – 15	94(23.5)
16 – 30	135(33.75)
31 and above	171(42.75)
Whether patient perceives that time given by the doctor is adequate	
Adequate	311(77.75)
Inadequate	89(22.25)

TABLE - VI PERCEPTION OF PATIENTS TOWARDS PARAMEDICAL STAFF

Discipline in queue	
Good	93(23.25)
Satisfactory	269(67.25)
Poor	38(9.5)
Behaviour of lab tech	
Good	155(38.75)
Satisfactory	224(56)
Poor	21(5.25)
Behaviour of staff	
Good	146(36.5)
Satisfactory	229(57.25)
Poor	25(6.25)
Problem of overcrowding	
Yes	335(83.75)
No	65(16.25)
Promptness of services	
Yes	69(17.25)
No	331(82.75)

## DISCUSSION

Quality care is one of the central dimensions of public health. Good quality care needs to be delivered at the earliest and at the proper time which is a basic right of consumers. In recent years it has become clear that quality care can be measured easily. Quality care can be divided by measurement into Structure, Process and Outcome. Structure refers to basic infrastructure and the overall facility and Process means the way the care is delivered and Outcome points to final result. Health care must guarantee quality care along with safety which is pivotal to quality care.<sup>1,2,3,4</sup> In this particular the study, the most of the patients interviewed were satisfied with the services at this tertiary institute, Skims, Srinagar, India. This is consistent with many studies done elsewhere.<sup>5,6,7,8</sup> However, the higher satisfaction must be attributed to SKIMS being a referral hospital, which receives patients who have often been shunted around between lower level facilities and attended by general practioners than by specialists. Aldana and his colleagues reported that the most powerful predictor for client satisfaction was the providers behavior towards patients. The behaviour of the doctors and paramedical staff in our study was found to be satisfactory but not exemplary.<sup>7,8,9,10,11</sup> Major client dissatisfaction was with waiting time greater than 30 minutes which is similar to other studies.<sup>9,10,12</sup> It was observed during the study that the ultimate satisfaction of a patient is his/hger rapport with the doctor. A patient forgets the toll that takes him to reach the services if a doctor sees the patient with compassion.

## CONCLUSIONS & RECOMMENDATIONS

In present scenario where the hospital is recognized as a social institute and patient is the only reason for its existence, the hospital must strive for patient oriented services. Assessing the overall scenario of OPD, it can be recommended that SKIMS needs to bring out some simple changes to improve patient satisfaction. These include:

1. Introducing simpler methods of registration.
2. Amenities like drinking water and clean toilets made available.
3. Adhering to strict time schedules by doctors and other staff.
4. Efforts made to reduce patient overload so that doctors and other staff can give more attention and time to the patients. The same can be achieved by strengthening infrastructure and human resources at the peripheral health facilities

5. The overall quality of care can be improved more in aggregate by raising the level of performance of all providers rather than finding a few poor performers and punishing them, and continuously making small changes to improve their individual processes. This approach can be very powerful if embraced over a period of time.

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**Health is undoubtedly the chief good and the foundation of all the other goods in this life. For even the mind depends so much on the temperament and disposition of the bodily organs that if it is possible to find some means of making men in general wiser and more skilful than they have been up till now, I believe we must look for it in medicine. It is true that medicine as currently practiced does not contain much of any significant use; but without intending to disparage it, I am sure there is no one, even among its practitioners, who would not admit that all we know in medicine is almost nothing in comparison with what remains to be known, and that we might free ourselves from innumerable diseases, both of the body and of the mind, and perhaps even from the infirmity of old age, if we had sufficient knowledge of their causes and of all the remedies that nature has provided. Descartes, Rene (1988), Selected philosophical writings. Cambridge (Cambridge University Press), 47**

## Original short article

### A study of knowledge, attitude and practice of hepatitis-B infection among the laboratory technicians in the civil hospital, Ahmedabad, Gujarat

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#### ABSTRACT

**BACKGROUND:** Hepatitis B is highly endemic throughout world. Laboratory technicians are at more risk for it due to blood exposure which is preventable.

**OBJECTIVES:** (1) To assess the KAP of Hepatitis B among the laboratory technician.

(2) To know their vaccination status.

