Peer Reviewed
Indexed Journal

Volume 3.Issue 3. July– Sep. 2014

National Journal of Research in Community Medicine

Official Publication of Community Medicine Faculties Association

ISSN: 2277-1522 (Print)

ISSN:2277-3517 (Online)

NJRCM of COMFA

India

www.commedjournal.in

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

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

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

Manuscript Submission:
http://www.commedjournal.in/man.html

Original Research Article

A Study on Knowledge, Attitude and Practice of Reproductive Tract Morbidity among Women in a Rural Area of Tamilnadu

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Date of Submission: 21.06.2014 **Date of Acceptance: 29.07.2014**

Abstract

Introduction : Reproductive ill health accounts for most of the burden of disease among women. Women are at a greater risk compared to men and because of stigma are less likely to seek treatment. There is a poor awareness of Reproductive Tract Infections (RTI) among women in India and this is responsible for much of the morbidity and mortality among them. **Objectives :** To study knowledge, attitude and practice regarding RTIs amongst women of reproductive age group (15-49 years). **Materials and Methods:** Systematic random sampling technique was done to select the appropriate number of households for the study. One woman in the age group of 15 – 49 years was selected from each selected household. 461 women thus constituted the sample of study population. Data was collected by a predesigned and a pretested questionnaire and was analyzed by using Statistical Package for Social Sciences (SPSS) version 18.0. Proportions were calculated for the various study variables. **Results :** Of the total study population of 461 women, majority(72%) of them were in the age group of 21-40 years.88.3% were literate and 83.5% of them were homemakers. Most (51%) of them belonged to middle socio-economic status.83.5% had correct knowledge of disease symptoms of RTI. 65.5% had correct knowledge regarding modes of transmission of RTI. 68.2% had the correct knowledge of prevention of RTI.77% of them sought treatment for RTI.Most (49.3%) of them chose private hospitals.91.5% had a negative attitude for internal examination.85% of them were following menstrual hygiene practices. About 75.4% of the study population had tubectomy done.

Key words: RTI , Transmission, Prevention, Tubectormy

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Introduction:

World Health Organisation has estimated that more than 340 million new cases of curable STIs namely syphilis, gonorrhea, chlamydia trachomatis and trichomonas vaginalis occur every year throughout the world in men and women aged 15-49 years with 151 million of the new cases occurring in South and South-East Asia.

Reproductive ill health accounts for 33 % of the total burden of disease in women, whereas it is 12.3 % for men. Globally STIs constitute a huge health and economic burden, especially for developing countries accounting for 17 % of economic losses caused by ill-health.[1] A woman is at risk of acquiring Reproductive Tract Infections(RTI) because of certain specific cultural practices and social norms of behaviour that put her at special risk. These include not only early initiation of sexual activity in young girls but also other situations faced by women in the developing world like unsafe abortion and unsafe childbirth as also traditional methods like insertion of roots, stems, leaves, twigs etc per vaginal for self medication.[2] About one-third of women from rural India had reported any one symptom of RTI / Sexually Transmitted Infections(STI). Women especially in rural

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India have lot of misconceptions regarding RTIs. Women are submissive to men socially and economically and they have less control over their sexuality. Low level of literacy and ignorance among rural women result in misconceptions about the illness. Culture of silence is prevalent among Indian women. Women hesitate to discuss their sexual and reproductive tract problems with their husband and other family members as they fear that their character would be suspected.[3] RTIs are often asymptomatic in women and may often go undiagnosed and untreated until complications like infertility supervene. Untreated or inappropriately managed RTIs have devastating effects on health of women. Some of the common complications of RTIs includes pelvic inflammatory disease (PID), ectopic pregnancy, infertility, adverse outcomes of pregnancy, neonatal morbidity and death (in case of HIV / AIDS and genital cancers).[4] HIV / AIDS is synergistically influenced by the presence of other RTIs. STIs facilitate HIV transmission. The 2006 report on the global AIDS epidemic has estimated that approximately 6.9 million people living with HIV in South East Asia Region. More than 6 million people with HIV live in India. About 2 million of the total cases were women aged 15 years and above and the most common route of infection transmission was through sexual contact.[5] Millennium Development goal 5, target 6 seeks to reduce the maternal mortality by three quarters by 2015. Prevention of pelvic inflammatory disease will contribute to this goal by preventing the death toll related to ectopic pregnancy. As 40 to 50 % of the ectopic pregnancies can be attributed to previous PIDs.[6] Taking the above facts into consideration a study was conducted in a rural area of Chennai to study knowledge, attitude and practice regarding RTIs amongst women of reproductive age group.

Materials and methods

A cross-sectional study was conducted among women of reproductive age group (15-49 years) in Sripuram, the field practice area of Rural Health Centre of Sri Balaji Medical College and Hospital, Chrompet, Chennai between August 2011 to June 2012 for a period of 11 months. The present study was conducted after approval from Institutional Ethics committee and after taking consent from the participants. Based on the prevalence of RTI among women of 15-49 years as 50% and with an alpha error of 0.05% ,limit accuracy of 10% and a non-response rate of 20% the minimum sample size required for the study was worked out to be 461. The total number of households in the area was 3230. All the houses were enlisted. Systematic random sampling technique was done to select the appropriate number of households for the study. Every 7th house was selected starting from the first house that is selected (3rd house in the list). In this house-to-house survey, if a house was found locked or the eligible subject not available, the next house was considered.One woman of 15 – 49 years would be selected from each selected household . If there are more than one than the youngest of all was included in the study sample. Data collection was done by household survey by direct interview using a pre-tested and structured questionnaire . The interview was carried out in Tamil in the comfortable environment at the home of the study subjects. The questionnaire consisted of close-ended questions with multiple choice . Relevant demographic data like name, age, religion, total family members, education, occupation ,type of family, monthly income and marital history was also accessed. Standard of Living Index was computed and the families were assigned low, medium and high standard of living.[7] Questions were related to knowledge of the common symptoms of RTIs, modes of spread and preventive measures. Questions were also asked regarding common practices during menstruation, personal hygiene practices and treatment seeking behaviour. The questionnaire was filled by the interviewer on the spot. The environmental conditions of the household were also surveyed.

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The data generated were analysed to determine the Knowledge , Attitude and Practice of the study subjects with regard to RTI. Analysis was done using Statistical Package for Social Sciences (SPSS) version 18.0.

Results

A sample of 461 women in the age group of 15-49 years formed the study population. Majority (72.0 %) of study subjects. were in the age group of 21-40 years.(**Table-1**) This observation assumes significance as this age group is both highly sexually active as well as highly fecund and both these conditions being risk factors for acquiring RTIs. The overall literacy rate was high with 88.3 % of the women being literate. 48.6 % of the women had educational qualifications of higher secondary and beyond. 83.5 % of women were homemakers,5 % were unskilled workers, 3.7 % were semi skilled workers , 2.6 % were skilled workers and 5.2 % were professionals. As per the Standard of Living Index Scale of NFHS II , majority (51.0 %) of women belonged to middle, 27.3 % of them to low and 21.7 % of them to high socio economic classes. Knowledge regarding RTIs amongst study subjects was judged with regards to awareness of common symptoms of RTIs and knowledge regarding modes of transmission and prevention. 83.8 % of the study subjects had correct knowledge of disease symptoms of RTIs. As per the correct knowledge of symptoms the responses were white discharge (69.0 %), low backache (8.9 %), burning urination (4.6 %) and coital pain (1.3 %). **(Table-2)** As per the correct knowledge of the modes of transmission of RTI, 39.7 % and 25.8 % of the study subjects correctly pointed out poor personal hygiene and sexual contact respectively. Certain wrong notions of spread like through food, water used for bathing and washing also prevailed amongst 0.4 % and 0.2 % of the women respectively. 18.4 % of the women also mentioned dirty toilets as a possible mode of transmission of RTIs. **(Table-3).** 43.7 % and 24.6 % of women felt that maintaining a

Table 1: Distribution of study subjects according to age (n=461)

Age group	No.	%
15 - 20 yrs	24	5.2
21 - 30 yrs	135	29.3
31 - 40 yrs	197	42.7
41 - 49 yrs	105	22.8
Total	461	100.0

Table 2: Knowledge of signs and symptoms of RTI (n=461)

Signs and Symptoms	No.	%
White discharge	318	69.0
Low back ache	41	8.9
Burning urination	21	4.6
Coital pain	6	1.3
Excessive bleeding during menses	71	15.4
Irregular cycles	3	0.7
Weakness	53	11.5
Total	461	100.0

Table-3 : Knowledge regarding the modes of transmission (n=461)

Mode of Spread	No.	%
Poor personal hygiene	183	39.7
Sexual contact	119	25.8
Food	2	0.4
Dirty toilets	85	18.4
Water used for bathing and washing	1	0.2
Don't know	98	21.3
Total	461	100.0

Table-4: Knowledge regarding modes of prevention (n=461)

PREVENTION OF ILLNESSES	No.	%
Good personal hygiene	201	43.7
Safe sexual practices	113	24.5
Both	110	23.8
Don't know	159	34.6

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good personal hygiene and adopting safe sexual practices prevents transmission of RTI. 23.8% had knowledge about both the above modes of prevention .34.6 % of women had no idea about the modes of prevention of RTI. **(Table-4).** As per the attitude towards curability of RTIs, 59.4 % of women believed that RTIs are curable, where as 40.6 % of the study subjects responded that RTIs are not curable. **(Table-5).** 77.0 % of the study subjects sought medical treatment for their ailments of reproductive tract and 23.0 % of women did not seek any medical help. **(Table-6).** Majority (49.3 %) of the study subjects sought treatment from private clinics followed by 22.3 % of them from primary health centres, 13.2 % of them from private hospitals, 9.3 % of them from government hospitals and 5.9 % of them sought native medicine.23% of the study subjects did not avail any treatment. **(Table-7).** 19.8 % of women stated financial constraints as a reason for not seeking treatment for RTIs followed by 6.6 % of them citing non availability of female medical officer, 5.6 % of them quoting that Health institution being too far and 3.8 % of women complained of lack of privacy. 64.2 % of women gave other reasons like " treatment was not necessary", "disease is not that serious to seek medical treatment", " it's a part of life", and " it will heal on its own". **(Table-8).** Majority (91.5 %) of women commented that they would not like an internal examination (PV examination) and only 8.5 % of women preferred for being examined internally. **(Table-9).** Majority (49.6 %) of women were using sanitary pads available commercially while 35.4 % were using fresh pieces of cloth during each period. 15.1 % of them were reusing old cloth. Use of sanitary pads for sanitary protection still remains uncommon in India. **(Table-10).** 49.8 % of women washed their genitals during menstruation only with water, 37.3 % of them washed with soap and water and only 12.9 % of women used antiseptics in addition to soap and water. **(Table-11).** 58.4 % of the study subjects said that they would stop

Table-5: Attitude towards curability of RTI (n=461)

RTI's are curable	No.	%
Yes	274	59.4
No	187	40.6
Total	461	100.0

Table- 6 : Treatment sought in the last 6 months (n=461)

Sought treatment	No.	%
Yes	355	77.0
No	106	23.0
Total	461	100.0

Table-7 : Places sought for treatment (n=461)

PLACES SOUGHT FOR TREATMENT	No.	%
Primary Health Centre	79	22.3
Private Clinic	175	49.3
Government Hospital	33	9.3
Private Hospital	47	13.2
Native medicine	21	5.9
Nowhere	106	23.0
Total	461	100.0

Table-8 : Reasons for not availing treatment(n=106)

Reasons	No.	%
Health institution too far	6	5.6
No female medical officer	7	6.6
No privacy	4	3.8
Economic reasons	21	19.8
Others	68	64.2
Total	106	100.0

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Table-9 : Attitude towards per vaginal examination (n=461)

Prefer P.V. examination	No.	%
Yes	39	8.5
No	422	91.5
Total	461	100.0

Table-10 : Menstrual hygiene practices amongst study subject (n=458)

Sanitary protection during menses	No.	%
Sanitary pad	227	49.6
Fresh cloth for each period	162	35.4
Old cloth reused	69	15.0
Total	458	100.0

Table -11: Perineal hygiene practices amongst study subjects (n=458)

Washing genitals	No.	%
Water	228	49.8
Soap & Water	171	37.3
Soap & Water + Antiseptics	59	12.9
Total	458	100.0

sexual activity till the RTI are healed. 28.5 % of them said that they would begin using condoms. However, 13.1 % of the women said that they would continue normal sexual activity. **(Table-12).** Contraceptive of choice among majority (75.4 %) of the study subjects was observed to be mainly permanent method of sterilization i.e. tubectomy .Use of intrauterine contraceptive devices (copper T) was around 15.1 % while only 9.5 % of them were using oral contraceptive pills. **(Table-13).**

Table-12 : Sexual practice of study subjects during affliction with RTI symptoms. (n=404)

Sexual practices during illness	No.	%
Continue normal sex	53	13.1
Use condoms	115	28.5
Stop sex till healed	236	58.4
Total	404	100.0

Table-13 : Use of contraceptive methods amongst study subjects(n=337)

CONTRACEPTION	No.	%
Tubectomy	254	75.4
Copper T	51	15.1
OCP	32	9.5
Total	337	100.0

Discussion

A study was conducted among 461 women in the reproductive age group of 15-49 years in the field practice area of Rural Health Training Centre, Sripuram of Sri Balaji Medical College and Hospitals to assess the knowledge , attitude and practice of Reproductive Tract Infections .

As per the knowledge of common symptoms of RTI, 83.8 % of the study subjects had correct knowledge of disease symptoms of RTIs. Their responses were white discharge (69.0 %), low backache (8.9 %), burning urination (4.6 %) and coital pain (1.3 %). The commonest symptom of RTIs, as known by the study subjects was vaginal discharge (69.0 %). A small survey done by Pachauri et al [8] in rural Maharashtra in 1994, where 32 women were asked to list all women's health problems, 95 % of the women had mentioned vaginal discharge. Patel et al [9] in

a survey conducted in Gujarat asked women list the ten most common illnesses in women according to severity, and found that the women had named 'white discharge' as the most serious. Thus, awareness of vaginal discharge as a sign of illness is widespread and often subjects over report its severity. Narayan et al [10] commented that there may be excessive worry about "normal" vaginal secretions amongst adolescent school girls. Sharma et al [11] on their paper on the reproductive health problems of adolescent girls also reported that even adolescent girls consider excessive vaginal discharge as a common health problem. Patel and Oomman [12] have suggested a psychological dimension related to the reports of white discharge. These studies favour with the observations of the current study. 8.9 % of women listed low backache as a manifestation of RTIs. This proportion is comparable to that reported by Latha et al [13] who have documented that low backache is a malady commonly affecting women (5.3-39.3 %) especially during the time of menstruation. Since it is a common symptom affecting women, it is normal for them to attribute it to their reproductive system.

As per the knowledge regarding modes of transmission of RTI in the present study 39.7% of study subjects reported poor personal hygiene and 25.8% opined sexual contact . Dirty toilets as one of way was replied by 18.4% of the women. Similar observations was noted by O'Toole E J [14] in his study where 26 % of the women mentioned sexual activity as a possible route of transmission, 16 % attributed it to unhygienic toilets and 19.5 % attributed it to excessive intake of sugary foods. Arun Singh et al in their study on perceptions of RTIs amongst women of Uttar Pradesh, has reported that only one third of women in rural areas were aware of RTIs / STDs. 15.29 % of women mentioned needles / blades /skin puncture as a possible mode of transmission. 11.76 % attributed it to heterosexual practices. 4.7 % attributed it to lack of personal hygiene and 15.29 % responded that they know the exact modes of transmission.[15] In an ICRH [International Centre for Reproductive Health] survey by Ibn Sina, only 24 % of the interviewed women said to have knowledge of any sexually transmitted infection.[16]

In this study it was observed that 77% of the women sought treatment for RTI in the past 6 months. This however differs with the observations of the following studies. Bhanderi MN [16] in his study conducted in slums of Gujarat reported only 34 % of the participants seeking treatment for reproductive morbidity from any health facility. Arun Singh et al [17] in his study in Bareilly district, U.P. had reported that 51.25 % of the study subjects had sought treatment for RTI. Bang et al [18] found that although 55 % of the women subjects were aware that they had a gynaecological complaint, less than 10 % actually sought help from medical personnel. Reasons given were statements like 'I am too old for these things ' and some women were frightened of an internal examination.

It was noted in this study that 49.3 % of the study subjects sought treatment from private clinics, 22.3 % of them from primary health centres, 13.2 % of them from private hospitals, 9.3 % of them from government hospitals and 5.9 % of women sought native medicine. Similar observation were noted in the following studies. Bhanderi MN [16], in his study had reported that among the women who sought treatment, 65 % went to private sector – of which 27.4 % attended private clinics and 28.8 % attended private hospitals and 8.4 % of them went to hospitals of Trusts and NGOs. Reasons for not using government facilities were found to be long waiting time, distance, poor quality of services, non-availability of health provider Agarwal et al [19] in their study of RTI among ever married women of reproductive age in a rural area of Haryana have found that among women with RTIs, less than 40 % visited government centres even though the treatment given there was free . Even Roy et al [20] noted that among STI patients, most prefer to visit

private clinics or wish to use alternative medicines like those prescribed by 'hakims' and 'vaids'. However Arun Singh et al [17] in his study stated that majority of study subjects in both urban and rural areas sought treatment from government health care facilities. Hence by increasing the number of health care facilities in public sector and improving the quality of services rendered at district hospitals / CHC / PHC the magnitude of cases of RTI and STD can be reduced. This differs with the findings of the present study.

In the present study it was observed that 19.8 % of women stated financial constraints as a reason for not seeking treatment for RTIs. Health institution being too far and non availability of female medical officer were pointed out by 5.6 % and 6.6 % of women respectively. 3.8 % of women complained of 'no privacy'. 64.2 % of women gave other reasons like " treatment was not necessary", "disease is not that serious to seek medical treatment", " it's a part of life", and " it will heal on its own". A study conducted in slums of Gujarat observed that among the women who did not seek treatment, 87 % stated that treatment was not necessary, 28 % said to have financial constraints and 26 % said they did not have time. According to some respondents who has not sought treatment; symptoms were " a discharge of dirt from body " or " it was heat inside the body" . [16]

In the present study 91.5 % of women commented that they would not like an internal examination and only 8.5 % of women preferred for being examined internally. Bang et al [18] in his study reported that most of his study subjects did not prefer or feared internal examination. The IWHC publication comments, that reservations against examination of one's 'private parts' could be a prime reason why, in spite of the existence of a good health care delivery system, women still prefer to wait and watch with the hope that their RTI symptoms will heal on their own. [21]

It was noted that in the present study majority(49.6 %) of women were using sanitary pads available commercially, 35.4 % were using fresh pieces of cloth during each period and 15.1 % were reusing old cloth. Use of sanitary pads for sanitary protection still remains uncommon in India. Women prefer using cloth pieces for the same, mainly due to the cost factor .[10] However in the present study, the use of commercially available sanitary protection was higher and nearly 85 % of women had satisfactory menstrual hygiene than that reported by Narayan KA et al [10] and Singh SG et al. [22] Narayan KA et al [10] have reported that the use of sanitary napkins by adolescent girls was negligible with only 5.2 % of subjects using it. The use of recycled old cloth pieces was more common with more than 70 % of the girls doing so. Singh SG et al [22] report that the use of commercially available sanitary protection ranged from 30.15 to 45.35 % amongst girls in rural Delhi.

It was seen in this study that 58.4 % of the women said that they would stop sexual activity till they are cured of RTI . 28.5 % of them said that they would use condoms. A small proportion(13.1%) of the women said that they would continue maintaining normal sexual relations even if they were suffering from RTI symptoms. This fact corroborates the comments by Ankrah EM [23] that most women are powerless to dictate their own sexual activity or to participate in sexual decision making. Condom use, the most effective defence against RTIs/STIs, requires the acquiescence of the male partner, which in the current cultural milieu of most developing nations, the woman may be without power to demand.[17] Joshi et al [24] comment, that in many sections of Indian society as in other cultures, some men assert their dominance in family life through insistence on their right to sexual intercourse "on demand", regardless of the attitude and responsiveness of their wives. Women may have little negotiating power over matters such as use of condoms and this may render women

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

defenceless against any threat to their health. These reasons therefore could result in high percentage of women practicing unsafe sexual behavior.

As was observed in the present study contraceptive of choice amongst the study subjects was observed to be mainly permanent methods of female sterilization i.e. tubectomy with the majority (75.4 %) of women opting for the same. Use of intrauterine contraceptive devices (copper T) was around 15.1 %. This is of relevance as insertion of IUCDs in unclean conditions and without attention paid to asepsis may result in RTIs.[17]

It was noted in this study that the overall literacy rate though high in the study population , knowledge, awareness and attitude towards Reproductive Tract Infections , menstrual hygienic practices and sexual practices in the presence of RTI is far from satisfactory. This requires health education to be given to both the males and females concerning RTI. Attention should be given to the teenage and adolescent girls regarding menstrual hygiene and RTI. For this the schools can play an active role. Having separate toilets for girls obviates the necessity to urinate outside or far off places and at the same time motivates them to continue school instead of dropping out. Health education sessions in antenatal and postnatal clinics should include proper promotion of personal and menstrual hygiene. Like wise awareness about RTI, symptoms , free treatment and free sanitary pads can be generated though mass media communications like radio, T.V., newspaper, and short films in the movie theatres. The limitations of the study was categorisation of study sample into caste and community wise was not done which would have further provided some insight into the awareness of RTI among study subjects. Age wise and literacy wise awareness of RTI was also not assessed.

Acknowledgement

The authors are grateful to the staff of the field practice area of RHC, Sripuram and also the women who participated in the conduct of the study.

Conflict of Interest

Nil

Source of funding

Nil

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Short Research Article

Prevalence of Hypertension among Adult Rural Population

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Date of Submission: 14.04.2014 **Date of Acceptance: 29.07.2014**

Abstract

Background: The prevalence of chronic diseases such as hypertension, diabetes mellitus etc, is showing an upward trend in most countries. Even though 72.2% of Indian population live in rural area, only few studies have been carried out to determine the prevalence of hypertension among rural people. **Objective:** To know the prevalence of hypertension among adult rural population. **Materials and methods:** A cross-sectional study was conducted in the field practice area of Rural Health Training Center of Narayana Medical College, Nellore. **Results and conclusion:** The prevalence of hypertension was found to be 23% among adult rural population. The study also concluded that smoking, family history of hypertension and obesity associated with hypertension.

Key words: Hypertension, Smoking, Family history, Obesity.

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Introduction

Hypertension is a chronic condition of concern due to its role in the causation of coronary heart disease, stroke and other vascular complications. It is the commonest cardiovascular disorder, posing a major public health challenge to population in socio-economic and epidemiological transition. It is one of the major risk factors for cardiovascular mortality, which accounts for 20-50 percent of all deaths.[1]

The prevalence of chronic diseases such as hypertension, diabetes mellitus etc, is showing an upward trend in most countries.[2]Even though 72.2% of Indian population live in rural area, only few studies have been carried out to determine the prevalence of hypertension among rural people. The present study was carried out to determine the prevalence of hypertension among adult rural population.

Materials and methods

The present study is a cross-sectional community based study conducted among 300 rural adults aged 25 years and above residing in Venkatachalam village , the field practice area of Rural Health Training Center, Narayana Medical College Nellore. The study was conducted from Dec.2013 to Mar.2014.The study was conducted by house to house survey. The first house was selected randomly and then every second house was visited till the required subjects were obtained. The data was obtained using a pre-designed and pre-tested questionnaire after obtaining informed consent .Blood pressure was measured as per WHO guidelines. Joint National Committee VII

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Table 1: Distribution of study subjects by sex and hypertension

Sex	Normotensive (%)	Pre Hypertension (%)	Stage 1 Hypertension (%)	Stage 2 Hypertension(%)	Total
Male	76(53.52)	25(17.60)	31(21.83)	10(7.04)	142
Female	95(60.12)	35((22.15)	09(5.69)	19(12.02)	158
Total	171(57.00)	60(20.00)	40(13.33)	29(9.66)	300

Chi-square value for sex vs. hypertension: 5.252, df-1, p-value: 0.022

Table 2: Prevalence of hypertension by age

Age group	Normotensive	Hypertensive	Total	Percentage
25-35	84	8	92	8.69
35-45	67	14	81	17.28
45-55	41	13	54	24.07
55-65	27	22	49	44.89
>65	12	12	24	50.00
Total	231	69	300	23.00

Chi-square value: 35.305 df: 4 p-value: <0.0001

Table 3: Distribution of study subjects by smoking and hypertension

Hypertension	Smoking (%)	No smoking (%)	Total
Yes	50(72.46)	19(27.54)	69
No	90(38.96)	141(61.04)	231
Total	140(46.66)	160(53.34)	300

Chi-square value: 23.960 df: 1 p-value: <0.0001

Table 4: Prevalence of hypertension by family history

Hypertension	Family history		Total
	Yes (%)	No (%)	
Yes	33(47.82)	36(52.17)	69
No	48(20.78)	183(79.22)	231
Total	81(27.00)	219(73.00)	300

Chi-square value:19.71 df:1 p-value: <0.0001

Table 5: Hypertension by obesity

Obesity	Hypertension		Total
	Yes (%)	No (%)	
Yes	25(36.23)	44(63.77)	69
No	53(22.94)	178(77.05)	231
Total	78(26.00)	222(74.00)	300

Chi-square value:4.871; df:1;p-value: 0.027

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criteria were used to diagnose hypertension. Smoking history and family history of hypertension was also obtained. Obesity was assessed using body mass index (BMI). Obesity was classified as a BMI of 30 Kg/m^2 and above. The data was analyzed using appropriate statistical tests.

Results

The present study showed that the overall prevalence of hypertension was 23% (69). The prevalence of stage 1 hypertension was 13.33% and stage 2 hypertension was 9.66%.The prevalence of hypertension was high in males (28.87%) compared to females (17.72%) and the difference was statistically significant. The overall prevalence of pre hypertension was (20%). The prevalence of pre hypertension in males was 17.6% and in females 22.15%.

Highest prevalence of hypertension was observed in the age group 65 and above (50%) and lowest prevalence of hypertension was observed in 25-35 age group (8.69%). The prevalence of hypertension increased with age.

72.46% of the hypertensives and 38.96% of normotensives were smokers. 47.82% of hypertensives and 20.78% of normotensives had family history of hypertension. 36.23% of hypertensives and 27.94% of normotensives were obese.

Discussion

In our study we found the overall prevalence of hypertension among adult rural population as 23%. Kokiwar Prashant et.al reported an overall prevalence of hypertension as 19.04% among adult rural population[3]. L.kannan and T.S.Satyamoorty reported a prevalence of 25.2% among rural population of Tamilnadu[2].

Our study found that the prevalence of hypertension increased with age. L.kannan and T.S.Satyamoorty also observed the same in their study. [2]Kokiwar Prashant et.al also reported an increase in the prevalence of hypertension with age[3].

In our study the prevalence of hypertension was high in males (28.87%). L.kannan and T.S.Satyamoorty reported a high prevalence of hypertension among females (27.4%) as compared to males (22.6%)[2].

In our study we found a statistically significant association of hypertension with smoking, family history of hypertension and obesity. Kokiwar Prashant et.al reported statistically significant association between hypertension and tobacco use[3]. S.Srinivas et.al reported association of hypertension with family history and obesity[4].

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Original Research Article

GeoSpatial Distribution of Anemia in Hilly Darjeeling

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Date of Submission: 06.06.2014 **Date of Acceptance: 29.07.2014**

Abstract

Background: Anemia is a major risk factor for mortality & morbidity. Pallor is reflection of anemia of a subject expressed clinically. Geographical Information System models are useful where number of area specific sample observations are generally very small to produce reliable direct estimates. **Objectives:** 1.To monitor and prevent anemia of nutritional origin through visual display of Spatial Mapping and administering nutritional support as needed. 2.To ascertain whether elevation of the hill has any impact on Pallor Prevalence. **Materials and Methods**: A descriptive cross-sectional study was conducted at household level, in 12 randomly selected villages in Darjeeling, during the period 2001-2002. Using pre-tested structured questionnaires, data were collected on demographic particulars, pallor incidence, dietary habit, monthly income, etc., from each available member of the household. Total number of case studies were only 728. Geostatistical Methods are used in the present study to predict spatial distribution of Pallor Prevalence at the block level throughout Darjeeling.**Results and Conclusions** : The present study highlights (i) Total Pallor Prevalence varies from (5 - 35)%. (ii) Female Pallor Prevalence varies from (5 – 65) % compared to Male Pallor Prevalence (5 – 25)%. (iii) In **high altitude** areas of Darjeeling, **Pallor Prevalence** are remarkably **less**. The outcome of the study suggest that **Elevation** of the hill has some **impact** on **Pallor Prevalence**. High altitude and less oxygen tension in the atmosphere, stimulates erythropoiesis that increases iron absorption and RBC production and controls Anemia. Further research is needed with larger sample size to confirm the impact of Elevation on Pallor prevalence. Need and dose of supplementary iron varying with altitudes in hills, may also be opened to review.

