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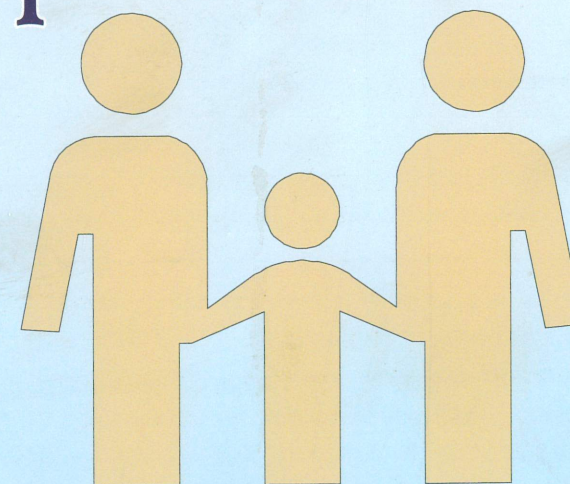
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National Institute of Health and Family Welfare
Munirka, New Delhi- 110 067

**Health
and
Population:
Perspectives
and
Issues**



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DISCONTINUATION OF TEMPORARY CONTRACEPTIVES AMONG WOMEN IN KERALA

A. Sreeranjini** and Asha T. Chacko**

ABSTRACT

The present study analyzed the various reasons for discontinuation of temporary contraceptives and its determinants among currently married women in Kerala. Data for the study were drawn from the National Family Health Survey-III. Distribution of currently married women in Kerala by reporting various methods of contraception indicates the poor performance of reversible methods over the years. The main reasons for discontinuation of the temporary methods are 'wanted to become pregnant', 'women's dislike or husbands', 'side effects', 'ill health' and 'other' reported reasons such as 'infrequent sex' etc. Reason for the discontinuation of temporary contraceptives is an important factor in the exclusion of the use of contraception in the sense that 'side effects' or 'drawbacks' of the method preferred become prominent for the discontinuation of temporary contraceptives. There are also certain demographic and socio-economic differentials existed in the discontinuation of temporary contraceptives by reasons. By performing multinomial logistic regression, it was found that women in each decreasing age group are less likely than those in higher to discontinue for either the reason 'drawbacks' or 'other' reported reasons than 'wanted to become pregnant'. The socio-economic status of women is very much linked to the discontinuation of contraceptives. The study confirms that there is a need for adequate information or support to use the temporary methods effectively to improve women's ability to choose the suitable methods.

Keywords: Temporary contraceptives, Discontinuation, Drawbacks, Side effects.

Contraception is a private decision between sexual partners. Practicing the use of contraception not only reduces the burden of additional children and decreases the maternal health risks associated with repeated pregnancies but also ensures protection against sexually transmitted diseases. All forms of contraception except female sterilization and vasectomy are temporary and can be used to space births and limit births. The choice of contraceptive methods is one

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of the personal aspects of fertility regulation which is very much related to the reproductive health of women. In India, government places greater prominence on spacing methods, so the situation is now changing as more couples prefer temporary contraception¹. The contraception technique to delay or avoid pregnancy is said to be effective in use until such time as the women want another child or no longer need contraception which is important in their reproductive life. Unwanted discontinuation of temporary contraceptives can lead to unplanned pregnancy and unwanted childbirth can cause health problems both to the mother and the child. The presence of barriers to fertility regulation is likely an important determinant of the pace of fertility decline or its delay in many countries. Lack of knowledge is clearly a significant barrier to fertility regulation. Side effects, lack of information and misinformation commonly interact to create a disproportionate fear of fertility-regulation methods².

Kerala achieved the replacement level of fertility at the beginning of the 1990s. The underlying factors for fertility decline were a series of socio-economic changes. This mainly made marked improvements in health and education and also enhanced the implementation of family planning programmes. This has resulted in a strong desire for smaller families. The official family planning programme was not merely a means for providing contraceptive services but has also been an independent causal factor in changing family size norms.

In Kerala, the family planning programme provided services where the demand of contraception existed, strengthened the demand where it was weak and created the demand especially among the poor where no demand existed previously³.

The Maternal and Child Health Programme (MCH) had an impact on mortality and fertility. It brought people closer to the health system and also delivered family planning which resulted in fewer unwanted births⁴

The knowledge of contraceptives is almost universal in Kerala. National Family Health surveys pointed out that woman in Kerala are aware of the modern contraceptives as well as traditional methods⁵. The most well known method is female sterilization followed by the modern spacing methods such as pills, Intrauterine Device (IUD), condoms etc. The pattern of contraceptive use in Kerala indicates the domination of permanent methods, especially female sterilization. A major concern of family planning programme in Kerala is the discontinuation of

temporary contraceptive methods either voluntarily or due to method failure. The objective of the study is to analyze the reasons for the discontinuation of temporary contraceptive and its determinants in Kerala.

MATERIALS AND METHOD

Data for the present study were drawn from the National Family Health Survey-III (NFHS), a nationally representative large scale sample survey conducted in 2005-06 that covers 99 per cent of India's population in all states. The NFHS in Kerala was conducted in all the 14 districts and collected information on various demographic, socio-economic and reproductive health aspects of women in the age group of 15 to 49 years. The NFHS included a series of questions on contraception and asked women about the contraceptives used by themselves and their partners. Since the present study focuses on the discontinuation of temporary contraceptives, the currently married women who are not sterilized and not pregnant at the time of survey forms the sample.

Two choices of temporary contraceptives have been considered namely; traditional methods including rhythm and withdrawal and modern methods such as pills/injections, IUD and condom. A set of socio-economic, demographic and reproductive variables are included as explanatory variables. Bi-variate analysis is used to find out the differentials of response variable - discontinuation of temporary contraceptives - according to various background characteristics of women. Reasons for discontinuation are grouped into three categories: 'wanted to become pregnant', 'drawbacks' and 'others'. So a multinomial logistic regression is performed to identify the main factors for the discontinuation of the use of temporary contraceptives among women in their reproductive ages.

FINDINGS AND DISCUSSION

Discontinuation of Temporary Contraceptives by Type of Method

Table 1 reveals the demographic, socio-economic and reproductive characteristics of women who discontinued the ever use of temporary contraception either modern or traditional. The variables selected for the analysis are women's age, number of living children, place of residence and education of both wife and husband, exposure to mass media and miscarriage. Among women who have discontinued, women who discontinued modern methods accounts for

58.0 per cent. Contraceptive choice and method choice are dependent on women's age. Age is also an important determinant for the use of contraception or discontinuation of temporary methods. In the age group of 25 to 34, the percentage of women who have discontinued the ever use of temporary contraception is 52.3. The percentage of women who discontinued the modern methods is higher than those who discontinued the traditional methods, in each age group. The percentage of women who discontinued modern method is higher in the age group of 25-34 compared to the other age groups. Even though the discontinuation is more in rural areas (61.0 per cent), the percentage of women who discontinued modern methods is more in urban areas (60.2 per cent). However, the tendency to discontinue appears to be more common in rural areas than in urban areas. For example, 50 per cent of the rural users, compared to 30 per cent of the urban users in Kerala discontinued the use within one year of acceptance⁶.

Education of women as well as husbands seems to be a contributing factor for the discontinuation of temporary contraception. The percentage of discontinuation of temporary contraception increases with the education of women and their husbands but no systematic association can be found in the case of discontinuation by type of method and education of women. But husbands' education has positive association with modern methods discontinuation whereas a reverse effect is seen in the case of discontinuation of traditional methods. Religion-wise distribution of women who discontinued the ever use of temporary contraception shows that Hindu women topped the list. Among Hindus and Muslims, the percentage of women with the discontinuation of modern methods accounts higher. The number of the women of SC/ST category is the highest (54.5 per cent) in the discontinuation of temporary contraception and the percentage of discontinuation of traditional methods is more among women in the same category. In the case of modern methods discontinuation, the share of forward caste is the highest (63.9 per cent). Women who discontinued is the highest in richest wealth index group (61.2 per cent) and the women who discontinued modern method are more compared to that of traditional methods in each wealth index group. Among women who discontinued modern methods, the share of poor or middle index of wealth is the highest (63.2 per cent) whereas in traditional method discontinuation it is for richer group (45.3 per cent). A significantly higher proportion of modern methods discontinuation is found among working women (69.8 per cent) and at the same time traditional methods discontinuation among non-working women is 44.7 per cent (significance at 5 per

cent level), while discontinuation of temporary contraceptives is more among non-working women (79.8 per cent).

TABLE 1
PERCENTAGE OF CURRENTLY MARRIED, NON-PREGNANT AND NON-STERILIZED WOMEN WHO DISCONTINUED THE EVER USE OF CONTRACEPTION ACCORDING TO SELECTED CHARACTERISTICS, NFHS III SURVEY KERALA

Characteristics	Modern	Traditional	Total No. (N)
Age			
≤ 24	57.7	42.3	24.3 (52)
25-34	60.7	39.3	52.3 (112)
35 years and above	52.0	48.0	23.4 (50)
Residence			
Urban	60.2	39.8	39.0 (83)
Rural	56.2	43.8	61.0(130)
Education(W)			
≤7 years	42.9	57.1	(3.3) 7
8-9 years	62.3	37.7	(32.2) 69
10 years and above	56.5	43.5	(64.5)138
Education (H)			
≤ 7 years	45.5	54.5	(5.4) 11
8-9 years	53.8	46.3	(37.4) 80
≥10 years	61.8	38.2	(57.5) 123
Religion			
Hindu	62.3	37.7	49.5(106)
Muslim	58.1	41.9	29.0(62)
Christian	47.8	52.2	21.5(46)
Caste			
Forward	63.9	36.1	54.5(97)
SC/ST	55.6	44.4	10.2(18)
OBC	58.7	41.3	35.4 (63)
Wealth index			
Poor/Middle	63.2	36.8	8.9 (19)
Richer	54.7	45.3	29.9 (64)
Richest	58.8	41.2	61.2 (131)
Occupation *			
Non-working	55.3	44.7	79.8(170)
Working	69.8	30.2	20.2 (43)
Miscarriage			
No	57.1	42.9	72.0 (154)
Yes	60.0	40.0	28.0 (60)

Family planning exposure			
No	50.0	50.0	21.5 (46)
Yes	60.1	39.9	78.5 (168)
Total living children**			
No child	42.9	57.1	6.5(14)
1 child	65.9	34.1	42.5(91)
≥2 children	53.2	46.8	50.9(109)
Reason for discontinuation			
Wanted to become pregnant	53.1	46.9	42.0(81)
Drawbacks	60.0	40.0	44.0(85)
Others	59.3	40.7	14.0(27)
Total	(58.0) 124	(42.0) 90	214

** 5% * 10% level

Even though majority of the women who discontinued have not experienced miscarriages, a slightly higher proportion of women who discontinued modern methods have the experience of miscarriages. Majority of the women who discontinued have the exposure to mass media, where in 60.1 per cent discontinued the modern methods compared to 39.9 per cent of traditional methods. Number of living children is found significant in the discontinuation of temporary contraception also. The percentage of women with the discontinuation of modern methods is higher among women having one child whereas in the case of discontinuation of traditional methods, the proportion of women having no child is higher. The present study observes that the working status of the women and number of children a woman had have significant association with the discontinuation of temporary contraceptives. A study done by Zhang et.al found similar observations that several socio-economic variables like socio-economic well-being, age, parity, and method type have significant impact on contraceptive discontinuation in northern India.⁷

Reason for the discontinuation of temporary contraceptives is another important factor in the explanation of exclusion of the use of contraception. Here, 'side effects' or 'drawbacks' of the method preferred become prominent for the discontinuation of temporary contraceptives followed by the reason 'wanted to become pregnant'. Only 14.0 per cent of the discontinued women report the other reasons such as 'infrequent sex,' 'own or husbands' dislike' etc. The reasons drawbacks or side effects becomes prominent among women who discontinued the modern methods (60.0 per cent) where as it gets least importance for the discontinuation of traditional methods. The proportions of women who

discontinued modern and traditional methods are almost the same among women who have the discontinuation due to drawbacks and other reported reasons.

