INDIA 2012

Population
Reproductive & Child Health

Selected Papers of
Bhopal Seminar 2012

Editors
Aalok Ranjan
Ravendra Singh

MLC Foundation
'Shyam' Institute

MLC Foundation
82, Aradhana Nagar
Bhopal, MP-462003, India
91-755-4222756

'Shyam' Institute
Mudian Ka Kuan,
Datia, MP-475661, India
91-752-2234522

www.shyaminstitute.in

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To

Dr Ishwar Dass

Who pioneered the Institution of Bhopal Seminar

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Contributors

Rashed Alam	Rajshahi University, Rajshahi, Bangladesh
M Baliarsingh	Jawaharlal Nehru University, New Delhi
T Chandrasekarayya	SV University, Tirupati
Pallavi Gupta	International Institute for Population Sciences, Mumbai
Kshipra Jain	International Institute for Population Sciences, Mumbai
Joemet Jose	International Institute for Population Sciences, Mumbai
Akash Kumar	International Institute for Population Sciences, Mumbai
Kaushlendra Kumar	International Institute for Population Sciences, Mumbai
Kasturi Mondal	International Institute for Population Sciences, Mumbai

Ritwika Mukherjee	Jawaharlal Nehru University, New Delhi
PV Murthy	SV University, Tirupati
Mayank Prakash	International Institute for Population Sciences, Mumbai
D Mahammad Rafi	SV University, Tirupati
Aalok Ranjan	Shyam Institute, Bhopal
Sanjit Sarkar	International Institute for Population Sciences, Mumbai
Tushar Savarkar	International Institute for Population Sciences, Mumbai
Nidhi Sharma	International Institute for Population Sciences, Mumbai
Chander Shekhar	International Institute for Population Sciences, Mumbai
Ravendra Singh	Ministry of Statistics and Programme Implementation, Government of India, New Delhi
D Sai Sujatha	SV University, Tirupati
Sayeed Unisa	International Institute for Population Sciences, Mumbai

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Population, Reproductive & Child Health

Introduction

Aalok Ranjan

This monograph presents a selection of papers presented at the Bhopal Seminar 2012. The theme of the Bhopal Seminar 2012 was Contemporary Issues in Population and Reproductive and Chid Health in India. The institution of Bhopal Seminar was established in the year 2000 to serve as a platform to promote evidence-based discussion and debate on contemporary issues in population and development in India and in its constituent states. Over the years, Bhopal Seminar has become a popular platform for presenting and discussing research related to population and development using the latest available data, especially among young research scholars in the field of demography, statistics, economics and other disciplines of social science.

Forty research papers were presented at the Bhopal Seminar 2012 on different aspects of population and reproductive and child health in India. The present monograph includes sixteen research papers. The papers included in this monograph were selected through an open competitive process that was based on the presentation of the paper and associated discussions. Participants of the Bhopal Seminar 2012 were informed in advance that in each technical session of the Seminar at the most two research papers would be selected jointly by the session chair and the rapporteur to be published as monograph for wider dissemination. The papers so selected were subsequently reviewed and revised on the basis of the comments raised at the time of the presentation of the paper and by the reviewer. The papers included in this monograph present a broad perspective of contemporary issues related to population and reproductive & child health in India and in its constituent states.

The first two papers of the monograph are devoted to the analysis of the data available through the 2011 population census in India. The first paper by Ranjan and Singh uses the provisional population figures of 2011 population census to analysis the demographic diversity across the districts of the country on the basis of a diversity index that has been developed for the purpose. The analysis reveals that most of the district level diversity in the demographic situation in the country is confined to a few districts only.

The second paper by Chandrasekarayya and Murthy has explored the decline in child sex ratio in India and in its constituent States on the basis of data available through population census since 1951. The paper raises concern about the declining child sex ratio in India and suggests a number of measures that may be taken to halt the nearly secular decrease in the child sex ratio in the country.

The next three papers of the monograph are devoted to an exposition of the current child health scenario in India. The impact of the transition in the family size resulting from demographic transition on child health has been analysed by Mukherjee on the basis of state level data available through National Family Health Survey 2005-06. The paper concludes that transition in the family size has an impact on child health that needs to be considered in the policy discourse.

The next paper by Gupta and Kumar analyses the impact of nutrition advice to pregnant mothers during antenatal visits on the prevalence of low birth weight and concludes that the prevalence of low birth weight is low in those mothers who got nutrition advice during antenatal visits. The paper suggests that nutrition advice during pregnancy should constitute an integral part of the essential antenatal care package to reduce maternal and child mortality.

Socio-economic inequality in child nutrition in India have been highlighted by Jose on the basis of the data available through the National Family Health Survey 2005-06. The paper suggests that the burden of underweight children in India is disproportionately distributed among the poor irrespective of gender or spatial location and there is a negative association between the proportion of underweight children and social and economic inequality that needs to be taken into account in any policy directed towards improving the nutritional status of children in India.

The next two papers of the monograph are devoted to reproductive health. The impact of socio-economic, demographic and health related factors on reproductive health behaviour in Bangladesh has been analysed by Alam on the basis of a survey carried out in Bogra district of Bangladesh. The analysis reveals that medical check up during pregnancy increases the probability of positive pregnancy outcomes. On the other hand, Mondal and Chander Shekhar analyse reproductive morbidity in the eastern states of

India and concludes that both reproductive morbidity and the treatment seeking behaviour varies significantly by the background characteristics of women.

The performance of the National Rural Health Mission is the focus of the next two papers of the monograph. The performance of the Mission in the context of health of women and children in Kotagarh block of Kandhamal district of Orissa has been analysed by Baliarsingh in one of the papers. The paper highlights the need of improving the quality of maternal and child health services if the Mission is to be effective in reducing maternal and child mortality. In the second paper, Sujatha and Rafi discuss the dimensions and challenges of National Rural Health Mission in the context of reproductive and child health care in Andhra Pradesh through a macro perspective. The paper concludes that poor utilisation of funds and shortage of manpower are major challenges to the success of the Mission in the state.

The next paper of the monograph, by Kumar and Unisa, analyses infant and young child feeding practices in EAG and non-EAG states in India. EAG states are those where demographic and health transition is slow and fertility and mortality levels are relatively high. The analysis reveals some significant differences in infant and young child feeding practices in the two groups that have important policy and programme implications.

The next paper by Ranjan analyses fertility transition at the district level in India on the basis of a fertility transition index that takes into account the two dimensions of fertility transition - the dimension of birth limitation and the dimension of delayed childbearing. The analysis suggests that when both the dimensions of childbearing are taken into consideration, there is hardly any transition in fertility in the country.

In the next paper of the monograph, Sarkar and Chander Shekhar analyse contraceptive use and methods choice in India on the basis of the data available through the latest District Level Household and Facility Survey 2007-08. The analysis emphasises the need to give more attention to address the unmet need of contraception among young couples. The analysis also reveals substantial use of highly inefficient traditional methods of contraception and recommends that reasons for the use of traditional methods should be explored and adequately addressed.

Socio-economic awareness about government health programmes among women is the subject of the next paper by Savarkar. The paper concludes that relatives and friends continue to be the main source of health related information in the country. However, in the upper class of the society, the electronic media is playing an increasing role in communicating health related information and messages to women. The paper also reveals that in specific cases, health personnel are also an important source of health information to women.

Using the information available through the District Level Household and Facility Survey 2007-08, Prakash analyses the level and determinants of self reported obstetric morbidity in India and associated treatment seeking behaviour. The analysis suggests that the self reported obstetric morbidity is very high in the country and there is clear cultural context of determinants and differentials in reproductive morbidity. The paper concludes that there is widespread imbalance in the treatment seeking behaviour.

Lifestyle diseases among Indian women have been analysed by Jain in the second last paper of the monograph on the basis of the data available through the India Human Develop Survey 2005. The paper emphasises the need of increasing awareness among women about lifestyle diseases and lifestyle modifications to promote good health and nutrition.

The last paper of the monograph, by Sharma, analyses the context and content of sexual relationship among youths of the slums of Mumbai and concludes that the nature of sexual and romantic relationship is changing. The concept of true love is getting replaced by casual sex while premarital sex appears to be on the rise. The paper highlights the need for programme interventions to ensure that youths are fully informed and equipped to make safe choices and negotiate wanted outcomes.

The papers presented in the monograph present an overview of contemporary issues related to population and reproductive and child health in India as revealed through the latest available data including the 2011 population census. The monograph is expected to contribute to policy and programme level discussions to address issues of current interest in the area of population and reproductive and child health in the country.

Demographic Diversity in Districts of India

Aalok Ranjan
Ravendra Singh

Background

India is a very diverse country, demographically as well as in terms of social and economic development. There are variations not only across states and Union Territories but also across districts within states and Union Territories and sub-districts within districts, etc. In view of this wide ranging diversity in the demographic and development situation across the country, there is a renewed emphasis in recent years to promote the decentralised districts-based approach to population and development planning. This emphasis is amply reflected in the 73rd and 74th amendments in the Constitution of India, Tenth and Eleventh Five-year Development Plans (Government of India, 2002; 2008), National Population Policy 2000 (Government of India, 2000), National Health Policy 2002 (Government of India, 2002) and the National Rural Health Mission (Government of India, 2005).

The diversity in demography and development across the country and the emphasis on decentralised district population and development planning call for analysing how demographic and development situation varies across the districts in the country and how demographic and development situation in a district contributes to the situation at state/Union Territory and country level. Analysing demographic and development diversity is thus important through a policy perspective as the persistence of the diversity suggests that exogenous variables and policy and programme interventions affect the demographic and development situation differentially at the lower level administrative units - districts, sub-districts and even towns and villages.

In this paper, we use provisional figures of the 2011 population census to analyse demographic diversity across the districts of India. These figures provide information about the population and its key characteristics for 640 districts of India as they existed at the time of the census. Although, carried out at an interval of ten years, the decennial population census is the only source of district level demographic information in India to facilitate assessment of the demographic situation and to analyse the demographic diversity across the districts of the country. The population census is also the only source to provide population related information support to the decentralised district population and development planning process and for evaluating the impact of population and development programmes and activities on the quality of life of the people at the district and below district levels.

The paper is organised as follows. In the next section, we develop a diversity index to measure the demographic diversity at the district, state/Union Territory and country level and show how the demographic diversity at the district level contributes to the demographic diversity at the state/Union Territory level and at the country level. Section three of the paper presents estimates of the diversity index for the country, states/Union Territories and districts of the country and analyses the variation in the index in the context of selected demographic variables that can be derived from the provisional figures of the 2011 population census. The fourth section decomposes total diversity into within state and between state components while the last section policy and programme implications of the diversity in the demographic situation across the districts of the country in the context of decentralised district population and development planning.

Demographic Diversity Index

We measure the demographic diversity across the districts of the country on a two dimensional scale - the dimension of the extent or intensity of diversity and the dimension of the extensiveness of the diversity. Measures of the extent or intensity of diversity include differentials and concentration. Differentials are the most basic. They measure how a demographic variable V in the district d, V_d, deviates from the national average, V_c. If V_d/V_c=1 for all districts in the country, there is no diversity in the variable V across the districts. The larger is the deviation from the limiting value of 1, the larger is the diversity across the districts. The ratio V_d/V_c, therefore, is an indicator of the extent or the intensity of diversity of the variable V across the districts in relation to the situation at the national level.

One problem in using the ratio V_d/V_c as an indicator of the extent or intensity of diversity is that it may take exorbitantly high or low values for extremely high or low

values of V_d. This concern can be circumvented by using the logarithmic scale rather than the normal scale. Thus the index of intensity of a demographic variable V in district d relative to the intensity in the country as whole may be defined as

$$I_{dc(v)} = \log(V_d/V_c) \quad (1)$$

where log stands for logarithm to the base 10 so that log(1)=0. It is obvious that $I_{dc(v)}=0$ when $V_d/V_c=1$; $I_{dc(v)}>0$ when $V_d/V_c>1$; and $I_{dc(v)}<0$ when $V_d/V_c<1$.