Key Words : Community Development block, Geographical Information System, Geostatistical Methods, Pallor, High Altitude

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Introduction

Malnutrition is a significant health problem for children and adults in India. Anemia in India is primarily linked to poor nutrition [1]. The National Family Health Survey (NFHS-3) 2005-06, found high prevalence of anemia - 70% in children aged (6-59) months. Anemia levels in men are at around 24%. More than half of women in India 55% are anemic[1].

Geoscience is a relatively new discipline developed in the 1960s primarily by mining engineers [2,3]. Geographical Information System (GIS) is useful for health science, for decision-making, planning, management and dissemination of information [4,5] .

Geostatistical Methods (GSM) are application of statistics and other informational techniques to geographically referenced (spatial) data and are currently used in various fields, viz., epidemiology, social sciences, medicine and public safety (i.e. emergency management and criminology), and many other fields. Spatial Mapping are used for prediction and visualization of the spatial distribution of the study variable throughout the surface [6] .

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Number of area specific sample observations related to anemia in small geographic hilly villages in Darjeeling, are not big enough to produce reliable direct estimates. Application of Small Area Estimation (SAE) technique are useful in such cases [7]. The strategy in SAE technique is to borrow strength from other areas. GSM are being increasingly used for small area estimation [8,9]. GSM does not require information on any auxiliary variable, unlike regression. A key component in using GSM is the availability of a digitized map of the boundaries of areas of interest (e.g. Block) within a geographical zone of interest(e.g., District).

Materials & Methods

Sources of Data and Study Design

Darjeeling, the hilly district (lying between $26^0$27'10" and $27^0$13' 15" North Latitudes and $87^0$59'30" and $88^0$53'00" East Longitudes) in the State of West Bengal in India, is selected for illustration [10,11]. The hill ranges of Darjeeling extend from North West to South East Alignment and it's elevation varies from 300 to 3000 meters (approx.) above mean sea level and comprises of 12 Community Development (CD) Blocks [11].

A descriptive cross-sectional study was conducted at household level in Darjeeling, during the period 2001-2002. Pre-tested structured questionnaires were used to collect information on demographic particulars, pallor incidence, dietary habits, monthly income, etc., from each available member of the household. Informed consent of the head of the family was taken prior to case study. It was the usual way to take prior approval of ethical committee, N. B. Medical College, before this study was conducted.

Repeated visit was performed as it was very difficult to get all the members of the family at one visit, often it was found that they went to a distant place for livelihood, even in holidays. The coverage of the area was difficult because of hilly area and transport problem].

Sampling

One village from each of 12 CD block, was first selected randomly using simple random sampling without replacement and considered as Principal Sampling Unit (PSU). Then all households in that selected village were enumerated. Sample population available was visited once only. Thus total no. of households enumerated were 164 in the selected 12 villages. Case studies related to 728 cases only.

GIS technique

GIS package ArcGIS version 9.3 was used for digitization of 12 CD block boundaries along with the boundaries of Darjeeling district and for computation of the block centroids. Individual case data collected at household level was aggregated to village level. Computed values at the village level are used as proxy values for respective blocks, and attached to respective block centroids and treated as representative sample for the whole block [9].

Geostatistical methods

Geostatistics are a collection of statistical techniques applied for explaining the autocorrelation of spatial data for predicting the distribution of data continuously for fitting a surface. In classical statistics, observations are assumed independent, i.e., there are no correlations between observations. In geostatistics, the information on spatial locations allows to compute distances between observations and to model autocorrelation (statistical relationships among the measured points) as a function of distance [12].

The relationship of autocorrelation of spatial data can be quantified through the graph of a semivariogram (Figure 0). The semivariogram is a plot of the average of the squared difference between the attribute values of a pair of points,

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Figure 0: Graph of a semivariogram

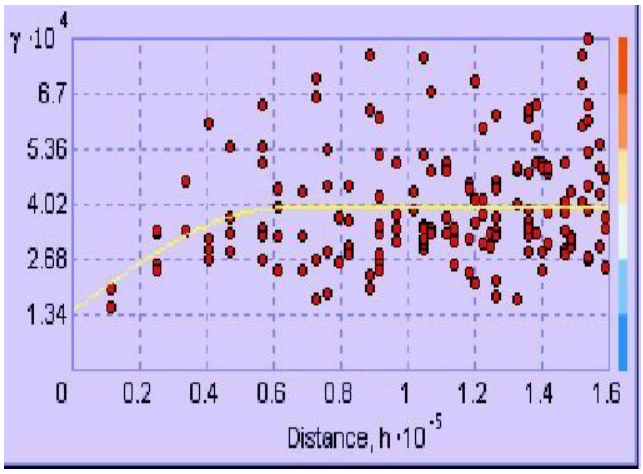

Figure 1. Total Pallor Prevalence in Darjeeling

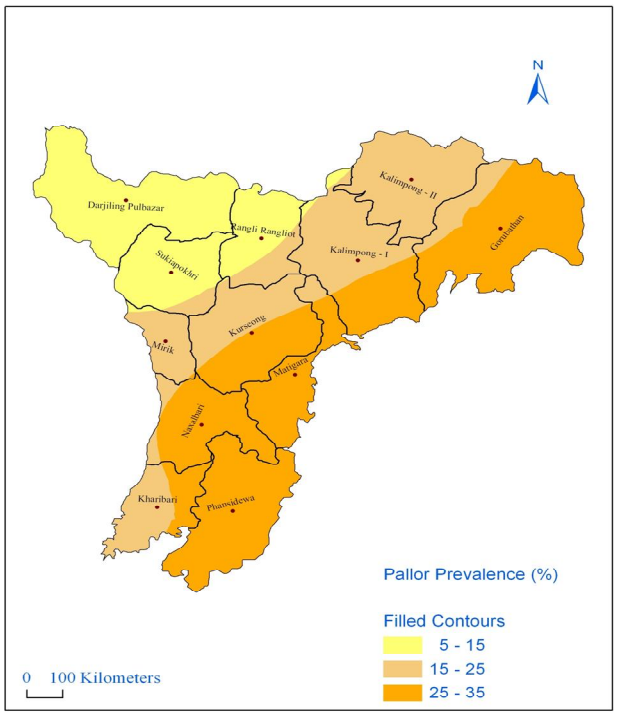

Figure 2. Pallor Prevalence among Females in Darjeeling

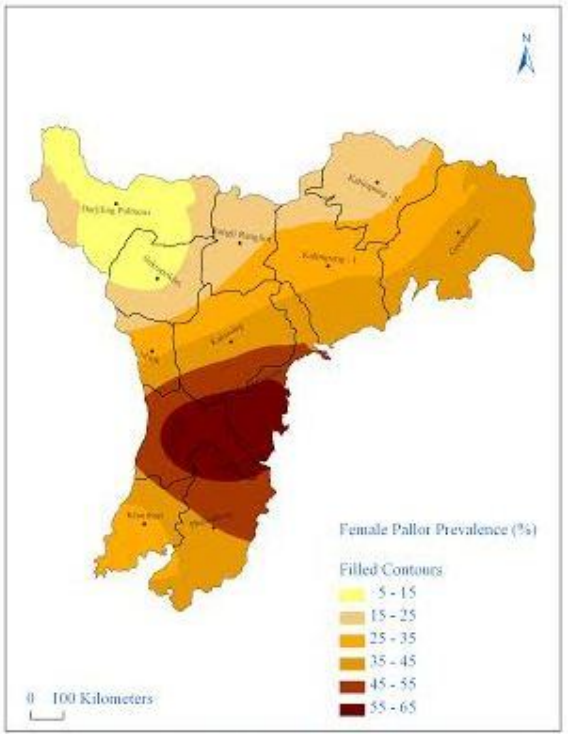

Figure 3. Pallor Prevalence among Males in Darjeeling

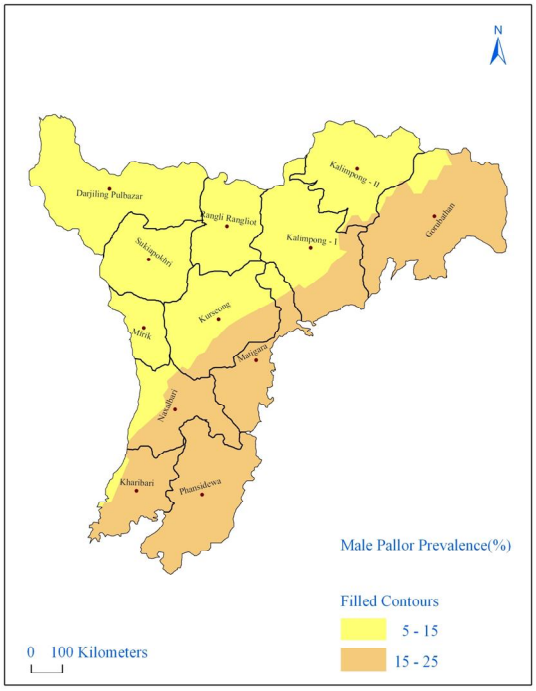

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Figure 4. Elevation Map of Darjeeling

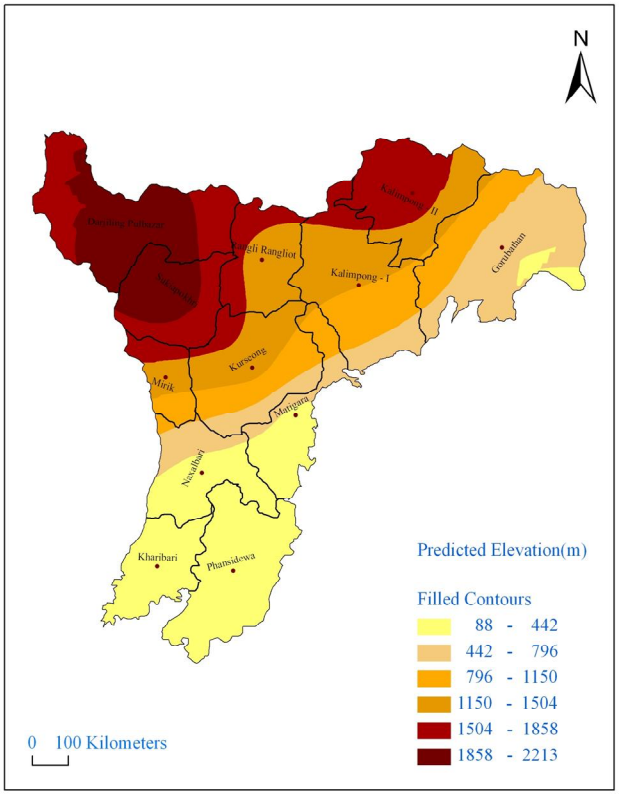
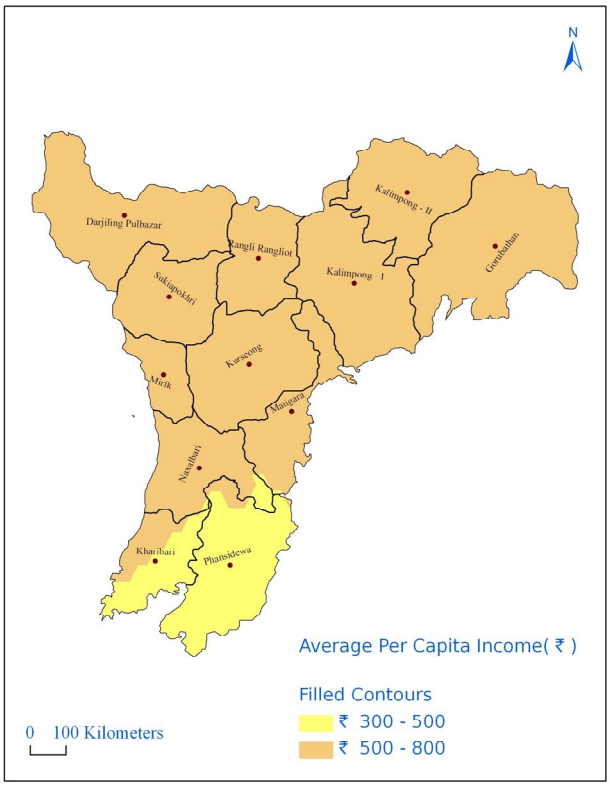


Figure 5. Prediction Map of Average Per Capita Monthly Income (Rs) in Darjeeling



versus the separation distance between the points. Mathematical equation of finding each point on semivariogram:

$$\gamma(h) = \frac{1}{2n}\sum_{i=1}^{n}\left(Z(X_i) - Z(X_i + h)\right)^2$$

In the above formula, gamma is the semivariogram value plotted on the dependent axis, h is the separation distance between a pair of points, Z(i) is the attribute value at location i, and n is the number of pairs with separation distance h.

Geostatistical methods are used to predict an attribute value at a location where the attribute has not been measured, based solely on the distance between the unmeasured location and neighboring locations, and the measured attribute values at those neighboring locations.

The basic assumption of GSM is that the neighboring locations influence the study variable more than the far away locations. Of several GSMs we used Ordinary kriging.

Ordinary Kriging makes use of the best-fit-line in the semivariogram (the yellow line in Fig.0) to predict attribute values at locations where the attribute has not been measured. The best fit line, more specifically, is used to estimate weighting factors for neighboring locations in the process of predicting an attribute at an unmeasured location. The equation for this line is the empirical relationship between separation distance and attribute difference. Once this prediction process has been conducted for the entire study region, the result is a predicted continuous surface of the attribute value.

In this study, all the 12 block centroids treated as the representative of the respective 12 blocks both for fitting the surface & prediction over the entire study area. Five variables viz., (i) Total Pallor prevalence i.e.,{no. of cases of pallor/(total population at the village level)*100}, (ii) Female pallor prevalence i.e., { no. of cases of pallor among

female/(female population at the village level)*100}, (iii) Male pallor prevalence i.e., {no. of cases of pallor among male/total male population at the village level)*100}, (iv) Elevation(m) i.e., altitude from sea level, (v) Average Per Capita Monthly Income (Rs) i.e., {Aggregated total monthly income of the village population/ number of persons at the village level}, are taken as study variables, and treated as corresponding attributes respectively for creating five smooth fitted surfaces of Prediction Map, viz., (i) Total Pallor Prevalence in Darjeeling [Figure 1], (ii) Pallor Prevalence among Females in Darjeeling [Figure 2], (iii) Pallor Prevalence among Males in Darjeeling [Figure 3], (iv) Elevation Map of Darjeeling [Figure 4], (v) Prediction Map of Average Per Capita Monthly Income (Rs) in Darjeeling [Figure 5].

Block centroids represented by point layers (filled in red color) and block boundaries (outlined by black color) by polygon layers throughout the fitted surface. Fitted surface gives the geospatial distribution of the variables studied over the district of Darjeeling.

Cross validation for all the predicted surfaces were done by taking $^{12}C_{11}$ possible sets of block centroids with the corresponding attributes and treating one as unknown. The result shows that average standard errors of predicted surfaces are 11.76, 20.11 and 12.59 respectively for the attributes viz., total pallor, female pallor and male pallor and the corresponding standard deviations in data values are 12.26, 20.88 and 12.09. Average standard errors using GSM seem to be high but compared to standard deviation in data values these are mostly consistent. Average standard errors using GSM are less compared to standard deviations in data values in cases of both the attributes of total pallor and female pallor.

Results

Spatial Mapping of Pallor Prevalence in Darjeeling highlights the following outcome :

Total Pallor Prevalence [Figure 1] : Pallor prevalence among the total population in Darjeeling, varies from (5 to 35)% throughout the surface. The surface is confined to 3 classes of pallor prevalence, viz., (i) (5 - 15)%, (ii) (15 - 25)%, (iii) (25 - 35)%, depicted by legends (Appendix).

Female Pallor Prevalence [Figure 2] : Pallor prevalence among females in Darjeeling is spreading throughout the district from (5 to 65)%. The surface is mostly smoothed within 6 classes, viz., (i)

(5-15)%, (ii) (15 – 25)%, (iii) (25- 35)%, (iv) (35 – 45)%, (v) (45 - 55)%, (vi) (55 – 65)%, depicted by legends (Appendix).

Male Pallor Prevalence [Figure 3] : Male Pallor prevalence in Darjeeling is spreading throughout the district from (5 to 25)%. Throughout the surface it is mostly homogeneous, confined to only 2 classes, viz., (i) (5 - 15)%, (ii) (15 - 25)%, depicted by legends (Appendix).

Child Pallor Prevalence [Figure not included] : It is observed that pallor prevalence among the Child in the age group (0 to 5) varies from 5 to 80 percent throughout the surface of Darjeeling district. Prediction Map of Child Pallor prevalence is not attached here.

Elevation [Figure 4] : Filled contours of predicted elevation map of Darjeeling are classified into 6 classes, viz., (i) (88 – 442)m, (ii) (442 – 796)m, (iii) (796 – 1150)m, (iv) (1150 – 1504)m, (v) (1504 – 1858)m, (vi) (1858 – 2213)m, in an ascending order of altitude, from above the sea level, depicted by legends (Appendix).

Monthly Income [Figure 5] : The average per capita monthly income along the surface is

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classified only within two groups (i) Rs (300 to 500) , depicted by filled contours of yellow color, (ii) Rs (500 to 800), represented by medium sand color.

Discussion

The discussion of the present study can be comprised as follows:

The Spatial Mapping of Pallor Prevalence in hilly Darjeeling is very much useful to prevent and monitor the anemia of nutritional origin. Nutritional support of folic acid and iron tablets could prevent anemia.

Comparison between [Figure 1] and [Figure 4] : (i) Total pallor prevalence (5 to 15)% [Figure 1], throughout Darjeeling Pulbazar and in major elevated areas of Sukiapokhri & Rangli Rangliot, is remarkably less compared to pallor prevalence throughout the surface. Compared to elevation [Figure 4], reversely, it is observed that these areas belong to highest & 2nd highest elevated classes, viz., (1858 to 2213)m & (1504 to 1858)m. (ii) Maximum total Pallor prevalence (25 to 35)% [Figure 1], prevails in the whole area of Phansidewa, major areas of Naxalbari, Matigara, Kurseong, Kalimpong I, Gorubathan. Elevation [Figure 4], reversely, are (88 to 442)m & (442 to 796)m. in those areas, belong to lowest and 2nd lowest elevated classes.

Comparison between [Figure 2] and [Figure 3] : Highest Pallor Prevalence among the Females [Figure 2] is (55 to 65)% , in contrast to highest Male Pallor Prevalence is within the range (15 to 25)% only. Female Pallor prevalence [Figure 2] is dispersed within the surface in six classes whereas Male Pallor prevalence [Figure 3] is divided only within 2 classes. Male pallor prevalence is much less compared to female. This fact corroborates with the report of (NFHS-3) 2005-06, all India figure of Anaemia between men & women.

Difference between Female and Male pallor prevalence found in this study is very much usual picture of a developing country like India, where gender bias, illiteracy, sacrifice of mother towards their family are the inbuilt factors! All these based on poverty and lac of food intake and genetic make up, hence it is expected that body pathology is dwarft to social pathology. Outside the social causes, the physiological causes such the menstrual loss, loss of blood during pregnancy outcome also contribute remarkably and lot of other causes involved directly or indirectly.

Comparison between [Figure 2] and [Figure 4] : (i) In major areas of Darjeeling Pulbazar & Sukiapokhri, Female Pallor prevalence [Figure 2] are within the range of (5 to 15)% and remarkably less compared to the whole surface of Darjeeling District. These areas belong to highest elevated class in respect to altitude [Figure 4], reversely. (ii) Female pallor prevalence [Figure 2] highest (55 to 65)%, prevailed at major areas of Naxalbari and Matigara, those belong to lowest elevated areas (88 – 442)m [Figure 4], reversely.

Comparison between [Figure 3] and [Figure 4] : Male pallor prevalence [Figure 3] is smoothed across the surface diagonally dividing the surface into two parts. (i) (5 to 15)% pallor prevalence [Figure 3] in the higher elevated areas [Figure 4]. (ii) (15 to 25)% [Figure 3] in the lower elevated areas [Figure 4].

Note : As contours of Child pallor prevalence (not included in the Figures) are mostly haphazard throughout the surface, not possible to conclude whether the patterns of contour are related with elevation or not!

Average per capita monthly income is less than Rs. 1000 throughout the surface (Figure 5). This is not acting as a risk factor, as it is mostly homogenous with a very little variation.

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Table 1 : Rate of Pallor Incidence in Darjeeling CD Block-Wise

ID	CD Block Name	ELEVATION (m)	MALE (%)	FEMALE (%)	TPAL (%)	MPAL (%)	FPAL (%)	CHPAL (%)	AVGPCY (₹)	NON-VEG (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Darjeeling Pulbazar	2067	52.27	47.73	10.00	15.00	5.28	0.00	589.30	22.22
2	Kalimpong - II	2045	47.96	52.04	10.23	7.32	12.77	33.33	491.70	50.00
3	Gorubathan	322	50.00	50.00	32.99	24.49	41.67	37.50	493.30	5.88
4	Kalimpong - I	1164	53.64	46.36	25.53	17.02	34.04	21.43	474.50	5.56
5	Rangli Rangliot	1161	58.82	41.18	9.68	0.00	23.08	0.00	725.60	75.00
6	Sukiapokhri	2213	54.84	45.16	4.35	0.00	8.33	0.00	667.00	11.11
7	Kurseong	1561	60.61	39.39	25.81	23.53	36.36	33.33	335.70	75.00
8	Matigara	118	48.48	51.52	40.74	25.00	61.54	60.00	641.90	80.00
9	Mirik	1331	40.00	60.00	20.00	0.00	30.77	100.00	620.00	0.00
10	Naxalbari	155	60.00	40.00	30.77	14.29	75.00	0.00	341.20	50.00
11	Phansidewa	106	42.74	57.26	39.09	38.89	45.31	55.56	433.30	19.23
12	Kharibari	88	49.51	50.49	15.96	8.70	23.40	12.50	442.90	**

** : Missing Value, TPAL : Total Pallor, FPAL : Female Pallor, CHPAL : ChildPallor
AVGPCY : Average Par Capita Income, NON-VEG : NON Vegetarian
Source : Tabulated Values from Health Survey in 12 Villages in Darjeeling(2001-02)

Prediction Map for Nutrition could not be created for non availability of data. However, type of Diet, Vegetarian(Veg) or Non-Vegetarian(Non-veg), taken by the subjects on the date of survey was considered as an indicator variable for pallor prevalence. It shows from tabulation (Table 1, ID 1., col.11), that Non-Veg. diet is only about (22.22)% in Darjeeling Pulbazar and (11.11)% in Sukiapokhri, but, pallor prevalence is less in all cases [Figure 1, Figure 2, Figure 3]. Both the areas belong to highest elevated class [Figure 4] in Darjeeling. Contrary to this, Non-Veg diet is about 80% and 50% respectively in Matigara and Naxalbari, the lowest elevated areas [Figure 4], but, the Female pallor prevalence [Figure 2] is maximum (45 to 65)% in those areas. Male pallor prevalence [Figure 3], and total pallor prevalence [Figure 1] is also higher in those areas. It explains, Non – Veg diet is not an indicator of less pallor prevalence in these hilly areas! Non- veg diet contains more haem iron compared to Veg diet, but, green veg also contain iron and folic acid. In this study, dietary habit is

not a determinant factor for pallor prevalence. Other reasons for more pallor prevalence should be reviewed.

The present study only highlights that prevalence of pallor is remarkably less in the highest elevated areas of Darjeeling. This is evident from comparison of [Figure 1] and [Figure 4], [Figure 2] and [Figure 4], [Figure 3] and [Figure 4].

Due to lack of similar studies on anemia prevalence in hilly areas using GIS, the present study cannot be compared with other studies. However, the low prevalence of anemia among adolescents in urban hilly community, was observed by Goel S. and Gupta BP [13]. Brookhart MA and others have found in their

studies that hemodialysis patients who live at high altitude use less exogenous erythropoietin but achieve higher hematocrit levels than those living at a lower altitude [14]. In another studies, Brookhart MA and others have found that resistance to EPO decreased with elevation, patients with end-stage renal disease (ESRD) living at high altitude either increase endogenous EPO production or respond better to endogenous and exogenous EPO [15].

Limitations of the present study are the usual limitations of the Cross-sectional study. Measures of exposure are only a proxy based on average in the population.

The findings of the present study suggest that Elevation of the hill has some impact on prevalence of anemia in Darjeeling. It has been found that other parameters, viz., per capita monthly income (Rs), diet intake, etc., has no significant impact with the varying altitude of the hills.

Implications of the study outcomes are that iron metabolism and erythropoiesis are inextricably linked [16,17]. High altitude and less oxygen tension in the atmosphere stimulates erythropoiesis. The erythropoiesis increase iron absorption and also RBC production which goes in favour of control of anemia. The iron demand could be fulfilled by daily intake of green leafy vegetables.

Further research is needed with larger sample size to confirm the impact of high altitude on prevalence of anemia. Need and dose of supplementary iron, with varying altitude in hills, are also open to review.

Acknowledgement : Authors deeply acknowledge the support of the Applied Statistics Unit and CSSC Lab of the Indian Statistical Institute, Kolkata, for providing infrastructural facilities and ArcGIS software, for the statistical application of Geographic Information System.

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Funding Support: Nil

Conflict of Interest: Nil

Original Research Article

Prevalence and socio economic markers of tobacco use in rural area of Salem district: Focus towards smokeless tobacco

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Date of Submission: 09.06.2014 **Date of Acceptance: 29.07.2014**

Abstract

Background: Factors like lesser cost, social acceptability and non stringent rules in smokeless product sales made people to choose or shift over smokeless tobacco use. ***Aims and Objectives***: To estimate the prevalence of smokeless tobacco use and its associated socio demographic factors in a rural area of Salem district. ***Methods***: This study was a community based cross sectional study. Totally 240 households were covered by house to house survey selected from systematic random sampling. With pretested interview schedule, data on smokeless tobacco use, duration of use and socio economic factors were studied. Adults more than 15 years were considered eligible for this study. Results are reported as percentages and chi square analysis. Multi variate logistic regression analysis was done by taking smokeless tobacco use as dependent variable and sex, age and other socio demographic factors as explanatory variables. ***Results***: Totally 139 men and 101 women were participated in this study. Overall prevalence of smokeless tobacco consumption is 39.2% (95% CI- 29.4% to 50%). Prevalence of smokeless tobacco use was higher among females (53.5%) compared to males (28.8%). Tobacco leaves along with betel quid, Snuff are the common forms of smokeless tobacco use. Among 40 users of male participants only two of them used smoking form of tobacco. Among the females almost smokeless tobacco is the commonest one. Low level literacy, female gender, unskilled occupation and age more than 50 years were found to be associated with smokeless tobacco use on bivariate analysis. Multivariate analysis by logistic regression showed increasing prevalence of tobacco use among females and current non smokers. ***Conclusions***: Cultural acceptability of smokeless tobacco has lead to high prevalence of smokeless tobacco use especially among socio economically poor. Tobacco cessation counseling and warning on tobacco health hazards has to be focused towards smokeless forms also.

