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EDITORIAL ARTICLE

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A study on Epidemiology of Fluorosis in a village of Nalgonda district, Andhra Pradesh

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Abstract:

Introduction : Fluorosis is an important problem of public health importance in some states of India. Nalgonda is one such district in Andhra Pradesh which is endemic for fluorosis. **Objectives :** To study the epidemiology and estimate the prevalence of fluorosis in Cherlapally village of Nalgonda district. **Materials and Methods :** Descriptive, cross-sectional study of the sample population of Cherlapally village by door to door approach and interview of the study population by questionnaire method.624 subjects residing in 104 households were selected by systematic sampling. 306 cases of fluorosis were diagnosed clinically. This was followed by collection of samples of drinking water, blood and urine samples. Samples of ground water were also collected to estimate the fluoride levels. Estimation of fluoride levels was by Fluoride Ion Electrode.(Eutech Instruments Pte Ltd.). All the data was analyzed by SPSS version of 10.0 for windows. **Results:** Overall Prevalence of fluorosis cases was found to be 49%. Prevalence of dental fluorosis was 28%, that of skeletal fluorosis was 21% and that of both was 13.1%. Majority of the fluorosis cases were in the age group of 41-60 years. The mean fluoride level in ground water sources was 3.76 mg/l. **Conclusion:** Practical training, workshops etc. for health staff, low cost water treatment technologies and nutrition and health education to people will help in mitigating the problem of fluorosis.

Key words : Prevalence, Dental fluorosis, Skeletal fluorosis

Introduction

Endemic fluorosis has been observed in many parts of the world where drinking water contains excessive amount of fluoride. Excess fluoride in drinking water causes dental and skeletal fluorosis , which is encountered in endemic proportions in several parts of the world.[1] Although fluorosis is most severe and widespread in India and China, it is endemic in at least 25 countries across the globe. The high natural concentration of fluoride holding minerals in the rocks irregularly distributed in India is the cause of endemic fluorosis.[2]

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In India the most common cause of fluorosis is fluoride laden water derived from bore wells dug deep into earth. [3]The severity of fluoride toxicity mainly depends on :

- the concentration of fluoride in drinking water
- daily intake of fluoride
- continuity and duration of exposure to fluoride
- the calcium and Vitamin D nutrition status.[4]

The World Health Organization guideline recommendation for maximum limit of fluoride in drinking water is 1.5mg/l.[5] Fluorosis is endemic in 20 out of 35 states and union territories of India Republic.[6] In Andhra Pradesh , Gujarat and Rajasthan, 70 -100% of the districts are affected. Fluoride levels in water in Andhra Pradesh vary from 0.4mg/l to a very high level of 29mg/l.[7]

Materials and Methods

The present descriptive, cross-sectional study was carried out in Cherlapally village, Nalgonda district from January 2007 to March 2007. Nalgonda is one of the high endemic district of Andhra Pradesh. Study sample was collected by systematic random sampling technique. All the households in Cherlapally village were enumerated and a list was made. There were 1045 households and this formed the sampling frame. 10% of the households were selected for the study by including every 10th household. As a result 104 households were selected . All the individuals resident in the 104 households after applying the inclusion /exclusion criteria yielded a study population of 624 persons. The inclusion criteria was those study subjects who were able to demonstrate as per the three diagnostic tests [8,9] for clinical assessment of skeletal fluorosis. For dental fluorosis it was assessed based on its diagnostic criteria .[10,11] The exclusion criteria was all those who were not able to perform the three diagnostic tests like morbid individuals and small children, those whose teeth were normal and not as per dental fluorosis criteria and or not available after 3 home visits. Ethical clearance was obtained prior to the initiation of the study. After obtaining informed consent and explaining the purpose of the visit, the data was collected by approaching the selected households and interviewing the available persons and the adult respondents if a child is present by a pre-designed and pretested questionnaire. Fluorosis was diagnosed clinically. To confirm diagnosis of fluorosis, the fluoride is mainly estimated in serum, drinking water and urine.Skeletal fluorosis was diagnosed by three diagnostic tests. [8,9] Similarly dental fluorosis was diagnosed by discolouration and damage to the teeth.[10,11] .To confirm diagnosis of fluorosis, the fluoride is mainly estimated in serum, drinking water and urine.[12] Around 10 samples of available ground water sources was collected to assess the fluoride level. Blood and urine samples were collected from the diagnosed cases of fluorosis. Water samples of drinking water sources were also collected from the houses of the fluorosis cases. The ground water samples as well the three samples of blood; urine and water were estimated for fluoride levels by using the instrument called Fluoride Ion Electrode (Eutech Instruments Pte Ltd.).Data was computed and analyzed using SPSS version -12 for windows.

Results

Out of 624 study subjects, 278(44.5%) were females and 346(55.5%) were males. Majority 128(20.5%) of the study population were in the age group of 21-30 years.). It was observed that 306 persons out of 600 study subjects were found to be suffering from fluorosis with a prevalence of 49 %. The clinically diagnosed cases of fluorosis showed high levels of fluoride in water, serum and urine samples. The mean fluoride level of the available ground water sources was estimated to be 3.76mg/l. Most 69 (22.6%) of the fluorosis cases were seen in the age group of 51-60 years. Female fluorosis cases (54.6%) were more than male fluorosis cases(45.4%). A large proportion 116(37.9%) of the fluorosis cases are from very low socio-economic status. (Class V of B.G.Prasad's classification of socio-economic status). A large number of fluorosis cases (85%) were diagnosed in households using well water and bore water. (Table-1). On assessing the nutritional status of the fluorosis cases it was observed that a large proportion (75.2%) of them were below normal. The association of nutritional status with fluorosis cases was found to statistically significant. ($p<0.001$). (Table-2). It was seen that out of the total fluorosis 306(100%) cases ,175(57.2%) had dental fluorosis,131(42.8%) had skeletal fluorosis and 82(26.8%) had both types of fluorosis. The prevalence of dental fluorosis was 28% and prevalence of skeletal fluorosis was 21% in the study population and prevalence of both types was 13.1%. (Table-3). A large proportion (41.1%) of the dental fluorosis cases was seen in the age group of 41-60 years. Females (53.7%) outnumbered the males (46.3%) in distribution of dental fluorosis cases. The prevalence of dental fluorosis also increased with age and this association was found to be statistically significant.($p<0.001$). Majority (48.1%) of skeletal fluorosis cases were seen in the age group of40-60 years. Similarly as in dental fluorosis, females (55.7%) outnumbered the males (44.3%) in distribution of skeletal fluorosis cases. (Table-4).

Table 1 : Distribution of Fluorosis cases as per drinking water sources

Source of Drinking water	Males(%)	Females(%)	Total(%)
Water can	6(4.3)	5(2.9)	11(3.6)
Tap water	12(8.6)	23(13.8)	35(11.4)
Well water	35(25.2)	42(25.2)	77(25.2)
Bore water	86(61.9)	97(58.1)	183(59.8)
Total(%)	139(100)	167(100)	306(100)

Table 2 : Fluorosis cases distribution as per nutritional status

BMI	Males(%)	Females(%)	Total(%)
<16.0	23(16.5)	9(5.4)	32(10.5)
16.0-16.99	11(7.9)	52(31.1)	63(20.6)
17.0-18.49	60(43.2)	75(44.9)	135(44.1)
18.50-24.99	45(32.4)	31(18.6)	76(24.8)
Total (%)	139(100)	167(100)	306(100)

$X^2=34.78;df=3;p<0.001$

Table 3 : Distribution of types of fluorosis cases

Types of Fluorosis	Males (%)	Females (%)	Total (%)
Dental	81(46.3)	94(53.7)	175(100)
Skeletal	58(44.3)	73(55.7)	131(100)
Both	49(59.8)	33(40.2)	82(100)

Table 4 : Age and sex distribution of Dental and Skeletal fluorosis cases

Age (yrs)	Dental Fluorosis cases			Skeletal Fluorosis cases		
	M (%)	F (%)	Total (%)	M (%)	F (%)	Total (%)
0 -10	2 (2.5)	2 (2.1)	4 (2.3)	0 (0)	1 (1.4)	1 (0.8)
11-20	4 (4.9)	3 (3.2)	7 (4.0)	1 (1.7)	2 (2.7)	3 (2.3)
21-30	4 (4.9)	14 (14.9)	18 (10.2)	2 (3.5)	3 (4.1)	5 (3.8)
31-40	6 (7.4)	23 (24.5)	29 (16.6)	10 (17.2)	12(16.4)	22 (16.8)
41-50	19 (23.5)	14 (14.9)	33 (18.9)	12 (20.7)	14(19.2)	26 (19.9)
51-60	23 (28.4)	16 (17.0)	39 (22.2)	16 (27.6)	21(28.8)	37 (28.2)
61-70	14 (17.3)	12 (12.8)	26 (14.9)	11 (18.9)	13(17.8)	24 (18.3)
>70	9 (11.1)	10 (10.6)	19 (10.9)	6 (10.4)	7 (9.6)	13 (9.9)
Total (%)	81 (100)	94 (100)	175 (100)	58 (100)	31 (100)	131 (100)

M-Males;F-Females

Discussion

It was observed in the study that males (55.5%) formed majority of the study population. Nirgude AS et al in their study on fluorosis in an urban slum of Nalgonda observed that females (57%) formed majority of the study population.[13] In the present study it was seen that majority of the females (42.8%) and majority of the males (37.9%) belong to the age group of 21-40 years. In the Panagal study it was observed that majority of the females were in the age group of 25-39 years whereas males were in the age group of 40-60 years.[13] Majority(41.2%) of the fluorosis cases in the present study were of the age group of 41-60 years. Similar observation was made in the Panagal study where majority of the fluorosis cases were in the age group of 40-60 years.[13] Majority of the study subjects belonged to upper lower (28.8%) and lower socio-economic class (37.9%) as per modified B.G.Prasad's Classification of socio-economic status. Similar observations were made by Nirgude As et al that majority of the study population were upper lower (41.5%) followed by lower middle class(29.8%).[13] The mean fluoride level of the available ground water sources in the present study was found to be 3.76 mg/l . Nirgude AS et al in their study found that the mean fluoride level in ground water sources to be 4.01mg/l.[13] Narayana et al in their study in villages of Nalgonda district found that the mean fluoride level in drinking water to be 3.8mg/l in Anthampet and 3.7mg/l in Battalapally.[16] In a study by Siddiqui in three villages of Nalgonda district it was found the fluoride level in drinking water as in the range of 5.2-11.8mg/l.[17]In the present study the prevalence of fluorosis cases was found to be 49%, prevalence of dental fluorosis was 28%, skeletal fluorosis was 21% and prevalence of both was found to be 13.1%.Nirgude AS et al in their study[13] found that fluorosis prevalence was 55%, dental fluorosis was 30.6% and skeletal fluorosis to be 24.9%. Choubisa in his study on fluorosis in southern Rajasthan noted that overall prevalence of dental fluorosis to be 45.7%.[14] Bharati P et al in their study on fluorosis in Gadag and Bagalkot districts of Karnataka observed that the prevalence of dental fluorosis was 35%.[15]

In the present study majority(59.3%) of the dental fluorosis cases had brown discolouration of the teeth. Bharati P et al had reported that 64.29% of dental fluorosis cases had browning of teeth.[15] Nirgude AS et al observed in their study that yellowish-brown discolouration of teeth with horizontal streaks was the most(28.7%) common symptom of dental fluorosis.[13] Bharati P et al in their study found that the prevalence of skeletal fluorosis was 17% and that of both types to be 12.67%.[15] The study on fluorosis in southern Rajasthan revealed that the overall prevalence of skeletal fluorosis was 22%.[14] . It was seen in the present study that back pain (68%) followed by joint pain (22%) was the common symptom of skeletal fluorosis. Joint pain was observed in 31.87% of the study subjects by Bharati et al in their study.[15] In a study by Narayana et al it was noted that 50-70% of cases reported joint pain and neck stiffness in their study.[16] Shashi et al in their study in three endemic areas of Punjab observed that back pain (73%) and neck pain (34%) as symptoms of skeletal fluorosis.[18] The differences in prevalence of fluorosis , their types as well as the symptoms as seen in the present study and other studies can be attributed to various factors like the asymmetrical levels of water table and concentration of fluoride levels in ground water. The deeper the water source more is the concentration of fluoride in water. It depends on the dose and duration of exposure to fluoride i.e. the number of years of intake of fluoride in drinking water. It also depends on the oral intake of nutritional supplements of Vitamins A, C, and D which may help to reverse the osteo-dental fluorosis.[19] Practical training ,workshops, slide demonstrations , low cost technologies for treatment of water, promotion of nutrition especially increase in intake of green leafy vegetables and fish rich in anti-oxidants and protein which are known to prevent the disease to some extent and avoiding fluoride containing toothpaste , decrease or avoiding consumption of black lemon tea and tobacco and treatment of those affected by fluorosis must be undertaken by doctors and health workers staying in fluorosis endemic areas. Teachers in schools can advocate and proactively play an important role in spreading awareness and prevention of osteo-dental fluorosis.

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SHORT ARTICLE-I

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Integrating Genomics and Public Health- Implications in Disease Prevention

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Abstract:

Genetics plays an important role in disease prevention. This article discusses the recent advances in molecular biology techniques, the evolution of the field of public health genomics and the possible application of genomics and public health to prevent disease. Molecular biology techniques have grown in leaps and bounds in the recent past and have offered newer diagnostic modalities to study disease causation. These techniques have been instrumental for early diagnosis and prevention of genetic diseases. Complementing the rapid development in the technological arena, the completion of the human genome sequencing has yielded immense possibilities to study the disease causing pathways especially in complex diseases. Application of epidemiological principles in Genome-Wide Association studies (GWAS) of complex diseases has revealed novel disease causing genes promising a newer paradigm in diagnosis and treatment of these diseases. In a developing country context where genetic disorders like Thalassemia, various dysmorphisms and birth defects are common, it becomes vital for public health physicians to become aware of concepts of genetics and its application in the primary care level. This awareness would further translate to newer policies and programs targeting the control of genetic diseases.

Key words: Genetics, Molecular biology

Introduction

Molecular biology techniques are developing at an accelerating pace yielding a far richer understanding of genomics. While genetics relates to the study of single gene and functions, genomics explores the interaction of the multiple genes with each other and with the environment. Human genome sequencing and rapidly emerging novel and powerful molecular technologies aid in better understanding of both genetics and genomics of various disease states, thus facilitating their application to assessment of disease states in the community and risk prediction, formulation of public policies and assuring the community of cost-effective genetic services and counseling giving birth to the new discipline of public health genomics.

The Bellagio workshop report attempts to define Public Health Genomics *as a responsible and effective translation of genome-based knowledge for the benefit of population health*.[1] This article gives an overview of history of public health genomics, its applications including a discussion of low-cost strategies suitable for developing countries.

History of Public Health Genomics

The roots of public health traces back to antiquity. The theory of miasma (Greek: Pollution: Bad Air) was put forward during the ancient times and the

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theory was eventually displaced in the 19th century by the discovery of germs and the germ theory of disease.[2]

As early as the Roman times, it was well understood that proper diversion of human waste was a necessary tenet of public health in urban areas. The Chinese developed the practice of variolation following a smallpox epidemic around 1000 BC. Subsequently Edward Jenner introduced the small pox vaccination in the 1820's.[2]

The earliest evidences for genetic basis of any disease was discovered in the Babylonian Clay tablets which describe the patterns of birth defects.[3] Many milestones have been achieved in the history of genetics subsequently. The concept of family history as a risk predictor was put forward by a physician named Joseph Adams when he noted that certain diseases occur more frequently among children of parents who were consanguineous, in his book "A Treatise on the Supposed Hereditary Properties of Diseases". The early seeds of genetic epidemiology were sown by Francis Galton when he first compared Intelligence, Height and other quantitative traits in related individuals and statistically analyzed them.[3]

Subsequently the discovery of DNA by Alfred Day Hershey and Martha and the description of the DNA double helix by Watson and Crick were significant landmarks in the history of genetics. McKusick identified 1959 as the birth year of clinical genetics with major milestones in molecular and cytogenetics.[4] In the same year a WHO expert group planned the first International study on the epidemiology of birth defects.[5] The major breakthrough came in the year 1990 when the US department of Energy and the National Institutes of Health initiated the Human genome Project. In the year 2001, the working copy of the Human Genome was officially published offering novel insights into many disease mechanisms.[6] Many disease causing genes such as Duchene's Muscular Dystrophy, Cystic Fibrosis and Huntington's chorea were identified since then. This triggered early diagnosis of these conditions and promoted further research on discovering treatment modalities. Simultaneously efforts were directed towards identifying common genetic variants among the population. The SNP Consortium developed the SNP database to identify the most common single nucleotide variations in the genome. Each SNP in this database is allocated a unique reference number.[7] The Human HapMap consortium was then established to quantify the association between SNPs in the genomes of human population.[8] These novel developments provided a basic framework to develop microarrays capable of typing around 500 000 SNPs across the genome. These arrays or "SNP chips" provide a cost effective way to genotype thousands of people and study complex multifactorial diseases through genome wide association studies.