**METHOD:** A cross sectional study was conducted in civil hospital. Total 60 laboratory technicians from different departments were enrolled. A pre-tested questionnaire was used to collect information.

**RESULT:** More than half of laboratory technicians (66.7%) know that hepatitis B is an infectious disease and 88.3% believe that it is spread by infected blood. 96.7% know that it affects the liver. 86.7% were wearing gloves and taking precaution while handling the sample. 13.3% were exposed to infectious material during their job. Only 35% were fully immunized.

**CONCLUSION:** Majority of laboratory technician know that hepatitis B is infectious and preventable but knowledge about the disease and protective measures are still needed in laboratory technicians.

**KEYWORDS:** Hepatitis B infection, Primary liver cancer, Universal work precaution.

#### INTRODUCTION:

Hepatitis B infection is a major public health problem. About two billion people are affected with hepatitis B worldwide and more than 350 million have chronic, lifelong infection. The virus causes 60-80% of all primary liver cancer, which is one of the top three causes of death due to cancer in SEAR. In India about 45 millions population is hepatitis b infection carrier. While in hospital staff it is 10.87%.<sup>1</sup>

The workers in laboratories in Colleges of Medicine and Teaching hospitals generally are faced with many hazards at work and his/her health and safety may be severely jeopardized if adequate preventive protective measures are not taken. These hazards can be physical, chemical, and blood-borne (cross) infections and even legal actions. The prevention of occupational hazards in laboratories requires a thorough knowledge of the

risks and practical measures to be taken.<sup>2</sup> Laboratory and other health care workers should familiarize themselves with “universal precautions”, which as defined by Center for Disease Control, as a set of precautions designed to prevent transmission of Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other blood-borne pathogens when providing first aid or health care. Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other blood borne pathogens<sup>3</sup> This study was done to identify the gaps in knowledge and would be helpful in planning effective health education campaign for health care staff.

#### METHODS

This was a cross-sectional interview and hospital-based study. The study was conducted at the civil hospital, Ahmedabad.

The study population included laboratory technicians who were working in the medical service during the time of the study. It was decided to take 50% of them as sample so total 70 laboratory technicians of various departments were interviewed with informed consent. Out of which 60 responded.

A structured anonymous questionnaire containing the demographic data, knowledge about the risk and prevention of HBV, screening status for hepatitis B, HBV vaccination status and Universal work precaution were interviewed, after taking informed consent. Data collection was done from 1<sup>st</sup> august to 31<sup>st</sup> august 2010. Confidentiality of all data collected was ensured. Selection of the workers was random from different departments.

The data collected were then processed and analyzed using epi\_info 3.5. software package. Our study had its limitations that it relied on information given by participants.

#### RESULTS

Majority of the laboratory technicians (75%) were from the age group 20-35 years and 70% of them were female. 42% of the study population were married. 66.7% had duration of job <10 years (Table-I)

Majority of the laboratory technicians had knowledge regarding hepatitis B and related to vaccine.(Table-II)

TABLE I: DEMOGRAPHIC PROFILE OF LABORATORY TECHNICIANS

Demographic variable	Frequency	Percentage
Age(years)		
20-35	45	75%
36-50	13	21.6%
50-60	2	3.4%
Sex		
Male	18	30%
Female	42	70%
Marital Status		
Married	42	70%
Unmarried	18	30%
Duration of job (Years)		
<10	40	66.7%
10-20	7	11.6%
20-30	6	11.1%
30+	7	11.6%

TABLE II : KNOWLEDGE ASSESSMENT OF LABORATORY TECHNICIANS

Knowledge regarding hepatitis B	Frequency	%
Hepatitis B is an infectious disease	40	66.7
How Hepatitis B spreads	53	88.3
Affects Liver	58	96.7
Knowledge of symptoms	52	86.7
Hepatitis B test is must before surgery	51	85
Hepatitis B vaccine is available	59	98
Knowledge of vaccination schedule	50	83.3
Government is giving free of cost	40	66.7
Ever exposed to infectious material	8	13.3
PEP available	52	86.7
Knowledge of outcome	53	88.3
Knowledge of their Hepatitis B status	5	8.3
Knowledge of Universal work precautions	53	88.3