Key Words: Smokeless tobacco, rural, perceived hazard, socio economic variability

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Introduction

Tobacco is the major risk factor for all non communicable diseases accounting for 10% of mortality. Tobacco consumption is estimated to cause about 71% of all lung cancer deaths, 42% of chronic respiratory disease and nearly 10% of cardiovascular disease.[1] Despite the efforts of national and international collaborative efforts, and commitment of world health organization through framework convention on tobacco control (FCTC) prevalence of tobacco consumption is facing an increasing trend. If disaggregated analysis on smokeless forms and smoke forms are reviewed prevalence of smokeless tobacco use remains static. Cost, social acceptability, non stringent rules in smokeless product sales made people to choose or continue over smokeless tobacco use.[2] According to recent global adult tobacco survey (GATS) 23.6%, 17.3% of males and females are using smokeless tobacco respectively.[3] Non communicable risk factor surveillance by ICMR also had showed 17.2%, 10.8% prevalence of smokeless tobacco among men and women respectively.[4] Mishri and betel quid with tobacco are common forms of tobacco consumed. Some states had even reported more than 50% of smokeless tobacco use among

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females. [5] Cohort study from India had reported the risk of still birth due to smokeless tobacco use is as great as maternal smoking.[6] Among the estimated 274.9 million tobacco users in India 163.7 million of them were using smokeless form. Many Indian studies had shown strong predisposition of smokeless tobacco towards oral cancers. Smokeless tobacco increases the risk of premature birth and low birth weight. [7] In South Asian countries even though smoking form is found to be rare among females, smokeless tobacco prevalence is common among them.

Among men smokeless tobacco use was positively associated with non daily smoking, binge drinking, BMI and negatively associated with higher education.[8] smokers during quitting process select smokeless tobacco in place of cigarettes. [2] smokers spuriously believe that non combusted forms of tobacco are safer.[9] Use of smokeless tobacco was strongly associated with perception of lesser harm towards these products. [9]

People are able to freely purchase all smokeless products. Rural area has higher prevalence in this regard compared to urban areas.[3] Recent Cohort study from

Kerala had reported higher incidence of smokeless tobacco compared to smoke form. It also reports higher prevalence of smoking form among young adults and smokeless form of tobacco use among older individuals. [10]

Peer influence, thrill seeking are found to be reasons for initiation of smokeless tobacco among adolescents. [11] Smokeless tobacco is found to be the cause for various cancers in aero digestive systems, pancreas, adverse reproductive health outcomes and fatal cardio vascular events [12–14] India is the largest manufacturing company for smokeless products in south Asian countries.

In this context it is necessary to assess the attitude of community on smokeless products. This study was aimed to estimate the prevalence of smokeless tobacco, socio demographic markers associated with it and perceived health hazards by users.

Methods

This community based cross sectional study was conducted in Magudanchavadi, rural field practice area of Annapurna medical college and hospitals, Salem during December 2012. This field practice area caters to 35000 populations. Majority of the population is involved in small scale industries mainly cotton mills or home based or network based weaving.

Consumption of smokeless tobacco was defined as regularly using tobacco in any forms other than smoking at the time of interview.

Totally 240 household were selected based on assumed tobacco prevalence of 9.2% , 80% power and 5% absolute precision, 1% alpha error & 10% non-response rate using Open Epi.[4] Five streets were conveniently selected from the village map (MGR Nagar, railway colony, teacher's colony, Ernapuram colony and Jeyapuri Street). These areas were selected specifically to avoid scattered residential areas around industrial locality. From the selected streets household was selected by systematic random sampling. In each household eligible participant was interviewed by house to house survey. Adults more than 15 years are considered to be eligible for this study. In case more than one eligible participant was present in the household one was selected by random. With the pretested interview schedule information on socio demographic characteristics, tobacco consumption, smokeless tobacco use and perceived hazards were collected.

Data were analyzed using SPSS version 16. Results are reported in percentages. Associated

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Table 1: Demographic characteristics with smokeless tobacco use

S. No	*Socio demographic characteristics*	*Consumption of smokeless*		*Chi square*	*'p' value*
		Yes	No		
1	*Sex*				
	Male	40 (28.8)	99 (71.2)	14.964	0.0001
	Female	54 (53.5)	47 (46.5)		
2	*Age*				
	Up to 35 years	14 (28.6)	35 (71.4)	14.488	0.002
	36 to 50 years	26 (29.2)	63 (70.8)		
	51 to 60 years	25 (50)	25 (50)		
	More than 60 years	23 (44.2)	29 (55.8)		
3	*Income*				
	Up to 1000	35 (50.7)	34 (49.3)	14.984	0.002
	1001 to 2500	10 (34.5)	19 (65.5)		
	2501 to 6000	43 (42.6)	58 (57.4)		
	>6000	6 (14.6)	35 (85.4)		
4	*Education*				
	Illiterate	57 (50.9)	55 (49.1)	23.08	0.0001
	Primary	21 (44.7)	26 (55.3)		
	Middle /High school	15 (25.9)	43 (74.1)		
	More than high school	1 (4.3)	22 (95.7)		
5	*Occupation*				
	Home maker	36 (49.3)	37 (50.7)	10.036	0.016
	Semi skilled	51 (38.6)	81 (61.4)		
	Skilled	0 (0)	7 (100)		
	Self employed	7 (25)	21 (75)		
6	*Current smoker*				
	Yes	4 (10.8)	33 (89.2)	14.76	0.0001
	No	113 (55.7)	90 (40.3)		

factors with smokeless tobacco were analysed either by chi square or Fischer exact test followed by multi variate analysis. Statistical significance was considered at 0.05 level.

Results

Totally 240 households were studied. Out of these 240 participants 139 (57.9%) were males and 101 (42.1%) were females. Majority of them were belong to 36-50 yrs. 20% of them were in the elderly (>=60 age years) group. 46.4% of them were not gone to formal schooling. Most of them were involved in unskilled/ semi skilled occupations. Majority of the households (59.2%) had per capita monthly income more than Rs. 2500.

Among 240 participants 94 (39.2%) had used smokeless tobacco at the time of interview. Prevalence of smokeless tobacco was higher among females and age group more than 50 years. People belong to socio economically deprived section like low income group, illiterate and unskilled laborers had higher prevalence compared to corresponding socio economically better section. There was significantly higher prevalence of smokeless tobacco was observed among people who don't indulge in the practice of current smoking compared to current smoker (table 1).

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Table 2: Logistic regression analysis of smokeless tobacco use with tobacco use with socio economic markers

S. No	Socio demographic	Unadjusted odds	Adjusted odds ratio	Adjusted odds ratio
1	*Sex*			
	Male	1.00	1.00	1.00
	Female	2.84 (1.7 to 4.9)	7.03 (1.63 to 0.8)	10.86 (3.4 to 35.1
2	*Age*			
	Up to 35 years	1.00	1.00	1.00
	36 to 50 years	1.03 (1.1 to 5.7)	0.44 (0.1 To 1.9)	-
	51 to 60 years	2.50 (1.1 to 5.7)	0.84 (0.1 to 4.8)	-
	More than 60 years	3.15 (1.4 to 7.2)	1.08 (0.2 to 6.7)	-
3	*Income (in Rs)*			
	Up to 1000	1.00	1.00	1.00
	1001 to 2500	0.51 (0.2 to 1.3)	0.51 (0.1 to 4.0)	-
	2501 to 6000	0.72 (0.4 to 1.3)	0.77 (0.2 to 9.9)	-
	>6000	0.17 (0.1 to 0.5)	0.17 (0.02 to 1.2)	-
4	*Education*			
	Illiterate	1.00	1.00	1.00
	Primary	0.77 (0.4 to 1.5)	0.48 (0.14 to 1.7)	
	Middle /High school	0.33 (0.2 to 0.7)	1.22 (0.3 to 5.9)	
	More than high school	0.04 (0.01 to 0.3)	0.85 (0.05 to 15.2)	
5	*Occupation*			
	Home maker	1.00	1.00	1.00
	Unskilled work / semi	0.65 (0.4 to 1.2)	0.66 (0.1 to 3.9)	
	Regular income	0.0 (0)	0 (0)	
	Self employed (land	0.34 (0.1 to 0.9)	0.64 (0.1 to 7.1)	
6	*Current smoker*			
	Yes	0.03 (0.01 to 0.1)	0.02 (0.01 to 0.1)	0.03 (0.01 to 0.1)
	No	1.00	1.00	1.00
	Adjusted R^2		0.641	0.568

**Model I- significant factors on bivariate analysis (sex, age, income, education, income, occupation and current smoking). **Model II- sex and current smoking status*

After adjusted analysis by logistic regression analysis female sex was found to have higher risk of smokeless tobacco consumption and being the current smoker had decreased prevalence. In the logistic regression analysis two models were built. In model I, significant factors on bivariate analysis (sex, age, income, education, income, occupation and current smoking) were included by enter method. In model II only sex and current smoking status are included. Model I and II had explained the variability of 64.1% and 56.8% respectively (table 2).

Perceived hazard

Out of 94 smokeless tobacco users 50 people told this tobacco chewing will lead to certain harm. Majority of them (29/50) had known this information through televisions. Mouth ulcer, discolouration of teeth and halitosis are the harmful side effects reported as harmful effects perceived by participants. Among these 94 tobacco users 23 were willing to quit from this habit of tobacco chewing. 26 people expressed that their health care provider asked about their smoking status and chewing tobacco during their last visit to health facility.

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Discussion

This study showed a 39.2% prevalence of smokeless tobacco in one of the rural population of Salem districts. This prevalence is much higher compared to recent nationwide survey reports. The higher prevalence found out in this study can be attributed to large proportion of participants with less than primary education and definition used. In nationwide surveys it was mainly focused towards daily use whereas this study used the definition of using smokeless products most of the days in a week (at least four days in a week). Previous literatures show sex based difference in consumption of tobacco.[15,16] This study also showed odds of females using smokeless tobacco was 10 times higher compared to males. Study report from northern India by Kumar et al says Proportions of chewing tobacco was 75% among all forms of tobacco.[16] This study also reports that due to relaxed social barrier effect for chewing form compared to smoking form women prefers to take chewing form. In this cultural context smoking is portrayed as one of the specific feature of masculine identity. Recent population based study done in Kancheepuram among adult 25-64 years by Kaur et al have reported 15.1% of smokeless tobacco use.[17] Report by Prabakar et al using nationwide family health survey also reports 16.9% prevalence of smokeless tobacco among females. [18]

In this study top four forms of smokeless tobacco consumed were betel with tobacco (45.7%), tobacco leaves (39.4%), snuff (21.3%) and Gutka (4.3%). According to recent non communicable risk factor surveillance, prevalence of smokeless tobacco is higher among females in Tamil Nadu compared to other states.[19]

Pattern of smokeless tobacco also varied between the age group in the current study. People younger than 50 years use in the form of powder along with areca nut whereas aged people preferred using tobacco leaves along with betel quid and lime. People more than 50 years are more likely to use smokeless tobacco compared to people less than 50 years. People said it is culturally unacceptable to use chewing tobacco in younger age. People also reported that as the age increases when all teeth are discoloured into yellow, they start using chewing forms of tobacco. Moreover misconception of chewing tobacco along with betel quid and lime will relieve their abdominal discomfort or dyspeptic symptoms, cultural habit of offering tobacco in all functions had facilitated tobacco use among elderly in this community.

In this study, increasing income had associated with decreasing prevalence of smokeless forms of tobacco. Likewise, increasing education also showed decrease in the prevalence of tobacco. People involved in white coloured job had not used smokeless tobacco forms. Study report by Prabhakar et al also reported increasing prevalence of smokeless tobacco.[18] Study report by Daniel AB et al reported increased prevalence of smokeless tobacco among low socio economic status, less educated and older people, low literacy level or unemployment. [20] Since income, education and occupation are related to each other whether these factors are directly associated or is there any interaction between them is not known.

People who are current smoker are less likely to use smokeless forms of tobacco compared non smokers. Among the 94 people who had reported smokeless tobacco four of them started this during the quit phase of cigarette smoking.

Multivariate analysis by logistic regression showed significant association of sex and current smoking status after adjusted for other characteristics. The more concerning result from this study was none of the participants were aware of the serious side effects like malignancies.

This study reiterates the findings of high prevalence of smokeless tobacco among socio

economically poor. This study adds the finding of increasing smokeless tobacco form as an alternative for tobacco among current non smokers. However, this study also has several limitations. Streets are selected by convenient sampling to avoid industrial region. Since interviews are conducted by more than one team variations between interviewers could not be excluded.

This study showed high prevalence of smokeless tobacco in this community. Moreover in multi variate analysis current non smoking status alone accounted for more than 50% variability. So, on routine screening for tobacco consumption during regular clinic visits should concentrate both smoking and smokeless forms. Health care providers involved in tobacco cessation should help the clients in selecting right choice of alternatives. Awareness generation programs on health hazards of tobacco should depict the smokeless forms also as equally hazardous one. Impact of awareness campaigns should reach close to the door steps of the marginalized socio economically poor population.

Successful public health approach towards tobacco control would be concurrent control of both smoke and smokeless forms not replacing with one another. Awareness creation, legislative and surveillance measures should equally focus on smokeless products also.

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Conflict of Interest-Nil

Source of Funding: Nil

Original Research Article

Knowledge Regarding Childhood Asthma among Mothers of Asthmatic Children Presenting to a Selected Hospital, Bangalore, South India

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Date of Submission: 18.06.2014 **Date of Acceptance: 29.06.2014**

Abstract

Background: The incidence of asthma is increasing among children and poor parent's knowledge often contributes to increase in morbidity and mortality. **Aim:** This study aimed to assess the knowledge regarding asthma among mothers of children suffering and admitted with asthma. **Methods and materials:** This was a cross sectional study conducted in a rural hospital between March and August 2011. Forty mothers were selected using non-probability convenient sampling technique. Structured interview questionnaire was used to collect the data. **Results:** Most of the mothers 28 (70%) were above the age of 30 years, 17 (42.5%) were uneducated. The knowledge regarding asthma was inadequate among 13 (32.5%) of mothers. The findings revealed that there was no statistically significant association between level of knowledge with age, educational status and occupation. **Conclusions:** Improved knowledge may help adopt better practices among parents especially among mothers of children with asthma and also help bridge the existing gap between recommended and actual practice regarding childhood asthma.

Keywords: Childhood asthma, knowledge, mothers, South India

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Introduction

Asthma is a public health problem and a chronic disease affecting pediatric population.[1-5] Respiratory tract infection including bronchial asthma are frequent cause of acute illness in infants and children. The most commonest cause of a frequent or persistent cough in an otherwise healthy child is bronchial asthma.[6] Asthma is one of the common disease of childhood, both in developed and developing countries including India. This potentially fatal chronic disease carries significant burden for patients, families and communities.[7]

The compliance to medication is influenced by patient income,[8] level of education[8] and the incidence of asthma is common among children belonging to the lower socioeconomic class.[9] Also, uncontrolled asthma was high among children whose mothers were less educated and parents were more concerned about adverse effects of medication.[10] There exists a wide gap between recommended and actual practice, because of educational barriers and a lack of asthma-related knowledge.[11] Asthma-related knowledge includes an understanding of pathophysiology, medications and prevention.[12]

Assessment of parent knowledge is a significant requirement if we need to improve childhood asthma management. This study was conducted to assess the knowledge of mothers regarding asthma whose children were admitted in a rural hospital with asthma.

Aims and objectives: To assess the knowledge among mothers of asthmatic children who were admitted in a rural hospital regarding childhood

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asthma and to determine the association of knowledge with selected demographic variables.

Materials and Methods

This was a cross sectional study done to assess the level of knowledge regarding childhood asthma among mothers of children suffering and admitted with asthma during the period of March to August, 2011.

In view of the nature of the problem and to accomplish the objectives of the study, structured interview questionnaire was prepared focusing on eliciting the current level of knowledge of mothers on asthma. Reliability of the tool was tested (r = 0.82) and validity was ensured in consultation with guides and experts in the field of pediatrics. The interview schedule included three knowledge domains: asthma and its prevalence, clinical manifestations of asthma and management and complications of asthma.

The study was carried out in a rural hospital in Bangalore and 40 mothers whose children were admitted with asthma were selected using non-probability convenient sampling technique.

The knowledge of mothers was scored as follows: each correct answer was given a score of one and a wrong answer with a score of zero. The maximum score was 35, to interpret level of knowledge the scores were distributed as follows: inadequate knowledge < 50%, moderate knowledge 50 - 74% and adequate knowledge > 75%.

The data was entered in Microsoft Excel and analyzed with statistical package for social sciences (SPSS-16) for descriptive and inferential statistics.

Results

During the study period, we interviewed 40 mothers of children who were suffering and

Table 1: Selected demographic distribution of study population.

Sl. No.	Demographic variables	Frequency	Percentage (%)
1	**Age**		
	Below 30	12	30.0%
	30-40	14	35.0%
	40 and above	14	35.0%
2	**Education**		
	Uneducated	17	42.5%
	School education	16	40.0%
	Graduation or above	7	17.5%
3	**Occupation**		
	Home maker	15	37.5%
	Farmer	14	35.0%
	Employed	11	27.5%

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Table 2: Knowledge of study population regarding asthma

Sl. No.	Level of knowledge	Number/frequency	Percentage
1	Inadequate knowledge	13	32.5%
2	Moderate knowledge	23	57.5%
3	Adequate knowledge	4	10.0%
	Over all	40	100

Table 3: Association of knowledge of mothers with demographic variables.

Sl. No.	Demographic variables	No (%)	Level of knowledge			Chi-square (χ^2)
			Inadequate	Moderate	Adequate	
			No. (%)	No. (%)	No. (%)	
1	**Age**					
	≤ 30	12 (30.0%)	4 (33.3%)	6 (50.0%)	2 (16.7%)	p>0.05
	31-39	14 (35.0%)	3 (21.4%)	10 (71.5%)	1 (7.1%)	
	≥ 40	14 (35.0%)	6 (42.8%)	7 (50.1%)	1 (7.1%)	
2	**Education**					
	Uneducated	17 (42.5%)	8 (47.1%)	8 (47.1%)	1 (5.8%)	p>0.05
	School education	16 (40.0%)	3 (18.7%)	12 (75.0%)	1 (6.3%)	
	Graduation or above	7 (17.5%)	2 (28.5%)	3 (42.8%)	2 (28.7%)	
3	**Occupation**					
	Home maker	15(37.5%)	3 (20.0%)	10 (66.6%)	2 (13.4%)	p>0.05
	Farmers	14 (35.0%)	8 (57.2%)	6 (42.8%)	0 (0%)	
	Employees	11(27.5%)	2 (18.2%)	7 (63.6%)	2 (18.2%)	

admitted with asthma**.** The demographic distribution of the study participants are explained in Table 1.

Most of the mothers were above the age of 30 years, almost equal numbers were either illiterates or attended school and were either home makers or assisting in farm activities (Table 1).

The level of knowledge of mothers about asthma, it was observed that out of 40 study participants, 32.5% had inadequate knowledge, 57.5% were found to have moderate knowledge and 10% of them had adequate knowledge regarding asthma. Most of the study participants had inadequate knowledge about etiology of asthma, moderate knowledge about complications and management of asthma and

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adequate knowledge about clinical manifestations of the disease (Table 2).

There was no statistically significant difference between the level of knowledge and demographic variables of mothers regarding asthma. There was no change in knowledge of asthma with increasing maternal age and with improved maternal educational status (Table 3).

Discussion

The Global Initiative for Asthma (GINA)[13] and the asthma guidelines for prevention and treatment from the National Heart, Lung and Blood Institute emphasize the importance of promoting a standardized classification for asthma treatment.[14] The purpose of this study was to assess the knowledge regarding asthma among mothers of children with asthma admitted in a rural hospital in Bangalore. The findings of this study indicated a number of factors of concern regarding the knowledge among mothers.

Rea et al.[15] found that lack of asthma-related knowledge and improper management of non-compliance was risk factors for death due to asthma. In this study mothers of children with asthma had considerable misperceptions about the disease. More than half of the surveyed parents expressed lack of understanding or confusion about the etiology of asthma. In a similar survey in India[16], majority of respondents (54%) were not aware of the etiology of asthma which was similar to our study findings.

In another study, parents of children with asthma have reported the use of complementary and alternative treatment such as massage, relaxation technique, diet[17] and the Echinacea herb.[18] In our study, more than two thirds of parents thought that herbs had a role in the disease treatment. Mothers in this study also believed that inhalers should only be used during an acute attack and had moderate knowledge on management of asthma, medications during an acute attack, keeping the child warm, about steam inhalation and when to consult a doctor. Parents also expressed concern about the safety of asthma medications. Chan et. al.[19] reported that 66% of the parents were concerned about the side effects of asthma medications and 15% expressed inability in using the medications. In our study, half of the parents were worried about addictiveness of the inhaler and the majority of them worried about side effects of the inhaled steroids. Such persistent worries may negatively impact asthma management and lead to serious sequels, which is why there is a need to educate mothers about asthma. Unfortunately, study participants also lacked information regarding the complications and prevention of bronchial asthma and the role of the environment, exercise and certain food items which were considered as factors triggering an acute attack of asthma. In general, poor knowledge could be attributed to the fact that health education regarding the illness was not a priority in most of the health care settings. According to childhood asthma guidelines, imparting knowledge to mothers helps improve their asthma-related knowledge and should be included be part of routine clinical care.[13,20]

Studies have shown that asthma, especially cough variant asthma (CVA), is the leading cause of chronic cough in children.[21, 22] CVA is defined by GINA as a special type of asthma with cough as the sole or main symptom and is more common in children.[13, 23] In this study, only one fourth recognized that a chronic cough may indicate asthma. Children with persistent cough for more than four weeks should be considered for a diagnosis of chronic cough. Parent's knowledge regarding asthma was low, with a lack of awareness about triggers, clinical manifestations, treatment and when to seek doctors help. This stresses the need for the health care providers to assess and educate the mothers of children with asthma regarding

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asthma, which might have a bearing on asthma control and related morbidity and mortality.[24-26]

The study findings indicate, poor knowledge among mothers of children with asthma regarding asthma. Optimal management can be achieved by educating patients and their families on various aspects of the disease and methods to prevent acute exacerbations and long term care. Parental education is also essential for ensuring a successful adherence to the treatment regimens. It is important to stress the role of medications in asthma control because parents often do not relate medication use to preventing asthma attacks.

Conflict of Interest: Nil

Source of Support: Nil

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Original Research Article

Community Diagnosis of a Rural Community of Salem- Community Based Learning By the Undergraduate Medical Students of a Tertiary Care Institute of Salem, Tamilnadu

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Date of Submission: 19.06.2014 **Date of Acceptance: 29.07.2014**

Abstract

Background: Community Orientation Programme (COP) is a unique learning experience and the core component of Community Based Learning, where the students are exposed to a community to gain knowledge, develop attitude and learn various skills needed for a successful competent physician. ***Objective:*** To enable the students to learn to study a community and to arrive at **Community Diagnosis** of the community through COP. ***Methodology :*** The first year MBBS students were given an orientation by the facilitating faculties on all aspects of Community Diagnosis. They were divided into small groups and collected the data from the respondents in the village on the various topics discussed. ***Results:*** Community Diagnosis by the students included the demographic profile of the population, socio-economic status, environment, vital statistics, fertility indicators, care, child rearing practices like breast feeding, weaning, immunisation, morbidity pattern ,health care utilisation and health seeking behaviour of the population of the village.

Key words: Community Orientation Programme(COP), Community Based Learning , Community Diagnosis, SPICES model

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Introduction

Community Diagnosis is core component of Community based Education. Educational strategies in curriculum development have introduced the new SPICES model [1] which includes community based education as one of the strategies. Rigorous and regular application of concepts within the SPICES model is therefore recommended in the development of current and future medical curriculums. Medical students should be actively involved in the process of advocating for and introducing the innovative principles involved in the SPICES model of curriculum development.[2,3]Community Orientation Programme (COP) is a unique learning experience based on community based learning, where the students are exposed to a community to gain knowledge, develop attitude and learn various skills needed for a successful competent physician.[4]It is the responsibility of the Institution through Medical Education with the efficient qualified and well trained facilitators, to produce qualified and certified health professionals competent to provide health care delivery. In a community based education, medical students receive their training in a community setting.[5] This experience motivates them to learn more about primary health care and also to deliver better service.COP is a component of community based learning and it also encourages team approach and active learning. Interpersonal skills, especially

communication skills are acquired and this plays a vital role like doctor-patient relationship, in hospital based clinical exposures. Recent curriculum reforms in a number of medical schools frequently involve a more student-centred approach, which encourages students to learn by intellectual discovery and critical thinking.[6]This study was done as a COP by the I MBBS students of Annapoorana Medical College & Hospital, Salem, Tamil Nadu, along with the faculty, as facilitators and guides.[7]The main objective was to learn about the community as a whole, ie the Community Diagnosis which includes the demography, environment, socioeconomic status, vital statistics, maternal & child health, health status, health seeking behaviour and health care utilisation.[7]

Aims & Objectives:

a) To enable the students to learn about the community as a whole, ie the Community Diagnosis of the community.
b) to study and appreciate the demographic profile, socioeconomic status and living environment of the community, the fertility indicators, vital statistics and child rearing practices of the community, the morbidity pattern and the health seeking behaviour of the community
c) to analyse, compile and present the collected data , thus arriving at community diagnosis

Materials and Methods:

The Department of Community Medicine of Annapoorana Medical College, Salem, has a Rural Health Training Centre (RHTC) at Magudanchavadi village, about 8 km from the Institution. The MBBS students have 60 hours of Community Medicine in the First year of the course, during which 30 hours are utilised for field visits including Community Orientation Programme (COP). This field survey was done in January 2012 in the Field practice area of our RHTC, with the following steps .

The whole batch of students (149) was given orientation about the programme.

Topics discussed includes – Demography, Socioeconomic status, Environment, Maternal & Child Health, (Child rearing practices- breast feeding and immunisation), vital statistics , morbidity pattern and Health seeking behaviour

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Pretested questionnaire prepared and students were taught the procedures of data collection

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Prior permission from the health authorities and local village leaders

↓

Social mapping done

↓

Informed consent from the respondents prior to collection of data

↓

The students were divided into five groups and areas were allotted

↓

Students did a door to door survey and collected the data from the households with faculty as facilitators using the questionnaire

↓

Data compilation and analysis by students in small groups with faculty guides

↓

Preparation of topic wise power point slides of their findings by small groups

↓

Final presentation of Community Diagnosis and discussion with feedback

Results

As per the data collected by the students, the following information was gathered and the students were able to compile, analyse and prepare PowerPoint slides and present the

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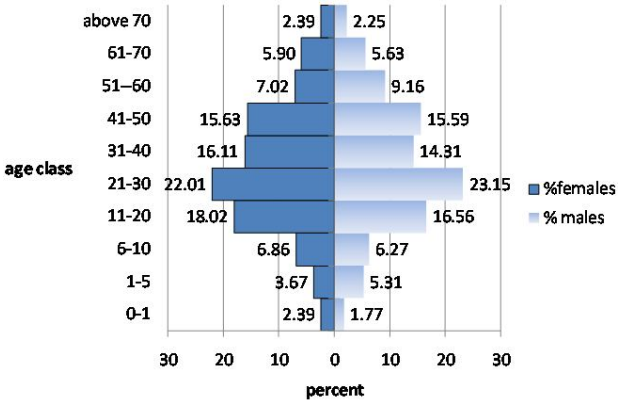
Community Diagnosis under the following headings.

Demographic profile:

The surveyed population in the village of Magudanchavadi was 1249 in 304 houses. Among them 622(49.80%) were males and 627(50.20%) females. 164(13.13%) were children less than 14 years of age (Dig 1).

