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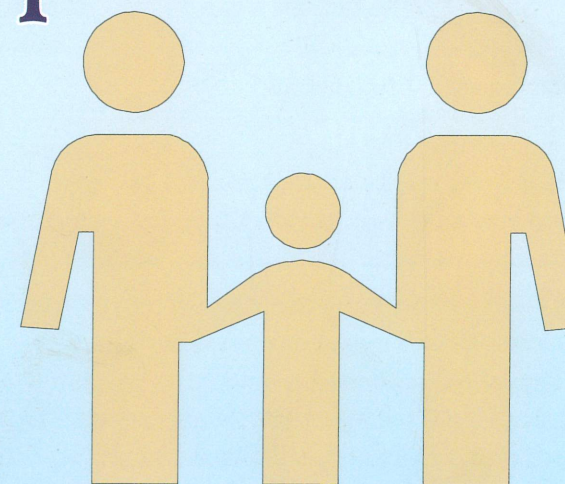
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Book Entry

2. PRAKASH C.M. (1977): A Guide to Communication System in Hospital; New Delhi, Wiley publications, p.38.

Chapter of a Book

3. DANDEKAR R. & MINSAS P. (1973): Control of Cross-infection in Hospitals; in: Kuppuswamy m. (ed.), Hospital Management in India, Bombay, Somaiya Publication, P.100

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KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) STUDY OF CONTRACEPTIVE USE AMONG THE RURAL WOMEN OF AMRITSAR DISTRICT OF PUNJAB

Rajesh Garg*, S. S. Deepti**, Tejbir Singh*** and A. S. Padda#

ABSTRACT

The aim of this study was to find out the knowledge and use of contraceptives among women in rural Amritsar along with the role of Multi Purpose health worker in promotion of contraceptive use. The study was carried out in Verka block, Amritsar. Twenty villages were selected and a total of 1000 females were interviewed. Only 1.7 per cent respondents stated that they were not aware of any contraceptive method. Knowledge regarding various contraceptive was 746 (74.6 %), 570 (57.0 %), 547 (54.7 %) and 143 (14.3 %) for permanent methods, oral pills, condoms and Copper-T respectively. 547 (54.7 %) respondents were using one or the other method of contraception. This shows a gap in the knowledge and practices of contraceptive use. Only 230 (23 %) respondents were motivated by the health workers to use contraceptives. Proactive role from the part of health workers and ASHA is the need of the hour along with ensuring the full time availability of contraceptives at the government health centres.

Keywords: Contraceptive, Knowledge, Source of Contraceptive, Family Planning, Health Worker.

Family planning is not a new concept in India. In ancient India, people preferred large families due to certain social and religious obligations as well as due to the high infant and child mortality rates prevailing at that time. However, even the ancient religious leaders advised small families. The Rig-Veda says, "A man with many children succumbs to miseries" which is probably the oldest statement suggesting against a large family.¹

The Family Planning programme in India, launched in 1952, has evolved through a number of stages and has changed its direction, emphasis and

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strategies.² The 1990s particularly witnessed dramatic changes in the family welfare policy and programme. With the 72nd and 73rd Constitutional amendments and the passing of the Panchayati Raj and Nagar Palika Acts in 1992, the family planning programme was legally brought into the domain of Panchayati Raj institutions. In 1996, the target-oriented approach was replaced by the target-free approach, where health workers' case-load would be determined by needs identified at the community level rather than set at the central or state level. The Reproductive and Child Health programme espouses the principles of client satisfaction and high quality in delivering comprehensive and integrated health services.³

Over the decades, there has been a considerable expansion and strengthening of the health care infrastructure, and family welfare services are now an integral part of services provided by primary, secondary and tertiary care institutions across the country. Currently, approximately 1.37 lakh sub-centres (1/4579 population) and 22975 primary health centres (1/27,364 population) in the rural areas, and 871 health posts and 1083 family welfare centres in urban areas provide family planning services at the grassroots level. Access to contraceptive methods has increased significantly and only negligible minorities of women perceive availability, accessibility or cost as major impediments to using contraception. Yet, in practice, access to and availability of services are significant issues of concern.³

Unmet need for family planning is higher in rural areas than in urban areas. It also varies by women's education (within the range of 14-17 %). Inter-state variations are wide as it ranges from 7 per cent in Punjab to 25 per cent in Uttar Pradesh. It is about 16-18 per cent in Rajasthan, Madhya Pradesh and Orissa.² Over the past few decades, there has been a substantial increase in the use of contraceptives in India. According to NFHS-III, The contraceptive prevalence rate for currently married women in India is 56 per cent, up from 48 per cent in NFHS-II. Despite impressive gains, several issues continue to hinder progress. The National Population Policy (2000) affirms the Government's commitment to address the unmet demands of contraceptives by making safe, effective contraceptives accessible to people.⁴ Still then, significant proportion of pregnancies continue to be unplanned; contraceptive needs of millions of couples remain unmet. As quality improves and more methods become available, more couples can use contraceptives. For each additional method that is widely available in a country, contraceptive prevalence increases by average 3.3 per cent points.⁴

MATERIALS AND METHOD

Study Area

Amritsar is one of the 20 districts of Punjab having a population of 21,52,182.⁵ The study was carried out in Verka block which is the rural practice area attached to the Department of Community Medicine, Government Medical College, Amritsar, during the period 2005-06. The Community Health Centre (CHC) Verka is situated seven km from the Amritsar city. In mid-2005, the population of the block Verka was 2,19,555 and had 3 primary health centres (PHC), 16 subsidiary health centres (SHC) and 7 sub-centres (S/c). There were a total of 94 villages in Verka block. The villages to be studied were selected by the standard cluster sampling technique.⁶ Twenty village clusters were to be selected for the study. In these 20 identified villages, there was a PHC in three villages, a SHC in six villages and a sub-centre in four villages. No government health centre was available in seven villages. A list of all the health personnel working in the selected villages was obtained. The date of visit was planned in consultation with the medical officer/multi purpose health worker - male/female (MPHW-M/F) of the area. Then on the pre-appointed date, the village was visited.

Study Population

A total of 1000 females were interviewed out of which 945 were married. Only the female in the house was interviewed because they frequently avail of the services for contraception for themselves and sometimes for their husband. The house in which a female was not available or the house was found closed/locked was not re-visited again and the next house was taken into consideration. A total of 50 houses were interviewed per village.

Methodology

In this cross-sectional study, the female in the house was informed about the purpose of the study. They were assured that confidentiality will be maintained and the information thus obtained will not be used for any other purpose except for the study. The importance of complete and correct information was explained to them and written consent was taken. The responses were recorded on a proforma evolved and pre-tested for the study. The design of the modified proforma was based on "Primary health care management advancement programme" (PHC-

MAP) modules by Aga Khan University.⁷ The questions were semi-open ended. The questions were asked in the local vernacular language. Ethical clearance for conducting the study was taken from the ethical committee of the institution i.e. Government Medical College, Amritsar.

Statistical Analysis

The information thus obtained was converted into computer based spreadsheets. Percentages, Correlation and Multiple regressions were applied wherever relevant.

Empirical Framework–The Model

The functional form of the model is:

$$Y \text{ [AFM]} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_p X_p + \epsilon \text{ or in vector notations } Y = XB + \epsilon$$

Where Y , X_1 , X_2 , X_3 X_p are the vector of the observation on the response and predictor variables, B is the vector of the parameters, I is the vector whose element are unity and X is the matrix[I , X_1 , X_2 , X_3 ,..... X_p]. ϵ is the random errors which may occur due to random fluctuation of the response. The parameter α , β_1 , β_2 ,..... β_p can be estimate by using the principle of least squares. The least square estimator of α and β_p are chosen to minimize the sum of squares of the residuals.

The vectors of the observation on the response and predictor variables used in the study and their classification used are given below;

Y =Response according to the family planning method they or spouse were using at the time of interview

Independent Variables:

X_1 = Age

1=	< 25 years (20.0 %)	2=	26 – 35 years (42.3 %)
3=	36 – 45 years (24.2 %)	4=	46 – 55 years (9.0 %)
5=	55 years and above (4.5 %)		

X₂ = Education status

- 1 = Illiterate(41.0%) 2 =Primary(22.3 %)
 3 =Middle(11.3%) 4 =10 + 2(23.0%)
 5 =Graduate and above (2.4%)

X₃= Respondent's occupation

- 1= House wife (91.3 %) 2= Services (Government / private(3.9 %)
 3=Labourer / Daily wagger/ Servant (3.4 %) 4= Shop keeper (1.4 %)

X₄ = Knowledge regarding various types of contraceptives (Multiple Answers)

- 1=Operation (Sterilization) (74.6%) 2=Pills (57.0%)
 3=Condom (54.7%) 4=Copper T(14.3%)
 5=Not responded (7.4%) 6=Don't Know (1.7%)

TABLE-A
SUMMARY OF REGRESSION ANALYSIS

Regression Statistics				
Multiple R	0.748501853			
R Square	0.560255024			
Adjusted R Square	-0.026071611			
Standard Error	128.5713809			
Observations	1000			
Analysis of variance				
	d.f.	S.S.	M.S.S	F-Ratio
Regression	4	63182.2	15795.55	316.9**
Error	995	49591.8	49.84	
Total	999	112774		

** Significant at 1%

TABLE-B
CORRELATION OF INDEPENDENT AND PREDICTOR VARIABLES

	Y
Y	1
X1	-0.45712*
X2	0.6959*
X3	-0.46317*
X4	0.9242**

*Significant at 5%,

**Significant at 1%

The concise outcome of multivariate regression model point out that all the independent variables included in the regression analysis could explain 56 per cent of the total variation. The value of R-square is 0.56; indicate that approximately 56 per cent of variations, in family planning methods used by respondents at the time of interview, were explained by the 4 explanatory variables. The value of F-ratio is significant at 1 per cent level of significance betray that the higher deliberate variation is considerably more than should be explained by chance (Table-A).

FINDINGS AND DISCUSSION

In the present study, out of 1000 respondents, most of the study respondents i.e. 423 (42.3 %) were in the age group of 26 – 35 years. 200 (20.0%) of the respondents were 18- 25 years of age, while 242 (24.2 %), 90 (9.0 %), 45 (4.5 %) were in the age group of 36 – 45 years, 46 – 55 years and 55 years and above respectively. Out of 1000 respondents, 590 (59.0 %) were literate. 223 (22.3 %), 113 (11.3 %), 230 (23.0 %) and 24 (2.4 %) of the respondents were educated up to primary, middle, senior secondary and graduates and above respectively while 410 (41.0 %) were illiterate. The literacy rate in Punjab, according to census 2001 is 69.95 per cent with Amritsar district having the corresponding figure of 67.85 per cent. The literacy rate in rural Amritsar is 60.65 per cent and according to gender, it is 67.83 per cent in males and 52.69 per cent in females.⁸

A large number (91.3%) of the respondents were house wives. Only 3.9 per cent of respondents were in service, 3.4 per cent working as a daily wage/ labourer or servant and 1.4 per cent of women had their own shops (General store etc.). According to NFHS- II, in Punjab, only 9 per cent of women do work other than their own housework.⁹

Out of 1000 respondents, when inquired about the knowledge regarding various contraceptive methods, sterilization was stated by the maximum number of respondents i.e. 746 (74.6 %). Oral pills, condoms and Copper-T were stated by 570 (57.0 %), 547 (54.7 %) and 143 (14.3 %) respectively (Table 1). In the present study, only 1.7 per cent of the respondents stated that they were not aware of any contraceptive method and 7.4 per cent refused to answer this question (Table 1). According to NFHS-III, in India, knowledge of contraception is nearly universal; 98 per cent of the currently married women know at least one family planning method. Women are most familiar with female sterilization (94 %), followed by the pill

(80%), male sterilization (79%) and the condom (74%)¹⁰. According to NFHS-III data, in Punjab, 98.9 per cent of the currently married women know at least one family planning method and are most familiar with female sterilization (96.3%), the pill (92%), the condom (89.7%), and the IUD (88.5%).¹¹ According to draft of National Strategy for Social Marketing 2001, awareness among women of reproductive age was 80 per cent for OCPs and 71 per cent for condoms.¹²

Thus the knowledge of at least one contraceptive is consistent with the national data. But the knowledge regarding various methods of contraception reported in the present study is less when compared to NFHS-III data. The reason for this is that in NFHS-III the respondents were told about the various methods and then asked whether they had knowledge regarding those contraceptive methods. But in the present study, this question was open ended and the respondents were not told about various methods. The responses were based on their own knowledge regarding family planning methods.

TABLE 1
DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR KNOWLEDGE
REGARDING VARIOUS TYPES OF CONTRACEPTIVES AVAILABLE FOR FAMILY
PLANNING (N=1000)

S.No.	Response	Number (percentage)
1	Operation (Sterilization)	746 (74.6%)
2	Oral Pills	570 (57.0%)
3	Condom	547 (54.7%)
4	Copper T	143 (14.3%)
5	Not responded	74 (7.4%)
6	Don't Know	17 (1.7%)

(Multiple Answers)

When inquired about the type of contraceptive they were using, out of 1000 respondents, 547 (54.7 %) respondents stated that they were using one or the other method of contraception. Tubectomy, condoms, pills, Cu- T and vasectomy were the methods used by 300 (30.0 %), 179 (17.9 %), 44 (4.4 %), 16 (1.6 %) and 8 (0.8 %) respectively (Table 2). 324 (32.4 %) of the respondents were not using any kind of contraceptive method and 74 (7.4 %) of the respondents did not answer the question. According to NFHS-III, the

contraceptive prevalence rate for currently married women in India is 56 per cent, up from 48 per cent in NFHS-2.¹⁰ According to NFHS -III, at the national level, in case of family planning (currently married women, age 15-49) methods adopted, any contraceptive method was used by 56.3 per cent, out of which female sterilization accounts for 37.3 per cent, male sterilization accounts for 1.0 per cent, IUD use accounts for 1.8 per cent, Oral Pills accounts for 3.1 per cent and Condom accounts for 5.3 per cent.¹³ According to NFHS-III Current contraceptive prevalence in Punjab was 63.3 per cent among currently married women using some method of contraception.¹⁴ Amongst the methods of contraception used in Punjab, female sterilisation (Tubectomy) was the most popular contraceptive method (Total- 30.8%, rural- 36.4%) followed by condoms (Total- 15.5%, rural- 11.7%), IUD (Total- 5.5%, rural- 6.4%) ,pills (Total- 2.9%, rural- 2.9%) and male sterilisation (vasectomy, Total- 1.2%, rural- 1.1%).¹⁴ According to Rapid household survey -II, phase -1 which covered 50 per cent of the country's districts during 2002-03, for Punjab, the CPR (contraceptive prevalence rate) for any method was 67.2 per cent.¹⁵ According to Registrar General of India, 1999, for Punjab, the CPR for any method was 66.0 per cent.¹⁶

Specific data on the use of male methods show that only a small minority of currently married couples were using such methods (condoms: 3% and vasectomy: 2%). Condom use was typically low in almost all the states, except Delhi and Punjab, where 18 per cent and 14 per cent respectively, of currently married couples were using condoms.³ The results of the current study also substantiate the above statement.