PEP: Post exposure prophylaxis

All laboratory technicians were screened for Hepatitis B, while only 35% of the study

population were totally immunized against Hepatitis B at the time of study. All the laboratory technicians were using disposable needle and syringe and put on apron while working, while all of the universal work precautions taken by only 86.7% of the laboratory technicians. (Table-III)

TABLE III: UNIVERSAL WORK PRECAUTIONS AMONGST LABORATORY TECHNICIANS

Work precautions	Frequency	%
Screened when selected as laboratory technician	60	100
Complete immunisation	21	35
Using gloves	52	86.7
Washing hands	54	90
Using disposable needle and syringe	60	100
Made use of First aid boxes	54	90
Experienced torn gloves	5	8.3
Put on masks	52	86.7
Put on laboratory Apron	60	100
Dispose of used needles and syringes in special containers	53	88.3
Dispose Laboratory waste in special containers	49	81.6
Take shower immediately after laboratory work over	60	100
Eat at laboratory	32	53.3
Precaution all above	52	86.7

## DISCUSSION

The major findings of this study provide some interesting insights into the question of preventing the transmission of pathogens (HIV, hepatitis virus etc.) through preventive measures used by laboratory technicians in hospitals. Despite their relatively high level of education, and the advanced level of knowledge about the modes of transmission of the pathogens, there were great disparities among technicians in attitudes and practices.

On the one hand, protection techniques such as regular hand washing or use of barrier protection including gloves of the proper quality and protective body clothing were used to various extents to prevent skin and mucous membrane contamination with blood or body fluids. This is good laboratory practice reducing exposure from prolonged or extensive contamination of skin with infectious fluids<sup>4,5</sup>

But on the other hand, 10% of the laboratory technicians did not wash their hands

after the removal of the gloves, Furthermore, 36.6% of them are not immunized against HBV. These lacunae need to be corrected if these workers are to be protected from been infected.

Disposal of used needles and syringes in special containers were not practiced by about 10% of the laboratory technicians and other laboratory waste was not thrown in proper containers by about 18% of them. Awareness should be raised about this problem, stressing the importance of developing and following guidelines for correct handling of laboratory wastes, particularly contaminated waste. Medical waste could be classified into general refuse, special medical waste and potentially infectious categories and processed accordingly.

All laboratory technicians were screened for Hepatitis B, Only 35% of the study population was totally immunized against Hepatitis B at the time of study. The reason for the same was not known. It should be mandatory for all of them to take vaccine.

The attitude and practice of the laboratory health workers towards universal Precaution call for a lot of concern as 53.3% of them ate in the laboratory and this is comparable with 41.0% rate observed amongst laboratory scientists in Ibadan, Nigeria<sup>6</sup>.

In our study, it was evident that such a comprehensive approach was not clear in the minds of most laboratory staff. Therefore, the

concept, use and effectiveness of universal precautions need to be clearly presented to all technicians.

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**Health is a wavering notion, if not directly in medical terms, then in social terms. Health is by no means solely a medical notion, but predominantly a societal one. Restoring to health again means in reality bringing the sick man to that kind of health which is respectively acknowledged in each respective society, and which was in fact first formed in that society itself. Bloch, Ernst (1995), The principle of hope. Cambridge, Mass. (MIT Press), 465**

**Original Short Article**

**Epidemiological determinants of animal bite cases attending the anti-rabies clinic at V S General Hospital, Ahmedabad**

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**ABSTRACT**

**INTRODUCTION:** Rabies is 100% fatal yet 100% preventable with timely and appropriate Post Exposure treatment. However, not all bite victims seek treatment. Moreover, myths and practices amongst people prevent appropriate treatment. Potent cell culture vaccines are available for the treatment of animal bite cases. **AIMS & OBJECTIVES:** 1) To study the epidemiological characteristics of victims of animal bite injuries. 2) To study the health seeking behaviour of persons with animal bite. **Methodology:** All new cases of animal bites registered in Anti Rabies Clinic of VS General Hospital for 3 months were studied by using pretested proforma.