The important breakthrough came in with the introduction of Genome Wide Association Studies (GWAS) .The first publication on GWAS was in the year 2005 which studied the age related macular degeneration and found two SNPs which had significantly altered allele frequency when comparing with healthy controls.[9] Many of these findings implicate previously unsuspected candidate genes and new patho physiological hypotheses especially for complex diseases such as diabetes mellitus, coronary artery diseases and cancers.. The method is feasible because millions of human DNA sequence variations have been catalogued and new technologies have been developed that can analyze more than one million variants rapidly and accurately.

Role of genomics in Public Health

The overarching goal of the Public Health Genomics is the identification of genetic and environmental factors which cause common diseases, and their application in preventing these diseases. With the recent and rapid advances in molecular techniques, there is a huge potential for genomic research for deciphering the disease mechanisms which has the scope of translating to effective and useful clinical and public health interventions.[10]

In the year 1981, the relationship between public health and genomics was analyzed when the World Health Organization (WHO) recognized that the epidemiological transition was driving the initiation of genetics services in lower-resource nations. The WHO idealized that genetics services could be

delivered through primary health care systems in developing countries.[11]

Single gene disorders such as Thalassemia and Sickle Cell anemia have always been a public health problem in developing countries. In developing countries, genetic diseases rank third cause for neonatal mortality.[12] Recent evidence also points out to the fact that although the burden of poverty related conditions and infections remain substantial in the developing world, there is a major increase in complex diseases such as cancer, cardiovascular diseases and Diabetes Mellitus which has been repeatedly proven to have genetic origins. However, the advanced methodologies such as Genome Wide Association Studies using gene chip arrays, Exome sequencing and other recent technologies are beyond the reach of developing countries. Against this backdrop, questions arise about how to prioritize the genetics diagnosis and testing services and incorporate them within the existing health care system.

The important task ahead for public health professionals in developing countries is to identify the common single gene disorders which could be diagnosed at a primary care level, analyze and prioritize resource allocation for implementing cost effective genetic testing and diagnosing strategies for preventing these diseases. Considering this potential role of the public health professionals, the World Health Organization has recently established a Genomics in Public Health initiative and has published the draft report on the importance of genomics in public health in developing countries.

Prevention strategies that are conventionally followed Vis Primary, Secondary and Tertiary Prevention can be applied to genetic diseases as well.[11]

1. Primary Prevention:

a) Carrier Screening: Many autosomal recessive conditions such as cystic fibrosis can be successfully prevented by carrier screening. The diseases for which carrier screening should be done depend on the disease prevalence in the community. This will assist the couples in planning their reproduction and avoid the birth of a diseased child. In many countries like Iran, carrier screening has become legal especially for Thalassemia. The couples then have the option of not marrying, abstaining from pregnancy or aborting the fetus as prescribed by the medico legal situation of the country.

b) Genetic Counseling for other genetic disorders which shows a region specific prevalence. A couple who already have a family history of a genetic disorder can be counseled about the subsequent pregnancies.

c) Risk assessment through family history: This is particularly useful in complex diseases of multifactorial etiology. Examples include type II diabetes mellitus, cardiovascular diseases and Cancer. Targeted preventive strategies for those who have positive family history is an effective method in primary prevention. The development of country and region specific family history tool can be an indirect cost effective method for disease prevention. The Family history initiative by the Center for Disease Control is a standing example for this strategy.[11]

d. Pharmacogenomics: SNP detections can play a significant role in preventing Adverse Drug reactions (ADR's) thereby preventing morbidity and mortality caused by ADRs. In addition, Pharmacogenomics helps to tailor drug dosages and individualize therapies.

2. Secondary prevention: (early diagnosis and treatment)

a) Newborn screening: This is the prime example of secondary prevention of diseases such as G6PD deficiency, Sickle cell trait etc.,

b) Genetic testing for risk prediction: For conditions in which there are proven and cost-effective preventive or therapeutic interventions on those who test positive. Example : BRAC1 and BRCA2 mutation screening and preventive strategies for those who test positive

3. Tertiary prevention (surgical repair and rehabilitation)

Surgical treatment where possible and Rehabilitation services in diseases such as neuromuscular disorders e.g. Duchene's muscular dystrophy, Spinal Muscular atrophy

Conclusions

As genomic research continues to expand, individuals involved in various aspects of public health will need to become increasingly aware of genomics as a public health tool. Not only the health care providers and public health professionals but also the public will need to be "genetically literate" if genomics is to be used as a tool for disease prevention.

Finally, the possible next steps that could be considered from a developing country perspective would be:

- Integrating genetic services into the primary health care system.
- All primary care physicians should be educated with basics of molecular genetics and how diseases are inherited. It is also vital for those who are involved in public health to understand the concepts of genetic epidemiology.
- Registries of congenital disorders and genetic diseases: To determine the baseline birth prevalence of the genetic condition, to increase awareness within the health work force of these conditions, and to improve the quality of diagnosis and recording.
- National screening programmes which includes newborn screening, prenatal screening, and carrier screening
- Establishing more genetic services and centers
- Improving care and rehabilitation for those affected with genetic disorders
- Forming support groups and guiding the families as new treatment modalities emerge.

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SHORT ARTICLE-II

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Kangaroo Mother Care – An Appropriate Technology to Reduce Neonatal Mortality Rate in Developing Countries

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Abstract:

The current neonatal mortality rate of India is 44 per 1000 live births. Thirty percent of all neonates are Low Birth Weight (LBW). LBW is highest in India. If we look at the causes of mortality in neonates, seventy five percent are related directly or indirectly to LBW. It is important that LBW babies are provided with scientifically sound, best, low cost, humane and comprehensive method of care.KMC meets the needs of warmth, nutrition and protection from infection with multimodal stimulation and humanizing high technology to achieve improvement in survival, morbidity and appropriate growth and development of LBW infants who are thermodynamically stable and are weighing between1800 gms to 2000 gms.

Key words: Kangaroo Mother Care, LBW, Neonatal mortality

Introduction

The current neonatal mortality rate of India is 44 per 1000 live births, accounting for almost 2/3 of Infant mortality rate and half of < 5 years mortality rate.[1] Thirty percent of all neonates are Low Birth Weight (LBW). LBW is highest in India. If we look at the causes of mortality in neonates, seventy five percent are related directly or indirectly to LBW. It is important that LBW babies are provided with scientifically sound, best, low cost, humane and comprehensive method of care. In the recommendation in Asia and North East Region conference for Millennium Goal in September 2007;the only best practice to scale up child survival, identified and suggested was Thermal Care including Kangaroo mother care in newborn at facility and community level by all countries[2] .

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KMC meets the needs of warmth, nutrition and protection from infection with multimodal stimulation and humanizing high technology to achieve improvement in survival, morbidity and appropriate growth and development of LBW infants who are hemodynamiclly stable and are weighing between1800 gms to 2000 gms.[3]

A study conducted in Ethiopia had found the survival of preterm LBW infant was remarkably better for early KMC group than the babies in conventional method of care[4].Many studies revealed that compared with conventional care, KMC was found to reduce severe illness, infection, breastfeeding problems, maternal dissatisfaction and hospital stay with this method of care and improve some outcomes of mother baby bonding[5,6,7,8].

Kangaroo Mother Care (KMC):

Kangaroo Mother Care (KMC) has been variously defined, but two essential components are skin-to-skin contact (SSC), and breastfeeding (BF). From the biological perspective, in the immediate newborn period of Homo sapiens, skin-to-skin contact represents the correct "habitat", and breastfeeding represents the "niche" designed for that habitat. In

the uterine habitat, oxygenation is provided through the placenta and the cord, as well as warmth, nutrition and protection. These are the four basic biological needs. Parturition (birth) represents a "habitat transition". In the new habitat, the basic needs remain the same. Research over the last ten years provides strong support for the contention that newborn itself in the skin-to-skin habitat, not the mother or the health services, provides these basic needs. Oxygenation has been shown to be improved on SSC, to the extent that KMC is used successfully to treat respiratory distress. The breathing becomes regular and stable, and is coordinated with heart rate. When removed from incubator and placed SSC, oxygen saturation may rise slightly, or the percentage of oxygen provided to maintain good saturation can be lowered. Heart Rate is increased when placed SSC. Though we can regard this increase as being with the clinically normal range, what is seen is actually a return to the physiologically normal heart rate, the lower rate being due to "protest despair behavior". Infants removed from incubators and placed SSC show a rise in temperature and a dramatic drop in glucocorticoids, as predicted by the "protest-despair response". Mothers are able to control the infants temperature within a very narrow range, far better than an incubator. To accomplish this, her core temperature can rise to two degrees Centigrade if baby is cold, and fall one degree if baby is hot. Skin-to-skin contact is better than incubator for re-warming hypothermic infants. Self-attachment refers to the phenomenon that full term un-drugged infants, left on their mother's chest and undisturbed, will all breastfeed spontaneously within one hour, with no help at all. But this behavior is dependent on SSC. Mother and infant should NOT be separated. The stimulations the newborn gives the mother during SSC elicit care giving and protective behavior from the mother. The baby's legs kicking on the mother's abdomen cause the mother's uterus to contract strongly, preventing post-partum bleeding. Nutrition is improved, both with respect to the mother's ability to breastfeed, and with respect to the newborn's utilization of the feed. The volume of mother's milk is greatly increased, and the frequency of feeds

Kangaroo Mother Care [2]

provided likewise. Even without the increased milk, with the vagal stimulation the infant receives, the gut is better able to use the milk provided, and grows faster. Immunity is improved, demonstrable even 6 months later. Prematures seem to have poor immune systems, and are susceptible to allergies, infections and feeding problems in the first year of life. Early SSC dramatically reduces these problems. Infections are reduced when SSC and exclusive breastfeeding are firmly introduced. Necrotizing enterocolitis (a potentially lethal and very costly disease to treat) has been dramatically reduced in many units following a KMC programme. In no published paper is a single adverse outcome reported for KMC. Positive effects on the mother are better bonding, healing of emotional problems associated with premature birth, among others. Breastfeeding is a behavior based on hindbrain functions that regulate hormones, autonomic functions and the somatic system. Key to understanding breastfeeding behaviors in the

transitional and newborn periods is "state organization". State Organization refers to the ability to control the level of arousal, or of being awake. A scale of state organization can be described varying from deep sleep to hard crying, each being associated with particular behaviors and conditions. For breastfeeding an infant should be in an awake state, and should thereafter be in quiet sleep for optimal development. KMC has profoundly beneficial effects on the state organization of newborns. "Suckling" is the "chewing movement" an infant makes on the nipple. Quite apart from suckling as a means to ingest food, this behavior has essential effects. Suckling stimulates the back of the palate, and results in intense vagal stimulation, which is vital for the general wellbeing of the baby. Suckling releases hormones similar to morphine in the brain, and gives powerful pain relief to infants. While it was observed that ability to suck on a bottle only started at 34 weeks post-conceptional age, recent research has shown that suckling from the breast is possible at 28 weeks. Suckling is a myographically distinct behavior from sucking, and research on sucking on bottles of premature infants shows it clearly to be stressful. Premature infants are unable to coordinate their breathing and their swallowing.

The primary violation, the worst case scenario, to any newborn is separation from its habitat/mother. This applies to Homo sapiens as fully as to other mammals studied. “Protest-despair” behavior is a stress reaction, and the hormones related to this have been extensively studied. At high levels, these hormones are intrinsically neurotoxin to the brain, particularly areas of the hindbrain, and any area which may be already a little hypoxic. SSC has been shown to markedly reduce this levels.[9]

Majority of the babies in our country are home delivered and care of LBW can be done by KMC, which will reduce the load of already overloaded pediatrics wards and nurseries. Thus KMC is an appropriate technology which is applicable everywhere, cost effective and results in healthier and more intelligent babies and adds to the nation’s wealth. Knowledge of KMC should be included in the syllabus of medical and nursing courses and in internship training programme.

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ORIGINAL RESEARCH ARTICLE

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Expenditure patterns of micro-savings among members of community based women's organizations in a rural area in Karnataka.

Shailendra Kumar B Hegde[1], Ramakrishna Goud B[2], Twinkle Agrawal[3], Abhita Braganza[4], Abhay Sood[5], Dias Brendan[6]

Date of Submission: 24.05.2012 Date of Acceptance: 10.06.2012

Abstract:

Introduction: Micro-financing schemes are acknowledged strategies for poverty alleviation, human development and empowerment of women. Community based women's organizations (CBWOs) comprising of 20 or less women with shared interests, involved in micro-financing make regular savings and use the pooled savings to give interest-bearing loans to their members. However, the impact of CBWOs on health care needs better understanding. ***Objective:*** To study the expenditure pattern of micro-savings among members of CBWOs in a rural area of Bangalore district. ***Study design:*** Descriptive study. ***Study area:*** Mugalur sub-centre area, Anekal taluk, Bangalore. *Study population:* Members of registered CBWOs in the sub-centre, involved in micro-savings for the past year, were interviewed using specifically designed schedules.***Results:*** Four CBWOs with 64 members were studied. Of these, 54 members (Mean age = 37.87 yrs ± 6.04) had availed loans. Of the 54 members, 70.3% did not have any personal income. A total of 126 loans were disbursed, amounting to 3, 71,000 rupees. Of this, maximum number of loans were availed to cover medical expenses (45, 35.7%) followed by expenses for construction or renovation of houses (42, 33.3%). An amount of Rs.1, 29,300/- (34.9%) was spent on housing and Rs. 90,600/- (24.4%) on medical expenses. Of the money taken for medical purposes, almost 60% was for buying medicines. ***Conclusions:*** CBWOs facilitate monetary requirements to cover health needs of its members indicating that they are viable options for financing health care especially in resources poor settings in India. Hence, they must be nurtured to augment health care financing in India.

Key words: Microfinance; Community based women's organization; Health care financing

Introduction:

Poverty has a powerful negative impact on all aspects of human development including health[1]. Over the years, microfinance, a people centric measure, has become an acknowledged strategy for poverty alleviation and empowerment of women[2]. Microfinance is a financial service of small transaction value provided by financial institutions to the poor to meet their financial needs[3]. Loans are given to small groups of people without collateral security on the basis of duration of their activity, records and the amount of savings that they already have[4]. The recovery of this kind of loans is relatively easy because of self regulation by the members[5].

Community based organizations (CBOs) usually comprise of 20 or less people from a homogenous class with shared interests who are willing to come together to address their common problems[4]. The purpose of the group ranges from savings and microfinance to advocacy (alcohol sale and domestic

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violence)[5]. Among community based organizations, community based women's organizations (CBWOs) are found commonly in rural India. Community based women's organizations involved in micro-financing usually make regular savings and use the pooled savings to give interest-bearing loans to their members[4]. In some cases, financially sound organizations may give loans even to non-members[6]. This kind of organizational structure helps them in prioritization of their needs and setting self determined terms of profit oriented repayments[1]. Hence, CBWOs with Micro-financing initiatives serve as effective means for alleviation of poverty, human development and social empowerment. However, the impact of CBWOs on health care needs better understanding. In order to study the impact of these CBWOs on health, there is a need to know the expenditure pattern of the micro-savings among the members. Hence, this study was undertaken with an objective to study the expenditure pattern of the micro-savings among the members of CBWOs in a rural area of Bangalore district. This study will help in assessing the contribution of CBWOs in utilizing health care services.

Materials and Methods

A descriptive study was undertaken in May 2009 in the seven villages coming under Mugalur sub-centre of Sarjapura primary health centre area, Anekal taluk, Bangalore District. In each village, all registered CBWOs involved in micro-savings for at least the past one year were enumerated and included in the study. Interview schedules were developed to collect data relevant to the CBWO and from individual members who had availed loans from the organization. Consent was taken prior to administering the interview schedule.