Nationally, as per NFHS-III, female sterilization accounts for 66 per cent of overall contraceptive prevalence which is down from 71 per cent of all contraceptive use at the time of NFHS-II.¹⁰ The predominance of sterilization is observed in almost all states; more than 90 per cent of contraceptive methods users are sterilized in all the southern states and Bihar; the situation is more skewed in Andhra Pradesh, where 97 per cent of all contraceptive method users are sterilized. Exceptions include Delhi, Punjab and a few north-eastern states where fewer than three in five users of contraceptive method are sterilized.³

TABLE 2
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE TYPE OF FAMILY
PLANNING METHODS USED BY THE RESPONDENTS AT THE TIME OF INTERVIEW.
(N=1000)

S.No.	Response	Number (percentage)
1	Tubectomy	300 (30.0%)
2	Condom	179 (17.9%)
3	Oral Pills	44 (4.4%)
4	Copper T	16 (1.6%)
5	Vasectomy	8 (0.8%)
6	Not Using	324 (32.4%)
7	Not Applicable	55 (5.5%)
8	Not responded	74 (7.4%)
	Total	1000 (100.0%)

In the present study, Out of 239 respondents using the spacing methods, 86 (36%) respondents obtained their supply from government health centre and 153(64 %) from private chemists/shops (Table 3). According to NFHS-III, in India, 71 per cent of current users of modern contraceptives obtained their method from a government hospital or other source in the public sector.¹⁰ However, the source of contraception varies greatly by method. Just over half of IUD users utilized the private medical sector for their IUD insertion. Almost two-thirds of pill users got their most recent supply from the private medical sector, which is also the most common source for condoms. ¹⁰ According to NFHS-III, in rural areas of Punjab, 62 per cent of pills, 54.8 per cent of condoms, and 48.6 per cent of IUD insertion services are obtained from the private medical sector.¹¹ Overall, the public medical sector plays a larger role in rural areas than in urban areas, and at least two-thirds of contraceptive users obtain their method from a public-sector source in every state except Meghalaya, Delhi, Nagaland, Assam, and Punjab.¹⁷ Thus, the results from the current study also indicate the same trend as at the national level i.e. in Punjab, private sector is the main source of family planning services.

In the present study, Only 230 (23%) respondents were motivated and given information by the health worker for various family planning methods. 770 (77%) stated that they were never approached by the health worker for counseling and advice on contraceptive methods (Table 4). According to NFHS-II, in Punjab, 38 per cent said that a government health worker was the person who mainly motivated them, 44 per cent reported that the motivator was someone other than a

government or private-sector health worker, mainly their husband. 14 per cent of the current users of a modern method said that they were not motivated by anyone; rather they adopted the method on their own.⁹

TABLE 3
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE SOURCE AVAILABILITY
FOR FAMILY PLANNING SERVICES (ONLY FOR SPACING METHODS) (N=239)

S.No.	Response	Number (percentage)
1	Private chemist	153 (64.00%)
2	Government health centre	86 (36.00%)
	Total	239 (100.0%)

However, most women and men, particularly those who rely on the public sector, do not have access to a wide choice of contraceptives. Nationally, for example, only 15 per cent of users of contraceptives, who were motivated by a health worker from the public or private sectors, were informed about at least one alternative method. Private and non-governmental organization (NGO) health workers were more likely to inform clients about alternative methods than public sector health workers (28 % Vs 19 %).¹⁸

TABLE 4
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE RESPONSES WHETHER
THE HEALTH WORKER HAD EVER MOTIVATED AND PROVIDED INFORMATION TO
THEM REGARDING FAMILY PLANNING METHODS? (N= 1000)

S.No.	Response	Number (Percentage)
1	Yes	230 (23.0%)
2	No	770 (77.0%)
	Total	1000 (100.0%)

In the present study, Out of 230 respondents who were motivated by the health worker to adopt a family planning method, 197 (85.65 %) were motivated for tubectomy, 13 (5.6 %) for condoms, 13 (5.6 %) for pills and 7 (3.04) % for IUD (Table 5). According to NFHS-II, In Punjab, among women who were ever discussed contraception by the health worker, the most frequently discussed method was female sterilization 55 per cent, followed by condom 44 per cent, oral pills 40 per cent and IUD 34 per cent. Discussions of traditional methods such as rhythm or withdrawal were limited (6 % and 3 %, respectively). Rural women

reported discussions of female sterilization more often than urban women and, in fact, female sterilization was the method most often discussed by rural women.⁹ Several small-scale studies report that most providers have a distinct bias towards sterilization and only minorities of clients were informed about reversible methods.³ In a study by Agarwal et al in Lucknow district, contraceptive methods were described to 76.7 per cent of respondents in rural area.¹⁸

TABLE 5
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE TYPE OF
CONTRACEPTIVE METHODS FOR WHICH THEY WERE MOTIVATED MOST BY THE
HEALTH WORKER. (N=230)

S.No.	Response	Number (percentage)
1	Tubectomy	197 (85.65%)
2	Pills	13 (5.62%)
3	Condom	13 (5.62%)
4	Copper T	7 (3.04%)
	Total	230 (100.0%)

At the end of the discussion, we would like to comment on some of the strengths and limitations of this study. The strength is that the investigators were able to reach to a large sample of females door to door. However, an important limitation of the study is that many factors like socio-economic status, parity, caste, education of husband and type of family (joint or nuclear) have not been analyzed in the present study which have a substantial effect on decision of contraceptive use. So there is a need to plan more in-depth analytic studies between contraceptive use and above said parameters to draw conclusive results.

Another limitation is that Verka Block; where the study was conducted; served as a rural field practice area to the Department of Community Medicine, Government Medical College, Amritsar; surrounds the Amritsar city. All the villages are not more than 20 kms away from Amritsar city. Due to this, many of the villagers utilize the services of health institutions of Amritsar city due to its geographical location. So further more studies are required in remote and border areas of Punjab so that more information regarding the availability and utilization pattern of contraceptive use could be ascertained.

CONCLUSION

The Contraceptive use is still low when compared to the awareness level. This indicates towards the "KAP gap". The awareness should be converted to action via motivation of the eligible couples keeping in view the goal of family welfare programme. The availability of the various contraceptives i.e. cafeteria approach must be ensured at the government health facilities at the ground level. ASHA must be involved in the distribution of spacing methods after proper training because she is supposed to stay in the same village and hence, it will be more convenient for the people to get the contraceptives according to the time suitable to them as most of the rural people are engaged in manual work whole of the day. The social marketing of the various contraceptive methods via traditional methods and new methods like internet must be given importance so as to create 'brands' in the mind of the people. Although target free approach is practiced in family welfare programme, even then the regular monitoring and evaluation of the ground level realities is required to make this programme successful. The incentives to Panchayati Raj Institutions (PRIs) must be linked to the indicators of family planning and maternal and child health (MCH) services to ensure real 'community participation'.

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E-MAMTA DATA VALIDATION IN GUJARAT

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ABSTRACT

E- Mamta is an initiative taken by Gujarat's Health and Family Welfare Department with the help of National Rural Health Mission and State's National Informatics Centre (NIC) that covers all citizens of Gujarat under Family Health Survey. E-Mamta involves name-based tracking of pregnant women for ANC, Delivery, and PNC; children for immunization and nutrition; adolescents for RCH services; and eligible couples for family planning; and facilitates closer monitoring of regular check-ups of the beneficiaries. Present study aims to validate the data already entered in E-mamta software with the objectives to validate the data entered in E-mamta software; and to identify missed and wrong entries.

A total of 12 districts (out of 25) were covered giving a fair representation to all parts of the state. In each district, 2 PHCs (best performing and worst performing) were identified and one Anganwadi was selected from each PHC randomly. One additional cluster (oldest Anganwadi) was surveyed in Municipal Corporations. Data were collected from all the houses of the selected village and corporation areas and were then tallied with the entries in both family health survey register and E- mamta software.

In rural areas surveyed, a gap of around 14 per cent was found between the collected data and family health record register. Discrepancy of around 23 per cent was present in the data entered in the E- mamta overall but there was a huge amount of variability among the districts. In the selected corporation areas, 85 per cent of members had been entered in the E- mamta software as a whole but the data varied.

Keywords: E-mamta, Data Validation, Gujarat

A woman's death is more than a personal tragedy--it represents an enormous cost to her nation, her community, and her family. Any social and economic investment that has been made in her life is lost. Her family loses her love, her nurturing and

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her productivity inside and outside the home. More than a decade of research has shown that small and affordable measures can significantly reduce the health risks that women face when they become pregnant. Most maternal deaths could be prevented if women had access to appropriate health care during pregnancy, childbirth, and immediately afterwards. One such rewarding effort is the "Mamta divas" strategy that has been initiated and is being practiced in full spirits in most of the districts of the state. ⁽¹⁾

The commencement of Mamta divas in Gujarat since around 5 years has brought a renewed hope for well being of mothers and children in the State. In an attempt to improvise the on-going venture by adding a few more elements and refining it further, Gujarat's Health and Family Welfare Department with the help of National Rural Health Mission and State's National Informatics Centre (NIC) have initiated E-mamta project. E- Mamta is an initiative that involves name-based tracking of pregnant women for ante-natal care (ANC), Delivery, and post-natal care (PNC); children for immunization and nutrition; adolescents for Reproductive and Child Health Services (RCH) services; and eligible couples for family planning. ⁽²⁾

Unique software has been developed to keep track of the required details. These details include location details, identification details, health provider details, ANC details, pregnancy outcome and PNC details.

This project also facilitates closer monitoring of regular check-ups of pregnant women, complete immunization of children, nutrition of pregnant women and children, adolescent friendly services and family planning services. It covers all citizens of Gujarat that are roofed under Family Health Survey. ⁽²⁾

The system works in three phases ⁽³⁾.

Family Health Survey

The mammoth first step in this regard, being Family Health Survey in rural and urban areas (slum and slum like) has been successfully accomplished by the health workers. Individual records of around 75.5 lakh families comprising 38.3 million beneficiaries, covering almost 75 per cent of population of Gujarat have already been entered in the Information system 'E-Mamta' till date. The benefits of the unique family healthcare ID provided is to capture the migration details and prevent loss of cases due to migration. The family survey data are being validated through physical verification by ASHA/FHW/ MOs and other senior officials in

order to ensure accuracy and reliability of the data.

Registration of Pregnant Mothers and Children

All mothers who are pregnant and children of age up to 6 years are being registered and provided a unique Mother/Child Health ID.

Tracking of Healthcare Services through Monthly Work Plans

The services provided to the pregnant mothers including ANC, delivery, PNC and immunization are captured in this program.

Thus E-Mamta facilitates service delivery through elaborate work plans prepared at sub-centres and given to ASHA/FHWs to provide services falling due to the beneficiaries; recording of the details of services provided to the mothers and children for ANC, immunization, PNC, nutrition; SMS alerts to the beneficiaries/health workers for the services that fall due; monitoring of incentives paid to various health workers; integration of the data with that from School Health, Integrated Child Development Services Scheme (ICDS), Education; and Generation of Health Management Information System (HMIS) reports like form no. 6,7,8,9 and register no. 2,3 ,4 and 5 by aggregation of various services.

E- Mamta incorporates several new features like Immunization Card by Child Health ID, Growth Monitoring Chart by Child Health ID, Pregnant Women Heart Rate/Blood Pressure (HR/BP) chart by Mother Registration Number, Work plan for Anaemia and Malnutrition, Monthly Inventory Stock and Forms 6, 7, 8, 9⁴.

The potential benefits of this project are better control on estimates of infant and maternal mortality and report into one mother and child record (MCR) e.g. District Health Information System (DHIS-2), Routine Immunization Monitoring System (RIMS), School Health, etc., list of beneficiaries for each services (auto generated), computerized work plan for workers and monitoring officers, quantifying off-take of Janani Suraksha Yojana/Chiranjivi Yojana (JSY/CY) benefits, and monitoring of incentives. Besides, it also provides improved supply chain management of vaccines and drugs, improvement in registration of births, better data analysis for preparation of block/district health action plans with realistic/accurate denominators².

Gujarat's E-Mamta project has achieved national recognition. The software was demonstrated at a national workshop on NRHM organized in Bhopal recently which was attended by the Union Health Secretary and Health Secretaries and National Rural Health Mission (NRHM) mission directors of all the states⁵.

For the results of E-mamta strategy to be accurate and universal, the data should be complete and precise. Present project aims to validate the data already entered in E-mamta software. This would give an idea of the extent to which data are missing and the measures that need to be implemented for rectifying the same.

OBJECTIVES

- To validate the data entered in E-mamta software.
- To identify the missed and wrong entries in E- mamta software

MATERIALS AND METHOD

The task of validation of data of E-mamta was assigned to Additional Project Director, Gujarat State AIDS Control Society (GSACS) by Hon, Ministry of H&FW. This has been done with the help of various government Medical Colleges of Gujarat.

Each medical college was responsible for data collection in a particular Regional Deputy Director (RDD) zone as far as feasible. In each zone two districts were covered namely one where the Medical college is located and the other which is the most remote and distant in that region; thus a total of 12 districts (out of 25) were covered giving a fair representation to all parts of the state.

As there is no established methodology for Validation of E-mamta data yet, according to the consensus of representatives of all the participating Medical Colleges, it was decided to identify the Primary Health Centre (PHCs) on the basis of performance of TT coverage in ANC during 2009–10, considering it to be a proxy indicator of RCH services.

In each district, two PHCs (one best performing and the other worst performing) were identified on the basis of TT coverage in the year 2009-2010.

This criterion was chosen for identification of PHCs with a view to providing an average picture of the whole district.

One additional cluster in corporation area (oldest Anganwadi) was surveyed by each Medical College to get an idea about the situation in Municipal Corporations.

Data Collection

All the houses of the selected Anganwadi and Corporation area were surveyed. A pretested semi-structured form was used for the survey. The data obtained from filled proformae were then tallied with the entries in both family health survey register and E-mamta software. Wrong entries as well as missed entries were identified.

Data Analysis

Data so obtained were checked for completeness, quality and internal consistency and analyzed using the Microsoft excel 2007.

FINDINGS AND DISCUSSION

Anganwadis selected randomly under the identified PHCs were surveyed in all the districts with the help of Anganwadi worker, ASHA, Helper, MPHW and ANM. Data recorded during the survey were compared with the data documented in the family health record register during the data collection itself with the help of accompanying health worker.

Data were later on compared with that of E-mamta software after procuring the passwords from the concerned PHCs in the respective departments of Preventive and Social Medicine in all the participating Medical Colleges.

A district-wise summary of the validated data is presented in Table I. A total of 4,172 households having 22,132 family members were surveyed in the 12 districts in the state.

Table 1 shows that in most of the districts, more than 80 per cent of members' entries had been made in the family health record register. Cent per

cent members had been entered in family health record register in Bhavnagar and Amreli districts.