On the other hand, the extensiveness of the population may be measured simply in terms of the population in district d as the proportion to the population of the country as a whole. If P_d denotes the population of the district d and P_c denotes the population of the country, then the extensiveness of the population in district d relative to the population of the country may be defined as

$$E_{dc} = P_d/P_c \quad (2)$$

It is obvious that $\sum E_{dc} = 1 \; \forall d \in c$.

The dimension of extensiveness in the measurement and analysis of diversity is important because the population and geographical area are not the same for all districts of the country and this structural diversity may influence the demographic diversity. Accounting for the structural diversity is therefore necessary for any analysis of demographic diversity across districts.

Using the index of the extensiveness of population E_{dc} and the index of the extent or intensity of the diversity of variable V in district d, the index of diversity in district d in relation to the situation in the country as a whole may be defined as

$$D_{dc(v)} = E_{dc} * (I_{dc(v)})^2 \quad (3)$$

Notice that the index $D_{dc(v)}$ is always positive. The larger is the value of the index $D_{dc(v)}$, the higher is the diversity in the district d compared to the situation at the national level. The index $D_{dc(v)}$ is a fuller measure of diversity in variable V across the districts as it takes into account the size of the population of the district.

Finally, total diversity in variable V across all districts of the country may now be defined as

$$D_{cd(v)} = \sum D_{dc(v)} = \sum E_{dc} * (I_{dc(v)})^2 \quad \forall d \in c \quad (4)$$

which is nothing but the weighted sum of the square of the index of intensity of the variable V in the districts of the country. It is clear that the index $D_{cd(v)}$ takes into account the two dimensions of diversity - the dimension of relative diversity and the dimension of extensiveness - as discussed above.

Arguing on the similar lines, the total diversity in variable V in all districts of a state/Union Territory s within the country may also be defined as

$$D_{sd(v)} = \sum D_{ds(v)} \quad \forall d \in s \quad (5)$$

$$D_{ds(v)} = E_{ds}*(I_{ds(v)})^2 \quad (6)$$

$$I_{ds(v)} = \log(V_d/V_s) \quad (7)$$

$$E_{ds} = P_d/P_s \quad (8)$$

Similarly, we can also define

$$D_{cs(v)} = \sum D_{sc(v)} \quad \forall s \in c \quad (9)$$

$$D_{sc(v)} = E_{sc}*(I_{sc(v)})^2 \quad (10)$$

$$I_{sc(v)} = \log(V_s/V_c) \quad (11)$$

$$E_{sc} = P_s/P_c \quad (12)$$

It is now easy to show that

$$D_{dc(v)} = E_{sc}*D_{ds(v)} + E_{ds}*D_{sc(v)} + 2*E_{sc}*I_{ds(v)}*I_{sc(v)} \quad (13)$$

and

$$D_{cd(v)} = \sum E_{sc}*D_{ds(v)} + \sum E_{ds}*D_{sc(v)} + 2 \sum E_{sc}*I_{ds(v)}*I_{sc(v)} \quad (14)$$

Equation (14) decomposes the total diversity in variable V across the districts in the country into two components - diversity across districts within a state/Union Territory or within state/Union Territory component and diversity across states/Union Territory within the country or between state/Union Territory component - and an interaction term. The interaction term may be distributed across the within state/Union Territory and between states/Union Territory components of the diversity following the Goldberg's rule (Durand, 1948).

Data and Variables

The analysis presented here is based on the provisional figures of the 2011 population census released by the Registrar General and Census Commissioner of India (Government of India, 2011). These figures are related to the total population, population aged 0-6 years and population aged 7 years and above who are able to read and write with understanding for each of the 640 districts of country as well as for its 28 states and 7 Union Territories separately for males and females and for both sexes combined.

The provisional figures of the 2011 population census permit estimation of the following 6 demographic indicators for all districts, states and Union Territories of the country:

1. Population density, defined as the population per square kilometre of the geographical area. Population density is the most commonly used indicator of the distribution of population across administrative units. If there is no change in the administrative boundaries, the change in the population density of an administrative unit is proportionate to the change in the population size of the administrative area. If population of a district/state has increased by 10 per cent, population density of that

state/district would also increase by 10 per cent if there is no change in the administrative boundary of the district/state.

2. Proportion of the population aged 0-6 years to the total population. This proportion is a crude indicator of the age structure of the population. The higher is this ratio, the younger is the age structure of the population.
3. The index of age composition defined as the ratio of the population aged 0-6 years to the population aged 7 years and above. The index of age composition may also be regarded an indicator of the age structure of the population.
4. Population sex ratio, defined as the ratio of females to males of all ages combined. This indicator reflects the sex balance in the population. In case of sex imbalance on the either side, the population sex ratio deviates from the limiting value of 1 in which case the number of females are equal to the number of males in the population.
5. Sex ratio in the population aged 0-6 years and sex ratio in the population aged 7 years and above. Age specific sex ratio normally varies from the population sex ratio. The sex ratio tends to be low at very young ages and increases with increasing age. 'Young' population and population with high birth rate tend to have lower overall sex ratio than 'old' population and population with low birth rate (Shryock and Siegel, 1976).
6. Fertility index defined as the ratio of the population aged 0-6 years to females aged 7 years and above. This ratio is similar to the conventional child-women ratio (Shryock and Siegel, 1976), although it includes women which are not exposed to the risk of a birth. This ratio gives an idea about the diversity in fertility levels across administrative units.

It is well known that the demographic indicators described above are influenced by the core demographic processes - fertility, mortality and migration. As such, the underlying assumption of the present analysis is that diversity in the six variables described above across the districts and states/Union Territories of the country broadly reflects the diversity in the three demographic processes across the districts and states/Union Territories of the country. It may however be reiterated that the 2011 population census data released so far is only provisional. There may be changes in these data when final figures of the population census are released by the Census Commissioner and the Registrar General of India. It will however take some time for the Census Commissioner and Registrar General of India to release final data of the 2011 population census for all the 640 districts, 28 states and 7 Union Territories of the country. Till then, the only source of data for analysing demographic diversity across the states/Union Territories as well as across the districts of India is the provisional data of the 2011 population census.

Demographic Diversity in India 2011

Estimates of six demographic variables, described above, for India are given in table 1. These estimates have been derived from the provisional figures of the 2011 population census. The table also includes summary measures of the inter-district variations in the six variables whereas the kernel density plot of the distribution of the variables across the districts of the country are presented in figure 1. These summary measures suggest that all the six demographic variables vary widely across the districts of the country. This is expected because of the social, cultural, economic and environmental diversity that is so pervasive in India. Moreover, the distribution of the six demographic variables across the districts of the country is essentially different as may be seen from the values of the skewness and kurtosis of these distributions. The distribution of population density across the districts is highly positively skewed and has a very high value of kurtosis. This suggests that some districts of the country have exceptionally high population density. At the same time, a very high value of kurtosis indicates that the distribution has sharp peak and long tails. According to the provisional figures of the 2011 population census, the population density is more than 2000 persons per square kilometre in about 15 percent districts of the country whereas in 11 districts, the population density is estimated to be more than 10 thousand persons per square kilometre. District Mumbai in Maharashtra has the highest population density of 50 thousand per square kilometre in the country whereas in all the districts of the National Capital territory of Delhi, the population density is estimated to be more than 3500 persons per square kilometre.

The distribution of the index of age composition and the index of fertility across the districts of the country, on the other hand, appears to be very similar. The skewness is positive but not very large in both the distributions which suggests that there are only a few districts in the country with extremely high ratio of the population aged 0-6 years to the population aged 7 years and above. At the same time, the kurtosis is negative for both the variables which implies that both the distributions have more rounded peak and shorter, thinner tails. The negative value of kurtosis also suggests that there is virtually no district in the country with extremely high index of age composition or extremely high index of fertility.

The distribution of the sex ratio across the districts of the country has however been found to be negatively skewed in all the three indicators of female male balance. This means that there are some districts in the country with extremely low proportion of females to males in the country. There are 9 districts in the country where the population sex ratio is estimated to be less than 800 females for every 1000 males according to the provisional figures of the 2011 population census with the lowest sex ratio estimated in

district Daman in the Union Territory of Daman and Diu where there were only 533 females for every 1000 males. In district Leh of Jammu and Kashmir also, the sex ratio has been estimated to be very low - just 583 females for every 1000 males. On the other hand, in 101 districts of the country, females outnumbered males at the 2011 population census with district Thane in Maharashtra topping the list with a population sex ratio of 1176 females for every 1000 males.

The negative skewness of the inter-district distribution is sharper in case of the sex ratio in the population aged 0-6 years compared to the sex ratio of all ages combined. However, the lowest sex ratio in the population aged 0-6 years is well above the lowest population sex ratio. There are only six districts in the country where the sex ratio in the population aged 0-6 years has been estimated to be less than 800 females per 1000 males. Four of these six districts are in Haryana while the remaining two are in Jammu and Kashmir. At the same time, there are only three districts in the country where the female population aged 0-6 years outnumbered the male population aged 0-6 years at the 2011 population census.

Finally, the distribution of the sex ratio in population aged 7 years and above across the districts is very much similar to the distribution of the population sex ratio. In fact, the sex ratio in the population aged 7 years and above appears to largely determine the population sex ratio. In ten districts of the country, the sex ratio in the population aged 7 years and above has been estimated to be less than 800 females per 1000 males and nine out of these ten districts, the population sex ratio is also less than 800 females per 1000 males with the lowest ratio estimated in district Daman of the Union Territory of Daman and Diu where there are only 500 females aged 7 years and above for every 1000 males aged 7 years and above. On the other hand, in 117 districts of the country females aged 7 years and above outnumbered males 7 years and above with district Mahe in Puducherry, topping the list with more than 1200 females aged 7 years and above for every 1000 males 7 years and above.

Table 1 also presents estimates of the diversity index defined by equation (4) for each of the six demographic variables and summary measures of the inter-district variations in the diversity index defined by equation (3). The district level diversity is the highest in population density but the lowest in sex ratio of the population aged 0-6 years. Moreover, the inter-district distribution of all the six demographic variables are skewed towards the right because of the index of diversity defined by the equation (3) is, by the very definition always positive irrespective of whether the intensity of the demographic variable in question in a given district is either less than or more than the intensity at the national level.

In any case, it is evident from table 1 that the observed inter-district diversity in India in all the six demographic variables is primarily the result of extreme situation in selected districts. In most of the districts, the diversity index, $D_{dc(v)}$, is less than the average $D_{dc(v)}$ for the country as a whole. The analysis also suggests that 90 per cent of the districts of the country account for only around 25 per cent of the total inter-district diversity in the population density while the remaining 75 per cent of the inter-district diversity is accounted by the remaining 10 per cent of the districts. In case of the index of age composition, this proportion is around 52 per cent which means that nearly half of the diversity in the index of age composition across the districts of the country is accounted by only 10 per cent of the districts having extreme values of the index of age composition. In case of the population sex ratio, the corresponding proportions are 90:10::45:55. Similarly, the corresponding proportions are 90:10::51:49 in case of the sex ratio of the population aged 0-6 years and 90:10::44:66 in case of the sex ratio of the population aged 7 years and above measured in terms of female/male ratio. Finally, in case of the index of fertility, 90 per cent of the districts of the country account for only about 51 per cent of the total diversity across the districts while remaining around 49 per cent of the total diversity is accounted by the remaining 10 per cent of the districts. The highly skewed distribution of the districts of the country on the scale of the index of diversity in all the six demographic variables is very well reflected in the kernel density plots presented in figure 2. The observed inter-district variation in the index of diversity suggests that the diversity in the demographic scenario across the districts of the country is largely a result of some extreme situation in selected districts.