Results

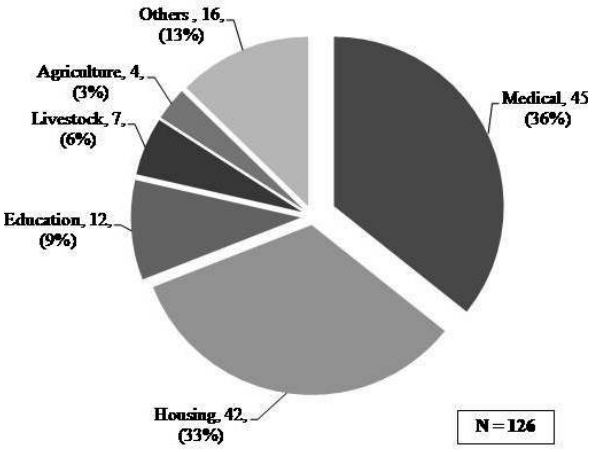
There were a total of four CBWOs in these seven villages which were actively functioning for more than one year. Hence, these four CBWOs were included in the study. Members of each CBWO met once every week and every individual contributed an amount in the range of Rs 10 to Rs 50 per week depending upon her financial capacity.

Of the 64 members in the four CBWOs, 54 had availed loans and thus were interviewed for the purpose of this study. The age of members ranged between 21 and 65 years (Mean = 37.87 yrs ±6.04). More than one third (37%) of the study population belonged to the 31 – 40 yrs of age group followed by those in the age group of 21 – 30 years (29.6%). 70.3% of the members who availed loans did not have any personal income.

According to the standard of living index (Parasuraman et al) 66.7% of the members who had availed loans, belonged to middle class families while 33.3% belonged to high class families. None of the members who availed loans belonged to low socio-economic class.

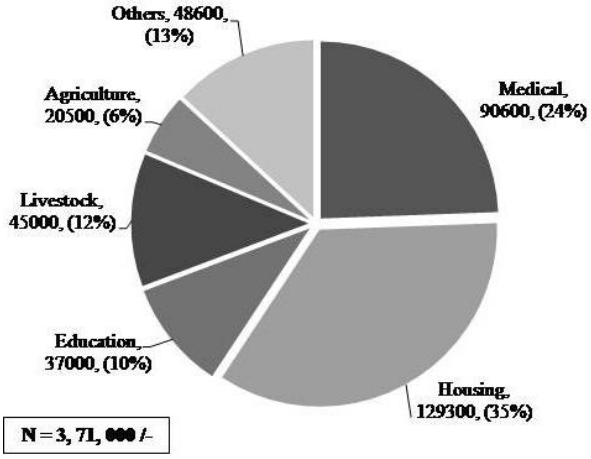
Among these 54 members, a total of 126 loans have been disbursed [Figure 1]. Of these, maximum number of loans were availed to cover medical expenses (45, 35.7%) followed by those to cover the expenses for construction or renovation of houses (42, 33.3%).

Figure 1: Disbursement of loans to the members of CBWO



A total of 3,71,000/- rupees had been disbursed through these loans. Even though more number of loans was availed to cover medical expenses, in terms of money spent, housing expenses exceed medical expenses. In all, an amount of 1, 29,300/- rupees (34.9%) was used for housing purposes while 90,600/- rupees (24.4%) was spent on medical expenses [Figure 2].

Figure 2: Amount of money disbursed through loans (in rupees)



The money taken for medical purposes overall was utilized to pay consultation charges, in-patient charges, drugs, transportation, food and accommodation. However, almost 60% of the money was spent on buying medicines for patients.

Discussion

There are a total of seven villages in Mugalur sub-centre with only four active CBWOs and 54 members. This indicates that number of CBWOs is very less. Also, a very small number of women are participating in these organizations. This indicates that participation of women in collective efforts like these for their development and empowerment is very low. This also indicates that women may not have adequate support from their family members (mostly husbands) to be a part of these groups.

More than two-thirds (70.3%) of the participants did not have any personal income indicating their financial dependence on others in the family and it is also possibly the reason to avail loans. Gopalan S.S et al in their study done in Kerala showed that almost half of the women did not have any personal income[2].

Two-thirds (66.7%) of the members belonged to middle class families and none of the members belonged to low socio-economic class. People belonging to the low socioeconomic status are not members probably because they lack the capacity to make weekly contributions and repay the loans taken. This is a serious concern because microfinance schemes are in place to alleviate poverty. If poor people are not able to take part in these schemes, then the purpose of these schemes will not be achieved.

Of the 126 loans disbursed, maximum number of loans were availed to cover medical expenses (45, 35.7%) followed by those to cover the expenses for construction or renovation of houses (42, 33.3%). Gopalan S.S et al in their study showed that only 10% of the loans were for medical purposes. But in the present study this proportion is more than three times the number. Also, this study was conducted in rural areas close to Bangalore city where people have better accessibility to private health care systems thus increasing the cost of health care. Also, the other study was conducted in Kerala where the public health care system is known to be better and the literacy levels are better when compared to rural Karnataka. Hence, the difference could be attributed to the above mentioned factors. Almost 60% of the money taken for medical purposes was spent on medications indicating the need for distributing inexpensive drugs or providing some subsidy for medications.

Conclusions

The following conclusions can be drawn from this study.

Firstly, loans availed from micro-savings were spent on Medical purposes (35.7%), housing purposes (33.3%), education (9%), livestock (6%) and agriculture (3%). But in terms of actual amount of money spent 35% of the money availed through loans was spent on housing, while 24% was spent on Medical purposes followed by livestock (12%), education (10%) and agriculture (6%)

Secondly, in our study area, the total number of CBWOs and the number of members in these CBWOs was very less.

Thirdly, people from low socioeconomic status were not members of CBWOs and hence these Micro-financing schemes were not really helping the most 'needy' This aspect must be further studied.

Fourthly, these CBWOs were definitely facilitating monetary requirements to cover health needs of its members indicating that these CBWOs will be viable options for financing health care especially in resources poor settings in India.

These microfinance schemes must be nurtured to augment health care financing. More people must be encouraged to participate in these schemes. One method to encourage could be that Government can announce special schemes and benefits to people who are members of these organizations. These community based organizations involved in microfinance should be further strengthened to expand their scope not only as an alternate to finance health care but empowerment of women and overall community development.

Acknowledgement

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Conflict of Interest

None Declared

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ORIGINAL RESEARCH ARTICLE

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A Study on Quality of Life of Elderly Population in Mettupalayam, A Rural Area of Tamilnadu

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Date of Submission: 25.06.12 Date of Acceptance: 07.07.2012

Abstract:

Introduction: There are few studies in India dedicated to the wellbeing of elderly and their health problems, in particular to their mental health and their quality of life.

Aim: The aim of this study is to assess the quality of life among the elderly population residing in the rural area of Tamilnadu and also to find out the factors influencing their quality of life**.**

Material and Methods: All elderly people aged 60years and above residing in Mettupalayam, a rural area in Tamilnadu was involved in the study. With a non response rate of 6.2%, total of 476 elderly person's quality of life was studied using WHOQOL BREF questionnaire. The results were expressed in terms of mean and SE of mean. Student T tests and one way ANOVA were applied to compare the mean scores of different variables under the four domains**.**

Results: The mean QOL score for all the elderly persons put together was 47.59 ± 14.56, indicating that on an average, the population as a whole had moderate quality of life. The highest score was for the social relationship domain with mean 56.6 and standard deviation of 19.56 and the lowest was for physical domain with mean score of 45 and standard deviation 11.84.

Key Words: quality of life, elderly, well being, ageing

Introduction

Ageing is a normal, inevitable, biological and universal phenomenon. It is the outcome of certain structural and functional changes taking place in different parts of the body as the life years increases. United Nations though has not adopted a standard criterion to define the aged; generally use 60+ years to refer to the elder population[1]. It is the time the combined effects of ageing, social changes and diseases are likely to cause a break down in health and their wellbeing[2].

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There has been an increase in the number of old aged people in all the countries in both absolute and proportional terms. Share of the elderly population of the world was 13% around 2000 and in India as per 2001 census the population of elderly was 76.6 million[1] as compared to 20 million in 1951. Thus the elderly account for 7.5% of the total population, in which elderly male are 7.1% and elderly female are 7.8%[4]. This increasing number of elderly has a great demand on the health services and social security measures. At present the ageing has become a social problem as the socioeconomic shifts are affecting the family to continue with the care of their aged. Traditionally our Indian families had always borne the responsibility of looking after the aged, but the changing times and industrialization have threatened this yesteryear culture. As a result family care of the

elderly becomes more and more difficult leaving the aged feeling lonely, dependent and marginalized.

Objectives

1) To assess the Quality of Life of elderly aged 60 years and above in Mettupalayam, a rural area of Tamilnadu.
2) To study the various factors associated with their Quality Of Life.

Materials and Methods

The study is a descriptive cross sectional study, done from April 2010 to October 2010 in a rural area, Mettupalayam. It is a health sub center (HSC) under Minjur block primary health center (PHC) in Thiruvallur district of Tamilnadu. It includes 5 villages namely Mettupalayam, Vannipakam, Mudichampedu, Siruvakam, Elavambedu. The total population of the HSC is 6041 as per the sub center records.

The study population comprised of elderly aged 60 years and above. A complete enumeration of the total elderly population in the study area was done. As per the family register maintained by Mettupalaym health sub center (HSC), the total elderly population in Mettupalayam was 509 and all were included in the study. Out of this 509 elderly 8 persons were not willing to participate in the study, 13could not be contacted though repeated visits were made, 3were not able to respond due to their illness and 9 could not be interviewed for QOL assessment since they had hearing disability hence they were excluded. Therefore with 6.2% as non response rate, 476 elderly individuals were included in the study. A standardized questionnaire was used to obtain the information from the study population. The final questionnaire consisted of 2 parts, in part1 information regarding **socio demographic profile** and self reported co-morbid conditions were recorded. This was obtained from the personal health record maintained by the individual who were diagnosed and receiving treatment from the health facility.

In part 2 of the questionnaire, **Quality of life** was assessed using **WHO Quality of Life BREF** (WHOQOL BREF) questionnaire. The WHOQOL-BREF is an abbreviated version of the original WHOQOL- 100. The WHOQOL is the only quality of life instrument that has been developed for wide range of cultures in 15 international field centers simultaneously including the Madras center presently Chennai, Tamilnadu, India. In this study the Tamil version of the WHOQOL-BREF questionnaire was used with due permission from the division of Mental Health, WHO.

Data analysis: The information thus collected by the questionnaire, was converted into a spread sheet using Microsoft Excel® Software and analyzed with the help of SPSS version 7.5.

The results were expressed in terms of mean and SE of mean. Students T test and one way ANOVA were applied to compare the mean scores of different variables under the four domains. A p value of <0.05 is considered significant.

Results

Among the 476 elderly individuals studied 194(40.8%) were males and 282(59.2%) were females. The mean age of the study population was 68.32 ± 7.35. The proportion of young old (60-69yrs) were more (57.8%), than the old –old (70-79yrs) and the oldest –old (80 & above) being 33.4% and 8.8% respectively. Also it was seen that majority of the elders in the study area were illiterate (66%) and illiteracy was more among females (75.5%) than in males (51%). 199(41.8%) individuals of the study population were widowed, among them 42(21.6%) of the males and 157(55.6%) of the females were widowed. The living arrangements of this population shows majority of the female elderly (37%) lived with their children and among the male elderly majority stayed with their spouse and children (47.4%). It is interesting to note that more number of female elderly (16.3%) stayed alone when compared to the male elders (15.4%). 41% of the respondents were belonging to lower class (class V of B.G. Prasad scale) family. It was observed that 18% of the individuals did not have any source of income and only 19% of the elderly were receiving old age pension. And it was seen that 40% were economically dependent on their family members. It was seen from the table 1 that 59% of the individuals were suffering from arthritis. And more than one third of the elderly were diabetics.

It was observed that nearly 50% were falling under the second quartile score of Quality of Life (Table 2). And very few (3.8%) individuals were having a very good QOL as classified by their quartile scores.

Table: 1 Distribution of co morbid conditions

Co-Morbid Conditions	Numbers (n)	Percentage (%)
Hypertension	110	23.1
Diabetes Mellitus	183	38.4
Arthritis	281	59.0
Heart disease	53	11.1
Gastro intestinal disease	45	9.5
Respiratory disease	47	9.9
Dermatological disease	13	2.7
Injuries	6	1.3
Malignancies	3	0.6
Genito urinary disease	1	0.2
Anemia	6	1.3
Others	15	3.2

Table: 2 Quartile Distribution of Quality Of Life

Total QOL score	Number (n)	Percentage (%)	QOL
0-25 (i quartile)	20	4.2	Poor
26-50 (ii quartile)	236	49.6	Moderate
51-75 (iii quartile)	202	42.4	Good
76-100(iv quartile)	18	3.8	Very good

The mean QOL score for all the elderly persons put together was 47.59 ± 14.56, which was in the second quartile indicating that in general, on an average, the population as a whole had moderate quality of life.

In this population the highest score was for the social relationship domain with mean 56.6 and standard deviation of 19.56 and the lowest was for physical domain with mean score of 45 and standard deviation 11.84(Table 3).

The mean Perceived Overall Quality of Life scores in the study population were 49.1 with a standard deviation of 21.56. The mean Perceived Overall Health Status scores in the study population were 39.8 with 21.56 as standard deviation.

Table: 3 Domain-wise mean QOL scores

Quality of life domains	N	Mean	S.D
Physical domain	476	45.0	11.84
Psychological domain	476	45.5	16.08
Social relationship domain	476	56.6	19.56
Environmental domain	476	49.7	16.78

The young old (60-69yrs) have better QOL scores when compared to the old-old (70-79yrs) and the oldest-old (80 and above). The elderly male had better QOL scores than the elderly female. The least score for male elderly was obtained in the physical domain 48.8 and for the elderly female it is the psychological domain 41.64. Literate elderly had better mean QOL domain scores than the illiterates. Married elderly had better mean QOL score in the domains except psychological domain. It was interesting to find that the unmarried had better psychological domain score 56.25 than the married 51.429. Married elderly had better mean QOL score in the all the domains except psychological domain. It is interesting to find that the unmarried had better psychological domain score 56.25 than the married 51.429. Also it was seen that the elderly who lived alone had the least psychological quality of life scores than the others including those who lived with other relatives. Economically independent elderly had better QOL when compared to the dependent elderly. The mean QOL domain scores were high for Socio economic Class I (monthly per capita Rs.2696 & above) elderly than the others. Elderly in class V socioeconomic status have the least mean QOL scores in all the domains. Co morbid illness has great influence on the QOL of the elderly as individuals without any co morbidity had better scores in all the four domains - physical(49.2347), psychological(62.5000), social(63.6905), environmental(60.0446).

Discussion

In this study the proportion of young old (60-69), old-old (70-79), oldest- old (80 and above) were 4.5%, 2.6% and 0.6% of the study population which is in accordance with the national figures 4.7%, 2.5%, 0.8%[3] and but less than that of Tamilnadu - 5.48%, 2.45%, 0.88% [4,5] respectively.

The female elderly (59.2%) in this population outnumber the male (40.8%) similar to the findings of the study conducted by Anil Jacob Purty, et al. wherein females formed 58.8% and males 42.2% of the study subjects[6].

The highest mean QOL score was seen in the social relationship domain indicating that their social contacts and the support they derive from their personal relations and peer group has great influence on their quality of life. This is similar to the result obtained in the study conducted by Ankur Barua et al. among 70 geriatric individuals in Karnataka using the Kannada version of WHOQOL-BREF wherein the highest QOL score was obtained in the social relationship domain[7].

Factors affecting quality of life (QOL):

The present study shows that the mean QOL scores decrease with increasing age, indicating that the despair of ageing greatly affect their quality of life. This situation also prevails in other countries where similar results are seen in the study conducted in Brazil by Helena A. Figueira where the young old (60-69yrs) have better QOL scores than the old- old (70-79yrs) and the oldest -old (80&above)[8]. Study conducted by Ibrahim T M et al. on elderly in Iraq[9] showed that the QOL of men was in general is better than women in all age groups which were similar to the results of my study.

The relation between marital status and wellbeing of the elderly has been widely studied especially in the western societies. These studies have shown that widowed elderly have poor health and wellbeing than the currently married. The divorced appear to be least healthy followed by widowed and single elders, while the married appear most healthy. Thus they take marital status as one of the key variable in determining their quality of life[10,11]. Similar results were seen in my study where the married elders had better mean QOL scores in physical, psychological, social relationship and environmental domains. The currently married had better quality of life scores than the widowed and single elders, which was statistically significant. Hence living with their spouse in general improved their quality of life and wellbeing.