Determinants of Discontinuation of Temporary Contraceptives by Type of Method

The discontinuation of temporary methods by type of method - either traditional or modern - differed according to some socio-economic, demographic and reproductive characteristics of the respondents. So, logistic regression is performed to identify the significant factors for the discontinuation of temporary methods by type of method. For creating the dependent variable, the discontinuation of modern methods is coded as 1 and the discontinuation of traditional methods is coded as 0.

From the estimates, the chances for the discontinuation of temporary methods by type - modern or traditional can be predicted. The result of logistic regression explains that working status of women and number of children have significance in the discontinuation of temporary contraceptives among currently married women who are not sterilized and non-pregnant.

TABLE 2
LOGISTIC REGRESSION ESTIMATES OF LAST METHOD DISCONTINUED AMONG CURRENTLY MARRIED, NON-PREGNANT AND NON-STERILIZED WOMEN

Variables	B	Exp β
Work Status *		
Non-working ^(t)		
Working	0.595	1.813
Total No. of living Children**		
<2 children ^(t)		
≥2Children	-0.356	0.700

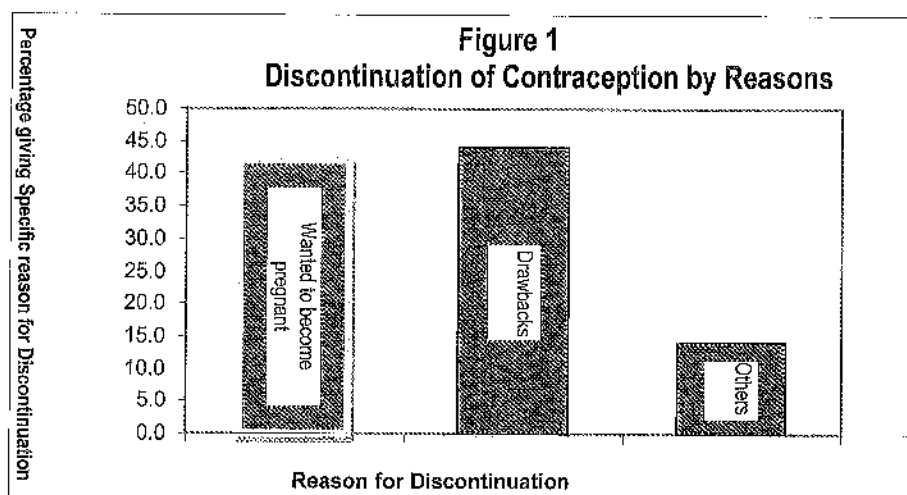
** 5% * 10% level

Working women are 81 per cent more likely to discontinue modern methods than those women who are not working. It can be inferred that increase in the number of children bear a negative influence on the discontinuation of modern methods i.e., women having more than or equal to two children are 30 per cent less likely to discontinue a modern method than those women who have less

than two children. The other socio-economic and reproductive variables fail to explain significantly in the discontinuation of temporary methods by type.

Discontinuation of Temporary Contraceptives by Reason

Figure 1 shows the distribution of women who discontinued temporary contraceptives according to the reasons. It can be observed that the discontinuation is mainly due to two factors namely "drawbacks" and "wanted to become pregnant" (44.0 per cent and 42.0 per cent respectively). The other reported reasons accounts for only 14.0 per cent. The study by Amrita Kansal et.al., found that the major reasons for the discontinuation of temporary contraceptives were want of children, side effects and husband away⁸ and Kiran Agrahari⁹ noted that side effects were the main reason for IUD discontinuation.



The association between age of women and the reasons for discontinuation of women is found to be significant which is obvious from Table 3. The percentages of those who discontinued the temporary contraception for 'drawbacks' as well as for other reported reasons are comparatively higher among older women. Rural residents are more in the case of discontinuation for the reason 'wanted to become pregnant' whereas urban residents discontinued more for 'drawbacks'. Among women who have cited the reason as 'drawbacks', the percentage of muslim women holds higher position as compared to other religions. In the case of the reason to become pregnant, the distributions by religion are almost same.

Among the SC/ST women who report discontinuation, the percentage of those reporting the reasons as 'wanted to become pregnant' is more while the proportion of stating the reason 'drawbacks' is higher among the women belonging to forward castes.

Enhancement of the educational levels of both husbands and wife tend to discontinue the temporary contraception for the reason 'wanted to become pregnant' whereas it shows a reverse tendency to discontinue the temporary contraception for the reason of 'drawbacks'. The proportion of women saying the reason 'wanted to become pregnant' is found higher among those women belonging to the group of richer wealth index whereas the proportion of those quoting 'drawbacks' it is more among women of richest wealth group. No significant difference can be observed in the distribution of working status of women with the reasons for discontinuation of temporary methods. The proportion of discontinued women for the other reported reasons is:

TABLE 3
PERCENTAGE DISTRIBUTION FOR THE REASON FOR EVER USE OF METHOD
DISCONTINUATION AMONG CURRENTLY MARRIED, NON-PREGNANT AND NON
STERILIZED WOMEN ACCORDING TO SELECTED CHARACTERISTICS, NFHS III
SURVEY, KERALA

Characteristics	Wanted to become Pregnant	Drawbacks	Others	Total
Age***				
≤ 24	43.8	45.8	10.4	48
25-34	50.0	40.4	9.6	104
35and above	19.5	51.2	29.3	41
Residence				
Rural	44.7	42.1	13.2	114
Urban	38.0	46.8	15.2	79
Religion				
Hindu	43.3	44.3	12.4	97
Muslim	40.0	49.1	10.9	55
Christian	41.5	36.6	22.0	41
Caste				
Forward	37.8	47.8	14.4	90
SC/ST	50.0	31.3	18.8	16
OBC	41.8	45.5	12.7	55

Education (W)				
7 years or less	29.4	58.8	11.8	17
8-10 years	34.6	48.7	16.7	78
above 10 years	50.0	37.8	12.2	98
Education (H)				
7 years or less	38.2	50.0	11.8	34
8-10 years	40.2	42.7	17.1	82
above 10 years	45.5	42.9	11.7	77
Wealth index				
Poor/Middle	41.2	41.2	17.6	17
Richer	51.7	36.7	11.7	60
Richest	37.1	48.3	14.7	116
Occupation				
No	41.8	44.4	13.7	153
Yes	43.6	41.0	15.4	39
Exposure (mass media)*				
No	40.9	34.1	25.0	44
Yes	42.3	47.0	10.7	149
Miscarriage**				
Yes	45.0	37.9	17.1	53
No	34.0	60.4	5.7	140
living children*				
No child	38.5	38.5	23.1	13
1 Child	47.5	43.8	8.8	80
≥ 2 children	38.0	45.0	17.0	100
Husband's desire				
DK/Different opinion	26.7	57.8	15.6	45
Same as wife	46.6	39.7	13.7	146
Method discontinued***				
Pill/Inj/IUD	21.4	69.0	9.5	42
Condom	50.0	32.4	17.6	68
Traditional	45.8	41.0	13.3	83
Total	81	85	27	193

***1% level, **5 % level and * 10% level

more among those having no exposure to mass media. Miscarriage history holds importance in the discontinuation of temporary contraceptives due to 'wanted to

become pregnant' as well as the 'other' reported reasons while the proportion of discontinuation due to 'drawbacks' is higher among those who have no history of miscarriage (significant at 5 per cent level). An increase is found among the percentage of women having reported the reason for discontinuation as 'drawbacks' with the increase in the number of children. The proportion of discontinuation for the reason 'to become pregnant' is higher among those having one child.

The type of method adopted significantly influences the reason for discontinuation as is evident from the table ($p < 0.01$). Among women who have discontinued condom, half of them did for the reason 'wanted to become pregnant' and among those who discontinued pills/injection/IUD, majority did for drawbacks (69.0 per cent). The proportion of discontinuation for the reason 'wanted to become pregnant' is higher among those discontinued condoms followed by that of traditional methods.

Determinants of Discontinuation of Temporary Contraceptives by Reasons

A multinomial logistic regression is employed to analyze the factors associated with the reasons for discontinuation of temporary contraceptives in which the dependent variable is reasons for discontinuation coded as (0) wanted to become pregnant, (1) as drawbacks and (2) other reported reasons. The independent variables which are found significant in the chi-square test are included in this regression.

Women in each decreasing age group are less likely than those in higher to discontinue for either the reason 'drawbacks' or 'other' reported reasons than 'wanted to become pregnant'. The discontinuation among less than 24 years and those in 25 to 34 years have 88 per cent each lesser odds to discontinue for 'other' reported reasons than that of women having the reason 'wanted to become pregnant'. At the same time the women who discontinued in these age groups have 38 per cent and 73 per cent respectively lesser odds for the discontinuation for 'drawbacks' than that of women having the reason 'wanted to become pregnant'. Here the reference category is women who discontinued in the age group more than 34 years of age.

TABLE 4
MULTINOMIAL LOGISTIC REGRESSION ANALYSIS FOR THE REASON FOR
DISCONTINUATION OF METHODS EVER USE AMONG CURRENTLY MARRIED,
NON-PREGNANT AND NON-STERILIZED WOMEN

Variables	Drawbacks		Others	
	B	Exp β	B	Exp β
Age				
$\geq 35^{(r)}$				
≤ 24	-0.466	0.627	-2.155	0.116***
25-34	-1.292	0.275**	-2.136	0.118***
Family planning exposure				
Yes ^(r)				
No	-0.234	0.791	0.775	2.171*
Miscarriage				
No (r)				
Yes	-1.162	0.313*	0.494	1.639
Husband desire				
Same opinion ^(r)				
Others (DK/Different opinion)	1.227	3.413***	0.777	2.174
Method discontinued				
Traditional ^(r)				
Pill/Inj/IUD	1.384	3.990***	0.561	1.753
Condom	-0.170	0.844	0.843	2.324

***1% level, **5 % level

The women who do not get the exposure to mass media compared to that of women with the exposure, have 21 per cent less chance to discontinue for 'drawbacks' than the reason 'wanted to become pregnant' and it is 2.1 times more likely for the other 'reported' reasons. Miscarriage tendency of women exert lesser chance (69 per cent less likely) to discontinue the temporary contraceptives for the reason 'drawbacks' while it is 63 per cent more likely to discontinue for 'other' reasons than the reason 'wanted to become pregnant'. Among women whose husbands have different opinion about the number of children as that of wife than among those with same desire are more likely to discontinue the temporary contraception for the reasons drawbacks and other reported ones than the reason wanted to become pregnant (3.4 times and 2.1 times respectively). Method of

temporary contraception produces different effect on the reasons for discontinuation.