TABLE 1
E- MAMTA DATA VALIDATION OF RURAL DISTRICTS OF GUJARAT

S. No	District	HH NO.	Total family members	Registered in family health record		Registered in E-mamta software		Wrong entry		Missed entry	
				No.	%	No	%	No.	%	No.	%
1	Ahmedabad	326	1711	1154	67.44	1288	75.27	75	4.38	423	24.72
2	Amreli	326	1945	1945	100	1879	96.61	8	0.41	74	3.80
3	Bhavnagar	324	1884	1884	100	1719	91.24	11	0.58	176	9.34
4	Gandhinagar	400	2197	1979	90.08	1929	87.80	2	0.09	268	12.20
5	Jamnagar	440	2546	1284	50.43	1284	50.43	1	0.05	1258	49.41
6	Narmada	196	973	917	94.24	925	95.06	31	3.19	78	8.02
7	Porbandar	409	1856	1767	95.20	1767	95.20	0	0	88	4.741
8	Sabarkantha	400	2076	2001	96.38	1990	95.86	9	0.43	86	4.14
9	Surat	400	1962	1723	87.82	1582	80.63	54	2.75	380	19.37
10	Surendranagar	222	1129	756	66.96	728	64.48	48	4.25	401	35.50
11	Valsad	320	1533	1256	81.93	1198	78.14	32	2.09	335	21.85
12	Vadodara	409	2320	2274	98.02	2168	93.45	63	2.72	198	8.53
	GUJARAT	4172	22132	18940	85.61	18457	76.8	334	1.5	3765	17.01

There was a wide variation in the gap in case of entries in E-mamta software. The maximum missed entries were in Jamnagar (50%) followed by Surendranagar (36%) and Ahmedabad (25%).

In Jamnagar and Valsad districts, there was a gap of around 50 per cent and 20 per cent in the entries respectively whereas in all other districts the discrepancy was between 5 and 14 per cent. In Surendranagar District, only 64 per cent of entries have been recorded in E-mamta software (with nil entry in one of the villages) and in Ahmedabad District, 75 per cent of entries recorded during the survey have been entered in the software.

In Junagarh and Bhavnagar Districts, 100 per cent entry had been done in E-mamta software and in Vadodara region 98 per cent of the total members had been entered.

Wrong entries were highest in Ahmedabad and Surendranagar Districts (around 4 %) followed by Narmada (3.19%), Surat (2.75%), Vadodara (2.72%) and Valsad (2%) Districts. In remaining districts, there were less than (0.5%) wrong entries.

Approximately 1.5 per cent wrong entries and 17 per cent missed entries in the state as a whole were observed.

TABLE 2
E- MAMTA DATA VALIDATION OF CORPORATION AREAS OF GUJARAT

S. No	District	HH No.	Total family members	Registered in family health record		Registered in E- mamta software		Wrong entry		Missed entry	
				No.	%	No.	%	No.	%	No.	%
1	Girdharnagar, Manubhai ni chali, Ahmedabad	200	931	931	100	890	95.59	0	0	65	6.98
2	Khedutvas, Bhavnagar	230	885	831	93.9	832	94.01	8	0.90	61	6.89
3	Ambanagar, Surat	201	850	387	45.53	322	37.88	0	0	528	62.1
4	Vishwakarmnagar, Gajarawadi, Vadodara	186	899	891	99.11	1038	115.46	143	15.9	16	1.77
5	Bhimvas, Jamnagar	185	1043	1027	98.46	1023	98.08	0	0	20	1.92
6	Kalyan society, Rajkot Corporation	128	645	419	64.96	362	56.12	28	4.34	283	43.87
	Total	1130	5253	4486	85.39	4467	85.03	179	3.40	973	18.52

One corporation area was surveyed by each Medical College, thus making a total of six areas. Oldest Anganwadi in the area was selected for validation of data.

A total of 1130 households having 5253 family members were surveyed (Table 2). 85.4 per cent of entries had been made in the family health record and 85 per cent of members had been entered in the E-mamta software as a whole, there were approximately 3 per cent wrong entries and 18.5 per cent missed entries but as can be seen from the above table the data are very incoherent and variable with maximum number of missed entries being in Rajkot Corporation area (44%). In Vadodara Mahanagar Seva Sadan (VMSS) area, the number of entries

in E-mamta software was more than the entries in recent survey data as well as the family health record as there had been an overlapping of data of two neighboring areas erroneously.

CONCLUSION

In rural areas, a gap of around 14 per cent was found between the collected data and the data present in family health record register. Discrepancy of around 23 per cent was present in the data entered in the E-mamta software in the 12 districts altogether but there was a huge amount of variability among the districts. In selected corporation areas, around 85 per cent of the beneficiaries had been recorded in the Family Health register as well as in the E-mamta software as a whole, but the data varied.

RECOMMENDATIONS

The family health record register which is presently prepared once a year should be updated at least quarterly. Especially new births and deaths should be updated without delay both in the register as well as in the software.

Wrong entries in the E-mamta software should be timely identified and verified at PHC and removed from the software after confirmation by block health officer/ urban health centre Medical Officer.

Data should be carefully and diligently entered in the E-mamta software to avoid wrong entries and discrepancy between the family health record register and the software.

Regular use of E-mamta in planning of Mamta Day as well as recording of the services provided soon after will help in better understanding of the software and its utility for health managers and also lead to ironing out of small software issues.

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NUTRITION REHABILITATION CENTRES IN THE MANAGEMENT OF SEVERE ACUTE MALNOURISHED CHILDREN

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ABSTRACT

The state of Madhya Pradesh has the largest number of malnourished children in the country. To check the prevalence of malnutrition, Nutrition Rehabilitation Centers were established in the state in collaboration with UNICEF as one of the innovative schemes under National Rural Health Mission. The centres provide in-patient treatment to the severely malnourished children using appropriate medical and nutritional intervention measures for a period of 14 days and have four follow-ups to ensure the recovery of the children. The NRCs also serve as training centers for the mothers in improving their knowledge and skills on complete care, feeding and follow-up of the children at household level. The first of such centers was set up in 2007 and in a short span of two years the number of such centers has increased to 175. The present article provides an overview of the growth of NRCs and outlines the various aspects of its functioning in improving the condition of the malnourished children.

Keywords: Malnutrition, Nutrition Rehabilitation Centers, Therapeutic Feeds

The most neglected form of human deprivation is malnutrition, particularly among children. Child malnutrition is the most pressing problem of the world, damaging both children and nations. Malnutrition is costing poor countries up to 3 per cent of their yearly Gross Domestic Product (GDP) and pessimistic scenario suggests that child malnourishment will increase from 166 to 175 million by 2020¹. Further compounding the problem is the magnitude of children affected by Severe Acute Malnutrition (SAM). About 60 million children with moderate acute and 13 million with severe acute malnutrition are estimated to live world-wide. About 9 per cent of sub-Saharan African and 15 per cent of south asian children have moderate acute malnutrition²⁻³ and about 2 per cent of children in developing countries have SAM³.

India accounts for nearly 60 million underweight children⁴. The National Family Health Survey-III (NFHS) reported the prevalence of underweight among Post-Graduate student*, Professor and Head**, Assistant Professor***, Department of Community Medicine, MGM Medical College, Indore, Madhya Pradesh.

children lesser than 3 years in 2005–2006 as 46 per cent, a figure representing only a marginal decline from the rates recorded in 1992–1993 (51%) and 1998–1999 (47%)⁵⁻⁸.

The problem of malnutrition is particularly widespread in some states of the country namely; Madhya Pradesh, Jharkhand, Bihar and Uttar Pradesh⁹. The state of Madhya Pradesh has the largest number of malnourished children in the country with the high Infant Mortality Rate (IMR) 72 per 1000 live births and the shortest life span: 58.9 years, the national average being 63.5 years¹⁰. As per NFHS-III, malnutrition rates stand at 60.3 per cent, a jump of 5 per cent points as compared to NFHS-II, malnutrition related deaths are the highest in the country^{6, 11}. Six million children under 5 are malnourished in Madhya Pradesh; one million are moderately malnourished and 1.3 million severely malnourished¹².

To combat this menace, the Government of Madhya Pradesh initiated the BAL SANJEEVANI drive in the year 2001 with support from the United Nations Children Fund (UNICEF). Twice a year a month long drive was carried out in 336 blocks of the state, undernourished children were identified and appropriately managed. Around 75 lakh children came under its preview. To prevent deaths among the severely malnourished children identified under the drives, the government initiated the concept of Nutrition Rehabilitation Centres (NRCs) under the Bal Shakti Yojna in 2007 with support from UNICEF as one of the innovative schemes started under the National Rural Health Mission (NRHM). The centres provide in-patient treatment to the severely malnourished children by using appropriate medical and nutritional intervention measures for a period of 14 days and have four follow-ups to ensure the recovery of the children¹³. The NRCs also serve as training centres for the mothers in improving their knowledge and skills on complete care, feeding and follow-up of the children at the household level. The first of such centers was set-up in 2007 and in a short span of two years the number of such centres has increased to 175. The present article provides an overview of the growth of NRCs and outlines various aspects of its functioning in improving the condition of the malnourished children.

EVOLUTION OF NUTRITION REHABILITATION CENTRES (NRC's)

As originally proposed by J. M. Bengoa in 1955, a Nutritional Rehabilitation Centre also referred to as Mothercraft Centres and CERN in French for Centre d'Education et Rehabilitation Nutritionnelle, was to be a child care centre that would admit only malnourished children. Accordingly he defined a NRC as "A

centre organized either with sleeping accommodation for children, or similar to day nurseries or kindergarten where malnourished children either attend for a few hours every day or are kept overnight, the objective of which is to educate the mothers through the nutritional rehabilitation of their children". The originality of this new procedure was that the child would recuperate on a diet which is locally available. The mothers of the children would come at periodic intervals to NRCs to prepare their meals and feed and take care of the children. The overall operation would be kept at the lowest possible cost. The objective of such centres was "to educate the mother through the nutritional recuperation of her child." Costs were to be kept low so as to teach the mothers the use of food obtainable within her own economic means and to provide a service that was essentially less expensive than the hospital^{14, 15, 16}. The first report on a NRC describes the Centre at Amatitlan, Guatemala established in August 1964^{17, 18}.

The earliest NRCs differed in the nature of the services provided, being out-patient only, day care¹⁹⁻²¹, in-patient or residential^{22, 23} or catering to out-patients and in-patients^{24, 25}. In response to local needs and opportunities, the centres enlarged their roles under varying capacities by acting either as specialized centres for motherhood, serving as health education outposts for community or functioning as auxiliary training centres for health workers and functionaries^{25, 26}.

DAY CARE NRC's

The day care centers offered protection to children who suffered from moderate and occasionally severe forms (without complications) of protein-energy malnutrition: the organization similar to that of a gardaire, crèche or kindergarten²⁷. On opening a new centre all pre-school children in the village were examined for edema, and their age, sex, name, and weight. The 30 most malnourished children on the basis of edema and per cent standard weight based on the Boston standards were identified. The mothers of these children were then invited to enroll at the centre on the condition that the children would remain all day at the centre 6 days a week, and that the mothers would work in the centre 1 day each week. Enrollment was for 3-4 months. While working with the mothers in caring for the children the staff would outline the improved child care practices being used in the centre, relying heavily on informal education in contrast to formal lectures and demonstrations. After completion of the three or four-month course, the mothers and children were 'graduated' and there was no further intervention. The next 30 worst nourished children were then identified and their mothers were invited to

enroll. Such cycles were repeated in a given community until large numbers of the same children proved eligible a second or third time. At this point the centre was closed, the staff moved to open a centre in a new village²⁸.

RESIDENTIAL REHABILITATION CENTRES

Centres of the residential type were also started in different countries (Colombia, Costa Rica, Papua New Guinea, Tanzania, Uganda and Venezuela) along with the day care centres. The children accompanied by their mothers lived in the centres as in-patients; the mothers helped to prepare the meals and also received suitable instruction in child feeding. Initially, the centres acted as convalescent centres for children who had been successfully treated in hospital for more severe malnutrition but not yet completely rehabilitated, or for children who had received treatment for diarrhoea at a rehydration centre. It was also believed that these centers could fulfill the activities of a nutrition institution or research centre since a wealth of information could be obtained for research on clinical and bio-chemical problems of nutritional rehabilitation of malnourished children. The children and the caregivers stayed for a variable length of time in the centres till the child attained weight normal for his age, but they were often released before the target weight had been achieved and the mother was educated about the principles on child nutrition so as to continue rehabilitation at home²⁹.

Following initial experiences and review studies on the effectiveness of the centres^{15, 16, 22, 23} such centers were started in other parts of the world where childhood malnutrition was a major problem. Centers opened in countries in the African continent and also Asia: Afghanistan, Algeria, Bangladesh, Burkina Faso, Gambia, Ghana, Iran, Madagascar, Malawi, Nigeria, Senegal, and Sudan. The centres were developed along the lines of a day care NRC, Residential type and some functioning as Therapeutic Feeding Centres (TFCs).

Though there are reports of such centres functioning in India²⁴, NRCs have started operating on a wide scale only recently since 2007. NRCs have been started in Madhya Pradesh, West Bengal, Jharkhand, Orissa and Maharashtra. Madhya Pradesh has the maximum number of such centres which were started in the state in order to combat the threat of widespread malnutrition in the state. The centres in the state are of the residential type and provide the children with both medical and nutritional rehabilitation.

NRCs in the State of Madhya Pradesh

As outlined above NRCs were established to check the menace of malnutrition in the state. The main objectives of the centres were³⁰:

1. To control severe malnutrition among the children aged between 1 and 5 years of age in the state; and
2. To bring down the per cent of severely malnourished children to less than 1 per cent.

The target group as outlined was severely malnourished children i.e. grade III and grade IV were identified during the Bal Sanjeevani drive which needed immediate attention and care³⁰.

Basic Organizational Framework of NRCs

Three models have been proposed for setting up of a new NRC in the state:

- Private partnership – In-patient treatment and nutritional rehabilitation services provided by NGOs.
- Government –public private partnership-Institutional treatment by Government and nutritional rehabilitation services by NGOs.
- Complete government-Medical management and nutritional rehabilitation services provided by government institutions.

Setting up of a NRC Unit³⁰:

Specific guidelines were formulated to set-up a new NRC. The NRC is to be located in a hospital building preferably a district hospital, Community Health Centre or a Block Primary Health Centre. The bed capacity is to be 20 for District level NRCs and 10 for Block level NRCs. The NRCs are to have a kitchen with adequate space for feeding, demonstration and counselling and adequate toilet facilities. The NRCs are to be modelled to promote not only physical but also psycho-social development of the child as well. The staff at the centres consists of a Paediatrician or a doctor trained by a Paediatrician, Feeding Demonstrator (FD), Staff nurse/ANMs, Cooks, Caretakers and Sweepers (Table 1). The staff members are provided with a three-day training course conducted by the Department of Women and Child Development (DWCD), the Ministry of Health and Family Welfare (MOHFW) and UNICEF before their inception in the centres.