**STATISTICAL ANALYSIS:** Proportions.

**RESULT:** Out of total 1112 cases of animal bite nearly 50% were below 25 years of age. Amongst them 850(76%) were males. Ninety six percent of cases were bitten by stray dog. Category III bites were seen in 754(67.8%) of cases. In 999(89.8%) cases lower extremities were affected. Two third of cases had attended the ARV clinic within 24 hours of bite. Only 24% of cases had done the wound washing. **Conclusion:** Local treatment of the wound soon after a bite is an important step in the management of a case and this was lacking in most of the subjects. Efforts to eliminate the stray dogs are required.

**KEY WORDS:** Rabies, Animal bite, health seeking behavior

**INTRODUCTION**

Rabies, a disease of antiquity continues to be a major public health problem in India. It is 100% fatal yet 100% preventable. It is estimated that the South East Asia Region accounts for approximately 60% of human deaths due to rabies in the world.<sup>[1]</sup> In India, it is estimated that 20,000 deaths occur due to rabies annually.<sup>[2]</sup> This may not be exact, as the disease is neither reportable nor notifiable. Multiple myths are associated with the disease, which vary from region to region, and they determine the post exposure treatment seeking behavior of animal bite victims. It is important to know about epidemiology of animal

bites, rabies and factors influencing post exposure treatment for preventing human deaths due to rabies and formulate rabies control strategies. This study was carried out with the objectives of collecting information from patients attending anti rabies clinic of V S general Hospital about epidemiology of animal bite and also elucidating the factors influencing the post-exposure treatment.

**MATERIALS AND METHODS**

Prior permission from ethical committee was taken to collect data. All the new cases of animal bite attending anti rabies clinic of V S General Hospital for the period of three months (August-October 2010) were interviewed. Written consent was taken from all the patients after the study was explained to the patients or their guardians (in case of children). Pre-designed and pre-tested proforma was used for collection of data. Data was analyzed using appropriate statistical software.

**RESULTS**

Out of total 1112 cases of animal bite, 538 (48.4%) were below 25 years of age. (Table 1) 850(76%) were males.

**TABLE I: AGE-WISE DISTRIBUTION OF CASES**

Age Groups (Years)	Frequency	Percent
<5	29	2.6
5-14	251	22.6
15-24	258	23.2
25-34	159	14.3
35-44	187	16.8
45-54	117	10.5
55-64	64	5.8
>65	47	4.2
Total	1112	100

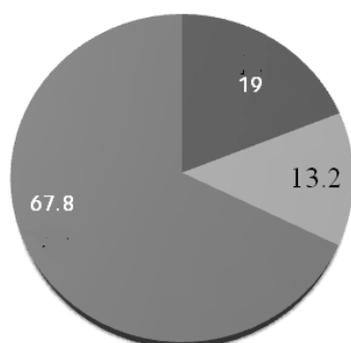
Stray dogs were responsible in 1070(96.2%) of cases while 39(3.5%) cases were bitten by pet dog. (Table II). Class II exposures

were seen in 147(13.2%) and 754 (67.8%) were of class II. (Figure I). Bites involved the lower limb in 999 (89.8%) of the victims followed by upper limb in 88(7.9%), trunk in 12(1.1%) and face in 6(0.5%) patients. (Table III) As many as 38.8% of bites occurred between 4 and 8 pm in the evening.

TABLE II: TYPE OF ANIMAL

Type of animal	Frequency	Percentage
Stray Dog	1070	96.2
Pet Dog	39	3.5
Cattle	3	0.3
Total	1112	100

FIGURE I : CATEGORY OF WOUND



■ Category I ■ Category II ■ Category III

TABLE III: SITE OF BITE

Site of bite	Number	Percentage
Lower Limb	999	89.8
Upper Limb	88	7.9
Trunk/abdomen	12	1.1
Face	6	0.5
*Lower Limb and Trunk	3	0.3
*Lowe limb and Upper Limb	2	0.2
*Face and Lower limb	2	0.2
Total	1112	100

\*Few victims had animal bites on more than one site.

TABLE IV: TIME BETWEEN ANIMAL BITE AND ATTENDING THE ARV CLINIC

Time period	Frequency	Percent
Within 24 hours	762	68.5
1-2 days	195	17.5
2-3 days	54	4.9
3-4 days	39	3.5
>4 days	62	5.6
Total	1112	100

Two third of cases had attended the anti rabies clinic within 24 hours of bite. (Table 4) Only 277(24.9%) of had done the wound washing after the bite. Half of the cases (52.6%) had applied indigenous materials on the wound. (Table V).