Table 2 lists 10 districts of the country with the highest diversity index $D_{dc(v)}$ for each of the six demographic variables. The table also presents the proportion of the total diversity across the districts of the country accounted by these ten districts. Results presented in table 2 are revealing. In case of population density, the 10 districts having the highest diversity index in the country account for more than 45 per cent of the total inter-district diversity across the country whereas in case of population sex ratio and sex ratio of the population aged 7 years and above, this proportion is more than 22 per cent. Finally, in case of the index of age composition, sex ratio of the population aged 0-6 years and index of fertility, this proportion is around 14 per cent. Table 2 thus confirms that a very substantial proportion of the total inter-district diversity in the selected demographic variables as revealed through provisional figures of the 2011 population census is accounted by extreme diversity in selected districts of the country.

Table 2 also suggests that the districts with extreme diversity are different for different demographic variables, although there are districts which have extreme values in more

than one variables included in the analysis. More specifically, district Mumbai Suburban in Maharashtra has extremely high diversity index in five of the six variables. It is only in case of the sex ratio of the population aged 0-6 years that this district is not included in the ten districts with highest diversity. On the other hand, district Chennai in Tamil Nadu, and districts Kolkata and North Twenty-four Parganas in West Bengal have extremely high diversity index in three of the six demographic variables - population density, index of age composition and index of fertility. Similarly, district Tiruvananthapuram in Kerala has extremely high diversity index in three variables - population sex ratio, sex ratio of the population aged 7 years and above and index of fertility whereas district Surat in Gujarat has extremely high diversity index in all the three indicators of female-male balance in the population. In district Daman of the Union Territory of Daman and Diu and districts Kannur, Kollam, Kozhikode, Mallapuram and Thrissur of Kerala, the index of diversity has been found to be very high in the population sex ratio and in the sex ratio of the population aged 7 years and above. Similarly, in district Coimbatore of Tamil Nadu, districts Krishna and Karimnagar of Andhra Pradesh, district Hugli of West Bengal and district Purba Champaran of Bihar, extremely high diversity index has been estimated in case of the index of age composition and the index of fertility. In the remaining 16 districts, the diversity index is amongst the highest in the country in one of the six demographic variables. These districts include three districts of the National Capital Territory of Delhi - North-West, North-East and West districts - district Bangalore of Karnataka and district Hyderabad of Andhra Pradesh where the index of diversity is amongst the highest in case of population density; districts Ahmednagar, Bid and Jalgaon of Maharashtra, districts Jhajhjhar and Sonipat of Haryana and district Amritsar in Punjab, district Jammu in Jammu and Kashmir and district Agra in Uttar Pradesh. Finally district Thane in Maharashtra, the diversity index in the sex ratio of the population aged 7 years and above has been estimated to be amongst the highest across the districts of the country. Thus a very substantial proportion of the total diversity in the six demographic variables is accounted by only 34 or by just about 0.5 per cent districts of the country. If these 34 districts are excluded from the analysis then there is very substantial reduction in the inter-district diversity in the country all the six demographic variables included in the analysis.

In order to cluster the districts according to the diversity in the six demographic variables, we have applied the K-means clustering technique. This technique requires the number of clusters to be extracted in advance. In order to decide the number of clusters, we followed the rule of the thumb according to which the number of clusters should approximately be equal to $\sqrt{n/2}$ where n is the number of districts. This rule suggested

that the total number of clusters that may be extracted from the data set should not be more than 18.

Application of the above approach suggested that out of the 18 clusters so extracted, only five clusters have more than 2 districts in the cluster. In the remaining 13 clusters, there was only one district in 12 clusters and 2 districts in one cluster (Table 3). Out of the five clusters which have more than 2 districts, cluster one comprised of 464 or more than 72 per cent districts; cluster two comprised of 103 or about 16 per cent districts; cluster three comprised of 33 or about 5 per cent districts, cluster four comprised of 18 or less than 3 per cent districts while cluster five comprised of 8 or around 1 per cent of the districts of the country. In other words, the clustering exercise thus suggests that 567 or very close to 90 per cent of the districts of the country are grouped in only two clusters in terms of the diversity in the demographic situation as depicted through the six demographic variables included in the analysis.

Out of the remaining 13 clusters, only one cluster has two districts and rest of the 12 clusters are one district cluster. These include five districts of the National Capital Territory of Delhi - South district, South-west district, North-east district, North-west district and West district - and districts Bangalore (Karnataka), Chennai (Tamil Nadu), Ghaziabad (Uttar Pradesh), Haora (West Bengal), Hyderabad (Andhra Pradesh), Kolkata (West Bengal), Mumbai (Maharashtra), Mumbai Suburban (Maharashtra), and North 24 Parganas (West Bengal). The demographic situation of these districts is essentially different from rest of the districts of the country according to the provisional results of the 2011 population census, although many of these districts are geographically contiguous districts. For example, all the five districts of the National Capital Territory of Delhi and district Ghaziabad of Uttar Pradesh are contiguous. Similarly, Kolkata, Haora and North 24 Parganas in West Bengal and Mumbai and Mumbai Suburban in Maharashtra are contiguous but they differ from each other in terms of the six demographic variables.

Decomposition

Districts of India are organised into states and Union Territories. This means that the diversity in the demographic variables across the districts of the country can be decomposed into inter-district diversity within the state/Union Territory and inter-state/Union Territory diversity according to equation (13) for each district and according to equation (14) for the whole country. Application of the equation (14) for individual states and Union Territories also permit to explore how the demographic diversity in different states/Union Territories contributes to the demographic diversity in the country as a whole.

Results of the exercise are presented in table 4. Interestingly, the contribution of the within state/Union Territory and between state/Union Territory components of the inter-district diversity in the country varies by demographic variables used in the analysis. In case of population density, the within state/Union Territory component accounts for around 52 per cent of the total inter-district diversity in the country. Around 46 per cent is accounted by the between state/Union Territory component and the rest is accounted by the interaction term which is insignificant in terms of the magnitude. By comparison, the within state/Union Territory component accounts for around 28 per cent the inter-district diversity in the index of fertility while more than 71 per cent of the diversity is accounted by the between state/Union Territory component. It is also evident from the table that, except in case of population density, between state/Union Territory component is larger than within state/Union Territory component in the remaining five variables. This means that the between state diversity in the demographic situation is larger than the within state/Union Territory diversity as reflected by the five demographic indicators estimated on the basis of the provisional figures of the 2011 population census.

As regards the relative contribution of different states/Union Territories to the total inter-district demographic diversity in the country, Uttar Pradesh figures amongst the five states contributing the largest share to the total diversity in all the six variables. In addition to Uttar Pradesh, Andhra Pradesh, Maharashtra and Tamil Nadu figure in four of the six variables, Bihar and West Bengal figure in three variables, Kerala in two variables and Delhi, Haryana, Punjab and Rajasthan in one of the six demographic variables. The total diversity accounted by the five states contributing the largest share has been estimated to be more than 55 per cent in all but one demographic variables. It is only in case of the sex ratio of the population aged 0-6 years that the five states with largest contribution accounts for very close to 50 per cent of the inter-district diversity in the country while this proportion is estimated to be more than 60 per cent in case of the index of fertility. Table 4 also suggests that the relative contribution of within state/Union Territory and between state/Union Territory diversity varies by state/Union Territory for different demographic variables.

Conclusions

The analysis presented here suggests that most of the demographic diversity across the districts of the country as reflected in the six demographic variables is confined to a few districts only. This observation bears significance in view of the social, cultural, economic and ecological diversity that is so pervasive in India. Despite this social, cultural, economic and ecological diversity, the demographic scenario appears to be very

similar across most of the districts of the country and there are only a few districts with extreme diversity in the demographic situation. The demographic diversity in the six demographic variables used in the present analysis may be attributed to the interaction of basic demographic processes - fertility, mortality and migration - as they shape the age and sex structure of the population. Information about fertility, mortality and migration patterns at the district level is currently not available through the 2011 population census. Once detailed district level data from the 2011 population census is available, it would be interesting to explore how the prevailing patterns of fertility, mortality and migration in the districts of the country contribute to the districts level demographic diversity in the country which is largely confined to a few districts only according to the present analysis.

The analysis also suggests that between state diversity in the six demographic variables accounts for a larger proportion of the total inter-district diversity in the country compared to within state inter-district diversity and there are substantive inter-state variations. Demographic diversity across the states/Union Territories of India are well known. The provisional results of the 2011 population census confirms that this diversity continue to persist.

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Table 1

Selected demographic indicators and associated diversity index in India and summary measures of inter-district variations.

Indicator	Population density	Index of age composition	Sex ratio			Fertility index
			Population	Population aged 0-6 years	Population aged 7 years and above	
			Estimates			
India	381	0.151	0.940	0.914	0.944	0.311
Summary measures of inter-district variations						
Minimum	1	0.072	0.533	0.774	0.500	0.152
Q1	210	0.124	0.905	0.892	0.904	0.254
Median	379	0.154	0.947	0.926	0.950	0.316
Q3	719	0.187	0.981	0.953	0.987	0.388
Maximum	45594	0.290	1.176	1.013	1.206	0.636
Range	45593	0.218	0.643	0.239	0.706	0.484
IQR	509	0.064	0.076	0.062	0.083	0.134
Mean	974	0.157	0.943	0.918	0.947	0.325
Trimmed Mean	486	0.156	0.943	0.920	0.947	0.322
Std. Deviation	3529	0.041	0.062	0.043	0.068	0.086
Skewness	8.890	0.498	-0.558	-0.744	-0.537	0.480
Kurtosis	89.444	-0.263	5.125	0.004	5.422	-0.253
			Diversity index (10^{-5})			
India (D_{cd})	23526.4	1264.3	61.3	37.8	70.4	1383.3
Summary measures of inter-district variations in the index (D_{dc})						
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Q1	1.904	0.154	0.007	0.005	0.007	0.131
Median	7.016	0.790	0.032	0.023	0.035	0.861
Q3	19.107	2.502	0.104	0.067	0.123	2.672
Maximum	2128.224	38.852	2.951	0.756	3.369	36.103
Range	2128.224	38.852	2.951	0.756	3.369	36.103
IQR	17.236	2.351	0.098	0.063	0.116	2.542
Mean	36.760	1.975	0.096	0.059	0.110	2.161
Trimmed Mean	14.976	1.497	0.063	0.044	0.072	1.654
Std. Deviation	145.953	3.295	0.207	0.095	0.241	3.499
Skewness	8.841	4.507	6.716	3.269	6.625	3.652
Kurtosis	94.331	34.264	67.874	13.967	64.854	21.801
N	640	640	640	640	640	640

Source: Author's calculations

Table 2

Ten districts with extreme diversity (highest value of the index $D_{dc(v)}$) in different demographic variables.

Population Density	Index of Age Composition	Population Sex Ratio	Sex Ratio of the Population Aged 0-6 years	Sex Ratio of the Population Aged 7 years and above	Index of Fertility
1. Mumbai (Suburban)	1. Kolkata	1. Surat	1. Surat	1. Surat	1. Kolkata
2. Chennai	2. North 24-Parganas	2. Malappuram	2. Bid	2. Malappuram	2. North 24-Parganas
3. Kolkata	3. Mumbai (Suburban)	3. Kannur	3. Jalgaon	3. Kannur	3. Purba Champaran
4. Mumbai	4. Purba Champaran	4. Thrissur	4. Agra	4. Mumbai (Suburban)	4. Karimnagar
5. Delhi North-West	5. Karimnagar	5. Mumbai (Suburban)	5. Ahmednagar	5. Thrissur	5. Mumbai (Suburban)
6. Hyderabad	6. Hugli	6. Kollam	6. Sonipat	6. Kozhikode	6. Chennai
7. Bangalore	7. Chennai	7. Kozhikode	7. Jammu	7. Kollam	7. Hugli
8. Delhi North-East	8. Krishna	8. Tiruvananthapuram	8. Ahmedabad	8. Tiruvananthapuram	8. Krishna
9. Delhi West	9. Coimbatore	9. Daman	9. Amritsar	9. Daman	9. Coimbatore
10. North 24-Parganas	10. Mumbai	10. Alappuzha	10. Jhajhjhar	10. Thane	10. Tiruvananthapuram
Proportion (per cent) of the total diversity in the country explained by ten districts					
45.26	14.74	22.15	14.33	22.61	13.73

Source: Author's calculations

Table 3

Cluster centres of the six demographic variables.