TABLE 1
STAFFING PATTERN AT NRC

Staffing pattern	For 20 bedded NRC	For 10 bedded NRC
Doctor	2	2
Feeding Demonstrator	1	1
Nurse/ANM	2	1
Cook	2	1
Caretaker	2	2
Sweeper/cleaner	2	2

Operational Details

The Department of Women and Child Development (DWCD) through their network of Anganwadi Workers (AWW) identifies the SAM children in respective localities and brings the children and their caregivers (preferably mothers) to the NRCs. All the Children brought to the NRC are managed as per a Screening/Triage system. The children are admitted depending on their clinical symptoms and signs and the result of the appetite test. The present admission criterion incorporates the recommendations of the New World Health Organization Child Growth Standards³¹. Children are admitted to the NRC if they fulfill any of the defined criteria³² (Table 2).

TABLE 2
ADMISSION GUIDELINES FOR NRC

For children > 6 months:	For infants < 6 months
W/H or W/L < -3Z score (77)	Infant too weak or feeble to suckle effectively independent of his/her weight
MUAC < 110mm	Infant is not gaining weight
Presence of bilateral pitting edema	Weight/length less than 70 per cent Presence of bilateral edema

Appetite Test

Often the only sign of severe malnutrition is a reduction in appetite. The most important criterion to decide whether a patient requires inpatient treatment or not is the test of appetite. A poor appetite means that the child has a significant infection or a major metabolic abnormality such as liver dysfunction, electrolyte imbalance, and cell membrane damage or damaged biochemical pathways.

Once admitted, anthropometric indicators are measured for monitoring the growth of the children. The weight at the time of admission, the height and the Mid Upper Arm Circumference (MUAC) are measured and the children classified into different grades of malnutrition for weight and height as per the new WHO growth standards based on Z scores³¹. A target weight based on the growth charts is calculated for each child to aid in the discharge of the children. The children are kept in the centres for a minimum period of 14 days and provided with nutritional rehabilitation with help of therapeutic feeds prepared from locally available foodstuff (Table 3).

If needed the child is managed for medical conditions based on WHO treatment protocol^{33, 34} consisting of 10 steps, with initial attention being devoted to assessment and treatment of hypoglycemia, hypothermia and dehydration which contribute to the maximum cases of mortality among SAM.

TABLE 3
CONSTITUENTS REQUIRED FOR THE APPETITE TEST

Required constituents	Weight of the child	
	< 4 kg	> 4 kg
Wheat flour	15 gm	30 gm
Cow's milk/toned dairy milk	20 gm	40 gm
Vegetable oil	2.5 gm	05 gm
Sugar	05 gm	2.5 gm

Medicines Administered

The medicines administered at the centres involve appropriate Antibiotics, Vitamin A as required according to the age of the child, Iron and Folic Acid, Zinc and Albendazole syrup. In addition, Potassium and Magnesium Sulphate are given and the child is immunized as needed with particular emphasis given to measles vaccine.

Therapeutic Feeds

Feeds provided at the NRCs consist of different therapeutic diets: the Formula 75 (F-75), Formula 100 (F-100) and the Low Lactose and Lactose Free Diet given to malnourished children with diarrhoea. On admission of the child at the NRC, 10 per cent sugar solution is given to the child, following which the appetite test is conducted as described (Table 3). If the child passes the appetite test then the child is started on a mixed diet with the energy dense F-100. If the

child fails the test then the child is given only F-75 feed for the first two days and then shifted to the F-100 feed.

F-75 Feed

The F-75 feed is made of Cow's milk, sugar, powdered puffed rice, vegetable oil and water. It provides 1.2 gm of protein, 1 gm lactose and 75 kcal of energy per 100ml of feed. At least eight feeds are to be provided to the admitted children during 24 hours, if there are problems of night feed then at least 5-6 feeds should be provided during day time. Breast fed children are always offered breast milk before the diet.

F-100 Feed

F-100 also consists of the same constituents as F-75 but in different concentrations. It provides 2.2 gm of protein, 3 gm lactose and 100 kcal of energy per 100ml of feed. F-100 is started if the child passes the initial appetite test. F-100 is fed to the child three times a day, the first and the last feeds of the day and a feed during evening. Interspersed between F-100 feeds is the normal diet of the child (egg, vegetable khichdi/vegetable dalia and banana milk or sago kheer).

Lactose Free Diets

The Lactose free diets provided to SAM suffering from diarrhoea have been divided into the 'Start up Lactose Free Diet' and 'Catch up Lactose Free Diet'. These diets consist of egg white in place of milk while the other ingredients being the same. The startup lactose free diet provides 1 gm protein and 100 kcal of energy per 100ml of feed and the Catch up Lactose Free diet provides 3 gm protein and 100 kcal of energy per 100ml of feed.

The coconut oil is used to prepare the feeds as it is easily palatable to the malnourished children. The total diet of the children every day is calculated according to their body weight and prepared in such a way that it meets the daily energy and protein requirements in the particular age group. Mothers of the admitted children are given hands on training in the preparation of the therapeutic feeds during their stay at the centres. Counselling sessions focussing on health education aspects and appropriate care of the children are also conducted for the mothers during their stay at the centres.

The children admitted to the NRCs are weighed on a daily basis and discharged at the end of the 14 day period if the following conditions are fulfilled³².

- Weight / height $\geq 1.5z$
- Increase in weight by $>15\%$
- Absence of edema for at least 10 days
- Achievement of 'target weight'
- Absence of infection
- Eating at least 120-130 kcal/kg body weight/day and receiving adequate micronutrients.

If any of the above conditions are not met then the child is made to stay for at least an additional period of 7 days at the centre. Following the discharge four follow-up visits are conducted at an interval of 15 days each. At the time of discharge the Aanganwari Worker is informed of the dates of the follow-up visits and instructed to bring the child and the mother to the NRC on the designated days.

Average Weight Gain during Rehabilitation at NRC³²

- Discharge weight (kg) - minimum weight (kg) $\times 1000 = A$ (difference in weights in grams).
- $A/\text{minimum weight} = B$ (Weight gained per kilo body weight).
- $B/\text{Duration of stay (Discharge day - minimum weight day)} = \text{Average weight gain (g/kg/ day)}.$

A minimum weight gain of at least 8 gm/kg/day is considered to be adequate as per the international standards to determine effectiveness of therapeutic feeding programmes³².

Output Indicators³²

Specific indicators have been designed to judge the effectiveness of the programme. They are as follows:

- Cured: Patient who has reached the discharge criteria.
- Defaulter: Patient who is absent for 2 consecutive days for weighing in an NRC.
- Non-Responder (failure): Patient who has not reached the discharge criteria after 40 days in the in-patient programme.

- **Dead:** Patient who died while in the programme at the facility or in transit to another component of the program (hospital) but had not yet been admitted to that facility.
- **Medical Transfer:** Patient is referred to a health facility/hospital for medical reasons and the NRC will not continue the nutritional treatment or transfer the patient back to the programme.
- **Transfer out:** Patient who has started the treatment in one NRC and referred to another site to continue treatment.
- **Transfer in:** Patient who has started the treatment in some another NRC and referred to a new NRC to continue treatment.

Financial Incentives Provided to the Beneficiaries

Cash incentives are provided to the mother and the AWW for bringing the child to the NRCs. Similarly an amount is fixed for the daily diets of the admitted child and compensation is provided for the daily wage loss of the mother.

- An incentive of Rs 100 to be provided to the parents/caregivers at the time of admission and Rs 100 at the time of discharge for travel cost.
- A sum of Rs 90 per child is allocated/day. Out of this Rs 25 to be spent for the food and Rs 65 to be handed over to the mother for her food and wage loss.
- An incentive amount of Rs 100 provided to AWW for counselling of the mother to stay at NRC for 14 days at the time of admission and for each follow up after discharge from NRC.

Critical analysis and assessments of NRCs have been done since their inception. Studies have observed that the NRCs are effective in treating malnourished children and more cost effective as compared to hospital-based treatment^{28,36,37,38}. Available literature also points towards the inherent weaknesses in the set-up: limited inpatient capacity, lack of enough skilled staff to treat a large number of children needing care^{39, 40} and the poor compliance rate during follow-up visits⁴¹⁻⁴³. The present WHO protocol advocates the Community Based Care (CBC) Model of Management of SAM which provides a framework for an integrated public health response to curb malnutrition, treating most patients with SAM at home with inpatient care being reserved for those with acute complications. Linking up of NRCs with the CBC model needs to be undertaken though putting such a system in place will require a large resource mobilization; hence a delicate balance needs to be achieved between the two models of treatment to optimize the results achieved in managing malnourished children.

FIGURE 1
TRIAGE SYSTEM FOR CHILDREN ADMITTED TO NRC

SCREENING TRIAGE APPETITE TEST

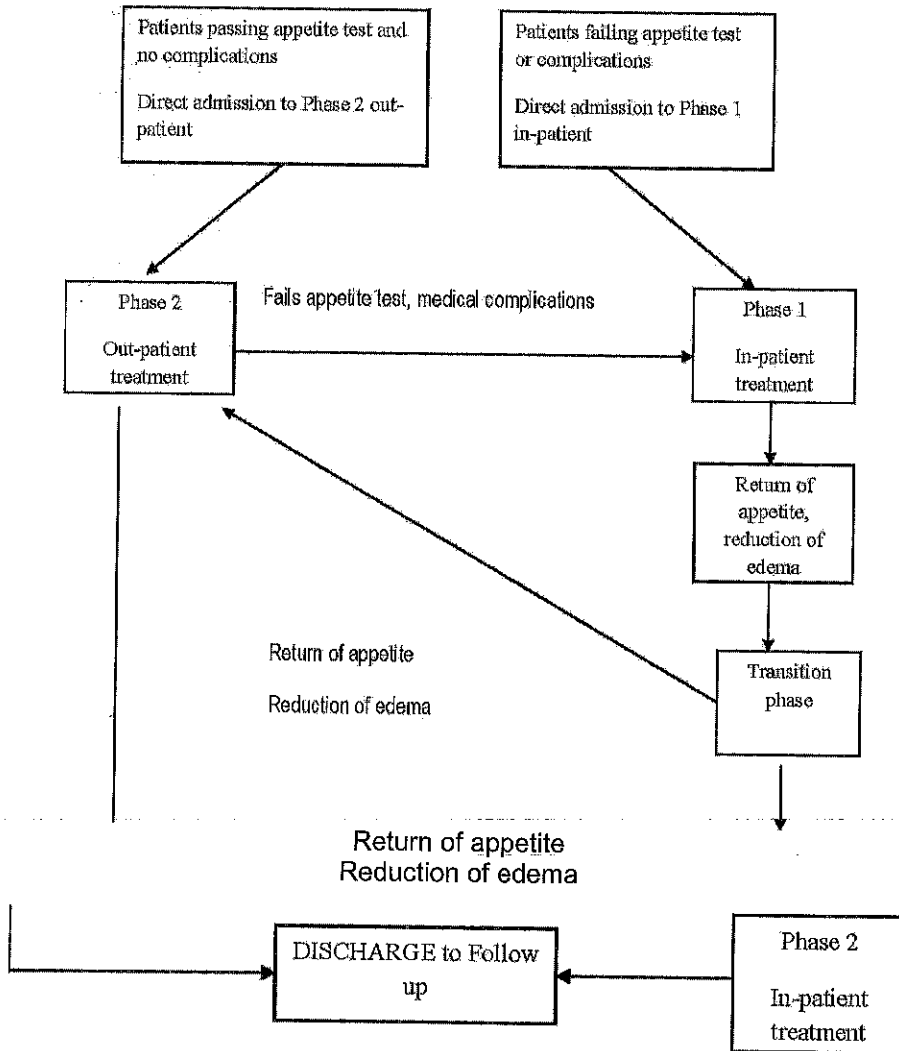
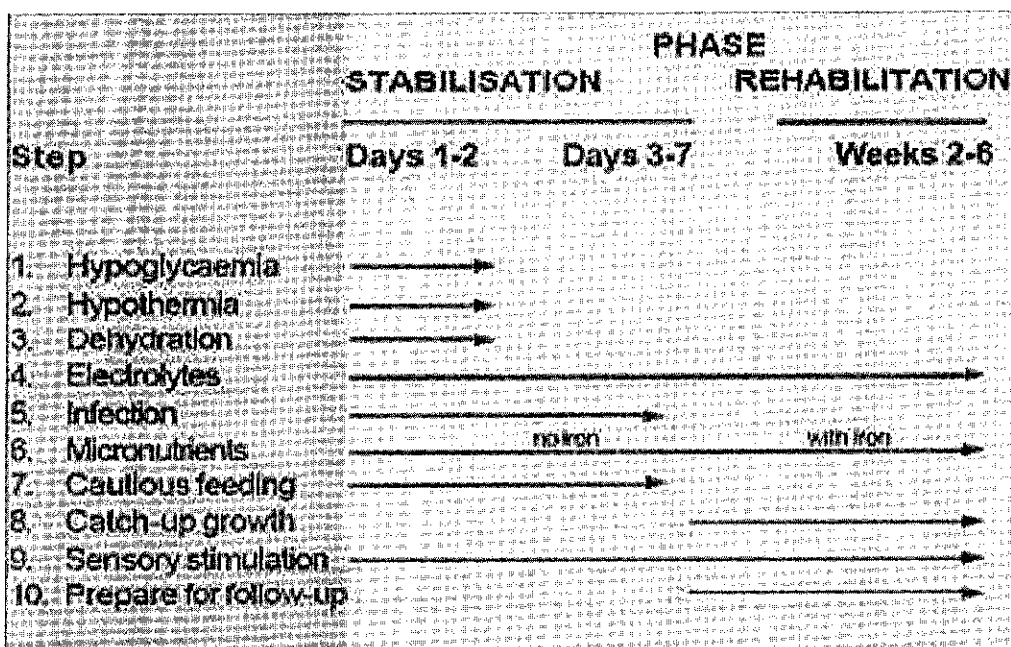


FIGURE 2
STEPS IN MANAGEMENT OF SEVERELY ACUTE MALNOURISHED (SAM) CHILDREN



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CORRELATES AND CONSEQUENCES OF TEENAGE MOTHERHOOD IN INDIA

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ABSTRACT

Child bearing is a complicated process and the probability of developing health problems multiplies when it is teenage pregnancy. Child marriages are still prevalent in India and so are teenage pregnancies. About 12 per cent of the girls aged between 15 and 19 years have become mothers. One in four women in Bihar and West Bengal begins child bearing in her teenage (NFHS-3, 2005-06). Given the higher probability of hazardous health problems among women who begin their child bearing in their adolescence, the socio-economic and demographic correlates of teenage pregnancy or motherhood in India and the consequences of teenage pregnancy are assessed using the NFHS-3 (2005-06) data. Findings reveal that rural women, those with lower levels of education and unemployed are at a greater risk of teenage pregnancy/motherhood. Consequences of teenage pregnancy manifest in the form of poor health of mother and child. Obstetric outcomes were more caesarean deliveries, pregnancy wastage among one in ten teenagers and more children are found to be of lower birth weights and also anaemic.

Keywords: Teenage Pregnancy, India, Anaemia, Body Mass Index

The ambitious target of the National Population Policy (NPP), 2000 to stabilize India's population by 2045 remains a far dream as the Total Fertility Rate (TFR) continues to be 2.6. The Government of India recently pushed back the target date to 2070. The slow declining trend is attributed much to the differential decline in fertility among the states in India. While there was a declining trend in fertility rates in 14 States, Northern and Central parts of the country continue to have persistently high TFRs ranging from 3 to 3.9 per cent. Among the factors that impede the declining tempo, the higher rates of child marriages and the consequent teenage motherhood undoubtedly cannot be ignored.