Various researchers have examined the effects of living arrangement on the quality of life of the elderly. According to them the changes in living arrangement and family structure have great impact on their physical and psychological wellbeing[12]. The present study also gives similar picture wherein the elderly living with their family have better QOL scores than the others. Hence it is clear that family has a great impact on their life satisfaction and so in their quality of life.

Presence of one or more morbidity gives poor mean QOL scores in all the domains of quality of life when compared to elderly without any morbidity. And this result is found to be statistically significant. Similar results are seen in the study conducted at Trivandrum by Vijayakumar et al. they found that poor health in the presence of morbidity and dependence in ADL greatly lowered their quality of life[13]. In the study conducted by Kumar R et al. found that health status was an important factor that had a significant impact on the quality of life of the elderly population[14]. Canbaz S et al. showed that those who were suffering from chronic diseases had a lower Quality of Life than those who were without any chronic disease[15].

Recommendations

Although the process of ageing, disorders and disabilities of old age cannot be totally prevented, suitable measures can be taken that would retard this progress thereby leading to a longer period of health and thus preserving their quality of life. Living arrangement, financial position and well being would undergo change in old age. Therefore in-depth studies through multidisciplinary assessment on issues like socioeconomic problems, morbidity pattern, quality of life and social security needs of the elderly should be done nationwide.

Traditional role of respecting and caring elders should be reinforced at school level and interventions from the primary level. The

experiences and expertise of the elderly should be utilized for the society.

Elderly should be given legal security against abuse and harassment. Policy makers should evaluate successful programmes for the elderly of other countries and adopt them to suit local conditions and economic viability. Separate processing schemes for the elderly should be organized to meet their needs of reduced mobility and safety precautions. Our "Womb to Tomb" social security policy should be strengthened.

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ORIGINAL RESEARCH ARTICLE

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Prevalence of needle-stick injuries, knowledge of universal precautions and post exposure prophylaxis among private medical practitioners of Madurai city, Tamilnadu

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Abstract:

Introduction: Every year needle stick injury cause an estimated 1.3 million early deaths, a loss of 26 million years of life, and an annual burden of US $535 million in direct medical costs. Thus there was a clear need of this study in practitioners in an Indian city. **Aims:** To assess the prevalence of needle stick injuries among private medical practitioners, to assess the knowledge of universal precautions and post exposure prophylaxis among the private medical practitioners. **Settings and Design:** The present cross sectional study was conducted in Madurai city. **Methods and Material:** A total of 950 medical practitioners were registered in IMA. Minimum sample size of 369 was obtained; finally 408 doctors were included in the study by simple random sampling. **Results**: Among the selected 408 doctors 274 (67.1%) were males and 134 (32.9%) were females. Out of 408 private practice doctors 213 (52.2%) were general practitioners and 195 (47.8%) were specialists in different specialties. A total of 346 (84.8%) doctors had needle stick injury in their life time and 64 (15.7%) in the past three months. Only 21(6.0%) doctors took the Post Exposure Prophylaxis (PEP) for HIV and only 97 (23.7%) had undergone training on universal precautions. **Conclusions**: There is a need to include universal precautions, biological waste disposal and PEP as a continued education workshop for medical practitioners. Medical practitioners have to be serious about needle stick injuries, protecting themselves with Hepatitis B vaccination, universal precautions, post-exposure prophylaxis and keeping a record of such incidents at their establishment.

Key-words: Needle Stick injury, post exposure prophylaxis, private medical practitioner, universal precaution, Madurai city.

Introduction

About 16 billion injections are administered each year in the third world countries. Most of the-injections were therapeutic. Immunization accounts for 3% of all injections.[1]Needle stick injuries (NSI) cause infections with blood borne pathogens like Hepatitis B (HBV), Hepatitis C (HCV) and Human Immunodeficiency Virus (HIV) and lead to disease, disability and death.[2] Every year NSI cause an estimated 1.3 million early deaths, a loss of 26 million years of life, and an annual burden of US $535 million in direct medical costs.[3] The World Health Organization defines “a safe injection” as one that does not cause the harm to the recipient, provider, and to the community.[4]

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Subjects and Methods:

A cross sectional study was conducted in the Madurai City for a period of 3 months from April 2011 to June 2011. The objectives were to assess the prevalence of needle stick injuries, to assess the knowledge of universal precautions and post exposure prophylaxis among the private medical practitioners.

List of medical practitioners was obtained from Indian Medical Association (IMA) Madurai chapter, Tamilnadu. A total of 950 medical practitioners, including 548 general practitioners and 402 specialists, were present in the list. Minimum sample size of 369 was obtained using the formula $4pq/l^2$ and the prevalence of Needle Stick Injury (NSI) as 52%[5] and with an allowable error of 10%. Finally 408 doctors were included in the study by simple random sampling. A maximum of 3 visits was done to contact the doctor before excluding them from the study for failure to contact. A structured questionnaire was prepared, pretested and necessary changes were made. All the doctors were contacted personally, objective of the study were explained and complete confidentiality was assured to them.

Results:

Among the selected 408 doctors 274 (67.1%) were males and 134 (32.9%) were females. The mean age of the doctors was 41 years (range 25 to 62 years). Out of 408 private practice doctors 213 (52.2%) were general practitioners (MBBS) and 195 (47.8%) were specialists in different specialties (Table 1). Majority of the private doctors 346 (84.8%) had needle stick injury at least once in their lifetime.

Table 1 Distribution of doctors by specialisation

Specialisation	No. of doctors	Percentage
General practitioner	213	52.2%
Obstetrics & Gynaecology	43	10.5%
Surgery & Allied Specialty	77	18.9%
Physician	32	7.8%
Other Medical Specialty	43	10.5%
Total	408	100%

Out of 408 doctors 161 (39.4%) doctors had not given injections in the past one year. Out of these 161 doctors132 (81.9%) were specialists and 29 (18.1%) were general practitioners.

In the past three months 64 (15.7%) doctors had NSI. In these 64, 56 (87.5%) were general practitioner and 8 (12.5%) were specialists ($p<.0001$).

Details of the NSI based on duration, time and sex distribution is shown in Table 2.

Table 2 Distribution of NSI according to sex

Period of injury	Sex		Total
	Males	Females	
In 3 months	42 (65.6%)	22 (34.4%)	64 (100%)
3 months – 1 year	70 (67.3%)	34 (32.7%)	104 (100%)
>1 year	118 (65.5%)	70 (34.5%)	188 (100%)
Total	227 (65.6%)	119 (34.4%)	346 (100%)

Difference in NSI among male and female practitioners was not significant ($p>0.4$).

Three hundred seventy seven (92.4%) practitioners had injury either with needle stick or sharp objects in their lifetime (Table 3).

Out of 377 doctors who had injury, 234 (62.0%) had NSI while doing routine medical care, where as 122 (32.3%) had injury while doing emergency procedures and 21 (5.5%) had injury while doing inexperienced procedures. Reported cause for occurrence of NSI has provided in details in table 5.

The knowledge on mode of transmission of HBV, HCV, and HIV, all most all the doctors have good knowledge on routes of transmission of these diseases and risk associated to exposure of body fluids. Most of the doctors 321 (78.6%) were not worn gloves 43 (10.5%) were occasionally wearing the gloves and 44 (10.9%) were wearing regularly while doing injections either IM or IV. Only 97 (23.7%) doctors had given correct response of recapping was not required. Modes of disposing sharps, 108 (55.3%) of Specialists and 94 (44.1%) GPs were using blue or white colour containers and the remaining were using paper boxes or dustbins to

Table 3. Details of NSI with different source and specialty

Source	Speciality					Total
	MBBS	O & G	Surg-eon	Physi-cian	Others	
IM injection	54	2	12	14	9	91 (27.3%)
IV injection	38	11	18	21	12	100 (28.9%)
Suturing	102	14	21	7	11	155 (44.8%)
Total needle stick injuries	194	27	51	42	32	346 (100%)
Other injuries while providing service						
Scalpel and blade injuries while performing surgeries	3	2	4	0	2	11(35.5 %)
Others (Glass etc..)	5	8	6	0	1	20 (64.5%)
Total	8	10	10	0	3	31 (100%)

dispose all type of waste. Only 97 (23.7%) had undergone training on universal precautions, among this only 22 (22.6%) were GPs and 75 (77.4%) were specialists.

Table 4- Post Exposure Prophylaxis (PEP)

Criteria	GPs	Specialists	Total
Some Knowledge	142	182	324 (79.4%)
Correct Knowledge	82	128	210 (51.4%)
Initiate PEP in one hour	64	104	168 (80.0%)
Initiate PEP in one day	15	20	35 (16.6%)
Initiate PEP in a week	3	4	7 (3.3%)
Lamividine with Zidovidine for 4 weeks	39	109	148 (70.4%)
Zidovidine alone for 4 weeks	15	36	51 (24.2%)
Lamividine alone	3	4	7 (3.3%)
Not sure of any drugs	3	1	4 (1.9%)

The presence of blood at the tip of needle was noticed only in 53 occasions, 38 out of 152 specialists and 15 out of 194 general practitioners (GPs). In 329 (95.1%) cases the injury was superficial and in 17 (4.9%) cases it was deep. Nearly half of them, 164 (47.6%) took action after the injury, antiseptic was applied after washing with soap and water; another 109 (31.5%) squeezed the blood before washing and applying antiseptic, and remaining 73 (21.1%) washed with soap and water only. Only 21(6.0%) doctors took the Post Exposure Prophylaxis (PEP) for HIV. None of the practitioners were keeping any written record of the NSI or other types of injury and PEP in their establishment. Nearly half of the doctors 202 (49.5%) were Immunized against hepatitis B. All most all the practitioners used disposable syringes for all types of injections.

Table 5. Reported cause for occurrence of NSI

Type of injury	Persons	Percent
Uncapping	79	22.8%
Giving Injection	40	11.6%
Resheathing or Recapping	116	33.5%
Using needle cutter	46	13.3%
While taking from staff nurse after loading.	29	8.4%
Others**	36	10.4%
Total	346	100%

**NSI due to patient error (eg.While giving injection to children)

Discussion:

The prevalence rate of needle stick injures of this study, life time was 92.4% and in the past 3 months it was 15.7%. was similar with 17.8% in Fullerton M et al,[6] 31% in North West Ethiopia,[7] 41.8% in Nigerian[8] and 94% in Shirin Mirza et al[9] in the life time was due to low level of awareness and poor compliance with the universal safety measure.

Regarding the occurrence of NSI, it is found that more number of injures, 41.1%by suturing, 50.6% injection needle, 2.9% by Scalpel and blade and 5.3% by others. Similar study conducted in Awassa City, Southern Ethiopia found the similar findings, 54.4% by syringe needle; suture needle 16.7%; lancet 8.9%; a glass item 8.3%; and other 11.7%.[10] and In another study,19.2% injection needle; cannula needle injury 0.89%, suture needle 3.13%, scalpel injury 0.45% and muco-cutaneous contamination 10.27%.[11] Regarding nature of injury, general practitioner while doing routine medical care, surgeons & O G specialist were also injured doing

emergency suturing procedures and doing inexperienced procedures. In a similar study conducted in Rawalpindi, Pakistan NSI commonly 43.3% occurred in Surgical departments, followed by 23% medical department, most common cause for NSI was hasty work 37.9% followed by recapping of needle 19.5%.[9] Similar study conducted in Awassa City, Southern Ethiopia found the Accidental injury 80.0%, injury as a result of a non-compliant patient 9.4%, injury by another staff 8.9% and other causes 1.7%.[10] Most frequent cause of NSI. In this study 33.5% of NSI was due to resheathing of used needles, this was comparable with other studies 51% of physicians by Thurn et al.[12] This is due to the fact that they are attending more number of patients and they perform a complex operation, which means that they are put under increased stress, where mistakes are prone to occur.

We measured knowledge of universal precautions by examining questions about five areas: mode of transmission of HBV, HCV, and HIV, exposure to body fluids, use of protective barriers such as gloves and gown, recapping of needles and disposal of biohazards NSIs among Health Care Providers (HCPs) were an important occupational hazard. This study found that 100% of Knowledge on transmission of HBV, HCV and HIV, 78.6% of doctors not wearing the gloves while performing procedures and only 23.7% doctors know the recapping not required. In a similar study conducted in Jamaica, 64.0% of the health care providers were very knowledgeable of universal precautions with significantly more among doctors 88.0%.[13] It is important to improve the knowledge about the universal precautions by continuing medical education in order to find ways to prevent them. Vaccination is one of the best ways to protect HCPs from infections, but vaccination is only available for HBV. In the present study, nearly half of the doctors 49.5% were immunized against hepatitis B. Similar data were found in a Swedish university hospital.[14]

In this study, the reaction of medical practitioners upon sustaining injury was unique. Nearly half of them 47.6% took action after the injury, antiseptic was applied after washing with soap and water; another 31.5% squeezed the blood before washing and applying antiseptic, and remaining 21.1% washed with soap and water only. In a study conducted in Nigeria by Wilson E. Sadoh et al found that 94.6% of HCWs observed hand washing after handling patients.[15] More over specialist should be aware that it is more protective and safe to squeeze and let out the blood in an attempt to immediately let out the virus which would have entered probably.

A register for injury and PEP needs to be kept in private medical establishments. This should contain details of the injury and serological status of the patient and the doctor.[16] Regarding concern for taking PEP after NSI only 6.0% doctors took PEP, 55.8% doctors were not using Sharps container to dispose used needles & sharps. [17, 18] Thus, along with the education for Universal Precaution, training for PEP and disposal of sharps (including needles) as a part of Biological Waste Management is also needed.

Conclusion

Over 90% doctors had injuries in life time and 15.7% were injured in last 3 months, exposing them to HIV, HBV, HCV, etc. Unfortunately only half of them took any action after the NSI, only 6% took PEP, none kept any record of the incident, only about 24% had been trained in universal precautions and only 49.5% were using white/blue container to dispose off needles. There is a need to include universal precautions, biological waste disposal and PEP as a continued education workshop for medical practitioners.

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Profile of diarrhea outbreaks in Nanded district, India

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Abstract:

Introduction: Diarrhoeal disease causes a heavy economic burden on the health services. This study describes the outbreaks of diarrhoeal diseases along with the reasons for the outbreaks and documents the corrective measures taken to control the outbreak. **Methodology:** A descriptive study was conducted in which the outbreaks of diarrhoea in the rural areas of Nanded district reported and investigated by the Epidemic Response Cell during the period April 2009 to March 2010 were analysed. The data regarding demographic status of the village, geographical location, month of occurence, data of household survey, laboratory reports, source of infection and control measures were collected. **Results**:A total of 32 outbreaks were included in the study. A majority of the outbreaks i.e. 23(72%) occurred in the rainy season and remaining 9(28%) occurred in the summer season. Out of the 16 talukas in the district, outbreaks were reported from 11 talukas. The attack rates varied from 0.57% to 21.46%.No deaths were reported in 28 outbreaks and in the rest of the outbreaks the case fatality rate varied from 2.78% to 7.69% . A total of three outbreaks were confirmed to be due to cholera. Piped water and well water were identified to be sources of the outbreak in 14 and 13 outbreaks respectively. The reasons for the outbreak identified were change in the source of drinking water, irregular disinfection, open field defaecation, negligence, insanitary conditions near water source, lack of Tropicalised Chlorinated Lime (TCL). **Conclusions**: Surveillance for diarrhoeal disease outbreaks should include factors which pose a risk for drinking contaminated water such as water scarcity, change in source of water, irregular disinfection, non availability of health staff ,non availability of TCL, beginning of rains, and provision of water by tankers.

Keywords: Diarrhoea, outbreak, water contamination

Introduction

Diarrhoeal diseases represent a major health problem in developing countries. Conservative estimates place the global death toll from diarrhoeal diseases at about two million deaths per year (1.7 - 2.5 million deaths), ranking third among all causes of infectious disease deaths worldwide. Most of these deaths occur in children under five years of age [(1)]. In India, acute diarrhoeal disease accounts for about 13 percent of deaths in under five years age group. During the year 2009,about 11.2 million cases with 1762 deaths were reported in India. [(2)] It has been estimated in a study that 27,486,636 DALYS will be lost in year 2016 in India due to diarrheal diseases.[(3)] Globally, there are an estimated 3–5 million cholera cases and 100000–120000 deaths due to cholera every year.[(4)] In India, the total number of cholera cases in 2009 were 3482 with 12 deaths. [(2)] The actual number of cholera cases may be higher because of underreporting and inconsistency in case

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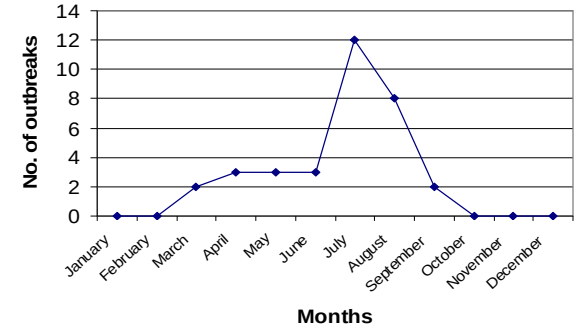
definitions. Studies have reported outbreaks of diarrhea [5-8] and cholera [9-13] in different parts of India. This study describes the outbreaks of diarrhoeal diseases in Nanded district along with the reasons and corrective actions taken for their prevention and control.