Discontinuation of modern methods (Pill/Injection/IUD) than that of traditional methods is more likely to discontinue the contraception either for 'drawbacks; or 'other' reported reasons than the reason wanted to become pregnant. The discontinuation of condoms is 16 per cent less likely than that of traditional methods to discontinue because of drawbacks than the reason 'wanted to become pregnant' while it is 2.3 times more likely to discontinue for 'other' reported reason than wanted to become pregnant.

CONCLUSION

The social and economic status of women is very much linked to the continuation of contraceptives. The study confirms that there is a need for adequate information or support to use the temporary methods effectively to improve women's ability to choose the suitable methods. The right choice of adoption of temporary methods is an important step towards the improvement in the health status of women. Follow-up measure is also necessary for the effective family planning programmes. It can be expected that Reproductive and Child Health Programmes and National Rural Health Mission services may succeed in popularizing the effective utilization of spacing methods in Kerala.

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EXCESSIVE FLUORIDE IN DRINKING WATER AND ITS CONSEQUENCES

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ABSTRACT

Excessive fluoride concentration in groundwater poses a serious health hazard in more than 25 developed and developing countries; including India where 19 states are facing acute fluorosis problems. This paper contains a broad overview of the intensity of the problem in different parts of India, its source and various clinical forms of fluorosis. Briefly we have also given some recommendations to prevent fluorosis. It has been concluded that fluorosis should be treated as a public health problem and more research and policy interventions are needed to tackle this problem.

Keywords: Fluoride; Fluorosis; Drinking water; Health.

Water is an essential resource for sustaining life. Though groundwater contributes only 0.6 per cent of the total water resources on earth, it is the major source of drinking water in India especially in rural areas. In India, fluoride is the major inorganic pollutant of natural origin found in groundwater. Millions of men, women and children in the country are affected by fluorosis and many of them are crippled and leading a vegetative life. The economically weaker sections of the society having low nutritional status are affected more. The incurable disease continues to be a major public health problem and urgent preventive measures are needed.

Although, the importance of fluoride to normal mineralization of hard tissues and formation of caries resistant enamel has been recognized, there has been as yet no conclusive evidence proving that it is an essential element for human health¹. Indeed, fluoride deficiency syndrome is yet to be described. This may be due to the fact that human body requirement of this micro-nutrient must be small, which is fulfilled naturally through food and water.

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Excessive ingestion of fluoride through water, food or dust causes a debilitating disease called 'fluorosis' a term coined and first used by Cristiani and Gautier in 1925². Acute fluoride intoxication is rarely seen and results mostly by accidental ingestion of large amounts of fluoride compounds but chronic fluoride poisoning is more common and can affect animals as well as humans. Excessive intake during pre-eruptive stage of teeth leads to dental fluorosis and further continued ingestion over years and decades causes bony or skeletal fluorosis. It has been found that the Intelligence Quotient of the children living in the high fluoride areas was significantly lower³. In further stages disease produces neurological manifestations. Feil first mentioned fluorosis in humans as an occupational disease in 1930⁴. Skeletal fluorosis was next reported as a disease endemic to Nellore, an area in India⁵.

Their study led to the publication of first report of neurological manifestations of fluorosis in late stages. Subsequently, cases of endemic and industrial fluorosis have been reported from various parts of the world⁶. Endemic fluorosis is usually restricted to tropical and sub-tropical areas, and is frequently complicated by factors such as calcium deficiency and malnutrition. It is widely prevalent in China, India, Middle East, North Africa, Ethiopian rift valley and other parts of Africa.

High incidence of endemic fluorosis in India is due to the fact that large areas of the country contain water supplies having high levels of fluoride^{7,8}. All states of India except in northeast reported cases of fluorosis and 25 to 30 million people are exposed to high fluoride intake and half a million suffer from skeletal fluorosis⁹. In India, fluoride is the major pollutant of natural origin found in groundwater. This paper reveals the intensity of this problem in India in detail besides examining its sources and its effects on health.

Global Scenario

The latest information shows that fluorosis is endemic in at least 25 countries across the globe as can be seen from figure 1. The total number of people affected is not known, but a conservative estimate would number in the tens of millions. Nineteen of India's 35 states and union territories are identified as endemic for fluorosis. In Mexico, 5 million people (about 6% of the population) are affected by fluoride in groundwater. Fluorosis is prevalent in some parts of central and western China and caused not only by drinking fluoride in groundwater but

TABLE 1
INDIAN STATES WITH AREA AFFECTED BY FLUORIDE POISONING¹²

S.N.	State	Area Affected (percentage)
1.	Andhra Pradesh	50 – 100
2.	Bihar	30 – 50
3.	Delhi	< 30
4.	Gujarat	50 – 100
5.	Haryana	30 – 50
6.	Jammu & Kashmir	< 30
7.	Karnataka	30 – 50
8.	Kerala	< 30
9.	Maharashtra	30 – 50
10.	Madhya Pradesh	30 – 50
11.	Orissa	< 30
12.	Punjab	30 – 50
13.	Rajasthan	50 – 100
14.	Tamil Nadu	50 – 100
15.	Uttar Pradesh	50 – 100
16.	West Bengal	-
17.	Uttaranchal	50-100
18.	Jharkhand	30 – 50
19.	Chhattisgarh	30-50

Southern part of India is severely affected by fluoride where its concentration in ground-water varies from 0.2-20 mg/L. Similarly the North-West region of India is also highly affected and ground-water concentration in this region is 0.4-19 mg/L. Central India and Deccan Province of India is moderately affected having groundwater fluoride concentration ranging from 0.2-10mg/L and 0.4-8mg/L respectively¹³.

SOURCES OF FLUORIDE

The various sources through which fluoride enters the body are drinking water, food, industrial exposure, drugs and cosmetics etc. However, in majority of endemic areas around the world, the main contribution is from water and only in few areas of India and China significant amount comes from food and rarely the polluted air is the culprit.

Drinking Water

The endemic fluorosis in India is largely of hydro geological origin¹⁴. The major source of fluoride in the groundwater is fluoride bearing rocks from which it get weathered and/or leached out and contaminates the water. The Geological Survey of India has brought out considerable data which reveal that fluorite, topaz; apatite, rock phosphate, phosphoric nodules and phosphorites are widespread in India and contain high percentage of fluorides. In groundwater, the natural concentration of fluoride depends on the geological, chemical and physical characteristics of the aquifer, the porosity and acidity of the soil and rocks, temperature, the action of other chemicals and the depth of wells. Due to large number of variables, the fluoride concentrations in groundwater range from well under 1.0 mg/L to more than 35.0 mg/L¹⁵.

Food Items

Besides water, food items especially agricultural crops are heavily contaminated with fluoride as they are grown in the areas where the earth's crust is loaded with fluoride bearing rocks.

TABLE 2
FLUORIDE CONTENT IN VARIOUS FOOD ITEMS¹⁶

Food Item	Fluoride (mg/kg)	Food Item	Fluoride (mg/kg)
Cereals		Fruits	
Wheat	4.6	Banana	2.9
Rice	5.9	Mango	3.2
Maize	5.6	Apple	5.7
		Guava	5.1
Pulses		Beverages	
Gram	2.5	Tea	60 - 112
Soyabean	4.0	Coconut water	0.32 - 0.6
Vegetables		Spices	
Cabbage	3.3	Coriander	2.3
Tomato	3.4	Garlic	5.0
Cucumber	4.1	Ginger	2.0
Ladyfinger	4.0	Turmeric	3.3
Spinach	2.0	Food from Animal Sources	
Mint	4.8	Mutton	3.0 - 3.5
Brinjal (egg plant)	1.2	Beef	4.0 - 5.0
Potato	2.8	Pork	3.0 - .5
Carrot	4.1	Fishes	1.0 - 6.5

Table 2 shows the fluoride content of food items commonly used in India. The fluoride content in food material mainly depends upon Fluoride level in soil; Fluoride level in atmosphere; and use of fluoride containing fertilizers and pesticides.

Industrial Exposure

Various industries involve in the manufacture of phosphate fertilizers, aluminium extraction, and fluorinated hydrocarbons (refrigerants, aerosol propellants etc.); fluorinated plastics (polytetrafluoroethylene etc.); petroleum refining and hydrogen fluoride manufacturing units are responsible for airborne fluoride. Fluoride dust and fumes pollute the environment inhaling dust and fumes is as dangerous as consuming fluoride containing food, water or drugs. Not only the industrial workers but also the people living in the vicinity of such industries are affected.

Drug and Cosmetics

The sodium fluoride containing drugs for osteoporosis, osteosclerosis and dental caries are in use for many years. The prolonged use of these drugs may causes fluorosis. Additionally, the toothpastes and mouth-rinses (whether labelled fluoridated or otherwise) also contain higher fluoride concentration. Dentists have shown that use of fluoridated toothpaste for brushing teeth enhances the serum fluoride level within minutes thereby promoting dental fluorosis¹⁷. The fluoride content arising from raw materials used for the manufacturing of toothpaste, namely, calcium carbonate, talc and chalk can have as high as 800-1000 mg/kg of fluoride. In the fluoridated brands of toothpastes, the fluoride content has been reported up to 1000-4000 mg/kg. Moreover, some of the mouth rinses are nothing but fluoridated water of a very high fluoride concentration.

FLUORIDE AND HEALTH

Fluoride in minute quantity is an essential component for normal mineralization of bones and formation of dental enamel¹⁸. However its excessive intake over a period of time may result in a crippling disease called fluorosis.

Water is the major contributor to the total daily fluoride intake in human body. Table 3 shows that as the concentration of fluoride in drinking water varies, its effect on human health also varies accordingly. If there is no fluoride intake from any source it may result in limited growth and fertility problems. A fluoride

concentration of less than 0.5 in drinking water may result in dental caries. Fluoride concentration of 0.5-1.5 mg/L in drinking water is the optimum amount that promotes dental health and prevents tooth decay. Further increase in fluoride concentration in drinking water (1.5-4.0mg/L) can cause dental fluorosis i.e. mottling and pitting of teeth. If drinking water fluoride concentration is in the range of 4-10mg/L it may result in dental as well as skeletal fluorosis and if the fluoride concentration in drinking water is beyond 10 mg/L it may cause crippling fluorosis¹⁹.

TABLE 3
CONCENTRATION OF FLUORIDE IN DRINKING WATER AND ITS EFFECTS ON HUMAN HEALTH

Fluoride Concentration (mg/L)	Effect
Nil	Limited growth and fertility
< 0.5	Dental caries
0.5 - 1.5	Promotes dental health, prevents tooth decay
1.5 - 4.0	Dental fluorosis (mottling and pitting of teeth)
4.0 - 10.0	Dental fluorosis, skeletal fluorosis (pain in neck bones and back)
> 10.00	Crippling fluorosis

Source: International Drinking Water Standards [1971], WHO, Geneva.