Teenage pregnancy has been a public health concern in India for decades. Teenage pregnancy is one that occurs from puberty to the age of 19.

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Puberty is the stage of adolescence when a girl can sexually reproduce. In India, girls experience puberty early and get married at younger age (Jeejeebhoy and Sebastian, 2003). About 23 per cent of the population of India is of adolescents and the proportion of females aged between 15 and 19 years to total female population in India is 9.3 per cent (Registrar General of India, 2001). Of this, almost one-fourth is already married. The rigid social and cultural norm in many societies and prevalence of illiteracy force a girl to marry early.

Consequently, the age at marriage in India still remains low and we find that one-fourth of adolescent girls marry by the time they reach their legal marriageable age (DLHS-3, 2007-08). Also the mean age at effective marriage of females aged <18 years in India hovers around 16 years for almost a decade (Family Welfare Statistics in India, 2006-2009). Early marriage exposes these girls to risk of pregnancy early in life.

Research studies, both in India and all over the world, document the problems of teenage pregnancy. Some studies highlight the lower access to higher education, high divorce rates, premature death of women, population growth, weak and unhealthy children and single motherhood to be negative consequence of teenage pregnancy (Goonewardena and Waduge, 2005; Shrestha, 2002; Rashid, 2006; Ganatra and Hirve, 2002, Nanda and Ram, 2003). Teenage pregnancies have been shown to be mainly associated with social problems rather than physical or medical problems. Nili et. al, 2002 opined that a considerable proportion of teenage mothers originate from working-class families and ethnic minorities.

The second and third rounds of the District Level Household Survey, 2002-04 and 2007-08 in India estimate that pregnancy complications is the highest among adolescent mothers. Similarly, any delivery and post delivery complications were also the highest among teenage mothers in the country (IIPS, 2006). The risk of pregnancy complications was found to be 2.5 times higher among pregnant teenagers as compared to mothers in their twenties (Sharma et al., 2001). In the developing countries, teenagers were reported to be at increased risk of maternal anaemia, pre-term birth and caesarean delivery (Scholl et al, 1994). These women are also at particular risks of nutritional deficiencies and sexually transmitted diseases.

The recent National Family Health Survey (2005-06) points out that 12 per cent of the women aged between 15 and 19 years in India have become mothers

and another 4 per cent have begun childbearing. Inter state variations are also discernible in this regard with the proportion varying between 27.5 per cent in Jharkhand and 3.1 per cent in Himachal Pradesh. The states of Bihar and West Bengal have about 25 per cent of women aged between 15 and 19 years beginning child bearing. Given the higher rates of teenage fertility in India, and the projected consequences of teenage motherhood as elucidated from various studies all over the world, a deeper inquiry into the problem in India should be of vital importance. Hence, the present study analyses the correlates and consequences of teenage pregnancy or motherhood in India.

OBJECTIVES

The main objectives of the study are (i) to identify the socio-economic and demographic correlates of entry into early motherhood in India; and (ii) to assess the consequences of teenage pregnancy in India.

MATERIALS AND METHOD

Data from NFHS-3 are used to draw a picture of patterns of teenage fertility in India and also to identify the correlates and consequences of some background characteristics associated with teenage motherhood in India. The analysis of teenage motherhood, therefore, confines only to 21480 ever-married women presently in their teen, i.e., from 15 to 19 years of age. The concept of teenage pregnancy or motherhood considered here are the women with at least one live birth or who were pregnant at the time of survey. Instead of inter-state comparison, we classified the states into regions; North (Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan and Uttarakhand), Central (Chhattisgarh, Madhya Pradesh, Uttar Pradesh), East (Bihar, Jharkhand, Orissa and West Bengal), Northeast (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura), West (Goa, Gujarat and Maharashtra) and South (Andhra Pradesh, Karnataka, Kerala and Tamil Nadu).

The background characteristics that influence the likelihood of entering motherhood in teenage include the economic status and the social set-up in which the women live. Among the socio-economic factors, place of residence, religion and caste, the marital status, education and work status of the mother and the standard of living expressed as the 'Wealth Index' are included. The proximate factors that probably influence fertility in India, like the use of contraceptives and timing of first sexual activity among the teenagers have limited relevance in the

present context for two reasons. First, sexual activity begins only after marriage and child bearing outside marriage is seldom encouraged in India. Second, in NFHS-3 data the proportion of fertility outside marriage among the teenagers is negligible and the proportion of teenagers using contraceptives is only around five percent. So these two proximate determinants of fertility are documented as major risk factors of teenage fertility.

Multivariate regression techniques are used to identify the correlates of teenage fertility and correlation analysis validates the probable consequences of teenage fertility. Since the dependent variable is dichotomous, binary logistic regression technique is adopted to identify the correlates of teenage pregnancy or motherhood. The inter-state variations in teenage pregnancy/motherhood and the consequences are also portrayed using GIS Arcinfo software.

FINDINGS

Contribution of Teenage Fertility to Total Fertility

To begin with, an overview of the growth of teenage population (15-19 years) in India and the contribution of teenage fertility to total fertility in India is given. The proportion of population between 15 and 19 years to total population declined during 1981-91. However it increased by the year 2001, a result of past high fertility rates (Census of India, 1981 to 2001). Fertility is concentrated mostly in the 20-29 year age group of women in any population. In India too the changes in fertility has been much influenced by fertility of women in the 20-29 age group. The relative contribution of fertility of women in the 15-19 year age group over the past few decades has been marked which has influenced the fertility decline (Nair S B and Padmadas, 1999). But the recent declining trend appears to have slowed down.

TABLE 1
CONTRIBUTION OF TEENAGE FERTILITY TO TFR IN INDIA

	1980	1990	2000	2005	2008
Age Specific Fertility Rate (ASFR) 15-19 years*	0.0882	0.083	0.055	0.045	0.041
		1	1	9	6
TFR*	4.4	3.8	3.0	2.9	2.6
Components of TFR (15-19)	0.44	0.38	0.26	0.23	0.21
Contribution of 15-19 years to TFR)	9.94	10.51	8.01	7.97	7.95

*Source: Sample Registration System, Office of the Registrar General of India, New Delhi.

We find that TFR in India declined from 4.4 in 1980 to 2.6 in 2008. When the TFR is decomposed into different components based on the ASFR, the 15-19 year component shows a decline (Table 1). But the decline slowed down after the year 2000. As far as the contribution of teenage fertility when expressed in percentage concerned, we observe that during 1980s about 10 per cent of the fertility occurred in the teenage. This proportion rose during 1990 and later declined to around 8 percent in 2008. This is evidence to the fact that child marriages do occur in India violating India's policies that stipulate legal age at marriage of 18 years for girls. So the future fertility decline will depend heavily of the decline in teenage fertility which is possible by reducing the proportion of child marriages in India.

Correlates of Teenage Motherhood

It is now worthwhile to examine the possible factors, both background and proximate, that influence teenage fertility in India. First, we assess the levels of teenage fertility in India and the inter-state variations.

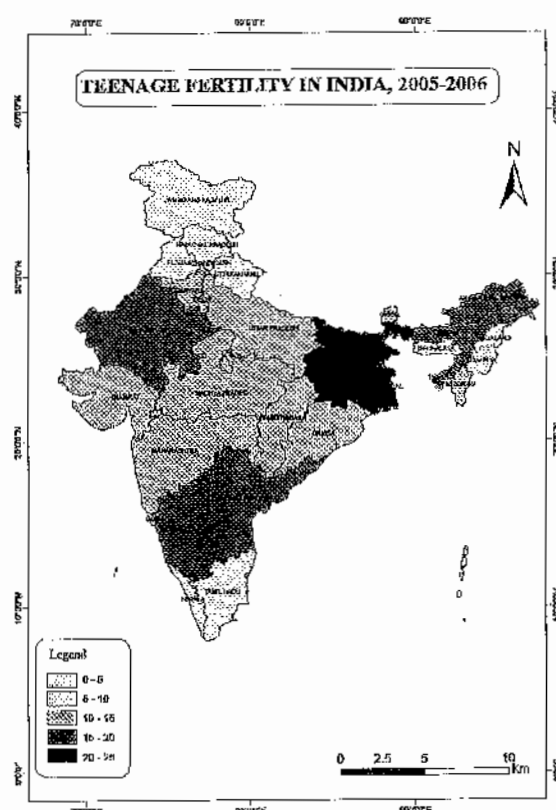
In India, 16 per cent of the women aged between 15 and 19 years have begun child bearing. Of this 16 per cent, at least 12 per cent already have had a live birth and about 4 per cent were pregnant with their first child at the time of survey. At the age of just 15 years, 2.5 per cent of the women have already begun childbearing. This proportion increased to 12.5 per cent among women aged 17 years and by the stipulated legal age at marriage of 18 years, almost one quarter of the women already entered motherhood. Teenage fertility associated with child marriages thus poses a major health problem among women (Table 2).

TABLE 2
PERCENTAGE DISTRIBUTION OF WOMEN 15-19 YEARS HAVE HAD A LIVE BIRTH OR WHO ARE PREGNANT WITH THEIR FIRST CHILD AND PERCENTAGE WHO HAVE BEGUN CHILDBEARING, INDIA 2005-06

Characteristics	Percentage of women who			Total Number of Women
	Have had a live birth	Are pregnant with their first child	Have begun childbearing	
Age				
15	1.3	1.2	2.5	4814
16	4.1	2.3	6.4	5237
17	8.6	3.8	12.5	4801
18	17.9	6.1	24.0	5606
19	29.7	6.1	35.7	4353
Total	12.1	3.9	16.0	24811

The inter-state variations are portrayed in Figure 1. The percentage of women who have begun childbearing is classified into five classes: Very low, Low, Medium, High and Very High per cent. Accordingly, 'Teenage Fertility' is either very low or low in most of the northern states except Rajasthan which shows high values. All the states in the central and western region have medium prevalence. In contrast, all the eastern states have very high proportion of women beginning childbearing in their teenage with the exception of Orissa which falls in the medium category. The southern region, however, depicts a mixed picture with Kerala and Tamil Nadu showing low values and Andhra Pradesh and Karnataka having high values.

FIGURE 1



The north eastern states also provides a mixed picture with low (Meghalaya, Nagaland and Manipur), medium (Mizoram) and high (Assam, Arunachal Pradesh and Tripura) rates.

A look at the summary statistics (Table 3) reveals that the mean age at marriage of women currently aged between 15 and 19 years is 15.5 years and their mean age at first birth is 16.5 years accounting for average duration of marriage to first birth interval of just 24.4 months.

In India, fertility outside marriage is a very rare event and so the major risk factor of teenage fertility turns out to be early marriage itself. Marriage usually leads directly to childbearing, given pressure, largely exerted by mothers in-law through their sons, for a young bride to have a baby relatively quickly (Barua A and Kurz K, 2008). Since women enter childbearing soon after marriage, the only possible way to reduce teenage fertility is enforcing strict measures to abolish child marriages.

TABLE 3
DEMOGRAPHIC CHARACTERISTICS OF WOMEN WHO BEGAN
CHILDBEARING, INDIA 2005-06

Characteristics	Values
Mean age at first marriage	15.5 years
Mean age at first birth	16.5 years
Mean duration of marriage to first birth	24.4 months
Mean number of children ever born	0.96
Mean number of living children	0.88

Background Socio-Economic Characteristics of Teenage Women

Many social factors have been found to be associated with poor birth outcomes, including poverty, unmarried status, low educational levels, drug use, and inadequate prenatal care (East and Felice, 1996). High rate of teenage childbearing among minority and disadvantaged groups, has been documented in the United States and the United Kingdom, as lack of opportunity and socio-economic disadvantage that contribute to teenage childbearing (Chen et al, 2007).

Differentials in teenage fertility by place of residence of the women are evident. Since almost three quarters of the Indian population live in rural areas, the marital and reproductive behaviour too gets conditioned accordingly. The proportion of women aged between 15 and 19 years who begin their child bearing in rural areas is more than double that of urban areas. This differential is

discernible in all the regions and in the Eastern states rural-urban differential is more pronounced.

Teenage pregnancy or at least teenage birth occurs disproportionately among the socially and economically disadvantaged class of society. Religiosity invariably influences the marital and fertility behaviour of women in India and differentials by religion are noticeable with regard to teenage fertility among the present group of women too. The proportion of teenagers who have entered motherhood in India shows only slight variation among the Muslims and the Hindus. This pattern is true for the southern, eastern and western region. But in the north eastern region the difference is well pronounced. In the north, teenage pregnancy or motherhood is higher among the Christians followed by the Hindus and then the Muslims. Regarding the caste-wise break up when one in five women aged between 15 and 19 years from SC/ST category becomes teenage mother or are currently pregnant, around 16 per cent of those in the OBC category have entered motherhood. Greater proportion of teenage fertility among SC/ST women is observed in all the regions except the north where more proportion of women in the OBC category have begun child bearing.

Fertility outside marriage is not encouraged in India and the rigid customs do not allow such practices. Teenage fertility by marital status of women supports this fact as fertility among never married is negligible. Also 58.2 per cent of the currently married women have already begun childbearing. In the NFHS-3 survey about 5.4 per cent of the women are widowed/divorced/deserted/separated and among such women in their teenage only, almost one-third of them become mothers in India. This pattern is more or less the same in all the regions in India.

Women's education is perhaps the most important factor that directly or indirectly exerts strong influence on fertility. There is a plethora of evidence to the fact that high fertility in India is associated with low levels of education and vice versa. Here we find that the proportion of women with either illiterate or with primary level of education experiencing teenage pregnancy or motherhood is almost three times greater than those women with secondary or higher levels of education.

Region-wise too the same pattern is discernible. In India, the persistence of early marriage reinforces women's low status and social isolation, and such marriages almost always force girls to prematurely end their education to assume household responsibilities. Consequently, early marriage reduces women's

employment prospects as well (Moore et. al, 2009). Working women often delay marriage and child bearing and this picture is true with regard to teenage fertility pattern too. When 17.2 per cent of the non working teenage women are already mothers, about 13 per cent of the working women have begun child bearing. Except in the northern states, where differentials in teenage fertility is absent by women's work status, proportion of women experiencing teenage pregnancy or motherhood is greater among women who are not working (Table 4).