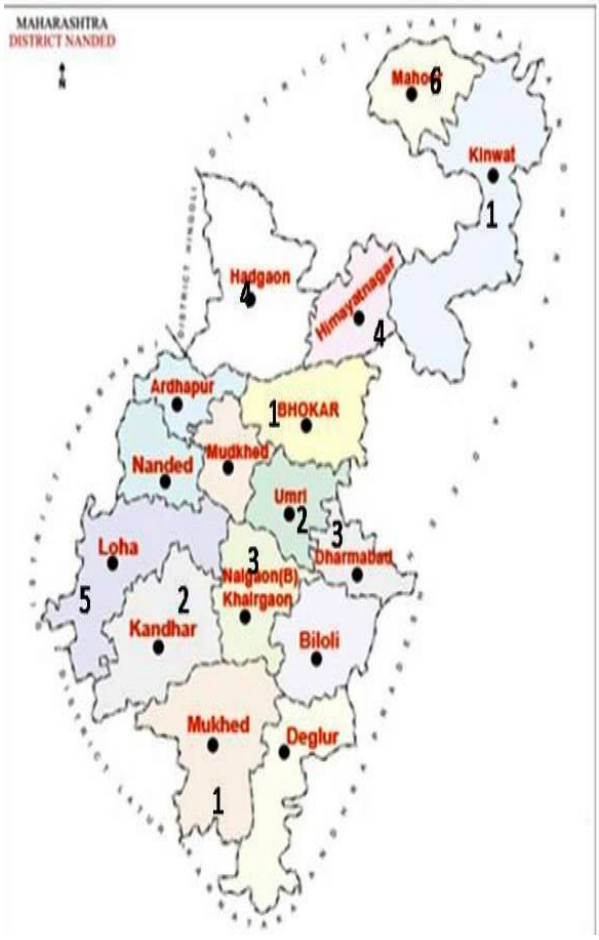
Figure1: Month wise distribution of outbreaks



Materials and Methods

A descriptive study was conducted in the rural areas of Nanded district. Nanded district is located in Maharashtra state in India. It has 1546 inhabited villages with a population of 2187195. There are 63 Primary Health Centers (PHCs) and 374 Sub-Centres (SCs) in the district.An Epidemic Response Cell (ERC) headed by a Medical Officer was functioning at the district headquarter. The contact number and address of the cell was communicated to all Primary Health Centres, Sub centres and Grampanchayats. When a cluster of diarrhea cases was reported to the ERC at the district headquarters, an investigation was carried out to ascertain the number of cases. Diarrhoea was defined as passage of three or more loose watery stool in a 24 hour period. The investigation team consisted of the staff at the ERC along with the Medical officer of the concerned Primary Health Center (PHC) and health workers from the PHC and Sub-Centre (SC). A house to house visit was conducted to identify all cases. The cases were searched for a period of twice the incubation period i.e. 10 days for cholera and five days for non cholera outbreaks. Stool samples of a sample of patients was sent to the Public Health Laboratory for microbiological investigations. Water samples from the suspected source of infection was sent to the Public Health Laboratory for microbiological analysis. Sanitary survey was conducted to identify the reasons of water contamination. Control measures implemented in the villages were noted down.

Figure 2: Taluka wise distribution of the outbreaks in Nanded district



The Medical Officer of ERC prepared the final report of the epidemic investigations which included the demographic status of the village, geographical location, month, data of household survey, laboratory reports, source of infection and control measures.At the end of the epidemic the attack rate i.e. number of cases per 100 population was calculated. If the attack rate was more than 0.5% population it was considered to be an outbreak of diarrhoea. All outbreaks of diarrhea confirmed by the epidemic cell during the period April 2009 to March 2010 were included for analysis. The data collected in the final reports of all the outbreaks were analysed in this

study. For each outbreak analysis of data of household survey, spot maps and laboratory reports were used to identify the source of the outbreak. Analysis was done by calculating the attack rate, case fatality rate and measures of central tendency and variation. The difference in the proportions was analysed by the chi square test.

Results

Table 1: Attack rates and Case fatality rates in the diarrhea outbreaks

No. of cases	Total population	Deaths	Attack rate (%)	Case fatality rate(%)
42	2056	Nil	2.04	0
13	715	1	1.82	7.69
24	3856	1	0.62	4.17
50	3630	Nil	1.38	0.00
31	1748	Nil	1.77	0.00
27	3629	Nil	0.74	0.00
58	1388	Nil	4.18	0.00
15	1550	1	0.97	6.67
17	965	Nil	1.76	0.00
10	1145	Nil	0.87	0.00
24	910	Nil	2.64	0.00
19	1534	Nil	1.24	0.00
33	1882	Nil	1.75	0.00
18	2418	Nil	0.74	0.00
7	1697	Nil	0.41	0.00
48	615	Nil	7.80	0.00
13	1336	Nil	0.97	0.00
21	1963	Nil	1.07	0.00
49	2829	Nil	1.73	0.00
11	526	Nil	2.09	0.00
22	1759	Nil	1.25	0.00
22	2521	Nil	0.87	0.00
12	2098	Nil	0.57	0.00
54	3500	Nil	1.54	0.00
13	1050	Nil	1.24	0.00
61	1300	Nil	4.69	0.00
36	2500	1	1.44	2.78
41	2500	Nil	1.64	0.00
37	1381	Nil	2.68	0.00
55	1640	Nil	3.35	0.00
95	2051	Nil	4.63	0.00
32	2690	Nil	1.19	0.00

Table 2:Attack rate according to age and sex

Categ -ory	Groups (N)	Attack rate	X^2	p
Age	Up to 14 years (n-25167)	324 (1.29%)	33.41	<0.05
	>14 years (n=36215)	686 (1.89%)		
Gend er	Males (n=31305)	496 (1.58%)	1.394	>0.05
	Females (n=30077)	514 (1.71%)		

A total of 32 clusters of diarrhoea cases were reported to the ERC during the study period and all were confirmed to be outbreaks of diarrhoea i.e. attack rate more than 0.5%. Figure 1 describes the month wise distribution of the 32 outbreaks. A majority i.e. 23(72%) outbreaks occurred in the period from July to September and the remaining 9(28%) occurred in the period from March to June. The attack rate was significantly more amongst persons aged above 14 years compared to those aged 14 years or less. There was no significant difference in the attack rates between the males and females. (Table 2).

Out of the 16 talukas in the district, outbreaks were reported from 11 talukas, with 11 of the 32 outbreaks occurring in Loha and Mahur talukas.(Figure 2).Table 1 describes the attack rates, case fatality rates and duration of the 32 outbreaks. A total of nine outbreaks had an attack rate of less than 1%, 14 had an attack rate of 1% to < 2%, four had an attack rate of 2% to 3% and five outbreaks had an attack rate of more than 3%. There were four deaths reported ,one each from four outbreaks. Of these two deaths occurred en route after referral before reaching the health centre/hospital, one death occurred at home due to refusal of admission by parents and one death occurred in the Rural Hospital. Of the four deaths due to diarrhea, three occurred in children aged six to seven years and one was in a 30 year old woman.

A total of 23 (72%) outbreaks were reported on the first day of the outbreak, seven were reported on the

second day and the remaining three were reported after the second day of the outbreak.

A total of 21 (66%) outbreaks were reported by health workers/officials including Anganwadi Worker, Auxiliary Nurse Midwife (ANM),Accredited Social Health Activist (ASHA),Rural Hospital staff, Medical Officers, padaworkers etc, six outbreaks were reported by the villagers and five by the Panchayati Raj Institution members.

Out of the 32 villages reporting diarrhea outbreaks, 19 had piped water supply. Field studies and laboratory investigations identified water from the bore well to be the source in two outbreaks. Water from handpump and well water was identified to be the source of infection in two and 14 outbreaks respectively. Piped water was identified to be the source of the outbreak in 14 outbreaks. Microbiological investigations revealed that these sources of water were not fit for drinking in 18 outbreaks though no predominant or specific pathogen were identified in the water samples. In the remaining 14 cases, water was disinfected before the sample could be collected for testing. Stool examination of the patients identified three outbreaks to be of cholera.

The investigations during the outbreak also brought out the following reasons for the outbreaks.

Change in source of drinking water. It was noted that the villagers change the source of drinking water due to water scarcity, stoppage of piped water supply or water collection after the first rains. In the summer season, when the source of water such as well went dry, the villagers started using alternate sources of water without disinfection. As soon as the rains began, the villagers again changed the source of drinking water. As soon as water collected in the wells they started using the water without disinfection. When piped water supply was stopped, people started using alternate sources of water supply. Villages facing water scarcity were provided with water through tankers without disinfection.

Irregular and inadequate disinfection: Disinfection was not done regularly due to non availability of TCL or sheer negligence.

Open field defaecation: Open field defaecation was practiced in many of the villages. Out of the 32 villages reporting outbreaks only three were open defaecation free.

Leakages: Even in villages with piped water supply, leakages in the valves and pipes led to water contamination due to back pressure, siphoning or seepage.

Negligence: A review of the records also indicated a scarcity of Tropicalised Chlorinated Lime (TCL),lack of follow up action in spite of previous reports of contaminated water and irregular disinfection of water. It was also noted that in many subcentres and Primary Health Centres the post of Multipurpose Worker (MPW) or Auxillary Nurse Mid wife (ANM) was either vacant, they were not residing at the headquarters or were on leave.

Insanitary conditions near water source: Some of the wells were found to be open, without a parapet, with ditches in its vicinity. In some cases the villagers used to wash clothes and utensils at the public tap. In one village the pipe carrying the drinking water was noticed to pass through an open gutter.

Prevention and Control Measures

As soon as the ERC received the information about the outbreak the respective PHC and SC were contacted. The village was visited and a house to house visit was done to identify new cases. Triage was practised for management of the patients to identify the different grades of dehydration and manage the patients accordingly. The data collected was analysed to confirm the magnitude of the problem which was followed by report writing. Usually an isolation ward was opened in the subcentre, schools or grampanchayat to admit the patients with severe dehydration. One medical officer and two ANMS were posted in rotation to provide services for 24 hours till the outbreak was fully controlled. All the activities were monitored from the district level too. Control measures taken included action to disinfect the water and interventions to prevent further contamination of water

IEC(Information Education and Communication):
Intensive IEC activities in the form of posters, announcements through mikes and lectures during gramsabhas (village meetings)were conducted on the topics of personal hygiene and environmental sanitation.
Disinfection: Orthotoulidine test was done for all sources of water and spot disinfection was done if the test was negative. During home visits the family was given mother solution, medichlor or chlorine tablets for regular disinfection at the household level. In villages where water was provided by tankers, the water was disinfected before collection at the village level.
Sanitary conditions near the source: The wells were converted to sanitary wells by cutting trees, constructing parapet, providing motor to draw water, covering wells and constructing drains. The ditches near the tube wells were filled.
Repairs: The leakages in the valves and pipes were repaired.
Regular Disinfection: The local workers were instructed to carry out regular disinfection.
Administrative action: Show cause notices were served on workers who had defaulted in their duties. Proposals for piped water supply were sent for villages which did not have this facility.

Discussion

In the present study a majority of the outbreaks occurred in the rainy season. Late summer and early rainy season have been identified to be the peak periods for incidence of diarrhoeal disease.[14] Diarrhoeal epidemics have been reported to be caused by faecal contamination of well water following rain. [6] In the case of early and little rains, the surface water collections are contaminated by percolation of water .In the summer season there is a risk of water scarcity when the villagers start using alternate sources of water for drinking. Thus early rains and water scarcity are high risk periods for diarrhea outbreaks.
In this study persons aged above 14 years were identified to be at higher risk of diarrhea during outbreaks with no significant difference between the men and women. Some studies have reported similar findings [15,16] while others have reported that all ages and both sexes are affected though extremes of ages were at higher risk.[5]
Though many outbreaks were reported on the first day itself, in some cases there were delays in reporting. The health workers reported the outbreaks in majority of cases yet the villagers and PRI also played an important role in reporting. The failure of the health department in reporting the outbreak and delays in referrals are points of concern.
An important finding of this study is that a change in the source of drinking water without disinfection poses a risk of outbreaks. There should be a clear laid out procedure which should be formulated whenever such changes need to be made. Permission from the Panchyati Raj institutions (PRI) /SC/PHC should be obtained before changing the source of drinking water. Water should be disinfected before use and the sample sent for testing the quality of water to ensure its safety.
The actions of the community such as open field defaecation, washing clothes, utensils and animals near water source poses the risk of water contamination. This study also shows that piped water supply does not guarantee protection against faeco oral diseases. Proper layout of the pipes along with regular maintenance and repairs are needed to ensure supply of safe and potable water. In a study conducted in a rural community in Western Maharashtra overall 49.8% of the water samples were found to be polluted whereas 45.9% of the samples from piped water supply were polluted. In this study it was found that irregular and/or inadequate treatment of water, lack of drainage systems and domestic washings near the wells led to deterioration in the quality of water.(16) In a study in which the Geographic Information System was used for the epidemiological investigation of an outbreak of acute diarrhoeal disease, local cultural practices such as indiscriminate defecation in public places, washing clothes and cleaning utensils from water taps where the community collected its drinking water, and poor engineering design and maintenance of the water supply system were identified to be the risk factors that could have contributed to the outbreak.[5]Contaminated drinking water was identified to be the source of infection in all the 32

outbreaks. In other studies too, contaminated drinking water has been noted to be the source for most diarrhoeal outbreaks recorded in India [10,12,17-22] Availability of potable drinking water for a large proportion of the Indian population is a major public health concern. Providing clean drinking water for all by 2009 and ensuring that there are no slipbacks by the end of the 11th plan is one of the monitorable targets of the 11th 5 yr plan.[23] One of the targets of the seventh Millennium Development Goal (MDG) of the United Nations i.e. ensuring environment sustainability is to halve the proportion of people who are unable to reach or to afford safe drinking-water between 1990 and 2015. It is important that every drinking water source should be 'improved' i.e. by nature of its construction or through the active intervention is protected from outside contamination, in particular from contamination with faecal matter.

As per the United Nations criteria, improved drinking-water sources include household connections, public standpipes, boreholes, protected dugwells, protected springs, and rainwater collection. [24]

According to Census 1991, 55.54% of the India's population had access to an improved water source. Census 2001 shows 86.77% of the rural population has access to safe drinking water. The Department's figures show that that in 2006, of the 14.23 lakh habitations, 13.80 lakh habitations (97%) have been provided with some drinking water source. At the end of 2008-09, the Department's database showed an increase in habitations to 16.61 lakhs, with 14.99 lakh (90%) in the Fully Covered (FC) or Partially Covered (PC) category. However, around 2.17 lakh habitations (14%) have water quality problems and do not have a safe source. There are over 41.55 lakh hand pumps, around 15.77 lakh public standposts, around 1.60 lakh mini-piped water supply schemes and 45000 multi village schemes in the country under the Rural Water Supply Programme. Of these systems, 88.21% handpumps, 93.49% standposts, 91.95% mini schemes and 96.26% multi village schemes are reported functional by the States. [25]

However coverage of the habitations with safe and potable water is a dynamic concept and there are reports of slippage of covered habitations to non covered and partially covered category due to reasons such as source going dry/lowering of ground water table, source outliving their lives, poor operation and maintenance and seasonal shortage of water. [25]

In India the primary responsibility of providing drinking water facilities in the country rests with the state government. The Union Government has been extending policy and technological as well as financial support through a centrally sponsored scheme i.e. Accelerated Rajiv Gandhi Water Supply programme under which funds are provided to state governments for implementing rural water supply schemes. With the 73rd and 74th amendments drinking water and sanitation are included in the list of subjects to be devolved to Panchayats.