Optimum Concentration of Fluoride in Drinking Water

According to WHO standards, the fluoride in drinking water should be within a range that slightly varies above and below 1 mg/L. In temperate regions, where water intake is low, fluoride level up to 1.5 mg/L is acceptable. Bureau of Indian Standard (BIS), has prescribed 1.0 mg/L and 1.5 mg/L as desirable and permissible limits for fluoride in drinking water, respectively²⁰.

Total Daily Fluoride Intake

The fluoride contents from all the sources determine the total daily intake of fluoride by a person. The estimated range of safe and adequate intake of fluorides for adults is 1.5 to 4.0 mg per day and it is less for children and those with renal disease. Ingested fluorides are quickly absorbed in the gastrointestinal tract; the body retains 35-48 per cent of it. Majority of it is stored in skeletal and classified tissues and the balance is excreted largely in the urine²¹.

VARIOUS FORMS OF FLUOROSIS

1. Dental Fluorosis

This form of fluorosis affects the teeth and mainly occurs in children. The natural shine or luster of the teeth disappears. In the early stage, the teeth appear chalky white and then gradually become yellow, brown or black. The discoloration will be horizontally aligned on the tooth surface as 'lines' or 'soot's' away from the gums. Tiny pits or perforations can be seen in the form of cavities on the surface of teeth. Dental fluorosis affects both the inner and outer surface of the teeth. One can become edentulous even at much younger age in the fluoride endemic areas. The disease has mostly cosmetic implications and has no treatment.

2. Skeletal Fluorosis

Skeletal fluorosis affects the bones/skeleton of the body. Skeletal fluorosis can affect both young and old alike. One can have aches and pain in the joints. The joints that are normally affected by skeletal fluorosis are neck, hip, shoulder and knee that make it difficult to walk and movements are painful. Rigidity or stiffness of joints also sets in. More worrisome is that skeletal fluorosis is not easily detectable until the disease attains an advanced stage. In severe cases, there is complete rigidity of the joints resulting in stiff spine, called as 'Bamboo spine' and immobile knee, pelvic and shoulder joints.

3. Non-Skeletal Manifestations

The soft tissues of the body may be affected by excessive consumption of fluoride. The symptoms include gastro-intestinal complaints, loss of appetite, pain in stomach, constipation followed by intermittent diarrhoea, muscular weakness and neurological manifestations leading to excessive thirst and tendency to urinate more frequently are common among the affected individuals. Repeated abortions or still birth and male infertility due to sperm abnormalities are also some of the complications.

PREVENTION OF FLUOROSIS

Fluorosis can be prevented by following methods:

Using Safe Drinking Water Sources: Since the major source of fluoride is drinking water, use of surface water, rainwater and low-fluoride groundwater for

drinking purpose can help in reducing the fluorosis. Generating awareness in the community regarding high fluoride source may be a good preventive measure. Rain-water collection at domestic level in high fluoride areas can be a great relief measure.

Defluoridation: It is the process of removal of excess fluorides from water. Defluoridation should be considered, only if other solutions don't work. Removal is achievable either by Nalgonda Technique which is a combination of several unit operations and processes incorporating rapid mixing, chemical interaction, flocculation, filtration and disinfection or by filtering water down through a column packed with a strong adsorbent, such as activated alumina (Al_2O_3), activated charcoal, or ion exchange resins.

Improving the Nutritional Status of Populations at Risk: Clinical data indicate that adequate calcium and vitamin C intake is clearly associated with a reduced risk of fluorosis. Fluoride absorption can be reduced by 50 per cent by adding calcium in diet. In such cases fluoride is bound in less soluble form and its faecal excretion is increased²². Similarly citrus fruits are reported to reduce the toxic effect of fluoride. Therefore, measures to improve the nutritional status in the fluorotic belts of the country, particularly of children appear to be an effective supplement to the technical solutions discussed above.

CONCLUSION

Some governments are not yet fully aware of the fluoride problem or convinced of its adverse impact on their population. Fluorosis should be treated as a public health problem. Efforts are therefore needed to support more research on the subject and promote systematic policy responses by the concerned State governments as well as by the Central government.

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PREVALENCE OF PICA PRACTICE AMONG PREGNANT WOMEN IN AND AROUND MANIPAL, UDUPI DISTRICT, KARNATAKA

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ABSTRACT

In documented research literature pica is reported to range from 0 per cent to 68 per cent depending on the client population. This study was designed to define characteristics and factors influencing the practice of pica in and around Manipal. The study group consisted of 180 pregnant women who were interviewed to know about the behaviour regarding pica practice and their general information. Prevalence of pica was found among 5 per cent of the study subjects. The common substances consumed were ice, raw rice, tamarind seeds and chalk. Statistically significant association was found between pica practice and socio-economic status ($p < 0.001$). There is a need to routinely screen pregnant women for pica during pregnancy. Further studies are also needed to establish possible health consequences of pica on mother and child.

Keywords: Pica, Pregnant Women, Raw Rice, Chalk.

The word pica is derived from the Medieval Latin word for 'magpie', a bird known for its appetite for diverse substances. Historical descriptions of the practice date from as early as 40 B.C.¹. Some pregnant women develop craving for nonfood items such as laundry starch, clay, soil, or ice - a practice known as pica. This phenomenon is referred to as pica². Pica can be harmful if non-food items crowd nutritious food out of the diet and contains toxins, bacteria and parasites³. In most cases, these cravings are caused by hormonal changes. Pica is associated with significantly lower maternal haemoglobin levels at delivery ^{4,5}. Types of pica most commonly practiced during pregnancy are found to be: Amylophagia (e.g. Consumption of starch), Geophagia (e.g. soil, clay or chalk), Pagophagia (e.g. ice), Plumbophagia (e.g. lead, paint chips), Lithophagia: e.g. Eating stone⁶. Odowa: soft stones eaten by pregnant women in Kenya².

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Globally, the available literature shows that the prevalence rate of pica varies from place to place and has been reported to range from 0 to 68 per cent depending on the characteristics of the population studied⁷. Eating of earth, ash and charcoal was found in 18 per cent of pregnant women admitted for delivery in Mysore (India)⁸. In Gujarat (India) 12 per cent of pregnant women were found to have pica for baked clay (mati)⁹.

The exact cause of pica is often unknown^{4,6}. Complications of pica practice can lead to a variety of complications to the fetus, including low birth weight, preterm labor and stillbirth¹⁰. The Indian literature is scanty regarding the current prevalence of pica in pregnant women and no study has been conducted in Udupi district, Karnataka. Hence, the present study was undertaken with the following objectives:

- (i) To determine the prevalence of pica practice during pregnancy;
- (ii) To identify the substances commonly ingested by the pregnant women; and
- (iii) To determine the characteristics of pregnant women practicing pica.

MATERIALS AND METHOD

Type of study

It was a descriptive cross-sectional study and conducted at hospitals and communities in and around Manipal over a period of 4 months i.e. August to December 2011.

Sample size

The sample size of the study was 180 subjects. The pregnant women were the target group; including all age group, religions and socio-economic status. The pregnant women admitted in hospitals from far of areas and those who were not willing to participate in the study were excluded.

Tools and Techniques

Pre-tested interview schedules were used. Kuppaswamy modified scale (2007) was used to determine socio-economic status and SPSS Package Version 16.0 was used for statistical analysis. World Health Organisation criteria were used for categorization of the Body Mass Index status of the pregnant women. Mild, moderate and severe anaemia were categorized on the basis of the haemoglobin

levels. Data collected were coded using statistical analysis tool. T-tests and Chi-square tests were used for the statistical testing.

TABLE 1
SOCIO-DEMOGRAPHIC CHARACTERISTICS

Age in Years	Frequency (N=180)	Percentage
< 20	2	1.1
20-29	147	81.7
30-39	31	17.2
Total	180	100
Educational Level		
Primary School	3	1.7
Middle School	30	16.7
High School	54	30
Intermediate or post high school diploma	44	24.4
Graduate or post graduate	49	27.2
Total	180	100
Socio-Economic Status		
Upper Middle (II)	151	83.9
Lower Middle (III)	25	13.9
Upper Lower (IV)	4	2.2
Total	180	100

FINDINGS AND DISCUSSION

The majority of the subjects that is 147 (81.7%) were between 20 and 29 years of age. About 54 (30%) had high school level of education-44 (24.4%) had intermediate or post-high school and 49 (27.2%) were graduates or post graduates. None of the subjects belonged to the upper (I) level, majority of the subjects that is 151 (83.9%) fell under upper middle (II) (Table 1).

Anthropometric Parameters

The majority of the study subjects 69.4 per cent gained adequate weight, 27.2 per cent inadequate weight and for 3.3 per cent the weight gain was more than normal. According to the pre-pregnancy BMI, the majority 56.1 per cent had normal weight (BMI 18.50-24.90 kg/m²), 32.2 per cent was underweight (BMI <18.50kg/m²), 10 per cent of them was overweight (25.00-29.00 kg/m²) and 1.7

per cent was obese (BMI >30.00 kg/m²). No statistically significant association between BMI and pica practice was found.

TABLE 2
TRIMESTER AND ORDER OF PREGNANCY OF THE SUBJECTS

Currently which trimester (N=180)	Frequency	Per cent
First trimester (0-12 weeks)	14	7.8
Second trimester (13-28 weeks)	45	25
Third trimester (29-40 weeks)	121	67.2
Total	180	100
Order of pregnancy		
One	128	71.1
Two	44	24.4
Three	8	4.4
Total	180	100

The current study represented that 7.8 per cent of pregnant women were under the category of the first trimester, 25 per cent the second trimester and the majority was in the third trimester i.e. 67.2 per cent. Majority of the pregnant women (71.1%) in the study were first time pregnant i.e. Primi-gravida, second pregnancy 24.4 per cent and third pregnancy only 4.4 per cent (Table 2).

Pica Behaviour

Out of 180 (100%) study subjects, only 9 (5%) pregnant women admitted to have pica practice and 171 (95%) said they do not practice pica, Table 3. There might have been some extent of under reporting owing to the fear of social stigma and/or embarrassment.

TABLE 3
PICA BEHAVIOUR (N= 180)

Pica	Frequency	Per cent
Yes	9	5
No	171	95
Total	180	100

Similar studies have been conducted in different parts of India. The prevalence of Pica in different places in India has been studied, like eating of earth, ash and charcoal was found in 18 per cent of pregnant women admitted for delivery in Mysore, India (Khanum, 1976)⁸. In rural Uttar Pradesh some pregnant women have craving for earth and ash from cooking stove ('chulah'), uncooked rice, bitter foods and sweet things. In Gujarat 6 out of 50 women (i.e. 12 per cent of pregnant women) were found to have pica for baked clay (mati) (Nag, 1994)⁹.

The current study shows 5 per cent of pica prevalence which is more than the value showed by (Walker, Sokaria, & Cannan, 1997) i.e. 2.2 per cent and 1.6 per cent prevalence rates respectively recorded among the Indian and Caucasian pregnant women¹⁵.