TABLE 4
BACKGROUND SOCIO-ECONOMIC CHARACTERISTICS OF WOMEN WHO BEGAN
CHILDBEARING, INDIA 2005-06

Characteristics	Percentage who have begun childbearing							Total No. of Women
	India	North	Central	East	North East	West	South	
Place of Residence***								
Rural	19.1	13.2	16.3	26.9	16.1	17.4	16.9	17,348
Urban	8.7	5.5	7.6	10.9	10.8	8.7	9.8	7463
Religion***								
Hindu	16.4	12.0	15.1	24.1	13.1	13.5	14.3	17795
Muslims	17.0	9.6	10.4	23.9	25.2	11.8	14.4	3153
Christians	7.8	13.3	0	6.1	8.7	0	9.4	462
Others	14.3	3.6	3.2	16.8	12.5	16.0	25.0	3198
Caste***								
SC/ST	20.2	12.0	18.4	29.5	13.1	19.6	17.8	6981
OBC	16.0	15.8	14.4	25.6	9.7	19.9	13.6	10020
Others	12.1	6.3	8.6	17.4	18.5	12.1	11.1	7810
Marital Status***								
Never Married	0	0	0	0	0	0	0	17969
Currently Married	58.2	51.4	54.3	59.7	63.0	63.9	60.8	6726
Widowed/Divorced/Separated/Deserted	31.4	54.5	30.0	38.9	33.3	6.7	23.5	115
Women's Education***								
Illiterate/Primary	28.0	21.3	22.7	33.7	26.5	30.2	33.5	9200
Secondary or Higher	8.9	4.7	7.3	13.5	9.0	9.2	8.8	15609
Women's Work Status***								
Non Working	17.2	10.7	15.8	25.0	15.7	14.5	14.6	18160
Working	12.7	10.8	9.5	19.2	12.4	11.6	12.8	6601
Wealth Index***								
Poor	23.4	15.5	18.9	30.7	23.3	23.3	20.2	9503
Middle	16.3	13.4	13.9	21.2	13.4	16.3	16.7	5390
Rich	8.6	7.8	7.1	10.7	6.4	8.6	9.4	9919

*** Significant at 1 percent level $p < .01$

Economic status plays an important role in the fertility behaviour with the economically better off group usually having lower fertility than their poor counterparts. Here the proportion of poor women who have begun child bearing is almost thrice and those in the middle income group is almost twice more than their richer peers and this pattern is the same for all the regions in general. If the differentials in teenage fertility by socio-economic status are observed for rural and urban areas, one interesting observation is that among both the urban poor and the rural poor, around one-fifth of the teenagers have begun child bearing. So teenage fertility is invariably high among the rural and urban poor people. In contrast, teenage fertility proportion among the rural rich class is double that of the urban rich class.

Bivariate analysis showed the association of background variables of the respondent on teenage fertility. As far as the factors that mostly determine teenage fertility in India are concerned, many explanatory variables have been identified in literature.

The association of socio-economic and demographic factors to teenage pregnancy is still a topic of strong debate (Chen et. al, 2007). Few researchers argue that societal level factors play a vital role (Teitler, 1999). But in teenage pregnancy, the most likely predictor variables would perhaps be the background socio-economic or cultural factors. To identify those variables that predict the likelihood of teenagers to begin motherhood (dependent variable), we employ multivariate logistic regression method since the dependent variable is dichotomous. The independent variables considered are place of residence, religion and caste, the marital status, education and work status of the mother and the standard of living expressed as the wealth index.

Bivariate analysis showed that teenage pregnancy and motherhood was proportionately more in the rural than in urban areas. Place of residence also emerges as a strong predictor of the risk of teenage motherhood among the teenagers in India with women from urban areas at lesser odds (50 per cent) of entering motherhood in the teens than the rural peers. In all the regions except the north eastern region this relationship is statistically significant.

However, one of the most consistent findings in this regard is the role of education in explaining teenage fertility. Higher levels of education are often associated with lower fertility. This finding is validated in the present context too as teenage mothers with higher levels of education are at lesser odds of

motherhood in their adolescence than their illiterate or lesser educated counterparts. We find that the magnitude of effect of education is relatively stable in all the regions in India (Table 5).

TABLE 5
RESULTS OF MULTIVARIATE LOGISTIC REGRESSION ANALYSIS SHOWING THE
CORRELATES OF TEENAGE PREGNANCY OR MOTHERHOOD IN INDIA-2005-06

Variables	North		Central		East		North East		West		South	
	Coeff	OR	Coeff	OR	Coeff	OR	Coeff	OR	Coeff	OR	Coeff	OR
Place of Residence (Rural)												
Urban	-0.71**	0.49	-0.42*	0.66	-0.56**	0.57	--	--	-0.57**	0.57	-0.46**	0.63
Religion(Hindus)												
Others	-0.66**	0.52	-0.49*	0.62	--	--	--	--	--	--	--	--
Caste (SC/ST)												
OBC	0.34**	1.40	-0.20*	0.82	-0.16*	0.86	--	--	-0.69**	0.50	--	--
Others	--	--	-0.43*	0.65	-0.40	0.67	--	--	-0.22*	0.80	-0.33**	0.72
Wealth Index (Poor)												
Middle	0.32**	1.38	--	--	-0.16*	0.86	-1.00**	0.37	--	--	--	--
Rich	0.56**	1.76	-0.35*	0.71	-0.57**	0.57	--	--	-0.62**	0.54	--	--
Mother's Education (Illiterate /Primary)												
Secondary/ Higher	-1.85**	0.16	-1.32*	0.27	-0.90**	0.41	-1.10**	0.34	-1.38**	0.25	-1.93**	0.15
Mother's Work Status(Non Working)												
Working	-0.60**	0.55	-1.04*	0.36	-0.66**	0.52	-0.62*	0.54	-1.08**	0.34	-1.02**	0.36
Husband's Work Status (Unemployed)												
Employed	--	--	--	--	--	--	-1.46*	0.23	--	--	-2.16*	0.12
N	4426		4928		3728		4274		2820		3779	
-2 log likelihood	1921.768		4895.40		6046.12		718.56		2360.06		3267.36	

** $p < .01$, * $p < .05$; Reference category of the predictor variables are given in brackets.

The influence of religion on teenage fertility appears to have attenuated over time as we find that barring northern and central regions in India, religion fails to significantly explain the likelihood of teenage fertility. Here the women who belong to religion other than the Hindus are at lesser odds to begin their childbearing than the Hindus. But with regard to the caste, in the northern states, OBC women are at greater odds of teenage fertility only in the northern region whereas in all others they are significantly at lesser odds.

Individual or household based socio-economic measures are stronger predictors of teenage pregnancy (Manlove J, 2009; Shaw M, 2000 Hockaday C, 2005). The association between the socio-economic status of the women expressed here as the wealth index and teenage fertility shows the much expected picture in all the regions except the northern region. The middle and rich income groups of women have lesser likelihood for beginning childbearing in their teenage compared to their poor counterparts in all the regions except the northern region where the middle and rich income groups are at greater odds of initiating teenage fertility.

Mother's education and work status have been highlighted to be strong predictors of fertility behaviour in India. Here too mothers with secondary or higher education levels and those who are employed are at lesser odds of entering motherhood early in their teenage as compared to lesser educated or illiterate and unemployed mothers respectively. Longer years of educational pursuit and also more time spent at work reduce the chance of early marriages. So the argument that higher levels of education lessens the possibility of early marriages and associated fertility as documented in many studies holds true here.

CONSEQUENCES OF TEENAGE MOTHERHOOD

Teenage fertility is widely professed as having important social and health consequences. Teenage mothers experience social disadvantage by way of educational levels, employment and wealth status. Avoiding childbearing during adolescence allows young women the chance to complete their schooling and to take advantage of work opportunities, and could have long-term benefits. Research in Europe has found some similar relationships between teenage childbearing and disadvantage, although the societal impact may be perceived differently where the level of adolescent childbearing is much lower than it is in the United States (Kiernan, 1996).

The health consequences manifest in the form of poor health of both the mother and child. Pregnant adolescents younger than 17 years have been shown to have a higher incidence of medical complications involving mother and child than do adult women (Piccinino and Mosher, 1998; Satin et. al, 1994). Consequences of teenage pregnancy or motherhood are assessed using variables that address the health status of the mother and the children born to teenage mothers. Information on the nutritional status of the mother and the anaemia level at the time of survey are provided in the NFHS-3 data. Pregnancy complications, type of delivery (last birth), self reported prevalence of Sexually Transmitted Diseases, pregnancy wastage and child loss are proximate variables that reflect the health status of the teenage mothers. The health status of the children is depicted mainly by nutritional status and prevalence of anaemia among children. Anaemia has been calculated for children aged six months and above.

Maternal Health Indicators

Nutritional Status of Teenage Mother

The nutritional status is expressed as the Body Mass Index (BMI) values. BMI below 18.5kg/m^2 is said to be thin, 30 kg/m^2 or above is obese. Almost two-thirds of the teenagers in the present data sample in India are thin. However, only a small proportion of teenagers who have begun childbearing are obese. The association between prevalence of thinness or obesity (termed abnormal BMI here) among teenage mothers and the level of teenage fertility shows a strong positive correlation (0.87) (Table 6).

In those states where teenage fertility is high, the proportion of women who are either thin or obese (abnormal BMI) is also high and vice versa (See Figure 2). In the eastern states of Bihar, Jharkhand and West Bengal (in red), the proportion of women with abnormal BMI is greater than 20 per cent (crossed lines). On the other hand, in the northern states of Jammu and Kashmir, Himachal Pradesh (in Green) and in the southern states of Kerala and Tamil Nadu (in yellow) the proportion of women with abnormal BMI is less than 10 per cent (slanting lines).

FIGURE 2

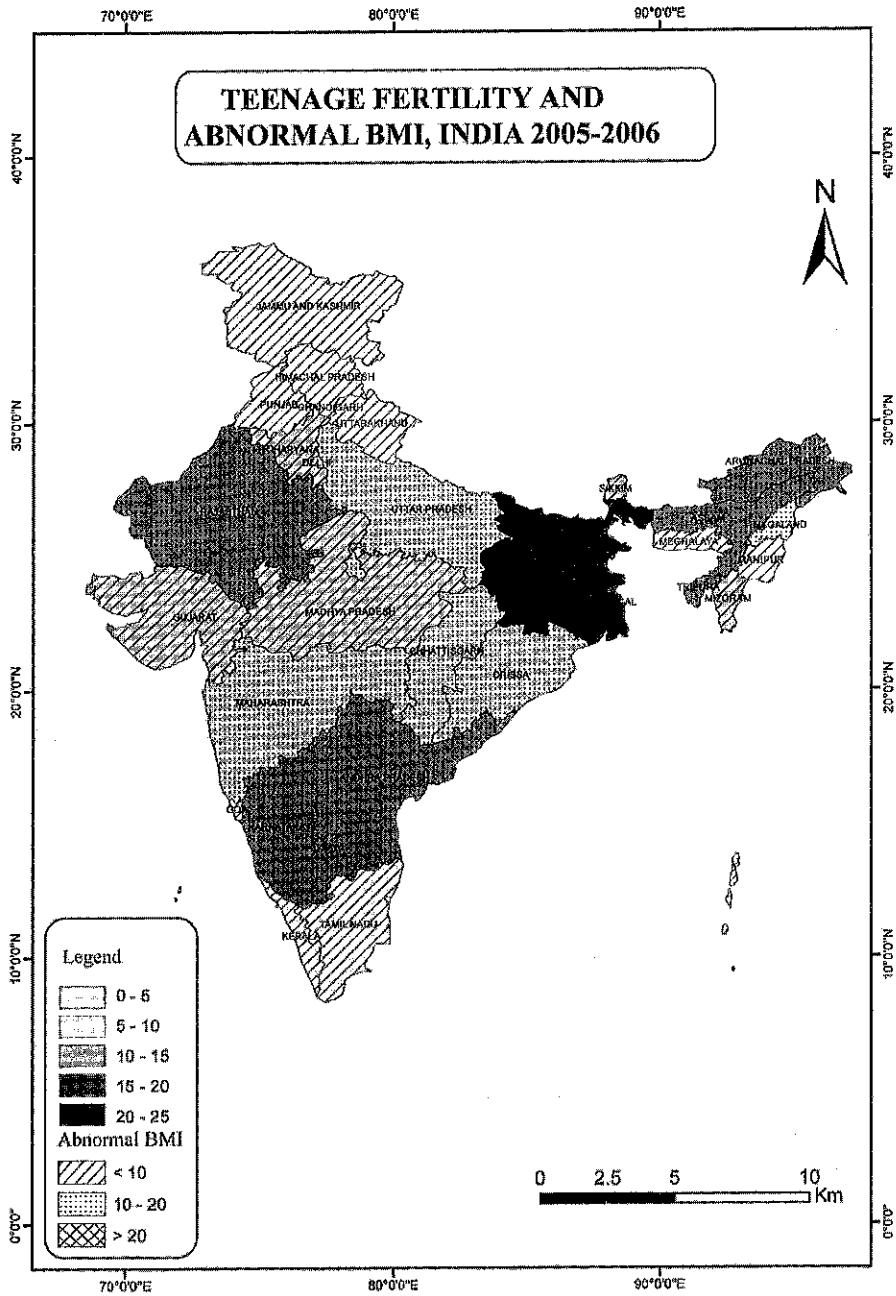


TABLE 6
CONSEQUENCES OF TEENAGE FERTILITY ON MOTHER'S HEALTH, INDIA 2005-06

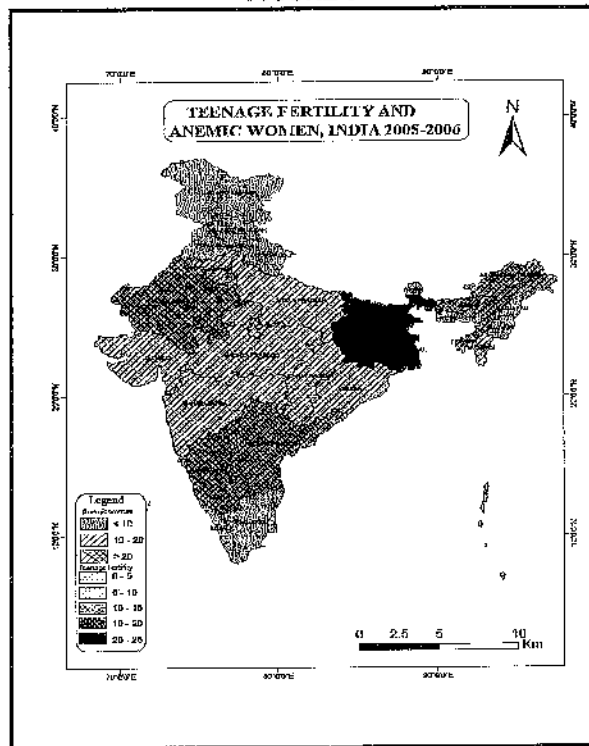
Indicators	Percentage	Correlation Coefficient
BMI of Women		
Thin	39.0	0.87
Obese	2.5	
Prevalence of Anaemia	66.1	0.97
Any Pregnancy related Health Problems	57.8	0.11
Pregnancy Wastage	9.8	0.86
Child Loss	8.0	--
Caesarean Section (last birth)	7.4	0.04

Maternal Anaemia

Anaemia in adolescent girls is a consequence of inadequate nutritional status which gets further compounded during pregnancy, due to growth of the foetus and maternal tissues (Kanani and Ghanekar 1997). Anaemia is pervasive among teenage women who have begun childbearing. Almost two-thirds are found to have any anaemia; mild or moderate or severe. Anaemic women are always at higher risk of contracting other diseases. Early pregnancy exerts much stress on women's health and the tendency to be anaemic increases. A study in north India showed that the prevalence of anaemia is high among teenage mothers, which occurs due to low intake of dietary iron (Pathak et. al., 2003).