Cluster number	Number of districts	Diversity index ($\times 10^{-5}$)					
		Population density	Index of age composition	Sex ratio			Index of fertility
				All ages	0-6 years	7 years and above	
1	1	890.41	11.15	0.18	0.12	0.28	9.39
2	1	1321.84	13.52	0.16	0.21	0.15	15.00
3	8	189.81	3.23	0.20	0.07	0.25	3.08
4	1	546.82	28.94	0.01	0.20	0.01	29.34
5	18	126.55	5.69	0.27	0.08	0.32	6.04
6	1	479.95	0.60	0.35	0.07	0.40	0.20
7	2	254.45	0.74	0.42	0.34	0.43	0.75
8	1	2128.22	20.55	1.25	0.00	1.54	15.04
9	1	351.52	5.78	0.00	0.21	0.01	5.49
10	1	1122.20	12.62	0.65	0.10	0.75	9.58
11	464	5.23	1.34	0.06	0.05	0.07	1.49
12	1	780.55	0.00	0.13	0.07	0.14	0.06
13	33	71.78	3.04	0.29	0.09	0.34	3.53
14	1	1052.01	0.45	0.43	0.19	0.47	0.10
15	1	1205.95	38.85	0.14	0.02	0.19	36.10
16	1	941.41	4.12	0.00	0.04	0.00	4.10
17	1	657.57	1.33	0.20	0.11	0.22	0.83
18	103	28.61	2.68	0.12	0.06	0.14	3.05

Source: Author's calculations

Table 4

Within state/Union Territory and between states/Union Territories components of diversity in demographic variables across the districts in India

State/Union Territory	Population density				Index of age composition			
	Within state/UT	Between states/UTs	Interaction	Total	Within state/UT	Between states/UTs	Interaction	Total
AN Islands	1.680	25.910	-3.550	24.036	0.023	0.412	0.005	0.440
Andhra Pradesh	1200.300	60.370	-116.380	1144.290	13.954	106.441	3.163	123.558
Arunachal Pradesh	10.840	212.430	-39.110	184.163	0.654	0.360	-0.059	0.954
Assam	183.320	0.890	8.360	192.565	18.767	6.291	-1.492	23.566
Bihar	209.530	1656.140	259.300	2124.964	12.989	218.194	-3.061	228.122
Chandigarh	0.000	167.180	0.000	167.179	0.000	0.543	0.000	0.543
Chhattisgarh	116.380	196.340	-94.940	217.769	3.625	2.406	-0.203	5.828
Dadra and Nagar Haveli	0.000	1.960	0.000	1.957	0.000	0.057	0.000	0.057
Daman and Diu	0.330	11.440	0.630	12.408	0.024	0.211	0.005	0.240
Delhi	181.810	2996.220	553.770	3731.794	1.402	4.071	0.133	5.606
Goa	0.770	0.020	0.020	0.819	0.057	2.875	0.016	2.948
Gujarat	607.480	42.340	-130.530	519.282	25.235	3.828	1.243	30.305
Haryana	38.920	42.800	12.900	94.624	10.854	0.040	0.085	10.978
Himachal Pradesh	72.150	136.440	-123.580	85.019	0.939	3.703	0.137	4.779
Jammu and Kashmir	374.990	244.400	-466.550	152.836	15.646	10.578	-2.407	23.817
Jharkhand	137.230	3.420	10.550	151.205	12.659	25.710	-1.917	36.452
Karnataka	1109.020	30.470	-107.850	1031.648	31.501	30.412	4.386	66.299
Kerala	94.320	347.170	88.790	530.275	14.332	50.793	3.662	68.788
Lakshadweep	0.000	2.780	0.000	2.781	0.000	0.040	0.000	0.040
Madhya Pradesh	260.220	262.770	-103.710	419.269	21.701	15.845	-1.826	35.719
Maharashtra	3753.920	3.260	-70.490	3686.683	37.962	43.105	4.542	85.609
Manipur	97.560	55.190	-77.700	75.047	0.643	0.007	0.006	0.656
Meghalaya	12.580	51.570	-11.900	52.239	1.052	8.310	-0.279	9.083
Mizoram	4.990	67.630	-8.690	63.925	0.430	0.487	-0.051	0.866

State/Union Territory	Population density				Index of age composition			
	Within state/UT	Between states/UTs	Interaction	Total	Within state/UT	Between states/UTs	Interaction	Total
Nagaland	14.680	40.990	-14.500	41.170	1.197	0.380	-0.093	1.484
Orissa	244.680	79.060	-76.850	246.886	20.377	6.759	1.584	28.720
Puducherry	2.760	69.450	5.850	78.053	0.021	1.510	0.005	1.536
Punjab	54.440	58.030	18.600	131.060	1.348	24.889	0.257	26.494
Rajasthan	472.570	444.300	-327.760	589.106	16.480	34.537	-2.057	48.961
Sikkim	11.510	21.120	-19.520	13.107	0.043	0.860	0.010	0.913
Tamil Nadu	1237.960	159.890	212.310	1610.161	8.243	143.341	2.369	153.953
Tripura	12.550	0.420	-1.140	11.836	1.028	0.495	0.073	1.596
Uttar Pradesh	563.930	1874.460	446.320	2884.710	45.222	67.642	-4.617	108.247
Uttarakhand	161.060	77.790	-99.040	139.807	1.360	0.000	-0.001	1.359
West Bengal	1081.320	1388.740	643.660	3113.716	63.282	53.175	9.311	125.768
India	12325.800	10833.390	367.270	23526.460	383.050	868.307	12.929	1264.286
	52.390	46.050	1.560	100.000	30.300	68.680	1.020	100.000

State/Union Territory	Population sex ratio				Sex ratio of the population aged 0-6 years			
	Within state/UT	Between states/UTs	Interaction	Total	Within state/UT	Between states/UTs	Interaction	Total
AN Islands	0.013	0.028	0.000	0.041	0.000	0.018	-0.000	0.018
Andhra Pradesh	0.543	3.737	-0.000	4.280	0.346	1.259	0.032	1.637
Arunachal Pradesh	0.164	0.011	0.000	0.175	0.009	0.052	0.001	0.062
Assam	0.069	0.096	-0.000	0.165	0.076	1.021	0.053	1.150
Bihar	1.251	1.131	0.001	2.383	0.662	0.639	-0.036	1.265
Chandigarh	0.000	0.322	0.000	0.322	0.000	0.047	0.000	0.047
Chhattisgarh	0.114	1.099	-0.000	1.212	0.069	1.113	-0.011	1.171
Dadra and Nagar Haveli	0.000	0.200	0.000	0.200	0.000	0.001	0.000	0.001
Daman and Diu	0.276	0.665	0.021	0.962	0.000	0.000	0.000	0.000
Delhi	0.099	1.750	0.001	1.849	0.072	0.751	0.001	0.824
Goa	0.003	0.019	-0.000	0.022	0.003	0.001	-0.000	0.003
Gujarat	2.896	0.540	0.004	3.440	1.069	0.948	0.146	2.162
Haryana	0.115	1.899	0.001	2.015	0.462	3.692	0.284	4.438
Himachal Pradesh	0.372	0.131	-0.000	0.502	0.116	0.008	0.002	0.126
Jammu and Kashmir	0.634	0.782	0.004	1.420	0.442	0.767	0.060	1.270
Jharkhand	0.380	0.026	-0.000	0.406	0.197	0.486	-0.052	0.631
Karnataka	1.183	0.822	-0.001	2.004	0.116	0.936	0.048	1.100
Kerala	0.517	10.523	0.003	11.043	0.020	1.187	-0.011	1.195
Lakshadweep	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Madhya Pradesh	2.257	0.133	0.001	2.391	1.468	0.007	0.002	1.477
Maharashtra	3.775	0.441	0.002	4.218	2.786	2.074	-0.269	4.591
Manipur	0.051	0.100	-0.000	0.151	0.008	0.019	-0.001	0.026
Meghalaya	0.021	0.103	-0.000	0.124	0.003	0.160	-0.001	0.162
Mizoram	0.016	0.023	-0.000	0.039	0.005	0.063	0.001	0.069
Nagaland	0.020	0.003	0.000	0.023	0.027	0.032	0.006	0.065
Orissa	0.619	1.038	-0.000	1.657	0.643	0.311	-0.101	0.854

State/Union Territory	Population sex ratio				Sex ratio of the population aged 0-6 years			
	Within state/UT	Between states/UTs	Interaction	Total	Within state/UT	Between states/UTs	Interaction	Total
Puducherry	0.011	0.191	0.000	0.203	0.003	0.057	0.000	0.060
Punjab	0.292	1.147	0.001	1.440	0.196	2.577	-0.039	2.735
Rajasthan	1.536	0.234	0.001	1.771	0.838	1.332	0.085	2.255
Sikkim	0.025	0.030	0.000	0.054	0.002	0.010	0.000	0.012
Tamil Nadu	0.470	3.606	-0.000	4.076	0.513	1.345	0.037	1.894
Tripura	0.003	0.028	-0.000	0.030	0.010	0.099	-0.007	0.102
Uttar Pradesh	7.216	3.767	0.010	10.993	3.140	0.857	0.083	4.080
Uttarakhand	1.233	0.089	-0.000	1.321	0.098	0.161	-0.006	0.253
West Bengal	0.302	0.064	-0.000	0.365	0.095	2.041	-0.062	2.074
India	26.476	34.778	0.049	61.303	13.494	24.071	0.245	37.810
	43.190	56.730	0.080	100.000	35.690	63.660	0.650	100.000

State/Union Territory	Sex ratio of the population aged 7 years and above				Index of fertility			
	Within state/UT	Between states/UTs	Interaction	Total	Within state/UT	Between states/UTs	Interaction	Total
AN Islands	0.016	0.042	0.000	0.058	0.030	0.286	0.003	0.319
Andhra Pradesh	0.627	3.950	-0.016	4.561	15.515	128.270	3.378	147.162
Arunachal Pradesh	0.218	0.025	-0.001	0.242	0.587	0.464	-0.061	0.990
Assam	0.098	0.041	0.001	0.141	18.297	5.780	-1.434	22.644
Bihar	1.646	1.943	0.014	3.603	14.370	240.076	-2.973	251.473
Chandigarh	0.000	0.377	0.000	0.377	0.000	0.168	0.000	0.168
Chhattisgarh	0.133	1.111	-0.003	1.241	3.855	1.032	-0.130	4.757
Dadra and Nagar Haveli	0.000	0.277	0.000	0.277	0.000	0.276	0.000	0.276
Daman and Diu	0.347	0.841	0.022	1.210	0.035	0.004	0.003	0.043
Delhi	0.109	1.937	-0.001	2.045	1.337	1.656	0.083	3.077
Goa	0.003	0.021	0.000	0.024	0.044	3.130	0.017	3.191
Gujarat	3.389	0.503	-0.010	3.881	23.922	2.527	0.978	27.426
Haryana	0.135	1.685	-0.003	1.816	10.731	0.229	-0.203	10.757
Himachal Pradesh	0.492	0.168	-0.001	0.660	1.139	4.551	0.124	5.814
Jammu and Kashmir	0.855	0.758	-0.011	1.601	14.684	13.740	-2.713	25.712
Jharkhand	0.456	0.007	0.001	0.464	12.248	25.269	-1.892	35.624
Karnataka	1.423	0.770	-0.003	2.190	32.400	35.555	4.664	72.619
Kerala	0.646	11.948	0.028	12.622	13.755	78.134	4.514	96.403
Lakshadweep	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.042
Madhya Pradesh	2.538	0.156	0.000	2.694	22.342	17.508	-1.839	38.011
Maharashtra	4.630	0.348	-0.005	4.973	36.668	39.201	4.184	80.052
Manipur	0.063	0.117	0.000	0.180	0.643	0.065	0.018	0.727
Meghalaya	0.033	0.101	-0.001	0.133	1.094	7.404	-0.258	8.241
Mizoram	0.022	0.019	-0.001	0.039	0.510	0.395	-0.043	0.861
Nagaland	0.025	0.008	-0.000	0.033	1.198	0.441	-0.100	1.540
Orissa	0.711	1.147	0.030	1.888	17.682	9.892	1.938	29.512