Not only in India but studies have been done all across the globe. A study published in 1994 found that 8.1 per cent of pregnant African-American women in the U.S. self-reported pagophagia, the ingestion of large quantities of ice and freezer frost¹². However, prevalence of pica found in the current study (5%) is higher when compared to 0.02 per cent pica practice that was found in Denmark¹⁸.

A study conducted in 1991 found a prevalence of pica in 8.8 per cent of pregnant women in Saudi Arabia¹⁶. Rates of pica among pregnant women in developing countries can be much higher, however, with estimates of 63.7 per cent (Nyaruhucha, 2009)¹¹ and 74.0 per cent (Ngozi, 2008) reported for two different African populations^{2,17}. In 2010, in Tanzania, according to recent figures, 40.1 per cent out of 2361 subjects were found to practice pica during pregnancy (Young & Khalfan, 2010).

Onset of Pica Behaviour: As depicted in Table 4 majority of pica practicing pregnant women were in the first trimester 6 out of 9 (66.7%). The current study is in compliance with Nyaruhucha, C. (2009)¹¹ which reported a similar trend i.e., the majority of the subjects lie in the first trimester and lowest in the third trimester.

TABLE 4
ONSET OF PICA BEHAVIOUR

Onset of pica trimester wise (N= 09)	Percentage and Frequency
First (0-12 weeks)	66.67% (6)
Second (13-28 weeks)	22.22% (2)
Third (29-40 weeks)	11.11% (1)
Total	100% (9)

According to (Mensah, Twumasi, Amenawonyo, Larbie, & Baffo, 2010) 87 per cent of pica practicing pregnant women were in the first trimester, 2.66 per cent was in the second trimester and none reported onset of pica behaviour in the third trimester. [13]

TABLE 5
TYPE OF PICA PRACTICE

Type of Pica Practice (N= 9)	Number and Percentage
Geophagia (chalk)	1 (11.11%)
Amylophagia (raw rice)	2 (22.22%)
Pagophagia (ice)	3 (33.33%)
Polyphagia (Amylophagia+ Pagophagia)	2 (22.22%)
Others (Tamarind Seeds)	1(11.11)

The current study showed the highest prevalence of the pagophagia (33.33%), followed by amylophagia and polyphagia (22.22% each) (Table 5). The non-food items that comprised pica practiced in this study group was ice, raw rice, chalk and tamarind seeds. The current study is in compliance with a study regarding beliefs and practices about food during pregnancy which found that tamarind seeds are being practiced in Gujarat by the pregnant women⁹. Raw rice, limestone, clay and mud were reported by a survey of food habits and beliefs of pregnant and lactating mothers in Mysore city⁸. Pagophagia has been reported to be the most common pica practice in a rural obstetric population⁷.

The subjects said that on non-availability of the pica item they ate ice-cream (3), sago balls (8), crispy food items, any other food items and starchy food (arrowroot). Out of nine women practicing pica, six suffered from gastro intestinal disorders.

For non-pica subjects the mean age with standard deviation was 26.36 ± 3.694 and for pica subjects it was 26.89 ± 1.616 . No statistically significant difference was found between the pica behaviour and age of the study subjects.

Table 6 represents the frequency of the reasons given by the pregnant women for pica practice. Three out of nine said it quenched thirst, seven said they enjoyed the taste, three said for visual appeal, four of them gave smell as the

reason, three practiced it unknowingly and fortunately none practiced it for cultural or religious purpose. Six of them said the practice of pica relieved them from nausea and heartburn. This reason is generally given by the subjects who are practicing pagophagia (ice) and amylophagia (raw rice), one practicing geophagia (chalk) one said it acted as a laxative. None of the subjects said it reduced stress and anxiety.

TABLE 6
REASONS GIVEN BY PREGNANT WOMEN FOR PICA PRACTICES

Why do you eat such substances (N=9)	Frequency
Quench Thirst	3
Enjoys Taste	7
Visual Appeal	3
Smell	4
Unknowingly	3
Helps in	
Reliefs Nausea	6
Reliefs Heartburn	6
Acts as Laxative	1

The current study is supported by (Mensah, Twumasi, Amenawonyo, Larbie, & Baffo, 2010) where 19 (10.11%) said it reduces thirst, 33 (17.55%) for taste, 31 (16.49%) for visual appeal, 20 (10.64%) for smell and 60 (31.91%) said it relieves nausea. A study by (Simpson, Mull, Longley, & East, 2000) also supports the current study as subjects gave the common reasons for practicing pica as it helps in relieving nausea, quench thirst and the study differed as one of the subject's said she practices it for religious purposes^{13,19}.

TABLE 7
DISTRIBUTION OF PICA PRACTICE IN PREVIOUS PREGNANCY AMONG STUDY SUBJECTS

Component		Frequency (%) N=180			χ^2 Test of Significance
		Pica behaviour			
Practiced pica in previous pregnancy		No	Yes	Total	1.572 ^{NS}
	No	168 (96)	7 (4)	175 (100)	p = 0.142
	Yes	3 (60)	2 (40)	5 (100)	Not
	Total	171 (95)	9 (5)	180 (100)	Significant)

^{NS} indicates no significance at 5 per cent level.

Table 7 shows that majority of the subjects (93.33%) were not practicing pica in previous pregnancy. Chi square significance test was applied. Since the p value is > 0.05 , no statistically significant association was found between the pica in previous pregnancy and current pica behaviour.

The findings of the current study differs from the pica practices of pregnant women in Nairobi, Kenya², where the finding was that pica practice in previous pregnancy exerts a significant influence on the pica practice during the subsequent pregnancy.

TABLE 8
DISTRIBUTION OF THE STUDY SUBJECTS ACCORDING TO SOCIO-ECONOMIC STATUS

Component		Frequency (%) N= 180			χ ² Test of Significance
		Pica behaviour			
Socio-economic status		No	Yes	Total	22.097** (p = 0.000)
	Upper Middle (II)	148 (98)	3 (2)	151 (100)	
	Lower Middle (III)	19 (76)	6 (24)	25 (100)	
	Upper Lower (IV)	4 (100)	0	4 (100)	
	Total	171 (95)	9 (5)	180 (100)	

**indicates significance at 1 per cent level

Table 8 depicts that maximum pica practicing women were in the lower middle class. The majority of the non-pica subjects fall under the upper middle class. The current study is in compliance with the Indian (Karnataka) study⁸ where more pica practicing pregnant women were from low income groups. Chi-square test showed a highly statistically significant association between the socio-economic status and pica behaviour at 1 per cent level of significance, which indicates that the subjects of low socio-economic status are more prone to pica practice.

The Chi-square significance test was applied to check the significant association of pica behaviour with childhood pica practice and previous pregnancy pica practice. Since the p value is > 0.05 no statistically significant association was found between the childhood pica behaviour and previous pregnancy pica behaviour with the current pica practice.

The majority of pica practicing subjects lie in the third trimester 6 (66.67%), the majority out of the subjects lying in the third trimester said that the onset of pica was in the first trimester and still it continued

CONCLUSION

In the present study, 180 pregnant women were interviewed to study pica practices. There was a significant association between pica behaviour and socio-economic status ($p = 0.000$) and also between pica behaviour with haemoglobin levels ($p \text{ value} = .005$). The findings of the study reveal that the pica practice is influenced by the low haemoglobin levels. Pica behaviour is not significantly associated with trimester, childhood pica practice, pica practice in previous pregnancy and with supplements.

In the small sample studied (180 pregnant women) pica was more commonly observed in the lower socio-economic status. It had no association with the presence of this practice in childhood or previous pregnancies. The majority of pica practice is considered to be in the first and second trimesters. Symptoms of pica usually appear in the first or second trimester of pregnancy, and persist for more than one month or throughout the pregnancy.

Pica practicing women said that it relieved them from nausea and heartburn that are the common problems during the first and the second trimester. In young pregnant women, the onset of pica is frequently with their first pregnancy in late adolescence or early adulthood. The commonest materials consumed were ice or raw rice. A larger study is needed to throw more light on this neglected subject.

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EFFECTIVENESS OF HOSPITAL INFORMATION SYSTEM IN A TERTIARY CARE GOVERNMENT HOSPITAL IN DELHI

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ABSTRACT

The effectiveness of Information System was assessed-based on mean score of predefined attributes according to the managerial levels. The main recommendation across all managerial levels was to reduce the excess paper work. The middle and higher level managers' recommended that 'reporting' needs to be timely, relevant, explicit and exception-based. The need of information varied from adequate and timely information to explicit and exception based reporting from operational level managers to top level managers. The records generated were utilized by the hospital for generating reports, calculating various requirements like medicines, linen, stationary, and preparing hospital statistical reports. The underutilization of available information was observed owing to excessive patients in the hospital along with avoidable excessive paperwork which can actually be decreased through the use of computerization and inter-linkage within the hospital for sharing common information of patients and their related information for routine work. It is thus found that the information system of the hospital under study was inadequate. Reports were also found deficient in terms of sufficiency, quality, clarity and explicitness of information.

Keywords: Hospital Information System, Information Attributes, Managers.

Hospital Information System (HIS) provides the required information to each level of the management at the right time, in the right form and at the right place, so that decisions are made effectively and efficiently¹. HIS is crucial for strengthening the health system especially in the developing world². All managers, irrespective of where or what they manage, perform four generic tasks. These include planning, organizing, leading and controlling³. Drucker (1961) emphasized the process of getting better and meeting higher standards as central to effectiveness of HIS. Mintzberg (1975) stated that managerial positions can be defined in terms of ten roles: Three are interpersonal, three are informational, and

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four are decisional. In this context, effectiveness is the feasibility of filling the roles, depending up-on the particular situation at hand. According to this approach, managers are effective in different ways at different times.

There are four main categories of information systems: First: Clinical/medical information system, which is used primarily to support direct patient care activities in hospital. Second: The operational administrative system, designed to aid management in the daily non-patient care activities of the hospitals. Third: The management planning and control system, often called the management information system which assist in making strategic policy decisions, which involves planning, controlling and evaluating activities. The fourth information system may overlay these systems on the data based management system. Hospital Information System can be applied in maintaining demographic, mortality and morbidity data⁴.

Evaluation of the effectiveness of HIS is an integral part of the management control process. It helps the organization to know the utility or effectiveness of the reports, being generated so that no manager is starved of information and no one is fed with unwanted data. There are ten information attributes identified for evaluation of HMIS viz. Timeliness, Accuracy, Relevance, Up-to-Datedness, Adequacy, No-Overloading, Format Clarity, No-Duplication, Explicitness and Exception-based reporting⁵.

AIM OF THE STUDY

To assess the information needs of hospital personnel of selected specialties and support units of tertiary care hospital to execute their managerial activity in the hospital under study.

MATERIALS AND METHOD

The study was cross-sectional and descriptive in nature including various levels of managers of a 1000 bedded tertiary care Government hospital of Delhi. The qualitative data were collected through semi-structured interview schedule from the managers of selected specialties viz. Medicine, Surgery, Pediatrics and Obstetrics and Gynecology (comprises nearly 60% of total hospital beds) and support units viz. Blood bank, Laboratories (Biochemistry and Pathology), Pharmacy, Central Stores and Supplies, Admission/Registration Counter and Medical Record Department. The study population under study was 105 which

was categorized into Top-level, Middle-level and Operational-level managers of wards, OPD and support units. Data regarding the type of information based on their preference and need for daily management and planning were collected on the likert-type scale with predefined score i.e. '0-Never', '1-Sometimes', '2-Most of the times' and '3-Always'. The answers' score was then added and then mean score was derived so as to make the responses comparable.