Dig 1 : Age Pyramid of The Study Population



Socio economic status:

83.5% of males and 76.8% of females were literates. Majority of them (51.12%) were unskilled labourers and only 26.84% were skilled (dig 2). Regarding income, nearly 30% of families were in the per capita income group of <1825 according to BG Prasad scale and about 26.9% families were in class I (> 3653) income group.(table 1)

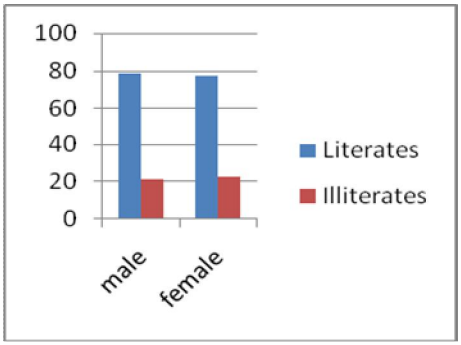
Table 1: Socio Economic Status of the Study Population

Per capita Income	SES Class	No	%
>3653	I	82	26.9
3652 to 1826	II	130	42.8
1825 to 1096	III	63	20.7
1095 to 548	IV	25	8.3
< 547	V	4	1.3

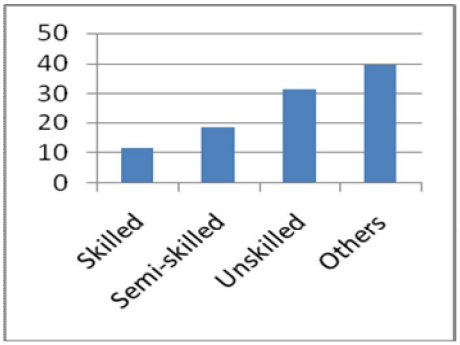
(according to modified BG Prasad scale 2009 AICPI. [17])

Dig 2 : Socio Economic Status of the Study Population

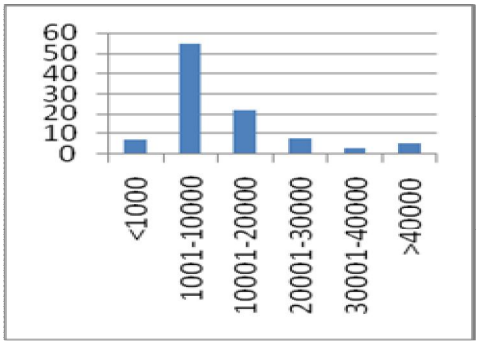
Education



Occupation



Income

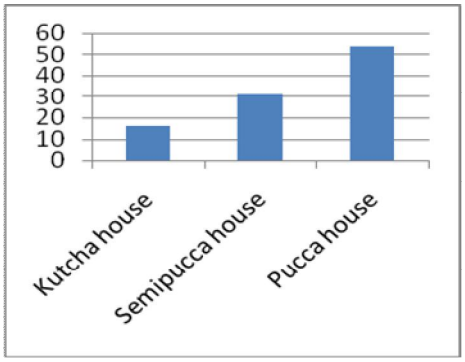


Environment:

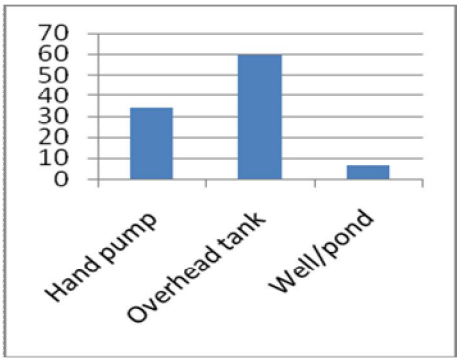
In the village Magudanchavadi, 53.8% of houses were pucca and only 15.8% were huts. Overcrowding was present in 34.3% of the houses. Water source to the community surveyed for the majority of 59.7% was through overhead tanks and 60% of them had good access of just less than 1 km distance. Sanitary latrines were present in 54.45% of the houses and the rest were using open air defecation.(dig 3)

Dig 3: Environmental Status of the Study Population

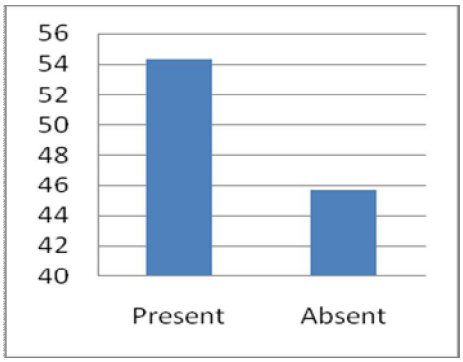
Housing



Drinking Water



Use of latrine



Vital statistics:

Among the population surveyed there were 30 births with a Birth Rate of 24.02/1000 and the number of deaths reported were 15 with a Death Rate of 12.0/ 1000,. Growth Rate was found to be 1.2%.

Fertility indicators:

The number of Eligible Couples in the community was found to be 242 and children were 376, with General Fertility Rate (GFR) of 123.97/1000.

Maternal care:

There were 09 pregnant women among the surveyed population out of whom 08 (90%) were registered. 78 % were immunised with one dose of Tetanus Toxoid and 45 % with two doses. Only 44.4% of the pregnant women had received Iron and Folicacid (IFA) tablets, and 55% of the pregnant women preferred Government Hospital for confinement.

Child rearing practices (Breast feeding, weaning, immunisation):

Among 56 mothers of <2 year old children, only 14 (25%) of them have initiated breast feeding within 1 hour of birth of the baby and 19 (33.93%) took more than 4 hours to breast feed the baby. Exclusive breast feeding was given by 31(55.36%) of mothers which was quite encouraging (table 2). Majority of the mothers 32(57.14%) started weaning only after 6 months and 18 (32.14%) of them by 4-6 months.

Dig 4: Vaccination Status of Children Aged < 2 Years

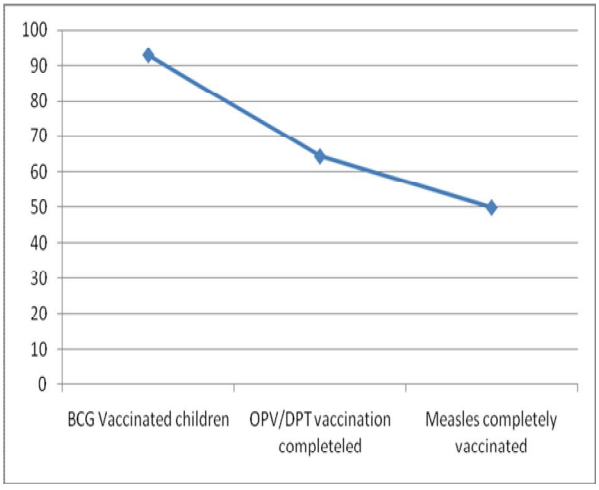


Table 2: Duration of Exclusive Breast Feeding among Study Population

Duration	No	percentage
< 1 month	3	5.36
1 t0 3 months	4	7.14
4 to 6 months	18	32.14
More than 6 months	31	55.36
Total	56	100

Regarding immunisation of the children, only 28 (50%) were completely immunised and the other 50% were partially immunised. BCG vaccination was found to be given to 92.86% of the children while OPV & DPT was given only to 64% and 62% respectively. Only 50% of the children had Measles vaccine.(dig 4) In the village , 29(52.1%) of mothers preferred to go to private hospitals whenever their children were sick and 46.4% mothers continued to feed their children with regular feeds and majority 57.1% of mothers weighed their babies regularly.

Morbidity pattern:

Among 1249 surveyed, 114 (9.13%) had health related problems and among them 55 (48.24%) were males and 59 (51.75%) were females. Majority 47(41.23%) were in the age group of 45-60 years. Period prevalence was found to be 58(4.64%) and majority 32(55.17%) were above 45 years of age.

Health care utilisation:

The health seeking behaviour of the community was encouraging. 144(48%) of them preferred to go to Government hospitals and primary health centres ,the main reason being economical, good access, service and facilities. 143 (47%) preferred private hospitals because of known doctors or family doctors, better care, service and satisfaction. 16(5%) of the community preferred traditional healers because they provide door service and comparatively economical.

Discussion

Community-Based Education is a means of implementing a community-oriented educational program. It consists of learning activities that take place within the community where not only students, but also teachers, members of the community and representatives of other sectors, are actively engaged through the educational experience. Community-Based Education can be conducted wherever people live, be it in a rural, suburban or urban area, and wherever it can be organized." [9]

The students were able to appreciate that the surveyed village population was comparable with that of the National Family Health Survey (NFHS) III data (50%males and 50% females). The younger age group (<14 years) in the present study was considerably less (13.13%) than that of NFHS III(37.2%).[10]While considering the socio economic status the female literacy rate was quiet encouraging with the rate of 76.8% in the study village when compared to 45.5% and 69.4% in the National and Tamil Nadu rural villages. The literacy rate among males was 83.5% compared to 72.3 and 84.1 in National and Tamil Nadu rural areas. Majority of the population were unskilled labourers.

In the surveyed village, 53.8% of houses were pucca compared to 28.8% and 69.9% in the National and Tamil Nadu rural villages respectively.[10]Only 15.8% lived in kutcha house while NFHS III reports 19.1%and also according to District level health survey (DLHS) III, kutcha house were 46.4% in rural India.[11] A Community Diagnosis Programme by Medical students at Nepal shows similar findings to the present study with 50% and 10% respectively.[8] Overcrowding was present in 34.3% , while in rural India it is almost 58%. Water source to the community surveyed was around 60 % through overhead tanks while

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compared to around 30% in rural India**.** [10] And also 60% of them had good access of just less than half an hour walk to water source while compared to 58 % in the national survey. The students were able to appreciate that the population in the surveyed village had a good access to drinking water which is twice as that of National data, and they also felt and realised that safe and potable water supply must be 100%.At Nepal , the study reveals that 95.88% had good access to water source.[8]

The use of sanitary latrines in the surveyed village was 54.45% and the rest were using open air defecation; while in rural India only 17.6% use sanitary latrines and study at a village of Nepal ,it is 90% .[8]Though there was a striking difference among people using sanitary latrines both in this study and in rural India, the students emphasized on measures to promote 100% use of safe sanitary practise to prevent communicable diseases through faeces.

Among the population surveyed there were 30 births with a Birth Rate of 24.02/1000, almost comparable to the National rate of 22.8/1000.The number of deaths reported were 15 with a Death Rate of 12.0% 1000, compared to 7.4/1000. Growth Rate was found to be 1.2% compared to the National rate 1.5%. [12]In the Nepal village the birth rate was comparable with 20.9 / 1000**.** [8]

Number of eligible couples in the community was found to be 242 and the children were 376 with the general fertility rate of 123.97/1000 whereas according to Family welfare statistics of GOI 2009, the GFR for rural India was 96.9/1000. The students were able to appreciate and understand this vast difference in the fertility pattern.[13]

It was really encouraging to note that 90% of the pregnant women registered themselves for antenatal care and checkup , 77.7% received two doses of TT and 44.4% received IFA tablets . This is comparable to 62.3%, 72.6%, and 61.2% respectively. 55% of the pregnant women preferred government hospital for confinement while in rural India, 70.4% had home deliveries and only 14.4 % got delivered in government hospitals. **[10]**

Among the mothers of less than two years old children 25% of them initiated breast feeding within one hour of the child birth in the present study population which is comparable with that of National survey with 22.4%.**[10]**and also UNICEF survey shows 33.5%.[14]Exclusive breast feeding was given by 55.35% of mothers which is quiet encouraging while in the National survey it was less than 15% but in the village of Nepal ,exclusive breast feeding was given by 78.82% of mothers[8]and UNICEF survey shows 36.6% .[14]Weaning was started by 57.14% of mothers after 6 months which is comparable to 52.7% in NFHS III.[10]

Regarding immunization 50% of the children were completely immunized which is comparable to the National data with 54.2 % while the Nepal village in contrast shows 96% of the children completely immunised.[8]BCG was given to 92.86% of the children while it was only 75% according to NFHS III survey. OPV and DPT 64% and 62% respectively were given, while the NFHS III reports 76.5 and 50.4% respectively. Only half of the children were immunized for measles, while NFHS III had a slight higher proportion of 54.2%. [10] The students were able to appreciate the drop in immunisation status of the children in the study population during the teaching program.(dig 4)

Thus the students were able to study the population and arrive at a Community Diagnosis. This concept of early exposure to the community surveys enables them to understand the living conditions and life style of the communities in rural and urban areas and the pattern of health status. The students were able to understand and appreciate the definition of Community Diagnosis “a quantitative and qualitative description of the health of citizens and the factors which influence their health. It identifies problems, proposes areas for

improvement and stimulates action"[9]Such surveys enable the students to learn and improve Interpersonal skills like communication skills and interview techniques. They also learn about demography, vital statistics, environment and health, socio economic status, fertility indicators, mother and child care, health status or morbidity pattern in the community, the health seeking behaviour and health care utilisation of the community.

Students were also motivated and encouraged to compile and analyse the collected data in small groups facilitated by faculty. Such small group learning methods help them to develop team building. Finally the preparation of power point slides and presentation of their findings and the Community Diagnosis motivated majority of the students give an encouraging feedback about the programme .Ultimately the community has become their chief learning environment.[15]This educational experience is always considered as unique, interesting , memorable and useful for each and every medical student or graduate.

Limitations:

Time allocation was limited. Prior arrangements and preparation needed a lot of planning and time consuming. The Institution being young and new, this being the first program of this kind ,it was carried out as a short program with limited educational time.[4,16]

Recommendation:

Students were able to identify the deficiencies in the community and were willing to render possible interventions like health education programmes. Such trainings of field surveys in rural and urban areas should be encouraged and practiced in undergraduate courses as per MCI requirements. Community based learning is an important component of Community Medicine. Such programmes prove that Medical Colleges can serve the community through the health centres.[15]

Acknowledgement:

The authors wish to thank all the staff of department of Community Medicine, of Annapoorana Medical College, the Management, the first MBBS students and the people of Magudanchavadi village.

Conflict of Interest: Nil

Source of Support: Nil

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Original Research Article

Study of Risk Factors Associated With Home Deliveries: A Cross Sectional Study in Rural Areas of Marathwada

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Date of Submission: 14.05.2014 **Date of Acceptance: 11.08.2014**

Abstract

Background: India being second most populous country in the world, women and pre-school children constitute about one third of total population; One in every five maternal deaths globally happened in India which accounted for 20 per cent of the total mortality in this respect. **Objectives:** To study the prevalence of home deliveries in rural areas of Marathwada and to study the risk factors associated with home delivery **Material and methods:** Present study was undertaken in the two sub centers under one of the PHCs in Aurangabad District of Maharashtra. A total of 659 respondent women were interviewed to collect information regarding last delivery. **Results:** The prevalence of Home delivery was (23.06%) while (58.27%) women were delivered in private hospitals and only (18.66%) delivered in Government institutions. After study analysis factors like higher age, Buddhist religion, illiteracy, nuclear family, agricultural workers, lower socioeconomic status, higher parity, non-registration for ANC and nonavailability of transport facility were significantly associated with the risk of home delivery. **Conclusions:** Home deliveries were more prevalent in women who were Buddhist and in those educated up to primary level or illiterate. Early ANC registration from the first pregnancy of the women with recommended visits should be encouraged since ANC registration has greater influence in selection of place of delivery.

Key words:- ANC, Illiterate, Home delivery, Prevalence, Anganwadi Workers, ASHA.

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Introduction

India being second most populous country in the world, women and pre-school children constitute about one third of total population; any neglect or delay in care can adversely affect the wanted outcome.[1] One in every five maternal deaths globally happened in India which accounted for 20 per cent of the total mortality in this respect. Gaps in these areas are alarming for South Asia, particularly for India, where 57,000 women died during pregnancy or within 42 days of termination of pregnancy in 2010, posting a maternal mortality rate (MMR) of 212 per one lakh live births. India's MDG target is to get the figure down to 109.[2] This magnitude clearly suggests that India's progress towards reducing maternal mortality will be crucial in the global achievement of Millennium Development Goal (MDG-5). Globally, there is evidence that most maternal deaths can be averted but for the 'three delays' – (i) delay in decision to seek professional care, (ii) delay in reaching the appropriate health facility, and (iii) delay in receiving care after arriving at a hospital. Tackling and averting this trio of delays will help the world as also India to reduce the burden of maternal mortality.[3]

On this background, the present study was carried out to find out the prevalence and factors associated with home deliveries in rural areas of Marathwada.

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Materials and Methods

Study design, settings and duration : A community based, descriptive, cross-sectional study was conducted between July 2011 to June 2012 in all 14 villages of the two sub centers under one of the PHCs in Paithan Taluka of Aurangabad District. Aurangabad is the district head quarter where Government Medical College is situated. Rural Health and Training Center (RHTC) at Paithan is the field practice area affiliated to Government Medical College which is situated 50 km away from the Aurangabad ***(Figure1-Spot map of Paithan).***

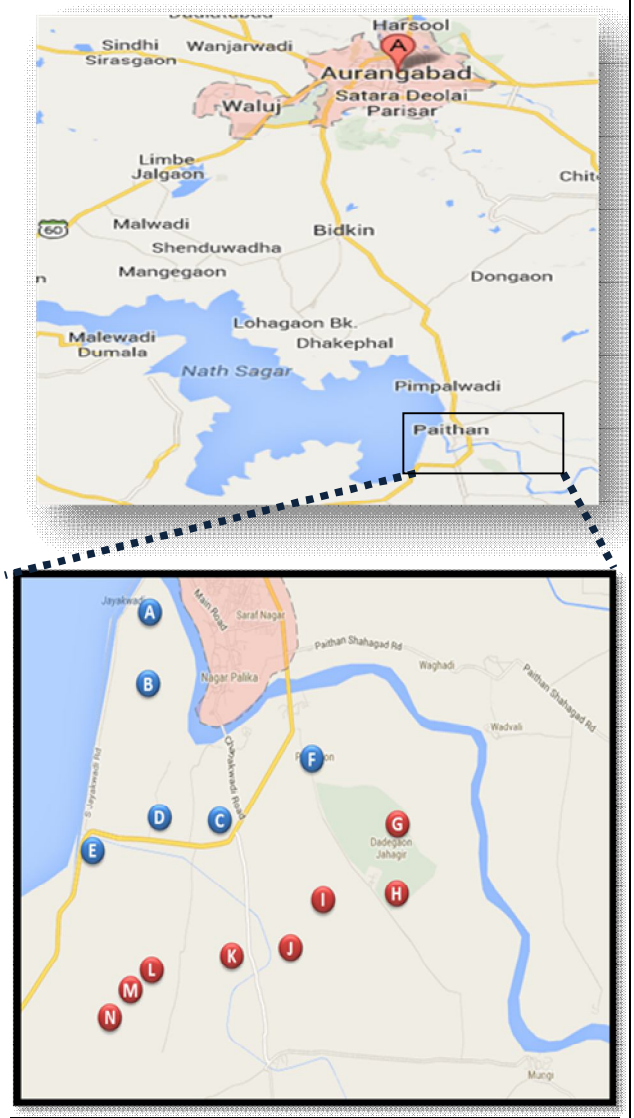
Study Population

Study subjects: Mothers who had less than 5 year old child at the time of interview. These mothers were interviewed and accordingly information was collected in pre-tested proforma to assess various factors associated with place of delivery.

Sample Size: As per the District Level Household Survey-III (2007-2008) percentage of home deliveries in Maharashtra was 45.2 and percentage of institutional deliveries was 54.1. For the calculation of sample size, rural percentage of home deliveries was taken.[4] Though the sample size derived was 469; total of 659 respondent mothers were interviewed.

Sampling technique: Out of three Primary Health Centers Under Paithan Rural Health and Training Center (Pimpalwadi, Nandar, Balanagar); one was randomly chosen (Pimpalwadi). This PHC had six sub centers of which two subcenters i.e. Changatpuri. SC-I(5,992) including 8 villages and Sonwadi SC-II(5,443) including 6 villages were randomly chosen for the study purpose by considering the operational feasibility and available resources. Thus we have studied two sub centers (One was said to be interior and other was some what nearer to health facility(Figure1) which is representative of rural population of the said PHC(40,567) Investigator made a list of villages from these sub centers and then villages were surveyed one after another for the data collection. A house to house survey was conducted in all the 14 villages of the sub center Changatpuri and Sonwadi. Thus a total of 659

Figure- 1: Spot Map of Paithan (North – South)



	Subcentre Sonwadi (Total 6 Villages)		Subcentre Changatpuri (Total 8 Villages)
A	Jayakawadi –(7.8)	G	Dadegaon (June) –(38.5)
B	Kawsan-(15.2)	H	Dadegaon (Navin)- (19.04)
C	Chanakwadi-(15.2)	I	Saygaon- (28.9)
D	Telwadi- (16.6)	J	Natkarwadi –(4.09)
E	Sonwadi- (32.8)	K	Changatpuri – (18.9)
F	Pategaon-(57.4)	L	Ghari- (35.2)
		M	Mammadpur- (33.3)
		N	Ismailpur -(4.5)

(Figures in the parenthesis indicates Percentages of home deliveries in respective Villages)

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Table 1: Risk factors associated with place of delivery (Univariate analysis)

Particulars	N	Home Delivery (n=152)	Institutional Delivery (n= 507)	p value
Age, Mean ± SD	659	25.15 ± 3.17	23.06 ± 2.52	<0.001
Religion				
Buddhist	106	39(36.79)	67 (63.20)	<0.001
* Other Religion	551	112 (20.32)	439 (79.68)	
Education				
**Educated upto Primary	186	81 (43.55)	105 (56.45)	<0.001
More than primary	473	71 (15.01)	402 (84.98)	
Occupation				
Agricultural Worker	184	80 (43.47)	104 (56.52)	<0.001
# Housewife	475	72 (15.15)	403 (84.84)	
Socioeconomic Status				
Lower	165	44 (26.66)	121 (72.33)	0.138
## Upper	494	108 (21.86)	386 (78.13)	
Family Type				
Nuclear	150	45 (30.0)	105 (70.0)	0.022
$ Joint	509	107 (21.0)	402 (79.0)	
Parity				
≥ 3	183	90 (49.2)	93 (50.8)	<0.001
<3	476	62 (13.0)	414 (87.0)	
ANC Registration Status				
Not Registered	56	33 (58.9)	23 (41.1)	<0.001
Registered	603	119 (19.7)	484 (80.3)	
Transport Facility				
Not Available	221	149 (67.4)	72 (32.6)	<0.001
Available	438	3 (0.7)	435 (99.3)	

Data in parentheses indicate row-wise percentages; Other religion includes Hindu and Muslim; **Illiterate and educated upto primary school were combined in multivariate analysis, as proportion of home delivery was near about same in both the group;# Includes housewife and owner cultivator; ## Lower SES includes Class IV and V, Higher SES Class I,II and III; $ Includes Joint and three generation type of family*

Table 2: Risk factors associated with home delivery (Multiple Logistic Regression)

	Adjusted OR	95% CI	p value
Age	1.097	0.52 – 2.29	0.806
Religion	0.63	0.27 – 1.46	0.28
***Education**	2.14	1.06 – 4.31	0.03
Occupation	3.03	1.38 – 6.67	0.006
Socioeconomic Status	1.36	0.5 – 3.65	0.539
Type of Family	1.32	0.67 – 2.60	0.418
Parity	3.36	1.55 – 7.30	0.002
ANC Registration	3.46	1.06 – 11.26	0.039
Transport facility	322.64	90.68 – 1148.0	< 0.001

** Education-Illiterate and those educated up to primary school were combined in multivariate analysis, as proportion of home delivery was near about same in both the group*

respondent mothers having under five children were interviewed to collect information regarding last delivery (Figures in parenthesis indicates total population)

Data analysis: Data was entered in MS Excel sheet and the indicators were expressed in proportions. Chi square test was used for univariate analysis to study factors related to place of delivery. Multiple Logistic Regression was done with the help of SPSS version 20.0 and was used to see independent association of different factors affecting place of delivery.

Ethical Considerations: Institutional Ethical committee approval was taken. A verbal consent was taken from all the participants.

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Results

The prevalence of home delivery was 23.07% while 58.27% women were delivered in private hospitals and only 18.66% delivered in Government institutions. We also found prevalence of home delivery was highest (57.4%) in Pategaon village under Sonwadi Sub center.

Thus on univariate analysis higher age group, Buddhist religion, illiteracy, nuclear family, agricultural workers, lower socioeconomic status, higher parity, non-registration for ANC and nonavailability of transport facility were found to be significantly associated with the risk of home delivery.

The mean age of mothers who were home delivered was 25.15 ± 3.17 years. Buddhist Religion was seen to have a significantly higher proportion of home delivery as compared to other religions ($p<0.001$).

It was observed that illiterates were more home delivered as compared to literates. Agricultural workers were less likely to go for institutional delivery and preferred home delivery. Joint family type is more likely to support better ANC care and institutional delivery. Also mothers in nuclear family had mostly preferred home delivery.

It was observed that, as the socioeconomic status of the women increases, there was higher probability of women being delivered in hospital. And it was found that as the parity of women increases, proportion of home deliveries also increases.

Majority of 55.9% women had delivered in home that were not registered for ANC while out of total women who were registered for ANC, 19.8% were delivered at home. The availability of transport facility is important as it facilitates the women to deliver in hospital as compared to its counterpart i. e. home delivery which is most of the time due to the non availability of transport facility in time.

The various reasons given by mothers who were home delivered were Non-affordability (55.2%), Not needed (as no complications in previous delivery) (55.2%), No transport facility (46.7%), time constraint (40.1%), Negligence from hospital staff in previous delivery (1.9%).

After applying Multiple logistic regression (Table-2), lower educational status i.e. illiterate plus less than primary (OR 2.15; CI 1.07 – 4.32), agricultural laborers (OR 3.03; CI 1.38 – 6.67), those with higher parity (above 3) (OR 3.37; CI 1.55 – 7.31), not registered for ANC (OR 3.46; CI 1.06 – 11.26) and non availability of transport facility (OR 322.6; CI 90.6 - 1148.0) were emerged as an independent risk factors for the home delivery.

Discussion

The prevalence of home delivery was 23.07% while 58.27% women were delivered in private hospitals and only 18.66% delivered in Government institutions. We also found prevalence of home delivery was highest (57.4%) in Pategaon village under Sonwadi Sub center due to lack of awareness about importance of institutional delivery in Dombari tribe which was residing there. (Figure-1)

As per the National Family Health Survey (NFHS)-III (2005-2006), percentage of institutional deliveries in rural areas of Maharashtra was 50.5 % as compared to national figures of 31.1%.[5] District Level Household Survey-III (2007-2008) findings reported 54.1% and 45.2% of institutional and home deliveries in rural areas of Maharashtra respectively.[6] Though the proportion of institutional deliveries in Maharashtra has been improved, still there is a scope for further improvement; thus promoting the women for institutional delivery will increase the proportion of deliveries assisted by skilled birth attendants which ultimately reduces the maternal mortality.

Ansari M A and Khan Z (2011)[7] a cross-sectional study in Aligarh district of Uttar Pradesh showed that percentage of home delivery was higher as compared to hospital delivery, these findings were not related to our study results.

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The mean age of mothers who were home delivered was 25.15 ± 3.17 years. Garg R et al (2010)[8] a study in Amritsar district, Punjab observed that the majority of women with higher age group were delivered at home thus showing similar increasing trend of home deliveries in higher age group as found in our study.

Buddhist Religion was seen to have a significantly higher proportion of home delivery as compared to other religions ($p<0.001$). Pandey S et al (2007)[9] a study in Nainital district, Uttaranchal, had found that out of total women who had delivered at home, majority of women were from scheduled caste and scheduled tribes which was in conformity with our study.

It was observed that illiterates were more home delivered as compared to literates. A study conducted by Kotnis S D, Gokhale R M (2007)[10] in Solapur, Maharashtra and Garg R et al (2010)[8] in Punjab also observed that, out of women who were illiterates, majority were delivered at home.

Agricultural workers were less likely to go for institutional delivery and preferred home delivery. Pandey S (2012)[11] a cross-sectional study in East Nepal had found that, out of total study subjects, the proportion of home deliveries were higher in agricultural workers showing similarity with our study findings regarding higher proportion of home deliveries in agricultural workers.

Joint family type is more likely to support better ANC care and institutional delivery. Also mothers in nuclear family had mostly preferred home delivery. Mumbare S S and Rege R (2011)[12] in a study in tribal area of Nashik observed that higher proportion of women belonging to joint family and three generation family were delivered at home thus showing inconsistent findings with our study.

It was observed that, as the socioeconomic status of the women increases, there was higher probability of women being delivered in hospital. A cross-sectional study in Nepal by Pandey S (2012)[11] had found similar trend of increasing proportion of hospital deliveries in women having higher income.

It was found that as the parity of women increases, proportion of home deliveries also increases. Das S et al (2010)[13] in a prospective study in Mumbai slums, Maharashtra also observed that, out of total women delivered at home, proportion of multipara and grand multi para was higher as compared to primi Para.