Teenage fertility with prevalence of anaemia (Figure 3) shows strong positive correlation (0.97). In the states where teenage fertility is high (Eastern states in red), prevalence of anaemia is also invariably high (crossed lines). Similarly, low prevalence of anaemia is found in states with low teenage fertility proportions (in green and yellow overlaid with dots).

FIGURE 3



Pregnancy Related Health Problems

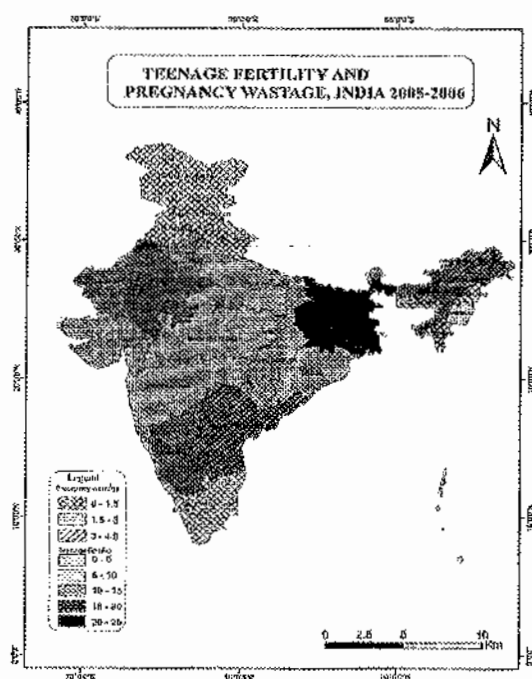
The health problems that women face during pregnancy are myriad. Research studies identify low pre-pregnancy weight and height, parity, and poor pregnancy weight gain as the only biological factors that have been associated consistently with negative pregnancy results (Goldenberg and Klerman, 1995). Here we consider problems like convulsions not from fever, swelling of legs, body or face, excessive fatigue, vaginal bleeding, night blindness and difficulty with vision during daylight that are documented as self reported problems in NFHS-3. Night blindness or difficulty in seeing at dusk is a common problem arising due to chronic vitamin A deficiency among pregnant women. Convulsions, at times, are fatal and vaginal bleeding during pregnant often threatens the life of both the mother and the foetus. It is observed that almost two-thirds of the teenagers had at least one of these problems during their most recent births. This proportion is higher in the northern states, eastern states of Bihar and Jharkhand and Madhya Pradesh in the central region. In the southern region, teenagers in Kerala also report higher proportion of health problems during pregnancy.

Pregnancy Wastage and Child Loss

Research studies show that the likelihood of foetal loss is more among women in their thirties and in the teenage years (Wood 1994). In India, almost 10 per cent of the teenage women who had begun child bearing at the time of survey have had foetal loss and another 8 per cent reported death of a child. The proportion of women reporting foetal pregnancy wastage is found to be strongly correlated with teenage fertility (0.86).

Figure 4 which shows the incidence of pregnancy wastage to teenage mothers in India overlaid on the teenage fertility validates this finding. All the eastern states plus Andhra Pradesh and Arunachal Pradesh where teenage fertility is high also shows higher proportion of pregnancy wastage (in red and green colour overlaid by slanting lines). On the other hand, low incidence of foetal loss is seen in states with low teenage fertility, for example, Kerala and Tamil Nadu (yellow and crossed lines), Jammu and Kashmir and Himachal Pradesh (light green with crossed lines). States that show medium level of teenage fertility also has medium levels of pregnancy wastage (light brown and dots).

FIGURE 4



Type of Delivery- Caesarean Section

Review of research studies indicates higher caesarean section deliveries to teenage mothers in many countries (Scholl et. al. 1994; Lao and Ho, 1997; Kumbi and Isehak, 1999). Delivery by caesarean section is considered as one of the poor obstetric outcomes of teenage pregnancy. In the NFHS-3 survey, women were asked about the type of delivery of her last birth. Overall nine per cent of the women aged between 15 and 49 years reported caesarean section. Among teenage mothers, this proportion is 7.4 percent. This proportion varies from around 20 per cent in Tamil Nadu and Andhra Pradesh in the Southern region to around 2 per cent in Madhya Pradesh and Rajasthan. Though only a weak correlation coefficient (0.11), exists the positive values indicate that caesarean section generally tends to be higher in states with higher teenage fertility.

Prevalence of 'Sexually Transmitted Infections (STI)' reported in India as per the findings of NFHS-3 survey is around 11 per cent. Prevalence of STI means women having either STI or symptoms of STI like genital sore or ulcer or who had abnormal genital discharge. Among women aged between 15 and 19 years who had begun childbearing at the time of survey 10.6 per cent reported prevalence of STI.

Health Consequences on Children

Based on the information that reflects the health status of children available from the NFHS-3 data set, the consequences of teenage fertility on the health of children are analysed. Evidence from various studies identify increased low birth weight babies or premature ones (Bledsoe and Cohen 1993, Ghosh, 1962, Wolfe and Perozek, 1997; Davidson and Felice, 1992), higher infant mortality rates (McDevitt, 1996, Kumar et. al., 2007) as the outcomes of teenage pregnancy. Here we consider birth weight of babies, anaemia and nutritional status of children born to teenage mothers (Table 7).

TABLE 7
CONSEQUENCES OF TEENAGE MOTHERHOOD ON CHILDREN'S HEALTH,
INDIA 2005-06

Indicators	Percentage	Correlation Coefficient
Low Birth Weight	45.3	0.22
Nutritional Status		
Stunted	37.6	0.18
Under Weight	43.5	0.42
Wasted	15.4	0.26
Prevalence of Anaemia	79.1	0.22

Birth Weight

There is a very marked association between young age of mother and low birth weight (LBW). We find that around 45 per cent of the babies born to teenage mothers have low birth weight. Biological immaturity in teenage mothers itself is an inherent risk factor for poor outcome and even adequate prenatal care does not completely eliminate the risk (Kumar et. al., 2007). Also as in the case of maternal health, inadequate prenatal care has been singled out as an important determinant of both prematurity and LBW (Makinson, 1985). Half of all the babies born to teenage mothers have low birth weight in the north eastern states, northern states, central state of Maharashtra and southern state of Kerala. The correlation coefficient of 0.22 shows the positive association indicating that states where teenage pregnancy is more, proportion of low birth weight babies is also more (Table 7).

Nutritional Status

The nutritional status indicators among children are height for age – stunted, weight for age—underweight and weight for height- wasted. In India, 37.6 per cent of the children born to teenage mothers are stunted, 43.5 per cent are underweight and 15.4 per cent are wasted. Nutritional deficiencies eventually lead to anaemia in children. The problem gets compounded when the mother is also malnourished. Studies show that more than half of all children born to malnourished teenage mothers are severely malnourished and undernourished (IIPS, 1995). Inter-state differentials do exist in prevalence of malnourishment among children of teenage mothers in India. Except Tamil Nadu, Andhra Pradesh and Tripura, all the other states show prevalence of stunting in children around 40 per cent. More than half the children born to teenage mothers are stunted in Orissa. Similarly, underweight children born to teenage mothers are more in Jharkhand, Orissa, Madhya Pradesh and Bihar. Though the proportion of wasted children is less as compared to stunted and underweight children, the north and north eastern states show more prevalence. Positive correlation coefficients between teenage pregnancy and proportion of stunted children (0.18), that with underweight (0.42) and with wasted children (0.26) show that children born to teenage mothers tend to be stunted, underweight or wasted in those states where teenage fertility is more prevalent.

Anaemia

Anaemia among children is widespread in India. Babies born to teenage mothers are at greater risk of health problems. Almost 70 per cent of the children in India have either mild, moderate or severe anaemia (NFHS-3). When the prevalence of anemia among children born to teenage mothers are analysed, around 79 per cent are anemic. The correlation coefficient between anaemia in children and teenage pregnancy is 0.22. The positive association is indicative of the fact that among the states, prevalence of anemia tends to be greater when teenage pregnancy increases. In most of the states except Kerala, Jammu and Kashmir, Delhi, West Bengal and Uttarakhand, prevalence of anaemia is above the national average.

CONCLUSION

Teenage fertility is widely prevalent in India. Though the contribution of teenage group to Total Fertility Rate has declined, over the last few decades, the tempo of decline has slowed down in the past few years. Since fertility outside marriage is not encouraged in India, the fact that overall 16 per cent of the women in India have begun childbearing is itself evidence to the phenomenon of child marriages especially before the legal age at marriage. The study findings reveal that the eastern states of Bihar, Jharkhand and West Bengal show more proportion of teenagers beginning child bearing. Teenage fertility is a problem also in the northern state of Rajasthan, north eastern states of Arunachal Pradesh, Assam and Tripura and the southern states of Karnataka and Andhra Pradesh. Most of these states other than those in the southern region are essentially the states where fertility is still on the higher side.

Statistical analysis identifies education and employment of the mother to be the most important contextual factors that explain teenage fertility irrespective of region in India among the social, cultural or demographic factors. Longer years of educational pursuit and also more time spent at work reduce the chance of early marriages. The socio-economic settings expressed by the wealth index also significantly explain to a large extent the likelihood of beginning child bearing in the teens. Teenage fertility is more among the poor women, whether in rural or urban areas. The cultural background does not emerge as the predictor variable uniformly through out India as religion fails to significantly explain fertility behaviour during the teenage.

The consequences of teenage fertility are found to manifest in the form of poor health outcomes on the mother and the children. Strong positive correlation coefficients indicate that prevalence of malnutrition, anaemia and pregnancy wastage to teenage mothers are more in those states where teenage fertility is more. Apart from the health consequences, studies have also pointed out the low educational attainment, low standard of living and unemployment status of women as the social and economic consequences of teenage fertility. Girls are forced to quit their studies and in the process lose opportunity to gain skillful employment too and so the poor always remain poor.

Given the higher rates of teenage fertility and the dire consequences on the health of the mother and the children, enforcing the legal age at marriage of women is the first most important step. Almost all the childbearing in India occurs only within marriage and so the existing laws to improve women's status through delaying age at marriage need to be more strictly imposed and supported. Contraceptive prevalence among teenagers is quite low in the present sample of women and so fails to explain the likelihood of teenage fertility. But increase in contraceptive use especially spacing methods should necessarily delay first birth and provide young women time to be physically, mentally and biologically prepared to enter motherhood. Adolescents, their parents and community should be made more aware of the negative health, social and economic consequences of teenage pregnancy through information dissemination, sex education and campaigns. At schools, sensitizing the teenagers on the reproductive health problems associated with teenage fertility should be given priority. As the saying goes, 'Prevention is better than cure' what we need now in India are stringent measures to prevent child marriages and the associated teenage fertility which should necessarily save the health of women and children and also bring down fertility in order to take India to the goal of replacement level fertility and ultimate population stabilization.

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HEALTH AND NUTRITIONAL STATUS OF LACTATING WOMEN AMONG DIFFERENT INCOME GROUPS IN NALANDA DISTRICT, BIHAR

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ABSTRACT

Lactation is a normal physiological process that begins soon after parturition during which the mother starts nourishing her baby. To fulfill this function she should have an additional nutritional store to nourish the rapidly growing baby. Nutritional food is a pre-requisite for maintenance of good health of lactating women and that of their offspring. Satisfactory performance of lactation is influenced by the nutritional status of the mother and by intake of adequate diet. Keeping this in view, the present study was conducted to assess the health and nutritional status of lactating women of different income groups in Nalanda district of Bihar (India). Low and high blood pressure levels, under weight, prevalence of nutritional deficiency signs and common infections were found to be the main areas of concern affecting health and well-being of lactating women.

Keywords: Nutritional Status, Nutrient Intake, Socio-Economic Group, BMI, RDA.

Nutritious food is a pre-requisite for maintenance of good health and well-being of vulnerable section of population. Lactating women are considered as nutritionally vulnerable section of the population. The paramount importance of nutrition of a woman during lactation for her own health and that of her offspring is widely recognized. Satisfactory performance of lactation is influenced by the nutritional status of the mother and the intake of adequate diet, (FAO,WHO,1981).

The most vulnerable period in women's life is reproductive period when they go through physiological stress and strain of child bearing and childrearing. The nutritional intakes during pregnancy and lactation influence the condition of the offspring at birth, the body's needs are aggravated and fall short of recommended dietary allowances which if not met gradually depletes her body nutrient reserves resulting in nutritional gap and causes deterioration in maternal health status.

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From a knowledge of human metabolism during lactation, it can be predicted that breast milk synthesis are blood (for milk energy and lactose) fatty acid (for longer chain acids), and blood free amino acids (for protein synthesis), Hartmann et al, 1998.

There is a wide spread belief in the communities that cultural food restrictions practiced by breast feeding women have deleterious consequences on the health status of mothers and infants. There is a lot of evidence available from several studies reported in different parts of the world that belief concerning the importance of food restrictions on lactation are very common, (Ferro-Luzzi et al, 1980 and Pande, et al, 1990).

MATERIALS AND METHOD

Women in the study were selected from Nalanda district, Bihar. Two hundred and fifty five lactating women were randomly selected from three blocks of Nalanda district. In which 85 lactating women were from each block. An interview schedule was used for obtaining information. Systolic and diastolic blood pressures were evaluated (using a properly calibrated aneroid manometer). The Height and weight were measured according to the methods of Jelliffe and BMI was calculated by weight (kg) / Height (m^2) equation given by Gopalan. They were categorized into four groups, based on their BMI:

- <20 kg - Underweight
- 20 - 24.9 = Normal
- 25 - 29.9 = Overweight
- >30 = Obesity

The clinical signs and symptoms pertaining to the nutritional deficiencies were recorded using the proforma prescribed by Jelliffe. Information on socio-economic status was collected based on the schedule adopted by HUDCO regional office, Patna. The results were statistically analysed using "Chi-square" test.

FINDINGS AND DISCUSSION

Table-1 gives distribution of lactating women of different income groups by their blood pressure levels. 73.17 per cent of lactating women of low income group have normal blood pressure, 18.25 per cent low and only 8.54 per cent high blood

pressure respectively. On the other hand 66.67 per cent of middle income group and 69.35 per cent of high income group respondents have normal blood pressure. Similarly 20.72 per cent and 17.74 per cent of medium and high income group women have high blood pressure respectively.

TABLE 1
BLOOD PRESSURE OF LACTATING WOMEN ACCORDING TO DIFFERENT INCOME GROUPS

Blood Pressure	Low Income Group		Middle Income Group		High Income Group		Total	
	No.	%	No.	%	No.	%	No.	%
Normal	60	73.14	74	66.67	43	69.35	177	69.41
High Blood Pressure	7	8.54	23	20.72	11	17.74	41	16.08
Low Blood Pressure	15	18.29	14	12.61	8	12.91	37	14.51
Total	82	100	111	100	62	100	255	100

$\chi^2 = 6.182$, d.f. = 4, $P < 0.1$

Overall 69.41 per cent of lactating women have normal health which may be considered as satisfactory while 16.18 per cent and 14.51 per cent have high and low blood pressure respectively and from health point of view it is a matter of concern. Lactating women of low income group suffer from low blood pressure more as compared to middle and high income groups. It may be due to lack of good quality food. High as well as low blood pressure levels are not good for health, therefore, one should take proper diet to promote good health.