FINDINGS

The hospital under study had 85703 patients attendance/day in general OPD and had 20132 patients attendance/day in special clinics. Approximately 3826 get admitted in the general wards in a month. The records in the hospital are generated at various levels starting from the point of first contact of patients (Emergency or OPD). The patient related records were maintained in admission register, treatment register, report book, injection book, laboratory book, CSSD book, medicine/antibiotic stock register, indent book, laundry book, doctor's round book and case-sheets etc. Out of all the records studied, it was observed that most of the records were maintained by the nurses except for certain records like case-sheets and records of surgeries, which were maintained by doctors.

The records in the wards were mainly utilized by the operational level managers for preparing various reports and for calculating the requirement of medicines, i/v fluids, stationery and linen etc. Although records' utilization was more in 'Medical Record Department' for preparing Monthly/Quarterly/Annual Hospital Statistical Bulletin, or for compiling and sending vital statistics (Birth and Death) report to local corporation. The bulletin bears the information of total IPD/OPD patients' attendance, total discharges/deaths, abscond, LAMA and patients with particular diseases in a given time period. These records were utilized for calculating various indicators like bed occupancy rate, bed turnover rate, average length of stay etc. The reports thus prepared were sent to hospital administrators and few to outside agencies like Municipal Corporation of Delhi, Parliament, and Directorate of Health Services, WHO or Media.

Considering the various attributes of information, their importance at each level has been estimated through taking arithmetic mean for each group so as to make it uniform and comparable.

Table 1 depicts that all the level of managers had given more or less emphasis on all the attributes of information mentioned. Among the operational

level managers, doctors seemed to be willing to get the information which was accurate (2.25), no overloading (2.5) and explicit in nature (2.25). But the Nurses laid emphasis on timeliness (2.25), self-explanatory (2.0) information along with the decrease in the paper work (2.5).

TABLE 1
ASSESSMENT OF EFFECTIVENESS OF HMIS AT VARIOUS LEVELS OF MANAGERS BASED UP-ON MEAN SCORES

S.No	Attributes	Op. Level Managers*		Middle Level Managers		Top Level Managers	
		Doctors	Nurses	HOD/HOU	Sister I/c	Dr.Admin.	Nurs.Ad min.
1.	Timeliness	1.5	2.25	1.375	2.0	1.25	2.5
2.	Relevance	1.375	1.125	0.875	1.5	1.25	3
3.	Accuracy	2.25	1.75	1.25	2.25	1.25	2.5
4.	Up-to datedness	1.625	1.5	0.875	2.5	0.75	1.75
5.	Adequacy	1.875	1.875	0.5	1.25	0.75	2.25
6.	No overloading	2.5	2.5	1.25	2.75	1	1
7.	Format clarity	1.25	1.25	1.0	2.75	1.5	1.5
8.	No duplication	1.75	1.625	2.0	1.0	2.25	1.5
9.	Explicitness	2.25	2.0	1.0	1.75	1.25	0.75
10.	Exception-based reporting	0.75	0.25	2.75	1.0	2.5	0.75
	Total	16.5	16.125	13.125	18.5	12.75	17
	Mean of Score	1.65	1.6125	1.3125	1.85	1.275	1.7

*Op.- Operational Level Managers, HOD/HOU- Head of Department/ Head of Unit, Sister I/c- Sister Incharge, Dr Admin.- Doctor Administrator and Nurs. Admin.- Nursing Administrator.

Among the middle level managers, HOU/HOD had shown concern for exception based reporting (2.75), without any duplication (2.0) which is concise, clear and timely. But, sister in-charge of the wards seemed to be more concerned for decreasing the workload (2.75) and format clarity (2.75) for the various reports and records. They also laid emphasis on the accuracy (2.25) as well as up-to-datedness (2.5) along with the timeliness (2.0) of the information.

Among the top-level managers, doctor administrators (Medical Superintendent, Addl. MS etc) showed more concern for the exception-based reporting (2.5) on clear format and without duplication (2.25). On the other hand, nursing administrators seemed to be more concerned for the relevant (3.0), accurate (2.5), adequate (2.25) and timely (2.5) information.

Although a lot of information was generated as well as utilized at various levels but this was not sufficient for effective delivery of patient care. For managing huge data as well as patients in OPD and wards daily, coordination and comprehensive approach from all the departments of clinical and support units of the hospital is needed. Hence, the information needs of the support unit staff was also assessed through taking mean score on the predefined scores. The mean scores of clinical specialties and support units under study were then compared to understand the quality of information they were getting and their requirement for daily management of their respective departments.

TABLE 2
MEAN OPINION OF MANAGERS OF SELECTED SPECIALTIES AND OF
SUPPORT SERVICE UNITS OF THE HOSPITAL WITH REGARD TO THE QUALITY
OF REPORTS

S. No.	Attributes	Middle and Operational Level Managers				Top Admn.	Mean of Supportive Services				
		Med	Surg	OB&G	Paed		MRD	Lab	BB	Phr	St & S
1.	Timeliness	1.25	1.75	2.0	2.5	1.875	0.6	2.5	2.5	1.5	1.5
2.	Relevance	1.25	1.25	1.0	1.5	2.125	1.6	2.0	2.0	2.0	2.0
3.	Accuracy	1.5	1.5	1.75	2.0	1.875	0.6	1.5	2.0	1.0	2.5
4.	Up to datedness	1.75	1.5	1.25	1.75	1.25	0.3	2.0	2.5	1.5	1.5
5.	Adequacy	1.75	2.0	2.0	1.75	1.25	0.6	1.5	1.5	1.5	2.5
6.	No overload	2.5	2.25	2.75	2.5	1.0	2.0	2.5	1.5	2.0	2.5
7.	Format clarity	1.5	1.0	1.0	1.5	1.5	1.3	2.0	1.5	2.0	2.0
8.	No duplication	1.25	1.0	2.0	2.5	1.625	1.3	1.5	1.0	1.0	1.5
9.	Explicitness	2.0	2.5	2.25	1.75	1.5	1.0	1.0	1.0	1.5	2.0
10.	Exception based report	0.5	0.25	0.5	0.75	2.25	1.3	2.0	2.5	2.0	2.0
	Total	15.25	15	16.5	18.5	15.87	11.3	18.5	18	16	20
	Mean of scores	1.525	1.5	1.62	1.85	1.587	1.13	1.85	1.8	1.6	2.0

*Med- Medicine, Surg- Surgery, OB&G- Obstetrics & Gynecology, Paed- Paediatrics, Top Admn.- Top Administrators, MRD- Medical Record Department, Lab- Laboratory, BB- Blood Bank, Phr- Pharmacy, St&S- Stores and Supplies.

Table 2 depicts the specialty-wise mean scores of middle, operational and top-level managers and the mean of support service units under study. The comparison was done to assess the priority for type of information they needed for effective running of their departments in the hospital.

As clear from Table 2 that all the hospital personnel wanted to reduce the extra workload, which was mainly related to the paper work. The operational as well as middle level managers in all the departments studied, had stressed to get explicit, adequate, accurate and up-to-date information, besides reducing the paper workload.

Supportive services personnel laid emphasis on attributes like timeliness, clear format, relevant, up-to-date and exception-based reporting along with the special emphasis on to decrease the paper workload through some easily operatable measures.

The top-level administrators of the hospital opines for the relevant information, which is timely, accurate, and without duplication. They stressed mainly on those reports which were exception to the general reports so as to save their precious time for administrative work.

DISCUSSION

Hospitals generate enormous data at each level but hardly utilized for analysis at operational or middle-level managers. The reason for underutilization may lie with the excessive workload of the patients and the baseline recording of data. Another reason may be lack of training for understanding its importance and effective utilization. Data were mainly utilized for making reports which were sent to the Managing Research Data.

The operational-level managers were collecting and recording the patients' related data as a routine work for smoothly carrying out their daily activities and for the sake of reporting to their seniors. Most of the operational-level managers were apparently not aware of the potential use of these records, reports or various statistical indicators. Although the requisite information was easily available and accessible through the patients' record file but study revealed that most of their needs were being fulfilled through direct interaction among them. The operational level managers were more inclined for patient care rather than maintaining the adequate and timely records. The operational-level managers were supervised for

patient care and report preparation but routine record maintenance was most of the time unsupervised. The results are comparable to a South Africa study by Pillay R, in regard to managers at various levels of hospital showing patient care as utmost priority but inexperience in handling data as management tool¹⁰

The middle-level managers believed in the management-based on their past experience and daily feedback from their subordinates. The interpretation of data was found to be minimal even at the level of middle-managers. The patients' related data were stored in the primary form i.e. registers and case sheets, even the 'copy of the report sent' was not always maintained. In case of loss of any report or instructed modification requires reworking from the register. The middle-level managers were sending their relevant reports to MRD and only few reports as asked by the top managers, were submitted with them. The study by Guerro RM et al indicates the build-up of skill gap to improve the efficacy and efficiency of management development programmes¹¹

The record maintenance by the managers at the OPD was minimal and comprised mainly the number of patients' attendance in the various departments, number of minor surgical procedures done in a department in a day, number and type of vaccinations done (routine immunization in children, pregnant females and special immunization like rabies etc), OPD instruments (BP apparatus, weighing machines, instruments etc.). Garbage, linen and other consumables. These records were mainly utilized for estimating the demand/needs of manpower and material supplies in the OPD.

The support service units studied were laboratory, blood bank, pharmacy and CSSD, maintaining the records of daily patients' attendance, tests performed, logistic and supply related activities. These records were mainly utilized for making monthly report for sending to the MRD and for requesting various indents/demands for the functioning of their departments.

On the other hand MRD utilized the reports obtained from the various departments for making the monthly/ quarterly/annual statistical bulletin for calculating various indicators and for sending reports to the outside agencies.

The managers at different levels had prioritized their information need with emphasis on timeliness. Doctors among operational and middle-level managers were willing to get the accurate, up-to-date and explicit information. Nurses among operational and middle-level managers stressed on the reduction of paperwork

and timely information. They also emphasized the need of clear format for better understanding and working, for data generation, compilation and utilization. The results are similar to a Zanzibar study by Igira FT et al. where the need was emphasized for standard clear format, customizing the analysis' tools and reports. Another emphasis was on self-explanatory information at all the levels among the nursing personnel. As the level of management goes high the demand for explicit and exception-based reporting on the clear format got increased. They emphasized the need of relevant information so as to take appropriate and timely action for smooth functioning in the hospital¹². This finding was true even at the support service units of the hospital.