Majority of 55.9% women had delivered in home that were not registered for ANC while out of total women who were registered for ANC, 19.8% were delivered at home. Since to study the risk factors of home delivery was our objective, we have observed that the ANC registration will decrease the risk of home delivery, but inspite of ANC registration 19.8% were home delivered, this is because there could be probability of some other risk factors which is obviously playing their role. A study conducted by Khatib N et al (2009)[14] in Wardha district, Maharashtra shows no relationship with our study findings regarding ANC status and place of delivery may be because of different study set up.

The availability of transport facility is important as it facilitates the women to deliver in hospital as compared to its counterpart i. e. home delivery which is most of the time due to the non availability of transport facility in time. Punia A et al (2010) [15] in a cross-sectional study from Haryana had similarly found that availability of transport facility increases the chances of women to deliver at hospital.

The various reasons given by mothers who were home delivered were Non-affordability (55.2%), Not needed (as no complications in previous delivery) (55.2%), No transport facility (46.7%), time constraint (40.1%), Negligence from hospital staff in previous delivery (1.9%). Tuladhar H (2009)[16] in Nepal studied 114 respondent women, reasons behind home delivery were, 32.5% financial problems, 37.1% Ignorance, 16.7% lack of transportation, 8.8% lack of attendant, 5.3% short labour, 3.5% long

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distance, 1.7% better option, 0.8% had unexpected preterm labour.

In present study proportion of home delivery was 23.06%. Home deliveries were more prevalent in women who were Buddhist and in those educated up to primary level or illiterate. It was observed that housewives and owner cultivators (women who were having their own land/farm) had preferably utilized hospitals for the delivery. Working women particularly in the field are at more risk to deliver at home due to time constraint and loss of daily wages as compared to housewives.

ANC registration has greater influence in selection of place of delivery as it was found that most of the mothers who were registered for ANC were delivered in hospital. Thus we have observed that, ANC registration is a protective factor that obviously will decrease the risk of home delivery.

We did not find socioeconomic status as an independent risk factor for the home delivery as it is obvious that many of the women who were belonging to lower socioeconomic status were using private trust hospital which seems to be affordable to them. It is found that the proportion of home delivery was higher in multipara; limiting the number of children will increase the proportion of hospital delivery.

The most important independent risk factor associated with the place of delivery is nonavailability of transport facility. It was seen that transport facility was available for 78.4% of the women, of which 86.6 % were delivered in hospital and only 13.3% were delivered at home. Availability of transport facility makes accessibility to health facility easier; which in turn facilitates the women to deliver in hospital.

Thus present study emphasizes the need for proper vigilance about the choice of women regarding place of delivery. It is right that the JSY scheme has promoted institutional deliveries but to study the JSY status of the women was not our study objective. Considering the nature of risk factors and outcome under study, authors feel that there would not have been scope for recall bias as they had interviewed last delivery.

Early ANC registration with recommended visits from the first pregnancy of the women should be encouraged at institutional level, since ANC registration has greater influence in selection of place of delivery.

In rural area, it is necessary to create awareness among mothers by increasing their knowledge through recreational and educational activities like role plays, poster exhibitions, demonstrations and counseling about importance of regular ANC check up and safe delivery practices. Importance of institutional delivery should be stressed in mother and decision makers in the family (husband, father in law and/or mother in law) through better and intense information, education and communication (IEC) activities.

Health care workers should take initiative to recognize the important sociodemographic factors associated with home delivery viz. lower educational status, occupation, lower socioeconomic status, higher parity, previous delivery status (whether home or hospital delivered), non-availability of transport facility and accordingly help them to deliver in hospital; thus long term measures are of dire need to improve these factors.

Limitations

The study is conducted in rural areas of Marathwada which is a field practice area of our institute. This area may not be representative of the rural area of Maharashtra. We could studied the risk factors (i.e. age, religion, education, occupation, ANC registration, transport facility etc.) associated with the home delivery and not the reasons behind each of these individual risk factors affecting home delivery.

Acknowledgment:

Word of thanks is due to the Child Development Project Officer of Paithan and District Health Officer of Aurangabad for their extended support during this study. I am grateful to all the

respondent mothers for their co-operation, without whom it would not have been possible to carry out this study and I am also thankful to all Anganwadi Workers, Accredited Social Health Activists (ASHA) for their assistance during data collection. Thanks are also due to all teaching and non teaching staff of my department for their valuable co-operation.

Conflict of Interest - None declared

Funding- None

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Original Research Article

Tuberculosis Default: A Qualitative Exploration in Rural Puducherry

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Date of Submission: 07.07.2014 **Date of Acceptance: 10.08.2014**

Abstract

Objective: The present study was done to explore the various reasons for tuberculosis default. **Material and Methods:** A qualitative design (semi-structured interview) was adopted. The list of defaults (n = 5) (RNTCP definition) was obtained from the tuberculosis registers of Primary Health Centre adjacent to our Medical College. We used semi-structured open ended questionnaire for interview of tuberculosis. Additionally, free-listing exercise was also undertaken with nine Directly Observed Treatment Short course (DOTS) providers to capture their perceived reasons. Manual Content analysis was done and themes were generated. We used Anthropac software for analysis of free listing. **Results:** Seven themes were derived from the data. These were related to job requirements, addictions, side-effects, family problems, family response, awareness level, and the role of health service providers. According to the DOTS provider, vomiting (Smith's S value – 0.6), Job requirement (0.4), Illiteracy (0.4), long duration of treatment (0.4) and side-effects (0.4) were the common reasons for default in tuberculosis treatment. **Conclusions:** Hence, pre-treatment counselling of patients and the role of health care providers for motivation and follow-up of patients should be stressed for addressing these barriers in treatment completion.

Key words: Tuberculosis Default, DOTS, RNTCP, Counseling

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Introduction

Tuberculosis is one of the major causes of global premature mortality and disability. Over one third of the world's population is infected with Tuberculosis. India alone contributes to about 26% of the global burden with an estimated 2-2.5 million incident cases (2010)[1].The emergence of extensive drug resistant tuberculosis (XDR-TB) form of multi-drug resistant tuberculosis (MDR-TB) has led to the emphasis on proper treatment guidelines, diagnosis and treatment compliance. is required, as one of the major reasons for this is attributed to defaults in the treatment regimen. When compared to those who complete treatment, patients who default facilitate TB transmission and have high post-treatment mortality and increased rates of recurrent disease[2].

Studies done on the reasons of default mostly deal with the quantitative nature, these studies suggest further evaluation into the patient's perspective for the reasons of default in a qualitative manner would influence the decision making process to reduce the default rate in the treatment regimenand offer better compliance.[2] Hence the study was carried out to qualitatively explore the reasons for default in the tuberculosis regimen.

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Materials and Methods

The study was undertaken at the Department of Community Medicine, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry. The list of defaults was obtained from the tuberculosis registers of Thirubhuvanai Primary Health Centre in Puducherry. The Revised National Tuberculosis Control Program (RNTCP) defines default as "A patient who has not taken anti-TB drugs for more than 2 months consecutively any time after starting treatment" the same was used for our study. The list of defaults included 8 patients of whom 3 could not be contacted, hence five defaults (males) were taken up for the study. The default cases were interviewed by paying house visits. The interviewer trained in qualitative research methods carried out the interview. The interviews were recorded using an audio recorder, the transcripts was prepared and manual content analysis was done to derive themes as to determine the factors which favoured default and the factors that could led to continuation of treatment.

A semi-structured interview of the defaults was carried out, from the list using an open ended questionnaire. In addition a free-listing exercise was undertaken with the Directly Observed Treatment Short course (DOTS) providers to capture the reasons they perceived to be the reasons of default. A total of nine (9) DOTS providers were asked to list out the reasons they thought were responsible for the patients to default tuberculosis treatment. The data thus obtained was analysed using Anthropac software and the Smith's S value was calculated. Data was analysed by first author who has received training in qualitative data collection and analysis.The findings were reviewed by second and third authors.

Results

The manual content analysis derived seven themes, mentioned as follows

Reasons for Default from the Default's Perspective

Job compulsions

Personal habits

Perception of side-effects

Family problems

Perceived stigma

Poor knowledge (disease)

Role of health personnel

Reasons for Default from the Default's Perspective

Job compulsions:

The job requirements of the respondents had a major effect on their access to the medicines. Most of them were migrant workers, whose jobs required them to travel long distances, thus making it difficult for them to collect the drugs citing the same.

For example one of the respondents a driver by profession said ***"I was driving a container lorry when I was diagnosed with tuberculosis but my job required me to travel long distances and stay out of my home for longer duration upto 10–15 days making it difficult to collect drugs regularly"***

Personal habits

Four of the respondents were addicted to alcohol and/or smoking before and during the period of time that they were on treatment, while some had quit smoking post diagnosis others felt that quitting was difficult and some said that because of the continuous coughing drinking alcohol helped in reducing their symptoms to a certain level.

For example one of the respondents said ***"I used to stay up all night coughing at those times I would just sneak out of the house to have a drink and sneak back into the house when all of my family members were asleep."***

Perception of side-effects

The respondents agreed upon the fact that the most common symptoms after starting the anti-tuberculosis treatment were indigestion, nausea, fainting, giddiness, stomach pain, vomiting, fever, exhaustion and red coloured urine. Most of them

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were explained about the occurrence of these symptoms and some of them clarified their doubts the about side-effects with the DOTS care provider and at times with the doctor, but they also conveyed the fact that the treatment had made them weak.

For example one of the respondents said that ***"I went and asked them (health care providers) about the symptoms they said that it was because of the tablets, because they were of a stronger dose.so I thought that all the symptoms that came thereafter were because of the same reason. I used to take the tablets and I was not able to take food properly and used to vomit continuously. I used to feel tired and exhausted always."***

Family problems

The respondents all belonged to a low socio-economic status and in majority of the circumstances were the sole earners of the family and hence their family circumstances to provide for their family had prevented them to continue the treatment.

For example one of the respondents a daily wage labourer by profession said ***"I have to go to work daily, if I do not go to work my family has no means of livelihood I do not have any other alternate sources of income"***

Perceived stigma

Each of the respondents had their own stigma relating to the disease and they changed their lifestyles accordingly. Their stigma appears to had an effect on their way of looking at the disease and this appears to have had an effect on their stopping treatment

For example one of the respondents said that ***"I have made a lot of changes in my life after being diagnosed with tuberculosis, [hesitantly] I have even stopped having sex with my wife because I fear it may affect her."***

Another respondent said **that "***I stopped going to work after being diagnosed with tuberculosis because I did not want to spread the infection to all those who worked with me"***

While another respondent said that ***"I was admitted in TB sanatorium, I got myself discharged from the hospital because everyday all the people in the bed next to me were dying one after the other. I could not stay there any longer because I was afraid that I might be next."***

Poor knowledge (disease)

Basic knowledge of the disease is essential to complete treatment, due to the complexity of the symptoms and side effects of the drugs and the disease on the whole, in the absence of awareness, the patients fail to realise the importance of treatment completion. **[In general all the respondents had a poor knowledge about the disease. In addition they also shared an absolute lack of interest in knowing details about their disease and the effects of discontinuing treatment.]**

One of the respondents had said that ***"we take the tablets that are being given to us, what is the point in knowing about the disease"***

One respondent shared that ***"the doctors will tell us what we have to know"***

Role of health personnel

The respondents shared a common view point about the role of the health care provider in the continuation of the treatment. Their attitude and approach had varied effects on the patient's ability to decide whether or not to continue treatment. They feel that a more kind and compassionate approach would help them a lot.

For example a respondent shared that ***"The DOTS provider came to my house and stood in front of my house and started insulting my family saying that I did not take the tablets regularly and that I was spreading the disease to all my neighbours. She is one of the reasons I stopped taking the tablets."***

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Table-1 Reasons for Default from the Default's Perspective

Sl. No	Themes	Codes	Details
1	Job compulsions	Occupation	• Migrant workers, driver, conductor
2	Personal Habits	Addictions	• Alcoholism and smoking
3	Perception of side-effects	Symptoms	• Indigestion, nausea , fainting, giddiness • Stomach pain, vomiting, fever , exhaustion, Red coloured urine
4	Family problems	Economic crisis	• Unable to work causing economic crisis (especially when the sole bread earner)
5	Perceived Stigma	Stigma	• Avoided sex for the fear of transmission • Stopped going to work for the fear of spread of infection • Patients' started dying in ward where admitted
6	Poor Knowledge(disease)	Disease	• Lack of interest • Doctor's will explain what is necessary • What is the use of knowing?
7	Role of health care personnel	Doctor	• Humiliation
		DOTS provider	• Insulting in front of neighbours, Threatening if medicines are discontinued • Poor follow up

Table-2 Factors Preventing Default from the Default's Perspective

S.no	Themes	Codes	Details
1	Awareness	Nature of the disease-Symptoms	• Health education regarding symptoms and Potential side effects • DOTS provider cleared the doubts
2	Family response	Support	• Wife and Children told me to take the tablets • Wife opposed the decision to stop the treatment • Family members scolded for discontinuing treatment
3	Role of the health care personnel	Doctor	• Doctor explained affectionately • Admitted and advised about continuing treatment
		DOTS provider	• Regular follow-up • Provision of drugs to relatives if not able to come in person • Compassionate advice

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Table-3 Factors leading to default-from the DOTS provider's perceptive

S.No	Items	Frequency	Respective Percentage	Average Rank	Smith's S Value
1	Vomiting	8	89	3.500	0.667
2	Illiteracy	6	67	4.333	0.444
3	Long Duration	5	56	3.000	0.444
4	Job Requirements	7	78	5.571	0.422
5	Giddiness	5	56	3.400	0.422
6	Poor Nutrition	6	67	5.500	0.367
7	More Tablets	5	56	5.000	0.333
8	Gastritis	6	67	6.500	0.300
9	Alcohol Intake	6	67	6.833	0.278
10	Itching	4	44	4.750	0.278

The issue of follow-up was also brought up ***"nobody from the hospital comes to pay us a visit, initially they paid house visits when I stopped treatment, but after that nobody has come so far"***

Doctors also have an important role as told by one of the respondents ***"the doctor asked me if I had any property, because if I had then I should leave my wife and run away, at least then they would be safe and happy"***

Factors Preventing Default from the Default's Perspective:

Awareness

The awareness of the disease seems to have a positive impact on the patient's decision. If the patients are explained about the risk of transmission and about the imminent threat of transmission their family faces in addition the improvement of symptoms after the intensive phase of treatment should also be explained if done so there is a good chance in the reduction of default.

One of the respondents who started back on treatment stated that ***"I went to a government doctor who listened to me and I cried when I told him my condition and he told that he would admit me and that I had to take the medicines regularly only then I could be better."***

Family response

Family support is of great importance in difficult times, this stands for any patient on anti-tuberculosis treatment. The respondents' whose family were supportive to their treatment and compassionate towards their situation had shown a desire to get well and thereby to continue treatment for their good as well as to take care of their family

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For instance as one of the respondents put it ***"my family took care after being diagnosed with tuberculosis, when I said that I did not like the tablets my mother scolded me and told that I have to take the medicines to get better, so now I am taking the tablets regularly."***

Role of the health care personnel

The respondents shared that some of the health personnel had shown concern about their condition and also ensured that they had taken their medicines regularly. The health personnel including both the doctors and the health personnel had an effect on the respondents through their inter-personnel communication skills and empathetic approach.

One of the respondents shared that ***"when it was difficult for me to go and collect the tablets one of the nurses in the centre had told me that she would give the tablets to my daughter so that I could get the tablets."***

One of the respondents who started back on treatment stated that ***"I went to a government doctor who listened to me and I cried when I told him my condition and he told that he would admit me and that I had to take the medicines regularly only then I could be better."***

Factors' leading to default-from the DOTS providers' perceptive

The analysis of the free listing data had shown that according to the DOTS providers the major reasons for default as per the Smiths s value was as follows **vomiting** (0.667), **illiteracy** (0.444), **long duration** (0.444), **job requirements** (0.422), **giddiness** (0.422), **poor nutrition** (0.367), **more tablets** (0.333), **itching** (0.300), **alcohol intake** (0.278) and **gastritis** (0.278)

Discussion

The present study has produced seven themes which contribute to default in the tuberculosis treatment regimen from the viewpoint of the defaulters; they are as follows job compulsions, personal habits, perception of side-effects, family problems, perceived stigma, poor knowledge (disease), and role of health care personnel, whereas the free listing exercise showed that the DOTS care providers attribute the default in treatment by the patients to reasons like vomiting, illiteracy, long duration, job requirements, giddiness, poor nutrition, more tablets, itching alcohol intake and gastritis. There appears to be a gross variation regarding the reasons of default, between the defaulters and the DOTS care providers. The effectiveness of the DOTS care and reduction in the default rate can be achieved only if this gap is reduced.

The role of family, substance abuse, stigma, treatment care provided, awareness etc., and their role in the completion or default of treatment was in line with the findings of Munro etal[3], who did a systematic review of the various qualitative literatureson tuberculosis default.

This study also revealed that stigma has a vital role in treatment completion, as patients with their perceived stigma fear tuberculosis, Education regarding the disease and an effective health education to reduce the stigma associated with the disease would influence treatment completion. These suggestions can also be attributed to the findings of Sommaet al[4] where they had ascertained that stigma both influences and indicates the effectiveness of TB control.

Alcohol addiction plays a vital role of in default of tuberculosis treatment. The interrelation between alcohol addiction and tuberculosis treatment completion is also shown in this study. It is essential to include alcohol intervention programs into the tuberculosis control programmes as it would help in the treatment completion by reducing the default rate which can be attributed to alcohol usage.[5]

The findings of present study should be seen in the light of some limitations. It was a small scale qualitative research. The gender bias and gender associated stigma in the completion of treatment

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could not be evaluated because all the respondents in the current study were male. [6]

Conclusions: The present study is a done in a qualitative manner to explore the reasons for default among patients on tuberculosis treatment; these findings can be used for planning of treatment regimens and pre treatment counselling.

Funding and Conflict of Interest: NIL

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Original Research Article

Role of Socio-cultural factors in "Health literacy of Specialist services utilization" in area of training health centre in India: A Cross-sectional study

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Date of Submission: 19.07.2014 **Date of Acceptance: 26.08.2014**

Abstract

Background: The influence & impact of socio-cultural factors upon health specialist services utilization is an upcoming issue in rural areas; where now specialized health services are also provided by training centre's of medical colleges in both government and private sector. **Material and Methods:** A descriptive cross sectional study was carried out on patients in catchment area of a health training centre in a rural area(Bilaspur) of district Muzaffarnagar(UP)India from 1st Aug 2013 to 31st July 2014. Total 500 patients who attended and went to any type of health specialist OPD were randomly selected from nearly 1000 specialists in OPD during above period. For collecting data a pre-tested semi-structured questionnaire was used to collect data by field workers posted at RHTC Bilaspur.Data was analyzed using Epi-info software version 7.1.3.3. and statistical significance was tested by applying Chi-Square test. **Results**: Majority of patients in study did health services utilization significantly (65%)($p<0.0001$). The cultural practices of understanding of health messages were more in patients who attended surgical specialties(55%) as compared to health services utilization practices for any kind of disease, which was more among those who attended medical specialties(57.5%)($p<0.05$).**Conclusions**: The socio-cultural practices of patients are significantly influencing the choice of specialty and their utilization tendency and reciprocally type of specialty use by patients also significantly impacts their socio-cultural practices; so both mutually emerge as significant associated factors in specialized services utilization from a health training centre of a private health institution, which can further clarified in more detail in future studies.

Keywords: Socio-cultural practices, Rural health training centre, Health Specialty, Private health institution.

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Introduction

Cultural practices are considered as the outcomes of a culture in relation to the traditional and customary practices of a particular ethnic group.[1] Cultural practices wheel in India have a wide range e.g. Religious and spiritual practices, medical treatment seeking practices, dietary preferences and childcare practices. Culture-bound syndromes are not uncommon in rural areas of India displaying many types of health disorders.[2]

High IMR, MMR in developing countries such as India where MDG goal achievement(Goal 5 - to reduce the high maternal mortality ratio by 3/4th by 2015) is appearing to be a difficult goal to achieve. The possible reasons that can be attributed for this are: poor access and

utilization of Specialized services in rural area despite the presence of Community health centre of primary health care & upcoming Rural health training centre (RHTC) due to rising private and government medical colleges in India as many studies across the globe have revealed the root cause of socio-cultural factors in seeking treatment from health specialists.[3,4]

Health literacy is an ability to read, understand and use any healthcare information in order to make right health decisions and follow instructions for treatment from both general practitioners as well as specialist doctors. In India although allopathic medicine services from primary health care system are still popular in rural areas for various kinds of diseases; but services from primary health care services are not upto the expectations of the clients and there non-popularity is often due to factors such as ignorance, faith in another system, constraints of money, suggesting that socio-cultural beliefs play dominant role in utilization of primary health care services.[5] Many studies conducted at RHTC in Muzaffarnagar rural area in past suggest that main specialized health care services utilized were mainly from Medicine specialists and RHTC of medical colleges can significantly contribute and support various programmes for primary health care system apart from its specialized curative services.[6,7]

Health services delay in seeking specialized health care are influenced not only by poor access to care and economic barriers; but also by individual and community knowledge and perceptions towards specialized health services as seen in study in Nicaragua.[8]The cultural beliefs around health and illness contribute to an individual's ability to understand and act on a health care provider's instructions as seen in study from USA.[9]It has also been seen from many studies that people in rural area approach religious and faith leaders for seeking treatment of their physical, emotional and mental problems. A case study on socio-cultural difficulties faced by rural families in district Muzaffarnagar (UP) have also revealed that these factors become dominant in health seeking behavior.[10]

The influence & impact of socio-cultural factors upon health specialist services utilization is therefore an upcoming issue in rural areas; where now specialized health care services are also provided by training centre's of medical colleges in both government and private sector and previous studies on this issue are lacking, so this is one of the prime reason for choosing this research topic by authors in this article.

Material and Methods

Specialized Health services Schedule at RHTC:

RHTC Bilaspur in district Muzaffarnagar is serving 6 villages, catering to a population of 43000 in State Uttar-Pradesh India since its inception in 2012.Daily a Specialty Clinic runs from Monday to Saturday(Monday-Medicine, Tuesday-ENT, Wednesday-Obs & Gyn,Thursday-EYE,Friday-Skin& VD and Saturday-Orthopedics)where patients are referred by LMO and Asstt Prof(Community Medicine) whenever required.

Research Question: What are the roles of the socio-cultural factors of patients in utilizing specialized health services at health training centre of a Private Health Institution in India?

Ethical approval:

The study was approved by Institutional ethics committee and additional permission were also taken from director, principal, HOD of community Medicine department as well MOIC (RHTC) for conduction of this study at RHTC area. Study participants were informed and their consent was also taken for participation in study.

Place of conduction of study: Patients in RHTC catchment area (Bilaspur) of a Private

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Medical college in district Muzaffarnagar of state Uttar Pradesh in India.

Study design: A descriptive cross sectional study

Study Participants: **Inclusion Criteria**: Study was carried out on only those patients who used specialized OPD Services in the catchment area of a health training centre in a rural area (Bilaspur) of district Muzaffarnagar(UP)India from 1st Aug 2013 to 31st July 2014. **Exclusion Criteria**: Patients who did not attend Specialist OPD were excluded from this study

Sampling frame: There was a annual General OPD of 10,000 patients who attended RHTC and 1000 patients were seen by specialists in their respective OPD out of these total patients during above period.

Sampling technique: Total 500 patients who attended and went to any type of health specialist OPD were randomly selected assuming that 50% patients can provide a good estimate of population parameters.

Data Collection technique: For collecting data a pre-tested semi-structured questionnaire was used to collect data by field workers posted at RHTC Bilaspur.

Data analysis: It was analyzed using Epi-info software version 7.1.3.3.

Statistical Tests Used: The statistical significance of study findings was tested by applying Chi-Square test.

Results

Out of the total sampled patients (500) maximum were found attending Medicine specialist OPD(30%) and least went to Skin and Obs& Gyn(10% each) OPD[Table:01].

Majority of the patients belonged to age groups 40-50(56%), with male predominance(77%) and majority of them were Hindus(57%)[Table:02]

Table 01. Distribution of Selected patients availing specialized OPD services at RHTC

S.No.	Type of Specialization OPD services availed	N=500	%
1	**Medicine**	150	30
2	**Ophthalmology**	100	20
3	**ENT**	75	15
4	**Skin**	50	10
5	**Orthopedics**	75	15
6	**Obs. & Gyn.**	50	10
	Total	**500**	**100**

Table 02. General profile of patients availing specialized OPD services at RHTC

S. No.	Socio-economic parameters	N=500	%
1	**Caste**		
	Lower	400	80
	Upper	100	20
2	**Education**		
	Illiterate	300	60
	Literate	200	40
3	**Type of Family**		
	Nuclear	200	40
	Joint	300	60
4	**Occupation**		
	Agriculture	375	75
	Non-agriculture	125	25
5	**Socio-Economic Class**		
	Lower	350	70
	Upper	150	30

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Table 04. Socio cultural (SC) practices of patients availing specialized OPD services at RHTC

S.No	Socio-cultural practices(multiple responses)	N=500 (in%)	
		Yes	No
1	General hygienic practices followed	100(20)	400(80)
2	Health services often utilized	325(65)	175(35)
3	Understand health education messages of Health workers	150(30)	350(70)
4	Mothers follow child feeding practices properly	75(15)	425(85)
5	Avail Delivery services at any kind of health facility	275(55)	225(45)
Chi-square test: $x^2=413.9$, df=4, p<0.0001			

Majority of patients belonged to lower caste(80%), Illiterate(60%), Joint family(60%) and mainly from an agricultural background(75%) and low socio-economic class(70%)[Table:03].

When socio-cultural practices of patients were analyzed, it revealed that majority of them did not a) follow general hygiene practices(80%) & b)health education messages of health workers(70%), even mothers did not follow child feeding practices properly(85%) whereas their health services utilization were good(65%) and majority availed delivery services at any type of health facility(55%) and these responses were found to be highly statistically significant(p<0.0001)[Table:04 & Figure:01]

The utilization of medical and surgical types of health facilities by patients when it was analyzed for their socio-cultural practices: the understanding of health messages culminating into cultural practices was more from surgical specialties (55%) whereas health services utilization practices for any kind of health facility was more among medical specialties (57.5%) and this finding was also statistically significant(p<0.05)[Table:05].