Some of the actions of the community pose a risk of contaminating drinking water e.g.open field defaecation or drinking contaminated water e.g. changing water source. In addition the reforms being brought about in rural water supply envisage a proactive role of the community in ensuring water safety and security. The fundamental basis on which drinking water security can be ensured is the decentralized approach through Panchayati Raj Institutions and community involvement. There is a need to shift from reliance on end product testing of water quality to risk assessment and risk management of water supplies commonly known as water safety plan. Water safety plan links the identification of a water quality problem with a water safety solution. It includes both water quality testing and also sanitary inspection to determine appropriate control measures. It is a quality assurance tool that ensures protection of the water quality from the catchment to the consumer.

It is planned to appoint one person, preferably a woman from the Village Water and Sanitation Committee (VWSC) elected at the gramsabha under the control of the Grampanchayat (GP) who will be designated as Jal surakshak for data collection at the household level and at the habitation level. Her functions are monitoring with field test kits, water sampling, conducting the Orthotoulidine test, keeping a watch over TCL availability and water sources.[26] The findings of this study indicate that in

addition to these functions she along with the Village Sanitation Water Committee (VSWC) should watch out for water levels of all possible sources of drinking water, any changes in sources of water, status of pipeline, sanitary conditions near water source and conducting IEC activities to prevent activities which cause water contamination as well as ensure active community involvement in water management.

The long term solution to the problem of water scarcity is ensuring sustainability of the water sources. The conjuctive use of ground water, surface water and rain water harvesting systems will be required to be encouraged as means of improving sustainability and drinking water security. Because of its vulnerability under different circumstances, in order to achieve water security at the individual household level, the water supply system should not depend on a single source and alternate sources should be monitored during periods of water scarcity.Water security and safety along with sanitation are the prime factors necessary to prevent diarrhea outbreaks in the rural areas.

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Conflict of Interest

None Declared

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ORIGINAL RESEARCH ARTICLE

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KAP of current beneficiaries of health insurance on health insurance in an urban area Chidambaram, Tamil Nadu

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Abstract:

Background: Health insurance penetration in India is very minimal. Major health related insurance schemes cover only 12% of Indian population. There are several obstacles that beneficiaries in the health insurance face, which could hinder its growth. Foremost challenges are -lack of awareness about the conditions, different schemes and the hospitals which are having health insurance coverage, and the lack of data that can allow informed decisions. **Objectives:** To find out the Knowledge, Perception and Attitude on Health Insurance among the Current Beneficiaries **Study Design:** Descriptive study. **Study Setting:** Chidambaram Municipal area. Subjects: 50 current beneficiaries of various health insurance schemes. The list was obtained from 4 health insurance companies namely Star health insurance, ICICI Lombard, Reliance health insurance and Bajaj health insurance. **Materials and Methods:** A pretested proforma was used to collect the socio-demographic characteristics and the knowledge, perception and attitude of current beneficiaries. **Results and Conclusions:** The important findings: sources of information were insurance agents (58%) and television (56%). Positive opinion admitted by the beneficiaries were: Health insurance offer protection from high hospitalization cost (80%), and response from companies regarding customer queries were good (84%). Negative opinions stated by them were: difficulty in claiming the benefits (68%) and more documents were required before getting any reimbursement (60%). Hence it was recommended that further studies with a larger sample size be undertaken to identify the real magnitude of the problem encountered while using the services of health insurance agencies. **Key Words:** Current beneficiaries, Health insurance and Likert scale

Introduction

The health infrastructure in India is facing overwhelming challenge of meeting the health goals and complexities emerging from the changing disease pattern and financing towards health care. The advancement in the field of various health care technologies and increase in cost of care has necessitated the exploration of health financing options to manage problems arising out of increasing health care costs.(1)

Health insurance is emerging fast as an important means to finance the health care needs of people. Health insurance in India is in nascent stage but growing very fast.(2) The uncertainty of disease or illness is accentuating the need for insurance system that works on the basic principle of pooling risks of unexpected costs of persons falling ill and need hospitalization by charging premium from a wider population base of the same community.

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Table.1: Distribution of the Beneficiaries by Socio-economic status

Characteristics	Male(%)	Female(%)
Education		
Upto secondary	5.6	28.6
HSC	2.7	0
Diploma/Degree	75	50
Professional	16.7	21.4
Occupation		
Skilled	75	57.1
Semi skilled	16.7	40.6
Unskilled	8.3	2.3
Annual Income		
Less than Rs.40000	11.1	21.4
Rs.40000-80000	8.3	7.2
Above Rs.80000	80.6	71.4
Total	100%	100%

Table 2: Distribution of the beneficiaries according to their insurance coverage

Insurance coverage Rs/-	Frequency	Percentage
Less than Rs.50000	22	44
Rs. 50000-1 lakh	17	34
Above 1 lakh	11	22
Total	50	100

Table 3: Distribution of the beneficiaries according to their years of insurance cover and amount of premium paid

Years of insurance cover	Frequency	Percentage
2 years	35	70
3 years	6	12
4years	9	18
Premium paid Less than 5000 Rs	36	72
5001-10000	10	20
Above Rs.10000	4	8
Total	50	100

Table 4: Distribution of the beneficiaries by their knowledge about the coverage of pre existing illnesses

Awareness on coverage of preexisting illness	Frequency	Percentage
Present	37	74
Not present	13	26
Total	50	100

Table.5: Distribution of the beneficiaries by age group vs insurance coverage

Age group	Insurance cover			Total
	<Rs.50000	Rs.50000-1 lakh	>1lakh	
24-34	14	10	3	27
35-44	6	4	5	15
>45	2	3	3	8
Total	22	17	11	50

d.f=4 chi square value=4.633 p=0.327

There is a growing demand from the middle class for both public and private health insurance as individuals cannot afford such high costs. This 'pull' factor has definitely been responsible for attracting insurance companies into the Indian health care market. A 'push' factor which has forced them to view this market is the recession in the health insurance market in developed countries, particularly the United States.[3] However, the complexity of health insurance industry has been much talked about but less understood.[4] Hence, this study is designed to ascertain the Knowledge, perception and attitude of health insurance among current beneficiaries of health insurance.

Materials and Methods

This descriptive study was conducted in the Chidambaram Municipal area, Tamil Nadu. Chidambaram town is situated southwest to Puducherry. This town is predominantly rural and an emerging urban area. A pilot study was carried out among 5 beneficiaries and picked up by a convenient sampling. A questionnaire was prepared to interview the beneficiaries of health insurance to assess their knowledge, perception and attitude on health insurance. Results of the pilot study were used to modify the tool and the methods. Attitude towards health insurance was assessed using Likert 5 point scale (strongly agree, agree, don't know, disagree, strongly disagree).

The study was conducted for a period of 6 months from July 2008-Jan2009. Since the investigator carried out the survey, there was no problem of observer variation as far as this study is concerned. The list of the beneficiaries was obtained from 4 health insurance companies namely Star health insurance, ICICI Lombard, Reliance health insurance

and Bajaj health insurance. They were interviewed after enlisting their availability and willingness to participate. 4 non willing beneficiaries were excluded from the study. Data analysis was done by using SPSS software (17version).

Result

A total of 50 beneficiaries were interviewed. The age and sex distribution of the beneficiaries was as follows: 77.8% of them were below 45 years of age and 72% were males. Beneficiaries reported that Insurance agents have played as major source information for 58% of the beneficiaries followed by television (56%).

Insurance coverage of the beneficiaries: As regards the insurance agency, a majority of them have had ICICI Lombard (34%) followed by Reliance Health insurance (32%) as their healthcare cover. 22% of the beneficiaries have insured for more than 1 lakh and the majority (44%) have insured for less than 50000/-(Table.2). Regarding the duration of the insurance coverage and amount of premium paid, 70% had their coverage for 2 years and only 18% had their insurance for 4 years and majority(72%) had paid <Rs.5000 as their premium (Table.3).

Perception of the beneficiaries: Beneficiaries positive opinion regarding health insurance were; 80% have admitted that health insurance offers protection from high hospitalization cost and 76% have stated that it provides easy access to health care and 84% of them have concurred that the companies have responded nicely to customer queries .Negative opinion of the Beneficiaries were; 68% have stated that claim processing is difficult with the companies and 60% stated that more documents are required before getting any reimbursement.

Attitude of beneficiaries towards health insurance:It is found that 60% of the beneficiaries have agreed that health insurance is helpful in meeting out unexpected medical expenses and 76% of them have admitted that they would recommend health insurance to their friends and relatives.

Table 4 shows the distribution of the knowledge of the beneficiaries about the coverage of preexisting illness. Majority (74%) of them have known that preexisting diseases are not covered by health insurance, for a specified period and they have expressed that complete information was given at the time of enrollment.

We found that only 24% of the beneficiaries have stated that they have availed services so far and majority (76%) of them didn't avail any services so far from the companies, over a period of minimum 2 years to 5 years.

Discussion

Bureau of Health Information[4] United States found that the highest proportion insured is among older adults (age 65 and older), among whom nearly 100 per cent are insured. Adults 18-44 (90%) are less likely to have insurance compared with other age groups.[4] In contrast to this the present study found that 40% in the age group of <45 years, insured to less than Rs.50000 and only 12% above 45 years insured to 1 lakh and above and the difference was not found to be statistically significant (p=0.327) (Table.5).

As regards the sources of information, 58% of the beneficiaries have come to know about health insurance via insurance agents followed by television (56%)**.** Thus, the insurance agents acted as a main source of information for the beneficiaries.

Savitha.N.Ramesh[5] hasobserved that the perception of the quality of insurance service influence enrollment. The reasons stated by the beneficiaries for the poor enrollment based on their perception were – ineffective network, poor or slow claim reimbursement and lack of transparency and negative feedback from their friends. Kathleen Scalise[6] has also found that 42 percent of insured Californians had experienced difficulty in getting referrals to specialists, problems with billing or payment, finding their plan does not cover needed care and not able to receive the care on time.

In contrast to this, the present study on the perception of the beneficiaries on health insurance shows that 80% of the beneficiaries have admitted that health insurance offers protection from high hospitalization cost and 76% of them have stated that it provides easy access to health care and 84% of them have admitted that the companies have responded nicely to customer queries. Hence the perception of the quality of insurance service

influencing the enrollment under health insurance. However the above perception is based on their limited use of the services. It was reported that only 24% of the current beneficiaries have used the services from health insurance companies. Many of the beneficiaries continue to pay the premium because they were satisfied. 70% of them sustained for 2 years and 30% of them sustained for 3 and more than 3 years.

Limitations

As the size of the sample was too small, generalization of the findings may be difficult. The sample which have been studied, expressed a favourable attitude towards health insurance. Among the beneficiaries, the proportion utilized the health insurance is only 24%. Hence the real magnitude of the problem encountered while using the services of health insurance agencies would not have been captured fully.

Conclusion

Though the awareness on health insurance was quite high among the beneficiaries, majority of them were unaware of finer details such as the different schemes. Hence an effort to provide awareness highlighting the different schemes and different benefits must be clearly made. There should be a transparency in the list of diseases which are covered and diseases which are excluded to avoid misunderstanding. For more coverage or enrollment the health insurance programme should aim to cover most of the prevailing common health conditions and exclusion criteria, rigid rules and regulations and unnecessary paper work must be minimized.

Acknowledgement

I thank all the insurance companies and beneficiaries who have extended their co-operation during the period of study.

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Epidemiological Profile of Human Leptospirosis in an Urban South Indian City

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Abstract:

Background: Leptospirosis is under diagnosed and under reported in India. The clinical features of leptospirosis are non-specific. Combining clinical expertise and awareness with rapid tests for diagnosis will increase the recognition of patients with leptospirosis. **Aim :**To evaluate the epidemiological risk factors for leptospirosis. Methods:Patients with fever admitted in a government facility hospital,North Chennai,South India,who were tested positive for leptospirosis utilizing Macroscopic Slide Agglutination Test (MSAT) titers of 2+ and above [confirmed by Microscopic Agglutination Test (MAT)] with Modified Faine's score of > 25 [Clinical (A) + Environmental (B) + Laboratory (C)] were taken up for study. These patients were evaluated for epidemiological risk factors in addition to the clinical profile. Other causes of fever were excluded with relevant investigations. This cross sectional study was undertaken from February 2006 to May 2007. **Results:** 90 patients were analyzed. There were 56 (62.2%); Males and 34(37.7%)Females. Mean Age was 37.5 years. All cases came from North Chennai. There were 86.6% outdoor manual workers, 7.7% housewives & 5.5% were students. 51 % patients came between September to December months. The important epidemiological risk factor in our study was the contact with contaminated environment. (Poor sanitation: 95.5%; walking barefoot: 85.5%; poor drainage facilities: 78.8% and contact with rodents in 33.3% cases).Fever, headache, myalgia were the common presenting features in our study. **Conclusion:** This study revealed that poor sanitation, walking bare foot, inadequate drainage facilities were the important epidemiological risk factors due to contaminated environment in acquiring leptospirosis in North Chennai. Rodents were the main animal source of contact. Rainfall was another important epidemiological risk factor.

Key words: leptospirosis,contaminated environment,poor sanitation,rainfall

Introduction

Infectious disease is an important cause of morbidity and mortality in India. Leptospirosis is one of most widespread zoonotic infection in world today and it has long been considered a rare zoonotic disease in India with only sporadic cases being reported [1, 2]. Now, the disease has been reported from various states of India during the monsoon months in mini epidemic proportions.

Domestic animals such as cattle, dogs, pigs may act as carriers for several months (temporary carriers), while rodents usually remain as carriers throughout their life (permanent carriers) and are considered the major reservoir of infections. Leptospires are excreted in the urine of the animals and they affect human beings when they come into contact with the urine of infected animals, directly or indirectly, when

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exposed to an environment contaminated by the urine of the infected animals. Therefore, the illness occurs commonly during the monsoon months. Leptospires enter the host through abrasions of the skin of the feet or intact mucous membranes of eye, throat and gut[3].Leptospirosis can occur in both urban and rural areas. In urban areas of developing countries, contaminated environment due to various factors such as overcrowded slums, inadequate drainage and sanitation facilities for both man and animals, presence of straydogs, cattle, pigs, domestic rats, bandicoots, poor condition of slaughter houses and people walking bare foot contribute to the spread of the illness[4,5].

In rural areas, high-risk groups are workers in rice fields, cane fields and other agricultural crops and animal husbandry staff. Workers in sewers, mines and military personnel are also at risk. Any person can be infected due to contact with the contaminated environment [4,5].Therefore ,the more important epidemiological factors are rainfall, contact with contaminated environment and animal's contact. The number of cases in a region often fluctuates from year to year due to various factors such as rainfall, flooding and animal infections. This study has been undertaken to study the epidemiological risk factors for acquiring leptospirosis in North Chennai, a large city in South India.

Materials and Methods

Patients, age more than 12 years admitted with fever of more than 5 days due to infectious disease who were tested positive for leptospirosis were taken up for study. These patients were evaluated for relevant epidemiological risk factors for acquiring leptospirosis. The period of study was from February 2006 to May 2007.Malaria, urinary tract infection, tuberculosis, enteric fever, viral hepatitis and other causes of fever were excluded from the study. Demographic data, occupation and address were collected. Epidemiological profile like rainfall, contact with contaminated environment and history of animal contact were collected. Contaminated environment was defined as presence of one or more of the following: drainage facilities in the house, stagnation of contaminated water around the house, contact with cattle, Pigs, bathing in water bodies (ponds, lakes) where domestic animals are bathed, walking barefoot and inefficient garbage disposal. Clinical features like fever, headache, myalgia, jaundice, oliguria, vomiting, loose stools, altered sensorium and other relevant features were recorded.

A simple and sensitive MSAT (Macroscopic Slide Agglutination Test) titers $\geq$ 2+ was used for early detection of leptospirosis. Modified Faine's score of > 25 (Clinical (A) + Environmental (B) + Laboratory (C)) [5,6,7] was used in the diagnosis. All patients tested positive by MSAT were further confirmed by MAT (Microscopic Agglutination Test) with titers of $\geq$ 1:80. MSAT is a simple screening test. This genus specific test is considered significant when the titer is 2+ and above. The sensitivity of the test was enhanced by adding locally prevalent serovars [8]. The genus specific tests are the tests of choice for the diagnosis of current infection. These tests are simple, more sensitive and become positive earlier than MAT [9,10].Antibodies to the leptospira are detected by serological tests[3,11,12].