TABLE V: MEASURES TAKEN IMMEDIATELY AFTER ANIMAL BITE

Measures taken immediately after bite	Number	Percentage
Wash with water	277	24.9
Apply antiseptic cream	147	13.2
Apply indigenous product	585	52.6
No first aid taken	74	6.7
Consulted doctor	29	2.6
Total	1112	100

## DISCUSSION

In this study, children and adult men were affected the most probably because of their outdoor activities. Similar findings were made in other studies too.<sup>4-7</sup> The main biting animal was dog and this observation is seen uniformly in other studies too.<sup>3-7</sup> Category III was present in 67% of bite victims. This finding is similar to that of study carried out by Ichhpujani et al (62.6%)<sup>8</sup> and Ghosh (62%).<sup>9</sup> Majority (72.5%) of victims did not even wash their wounds with soap and water. This is quite alarming and this calls for concerted health education of people through mass media. Another factor which causes concern is that 585(52.6%) bite victims had applied indigenous products like chilli powder, snuff etc. which are harmful.

## CONCLUSION

In conclusion, the dogs were the main biting animal, affecting mostly the children and adult. The bite victims did not do proper wound care. The indigenous treatment was quite prevalent. All these call for concerted effort for a mass awareness campaign.

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## ***A poem for public health***

***FIRST THEY VOTED to eliminate child care inspections***

***And I didn't speak up because I didn't have children***

***THEN THEY VOTED to stop inspecting food service establishments***

***And I didn't speak up because another agency did those inspections***

***THEN THEY VOTED to get rid of nursing home and hospital inspectors***

***And I didn't speak up because I worked in the OSTDS program***

***THEN THEY VOTED to abolish Environmental Health***

***And there was no one left to speak up***

***Anonymous***

**Letter to Editor**

**What we predict for the sex ratio in India for the next census 2021?**

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Sex ratio is always the issue of a discussion in public health forums and journals. With the release of provisional figures of the census of the second decade of the 21<sup>st</sup> century once again it again becomes the talk of the town specially in public health corners. So we took this opportunity to discuss it and also tried to predict the future sex ratio.

The Indian sex ratio has shown a secular decline since the beginning of the twentieth century excepting some reverse trend of improvement during 1951, 1981 and 2001.<sup>1</sup>

Although the masculinity of sex ratio is a reality from the very beginning and more so in case of child population in India the concern regarding this phenomenon with the onset of this century is because of the startling figures exposed by the 2001 Census. The loss of female children will create an unbalanced sex structure of the population in country and will have serious demographic and social consequences. They also do not conform to the principle of gender equality in a modern civilized society.

Table: Trend of sex ratio in India (1961-2011)

Year		Females per 1000 males	Trend	Females per 1000 males in age group 0-6 years		Trend
1961		941	Declining	976		
1971	14 points	930	Declining	964	14 points	Declining
1981		934	Rising	962		Declining
1991		927	Declining	945		Declining
2001		933	Rising	927	31 points	Declining
2011		940	Rising	914		Declining
		(?)				
2021	(?)	Expecting a sharp decline		?		
		(?)				
2031		Expecting a sharp decline		?		
		(?)				

The above table showed that in the year 1971 the sex ratio was 930 which was turned to 934 with marginal increase of 4 point in year 1981 with the declining child sex ratio of 962 from 964. While in census year 1991 the sex ratio dropped down to 927 with the drop of 7 point of that of previous census. The one possible reason behind the decline of sex ratio in year 1991 may be the low child sex ratio in previous three decadal censuses. Consistent decline of child sex ratio from 1961 to year 1981(14 points) reflected as a low sex ratio in 1991 which was 927 with 14 points dropped to that of 1961 when it was 941. As the same cohort of children (0-6) had comprised the adult cohort in successive decades, the overall sex ratio has suddenly dropped in year 1991.