Discussion

In the present study out of the total sampled patients (500) maximum were found attending Medicine specialist OPD(30%) and least went to Skin and Obs& Gyn(10% each) OPD. This fact was also found in their studies by Davey S et al (2014) on Adolescents and young adults in rural and urban areas and other researchers [Garg S& Nath A(2008)& Joshi BN etal(2011)].[6,11,12] Majority of the patients in our study belonged to age groups 40-50(56%), with male predominance(77%) and majority of them were Hindus(57%) and they belonged to lower caste(80%), Illiterate(60%), Joint family(60%) and mainly from an agricultural background(75%) and low socio-economic class(70%).This profile of patients is in consonance with study by ICSSR, New Delhi(Reddy N,2006) in which Muzaffarnagar district comes under class B1 of Minority Concentrated District with similar kinds of socio-economic parameters and also found in report of District Sankhiya Patrika (Muzaffarngar(2006) and study of Davey S et al (2014).[7, 13-14]

When we analyzed socio-cultural practices of patients, it revealed that majority of them did not follow general hygiene practices(80%) & health education messages of health workers(70%), even mothers did not follow child feeding practices properly(85%) whereas their health services utilization were found to be

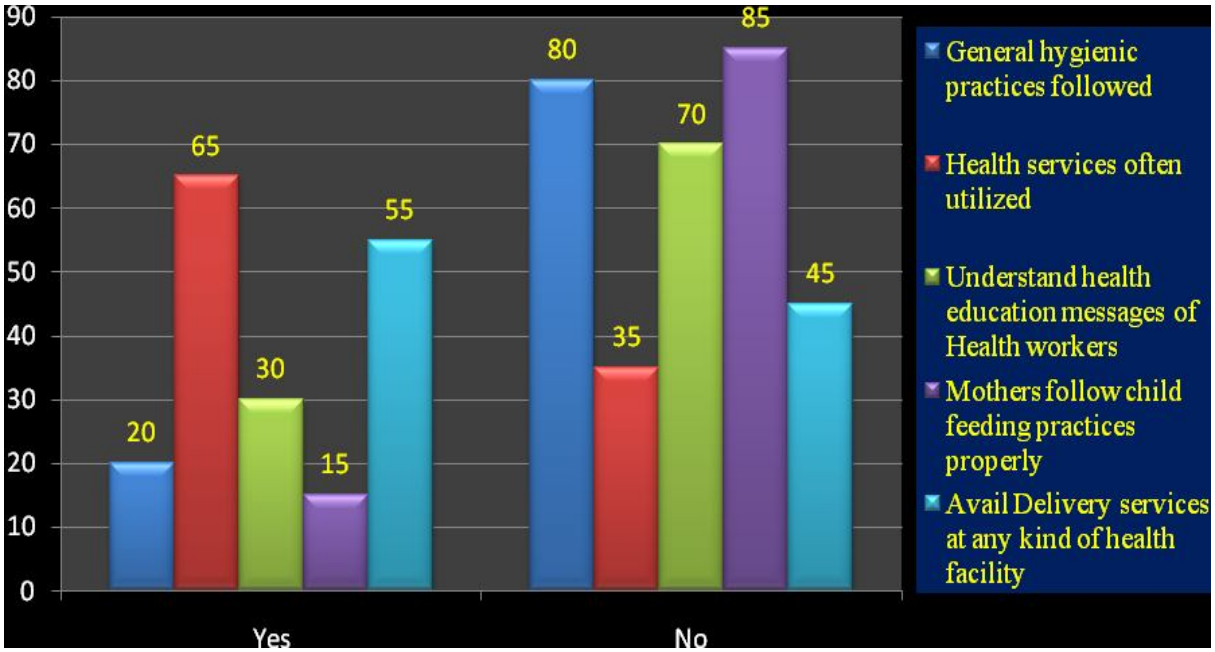
Table 05. Association among Medical and Surgical specialty choice of patients with their Socio-cultural practices

S.No.	Socio-cultural practices (multiple responses)	Type of specialty which patients choose (N=500)	
		Medical Specialization* **(N=200)**	**Surgical Specialization**** **(N=300)**
1	**Understand of health messages culminating into Cultural practices**	85(42.5%)	165(55%)
2	**Health services utilization practices for any kind of health facility**	115(57.5%)	135(45%)
	Total	**200**	**300**
Chi-Square test:X^2=7.01,df=1,p<0.05			

**Medical Specialization: Medicine + Skin OPD patients*

***Surgical Specialization: EYE+ENT+ORTHO+ OBS&GYN Patients*

Figure 01: Socio cultural(SC) practices of patients availing specialized OPD services(multiple responses)



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good(65%) and these responses were found to be highly statistically significant($p<0.0001$). It has been seen in study of Worthington RP and Gogne A(2011) that patient health-seeking behavior decides delays in obtaining medical help for reasons with their roots in culture, social practice and religious belief.[3] Other studies have also found that there are many different potential barriers (some tied to ethnic minorities) in use of health services as found in Netherlands(Scheppers E et al 2005).[15]Study of Pandey N (2011) in rural area of Uttar Pradesh also suggest the similar issues of household members, previous health care experiences and social networks in the village and interaction with health workers as factors which can affect patients decision to seek care, as similar to our study.[16]

In the primary health care setting, with a scarce resource, it is important to remember social and cultural factors that can negatively impact on patient well-being. The patients with culture-bound symptoms are common within primary health care in India; where some causes are infrastructural, and also based on access and delivery, but key ones are cultural values, social practices and beliefs influencing health care utilization.[3] Study of Lyratzopoulos G et al (2012) had also revealed these kinds of fact that substantial ethnic differences in patient experience exist in a national healthcare system providing universal coverage and there were large variations in the experiences reported by ethnic minority patients in different practices. [17]

The utilization of medical and surgical types of health facilities by patients when it was analyzed for their socio-cultural practices: the understanding of health messages culminating into cultural practices was more from surgical specialties (55%) whereas health services utilization practices for any kind of health facility was more among medical specialties(57.5%) and this finding was also statistically significant($p<0.05$). Sociocultural factors such as not perceiving the need for the services and objections from family members emerge as barriers to utilization of institutional delivery as found in study of Tey NP & Lai SL(2013).[18] The study of Hudelson P(1996) also suggest that socio-economic and cultural factors work in two ways: first, in determining overall gender differences in rates of infection and progression to disease, and second, they can lead to gender differentials in barriers to detection and successful treatment of specialized health services.[19] The physical and socio-cultural barriers to access for patients in rural areas are therefore emerging as key issues and barriers to healthcare utilization exist for all the wealth categories in dimensions such as: the health seeking process and health services delivery etc.[20] The study of Pletscher M(2013) in Swiss had also emphasized on fact that number of specialist visits by rural patients, was better for people with very good health literacy and this finding is just similar to our study.[21]

Conclusion:

Health specialist services utilization is related to their health care literacy among rural patients. The socio-cultural practices of patients are significantly influencing the choice of specialty and vice-versa and so both of them are a significant associated factor in specialized services utilization from a health training centre of a private health institution, which can clarified further in future studies in more detail.

Source of funding: Nil

Conflict of Interest: Nil

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Original Research Article

Low birth weight and associated factors in a rural maternity hospital, Bangalore

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Date of Submission: 17.06.2014 **Date of Acceptance: 10.09.2014**

Abstract

Introduction: More than twenty million low birth weight (LBW) babies are born every year throughout the world. In India 22% of the births are LBW according to NFHS– 3. LBW is responsible for 60% of the infant mortality and it carries a 40-fold increase in the risk of neonatal mortality. LBW has short term and long term consequences for the baby. **Objective**: To determine the prevalence of LBW and its association with socio - demographic, maternal and obstetric factors in a rural maternity hospital in Karnataka. **Methodology**: Data was collected by performing a record review of inpatient records of women who had delivered in the hospital over a period of one year (1st January 2012 to 31st December 2012). **Results and Discussion**: There were 1017 live births during this period. The prevalence of LBW was 21.1%**.** Birth weight showed statistically significant association with anaemia and gestational age at delivery ($p < 0.05$). There was no significant association between LBW and maternal age, birth order, maternal education, per capita income of the family, time of antenatal registration and number of antenatal visits. **Conclusion**: The prevalence of LBW was 21.1%**.** There was no significant association between LBW and maternal age, maternal education and per capita income of the family. Birth weight showed statistically significant association with anaemia and gestational age at delivery.

Keywords: Low birth weight, record review, antenatal mothers

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Introduction

Birth weight is a reliable and sensitive predictor of a newborn's chances for survival, growth and long term physical and psychosocial development.[1] Low birth weight (LBW) has been defined as a birth weight of less than 2.5 kg regardless of gestational age.[2] Infants weighing lesser than 2500 grams are approximately 20 times more likely to die than other babies. LBW is closely associated with foetal and neonatal mortality and morbidity. It also leads to inhibited growth and cognitive development and also associated with chronic diseases later in life.[3] Since birth weight has a strong correlation with infant survival, attention has been given to strategies that will reduce the proportion of infants with LBW.[4] The study of LBW is very important, since sub-optimal birth weight may have consequences in the perinatal period, during infancy and even in adulthood. Perinatal morbidity and mortality are more frequent in LBW infants than in normal infants. LBW is the second common cause of death in the perinatal period, after premature birth.[5] Furthermore, term infants weighing between 1500 and 2500 g at birth have a perinatal mortality rate 5–30 times greater than infants with birth weights between the 10th and 50th

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percentile, while infants born almost at term weighing less than 1500 g have 70–100 times higher mortality rates.[6]

The World Health Organization has estimated that annually 24 million LBW infants are born globally. The prevalence of LBW infants is around 5% in many developed countries and up to 30% in underdeveloped or developing countries.[7-10]There are numerous factors contributing to LBW, both maternal and foetal. The maternal risk factors are biologically and socially interrelated; most are, however, modifiable. Of the total estimated babies born with intra uterine growth retardation (IUGR i.e.,<2.5 kg and ≥37 weeks), Asia accounts for 75%, followed by Africa 20% and Latin America 5% respectively. 11% of all LBW babies born in developing countries are IUGR, which is 6 times higher compared to developed countries.[11] Within South Asia the prevalence of LBW is 36% in Bangladesh and 19% in Pakistan.[12] In India, the prevalence of LBW has been reported as 26%.[13] While the proportion of IUGR has been found to be 54% of all the LBW babies.[14,15]

Materials and Method

We conducted our study in a 50 bedded rural hospital in Ramanagara District, Karnataka. This hospital mainly provides maternity health care services. It also provides outpatient services to approximately 900 patients per week. The hospital has a bed occupancy rate of approximately 85% per year. We conducted a record review of all women who delivered over a period of one year. Permission from the hospital authorities was taken. Records over a period of one year from1st January 2012 to 31st December 2012 were reviewed to gather data. In addition to demographic characteristics, information regarding antenatal care, intra natal care, postnatal care, risk factors of low birth weight, new born details and anthropometry of the new born were collected.

Data was entered in Microsoft Excel and analyzed using SPSS for Windows version 16. Data was analyzed for simple descriptive statistics like means and proportions were calculated. Tests of association like Chi Square test were done to identify significant relationships between exposure factors and LBW.

Results

We reviewed a total of 1017 records of mothers who had delivered in the study period. The prevalence of low birth weight was 214 (21.1%) in the study population. The association between low birth weight and maternal age, religion, maternal education, per capita income of the family, birth order, full antenatal care, anaemia in the mother, maternal weight gain, time of antenatal registration, number of antenatal visits and gestational age at delivery were studied. In the study population statistically significant association was found between birth weight and anaemia and gestational age at delivery.

Table 1: Demographic details of study population (n=1017)

Age of Mother	**Frequency**	**Percentage**
<19	106	10.4
19 – 29	893	87.8
> 30	18	1.8
Marital Status		
Married	1013	99.6
Unmarried	2	0 .2
Unknown	2	0 .2
Education of Mother		
Illiterate	53	5.2
School education	697	68.5
Higher Secondary	172	16.9
Graduate	84	8.3
Unknown	11	1.1

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Most of the mothers were between the age of 19 to 29 years and it was observed that 106 (10.4%) of them were teenage mothers. Among the antenatal mothers 1013 (99.6%) of them were married and 869 (85.4%) of them had school education, 84 (8.3%) were graduates and all of them were homemakers.

Table 2: Antenatal care of the study population (n=1017)

Antenatal care	Frequency	Percentage
Antenatal checkups ≥4	662	65.1
2 doses of tetanus toxoid injections received	1017	100
Iron and folic acid tablets ≥ 100	635	62.4
Early registration at study site	163	16.1
Full Antenatal care	468	46.2

Among the study population 662 (65.1%) had four or more antenatal check-ups and 468 (46.2%) had full antenatal care ie. at least four antenatal check-ups, two doses tetanus toxoid injection and at least hundred iron and folic acid tablets.

Table 3: Antenatal haemoglobin level at third trimester (n=1017)

Hemoglobin	Frequency	Percentage
Normal (> 11gm %)	443	43.6
Mild Anemia (10-11gm %)	290	28.5
Moderate Anemia (7-9.9gm %)	277	27.2
Severe Anemia (<7gm %)	7	0.7

The laboratory investigation report in the records revealed that 290 (28.5%) had mild anaemia, 277 (27.2%) had moderate anaemia and 7 (0.7%) had severe anaemia.

Table 4: Obstetric History of study population (n=1017)

Variable	Frequency	Percentage
Primi gravidae	634	56.6
Multi gravidae	375	42.7
Grand multi gravidae	8	0.7
Gestational week at delivery		
< 37 weeks	59	5.8
37-42 weeks	946	93.0
>42 weeks	12	1.2

Majority of the study population 946 (93.0%) had their delivery during 37-42 weeks. In the study population 729 (71.7%) had normal vaginal deliveries, 155 (15.2%) had caesarian section and 133 (13.1%) had assisted forceps delivery.

Table 5: Newborn details of study population (n=1017)

Gender	Frequency	Percentage
Male	473	46.5
Female	546	53.5
Birth Weight		
Very LBW(<1500g)	7	0.7
LBW(1500-2499g)	208	20.4
Normal BW(≥2500g)	804	78.9

Of all the newborns 7 (0.7%) babies were born with very low birth weight, 208 (20.4%) had low birth weight and 804 (78.9%) had normal birth weight.

There was statistically significant association between LBW and maternal anaemia at third trimester and gestational week at delivery. Among the term deliveries 25.5% were low birth weight which signifies intra uterine growth retardation.

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Table 6: Low birth weight and associated factors

Variable		Low birth weight	Normal birth weight	P Value
Hemoglo-bin	<11gm%	167 (41.1%)	407 (58.9%)	<0.05
	≥11gm%	46 (11.5%)	397 (88.5%)	
Gestation-al week at delivery	<37 wks	16 (37.2%)	43 (62.8%)	<0.05
	37-42 wks	192 (25.5%)	754 (74.5%)	
	>42 wks	5 (71.4%)	7 (28.6%)	
Total		213 (21.1%)	804 (78.9%)	-

Discussion

The prevalence of low birth weight in the study population was 21.1% and the mean birth weight was 2.6± 0.4kg. The prevalence of LBW (<2.5 kg irrespective of gestational age) is estimated to be 16% worldwide, 19% in the least developed and developing countries and 7% in the developed countries. The highest prevalence of LBW is 31% in South Asia followed by Middle East and North Africa 15%, Sub-Saharan Africa 14% and East Asia and Pacific 7%.[11] Studies done in rural areas of India had the same magnitude of LBW 20- 33%.[16-19] But, one study done in Ballabgarh had the prevalence rate of LBW as low as 8.8% and another study conducted in West Bengal as high as 31.3%. In the studies conducted in rural areas the mean birth weight of newborn ranged between 2.6±0.5 to 2.8±0.4 kg.[16, 19-21] Most of the hospital based studies had the prevalence rate of LBW more than 30% and the mean birth weight of new born ranged between 2.5±0.4 to 2.8±0.4 kg.[21-24] According to National Family Health Survey –3, over one in five (22%) babies born in India were of LBW. The proportion weighing less than 2.5 kg is slightly higher in rural areas (23%) than in urban areas (19%).[25] Different studies have revealed that significantly associated risk factors for the birth weight of a newborn vary according to the geographical location and the study population. A prospective longitudinal study was carried out in the rural areas of district Ambala, Haryana. The results showed a significant association between the birth weight of baby and the maternal age, maternal education, per capita income of the family, time of antenatal registration, number of antenatal visits, physical work during pregnancy, height and weight in pregnancy.[17] In our study we could not find statistically significant association between LBW and above mentioned factors. In a maternity home record based retrospective case control study conducted in the field practice area of Kasturba Medical College, Manipal the significant determinants identified for intra uterine growth retardation were maternal age 30 years, primiparity, maternal height 145 cm, maternal weight 45 kg and anaemia in pregnancy.[26]

In India, anaemia is the second most common cause of maternal death, accounting for 20% of total maternal deaths.[27] The prevalence of anaemia ranges from 33% to89% among pregnant women with wide variations in different regions of the country.[28]Pregnant women from rural Maharashtra in India registered a prevalence of 56.4%.[29] Our study also showed a high prevalence of 56.4% of anaemia among antenatal mothers. The haemoglobin levels of all the antenatal mothers were available in the records and haemoglobin values at the third trimester was taken for the analysis. In our study there was statistically significant association between anaemia and LBW.

Conclusion: The prevalence of LBW was 21.1%**.** In the study population statistically significant association was found between birth weight and anaemia and gestational age at delivery. There was no significant association between LBW and maternal age, maternal education and per capita income of the family.

Recommendations: Interventions to reduce LBW and maternal anaemia should be specific

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for the targeted population and directed at the quantitatively important modifiable determinants of LBW. Comprehensive approaches which institute a combination of interventions to improve the overall health of the women are needed. Such approaches are likely to be most effective in reducing the LBW problem. Health education regarding the causes, risk factors and prevention of LBW is advisable among adolescents and antenatal mothers.

Limitation: Low birth weight is an indicator of maternal malnutrition which was not assessed in this study.

Conflicts of interest:

Nil declared.

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Original Research Article

The Anti-Microbial Profile of Pyoderma in a Tertiary Care Institute

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Date of Submission: 28.08.2014 **Date of Acceptance: 20.09.2014**

Abstract

Introduction: Pyoderma is a superficial skin infection caused by various bacteria. It can be primary or secondary to pre-existing skin condition. Pyoderma is a common and easily treatable clinical condition but has many complications if not properly treated. There is a change in the spectrum of organisms causing pyoderma and changing antibiotic sensitivity due to irrational use of antibiotics. Hence we studied the organisms causing pyoderma and their sensitivity pattern in our tertiary referral centre. **Aim:** To identify the organisms causing pyoderma and to identify their antibiotic sensitivity pattern. **Materials and Methods:** All patients attending the dermatology department with pyoderma were studied. **Result:** Of the 60 samples collected, majority of them were males from low socio economic status. 68% of them had primary pyoderma. *Staphylococcus aureus* was the predominant gram positive cocci and it is resistant to Penicillin, Ciprofloxacin and Cephalosporin. Other organisms like *Streptococcus pyogenes* was sensitive to Ampicillin and gram negative bacteria were sensitive to ciprofloxacin. **Conclusion:** Pyoderma is common in the lower socio economic groups and there is an increase in the resistance to the routinely used antibiotics. Hence routine culture sensitivity of pyoderma would help in treating the patients and prevent complications.

Key words: Antibiotic sensitivity, skin infection, microbiology

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Introduction

Skin and soft-tissue infections are among the most common infections and serves as a major cause of serious local and systemic complications. These complications can range from mild to severe thus making skin infections a significant condition in medical practice today. They are caused by bacteria, fungi, virus or parasite. Bacteria are the most important causes of these superficial skin infections. Although many bacteria come in contact with or reside on the skin, they are normally unable to establish an infection. When they do occur however, they can range in size from a tiny spot to the entire body surface which can either be harmless or life threatening. An example of such type of skin disease caused by bacteria is pyoderma.

Any condition that results in accumulation of neutrophilic exudate can be termed as pyoderma. It has various etiologies are infection, inflammation or neoplasm; however, pyoderma usually refers to bacterial infection of skin. The factors which are associated with the increased incidence of pyoderma include poverty, malnutrition, overcrowding, poor sanitation, and seasonal variation thus explaining the higher incidence in the lower socio economic strata especially among the children who are the common victims [1].

Pyoderma can either manifest as primary or secondary pyoderma. Primary infections have a

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characteristic morphology and course, caused by a single organism and arise on normal skin [1]. Primary are most frequently caused by coagulase positive *Staphylococci* or β–haemolytic *Streptococci*. Secondary pyoderma occurs as a superimposed condition in diseases like eczema, ulcers, scabies, pediculosis etc. Staphylococci and streptococci can also cause secondary pyoderma along with Gram-negative microorganisms like *Proteus, Klebisella, Pseudomonas aeruginosa* and *Escherichia coli* [1].

Though easily treatable, the condition is known for its chronicity, recurrence, and other complications like post streptococcal glomerulonephritis [2]. Therefore, timely recognition and prompt bacterial diagnosis with antimicrobial sensitivity is imperative for the effective management and treatment of pyoderma [2]. Previously various antibiotics were very effective for such cases but indiscriminate use of topical and systemic antibiotics has contributed to resistance thus posing a big problem to clinicians. So for successful treatment of pyoderma a detailed knowledge about the causative microorganisms and antibiotic sesitivity pattern is essential [3].

The rapid emergence of multidrug resistance in most of the Gram positive bacterial isolates complicates the management of pyoderma and demonstrates the need for more judicious use of antimicrobial agents [2]. The pattern of skin diseases varies from one country to another and in different parts within the same country [4,5]. Changing trends are being noted in the etiological aspect of primary pyodermas and the problem of emergence of drug resistant strains is an ever increasing one. Hence it would be ideal to do culture and sensitivity tests before prescribing antibiotics [6]. In view of the above facts, this present study was undertaken to isolate and characterize bacterial pathogens from clinical samples over a period of six months in our hospital and to detect the sensitivity pattern of those isolates to the commonly used antibiotics.

Aim: To identify the bacterial pathogens from cases of pyoderma and to find out their antibiotic susceptibility pattern.

Objectives:

1. To isolate and characterize the bacteriological agents from infection sites.
2. To identify the common bacteria causing pyoderma.
3. To detect the antibiotic sensitivity pattern of bacterial isolates to the commonly used antibiotics

Materials and Methods

The study was performed in a medical college hospital in South India for 6 months. Total number of sample collected was 60. Pus swabs were collected from the patients with pyoderma attending the dermatology outpatient department.

Inclusion criteria: All patients with pyoderma attending dermatology outpatient department.

Exclusion criteria: Those patients who are on topical or systemic antibiotics were excluded.

Specimen: The pus was collected using 2 swabs from the abscesses, boils, skin lesions or from the infected area.

Methodology

Sample processing was done in three steps a) Microscopy b) Identification of bacteria c) Antibiotic susceptibility testing. The lesions were swabbed with alcohol and the pus was collected by using a sterile cotton swab. In the case with intact pustule lesions, the pustule was ruptured with a sterile needle and material was taken with sterile swab. In crusted lesions, the crusts were partly lifted and material was taken from underneath [8]

The swabs were transported immediately to the laboratory. Of the two swabs collected one was used for Gram stain and microscopic examination and the other for culture. Second swab was inoculated on to the following media [4]:

1. Blood agar
2. MacConkey agar

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3. Crystal violet blood agar (1:500000 of crystal violet in blood)
4. Chocolate agar

Bacterial pathogens were identified by inoculation into the above mentioned media after which they were incubated aerobically at 37^0C for 24 hours and also by biochemical characteristics. MacConkey agar plate was used for Gram negative bacilli while Crystal violet blood agar was used for the growth of *Streptococci* [4] and Blood agar plate was used to identify haemolytic organisms. The tube coagulase test was done to identify *Staphylococcus species*

Table 1– Details of organisms from positive samples

S. No	Organism isolated	No. Of isolates	Percentage
1	*Staphylococcus aureus*	35	44.87%
2	*Streptococcus pyogenes*	14	17.94%
3	CONS*	9	11.53%
4	*Enterococcus spp.*	5	6.41%
5	*Pseudomonas aeruginosa*	8	10.29%
6	*Citrobacter spp.*	2	2.56%
7	*Klebsiella spp.*	2	2.56%
8	*E. coli*	1	1.28%
9	*Proteus*	1	1.28%
10	*Enterobacter*	1	1.28%
	Total	78	

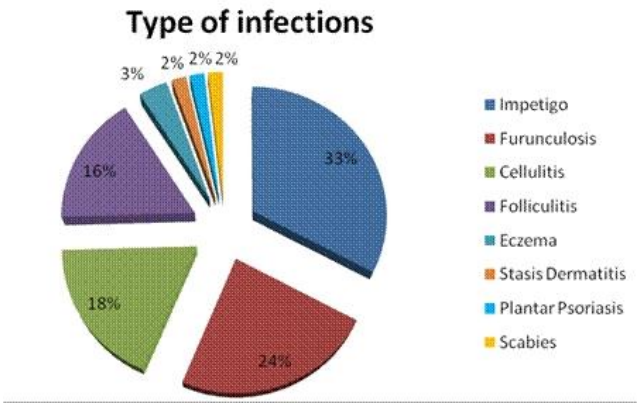
**CONS- Coagulase negative Staphylococcus*

Results

During the period of six months 60 samples were collected from the patients with clinically diagnosed pyodermal infections attending Dermatology outpatient department. Out of 60 samples, 18 (30%) pyodermal cases were from age group below 10 years which was predominant age group. Out of 60 samples received, 41 were male and 19 were females of which 37 males yielded a potitive culture and 18 females yielded a positive culture. Among the total 60 number of samples, 45 (75%) patients were from poor, 13 (21.67%) from fair and 2 (3.33%) from good socio economic status. Out of 60 pus samples, 55 (92%) yielded bacterial growth culture positive and 5 (8%) samples had no growth. Out of 55 positive samples, 37 patients were infected with primary pyoderma (67.27%) and 18 (32.73%) were with secondary pyoderma. With regard to the site of infection, the maximum lesion isolated from the lower limbs 32 (53.33%), followed by 10 (16.66%) on scalp, 8 (13.34%) on face, 6 (10%) on trunk, and 2 each on hand & gluteal region (6.67%) (Figure 1)

On the basis of type of infection, out of 55 positive samples, 18 (33%) patients were having predominantly impetigo followed by furunculosis 13 (23.64%), cellulitis 10 (18%), folliculitis 9 (16.36%) and others such as eczema, stasis dermatitis, plantar psoriasis, & scabies constitutes the remaining 9% (Figure 2).

Figure 1: The distribution of type of infections



Among the total 55 positive samples, monomicrobial growth was detected from 32 (58.18%) samples and 23 (41.82%) had polymicrobial growth. The total number of bacterial isolates was 78 (Figure 3).

Out of the total 78 bacterial isolates, 63 (80.76%) were Gram positive cocci and 15 (19.24%) were Gram negative bacilli. Out of 63 Gram positive isolates, *Staphylococcus aureus* was the predominant isolate i.e 35 (55.55%), followed by *Streptococcus*

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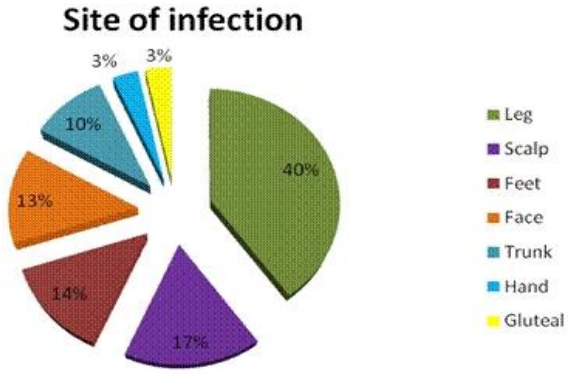
Figure 2: Distribution of site of infection



pyogenes- 14 (22.23%), Coagulase negative *Staphylococci* (CONS) - 9 (14.28%) and *Enterococcus spp.* - 5 (7.94%). Among the Gram negative bacterial isolates *Pseudomonas aeruginosa* was the predominant isolates i.e. 8 (53.33%) and out of this 8, 1 strain was ESBL*, followed by *Citrobacter & Klebsiella* each 2 (13.33%) and *E.coli, proteus & Enterobacter* each 1 isolates (6.66%). The *E.coli* isolated was also ESBL*

*ESBL- Extended spectrum beta lactamase

Among the 35 isolates of *Staphylococcus aureus*, maximum resistance was seen to cephalexin & penicillin and least to vancomycin, Linezolid & rifampicin. Antibiotic resistance pattern of *Staphylococcus aureus*, which was the predominant isolate,is as follows Cephalexin (77.27%), Penicillin (72.72%), Cotrimoxazole (52.27%), Ciprofloxacin (40.90%), Gentamicin(29.54%), Erythromycin (18.18%), Clindamycin (9.09%). All strains of Staphylococcus aureus were 100% sensitive to vancomycin, linezolid and rifampicin. Among 35 *Staphylococcus aureus* strains isolated 3 (8.57%) were MRSA (Figure 4).

All 14 strains of *Streptococcus pyogenes* were 100% sensitive to ampicillin, ciprofloxacin, & vancomycin and 93% sensitive to gentamycin, cotrimoxazole, & erythromycin (Figure 5).

Pseudomonas spp. isolated had shown 100% sensitive to Ciprofloxacin, Cefepime & Piperacillin and 88% sensitive to gentamicin, ofloxacin, & amikacin. *Enterococcus spp* was 100% resistance to pencillin, followed by Ampicillin (80%), Cephalexin (40%). Cotrimoxazole, Erythromycin, Vancomycin showed (40%) resistance each and Ciprofloxacin, Gentamicin were 100% sensitive (Figure 6).

Discussion

In the present study during a period of six months from 60 samples were collected from patients with clinically diagnosed pyodermal infections attending dermatology outpatient of our Hospital. Out of 60 pus samples, 55 (91.67%) yielded bacterial growth. 5 (8.33%) samples had no growth which tends to occur as seen in a study by *Sujata Baveja et al* in which 16.3% of patients were culture negative [8,9]. *Baslas et al* also reported negative cultures in 14.9% of patients [9].