Results

Table 1: Age and Sex Distribution of the study population

Age	Male	Female	Total (%)
12 – 20	12	8	20(22.2)
21 – 30	6	8	14(15.5)
31 – 40	13	9	22(24.4)
41 – 50	9	2	11(12.2)
51 – 60	9	4	13(14.4)
61 – 70	4	2	6(6.6)
71 – 80	3	1	4(4.4)
Total	56	34	90(100)

Table 2: Occupation of the Study Population

Occupation	Cases (%)
Labourers	71(78.8)
Farmers	7(7.7)
Housewives	7(7.7)
Students	5(5.5)

A total of 90 patients diagnosed to have leptospirosis were analyzed. There were 56 males & 34 females with mean age of 37.45 years. Age/sex group distribution data showed that maximum number of

patients was seen in age group between 31 to 40 years. Among them lowest age was 13 and highest age was 74 years. As age advances, the leptospirosis incidence decreased in our study group(Table1). The maximum percentage of cases occurred in laborers (78.8%). The other patient groups were farmers (7.7%) who were outdoor manual workers, housewives (7.7%) and students (5.5%)(Table 2). In our study group, the patients came predominantly from North Chennai (South India), the area surrounding the hospital.

Table 3: Epidemiological Risk factors in cases detected with Leptospirosis

Epidemiology	Cases	Percent-age (%)
I. Rainfall	52	57.7
II. Contact with contaminated environment	86	95.5
i) Poor sanitation (eg. inefficient garbage disposal)	86	95.5
ii) Walking barefoot	77	85.5
iii) Poor drainage facilities (eg. stagnant water)	71	78.8
iv) Recreational activities involving the contact with contaminated water	13	14.4
v) Bathing in ponds, lakes and wells	14	15.5
III. Animal contact	44	48.8
i) Rodents	30	33.3
ii) Domestic animals		
a. Cattle	10	11.1
b. Dogs and Cats	14	15.5
c. Pigs	10	11.1

Contact with contaminated environment occurred in 95.5% patients. History of recent rainfall within the last month of onset of fever was present in 57.7% patients, animal contact in 48.8% patients. 95.5% patients who had contact with contaminated environment came from an area where poor

Figure1: Month wise distribution of leptospirosis

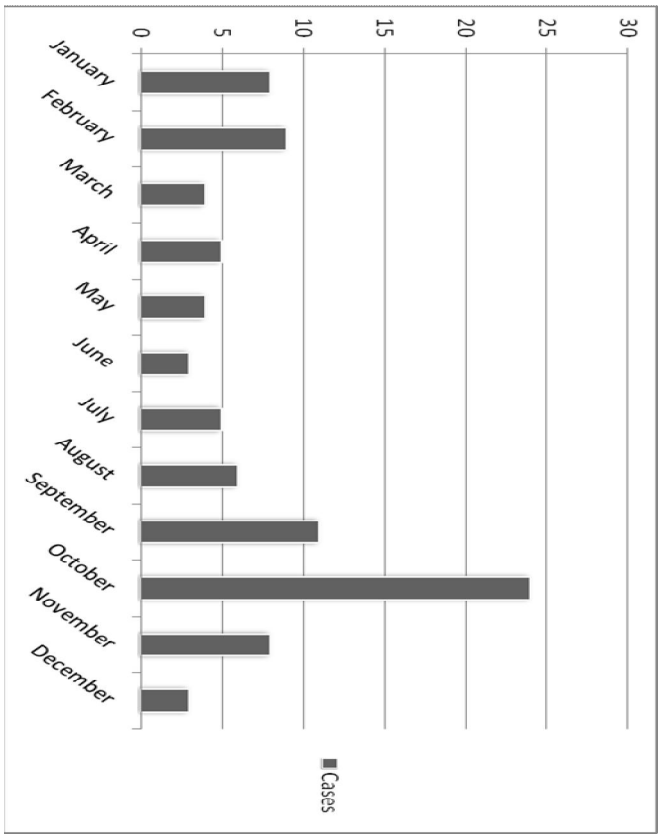

Figure-2: Contact with contaminated environment

sanitation existed in the form of inefficient garbage disposal. Out of 48.8% patients who had contact with animals, 33.3% patients had history of contact with rodents and 15.5% patients had history of contact with dogs and cats (Table 3).September to November months recorded the highest number of patients(47.78%)(Figure:1). All patients had fever. Headache occurred in 94.4%, myalgia in 56.6%, jaundice in 23.3% and oliguria in 16.6% patients.

Figure: 3 Shows interaction between epidemiological risk factors

Epidemiology

Environment
(Favourable factors)
Suitable animal host
Optimum Temperature $28^{o} – 32^{o}$ C
Water – unpolluted
Non-saline
Alkaline pH

Occupations at risk
Agriculture, Livestock handling, Mining, Abattoirs, Poultry, fishing, conservancy workers
Laboratory/Veterinary/Military personnels

Environmental pollution
(contaminated water)
inadequate drainage facilities
inefficient garbage disposal
stray dogs, cattle, pigs and rodents
barefoot walking

Home and leisure activities
Home – family pets
leisure – swimming
hunting
boating

Discussion

Leptospirosis has been under diagnosed and under reported from India due to a lack of awareness of the disease and lack of appropriate laboratory diagnostic facilities in most parts of the country [1,2]. Since 1980's the disease has been reported from various states during monsoon months in mini epidemic proportions. The disease is endemic in Kerala,Tamilnadu,Gujarat,Andamans,Karnataka,Maharashtra.It has also been reported from Andhra Pradesh,Orissa,West Bengal,Uttar Pradesh,Delhi & Puducherry[13,14].

In our study middle and young age groups were commonly affected with leptospirosis than the age group >60 years(Table-1) and males predominated in our study group which was consistent with the study of C.O.R.Everard, S.Bennett et al[15] .The age group between 20 to 50 years is the economically productive period and during which period they have high chance of occurring contact with contaminated environment. This may be related to the "way of life" as well as to specific occupations[9].Majority of patients in our study group belonged to the lower socio economic status. Contaminated environment, poor sanitation facilities and stagnant contaminated water were prevalent in their areas. In the 90 patients of our study group, fever (100%), headache (94.4%), myalgia (56.6%) were the common clinical features noted.

Contaminated environment is due to poor environmental hygiene, which is contributed by rainfall, poor sanitation (inadequate garbage disposal which can attract rodents),poor drainage facilities(e.g.stagnant water).These factors can attract cattle, pigs, rodents and stray dogs which are potential source for infection. With all the above factors, walking in barefoot, recreational activities involving the contact with contaminated water and bathing in ponds, lakes and wells poses a potential risk, when coming in contact with stagnant water or infected soil(Figure-2).Contact with contaminated environment is most important epidemiological risk factor. In our study contact with contaminated environment occurred in 95.5% patients.

Poor sanitation facilities (eg.inefficient garbage disposal) were the (95.5%) most important epidemiological risk factor found in our study group. This is followed by history of walking barefoot in 85.5% patients, exposure to poor drainage facilities in 78.8% patients, history of bathing in contaminated water sources like in ponds/lakes/wells in 15.5 % patients and in 14.4% of patients had history of recreational activities involving the contact with contaminated water(Table.3).History of recent rainfall within the previous one month of the onset of fever was present in 57.7% patients. Out of 48.8% patients who had history of animal contact, 33.3% patients had history of contact with rodents of which one patient gave the history of removal dead rats and the other had the hobby of putting eatables to the rats whose house was heavily infested with rats. Among the patients who had contact with animals, significant number had contact with domestic animals. In our study group all the farmers and some of the labourers had exposure to domestic animals such as cattle, dogs, cats and pigs. This study highlights the importance of contact with contaminated environment being the most important risk factor.

In our study we had leptospirosis patients throughout the year with more number of patients (47.78%) between September to November months during which time the Chennai city gets monsoon rain (Figue-1).In other months, the persistence of contaminated environment was responsible for the transmission of leptospires.This is in contrast with the study done by Muthusethupathi MA,Shivakumar S, et al[16] during 1987 – 93 where 90% patients reported during monsoon months.

Occupation plays an important role in the risk of acquiring infection. Leptospirosis is common in high risk groups which include agricultural workers, outdoor manual workers, abattoirs, miners, veterinarians and also any one venturing outside in an environment which has water, infected soil and infected animals[4].In our study group,78.8% patients were labourers and 7.7% were farmers(Table-2).Thus the outdoor manual workers predominated in our group. These patients had direct contact with the contaminated environment. 7.7% patients were housewives and 5.5% were students who had contact with the contaminated environment while playing in the schools. The inter-relationship between the occupations, contaminated environment and home and leisure activities is shown in Figure-3.This was consistent with the previous Chennai study in which the outdoor manual workers predominated work[4] .Outdoor manual workers are more vulnerable while they come in contact with contaminated environment. Leptospirosis is a zoonosis and infected animals (rodents and domestic animals) are an important source of infection. Contaminated environment is due to the urine of these infected animals contaminating the soil and water and contact with this leads to human infection.

Everard JD, Everard CM[5] pointed out that where leptospirosis is widespread in the environment and where the disease is endemic, infection will be related to a way of life as well as to specific occupations. Thus when there are large number of rodents, stray dogs and wild animals, where people drink or bathe in untreated water,when sewerage and drainage facilities are inadequate and where open shoes or none at all worn,leptospiral infection can be common. In such places occupational risk factors are so vertically linked with life style risk factors then investigation of sources of infection in individuals are inappropriate.

This study has revealed the role of contaminated environment in the transmission of leptospirosis. Among the contact with contaminated environment, poor sanitation (inefficient garbage disposal) and walking barefoot are the most important epidemiological risk factors. Recreational activities and bathing in the contaminated water, rainfall and animal contact are the other epidemiological risk factors. Leptospirosis can also occur in non-monsoon months due to the persistence of the contaminated environment. Outdoor manual workers are at risk of acquiring leptospirosis.

Conclusion: Contact with contaminated environment [poor sanitation (e.g. inefficient garbage disposal), poor drainage facilities (e.g. stagnant water)], walking in barefoot,recreational activities involving the contact with contaminated water and bathing in contaminated water sources like in ponds, lakes and wells are important epidemiological risk factors in acquiring leptospirosis. Rodents were the main animal source of contact. Rainfall was another important epidemiological risk factor. High risk occupational groups involving the contact with the above factors are vulnerable.

We recommend that all patients with fever of more than 5 days of duration should be investigated for leptospirosis especially in endemic areas. Preventive measures like antirodent measures, isolation of index case domestic animals and control of transmission along with public health measures to improve the contaminated environment will run a long way to decrease not only leptospirosis but also other communicable diseases.

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Health Care- Seeking Behaviour of Women with Symptoms of Reproductive Tract Infections in Urban field practice area, Hubli,Karnataka.

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Abstract:

Background: Reproductive tract infections (RTIs)is a global public health problem,mostly ignored by many women.Since a large proportion of women suffer morbidity silently, and are reluctant to seek care, a community based study was done in Hubli,to know the health care-seeking behaviour among symptomatic women with RTI. **Objectives:**To estimate the pattern of health care-seeking behaviour and reasons for those not seeking help, among women with symptoms of RTI. **Materials and Methods**:It is a cross-sectional study, where a simple random sampling technique was used to select households . A pre-tested structured questionnaire was used to collect data on reproductive history, current and past RTI symptoms and their health seeking behaviour, from 656 reproductive age group women residing in field practice area. The presence of infection was confirmed by clinical examination in the Urban health centre. **Results:** It was observed that, among 265 women who had symptoms of RTI, only 146(55.09%) women with symptoms had sought some form of treatment, while 119(44.91%) had not sought any treatment. It was found that majority 72(49.32%) symptomatic women, who sought treatment, preferred home remedies. Among those who did not prefer any treatment, 95(79.83%) had attitude that it will get cured by itself. Among those who had not sought treatment, 117(98.32%) women had evidence of RTI. **Conclusion**:In this study, the health care seeking behavior of women with RTI is low .Hence, women must be given health education to seek health care earlier to prevent further complications of the disease.

Key Words: Reproductive tract infections, health care seeking behavior, syndromic approach

Introduction

The global burden of reproductive tract infections (RTI's) is enormous and is an important public health concern, particularly in developing countries where RTIs are endemic.(1) RTI's, excluding Human Immunodeficiency Virus (HIV) constitute the second major cause of disease burden (after maternity related causes) in young adult women in developing countries.(1)

The presence of high prevalence of asymptomatic disease, is a barrier to effective control.(2) Even when symptoms occur, their presentation can overlap with and be diagnosed as a normal physiological change and normal physiological discharge may be misdiagnosed as RTI's.(3) In some instances, despite availability of best services, symptomatic persons do not seek or delay in seeking appropriate diagnostic and treatment services.(4) RTI's entail a heavy toll on women, if untreated can cause serious consequences of infertility, ectopic pregnancy, cervical cancer, menstrual disturbances, pregnancy wastage and low birth weight babies.(1) The presence of RTI's

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especially ulcer causing STI's can enhance the acquisition and transmission of the human immunodeficiency virus. [5]

This study was carried out to assess the understandings and care seeking behaviour with regards to RTI's among women of the reproductive age group, in the field practice area of Urban Health Training Centre (UHTC), Hubli, Karnataka. The objective of this study was to estimate the pattern of health care-seeking behaviour and reasons for those not seeking help, among women with symptoms of RTI.

Materials and Methods

It is a cross- sectional study, conducted for one year, from April 2005 to March 2006.The sample size was calculated by taking into consideration 19 % of women under 15 – 45 years in urban community, at 95 % Confidence Interval and 3 % permissible error, covering ±1.96 under normal curve, the sample size worked out to be 656 with the application of the formula [$\pm 1.96\sqrt{pq/n}=\pm 0.03$].

This study was undertaken in the field practice area of Urban Health Training Centre, (UHTC),Hubli. All houses in the urban field practice area were numbered and by using a random number table ,the houses were selected on the basis of simple random sampling technique, until 656 reproductive age group women were covered in nearly 520 families. A pre-tested structured proforma was used to interview the women about their reproductive history, current and past RTI symptoms as well as their health seeking behaviour.

The syndromes related to RTI like abnormal excessive vaginal discharge, genital ulcer disease, inguinal bubo, lower abdominal pain, lower back ache and pain during urination ,as recommended by Government of India, Ministry of Health and Family Welfare, for management of RTIs / STDs were considered.[6]All 656 women were given referral slips and encouraged after counselling to attend for clinical examination in UHTC. Statistical tests like Proportions and Chi-square test was used .Data was tabulated on Microsoft excel sheets and analyzed using software SPSS

Results

Table 1: Distribution of symptomatic women with RTI and their health seeking behaviour

Health care seeking behaviour	RTI on clinical examination		Total
	Present (%)	Absent (%)	
Sought some treatment	128(87.67)	18(12.33)	146
Not sought any Treatment	117(98.32)	2(1.68)	119
Total	245	20	265

(x^2 =18.34, p<0.001, significant)

Table.2: Distribution of women with duration of symptoms of RTI before seeking treatment

Duration of symptoms of RTI before seeking treatment	RTI on clinical examination		Total
	Present (%)	Absent (%)	
<1 Month	3(30)	7(70)	10
1-6 Month	36(85.7)	6(14.3)	42
6-12Month	83(94.3)	5(5.7)	88
>12Month	6(100)	0	6
Total	128	18	146

(x^2 =31.97,p<0.001,highly significant)

It was observed that, out of 656 women taken for study, 265 women had symptoms of RTI and among them, 245(92.5%) women were positive for RTI on clinical examination.(n=265). And among 265 symptomatic women, 146(55.09%) women who had sought some form of treatment, while 119(44.91%) had not sought any treatment before.(n=265)

[Table 1] .Among those who had sought treatment,128(87.67%)women had evidence of RTI,(n=146).Among those who had not sought treatment, 117(98.32%)women had evidence of RTI.

(n=119).It was found that, the difference between the proportion of women with RTI, who had sought treatment earlier and those who did not seek treatment early was found to be statistically significant. (p<0.001).Hence early treatment seeking reduces the risk of RTI, but proper ,regular and follow up treatment from health professionals are required for complete cure of RTI.[Table 1]

Table.3:Distribution of symptomatic women with RTI and the sources of treatment preferred

Sources of treatment preferred	RTI on clinical examination		Total
	Present (%)	Absent (%)	
Home remedies	72(100)	0	72
Allopathic Doctor	5(29.4)	12(70.6)	17
Chemist shop	5(100)	0	5
Traditional healers/quacks	11(91.7)	1(8.3)	12
Others (health workers, nurses etc.)	35(87.5)	5(12.5)	40
Total	128	18	146

$(x^2 = 20.08, p < 0.001, \text{highly significant})$

Table 2 shows the duration of symptoms before seeking health care by women. It was found that majority of women 88(60.3%) sought treatment for the duration of symptoms of 6-12 months, while 42(28.8%) women sought treatment for the duration of symptoms of 1-6 months,10(6.8%) women for less than one month duration of symptom and 6(4.1%) women for greater than 12 months symptom.(n=146)

It was found that among symptomatic women who had sought treatment with duration of symptoms<1 month, only 3(30%)women had evidence of RTI, while among those women who had treatment between 1-6 months duration of symptoms,36(85.7%) had evidence of RTI and among those women who had sought treatment between 6-12 months duration of symptoms,83(94.3%)had RTI and among women who had sought treatment greater than 12 months duration of symptoms,nearly6(100%) of them had evidence of RTI. It was observed, that there is relationship between seeking the treatment early and decreased RTI occurrence, which was found statistically significant.(p<0.001)[Table 2].This emphasizes that, seeking the treatment with early duration of symptoms, helps in complete cure of the disease.