State/Union Territory	Sex ratio of the population aged 7 years and above				Index of fertility			
	Within state/UT	Between states/UTs	Interaction	Total	Within state/UT	Between states/UTs	Interaction	Total
Puducherry	0.015	0.208	0.000	0.223	0.013	2.123	0.005	2.142
Punjab	0.347	1.054	0.002	1.403	1.592	19.843	0.206	21.641
Rajasthan	1.894	0.112	0.004	2.011	17.959	36.599	-1.994	52.565
Sikkim	0.029	0.042	-0.000	0.071	0.033	0.672	0.008	0.713
Tamil Nadu	0.518	3.742	-0.003	4.256	8.669	167.792	2.502	178.963
Tripura	0.004	0.020	-0.000	0.024	1.070	0.604	0.080	1.753
Uttar Pradesh	8.953	4.330	0.036	13.320	49.439	86.574	-4.766	131.247
Uttarakhand	1.586	0.163	-0.004	1.745	2.169	0.036	0.008	2.213
West Bengal	0.344	0.006	0.001	0.350	61.490	53.759	9.376	124.625
India	32.305	37.977	0.076	70.358	385.520	984.097	13.683	1383.300
	45.920	53.970	0.110	100.000	27.870	71.140	0.990	100.000

Source: Author's calculations

Sharp Decline in Child Sex Ratio Emerging Concerns from 2011 Census

T.Chandrasekarayya
P.V. Murthy

Introduction

A balanced child sex ratio is necessary for smooth continuation of any society. An imbalance in the child sex ratio leads to severe socio-economic, demographic and cultural consequences. Moreover, declining juvenile sex ratio is indicative of marginalisation of the girl child. In India, every year "January 24" is observed as the "National Girl Child Day" to honour the girl child. Unfortunately, the girl child bears most the family level burden in the Indian society- looking after younger siblings, doing household chores, etc. Girls are also neglected in many ways compared to boys in several parts of India, especially in downtrodden sections.

The sharp decline in child sex ratio is a severe problem in many parts of the country since 1950. It has been witnessed in the 2011 population census of India as well. As per the provisional data of 2011 population census, the over all sex ratio in India has gone up by seven points to touch 940 females per 1000 males, against 933 in census 2001, while the child sex ratio plummeted to 914 from 927 in 2001. This steep decline in the child sex ratio is a dangerous sign of the girl child deficit. It also shows an alarming sign of gender inequality in the child population. India ranks 129 in the world in Gender Equality Index which reflects the severity of gender discrimination in India (United Nations, 2011).

The rapid decrease in the child sex ratio in India as revealed through the provisional figures of 2011 census is shocking. The child sex ratio estimated in the 2011 population census is the lowest in the country since independence. It is in the above context that the present study analyses the sharp decline in the child sex ratio in India and its constituent

states, Union Territories and districts. The analysis is expected to be useful for social activists, planners and policy makers through the policy perspective.

Objectives

Major objectives of the present study are as follows:

- To study the decline in child sex ratio by regions, states and Union Territories;
- To identify districts, states and union territories with lowest child sex ratio;
- To study the number of districts with worst, moderate and satisfactory child sex ratio in states and Union Territories;
- To identify the bottom ten states and districts with low child sex ratio in India; and
- To study the child sex ratio in bottom ten districts in the most child populous states.

Methodology

The data for the present study are taken from the population census of India since 1951. The overall sex ratio in the population census in India is defined as the number of females per 1000 males while the child sex ratio is defined as the number of female children per 1000 male children in the age group 0-6 years. The districts of the country have been classified into three categories in terms of the level of child sex ratio - districts with low child sex ratio ($\leq$ 849 female children for every 1000 males children), moderate child sex ratio (850-949 female children for every 1000 males children), and satisfactory child sex ratio (at least 950 female children for every 1000 males children). Both state and district level data are used in the present analysis.

Results

Trends in the child sex ratio. Data on overall sex ratio as well as child sex ratio is furnished in table 1 which reveals the pattern of rapid decline in the overall sex ratio over a period of six decades. The over all sex ratio was 946 in 1951, which fluctuated around 934 during 1971 through 2001, and increased to 940 in 2011. By contrast the child sex ratio was 983 in 1951, which decreased throughout the period 1951 through 2011. In 2011, the child sex ratio was 914 in the country which is the lowest since independence reflecting an increasing preference for the male child.

Spatial variation in the child sex ratio. Analysis of declining child sex ratio by regions and states/Union Territories of India may help in regional planning to save the girl child. Data are furnished in tables 2 and 3 which reveal that steep decline in the child sex ratio has been recorded in the states of eastern region followed by north-western, north-

eastern, northern and southern regions of the country. Rapid decline in the child sex ratio may also be observed in the Union Territories. However, this decline does not affect deficit of girls in India as a whole because of their small size of child population.

Among the states, a drastic decline in the child sex ratio is observed in Jammu & Kashmir, Maharastra, Rajasthan, Manipur, Uttaranchal, Jharkhand, Nagaland, Sikkim, Madhya Pradesh and in Dadra and Nagar Haveli and Lakshadweep among the Union Territories. By comparison, the child sex ratio has increased in Punjab, Haryana, Himachal Pradesh, Gujarat, Tamil Nadu, Mizoram and Andaman Nicobar Islands in recent years. The child sex ratio in 2011 was the highest in Mizoram (972), closely followed by Meghalaya (970), while Haryana (830) had the lowest child sex ratio in the country followed by Punjab (846).

The distribution of districts by the level of child sex ratio is given in table 4. There were 58 districts at the 2011 population census where the child sex ratio was less than 850 while in 184 districts, the child sex ratio was at least 950. Northern states had the largest number of districts with low child sex ratio followed by north-western, southern, north-eastern and eastern states. Among the districts, the child sex ratio was the lowest in Jhajjar district of Haryana (774).

Districts with lowest child sex ratio. Table 5 identifies 10 districts in the country where the child sex ratio was the lowest in the country at 2001 and 2011 population census. At the 2001 census, all the ten districts were in Punjab and Haryana. At the 2011 census, however, some of these districts were located in Jammu and Kashmir, Maharastra and Uttarakhand also. On the other hand, district Lahul and Spiti in Himachal Pradesh had the highest child sex ratio at 1,013, followed by Twang in Arunachal Pradesh (1,005).

States/Union Territories with lowest child sex ratio. Among the states and Union Territories of the country, the child sex ratio remained the lowest in Haryana and Punjab at the 2001 as well as at the 2011 population census which are amongst the economically progressed States of the country (Table 6). Other states/Union Territories with very low child sex ratio include: Chandigarh, Delhi, Gujarat, Himachal Pradesh, Uttaranchal, Rajasthan, Maharastra and Uttar Pradesh. Table 6 also suggests that the child sex ratio has declined rapidly in Jammu and Kashmir between 2001 and 2011.

Chid sex ratio in most child populated States. Child population in India constituted around 13 per cent of the total population at the 2011 population census. Uttar Pradesh had the largest child population followed by Bihar, Maharashtra, Madhya Pradesh and Rajasthan. These five states constitute 52 percent of India's child population. Therefore, child sex ratio in these States mainly determines the child sex ratio of the country. It is

argued that the child sex ratio in bottom ten districts of these five States contribute significantly to the child sex ratio in India. These districts are shown in table 7.

Causes of low child sex ratio. Major causes that may be attributed to the sharp decline in the child sex ratio include:

1. Female feticide. Modern and globalization society is promoting indiscriminate abortion of female fetus through sex selection which results in missing girls at birth. After china, India has the largest number of "missing girl" at birth. Razavi (2011) has observed that, in the two countries, an additional 1.2 million girls would have been born if they were not missed.
2. Son Preference. There is a clear cultural preference for boys that is causing sex-selective abortions, a phenomenon stated by Sen (1990) as "natal inequality." In many parts of India, parents prefer son to perform rituals and for old age security.
3. Discrimination. The disproportionate mortality of girls during infancy and early childhood is the result of discrimination and lack of access to safe water, sanitation and health facilities. India also accounts for excess female mortality after birth (Government of India, 1993).
4. Daughters viewed as liability. Daughters are viewed as liability and sons are preferred as assets by a large proportion of low economic status households.
5. Anti-girl child gender basis. The reduction in girl population is not mainly natural population division, but because of anti-girl child gender basis. However, gender inequality is a burden on societies and it is actually socially determined.

Consequences of declining child sex ratio. In the long run, girls would be more in demand than boys. In such a situation, girls may insist that the boy's family incur the cost of wedding. There would also be more inter-caste, inter region and inter-religion marriages which may create many socio-cultural and other problems. The age gap between bride and bridegroom may increase. Boys of one region where the sex ratio is more skewed will marry girls of other regions; the choice of course would rest with the girls.

Conclusions

The child sex ratio has been declining rapidly in India in recent decades. It was 983 in 1951, plunged to 914 in 2011, the least since independence. Rapid decline in the child sex ratio has been recorded in the eastern region. Among the states, a rapid decline in child sex ratio found in Jammu and Kashmir, Maharastra, Rajasthan, and Madhya Pradesh. Northern states have the higher number of districts with low child sex ratio. The lowest child sex ratio is recorded in Jhajjar district of Haryana. The bottom ten districts with

lowest child sex ratio are in the states of Haryana, Jammu and Kashmir, Maharastra and Uttaranchal. The bottom ten states with the lowest child sex ratio are Haryana, Punjab, Jammu and Kashmir, Rajasthan, Maharastra, Uttaranchal, Gujarat, and Uttar Pradesh. Fifty eight districts have child sex ratio lower than 850.

The gender gap in children can be addressed only when it is realised that the gender inequality in children affects the well being of both males and females in the society in the long run. In Indian Society, most of the females in general are dependent on parents during young age, on the spouse during middle age and on children during the old age for their livelihood. As such, gender equality should be initiated at the family level. Parents should give equal freedom for girls along with boys. Importance should be given to the attitudes, desires and wishes of the girls and they should be encouraged and motivated to compete with boys. Parents should discourage too much dependency on them and should encourage girls to take their own decisions. Also girls themselves should question any discrimination against them. In the fields of agriculture, economic services, education, marketing etc., equal importance should be given for girls along with boys. Economists argue that agricultural production will increase if females are given opportunities in the agricultural sector. All these would reduce the gender gap. Mass media has to play a vital role by creating awareness among the people on adverse effects of rapid declining child sex ratio thereby low child sex ratio. Finally, importance should be given for effective implementation of the pre -natal, diagnostic techniques and controlling the illegal promotion of ultra sound machines to determine sex of the baby.