In our study, out of 60 samples, 18 (30%) were from the age group below 10 years. A similar study by *M Jyothi Nagmoti et al* showed most of the patients (45%) belonged to the age group of 1-4 years [10]. Another study by *S Mariette Mathew et al* showed that the maximum incidence was in the 14 year age group (54.2%), followed by the 5-8 years age group (24.2%) [1]. Another study by *Adarsh Chopra et al* had 31% cases between 0-10 year age group [11].

Males were (69%) were predominantly affected than females which is similar to the report by *M Jyothi Nagmoti et al* [10]. But *S Mariette Mathew et al* showed a higher prevalence of pyoderma in female children (60%) [6]. In our study 45 (75%) patients were from poor socio-economic status which is similar to a study by *M Jyothi Nagmoti et al* confirming socio economic status is an important risk factor for the development of pyoderma [10]. Out of 55 positive samples, 37 were having primary pyoderma and 18 with secondary pyoderma. Polymicrobial growth was found in 23 (41.82%) and monomicrobial in 32(58.18%) of samples. A similar result was also seen in study by *DP Ghadage et al* in which single infecting organism was isolated

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Figure 3: The distribution of monomicrobial & polymicrobial growth

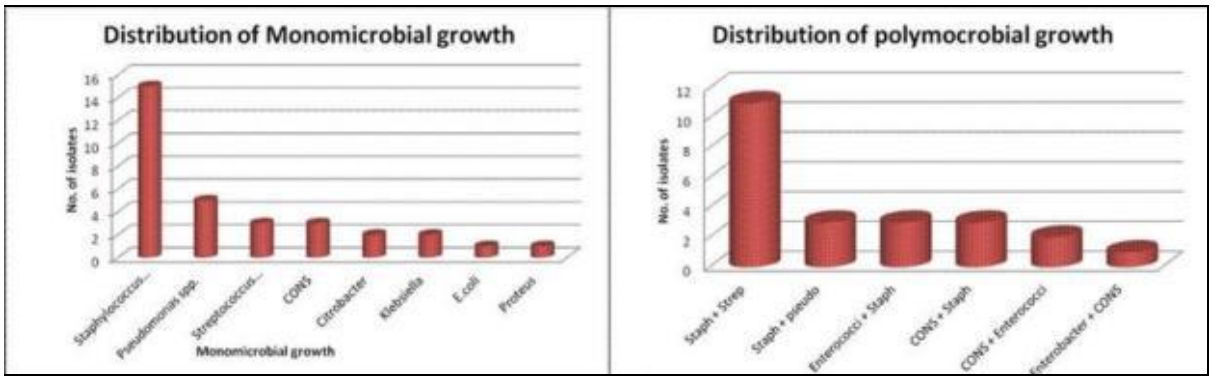

Figure 4: Antibiogram of *Staphylococcus aureus*

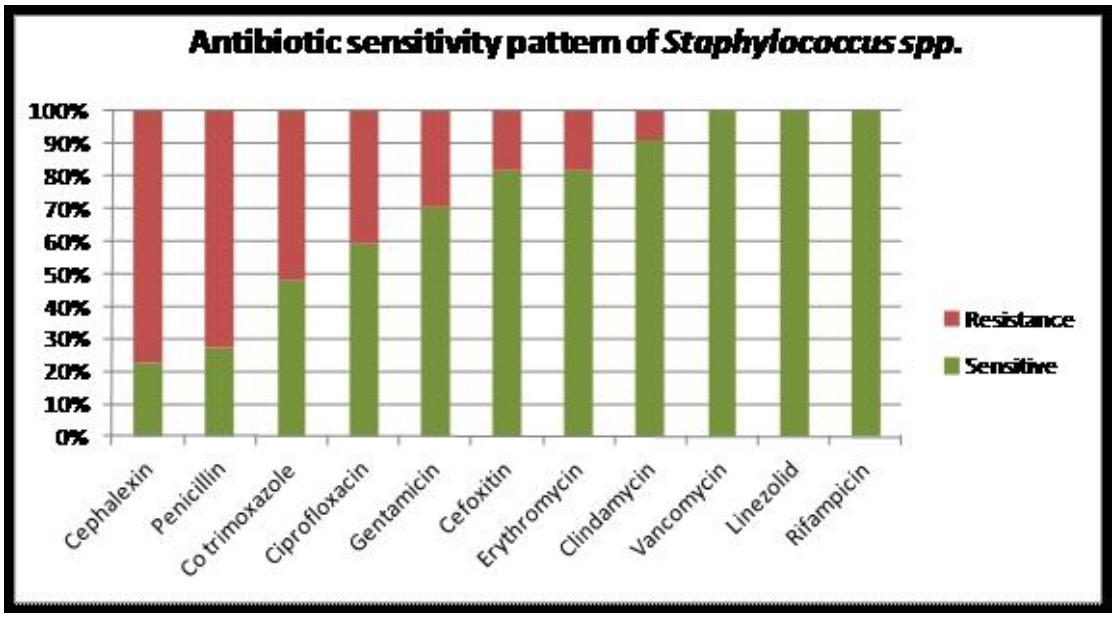

Figure 5: Antibiotic sensitivity pattern of *Streptococcus pyogenes*

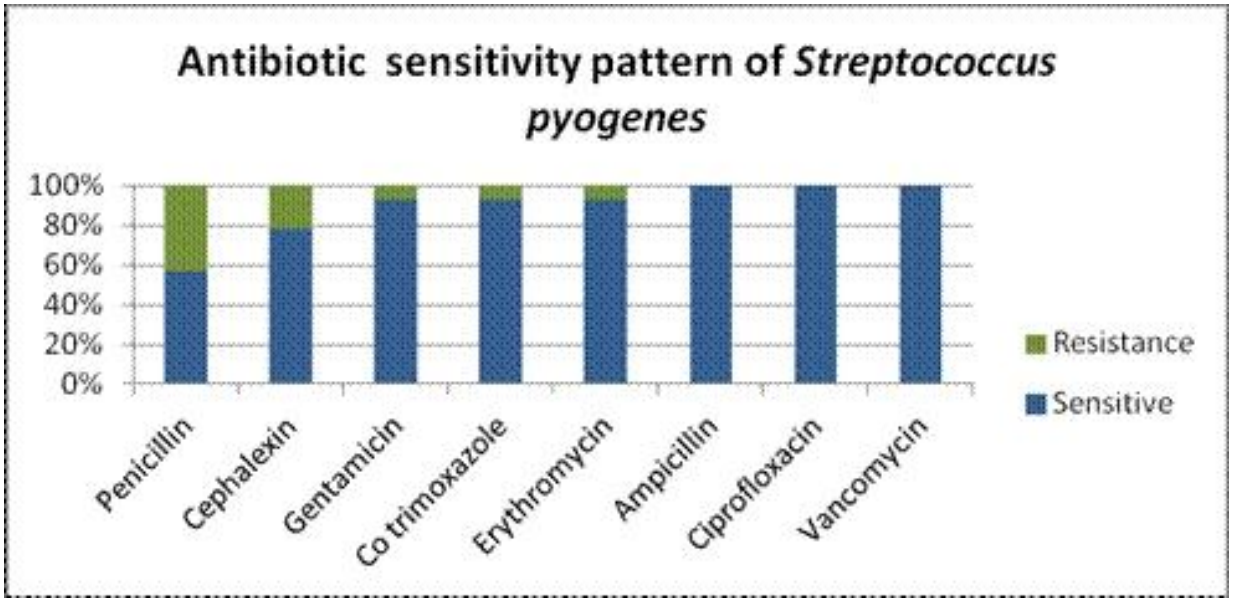

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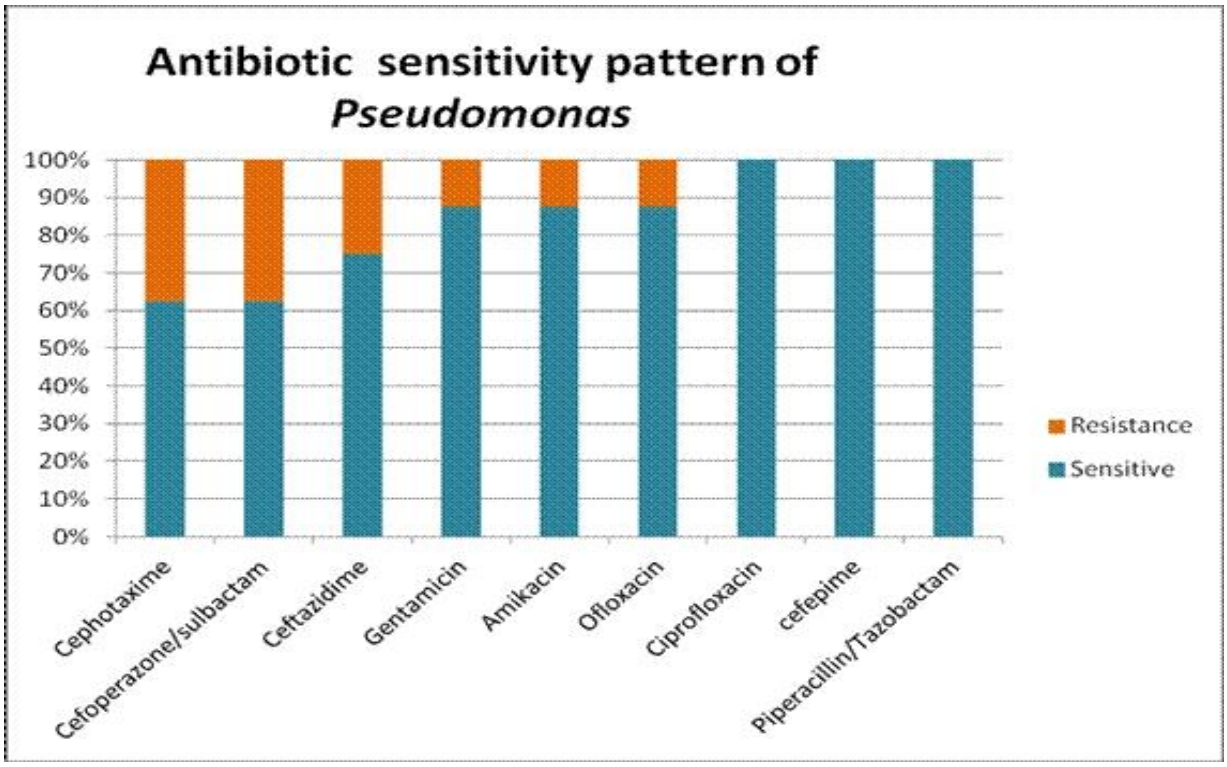
Figure 6: Antibiotic sensitivity pattern of Pseudomonas



from 46.9% cases and more than one type of organism from 65.46% cases [3]. But *Sujata Baveja et al* have reported as 100% monomicrobial growth in her study [8]. Other studies have reported polymicrobial flora ranging from 5-16% [12,13].

In our study 18 (33%) patients were having impetigo which was the predominant lesion. 13% of patient studied by *Ramani et al* [14] and *Saxena et al* [15] were of secondary pyoderma type, of which the commonest was impetigo while *Khandari et al* [16] found 16% of their cases were of secondary bacterial infection due to eczema. In this present study, *Staphylococcus aureus* accounted for 55.55% of all the bacterial pathogens identified and were less frequently associated with secondary pyodermas than with primary pyodermas. Many similar studies also had reported *Staphylococcus aureus* as commonest isolates from pyodermal infections which are close to our result like 52.1% in *KV Ramana et al* [2] and 52.6% in *Khalil Ahmed et al* [17]. Other studies by *CB Bhaskaran et al* [18], *S Mariette Mathew et al* [6] and *M Jyothi Nagmoti et al* [10] had reported 69.8%, 47.5% and 45% *Staphylococcus aureus* as common isolates respectively. In *Sujata Baveja et al* [8] and *Rama Raghu Rao et al* [19] studies *S. aureus* were isolated from 81.4% and 80% of patients respectively which are comparatively higher. Other studies [12, 13, 15, 20, 21, 22] also reported Staphylococcus aureus as predominant.

In our study, out of total 35 *Staphylococcus aureus* isolated, 3 were MRSA i.e (8.57%). In a series on community-acquired pyodermas from Mangalore, *Nagaraju et al* [20] reported that 11.8% of strains of 202 *Staphylococcus aureus* strains were methicillin resistant which is similar to our study. The antibiotic resistance pattern of *Staphylococcus aureus*, which was the predominant isolate, is as follows: Cephalexin (77.27%), Penicillin (72.72%), Cotrimoxazole (52.27%), Ciprofloxacin (40.90%), Gentamicin (29.54%), Erythromycin (18.18%), and Clindamycin (9.09%). All strains of Staphylococcus aureus were 100% sensitive to Vancomycin, linezolid and rifampicin.

In *S Mariette Mathew et al* [6] study the antibiotic resistance patterns showed that resistance to penicillin is 79.3% was corresponding to our study and in *DP Ghadage et al* study they found maximum strains of

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Staph. aureus were susceptible to co-trimoxazole (72%), clindamycin (61%) and ciprofloxacin (61%). A low susceptibility was observed to gentamicin (12%), penicillin (21%) and norfloxacin (39%).

In our study, *Streptococcus pyogenes* strain isolated were 14 (22.23%) and they were 100% sensitive to Ampicillin, Ciprofloxacin, Vancomycin & 93% sensitive to Gentamycin, Cotrimoxazole, & Erythromycin. Beta haemolytic *Streptococcus* accounted for 26.98% of the total isolates in *Singh G et al* [23] 25% *in RG Baslas et al* [9] and 17.4% in *CB Bhaskaran et al* [18] study 5 (7.94%) *Enterococcus spp.* were isolated and had shown 100% resistance to Penicillin, followed by Ampicillin (80%), Cephalexin (40%). Cotrimoxazole, Erythromycin, Vancomycin showed (40%) resistance each and Ciprofloxacin, Gentamicin were 100% sensitive.

More than 60% of the *Pseudomonas spp*. isolated in our study had shown sensitive to all the drugs. Ciprofloxacin, Cefepime and Piperacillin were 100% sensitive. One out of 8 isolates of *Pseudomonas spp*. was ESBL. Among the other gram negative bacilli, *E. coli* strain was also ESBL which were confirmed by double disk synergy test for ESBL enzyme. Other Gram negative bacilli isolated like *Citrobacter, Enterobacter, Klebsiella,* and *Proteus* did not show any significant resistant pattern.

Conclusion

Pyoderma is a significant dermatological conditon in India espicially in the lower socioeconomic class which was evident in our study as well as other studies. Our aim was to highlight the organisms responsible for pyoderma and its antibiotic susceptibility pattern. We found that most of our samples were from males (69%) and 68% our subjects suffered from primary pyoderma. Almost a third of our samples were found to be due to gram positive cocci of which *Staphylococcus aureus* was the most predominant and the rest were caused by other organisms. We also found that *Staphylococcus aureus* had an increasing resistance pattern to Penicillin, Ciprofloxacin and Cephalosporin but *Streptococcus pyogenes* was highly sensitive to Ampicillin, Ciprofloxacin and Vancomycin. With regard to the Gram negative organisms, they were sensitive to Ciprofloxacin. We also found out that organisms that caused pyoderma were more sensitive to stronger antibiotics.

We conclude that there is increasing antibiotic resistant among the commonly used drugs hence a culture and sensitivity test would be useful to successfully treat pyodermas in order to avoid the complications of pyoderma. Also knowing antibiotic sensitivity pattern in a locality would help the general practitioner in choosing the right drug.

Conflicts of interest:

Nil declared.

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

Original Research Article

Study of causes of deaths among the insured population of a north eastern district of Andhra Pradesh

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Date of Submission: 13.09.2014 **Date of Acceptance: 30.09.2014**

Abstract

Context: Majority of deaths in India occurs at home and many of these do not have a certified cause. Therefore most deaths go unrecorded. Analysis of the causes of death across different population groups is an important input to national and international health decision-making and planning processes. Verbal Autopsy (VA) methods have been developed and when used appropriately these provide reliable information regarding the cause and circumstances of death .**Objectives:** 1. To study cause of death in the insured population by verbal autopsy.2. To study the age specific death rate and compare it with national figures. **Material and Methods:** The study was conducted in the IKP-DRDA insured population of the Vizianagaram district, Andhra Pradesh. It included a community based survey of deaths that occurred during a period of one calendar year by verbal autopsy. The sample size of 141 was considered for the study. Data collection was done by interview technique using the standardized tools in the form of narrative history from respondents and by questionnaires. The structured questions were on identification, socio-economic background, place of death, treatment received for illness before death, symptoms of the deceased with duration, etc. The elicited information on the cause of death was analyzed. Percentages and Standardized Mortality Ratio was calculated. **Results:** Age-wise study of deaths revealed that 55 deaths were in the age group of 18-39 years, 83 deaths were in the age group of 40 to 59 years and 3 deaths were among > 60 years of age. Diseases of circulatory system accounted for 42 deaths (30%). Infections and parasitic diseases accounted for 38 deaths (27%). **Conclusions:** The common causes for deaths were found to be diseases of the circulatory system, infections, external causes of mortality, respiratory system diseases and neoplasm.

Key words: Deaths, insured population, survey, verbal autopsy

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Introduction

In developing countries the cause of death is often inadequately recorded on the death certificate [1]. In rural areas of these countries, validation studies are not feasible owing to the fact that the vast majority of deaths occur at home [2]. Over 75% of the annual estimated 9.5 million deaths in India occur at home and the majority of these events do not have a certified cause. Therefore most deaths go unrecorded. Further the full potential of their health systems cannot be realized by the number of people who die or why they die. Health systems need reliable information especially about causes of death to function properly. India and other developing countries urgently need reliable quantification of the causes of death. They also require better epidemiological evidence about the relevance of physical (such as blood pressure and obesity), behavioral (such as smoking, alcohol, drug dependence and high risk taking) and biological (such as blood lipids and gene polymorphisms) measurements to the development of disease in individuals or disease rates in populations [3]. In absence of such

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tools, verbal autopsy (VA) methods have been developed to assign causes of deaths [4]. VA is a method of ascertaining probable causes of death based on an interview with primary caregivers and relatives of the deceased about the signs, symptoms and circumstances preceding death [5]. Since it takes a long time to achieve a fully functioning civil registration system with medical certification of cause of death, more and more countries are using verbal autopsies to meet the information needs of their health systems [6]. VA has been used extensively for childhood and maternal deaths [7-12]. Few studies have been conducted to determine the causes of deaths of adults by VA in general population [13-16]. Analysis of the causes of death across different population groups is an important input to national and international health decision-making and planning processes. Literature search revealed that there had been no studies conducted on causes of deaths among insured population in India and literature for very few such studies available for other countries [17, 18].

Hence the study was conducted with the following objectives:

1. To study the causes of deaths in the insured population in the study area using the method of verbal autopsy.

2. To study the age specific death rates and compares it with national figures

Materials and Methods

The study was conducted in the district of Vizianagaram, Andhra Pradesh, during 2009. It was a descriptive cross sectional type of study among the cases of deaths that occurred in Indira Kranthi Patham (IKP) - District Rural Development Agency (DRDA) insured individuals during a period of one calendar year 2008 by verbal autopsy.

The population which was insured under IKP-DRDA during the study period for the district of Vizianagaram was about 5, 03,073 who were aged between 18 years to 60 years and spread over in 26 rural mandals. Among these insured persons the number of deaths reported was 1133. The nature of death was mentioned routinely as natural death by registering authority. It was also observed that more than one third of the deaths were among 18 to 40 years of age. Hence this study was undertaken at the behest of the Project Director, DRDA, Vizianagaram (Nodal agency) in coordination with the management of MIMS Medical College, Vizianagaram. The Department of Community Medicine was entrusted with the responsibility of investigation of cause of deaths which occurred during the year 2008 among the insured population under IKP – DRDA.

The mandal wise – village wise lists of deceased persons were prepared with the help of the Nodal agency. Out of the 26 man dals, 13 mandals were selected on the basis of number of deaths. In view of the feasibility criteria such as number of staff available, the funding etc, 10% of the total deaths i.e. 113 were considered a satisfactory sample. Additional 5% was included to avoid the problem of non-cooperative or not available relatives. Finally with all these, verbal autopsies were conducted among 141 randomly selected cases (i.e. 12% of the total 1133 deaths in the insured population con) in the selected mandals spread over 50 villages / hamlets.

The VA tool was designed in the form of a questionnaire. The structured questions were used on identification, socio-economic background, treatment received for illness before death, symptoms of the deceased with duration, etc. Data collection was done by interview on narrative history from relatives/ neighbours of the deceased persons using pretested questionnaires. A responsible adult person in the household of the deceased was interviewed to answer the questionnaire (wife /

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husband / father / mother/ son/daughter) in all the cases. Additional information was also obtained for confirming the data from the neighbors / village leaders /members of self-help groups of the village.

Algorithms were used to define causes of death as per ICD – 10. Only a limited list was prepared to get a broad insight into the causes of death. The team (two doctors & multipurpose health assistant) visited the household of the deceased for the interviews. A total number of 5 teams were formed and adequately trained for ensuring uniformity of data collection during the last week of May 2009. Statistical analysis of the data was undertaken to obtain percentages and various rates for drawing conclusions.

Results

The insured study population was divided in two main groups viz, 18- 39 years and 40- 59 years for the sake of simplicity of comparison. The age specific death rate (ASDR) of this population was calculated. The details are furnished in Table 1.

The present study focused on the details of the study sample of 141 cases of deaths as mentioned in the methodology. These are presented ahead. The age wise distribution of the deceased persons is shown in graph 1 ahead.

The deceased male cases were 105 (74.47 % of 141) and the deceased female cases accounted for remaining 36 (25.53% of 141). The age and gender wise distribution of the 141 cases of deaths is represented in Table 2.

The caste wise breakup of the deceased individuals is represented in graph 2.

Out of the total 141 deceased persons, 104 (73.76%) were illiterate and the rest 37(26.24%) were literate of whom only 16 (11.35% of total 141) had attended high school or more. Further it was observed that 61 (43.26%) persons were smokers, 23 (16.31%) were habituated to ghutka and 45 (31.91%) were consuming alcohol

Table 1. ASDR for study population

Age Group	Population (Insured)	Deaths	ASDR (per 1000)
18-39 years	3,11,340	383	1.23
40-59 years	1,91,733	750	3.91

Table 2 Age and gender wise distribution of the deceased persons.

Age group	Gender		Total
	Male Number (Percentage)*	Female Number (Percentage) *	Number (Percentage)*
18-39 years	41 (39.05%)	14 (38.89%)	55 (39.01%)
40-59 years	62 (59.05%)	21 (58.33%)	83 (58.87%)
>60 years	2 (1.90%)	1 (2.78%)	3 (2.12%)
Total	105 (100%)	36 (100%)	141 (100%)

*Yates' Chi square= 0.15, degree of freedom=2, p value= 0.93, not significant ,*Indicates group wise percentage.*

Table 4. Analysis of expected death rates for the study population

Age group	Population SRS -2008	ASDR SRS 2008	Expected number of deaths
18-19	3920	1.4	5
20-24	9799	2.0	20
25-29	8329	2.1	17
30-34	7643	2.7	21
35-39	6467	3.5	23
18-39	**36158**		**86**
40-44	5880	4.5	26
45-49	4410	6.1	27
50-54	3920	8.6	34
55-59	3332	12.6	42
40-59	17542		129
Total 18 to 59	**53700**		**215**

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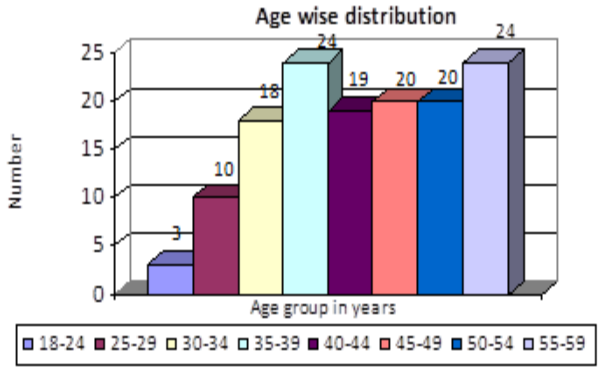
Table 3. Causes of death according to ICD-10

Sr. No.	Cause of death as per ICD-10	Age in years		Total Number (Percentage) *
		< 40 years Number (Percentage) *	>40 years Number (Percentage) *	
1	Circulatory System (**I** 00 – **I** 99)	8 (14.55%)	34 (39.53%)	42 (29.78%)
2	External Cause of Mortality (**S** 00 – **Y** 98)	10 (18.18%)	6 (6.98%)	16 (11.35%)
3	Infectious – Parasitic Diseases (**A** 00 – **B** 99)	16 (29.09%)	22 (25.58%)	38 (26.95%)
4	Neoplasms (**C** 00 – **D** 48)	5 (9.09%)	6 (6.98%))	11 (7.80%)
5	Respiratory System (**J** 00 – **J** 99)	1 (1.82%)	5 (5.81%)	6 (4.26%)
6	Digestive system (**K** 00 – **K** 93)	10 (18.18%)	6 (6.98%)	16 (11.35%)
7	Genitourinary System (N 00- **G** 99)	0	1 (1.16%)	1 (0.71%)
8	Nervous System (**G** 00 – **G** 99)	0	1 (1.16%)	1 (0.71%)
9	Other Sudden Death Unknown Causes of Death (**R** 96)	4 (7.27%)	4 (4.65%)	8 (5.67%)
10	Other ill defined – Unknown Causes of Death (**R** 99)	1 (1.82%)	1 (1.16%)	2 (1.42%)
Total		55 (100%)	86 (100%)	141 (100%)

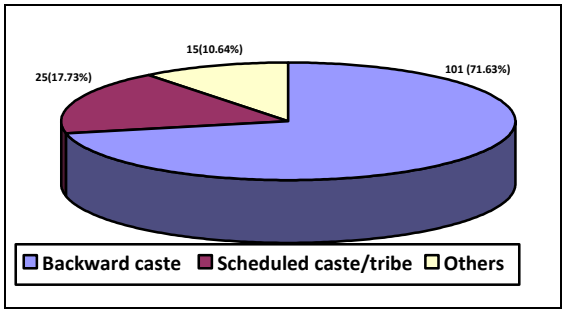
*Indicates group wise percentage.

regularly. Interestingly 102 of 141 houses (72.34 %) were indebted for amounts exceeding Rs. 20,000 at the time of death of the insured. The loans were taken for marriage of daughter / sister or for treatment of diseases. A part of the loan was taken from local moneylenders at 24 % rate of interest or more. Some loans were availed from self-help groups of the village and IKP office at mandal headquarters. It was reported that 35(24.82%) of the deceased persons were worried or depressed before their death. They were apparently worried about loan amount, interest or about the diseases they were suffering from.

Graph 1. Age wise distribution of study population



Graph 2. Caste wise distributions of deceased persons



Duration of previous illness before death in the deceased persons was < 1 week in 54 (38.30%), 1-4 week in 21 (14.89%), 1month -1 year in 29 (20.57%) and > 1 year in 37 (26.24%). The deceased persons who did not receive any treatment before death were 33 (23.41 %) while 22(15.60%) received treatment from local quacks or in the form of natural herbal medicines whereas 86 (60.99%) persons had availed some form of medical treatment during illness before death. The causes of death according to International Classification of Diseases (ICD) – 10[19] as obtained from the study are furnished in Table 3.