CONCLUSION AND RECOMMENDATION

The government hospital under study was found to be over-burdened with the huge patients' load and related records on the daily basis in the conventional way. This had resulted in inadequate and delayed information. Also there was deficiency in the information supplied in terms of its sufficiency, quality, clarity and explicitness. The managers had lot of information which actually needs processing so as to make it presentable to those who required them. The data were primarily used for report (monthly) preparation and for requesting indents and demand of certain equipments for their department. Hospital under study requires proper policy/guidelines or SOPs (standard operating procedure) for role clarity, appropriate format, trained personnel for record keeping and its utilization both for in-patients as well as for out-patients departments to ensure optimal and adequate utilization of the big quantum of patient's related information which actually may be of great use for hospital as well as for outside agencies. Hence, information system of the hospital should be reviewed and improvements should be initiated within permissible limits of the hospital including certain degree of automation if possible.

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ACUTE ACCIDENTAL POISONING DURING CHILDHOOD- STUDY TO UNDERSTAND THE CHARACTERISTICS OF CHILDHOOD POISONING

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ABSTRACT

Accidental poisoning during childhood is a world-wide problem and it still continues to be a major cause of morbidity and mortality amongst the children. The objective of the present study was to evaluate the frequency, etiology, clinical characteristics and outcome of accidental poisoning amongst the children. A retrospective study of childhood poisoning was conducted at Regional Institute of Medical Sciences Hospital (RIMS), Imphal, by reviewing the data of 192 children admitted with accidental poisoning over a period of ten years from June 1999 to May 2008. The total incidence of accidental childhood poisoning was 0.67 per cent, the male to female ratio being 2:1 with no significant differences between urban and rural populace. Of these, maximum (76.5%) belonged to 0-4 years age group. Incidence of kerosene poisoning topped the list (53.1%), followed by pesticides and chemicals (16.6%), food poisoning (12.5%), pharmaceutical agents (10.4%) and miscellaneous household chemicals including plant poisons 6.8 per cent. The overall mortality rate was 4.6 per cent, with organophosphorus compounds accounting for 88 per cent of the fatalities. Accidental childhood poisoning still continues to be a major prevailing problem, which requires a mass public awareness campaign and emphasis on the use of more child proof containers and packs for storage of common household chemicals and medications.

Keywords: Accidental poisoning, Kerosene, Fermented soyabean, Organophosphorus compound.

Accidental poisoning is a world-wide problem representing a significant cause of childhood morbidity and mortality, and has been a subject of many studies in India and other countries. While a large number of childhood poisonings may have gone unnoticed and early observations in various studies from different parts of India have accounted for 0.33 per cent to 7.6 per cent of the total hospital admissions, later reports have shown an increased trend. The objective of this 10-

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year retrospective study was to define the characteristics of acute childhood poisoning cases, reported in the Department of Pediatrics, Regional Institute of Medical Sciences Hospital, Imphal, an apex referral centre in Manipur.

MATERIALS AND METHOD

A retrospective data of all the children admitted to the Pediatric Department of Regional Institute of Medical Sciences (RIMS), Imphal, from June 1999 to May 2008, were collected and those cases which were diagnosed and treated on the lines of acute poisoning were considered for the study. Data collected included age, gender, preliminary diagnosis, type and source of poison, clinical symptoms and signs, duration of hospital stay and outcome.

RESULTS AND OBSERVATIONS

Out of the total 28,483 children admitted to the Pediatric department during the study period, 192 (0.67%) cases were admitted with acute poison ingestion with or without signs of intoxication. The highest incidence (76.4%) of poisoning cases was observed in the age group of 0-4 years (Table 1).

TABLE 1
AGE-WISE DISTRIBUTION OF POISONING CASES

Age Group (yrs)	No. of Cases	Percentage
0-1	32	16.6
1-4	115	59.8
4-8	25	13.0
9-12	20	10.4

The male to female ratio was found to be 2:1, which remained constant at that figure but increased sharply to 5:1 in the older age group of 8-12 years. The incidence was slightly more among children of urban population as compared to that of rural areas with an urban to rural ratio of 1.3:1. Most of the children (47.6%) were brought within half an hour of recognition of the event by parents, neighbours and directly from home to the hospital. The source of the poison was open containers in 52.3 per cent of the cases. The incidence of the number of poisoning cases showed a downward trend during the latter part of the 10-year study period-the cases reported which averaged 30 from 1999 to 2003 had declined to a mean average of 9 from 2004 onwards (Table 2).

Petroleum products particularly, kerosene, accounted for the highest number of cases (102/192; 53.1%), followed by food poisoning (24/192; 12.5%)

(Table 3). Out of the 102 children poisoned with kerosene, 95 children were brought to the emergency department with alleged ingestion without any symptoms. Later on 34 (33.3%) children developed signs of pneumonitis with respiratory distress and accompanying radiological changes; 11 of these children went on to have lung consolidation with hospital stay of more than a week. The rest 68 (66.6%) had only mild symptoms of vomiting, abdominal pain and required an overnight hospital stay for observation.

TABLE 2
YEAR-WISE POISONING CASES REPORTED

Year	No. of Cases	Percentage	Mortality
1999	23	11.9	1
2000	22	11.4	0
2001	35	18.2	2
2002	30	15.6	1
2003	36	18.7	2
2004	9	4.6	0
2005	7	3.6	0
2006	11	5.7	1
2007	11	5.7	1
2008	6	3.1	1
Total	192	0.4	9 (4.6%)

Fermented soyabean seeds comprised the majority i.e. 50 per cent of the total food intoxication cases. These children presented with multiple episodes of vomiting, diarrhoea and encephalopathy, resolved on its own with conservative treatment. The rest of the food intoxication was due to ingestion of curd (16.7%), mushroom (12.5%) and unidentified eggs (bird eggs); most of them had gastrointestinal upset in the form of abdominal pain and vomiting. An interesting case was ingestion of roasted grasshopper by a family of five who also had GIT features.

Organophosphorus compounds like pesticides, rat poisons constituted the third major group of poisons (11.9%). Of the 23 cases with organophosphorus ingestion, 8 expired secondary to CNS complications within 24 hours of hospitalization. Twelve children had mild cholinergic signs and symptoms like gastrointestinal upset, salivation, diarrhoea and miosis. The remaining two children had only alleged history of ingestion and were asymptomatic at admission. The nature of the poison could not be ascertained in one case who had presented with seizures and upper gastrointestinal bleed, but was managed conservatively and eventually recovered fully.

Medicinal drug ingestion was observed in 20 cases (10.4%). Only two cases developed complications - one due to nimesulide (300mg) induced acute renal failure and second, due to isoniazid induced hepato-toxicity.

TABLE 3
DATA OF THE 192 CASES OF POISONING: ETIOLOGY, AGE DISTRIBUTION AND MORTALITY

Sl. No	Type of Poison	No. of Cases	Percentage	Age Group				Mortality
				0-1	1-4	4-8	8-12	
1.	Petroleum Products							
	Kerosene	102	53.1	18	73	8	3	
	Diesel	1	0.1	1	-	-	-	
2.	Food Poisoning							
	Soyabean	24	12.5					
	Curd	12		-	2	4	6	
	Mushroom	4		1	2	-	1	
	Roasted Grasshopper	3		-	1	1	1	
3.	Organophosphorous Compounds	23	11.9	3	16	4	-	8
4.	Medicinal drugs	20	10.4					
	Nimesulide	3		1	2	-	-	
	Lorazepam	2		-	2	-	-	
	Carbamazepine	2		-	2	-	-	
	Cyproheptadine	2		1	1	-	-	
	Dapsone	2		-	1	1	-	
	Phenobarbitone	2		1	1	-	-	
	Paracetamol	1		1	1	-	-	
	Trihexiphenyldyl	1		-	-	-	1	
	Phenargan	1		1	-	-	-	
	Digoxin	1		1	-	-	-	
	Isoniazid	1		-	1	-	-	
	Phenothiazine	1		1	-	-	-	
	Iron	1		-	1	-	-	
5.	Hydrocarbon	5	2.6	-	1	3	1	
6.	Corrosives	4	2.1	1	3	-	-	
7.	Miscellaneous	13	6.8					
	Phenyl	2		-	2	-	-	1
	Castor Seeds	2		-	-	1	1	
	Dhatura	2		-	-	-	2	
	Dettol	1		-	1	-	-	
	Surf	1		-	1	-	-	
	Cannabis	1		-	-	1	-	
	Plant Seeds	1		-	1	-	-	
	Mosquito Repellant	1		1	-	-	-	
	Agricultural Ripening Agent	1		-	1	-	-	
	Unknown	1		-	-	1	-	

There were two cases of dapsone - induced methemoglobinemia, which was managed conservatively. Other drugs that lead to ingestion included; lorazepam (2), carbamazepine (2), cyproheptadine (2), phenobarbitone (2), trihexyphenidyl (1), phenothiazine (1) and phenergan (1). The affected children presented with drowsiness and required overnight hospital observation. There was one case each of alleged excessive paracetamol, digoxin elixir and iron ingestion, all of them requiring only observation. Paint thinner ingestion was reported in five cases (2.6%) and corrosive agents in four cases (2.1%) - three having drunk H₂SO₄ and one having eaten alum, a caustic alkali, none of them succumbing to it. Two kids developed ulcerations of the oral cavity, mild nausea and vomiting. Another two (one with acid, one with alum) developed severe abdominal pain and upper gastrointestinal bleed. On follow up, they had developed dysphagia due to esophageal stricture and had been referred for consultations with a cardiothoracic surgeon.

Among the miscellaneous household agents, acute phenyl ingestion was reported in two children with one child succumbing to it. Intake of dettol, washing powder (surf), mosquito repellent and agricultural ripening agents were reported in one child each. Castor and *dhatūra* seeds were ingested by two kids each and cannabis leaves by one child. Majority of them presented only with minor symptoms and signs and required only 2-3 days of hospitalization.

DISCUSSION

Poisoning in children can range from accidental ingestion in toddlers and preschool children resulting from their own curiosity, to intentional overdoses in adolescents. The present study encompasses those admitted with accidental poisoning as no suicidal. Homicidal poisoning cases were encountered during the study period.

In the present study, the overall incidence of acute accidental childhood poisoning was 0.67 per cent. The lower incidence of our study may be explained partly on the basis of improved and readily accessible first aid care being provided at peripheral remote centers, i.e. community and primary health centers, especially after the advent of National Rural Health Mission (NRHM). In the age distribution, the maximum cases belonged to 1-4 years age group, accounting for 59.8 per cent of the poisoning cases, which is consistent with other quoted figures.^{2,6-8} This particular age group is more susceptible because of the tendency for oral exploration of all things and their inherent propensity for independent mobility and

inquisitiveness. The increased male to female ratio (2:1) may partially be attributable to greater degree of activity among male children.^{4,6,7}

Kerosene poisoning was found to be the most common cause comprising 53.1 per cent of the total poisoning cases, while other studies reported incidences varying from 33.7 per cent to 55 per cent.^{1-5,9-11} In developing countries, including India, where there is lack of adequate energy resources – cooking as well as lighting, kerosene is still used as a conventional source of energy in most of the homes especially in the rural areas.^{9,12} Being stored in bottles and usually kept on the floors within ready reach of young children, kerosene continues to be a frequent cause of accidental paediatric poisoning.¹³ Kerosene poisoning can have mild to serious gastrointestinal, respiratory and central nervous system manifestations, but the overall prognosis in our study was good.