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Table 1
Child sex ratio (F/M) and overall sex ratio (F/M) in India

Year	Child sex ratio		Overall sex ratio	
	Females per 1000 males	Change from the previous census	Females per 1000 males	Change from the previous census
1951	983		946	
1961	976	-7	941	-5
1971	964	-12	930	-11
1981	962	-2	934	+4
1991	945	-17	927	-7
2001	927	-18	933	+6
2011	914	-13	940	+7

Source: Census of India, 1961, 1981, 2001 and 2011

Table 2

Child sex ratio (F/M) in India and States, 2001 and 2011

India/States/Union Territories	2001	2011	Change in child sex ratio between 2001 and 2011
India	927	914	-13
Andaman and Nicobar Islands	957	966	+9
Andhra Pradesh	961	943	-18
Arunachal Pradesh	964	960	-4
Assam	965	957	-8
Bihar	942	933	-9
Chandigarh	845	867	+22
Chhattisgarh	975	964	-11
Dadra and Nagar Haveli	979	924	-55
Daman and Diu	926	909	-17
Delhi	868	867	-1
Goa	938	920	-18
Gujarat	883	886	+3
Haryana	819	830	-11
Himachal Pradesh	896	906	+10
Jammu& Kashmir	941	859	-82
Jharkhand	965	943	-22
Karnataka	946	943	-3
Kerala	960	960	0
Lakshadweep	959	908	-51
Madhya Pradesh	932	912	-20
Maharashtra	913	883	-30
Manipur	957	934	-23
Meghalaya	973	970	-3
Mizoram	964	972	+8
Nagaland	964	944	-20
Orissa	953	934	-19
Pondicherry	967	965	-2
Punjab	798	846	+48
Rajasthan	909	883	-26
Sikkim	963	944	-19
Tamil Nadu	942	946	+4
Tripura	966	953	-13
Uttar Pradesh	916	899	-17
Uttaranchal	908	886	-22
West Bengal	960	950	-10

Source: Census of India, 2001 and 2011

Table 3

Child sex ratio (F/M) in different parts of India, 2001 and 2011

Regions	2001	2011	Change in child sex ratio between 2001 and 2011
Eastern	957	942	-15
North-eastern	965	954	-11
North-western	889	875	-14
Northern	931	923	-8
Southern	952	948	-4
Union Territories	963	934	-29

Source: Census of India, 2001 and 2011

Remarks: States included in different regions are as follows:

Eastern	Odisha, West Bengal
North-eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura
North-western	Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Maharashtra, Punjab, Rajasthan
Northern	Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh, Uttarakhand
Southern	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu
Union Territories	Andaman and Nikobar Islands, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep, Puducherry

Table 4
Child sex ratio (F/M) in India and States, 2001 and 2011

India/States/ Union Territories	District with lowest child sex ratio in the State/UT in 2011	Female children per 1000 males children	Number of districts with child sex ratio lower than State/UT average in 2011
India	-	-	-
Andhra Pradesh	Y.S.R	919	11
Andaman, Nicobar	South Andaman	961	02
Arunachal Pradesh	Dibang Vally	831	07
Assam	Karbi Anglong	916	12
Bihar	Vaishali	894	20
Chandigarh	-	-	-
Chhattisgarh	Jashpur	944	07
Dadra & Nagar Haveli	-	-	-
Daman&Diu	Daman	905	01
Delhi	South West	836	03
Goa	North Goa	911	01
Gujarat	Surat	836	09
Haryana	Jhaijar	774	11
Himachal Pradesh	Kangra	873	05
Jammu& Kashmir	Samba	787	08
Jharkhand	Bokaro	912	09
Karnataka	Bagalkot	929	12
Kerala	Alappauzha	945	03
Lakshadweep	-	-	-
Madhya Pradesh	Morena	825	18
Maharashtra	Bid	801	19
Manipur	Senapati	912	05
Meghalaya	Ribhoi	956	02
Mizoram	Serchhin	926	04
Nagaland	Longleng	882	05
Orissa	Nayagarh	851	13
Pondicherry	Yanam	917	03
Punjab	TarnTaran	819	09
Rajasthan	Jhunjhunun	831	13
Sikkim	North District	897	01
Tamil Nadu	Ariyalur	892	13
Tripura	West Tripura	942	02
Uttar Pradesh	Agra	835	33
Uttaranchal	Pithoragarh	813	03
West Bengal	Kolkata	923	13

Source: Census of India, 2001 and 2011

Table 5
Child sex ratio (F/M) in regions of India, 2001 and 2011

India/States/ Union Territories	District with lowest child sex ratio in the State/UT in 2011	Female children per 1000 males children	Number of districts with child sex ratio lower than State/UT average in 2011
East States	-	-	26
North States	-	-	90
North western States	-	-	78
North Eastern States	-	-	38
Southern States	-	-	39
Union Territories	-	-	05

Source: Census of India, 2001 and 2011

Remarks: States included in different regions are as follows:

Eastern	Odisha, West Bengal
North-eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura
North-western	Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Maharashtra, Punjab, Rajasthan
Northern	Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh, Uttarakhand
Southern	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu
Union Territories	Andaman and Nikobar Islands, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep, Puducherry

Table 6

Ten districts having lowest child sex ratio in India: 2001 and 2011

SN	2001			2011		
	District	State	Child sex ratio	District	State	Child sex ratio
1	Fatehgarh Sahib	Punjab	766	Jhajjar	Haryana	774
2	Patiala	Punjab	777	Mahendragarh	Haryana	778
3	Manasa	Punjab	782	Rewari	Haryana	784
4	Bathinda	Punjab	785	Samba	Jammu & Kashmir	787
5	Kapurthala	Punjab	785	Sonipat	Haryana	790
6	Sangur	Punjab	786	Jammu	Jammu & Kashmir	794
7	Gurudaspur	Punjab	789	Bid	Maharashtra	800
8	Kurukshetra	Haryana	771	Ambala	Haryana	806
9	Ambala	Haryana	782	Rohtak	Haryana	807
10	Sonipat	Haryana	788	Pithoragarh	Uttarakhand	812

Source: Census of India, 2001and 2011.

Table 7
Ten districts having lowest child sex ratio in India: 2001and 2011

SN	2001		2011		
	State	Child sex ratio	SN	State	Child sex ratio
1	Punjab	798	1	Haryana	830
2	Haryana	819	2	Punjab	846
3	Chandigarh	845	3	Jammu & Kashmir	859
4	Delhi	868	4	Delhi	867
5	Gujarat	883	5	Rajasthan	882
6	Himachal Pradesh	896	6	Maharashtra	883
7	Uttarakhand	908	7	Uttarakhand	885
8	Rajasthan	909	8	Gujarat	886
9	Maharashtra	913	9	Chandigarh	887
10	Uttar Pradesh	916	10	Uttar Pradesh	889

Source: Census of India, 2001and 2011.

Table 8

Distribution of districts by the range of child sex ratio in India and States, 2011

India/States/Union Territories	Female children per 1000 male children	Number of districts with child sex ratio		
		≤ 849	850-949	950 & above
India	914	58	395	184
Andaman, Nicobar	966	-	-	3
Andhra Pradesh	943	-	15	8
Arunachal Pradesh	960	1	2	13
Assam	957	-	4	23
Bihar	933	-	30	8
Chandigarh	867	-	1	-
Chhattisgarh	964	-	2	16
Dadra & Nagar Haveli	924	-	1	-
Daman&Diu	909	-	2	-
Delhi	867	1	8	-
Goa	920	-	2	-
Gujarat	886	3	22	1
Haryana	830	17	4	-
Himachal Pradesh	906	-	8	4
Jammu& Kashmir	859	7	14	1
Jharkhand	943	-	12	12
Karnataka	943	-	19	11
Kerala	960	-	2	12
Lakshadweep	908	-	1	-
Madhya Pradesh	912	3	41	6
Maharashtra	883	7	27	1
Manipur	934	-	9	-
Meghalaya	970	-	-	7
Mizoram	972	-	2	6
Nagaland	944	-	5	6
Orissa	934	-	19	11
Pondicherry	965	-	1	3
Punjab	846	11	9	-
Rajasthan	883	3	30	-
Sikkim	944	-	3	1
Tamil Nadu	946	-	14	18
Tripura	953	-	02	2
Uttar Pradesh	899	4	65	2
Uttaranchal	886	1	6	6
West Bengal	950	-	13	6

Source: Census of India, 2011

Table 9

Distribution of districts by the range of child sex ratio in regions of India, 2011

India/States/Union Territories	Female children per 1000 male children	Number of districts with child sex ratio		
		≤ 849	850-949	950 & above
Eastern	942		32	17
Northern	923	8	156	50
North-western	875	49	125	7
North-eastern	954	1	27	58
Southern	948	-	50	49
Union Territories	934	-	5	3

Source: Census of India, 2011

Remarks: States included in different regions are as follows:

Eastern	Odisha, West Bengal
North-eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura
North-western	Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Maharashtra, Punjab, Rajasthan
Northern	Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh, Uttarakhand
Southern	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu
Union Territories	Andaman and Nikobar Islands, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep, Puducherry

Table 10

Bottom ten districts with child sex ratio in the highest child populated States, 2011

SN	Bihar		Maharastra		Madhya Pradesh		Rajasthan		Uttar Pradesh	
	District	CSR	District	CSR	District	CSR	District	CSR	District	CSR
1	Vaishali	894	Bid	801	Morena	825	Jhunjhunun	831	Agra	834
2	Patna	899	Jalgaol	829	Gwalior	832	Sikar	841	Baghpat	837
3	Begusarai	911	Ahmad Nagar	839	Bhind	835	Karauli	844	Bulandshahr	844
4	Khagaria	912	Buldana	842	Datia	852	Dhaulpur	853	Gautham Buddh Nagar	845
5	Bhojpur	914	Kolhapur	845	Rewa	883	Ganganagar	854	Ghaziabad	850
6	Lakhisarai	915	Jalna	846	Tikamgarh	886	Jaipur	858	Meerut	850
7	Muzaffarpur	917	Aurangabad	848	Sheopur	888	Dausa	859	Muzaffarnagar	858
8	Jehanabad	918	Osmanabad	853	Shivpuri	889	Alwar	861	Jhansi	859
9	Saran	921	Washim	859	Indore	892	Bhearatpur	863	Mahamayanagar	862
10	Purba Champaran	923	Sangli	862	Chhatarpur	894	Sawai Madhopur	865	Hardoi	863

Source: Census of India, 2011

Family Size Transition and its Implications for Child Health in India

Ritwika Mukherjee

Introduction

Family size is of great importance not only for the country as a whole but also for the welfare and health of the individual. India adopted the goal of universalising the 'two child family norm' which has consequences both at micro (individual) and macro (community) levels. A norm in relation to family size, according to sociologists, implies a pattern which sets limits for fertility behaviour. In recent years, the decline in family size in most parts of India is controlled not only by the family planning initiatives such as contraceptive use sex selective abortions but also by the disintegration of the joint family system. Generally, the size of the family has direct and indirect implications on the quality of child care. In this paper, we have made an attempt to analyse the causative association between the decline in the size of the family and its impact on child health care at disaggregated level with the purpose of searching clues if the linear relationship actually holds.

Objectives

- To highlight transition in family size and the twin process of family planning and disintegration of families conjointly operating to a decline in the family size.
- To examine the paradox of family size transition and the conventional measures of socio-economic development.
- To trace out the implications of small families on child care both in terms of medical and non-medical child care across the socio-economic dimensions.

Inequity in child care is a composite outcome of a number of social, economic, cultural and environmental factors. In most cases it is controlled by all these factors wherein the change in family size acts as a catalyst to differentiation in child care. The main research enquiry in the present study is therefore to examine how much and to what extent the change in family size has resulted in the inequity in child care across India.