Chi-square test was applied to find out the effect of socio-economic status on the blood pressure of the lactating women. A clear association was inferred between the socio-economic status and the status of blood pressure. Value of $\chi^2 = 6.182$, d.f. = 4, $P < 0.1$.

Using BMI a study was carried out to assess the nutritional status of lactating women with respect to its economic status. In low income group, out of 82 lactating women highest percentage 56 (68.29 %) were normal, 28.05 per cent under weight, 3.66 per cent overweight and none had obesity. While among the middle income group out of 111 lactating women, 31.53 per cent was under weight, 10.81 per cent over weight and 1.80 per cent obesity. In the high income group, out of 62 lactating women, 46.77 per cent had under weight, 4.84 per cent

over weight and none had obesity. Out of 18 over weight, maximum percentages of overweight were found in middle income group. Faulty food habit and less physical work might have resulted in overweight of lactating women in middle income group.

TABLE 2
NUTRITIONAL STATUS VERSUS SOCIO- ECONOMIC STATUS

Socio-economic status	Nutritional status according to Body Mass Index(BMI)								Total	
	20.1- 24.9 (Normal)		<20 (Under Weight)		25 - 29.9 (Overweight)		>30 (Obesity)			
	No.	%	No.	%	No.	%	No.	%	No.	%
Low Income Group	56	68.29	23	28.05	3	3.66	-	-	82	100
Middle Income Group	62	55.86	35	31.53	12	10.81	2	1.80	111	100
High Income Group	30	48.39	29	46.77	3	4.84	-	-	62	100
Total	148	58.04	87	34.12	18	7.06	2	0.78	255	100

$\chi^2 = 13.18$, d.f.= 6, $P < 0.1$

Chi-square test was applied to find out the effect of socio-economic status of the family on the nutritional status of the lactating women. Value of χ^2 being 13.18, d.f.= 6, $P < 0.1$. No association was found between nutritional status of lactating women and socio-economic status. The result showed that there was a massive variation in prevalence rates of under nutrition between low and high socio-economic groups. Normal lactating women were more in low income group (Table 2).

Table 3 depicts prevalence of nutritional deficiency signs in lactating women of different income groups. The table reveals that lactating women of low income group suffered more than those of middle income group from night blindness as a sign of vitamin-A deficiency. There were no cases of night blindness among the women of high income group. Similarly, prevalence of Bitots spot was highest among low income group women and decreased with the rise in their income. Similar is the case with the prevalence of conjunctivitis where lactating women of low income group have highest percentage of sufferers followed by middle and high income group.

TABLE 3
PREVALENCE (PERCENT) OF NUTRITIONAL DEFICIENCY SIGNS IN LACTATING
WOMEN ACCORDING TO DIFFERENT INCOME GROUPS

Deficiency Signs	Low Income Group		Middle Income Group		High Income Group		Total	
	No.	%	No.	%	No.	%	No.	%
Vitamin-A deficiency								
Night Blindness	9	10.98	6	5.41	0	0.00	15	5.88
Bitots spot	12	14.69	12	10.81	4	6.45	18	10.98
Conjunctiva Xerosis	20	24.39	23	20.72	9	14.52	52	20.39
Vitamin-B deficiency								
Angular stomatitis	22	26.83	8	7.21	4	6.15	34	13.33
Cheilosis	22	26.83	25	22.52	8	12.90	55	21.57
Red & Raw Tongue	17	20.73	45	40.54	27	43.55	89	34.90
Vitamin-C deficiency								
Bleeding Gum	11	13.41	14	12.61	0	0.0	25	9.80
Swollen Gum	14	17.08	22	19.82	8	12.91	44	17.26
Iron deficiency								
Yellowish Nail	18	21.95	17	15.32	1	1.61	36	14.12
Pallor of Skin	9	10.96	20	18.02	2	3.23	31	12.16
Pallor of Tongue	17	20.73	6	5.41	2	3.23	25	9.80
Oedema	17	20.73	6	5.41	6	9.88	29	11.37
Iodine deficiency								
Visible goiter	0		0		0			
Thyroid problem	11	13.42	15	13.52	5	8.06	31	12.16

In the total sample, 5.88 per cent 10.98 per cent and 20.39 per-cent of women suffer from night blindness, Bitots spot and conjunctivitis respectively. In all the cases income level of the women is correlated with the prevalence of these diseases. It reveals that the sampled women were not careful about eye care to a large extent resulting in different types of eye diseases (Table 3).

With regard to diseases due to vitamin-B deficiency, lactating women suffered more from Red and Raw tongue followed by cheilosis and angular stomatitis.. While percentage of women suffering from angular stomatitis and cheilosis was the highest among low-income group of women followed by middle and high income group; Percentage of women suffering from Red and Raw tongue was the highest among high income group (Table 3).

It is also clear from the table that symptoms/ailments due to vitamin-C deficiency were mainly prevalent in the form of swollen gums than bleeding of gums. Again, the women of low income group suffered more than those of high income group due to vitamin-C deficiencies.

Iron deficiency syndrome is prevalent more in the form of yellow nails followed by Pallor of skin, oedema and Pallor of tongue. The prevalence of these ailments was the highest in low income and lowest among the high income group lactating women. Thus, Iron deficiency syndrome is highly correlated with the income group of the women and rose with the decrease in income level.

12.16 per cent of lactating women suffer from thyroid problem due to iodine deficiency. This problem is more prevalent among lactating women of low and middle income groups as compared to those of high income group.

TABLE 4
PREVALENCE OF COMMON INFECTIONS IN LACTATING WOMEN ACCORDING TO
DIFFERENT INCOME GROUPS

Name of disease	Low Income Group		Middle Income Group		High Income Group		Total	
	No.	%	No.	%	No.	%	No.	%
Dental caries	9	10.96	24	21.62	1	1.61	34	13.33
Enlarged Tonsils	14	17.07	19	17.12	2	3.23	35	13.73
Cough, cold and fever	9	10.96	9	8.11	5	8.06	23	9.02
Wax Discharge	12	14.63	2	1.80	0	0.00	14	5.49
Dermatitis	10	12.20	4	3.60	5	8.06	19	7.45
Regular Diarrhoea	10	12.20	15	13.5	6	9.7	31	12.2

It is clear from Table-4 that lactating women of all income groups suffer from common infections. Dental caries, enlarged tonsils and regular diarrhoea are more prevalent than cough, cold and fever, dermatitis and wax discharge among lactating women of different income groups. No correlation between the common infections and income of the respondents, was found.

CONCLUSION

The present study was conducted to examine the health and nutritional status of lactating women of Nalanda district in Bihar (India). The indicators of health and nutritional status used in the study include blood pressure level (B.P.), Body Mass Index (BMI), prevalence of nutritional deficiency signs and common infections among the lactating women. The study revealed that incidence of low blood pressure (Particularly in low income group), high blood pressure (more common in high income group), under weight (common in high income group) nutritional deficiency signs of conjunctivitis (common in low income group), Red and Raw tongue (seen in middle and high income groups), swollen gums (popular in middle income group), Yellow nails (common in low income group) and Thyroid problem (common in low and middle income group) were the major areas to be addressed to improve the health and nutritional status of lactating women across all income levels.

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IMMUNIZATION COVERAGE EVALUATION IN A RURAL BLOCK OF DISTRICT ROHTAK, HARYANA

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ABSTRACT

The present study was conducted in block-Lakhanmajra; the rural field practice area of the department of Community Medicine, PGIMS, Rohtak. The aim of the study was to assess the vaccine coverage in 12-23 months old children and to identify the reasons for partial and non-immunization, using 30 cluster sampling technique. The study reveals that 78.2 per cent of the children were fully immunized, 21.3 per cent partially and 0.4 per cent had not received any vaccination at all. Sub-centre was the most preferred place for vaccination. Maximum dropout rate (17.9%) was observed from Diphtheria, Tetanus and Pertussis to Measles. Mean delay in vaccination was the highest in case of measles i.e. approximately a delay of 43 days. Out of the 45 partially immunized children, majority cited lack of information about immunization as a reason.

Keywords: Immunization Coverage, Rural Area, Cluster Sampling.

Immunization has been a central goal of the health care system in India from 1970. The Expanded Programme on Immunization (EPI) was started in 1978 followed by the Universal Immunization Programme (UIP) since 1985¹. Though the reported incidence of Vaccine Preventable Diseases has decreased since 1985, yet there appear to be a recent decline in the immunization coverage. Hence, stress was laid on immunization. It may be noted that roughly three million children die globally each year of vaccine preventable diseases (VPDs) with a disproportionately a large number of these children reside in developing countries.² Vaccines remain one of the most cost-effective public health initiatives³, yet vaccination coverage in India is far from complete despite a longstanding.

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commitment towards universal coverage. Pulse polio immunization (PPI) campaign, initiated in 1995, successfully increased polio immunization, however, coverage of non-polio vaccines have remained unaffected by the PPI campaign.

As per the National Family and Health Survey-3 data⁴, only 43.5 per cent of the children between 12 and 23 months were fully immunized in India while in Haryana the children who were fully immunized were 65 per cent. However, 8 per cent of the children were not immunized at all. The coverage was the lowest for DPT₃ and measles.

Though the reported incidence of VPDs has decreased since 1985, yet there appears to be a recent decline in the immunization coverage.⁵ Much work remains to be done to protect all the children of the nation from these VPDs. India's size and diversity make this especially challenging, coupled with resource constraints and competing priorities. The present study was conducted to assess the vaccine coverage in 12-23 months old children and to identify reasons for partial and non-immunization.

MATERIALS AND METHOD

The study was conducted in block-Lakhanmajra, the rural field practice area of the department of Community Medicine, PGIMS, Rohtak. The block has 24 villages with a total population of 1,03,548 as on March 31, 2009. It was a cross-sectional type of epidemiological study which was conducted in October 2009. The 30 cluster sampling technique, the standard methodology for such surveys as devised by the World Health Organization⁶; was used for the study. Seven children aged between 12 and 23 months were selected from each of the selected clusters. 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, semi-structured, pretested interview schedule was used which had information on the history of vaccination and different factors affecting the vaccination. Vaccination cards were also used to know the exact time of vaccination and in case vaccination cards were not available, history from mothers/reliable respondents were taken. Analysis was done using proportions.

FINDINGS

Out of the total of 211 children studied, 79 (37.4%) had immunization cards. At least 78.2 per cent of the children were fully immunized, 21.3 per cent

were partially and 0.4 per cent had not received any vaccination at all. Coverage of DPT1 and oral polio vaccination was maximum i.e. 98.1 per cent and was least for measles i.e. 80.56 per cent (Table 1). Bacillus Calmette-Guerin scar was present in about 95 per cent of the children i.e. 191 of 201. 80 per cent of BCG and more than 97 per cent of other vaccines were administered at sub-centre (Tables 2 & 3). Maximum dropout rate (17.9%) was observed from DPT1 to Measles (Table 4). Mean delay in vaccination was the highest in case of measles i.e. approximately a delay of 43 days, followed by about 38 days for DPT₃ and 30 days for BCG. Out of 45 partially immunized children, about 70 per cent of them (32) cited lack of information about immunization as a reason for partial immunization. 40 per cent (12) of these mothers were unaware of need for immunization. An odd 30 per cent (9) had fear of adverse effects and about 13 per cent (4) were unaware of the need to return for 2nd or 3rd dose. Similar proportion of mothers also did not know about the place and time of immunization. Remaining (3%) had wrong ideas about contraindication. About 15 per cent of the mothers (7 out of 45), lacked motivation for immunization. Exactly 71 per cent of them postponed the immunization till another time and 28 per cent had no faith in immunization. Obstacles such as non-availability of vaccines, non-availability of time, family problem (ill mother) and ill child were faced by 15 per cent of mothers. One child who was non-immunized in the study, cited lack of knowledge about the place and time of immunization as the reason for non-immunization.

TABLE 1
VACCINATION COVERAGE AMONG STUDY SUBJECTS (N=211)

Vaccine	Number	Percentage
DPT ₁ and Oral Polio Vaccine (OPV) ₁	207	98.1
DPT ₂ and OPV ₂	199	94.3
DPT ₃ and OPV ₃	190	90.04
Measles	170	80.56
BCG*	201	95.2

* BCG scar was present in about 95 per cent of children i.e. 191 of 201.

TABLE 2
PLACE FOR BCG VACCINATION (N=201)

Place	Number	Percentage
Sub-centre	160	79.6
Govt. Hospital	34	16.9
Private	7	3.4

TABLE 3
PLACE OF VACCINATION FOR DPT AND OPV (N=207)

Place	Number	Percentage
Sub-centre	201	97.1
Govt. Hospital	6	2.8
Private	0	0

TABLE 4
DROP-OUT RATES OF DIFFERENT VACCINES

Vaccine	Dropout rates (%)
DPT (1 – 3)	3.8
BCG to measles	15.4
DPT1 to measles	17.9

DISCUSSION

The coverage for various vaccines in the study area is quite good as compared to the national figures (NFHS-3)⁴, data from state of world's children 2009⁷ and also some of the studies undertaken in the area⁸. However, it is still lesser than the national targets.

BCG coverage in the study was found to be lesser than DPT₁. This might be due to improper recall by the mothers as only 79 (37.4%) of the total mothers had immunization cards. Dinesh et al also found that the importance of keeping immunization cards were not well understood even in urban areas, as the cards of around one-third (30.1%) of the total children could not be traced in their study settings.⁸

Another reason might be that the health worker did not assess proper history and failed to give proper immunization to the beneficiary. It stresses up on the importance of having immunization card with both the mother and the health worker.

Mean delay in vaccination was the highest in case of measles i.e. approximately a delay of 43 days, followed by DPT₃ and BCG. Dinesh et al reported similar results.⁸ This implied that measles immunization is usually done at late age than desired.

Another concern in the study was a high number of dropouts, which is more than the dropout rates in Haryana (NFHS-3)⁴. The most common reason for dropouts was found to be the ignorance of parents/family members about the need of immunization followed by fear of adverse effects. As almost all of them (more than 97%) were availing of services from Government sector, this also stresses the role of health workers in immunization services in the study area.

Several researchers have also found that the effectiveness of community health workers in expanding immunization coverage was at best low.⁹ Anecdotal and case study evidence suggested that the current job requirements of the health workers may not be optimally allocating them time for the goal of achieving immunization coverage.¹⁰⁻¹² At the same time, providing better training and monitoring of the community health workers has been identified as important areas for improvement^{11,12}. Improving maternal literacy was other potential avenue for expanding coverage. Policies that encourage female education might lead to significant gains in immunization.

CONCLUSION

Improvement in issues related to delivery of services is the most important key to address the low effectiveness of community outreach immunization activities in villages. The health workers have many responsibilities with few

resources. Significant improvement in the functionality of the existing rural infrastructure may be possible by rationalizing the role of the health workers and providing them with adequate financial and manpower resources to realistically meet the goals.

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