Deaths under 40 years of age were 55 (39.01% of 141) and those of more than 40 years of age accounted for the remaining 86 (61.09% of 141)

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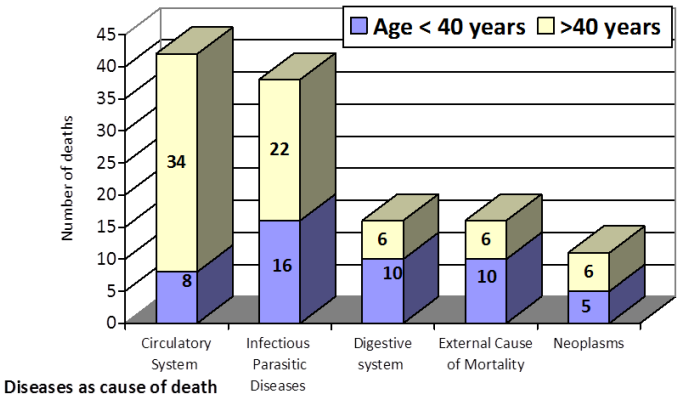
Graph 3. Top 5 causes of death



deaths. Among the diseases of circulatory system which accounted for 42 deaths (29.08% of 141), 29 were due to ischemic heart disease and myocardial infarction. Surprisingly, among < 40 Years age, 5 sudden deaths were due to myocardial infarction. Cerebrovascular diseases particularly stroke accounted for only 10 deaths (11.62% of 86) among > 40 years. Other causes such as chronic rheumatic heart diseases and shock due to bleeding etc. resulted in deaths among 3 individuals, all in < 40 years of age. External causes of mortality included intentional self-harm (suicide) in 9 deceased cases, fall & snake bite in 2, transport injury in 3 and electrical shock & heat stroke in 2 cases. Tuberculosis & vector borne diseases (viral hemorrhagic fever, malaria & dengue) were the leading infections causing death among 9 cases and 8 cases respectively. HIV infection was reported in 14 persons and accounted to the deaths directly or indirectly. AIDS deaths were reported in 3 persons. The intestinal infections such as typhoid led to death in 3 persons & diarrheal disease in 5 persons, Malaria and dengue hemorrhagic fever accounted for death in 8 individuals. Pyrexia of unknown origin & hyperpyrexia were reported in 4 deceased cases. The neoplasm which were reported as the cause of death included those of digestive organs and stomach in 4 cases, lip & oropharynx in 3, female genital tract in 1 and others viz brain & spine in 3 cases. Diseases of respiratory system included chronic obstructive pulmonary diseases (COPD) in 4 persons and pneumonias in 2 persons. Digestive system diseases included chronic liver failure or alcoholism or hepatitis A and B in 15 individuals and appendicitis in 1 person.

On further analysis, it was noted that the common causes for death as attributed in 123 (87%) cases were found to be diseases of circulatory system (I 00 – I 99) , infectious – parasitic diseases (A 00 – B 99), digestive system (K 00– K 93), external cause of mortality (S 00 – Y 98) and neoplasm (C 00 – D 48). The details are shown in graph 3.

The population and age specific death rate (ASDR) for Viziangaram district based on sample registration system (SRS) 2008[20] were used to calculate the expected number of deaths for each group. The details are furnished in table 4.

For a population of 53,700 in 18-60 age group, the expected number of deaths as per SRS – India 2008 after calculation came to 215. Hence when the insured population of Vizianagaram-IKP-DRDA is 5, 03,073 in 18-60 age group, the expected number of deaths should have been 2014. The actual number of deaths that occurred in Vizianagaram-IKP-DRDA insured population during that period was 1133 only. Thus the Standardized Mortality Ratio (SMR) worked out to be 56.26%. In other words, the insured population of Vizianagaram-IKP-DRDA was observed to have a mortality risk of 43.74% less in comparison to the national data for the general population.

Similarly, the expected number of deaths among 18 – 39 years population as per SRS 2008 on calculation was 754. But the actual number deaths among insured under IKP-DRDA were observed to be 383, reaching the SMR of 50.80%.

Discussion

Monitoring of causes of deaths over a long period enlightens the understanding of epidemiologic transition. In developing

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countries, due to various deficiencies in existing registration systems like incomplete coverage, late registration and missingdata, the reliable information on causes of adult deaths and its trend is rarely available.[1] Under such constraints, the information on broad causes of deaths using verbal autopsy may be useful.

In the present study, the ASDR of was found to be increasing with the age. The ASDR for rural India does show a similar rise as revealed from the National Health data [20]. The increase with age can be explained on the background of the cumulative role of various conditions like susceptibility for communicable and non-communicable diseases in the old age, drug addiction over a long period, malnutrition etc. Among the investigated cases of deaths, proportionately a large proportion of deaths occurred in the backward class and scheduled caste/tribes. The people from downtrodden communities are at the risk of vulnerable conditions like lower socioeconomic status and less education leading to increased number of deaths in them. Deaths in males were more as compared to that in females. This is in accordance with other studies by Joel Negin [21] and Dongre AR [22] . Three-fourths of the deaths occurred in illiterate individuals. The higher number can be due to the decreased tendency of health seeking behaviour and lack of awareness of the illiterate group. Similar findings have been reported by other studies also [12, 22]. Almost half of the deceased persons were habituated to ghutka and smoking. About one-third of the deceased persons were addicted to alcohol in their lifetime. These findings are in contrast to another study conducted in Maharashtra wherein more than 60% of the deceased persons had the habit of ghutka and smoking. But addiction to alcohol was reported in only 18% of the deceased persons in that study [22]. Such variations depend upon cultural patterns prevailing in the area.

In the broad sense, the causes of death in the present study included non-communicable and communicable diseases. The non-communicable diseases comprised of ailments related to circulatory system, digestive system, external cause of mortality and neoplasm accounting for about three fourths of the deaths. R Kumar [9] observed non communicable diseases as cause of death in about 54% of and V Gajalakshmi [13] found this in about 50% of the deceased in their studies. Whereas Dongre AR [22] reported non communicable diseases leading to death in about 32% of the study sample. Of the various causes of deaths the involvement of circulatory system was found to be one third of the total. This finding is similar to that reported by V Gajalakshmi[13] and R Kumar[9] in different studies and in contrast, the study of Dongre AR[22] revealed cardiovascular deaths in about one tenth of the total deaths.

More than one fourth of the deaths were due to infections such as tuberculosis, certain severe viral fevers, typhoid, diarrhoea etc. HIV / AIDS related deaths were also noted as a direct cause only in few cases and mostly such occurrence was concealed. The other studies [9, 13, 22] have come across differences in the proportion of deaths due to infections. In a study in Tamil Nadu by V Gajalakshmi[13], infections accounted for around 20% of deaths whereas R. Kumar[9] reported 6.11% in Chandigarh and Dongre AR[22] reported it as 51% in Maharashtra.

Causes of death could not be specified in about 7% of the total deceased persons in the present study. This is in coherence with the findings of Dongre AR [22]. However unspecified causes accounted for only 4% of the total deaths in the study by V Gajalaxmi[13] and 25% in the study by R Kumar[9].

The insured population of Vizianagaram-IKP-DRDA in the overall age group of 18- 60 years as well as 18-39 years had almost half the mortality risk when compared with the general

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population. This is a highly favourable mortality experience more so for the 18-39 years age group.

The strengths of the study must be considered in the light of certain limitations. The sensitivity and specificity of verbal autopsy varies between populations depending on the distribution of causes of deaths [14].The present study was conducted on a sample taken from the insured population of a district. The diagnosis of cause of death was based only on verbal autopsy from the relatives of the deceased persons. Opinion from the health personnel was limited only to the records which were provided by the relatives at the time of interrogation. Verbal autopsy for the cause of death in the general non-insured population was not included in the study.

Conclusions

The common causes for deaths were found to be: diseases of circulatory system, infections, and diseases of digestive system, accidents and neoplasms. Apart from circulatory system diseases, infections and parasitic diseases accounted for more deaths in younger population & included Tuberculosis & vector borne diseases (viral hemorrhagic fever, malaria & DHF). The mortality in the insured population was less than that in the general population in contrary to the apprehension expressed by DRDA authorities. This underlines the importance of health insurance and the need to make such facilities available to a wider group of population.

Acknowledgements

The authors acknowledge with grateful thanks the constant encouragement of the Management, the Dean and the Principal of Maharajah's Institute of Medical Sciences, Vizianagaram, Andhra Pradesh to engage in research work. The valuable guidance given by the Professors of Community Medicine department is also thankfully acknowledged. The study would not have been a reality without the financial and technical assistance and co-operation by the IKP- DRDA, Vizianagram. Special thanks are also extended with profound sense of gratitude to the study participants for their cooperation to conduct the study.

Interest of conflict: None

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Original Research Article

Comparison of Rural-Urban Mortality in Pondicherry, India

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Date of Submission: 23.09.2014 **Date of Acceptance: 30.10.2014**

Abstract

Background: Measurement of mortality is primary in the assessment of health status of a population and evaluation of health programmes. Differences exist in mortality between the rural and urban areas. Therefore this study was done to find out the urban-rural differences in the causes and distribution of mortality in Pondicherry.

Material and methods: A record based descriptive study done in the service areas of Urban Health Centre (UHC) and Rural Health Centre (RHC) of JIPMER, Pondicherry to calculate Crude Death Rates (CDR), Standardised Mortality Rates (SMR), proportional mortality rates, age-specific mortality rates (ASMR) and the life expectancy of the population.

Results and inferences: The SMR in the rural area was 101.01% compared to 98.19% in the urban area. But LE at birth of the rural population was higher (74.11 years) compared to the urban population (72.1 years). Non-communicable diseases contributed to 87% and 84% of mortality in rural and urban areas respectively.

Conclusion and recommendations: Non-communicable diseases contribute to very large proportion of mortality. Mortality among relatively younger men is due to alcoholism. Therefore the focus of health care delivery needs to shift to the non-communicable diseases at the same time not losing control over infectious diseases. Problem of alcoholism needs to be controlled.

Key-words: mortality, causes, urban-rural difference

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Introduction

Measurement of mortality is primary in the assessment of health status of a population. Long-term mortality measurements are the key to monitoring trends in health conditions of the population, detecting new epidemics, spurring research into avoidable causes of death, evaluating the success of control programs, and improving accountability for expenditures on disease control.[1, 2] Therefore study of mortality indicators are often the first step in assessing and comparing the health status of communities.

In India, differences exist in the health status between people living in the urban and rural areas of the country.[3] Rural population in India experience poorer health as shown by worse indicators across all major areas of health care delivery, [4] though there are intra-State and inter-State variations in rural – urban inequalities in the public health status.[5] The differences in overall development and services like sanitation and especially health contribute to the variations in morbidity and mortality between urban and rural areas. The ratio of urban-to-rural life expectancy at birth shows that the average urban Indian can expect to live longer than the average rural Indian. [5] But, the rural share in epidemiological transition with change in disease patterns, improvements in the nutritional and health infrastructure, eradication and control of major killer diseases and socio-economic development, has been greater in the southern states. [6] Pondicherry is a Union Territory in the South-eastern coast of India with the highest per capita expenditure on health, Rs 2342 for the year 2010-11 and HDI ranking of sixth among all the states and Union Territories of India. [6, 7] With rapid epidemiological transition as a consequence of economic and social changes, modification of the health system is required to ensure that the services provided address the main diseases suffered by the population. [8] In addition to providing services under the various national health programs, the states especially the better performing ones, need to identify region specific public health challenges and plan the services accordingly. With this background, this study was undertaken to find out the causes and distribution of mortality in all age groups of population in the urban and rural areas of Pondicherry.

Materials and Methods

This was a record based descriptive study done in the service areas of Urban Health Centre (UHC) and Rural Health Centre (RHC) of JIPMER, Pondicherry.

Death statistics and details of the causes of all deaths in this population during the period 2011-12 were collected from the registers of vital events maintained at the UHC and RHC. The Crude Death Rates (CDR), Standardised Mortality Rates (SMR), age-specific mortality rates (ASMR) and proportional mortality rates were calculated for the urban and rural areas and the genders separately. For SMR calculation, standard rate used was the average of the rural and urban mortality rates. The ASMR were used for calculation of life expectancy by using the method of abridged life table with five years class intervals. The population in each age group was obtained from the enumeration registers of both areas. All mathematical calculations were done manually as post-graduate learning exercises.

Results

Rural area

The service area of RHC covers a population of 8999. The total number of deaths during the study period was 39 with CDR of 4.33/ 1000 population and SMR of 101.01%.

Life expectancy

The overall life expectancy at birth in the RHC area was 74.11years; about 73 years in men and 74.64 in women (Table 1). Between 46 to 60

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Table 1. Gender wise ASMR and LE in rural field practice area

AGE GROUP (in years)	Overall ASMR	Overall LE	ASMR in males	L E in males	ASMR in females	LE in female
0-1	-	74.11	-	73.06	-	74.64
1-5	-	73.11	-	72.06	-	73.64
6-10	119	69.11	245	68.06	-	69.64
11-15	-	64.18	-	63.58	-	64.64
16-20	142	59.18	264	58.58	-	59.64
21-25	-	54.34	-	53.71	-	54.64
26-30	-	49.39	-	48.71	-	49.64
31-35	127	44.34	236	43.71	-	44.64
36-40	125	39.39	260	38.8	-	39.64
41-45	324	34.43	623	33.89	-	34.64
46-50	726	29.52	1090	29.07	362	29.64
51-55	906	24.68	1764	24.3	-	24.71
56-60	1538	19.83	2649	19.58	574	19.71
61-65	1230	14.98	675	14.94	1694	14.77
66-70	2809	10.08	4109	10	1904	9.99
>70	6218	5.18	6315	5.14	5555	5.18

Fig 1a Proportional mortality rate – male population in rural field practice area

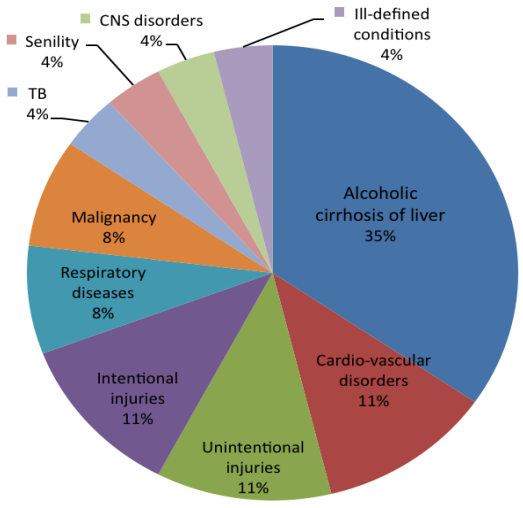

Fig 1b Proportional mortality rate – female population in rural field practice area

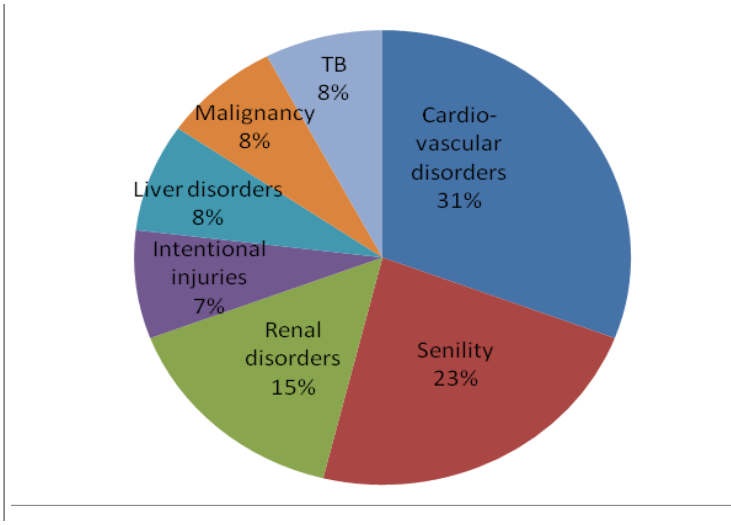

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Table 2. Gender wise ASMR and LE in urban field practice area

AGE GROUP (in years)	Overall ASMR	Overall LE	ASMR in males	L E in males	ASMR in females	LE in female
0-1	2143	72.1	5263	68.8	-	74.68
1-5	0	72.66	-	71.6	-	73.68
6-10	0	68.66	-	67.6	-	69.68
11-15	0	63.66	-	62.6	-	64.68
16-20	0	58.66	-	57.6	-	59.68
21-25	253	53.66	294	52.6	223	54.68
26-30	329	48.78	437	47.7	221	49.78
31-35	535	43.92	1070	42.9	-	44.87
36-40	145	39.12	277	38.35	-	39.87
41-45	861	34.16	1684	33.44	-	34.87
46-50	1619	29.4	3320	28.9	-	29.87
51-55	519	24.77	552	24.69	503	24.87
56-60	777	19.87	1130	19.8	478	19.96
61-65	1052	14.97	952	14.9	1111	15.03
66-70	440	10.04	1087	10.03	-	10.05
>70	2557	5.05	2395	5.06	2703	5.05

Fig 2a Proportional mortality rate – male population urban field practice area

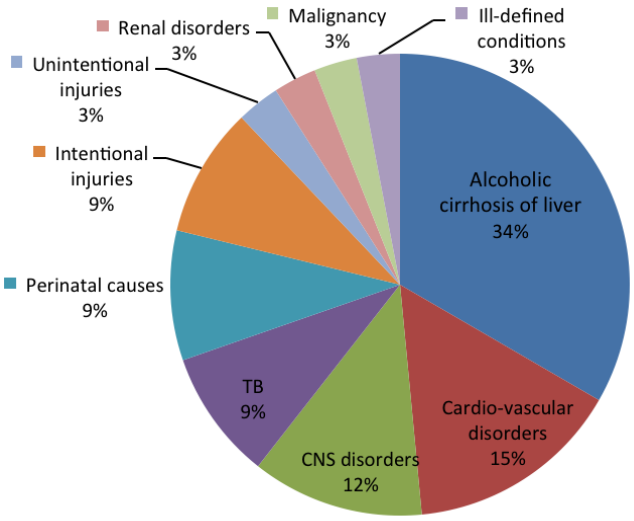
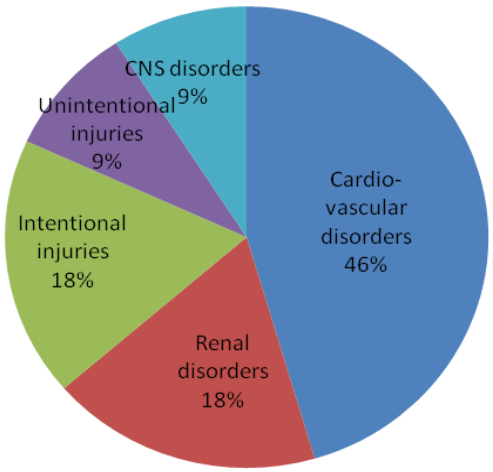


Fig 2b Proportional mortality rate – female population urban field practice area



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yrs, the ASMR for men were 1090, 1764 and 2649 deaths/lakh population whereas for women it was 362, 0 and 574 deaths/lakh populations in the 46-50, 51-55 and 56-60 yrs categories respectively.

Causes of death

There were no deaths in the under-five age group in the rural area. In the 6-10y and 10-19y age groups, there were two accidental deaths among males, one each due to drowning in a 10y old and Road Traffic Accident (RTA) in a 19y old.

There were no pregnancy and child birth related mortality among women in the reproductive age group (15-45 years). Among the eight deaths in the 20-50 yrs age group, seven were in men and one in a female. Of the seven deaths among men in this age group, five were directly due to alcoholism; other two were due to carcinoma stomach and road traffic accident. There were eight deaths in the 50-60 yrs category again seven in men and one in a female. Among the men, two were due to suicide and two due to alcoholic cirrhosis of liver. In the 60 plus age group there were 10 deaths each in males and females. The proportional mortality rate for the overall RHC population was 25.6% for alcoholic cirrhosis of liver (ICD-10 code K70.3), 17.9% for cardiovascular diseases and 10.3% for unintentional injuries. Intentional injuries and malignancy contributed 7.7% each followed by Tuberculosis (TB), renal disorders and respiratory diseases contributing 5.1% each. In males liver disorders caused 34.6% deaths and in females cardiovascular disorders caused 30.7% deaths (Fig 1).

Urban area

The service area of UHC covers a population of 8655. The total number of deaths during the study period was 44 with CDR of 5.08/1000 and SMR of 98.19%.

Life expectancy

The overall life expectancy at birth in the urban area was 72.1 yrs; 68.8 yrs among males and 74.68 among females. There was a two years advantage for females in life expectancy at ages one, five, ten, fifteen, twenty, twenty five, thirty and thirty five. Thereafter the difference narrowed down (Table 2). The ASMR were 1070, 277, 1684 and 3320 deaths/lakh population for males in the age groups of 31-35, 36-40, 41-45 and 46-50 years respectively. But there were no deaths among women in these age groups.

Causes of death

There were three neonatal deaths in the urban area. All three were males and late neonatal deaths occurring on 25th, 27th and 30th days of life. Two were pre-term babies and died due to sepsis; the third was due to Sudden Infant Death Syndrome in the 30 day old baby.

There were no pregnancy and child birth related mortality among women in the reproductive age group (15-45 years) in the urban area as well. However there were two injury related deaths in women between 20-30y; one due to suicide (23y) and other because of burns (30y). Out of 20 deaths among males aged between 20 -50 years in the urban area, five were due to Tuberculosis (25%) and four (20%) due to injuries; one accidental, two suicidal and one homicidal. Alcoholism was attributed as the direct cause of death for five (25%) in these age group men but was recorded as associated factor in the two deaths due to TB as having being the reason for default in treatment leading to death. Fourteen deaths occurred in people aged more than 60yrs in this area during the study period. Overall alcoholic cirrhosis of liver (ICD-10 code K70.3) was attributed as cause in 25% of the deaths followed by 22.7% due to cardiovascular disorders and 11.4% due to CNS disorders in the urban area. Intentional and unintentional injuries contributed to 9.1 and 6.8% of the mortality respectively (Fig 2). In men 1/3rd of the deaths were caused due to liver disorders and in women almost half (45.4%) of the deaths were due to cardiovascular disorders.

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Discussion

These groups of rural and urban population in the study experienced lower mortality in terms of CDR compared to the average for Pondicherry, i.e. 7.5/1000. [9] The CDR in rural area was much lower (4.33/ 1000) than the Indian average for rural areas (7.8/1000) but closer in the urban area (5.08 in Pondicherry vs. 5.8 in urban India). [10] The CDR however may be misleading if the age distribution of the population in Pondicherry varies from the average population in India. Comparing the rural and urban areas in the study, although the CDR was lower in the rural, the SMR was higher than the urban.

Life expectancy

The overall life expectancy at birth of the rural population was higher (74.11 years) compared to the urban population (72.1 years) even though the mortality was higher in rural area. The contrary result was because of the distribution of deaths in the different age groups. The ASMR was higher in the older age groups in rural area compared to higher mortality in the middle ages (30-50 yrs) in the urban area.

The overall life expectancy at birth of females was same in both the areas (74.64y in RHC and 74.68y in UHC) and is much higher than latest available figure of 69.7yrs for Pondicherry and for India. [11, 12] But it was lower among men in urban area (68.8y) compared to rural (73.06y), the rural men having an advantage of almost 4 years over the urban men. Though both were higher than the average LE for males in Pondicherry (67yrs) and India, [11, 12] the difference was because of higher mortality among urban men in the middle aged (30-50yrs) mainly attributed to alcoholism. The gender gap in LE was almost six years in the urban area whereas it is negligible in rural area.

Causes of death

The proportional mortality rates for non-communicable diseases in these two areas of Pondicherry were 87% in rural and 84% in urban. Socio-economic development, highest expenditure on health in the country [13] and the changing structure of the population in Pondicherry may be the cause of predominantly non-communicable causes of mortality in the population groups compared to 42% of mortality attributed to non-communicable diseases in India. [14] The leading cause was liver disorders among men in both areas and cardiovascular disorder among women. Alcohol was a major cause for the burden of mortality in men. As the maternal mortality is decreasing, other causes mainly the cardiovascular disorders have become the number one cause of mortality among women in these areas. But all these cardiovascular deaths occurred in women above the age of 65yrs in rural and 70yrs in urban area.

Conclusion

The changing pattern of mortality in these two population groups in Pondicherry might be a hint at the evolving trends and therefore needs to be substantiated with large-scale data. The focus of health care delivery needs to shift to the non-communicable diseases at the same time not losing control over infectious diseases. The health sector and the government have to take cognizance of the burden of morbidity and mortality among relatively younger men due to alcoholism. Injuries, both intentional and unintentional may be prevented by improving law and order situation and also a control on the problem of alcoholism.

Limitations

The population of both areas together is approximately 2% of the total population of Pondicherry. The number of deaths in each age group in a one year period is small and therefore affects the proportions in a big way. The denominator population may not be representative of the whole of Pondicherry in terms of all the socio-demographic characteristics. The mortality rates were not adjusted to other possible confounders like

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socio-economic status as the individual data for these variables was not available at the time of conduct of the study.

Conflict of interest: Nil

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

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ANNAPOORANA MEDICAL COLLEGE **NAME:**
DEPARTMENT OF COMMUNITY MEDICINE *Roll.No*
COMMUNITY SURVEY - PROFORMA

House No **Household No** **Name of the Informant**

S.No	Name	Age	Sex	Relationship to head	Marital status	Literacy Lit/Illiterate	Education P/M/S/HS/T/C/Prof	Occupation	Income
1									
2									
3									
4									
5									
6									
7									
8									

NOTE : MARITAL STATUS: S-Single, M-Married, W-Widow/widower, Sep-Separated, D-Divorcee
EDUCATION : P-Primary, M-Middle, S- Secondary HS-Higher Secondary,
T-Technical Education (Dip.Certificate Courses) Prof – Professional courses.

Column number 7 not applicable for those who have had/undergoing formal education
Mark Reasons for drop outs: 1. To look after siblings. 2. Economic reasons 3. Loss of parent/s
4. Distance of the school 5. Not interested in study 6. Others (Specify)

NAME:

Roll No:

FERTILITY

Age Group of mothers	No. of mothers	Number of Children born in the past one year	Number of Children ever born
15 - 19			
20 –24			
25 –29			
30 –34			
35 –39			
40 –44			
45 - 49			

VITAL STATISTICS (For the past 1 year)

BIRTH				**DEATH**			
Name	**Age**	**Sex**	**Present status**	**Name**	**Age**	**Sex**	**Cause of death**

ENVIRONMENT ***NAME*** ***ROLL NO***

Type of House	**Source of Drinking Water**	**Distance of source**	**Sanitary Latrine**
Hut	Hand pump		Present
Semi pucca	Overhead tank		Absent
Pucca	Well/pond		

If toilet present in the house : Using/Not using

If not using :
1. Problem in water supply
1. Not used to
2. Presence of toilet in the house itself makes foul smell and dirty
4. Others

Over Crowding

No. of persons in the family :

No. of Rooms :

No. of persons per room :

Over crowding : present / absent

1. MATERNAL HISTORY (for all eligible couples – during last five years)

NAME:
Roll.No.

			Antenatal care			Delivery		Outcome	Present status
Name of EC	**Age at marriage**	**Number of pregnancies in the last 5 years**	**Regn.**	**TT**	**IFA**	**At home**	**Hospital**	**Live /dead**	**Live /dead**

3. PRESENT HISTORY

				Immunization		IFA		
Name	Trimester	Registered Yes/No	No, of visits by Heath worker/herself	TT - 1	TT -2	Recd.	Not Rd.	Choice of place of delivery

BREAST FEEDING: CHILDREN (up to 2 years) NAME

Roll.No.

Name of the child	Place of delivery	Prelacteal feeding	Breast feeding			Weaning	
			Time of initiation of breast feeding	How long exclusively given	When stopped completely	Time of initiation	Nature of food started

IMMUNIZATION (children between 1 to 2 years.)

Name of child	BCG	OPV				DPT			Measles
		0 dose	**I**	**II**	**III**	**I**	**II**	III	

CHILD CARE LESS THAN 5 YEARS

1. In case of sickness of child where do you take the baby? GH/PHC/SC/P/private/traditional healers
2. Do you continue regular feeding during bouts of sickness? (Diarrhoea/ARI/Fever) Yes/No
3. Do you weigh your baby regularly? Yes/No If yes, how often? Where?

MORBIDITY

NAME: **ROLLNO**

Point Prevalence

1. Is anybody sick in the family?Yes/No. 1 a) ***If Yes*** Name Age Sex Type of Sickness

2. Whether he/she attending to routine work? Yes/No

Period Prevalence

1. Anybody was sick in your family in the past one month? 1a***)*** ***If Yes*** Name Age Sex Type of Sicknesss

2. Was he/she attended to routine work during illness? Yes/No

HEALTH CARE UTILISATION

1. When somebody falls sick, where do you go for treatment?

   1. GH/PHC/SC 2. Private 3. Traditional healers

2. Reasons for the preference:

3. Distance travelled:


National Journal of Research in Community Medicine