Food poisoning was seen in 12.5 per cent of our study, while other studies have shown an incidence ranging from 6.6 per cent to 48.8 per cent^{3,5,6} Fermented soyabean seeds were found to be most commonly implicated food intoxicant. It is a common staple food supplement of the people of the Northeastern part of India. Most of them are easily prepared at home; but if not hygienically prepared, it can be a cause of wide gastrointestinal manifestations. The exact chemicals responsible for the toxic effects are not yet known. Due to inadequate facilities, bacteriological and toxicological investigations could not be done in the affected children. An unusual case was, a family of five members (including two adults), brought after ingestion of roasted grasshoppers, with vomiting and encephalopathy. While the father succumbed to it, the mother and the kids received supportive management and subsequently recovered completely.

Organophosphorus poisoning has shown a significant incidence of 11.9 per cent against other reported figures of 4.9 to 9.2 per cent^{2,5,7,14} This higher range may be ascribed to easy accessibility of organophosphorus compounds like mosquito repellants, insect and rat killers at home. Around 88 per cent of the total observed mortality in our study was because of organophosphorus intoxication, primarily due to muscarinic CNS toxicity.

The incidence of pharmaceutical drug ingestion was observed to be 10.4 per cent in the present series. This figure is much higher in the West and other developed countries, where it still accounts for a major share of acute childhood intoxication. In the Indian scenario, our incidence has not shown any major increase as compared to other studies. This may be attributed to better parental

awareness and safe keeping of medications. Most of the drugs were prescription drugs for the family elders, ingested accidentally. An interesting case was two cases of acute dapsone intoxication presenting with methemoglobinemia, which was managed successfully with ascorbic acid.

Corrosive accidental poisoning accounted for the least number of intoxication (2.1%), - three having ingested acid and one with alum, all occurring in children under the age group of 5 years. Buch et al have reported a similar figure of 2.7 per cent incidence of corrosive caustic soda ingestion. All the subjects in our study recovered, had prolonged hospital stay of more than ten days; one developed esophageal stricture requiring further surgical follow-up.

The overall mortality rate in the study was 4.6 per cent, organophosphorus compounds accounting for 88 per cent of the cases. Mortality rates, reported from various studies in the past two to three decades have varied from 0.8 per cent to 12.5 per cent^{3,5-7,9,11}. The figure in the present study in comparison to the previous rates fall in the intermediate range, predominantly because of the rise in organophosphorus intoxication. Even though the morbidity and mortality have declined significantly in the past two to three decades, accidental childhood poisoning remains an important public health problem resulting in considerable mental trauma and anxiety for the children and their parents. This can be prevented by mass education on judicious and safe practices of storing medications and household chemicals. Lastly, the strict regulation of secure packaging and prescribing of all medications in childproof small containers will go a long way in preventing and eliminating the incidence of accidental childhood poisoning.

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ANTE-NATAL CARE AND DELIVERY PRACTICES AMONG FEMALES IN RURAL BLOCK OF DISTRICT ROHTAK, HARYANA

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ABSTRACT

In India, both infant mortality and maternal mortality are high. Both of these mortalities can be addressed by providing good quality of ante-natal care (ANC) and promoting institutional delivery. There is considerable variation in the availability and quality of these services and regional diversity in the cultural beliefs, which affect the utilization of these services. The study was conducted in block-Lakhanmajra; the rural field practice area attached to the department of Community Medicine PGIMS, Rohtak, and found that only 72 per cent of females received ante-natal care. Tetanus Toxoid (TT) coverage was 91.9 per cent and 5.3 per cent females did not receive even a single dose of TT. More than half of the subjects (55%) were not consuming adequate number of Iron Folic Acid tablets. Half of the deliveries were conducted at home and nearly 7 per cent of deliveries were still attended by untrained persons. Utilization of ANC services and promotion of institutional deliveries should be promoted by enhancing awareness among females, improving quality of services in government setups and by ensuring availability of health staff coupled with the training of all the untrained Traditional Birth Attendants.

Keywords: Ante-natal care, Rural area, Delivery practices.

In India, both child mortality (especially neo-natal mortality) and maternal mortality are high. Six out of every 100 children born in India die before reaching the age of one, and approximately three out of every 1,000 mothers who become pregnant die of causes related to pregnancy and childbirth.¹

Pregnancy and childbirth are special events in women's lives. This can be a time of great hope and joyful anticipation.² Pregnancy requires specialized care and it is generally agreed to be a preventive activity. The primary aim of ante-natal care is to achieve, at the end of pregnancy, a healthy mother and a healthy baby.³

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Traditionally, in rural India, pregnancy is considered a natural state for a woman rather than a condition requiring medical attention and one which affects woman's health-seeking behaviour, especially, as related to pregnancy and childbirth. Poor utilization of services is also related to cultural and socio-economic constraints as well as perceptions regarding accessibility of facilities and quality of care. Lack of finances, transportation problems, unwilling husbands and family members whose permission is often required to go to a health centre, are some of the major social barriers for accessing ANC care.⁴ If at all ante-natal visits are there, they are either less frequently, or too late in the pregnancy hence their content is unclear. Moreover, it appears that ante-natal services are likely to be sought only by those women who experience difficulty or signals of a complicated delivery.⁵

Effective ante-natal care (ANC) can improve the health of the mother and give her a chance to deliver a healthy baby. Regular monitoring during pregnancy can help in detecting complications at an early stage before they become life-threatening emergencies.⁴

India accounts for more than one-fifth of all maternal deaths world-wide. Despite many benefits associated with ante-natal care and institutional delivery, India's maternal and child health programmes have not aggressively promoted these, except in high-risk cases.⁶ Though there is uniformity in programme design throughout the country, yet there is a considerable regional diversity in the cultural beliefs, availability and quality of health services, thus affecting utilization of these services.

MATERIALS AND METHOD

The study was conducted in block Lakhanmajra, the rural field practice area attached to the department of Community Medicine, PGIMS, Rohtak. The block has 24 villages with the total population of 1,03,548 as on 31 March 2009. It was a cross-sectional type of epidemiological study conducted in October 2009. The 30 cluster sampling technique was used for the study. At least seven females were selected from each of the selected clusters making a total sample size of 210. Females having a child aged less than one year were included in the study. If there were two eligible subjects in any household, both the subjects were enrolled in the study. It was an interview based study. A pre-designed, pre-tested, semi-structured schedule was used for the study to find out ante-natal care received and delivery practices adopted. Ante-natal care was defined as - when the female

had received ≥ 100 tablets of Iron Folic Acid (IFA), taken two doses or booster of TT vaccination and had undergone at least three ante-natal visits at any health institution. Analysis was done using percentage and proportion.

RESULTS

The findings of the study reveal that only 72 per cent of females received ante-natal (i.e. 151 out of 210), which is less than National Family Health Survey-3, Haryana (87%). Subjects who received ante-natal care from government health facility were less than one-fifth (19%; Table 1). Most of the females were utilizing government set-up for getting TT and IFA but for ante-natal advice more than two-third of the females were visiting private institutions (Table 2). More than half of the subjects (55%) were not consuming adequate number of IFA tablets (Table 4).

TABLE 1
TYPE OF RECORDS AVAILABLE WITH STUDY SUBJECTS (N=210)

Type of Records	Number	Percentage
ANC card*	40	19
Other records†	123	58.5
No records	47	22.5

*Cards issued by government health facility i.e. sub-centre, PHC, CHC etc.

†Cards issued by private practitioners or private health institutions.

TT coverage was better among the subjects as nearly 90 per cent of the subjects had received two doses of TT vaccine and all those who were eligible for booster dose also got it (Table 3). In this study, approximately half of the deliveries were conducted at home (Table 5) and nearly 7 per cent deliveries were still attended by untrained persons (Table 6).

TABLE 2
SOURCE OF UTILIZATION OF ANTE-NATAL CARE SERVICES (N=210)

Services	Source			No service
	Sub-centre	Hospital	Private	
TT	177	17	5	11
	84.2%	8%	2.3%	5.2%
Iron Folic Acid tablets(IFA)	114	27	10	59
	54%	12.8%	4.7%	28%

TABLE 3
COVERAGE OF TT (N=210)

TT	Number	Percentage
TT ₁	199	94.7%
TT ₂ /B	193	91.90%

TABLE 4
CONSUMPTION PATTERN OF IRON FOLIC ACID (IFA) TABLETS (N=151)

Consumption of Iron Folic Acid Tablets	Number	Percentage
<100 Tablets	83	55%
≥100 Tablets	68	45%

TABLE 5
PLACE OF DELIVERIES (N=210)

	Place of Deliveries		
	Home	Govt. Health Facilities	Private Sector
Number	103	77	30
Percentages	49.04%	36.66%	14.28%

TABLE 6
PERSONNEL ATTENDING DELIVERIES (N=210)

	Deliveries attended by			
	Untrained Persons	Trained TBA	Govt. Health Staff	Others*
Number	15	88	77	30
Percentages	7.1%	41.9%	36.7%	14.3%

DISCUSSION

Ante-natal care allows the management of pregnancy, detection and treatment of complications, thus promotes good health. What women think of pregnancy and how they perceive the risks during pregnancy are some important determinants of seeking ante-natal care. Women in our settings generally do not perceive childbearing as a problematic issue. This negatively affects the utilization of maternal health services.

In this study, only 72 per cent of women had received ante-natal care services. In a study conducted in urban slum of Delhi, only 67.1 per cent of pregnant women were registered for ante-natal care.⁷

TT coverage was better among study subjects as it was 91.9 per cent although 5.3 per cent of females did not receive even a single dose of TT. While in a study conducted in 90 districts of various states of India, 77.9 per cent of pregnant women had received TT2/booster and 13.6 per cent had not taken even a single dose of TT. It was also observed that 59.68 per cent of pregnant women consumed IFA tablets and among them only 70.27 per cent took them regularly.⁸ In this study more than half of the subjects (55%) were not consuming adequate number of IFA tablets.

It was encouraging to see that pregnant women are aware of inj. TT and IFA supplementation and mainly availed of these services from government health functionaries. Similar findings have been reported by other researchers.⁹

It was found that less than one-fifth (19%) of the subjects received ante-natal care from government health facility. Metgud et. al revealed that in rural Belgaum 48.39 per cent of pregnant women went to private hospitals for ante-natal care, 17.74 per cent to district hospital, 16.13 per cent to sub-centre and only 9.68 per cent women went to Primary Health Centre for ante-natal care.¹¹ Singh et al revealed that in rural area of Bathinda district of Punjab, 30.8 per cent of pregnant women went to Government Hospital/Primary Health Centre, 47.2 per cent to private hospitals, 12.0 per cent to sub-centre for getting ante-natal care and 10 per cent of them did not receive antenatal care at all.¹²

CONCLUSION

Ante-natal care plays a critical role in preparing a woman and her family for childbirth by establishing confidence between the woman and her health care provider¹³. Further, ante-natal visits may raise awareness about the need for care during delivery¹⁴ besides giving women and their families a familiarity with health facilities that enable them to seek help more efficiently during a crisis.¹⁵ However, uptake of these services is far from universal even in settings where they are widely available. Utilization of ANC services and promotion of institutional deliveries should be enhanced by increasing awareness among females, improving quality of services in government setups and by ensuring the availability of health staff and training of all the untrained TBAs.

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