Database and Methodology

The database for the present study has been taken from National Family Health Survey 2005-06. Data source for different socio-economic developmental indicators have been taken from Census of India, 1991, 2001 and 2011.

Appropriate bi-variate analyses are carried out to see the gross effect of different factors over child care. However, the net or independent effects of all the factors have been captured through the binary logistic regression model. Two separate models have been used according to each of the two dimensions of child care - medical care and non-medical care.

Family size transition in India. This subset of analysis gives a causative outline of the small family size by focussing on two important issues in the present context of development studies. The process of family transition in southern states has been faster than many other states of India, especially the northern states. As such, the growing desire for small families in the emerging context of 'small family norms' and the breakdown of joint family system with modernisation are discussed.

Family planning initiatives. There has been concern amongst Indians of the recent decade to have a disciplined family life especially pertaining to a reduction in the number of children. The recent 'revolution in family life' especially in southern India may not correspond to classical theories of fertility decline where a decline in fertility is associated with changes in material conditions of the people. The present section seeks to enquire the mechanisms of fertility decline manifested by the outcome indicators of actual as well as desired size and composition of the family.

A close look will verify existence of the north-south divide in terms of number of children born; southern states reporting greater possibilities of two or less than two living children and has been strengthened over the years with a clear jump from 1998-99 to 2005-06 in terms of percentage of families having two or less than two living children. The northern counterparts except Himachal Pradesh and some of the economically developed pockets like Punjab and Haryana show a persistence of large families with the fertility preferences towards a son coupled with the widespread unmet need to fulfill the target. However, this discrepancy is somewhat diluted in the urban context with a gentle

gradient from the south to the north where most of the families have achieved the replacement level fertility with greater levels of awareness and attitudes of maximizing well-being of children and minimizing costs of additional childbearing.

Desire to have a child is one of the basic instincts of human behaviour, but to what extent this can be strengthened and lengthened essentially depends upon the socio-cultural dispositions of a country as well its stage of economic development. Desire for no more child is essentially not met with only one living child, the figure shoots up to a considerable proportion after having two living children. Thereafter a certain consistency is maintained in the trend followed by little desire among the currently married women to have more children when the existing number of living children crosses three or four. The regional variations call for some exploratory analysis. The western region comprising the states of Uttar Pradesh, Madhya Pradesh, etc. show a glaring desire to have many children showing the lowest proportion of currently married women who wants no more child at the 4th living birth order. South and western regions already have their fertility rates stabilized at lower levels and hence very few currently married women have actually reached to as many as 4 or 5 living children. However, the desire of not bearing child after having at least one child has increased over the years, the most remarkable being the eastern and the north-eastern regions where many currently married women express their satisfaction with one living child. This is more conspicuous for urban areas with the rising middle class and opportunity costs of time.

Use of family planning methods. The new National Population Policy 2000 of India has set, as its immediate objective, the task of addressing unmet need for contraception in order to achieve the medium-term goal of bringing the total fertility rate to the replacement level by the year 2010. One of the 14 national socio-demographic goals identified for this purpose is to achieve universal access to information/counselling and services for fertility regulation and contraception with a wide range of choices (Government of India, 2000).

Clearly, contraceptive use is now a happening issue in India. The rural areas have shown a remarkable improvement in 2005-06 (40.6 per cent), almost double to that in 1998-99. A more steady progress could be found in the urban areas where almost 56 per cent of the currently married women in their reproductive ages group use any kind of contraceptive. The National Rural Health Mission launched to cater the unmet needs of the rural areas have worked significantly in this case, even though some states like Uttar Pradesh, Bihar, Rajasthan, Orissa, Madhya Pradesh still record values lower than the national average. Madhya Pradesh, though reporting lower than national average, has shown a remarkable improvement in the recent years due to active grass root level

participation and increasing diffusion of the traditional and new methods of contraception. States like Kerala, Tamil Nadu, West Bengal, Punjab show widespread use although the underlying motives may be different. Kerala, long having achieved the replacement level fertility, is sweeping itself into the second stage of demographic transition and shares common issues with many socially developed states of the world. West Bengal's case is more of spending quality time and cost of a few children rather than a whole lot to fulfill their middle class needs. While Punjab is a more gendered motivation to stop childbearing after securing the advantages of a boy child.

Role of modernisation factors. Studies on the influence of modernity and industrialization on family structure has been a long-standing topic of discussion among sociologist and social anthropologists. These studies suggest that the joint family or extended family system typical of an agrarian, pre-industrial economy must inevitably give way to more smaller and adaptive nuclear families once the traits of modernisation enters the society like urbanisation, take-off for industrialization, etc.

The nuclear families are not only an urban phenomenon; they too reflect strong assistance with the southern and north eastern states, Delhi and West Bengal being two exceptions of the northern and eastern regions respectively. All the northern, western and central states have reported lower than national average values showing strong traits of their traditional cultures of extended families more prominently in the rural areas. Incidentally, some of these states have already achieved replacement level fertility (Punjab, Haryana, Himachal Pradesh) and show an alarming use of contraception, so the issue of modernisation impacted small families is a big question, trends merely succumb to a need based approach towards fulfilling the target goal of two child families in the wake of distorted numbers of very high fertility in some backward states creating an unprecedented pressure on land and existing resources. The nuclear families which could be ascertained as a proxy for small families have not shown a similar transition as the transition in fertility in India.

Rationale behind fertility decline. Among the factors other than private income that have a strong influence on fertility, basic education, especially female education, is considered as one of the most powerful. Female education influences: 1) desired family size, 2) the relationship between desired family size and planned number of births, and 3) ability to achieve the planned number of births. Educated women are most likely to voice resentment at the burden of repeated pregnancies and to take action to lighten that burden. This may occur because educated women have other sources of prestige and fulfilment besides reproductive performance, more control over household resources and personal behaviour, and greater involvement in reproductive decisions (Dyson and

Moore, 1983). Further, opportunity cost of time tends to be comparatively high for educated women, and this creates an incentive to minimize such time-intensive activities such as child bearing and child rearing. Most importantly, maternal education helps in achieving planned number of births by facilitating knowledge and command over contraceptives. Female labour force participation have a negative impact on fertility since the double burden of household work and gainful employment enhances the effectiveness of women's agency in society and repeated pregnancy quite stressful. The context of urbanisation becomes relevant and acts independently to control fertility on account of greater access to relevant information in the urban areas and the breakdown of the socio-cultural hindrances to economic development such as joint family structure. The effect of poverty has significant impact upon fertility after controlling the other explanatory variables such as female work participation rate which is generally found to be higher in poor families.

As already mentioned the speedy fertility decline in India was almost bypassed of the major elements of modernisation in some states projecting towards an inconsistency associated with the conventional theories of fertility. The discourse of fertility decline in India is mainly confined to the three southern states namely, Kerala, Tamil Nadu and Andhra Pradesh all having achieved fertility rates below the replacement level. The experience of Kerala led to the understanding that even without considerable improvement in the levels of industrialization, urbanisation and material improvement in the standard of living of the population, fertility decline took place with social development. In case of Tamil Nadu, fertility decline almost paced as that of Kerala even though with a somewhat lower level of social development. Of them female literacy assumes to be a very important determinant of social development governing the fertility decline. The massive decline in fertility in Kerala could be attributed to this indicator in spite of lower levels of urbanisation and industrialization as already mentioned. Tamil Nadu's story is not the magic female literacy as that of Kerala, but more of the modernisation factors like urbanisation, etc. In contrast, some of the northern states do not exhibit urbanisation character like Himachal Pradesh or very high female work force participation like Punjab, yet having achieved replacement level fertility very much comparable to any of the long achieved southern states. Simultaneously, Gujarat with high levels of urbanisation, female literacy and female work participation does not find itself among the top ten states which have achieved replacement level fertility. It essentially shows the nature of inconsistency which the traditional theories fail to explain given the diverse experience and nonlinear complex juxtapositions of developmental discourse.

Inter-state variations in child care. Child care is a very sensitive issue which is dependent not only on medical care but also on non-medical care. The present subset gives an overview of the prevalent medical and non-medical care in India as an advocate to the take-off for modernisation.

India seems to have shown a better response to non-medical care that has been reflected through breastfeeding but immunisation shows a varied picture. Universal immunisation which is sought to be the best protective measure of a growing child has been considered for six vaccine preventable diseases: tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles. According to the guidelines developed by WHO, children (1-2 years) who received BCG, measles, and three doses each of DPT and polio (excluding polio 0) are considered to be fully vaccinated. Considering the status of universal immunisation, the backward as well as high fertility states like Uttar Pradesh, Bihar, Jharkhand, Rajasthan have reported fairly deficient values much lower than the national average whereas Tamil Nadu, Punjab, Kerala, Himachal Pradesh, Maharashtra, which have attained replacement level fertility are on the higher side in child's better immunisation scenario. However, Andhra Pradesh show a grim picture in terms of universal immunisation of child aged 1-2 years. Thus parental educational enlistment and women's empowerment may not go hand in hand with fertility decline as could be found for Andhra Pradesh, where substantial increase in contraception was the reason for a very steep decline in TFR as low as 1.8 in 2005-06.

Immunisation against the six vaccine preventable diseases shows a marked difference according to household type which could be considered as a proxy for modernisation. The protective efforts of the child is no doubt better among the non-nuclear families except in some southern states like Andhra Pradesh and Tamil Nadu wherein the nuclear families show a better performance than the non-nuclear counterparts. This essentially shows the functionalities of extended families wherein the child is under the surveillance of a number of familial vigilant apart from their parents. By and large, child immunisation is on the decline when the number of living children is more than two. The protective care is the highest with two living children barring a few states like Assam, West Bengal and Goa. The level of immunisation remains satisfactory across the region with Gujarat in the west reporting the highest proportion of children who have received full vaccination. More than regional variations, the structural variations in terms of household type and family size assume a greater weight.

Breastfeeding constitutes an important part of the intensive care of the child. Table 9 provides a bivariate association between breastfeeding cross classified by household structure and number of living children. Unlike universal immunisation, nuclear families

show a better response in breastfeeding barring a few states like Tamil Nadu, West Bengal, Tripura, Assam. The northern and western regions show the widest difference between nuclear and non-nuclear households, southern states apart from Kerala as well as north-eastern and eastern region, the values remain back to back. The entire central region, a few hilly pockets in the north like Jammu and Kashmir and Uttarakhand and high fertility states of Bihar and Jharkhand in the east have their children breastfed lower than the national average figures for the first child. Like immunisation, the intensive care is higher for the first and the second child, keeps on decreasing as birth order increases.

Results from the multivariate model. In order to trace out differentials in child care in terms of the desired family size and a number of socio-demographic factors, binary logistic regression analysis has been applied. Two separate models have been worked out to show differentials in child care in terms of medical and non-medical care. The dependent variable in the case of medical care is the proportion of children 12-23 months who received full immunisation, whereas in the other case, it is the proportion of children below 1 year who are currently breastfed. The main objective of this exercise is to show the differences in probable outcomes in terms of child care according to different family size and household structure as well as to identify the other proximate determinants that in turn affect the quality of child care other than family size. It is notable that a number of these factors also have significant relation with changes in family size itself; therefore, the differential probabilities that may occur in response to these factors can be interpreted as the indirect effects of family size, or more specifically, the modernization factor itself.

Nuclear households taken as the proxy for small families have performed better in terms of both immunisation and breastfeeding compared to non-nuclear counterparts. This relationship is stronger for breastfeeding where the results are statistically significant. Considerable degree of discrimination occurs in large families where chances of immunising a child is less with three or more living children as compared to families which have two or less than two living children. The degree of this discrimination between two or less than two living children (sought as the reference category) and the third child becomes stronger in urban areas. Even in case of breastfeeding, the same tendency of benefits of small families are noticed even though the results are not statistically significant. A substantial discrimination in care occurs across the sex of the child and the female child is at a very disadvantageous position across all levels, be it rural or urban. However, the magnitudes of discrimination in urban areas are higher for immunisation while reverse is the case for rural areas. That the first child is a blessed child is evident from the relative survival opportunities it gets as compared to the next child.