The child sex ratio was still declined in 1991 and 2001 census. It was dropped down from 945 in year 1991 to 927 in 2001 and further to 914 in 2011(31 points). The same cohort (0-6 year) which comprised the 0-6 in year 1991 and 2001 is now the part of adult in year 2011, so it should be ideally reflected in overall sex ratio as a decline or only marginal increase in 2011. But in year 2011 as per the provisional data of census the sex ratio increases to 940 from 933 in 2001.<sup>2</sup> Based on this hypothetical calculation we presume that there may be a sharp decline in overall sex ratio in future census of 2021. A skewed sex ratio may be making the lot of women worse. Robbery, rape and bride trafficking tend to increase in any society with large groups of young single men.

The only means to show better off in respect to sex ratio is only through improving the child sex ratio in next few years so it will again reflect in future censuses in terms of better overall sex ratio. In spite of this, if the child sex ratio will also remain decline in next census, we have to bare its effects till mid 21<sup>st</sup> century as it is definitely going to reflect in long term future in till next three or four censuses. The only means to get satisfaction in next census in terms of sex ratio intensive measures should be directed to improve the child (0-6) sex ratio. Thorough understanding of social factors is required before initiating such measures. The states with the worst sex ratio are among the richest, which suggests distorted sex selection will not be corrected just by wealth or government policy. In fact sex selection therefore tends to increase with education and income: wealthier, better educated people are more likely to want fewer children and can more easily afford the ultra sound scans. According to a study

conducted by Bardia et al there is a 'demand' for sex determination technology and, therefore, this would continue to be 'supplied'. At most the 'supply' can be regulated. Social engineering efforts need to be targeted at reducing the demand if the sex ratio is to be improved.<sup>3</sup>

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**Health**  
**is a state of complete**  
**physical, mental and social**  
**well-being and not merely**  
**the absence of disease or**  
**infirmity.**  
**The enjoyment of the**  
**highest attainable standard**  
**of health is one of the**  
**fundamental rights of every**  
**human being without**  
**distinction of race, religion,**  
**political belief, economic or**  
**social condition.**  
**World Health Organization**  
**(1946), Constitution. Geneva**  
**(WHO)**

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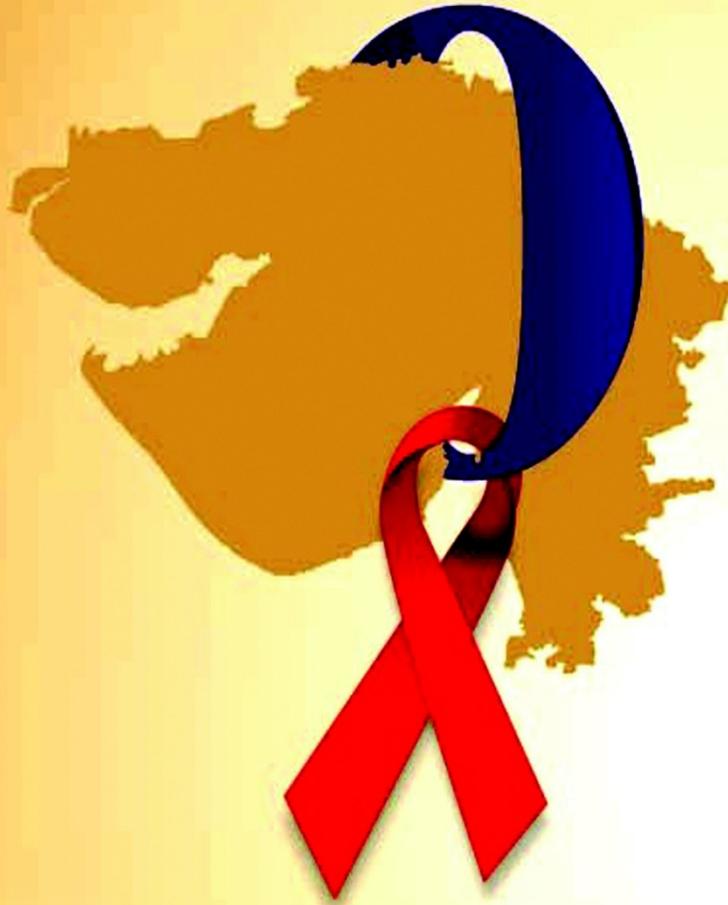
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