It was observed that among 146 symptomatic women who had sought treatment, majority 72(49.32%) had preferred home remedies, followed by 40(27.4%) sought treatment from health workers, nurse etc. who visited their homes.17(11.6%) went to allopathic doctor ,12(8.2%) approached traditional healers/quacks and 5(3.4%) took treatment as suggested by chemist in a pharmacy shop.(n=146) [Table 3]

Table:4 Distribution of symptomatic women with RTI and the reasons for not seeking health care

Reasons for not seeking health care	RTI on clinical examination		Total
	Present (%)	RTI Absent (%)	
No time	9(100)	0	9
Cure by itself	93(97.9)	2(2.1)	95
No response	15(100)	0	15
Total	117	2	119

It was found that, all women who had sought home remedies 72(100%) and treatment from chemist shop 5(100%) had evidence of RTI. It was observed that, those women who had sought treatment from traditional healers/quacks ,11(91.7%)women had evidence of RTI ,while 35(87.5%)women, who had sought treatment from health workers or nurses had evidence of RTI. This was because, women had failed to take the treatment regularly and completely. Among women who went to allopathic doctor and had a follow up, only 5(29.4%)women showed evidence of RTI. It was found that the proportion of women,who sought treatment from qualified person had lesser incidence of RTI, which was found to be statistically significant.(p<0.001). This emphasizes

that early health seeking from qualified, competent practitioner will reduce the progress of the disease or infection and further reduce the complications.[Table 3].

Table 4 shows that, among 119 women who had not sought treatment for their symptoms, majority of women 95(79.8%) gave reason that, it will cure by itself, 15(12.6%) did not give any response,while 9(7.6%) told that, they did not have time to seek health care.(n=119).It was found that, all women who gave reason for not seeking treatment as no time and showed no response had evidence of RTI.

Discussion

Our study is similar to study conducted in Vellore, Tamilnadu by Jasmine et al, where only one-third of the women in that study who reported symptoms, 35% sought any treatment, while 65% had not sought any treatment. [(7)] This is contrary to study done in Nigeria, where most patients (87.9%) sought medical care when they experienced symptoms of RTI's. [(8)]. The duration between symptom recognition and seeking help can have important repercussions for women's health, as obviously the more promptly help is sought the better, it is for women, and by implications also their husbands. In a study by Durr-e-Nayab et al, the proportion seeking help within 30 days of experiencing a symptom is lowest, increasing with the passage of time, and is highest when a symptom is over 90 days old. [(9)] This is similar to our study ,that majority 88(60.3%) had sought treatment after 6-12 months of RTI symptoms. Bhatia and Cleland (1995), in their study in South India on the health seeking behaviour of women with gynaecological morbidities, also found that there is a higher probability of seeking treatment among women who have been experiencing a symptom for a longer time than for those whose experience is a more recent one. [(10)] .It was observed in our study, that among 146 symptomatic women who had sought treatment ,majority 72(49.32%) had preferred home remedies.This is similar to Jasmine et al study , of the 35% who had sought treatment, 21% of them had opted for home remedies or traditional medicine, 57% had approached unqualified private practitioners and 13% had gone to CHAD Hospital. Only 9% had sought medical care at the government primary health centers. [(7)]

In a study conducted at Hooghly,West Bengal by Samanta A et al,50% of female STI patients sought treatment from any of the health care providers,46.3% of women went to Govt facility.[(11)] . In a study done at Karachi, women consulted a variety of healthcare providers in their pursuit for treatment, mainly allopathic doctors and hakims. The different treatments prescribed to women ranged from oral and intra-vaginal medications to various home remedies including refraining from specific foods. [(12)] .In a study done in Nigeria,Government health centres were the most visited health facility for treatment of RTI's. [(8)] This finding is different from, what is reported in West Bengal where most respondents (41.5%) patronized private doctors.[(13)]A study done in Egypt by S A Sallam et al showed that, when investigators asked who to consult and what to do before seeking medical advice for RTI symptoms, the answers were very varied and sometimes questionable. [(14)] .In a study by Nargis Rizvi et al,among Nepalese women, they expressed that a number of topical home remedies are used for the treatment of vaginal discharge. [(15)] However, most (90%) of these patients in the current episode, had been to two or more health providers before they finally reached the hospital. The first place of contact with health system was the pharmacy by urban women and traditional healers by rural women.[(15)] .Our study is in accordance to Jasmine et al study, where among symptomatic women, 65% had not sought any treatment for their gynecologic problems. Of these women, 58% reported that they felt the symptom was not alarming and so there was no need for treatment, similar to our study, where majority of women told that, it will cure by itself. [(7)]

In another study conducted by Nargis Rizvi et al,all those women, who did not seek care 20%,the reason was due to shame and fear and lack of privacy in biomedical institutions. [(15)] A study conducted by Akkinnawoe et al,found that ,the reason for not seeking care was due to economic reason or due to ignorance by women, [(16)] while a similar study on health seeking behaviour conducted by Singh Lakhwinder et al in Rajasthan found that,women

avoided seeking health care,due to assurance of maintainance of confidentiality by quacks. [17]

Other less common reasons were absence of a female provider in the nearby health care center, lack of privacy and distance from home. [7] Many studies show that the reasons for not seeking care were stigma and embarrassment, lack of privacy, lack of female doctors at health facilities and treatment cost. [18] In a Nigerian study, 15 of the 22 respondents (68.2%) who did not seek medical care gave short duration of symptoms as the reason for their behavior. [8] The limitations of our study were that, we relied upon self reported answers to events that may have occurred earlier and these may be subject to recall and reporting bias. Also, severe symptoms are likely to be remembered longer than mild symptoms.

Conclusion

People's health care seeking behavior has major implications for transmission of disease and its control. An understanding of health care seeking behavior is therefore important, if RTI/STI control programmes are to be effective. At the moment relatively little is known about, who people turn to for advice, or about how symptoms are perceived, recognized or related to decisions, to seek help. Studies providing such information would assist programme planners in the development of more accessible and effective services in the control of RTI.

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Millennium Development Goals (MDGs) WATCH-Countdown to 2015 Measuring progress towards the MDGs – Indian Scenario

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The Millennium Development Goals (MDGs) set up by the United Nations were adopted by 189 countries in the UN Millennium Summit held in September, 2000 including our own country India. The United Nations Development Group (UNDG) in its 2nd Guidance note (endorsed in 2003) on 'Country Reporting on the Millennium Development Goals' provided a framework of 53 indicators (48 basic + 5 alternative) which are categorized according to targets, for measuring the progress towards individual targets.

India's MDG framework recognizes all the 53 indicators that UNDG's 2003 framework for monitoring of the 8 MDGs. However, India has found 35 of the indicators as relevant to India.

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India's MDG-framework has been contextualized through a concordance with the existing official indicators of corresponding dimensions in the national statistical system.

Table – 1 provides the details of Goals, Targets and Indicators of India's MDG Framework. It also summarizes the progress so far.

The methodology for tracking the MDGs in this report is the one prescribed by the UNSD for developing countries. This methodology is characterized by the simplicity of its formulation and ease of interpretation. The indicators in India's MDG framework are mostly direct indicators which obviate the need for imputation or indirect derivation of the measures the identified indicators. This simplifies the review exercise and eliminates the need to depend on assumptions.

Table 1: Goals, Targets and Indicators of India's MDG framework including the summary of India's progress so far in achieving the MDG[1]

MDG 1: Eradicate Extreme Poverty and Hunger			
Target 1: Halve, between 1990 and 2015, the Percentage of Population below the National Poverty Line			
Indicator 1: Poverty Head count Ratio(HCR-Percentage of population below the national poverty line)	Percentage of the population in poverty declined from 45% in 1993-94 to 37 % in 2004-05.	Country is required to achieve a HCR level of 23.9% by 2015 in order that MDG target 1 is achieved.	**Moderately on-track**
Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger.			
Indicator 4: Prevalence of underweight children under 3 years of age	From estimated 52% in 1990,the Proportion of underweight children has declined for about 40% to 2005-06	It is required to be reduced to 26% by 2015 to reach the target	**Slow or almost off-track**
MDG 2: Achieve Universal Primary Education			
Target 3: Ensure that by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary education			
Indicator6: Net Enrolment Ratio in primary education	In the years 2008-09 and 2009-10, India's NER by the DISE statistics, are 98.6% and 98.3% respectively.	A trend based on DISE data shows the country now well set to achieve cent percent primary education for children in the primary schooling age of 6-10 years ahead of 2015.	**On track**
Indicator 7: Proportion of pupils starting Grade 1 who reach Grade 5	It has risen from 62% in 1999 to 81% by 2002 and declined thereafter to 73% in 2004. According to DISE 2007-08, it further dipped to 72% in 2007-08. However, DISE 2009-10 indicated an improvement to 76 percent in 2008-09.		
Indicator 8: Literacy rate of 15-24 year olds	It increased between 1991 and 2001 from 61.9% to 76.4 % and 86% in NSS 2007-08. The rural-urban gap in youth literacy also has significantly reduced	According to the trend exhibited during 1991- 2001, India is likely to attain 100% Youth literacy4 by 2015	

MDG 3: Promote Gender Equality And Empower Women			
Target 4: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education, no later than 2015.			
Indicator 9: Ratio of girls to boys in primary, secondary and tertiary education	**In primary education,** the GPI ratio has gone up from 0.76 in 1990-91 to 0.98 in 2007-08 showing 29% increase.**In secondary education** the increase is from 0.60 in 1990-91 to 0.85 in 2007-08 thereby showing 174 crease, n**In higher education,** it has increased rom 0.54 in 1990-91 to 0.7 in 2007-08 registering an increase of 30%.	The rates of increase in GPI signify India's on the track progress to achieving Gender parity in enrolment by 2015, even for Secondary grade.	**Moderately or almost** **nearly on track**
Indicator 10: Ratio of literate women to men ,15-24 years old	The Female: Male literacy rate for 15-24 years increased from 0.67 in 1991to 0.80 in 2001. NSS (2007-08) results show that, literates in the age group 15-24 years at all India level is 86% with 91% males and 80%females. Thus the ratio of literate women to men in the age group 15-24 years stands at 0.88 in 2007-08.	The ratio of literate women to men in the age group 15-24 yrs tends to exceed to 1 by 2015, implying reaching a state of gender disparity against male youths in literacy by 2015.	***Gender parity in youth literacy tends to be a reality***
Indicator 11: Share of women in Wage employment in Nonagricultural sector	As per NSS 66th round on Employment and un employment during 2009-10, the % share of females in wage employment in the non-agricultural sector, stood at 18.6%.	It is projected that at this rate of progression, the share of women in wage employment can at best reach a level of about 23.1% by 2015.	
MDG 4: Reduce Child Mortality			
Target 5: Reduce by two-thirds, between 1990 and 2015, the Under-Five Mortality Ratio.			
Indicator 13: Under- Five Mortality Rate	SRS based U5MR in India for the year 2010, stands at 59 and it varies from 66 in rural areas to 38 in Urban areas.	Given to reduce U5MR to 42 per thousand live Births by 2015, India tends to reach near to 52 by that year as per trend shown above, missing the target by 10 percentage points.	**Slow or** **off-track**
Indicator 14: Infant Mortality Rate	Though IMR for the country as a whole declined by 33 points in the last 20 years at an annual average decline of 1.65 points, it declined by six points between 2008 and 2010 with IMR at national level being 47 in 2010.	With the present improved trend due to sharp fall during 2008-09, the national level estimate of IMR is likely to be 44 against the MDG target of 27 in 2015.	
Indicator 15: Proportion of one year old children immunized Against measles	The national level measure of the proportion of one-year old (12-23 months) children immunised against measles has registered an increase from 42.2% in 1992-93 to 74.1% in	At the historical rate of increase, India is expected cover about 89% children in the age group 12-23 months for immunization against measles by 2015. Thus India is likely to fall short of universal immunization of one year olds	

	2009 ***(UNICEF & GOI-Coverage Evaluation Survey 2009).***	against measles by about 11 percentage points in 2015.	
MDG 5: Improve Maternal Health			
Target 6: Reduce by three quarters, between 1990 and 2015, the Maternal Mortality Ratio.			
Indicator 16: Maternal Mortality Ratio (MMR)	From an estimated MMR level of 437 per 100,000 live births in 1990/1991, the current MMR is 212	India is required to reduce the MMR to 109 per 100,000 live births by 2015. At this pace of decrease, India tends to reach MMR of 139 per 100,000 live births by 2015, falling short by 30 points.	**Slow or off-track**
Indicator 17: Proportion of Births attended by skilled health personnel	It increased from 26% in 1992-93 to 47% in 2007-08. As a result, the coverage of deliveries by skilled personnel has also increased almost similarly by 19% points from 33% to 52% during the same period.	With the existing rate of increase in deliveries by skilled personnel, the likely achievement by 2015 is only to 62%, which is far short of the targeted universal coverage.	
MDG 6: Combat HIV/AIDS, Malaria And Other Diseases			
Target 7: Have halted by 2015 and begun to reverse the spread of HIV/AIDS.			
Indicator 18: HIV prevalence among Pregnant women aged 15-24 yrs	Among pregnant women of 15-24 years, the prevalence of HIV has declined from 0.86% in 2004 to 0.48% in 2008.	***Trend reversal in prevalence of HIV/AIDS continues***	**Moderately on-track**
Target 8: Have halted by 2015 and begun to reverse the incidence of Malaria and other major diseases.			
Indicator 21: Prevalence and death rates associated with Malaria	The total Malaria cases have declined from 2.08 million to 1.6 million during 2001 to 2010. Similarly Pf cases have declined from 1.0 to 0.83 million cases during the same period. Less than 2000 annual deaths were reported during all the years within this period with a peak in 2006 when an epidemic was reported in NE States.		**Slow and off-track**
Indicator 23: Prevalence and death rates associated with Tuberculosis	Prevalence of all forms of TB has been brought down from 338/ lakh population (1990) to 256/ lakh population in 2010 and TB mortality in the country has reduced from over 42/lakh population in 1990 to 26/lakh population in 2010 as per the WHO global report 2011.	Repeat population surveys conducted by TRC7 indicate an annual decline in prevalence of the disease by 12%.	**Slow and off-track**
MDG 7: Ensure Environmental Sustainability			
Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.			
Indicator 25:	As per 2011 assessment, India has a forest cover of 6,92,027 km2, which	There is an increase in forest cover by about 1128 sq. km	**On track**

Proportion of land area covered by forest	constitutes 21.05% of the Country's geographic area.	between 2007 & 2011.	
Target 10: Halve, by 2015, the proportion of people without sustainable access to safe Drinking water and basic sanitation.			
Indicator 30: Proportion of population with sustainable access to an improved water source in urban and rural areas	The proportion of households without access to safe drinking water sources from its 1990 level (about 34%), i.e. of the order of 17% to be reached by 2015.	It has already been attained by 2007-08, much before the target timeline. By 2015, India is likely to reduce the rural proportion of no sanitation to 58.84% (against target of 46.64%) and urban proportion of no sanitation to 11.64% (against target of 12.14%).	**On-track or** **fast by one main indicator (for drinking** **Water) but slow by another** **main indicator (Sanitation)**
Indicator 31: Proportion of population with access to improved sanitation, urban and rural areas	Given the 1990 level for households without any sanitation facility at 76%,	India is required to reduce the proportion of households having no access to improved sanitation to 38% by 2015.	
MDG 8: Develop A Global Partnership For Development			
Target 18: In co-operation with the private sector, make available the benefits of new technologies, especially information and communication.			
Indicator 47: Telephone lines and Cellular subscribers/100 population	At the end of June-2011, 98.1% of the total inhabited villages in India have been connected.		**On-track or fast**
Indicator 48A: Internet subscribers per 100 population	Over a period of 12 years, internet subscriber base had increased by 97 fold from 0.21 million in 1999 to 20.33 million in 2011. Apart from this, 346.67 million wireless subscribers have subscribed to data services, as reported by the wireless service providers.		

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