From the birth order wise analysis it is clearly noticeable that the second and subsequent birth orders are so much at a grave situation in comparison to the first, the values of some being statistically significant barring the second birth order of likelihood of immunisation. Parent's desire for small families indirectly indicates appropriating existing resources in a sustainable manner and meeting quality care of the child. The chances of both immunisation and breastfeeding are higher for those children whose parents do not want any more child irrespective of the place of residence though the phenomenon is stronger in urban areas.

In terms of structural variations across the socio-cultural dimensions too the evidences are quite interesting. In all types of care, it is the general castes which are on the brighter side in comparison to the marginalised and vulnerable social segments of the population. The result is statistically significant and perhaps ascribed to the lower socio-economic status and social opportunities granted to these marginalised groups in comparison to general households. From the perspective of wealth standards of the population, the poorer have greater probability of immunising and breastfeeding the child in comparison to the poorest which on the other hand have higher chances of child care as compared to medium, rich and richest stratum of the population. This indeed points to the fact that child care is no longer confined to the richer and wealthy people of the country; it has been rapidly diffused to the lower segments in the modern period. More than that, child care which here has been captured through universal immunisation (excluding breastfeeding) is no longer costly and with the diligent efforts made by the Government to make it universal across space and people, little variations remain with child care and economic constraints of the families. Moreover, the richer and wealthier occupants have other business in their life apart from actively taking part in child care all day long, hence might lose some of the important timings of vaccinations which the poor and home working mothers keep a close eye at. The validity of this argument is followed by a wider elaboration in the next part which constitutes parental motivations and their awareness for keeping the child healthy.

The education of mother is an important controlling variable of child care as revealed in the binary logistic regression model where uneducated mothers show lesser chance of immunising the child as compared to those who have attained primary or secondary schooling. The results are not statistically significant for breastfeeding where the argument is irrelevant from the perspective of mother's educational attainment. The argument becomes all the more valid and explanatory when parental educational enlistment is considered. Having attained a higher level of education, parents become more aware of the protective care of the child and goes on the process for full

immunisation unlike the parents of those children with no education. Education not only broadens the awareness level but also sets forth new opportunities and expectations. Mothers who do not work, have higher chances of breastfeeding and immunising the child than those who are working which is quite natural of the greater opportunity costs of time of employed mothers where child care often has to be sacrificed in the name of an outside burdened work. Herein calls an elaborate understanding of the nature of work. If the work is more efficient, less labour intensive and less time consuming like in case of skilled work, it is more advantageous or rather has a greater chance of immunisation unlike mothers engaged in agriculture. Breastfeeding shows no such differences in terms of the quality of the mother's work. It is simply the non-working mothers which have greater chance of breastfeeding the child as compared to employed women.

The spatial dimensions of child care needs a broader elaboration given the regional diversity of the country. The northern region have greater likelihood of both immunisation and breastfeeding of the child compared to the central region which is still at a backward stage of socio-cultural dispositions, their demographic destinies of little value of keeping child under proper health care. Except the eastern region, all other regions have higher chances of immunising the child than the North. in case of breastfeeding all the regions excepting central and south display greater chances of breastfeeding in comparison to the traditional value holders of the north.

Major Findings and Conclusion

The family size transition in India evokes out of the desire for small families operating jointly through the mechanism of fertility decline and increasing trend of nuclearisation of families which could be taken as a proxy for small families.

- The process of nuclearisation is more an urban phenomenon. The richest set of households in terms of access to resources has higher non-nuclear families than the poorest.
- The process of fertility decline in India under many circumstances remains unresolved by the explanations provided by the conventional fertility theories. Andhra Pradesh, for example, had one of the lowest total fertility rate in 2005-06 but the sharp decline in fertility is not accompanied by appreciable social development. Female literacy which is one of the most important explanatory variables impacting fertility decline is well below the national average.
- A distinct rural/urban differential could also be observed in access to child health care facilities where the urban households have fared much better even though the gap is narrowing over time. This is a typical situation in southern states which have mostly

achieved the replacement level fertility by prioritizing reproductive and child health at every level of the family planning programme. A good effective solution caters the unmet need though contraceptive use does not always imply an improvement in socio-economic conditions of the population. Parental educational enlistment and women's empowerment may not go hand in hand with fertility decline as could be found for Andhra Pradesh, where a very high use of contraception was the reason for a very steep decline in the total fertility rate.

- On the contrary, some of the northern states like Bihar, Chattisgarh, Orissa, Madhya Pradesh, family size mostly ranges from medium to high with bulk of the population being rural and inefficient grass root family planning implementation for which the National Rural Health Mission was launched as a landmark event.
- The factors of modernization have different effects in terms of levels and quality of child care. Small or nuclear households are reported to have performed better in terms of both medical and non-medical care as compared to the non-nuclear households.
- In terms of structural variations, socially vulnerable and marginalised communities are at a higher risk of poor health condition of the child. The economic situation of the family is little valid to explain the observed differentials on child health care. Poorer consider an upper hand than the richer.
- Other proximate determinants of child care like mother's occupation or their educational attainment also have considerable effects where mothers having at least some level of education or those who are employed in skilled occupation are reported to perform better in terms of medical protective care like complete immunisation.

Thus the small family norms incepted as an exception to the usual discourse of socio-economic development is seen to have diverging results in terms of quality child care. The western, eastern and the southern regions have shown better performance in the protective efforts of the child while breastfeeding which demands an intensive care of the child show differences particularly pertaining to the working status of the mother. Education of both the parents and the modern demographic ideologies are essentially crucial for meeting the desired outcomes of medical care which has little to do with the income profile of the household. In some of the economically developed pockets of the north, like Punjab and Haryana, the small family norm actually translated to the "intensification effect" of strong son preference with increasing performance of sex selective abortions with a skewed sex ratio at birth.

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Table 1

Selected Indicators for analysing Family Size and Child Health Care

Variable		Source	Year	Level of consultation
Family size variables				
Modernisation	Percentage of households by structure (nuclear/non-nuclear)	NFHS III	2005-06	Unit Level (T-R-U)
Family planning	Percentage of Families having two or less than two living children	NFHS I, II, III	1992-93 1998-99	Unit Level (T-R-U)
	Share of currently married women who want no more children by number of living children		2005-06	
	Percentage of currently married women (age 15-49) who are currently using any kind/method of contraceptives			
Child care variables				
Medical care	Post Natal Preventive Child Care			
	% children 12-23 months universally immunized	NFHS III	2005-06	Unit Level (T-R-U)
Non-medical care	Post-Natal Non Medical Care			
	% children 0-12 months currently breastfeeding	NFHS III	2005-06	Unit Level (T-R-U)

Table 2

Proportion (per cent) of families having two or less than two living children in India and States

States	NFHS I			States	NFHS II			States	NFHS III		
	Total	Rural	Urban		Total	Rural	Urban		Total	Rural	Urban
Andhra Pradesh	57.24	56.54	59.30	Andhra Pradesh	70.15	67.26	78.80	Andhra Pradesh	71.20	74.24	69.42
Arunachal Pradesh	44.78	43.10	44.44	Arunachal Pradesh	54.55	51.72	75.00	Arunachal Pradesh	42.76	37.42	55.43
Assam	42.06	40.74	55.71	Assam	56.63	55.43	76.19	Assam	60.57	56.63	75.71
Bihar	44.28	43.95	46.45	Bihar	47.33	46.59	54.98	Bihar	40.56	39.91	42.02
Chhattisgarh				Chhattisgarh				Chhattisgarh	50.63	46.63	62.38
Delhi	53.51	50.00	53.85	Delhi	60.65	51.35	61.68	Delhi	58.27	49.00	59.08
Goa	64.44	62.50	66.67	Goa	75.00	72.22	72.73	Goa	78.85	78.37	79.32
Gujarat	56.20	52.95	63.47	Gujarat	59.62	54.88	67.87	Gujarat	[illegible]	[illegible]	[illegible]
Haryana	50.66	49.89	53.39	Haryana	58.72	56.99	64.83	Haryana	58.92	55.85	70.45
Himachal Pradesh	54.83	54.10	65.22	Himachal Pradesh	66.04	65.31	83.33	Himachal Pradesh	72.76	71.16	77.47
Jharkhand				Jharkhand				Jharkhand	48.22	43.18	60.98
Jammu and Kashmir	51.90	49.17	70.00	Jammu and Kashmir	51.72	49.59	63.04	Jammu and Kashmir	50.90	46.26	66.79
Karnataka	55.36	53.20	60.74	Karnataka	67.72	65.10	73.76	Karnataka	65.59	60.77	74.77
Kerala	71.59	70.04	76.01	Kerala	77.68	75.12	89.12	Kerala	78.56	77.50	80.79
Madhya Pradesh	51.24	51.09	51.83	Madhya Pradesh	51.98	50.27	58.18	Madhya Pradesh	51.33	42.09	64.23
Maharashtra	53.32	50.32	58.02	Maharashtra	61.17	58.28	65.67	Maharashtra	69.78	67.85	70.83
Manipur	44.35	41.46	51.52	Manipur	53.25	50.91	59.09	Manipur	56.12	50.55	64.99
Meghalaya	42.37	41.05	47.83	Meghalaya	41.75	39.77	50.00	Meghalaya	40.99	36.32	52.17
Mizoram	45.45	40.00	52.94	Mizoram	50.00	43.75	57.14	Mizoram	52.36	45.11	61.38
Nagaland	46.67	46.88	45.45	Nagaland	38.24	35.09	54.55	Nagaland	40.61	32.23	52.60
Orissa	52.51	52.00	55.34	Orissa	60.88	60.67	62.16	Orissa	60.81	58.81	66.97
Punjab	53.68	51.48	60.89	Punjab	60.23	58.46	66.43	Punjab	64.65	62.49	68.72
Rajasthan	46.74	46.64	47.14	Rajasthan	49.81	48.50	54.94	Rajasthan	45.72	40.24	62.13
Sikkim				Sikkim	62.50	57.14	100.00	Sikkim	65.39	57.89	82.74

States	NFHS I			States	NFHS II			States	NFHS III		
	Total	Rural	Urban		Total	Rural	Urban		Total	Rural	Urban
Tamil Nadu	66.65	63.26	72.75	Tamil Nadu	77.63	74.59	83.44	Tamil Nadu	77.52	70.90	83.67
Tripura	54.36	51.56	75.00	Tripura	67.47	64.79	81.82	Tripura	72.77	69.76	84.21
Uttarakhand				Uttarakhand				Uttarakhand	54.48	52.25	60.95
Uttar Pradesh	43.23	42.50	46.78	Uttar Pradesh	44.25	43.15	50.00	Uttar Pradesh	40.36	36.04	48.85
West Bengal	54.80	52.36	63.11	West Bengal	64.51	62.28	74.46	West Bengal	67.19	63.22	73.35
India	50.83	49.03	56.95	India	56.56	54.01	65.51	India	56.07	50.77	64.79

Source: Computed from NFHS I, II and III.

Table 3

Proportion (per cent) of currently married women who want no more children by number of living children

Region	Total					Rural					Urban				
	Number of living children					Number of living children					Number of living children				
	1	2	3	4	5+	1	2	3	4	5+	1	2	3	4	5+
							NFHS I								
North	11.76	39.20	43.69	51.59	60.57	9.42	32.56	38.95	50.44	60.06	18.54	56.00	57.45	55.43	62.75
Central	5.51	21.12	36.40	49.18	62.44	4.58	16.95	34.00	48.15	62.75	9.38	39.39	47.62	54.52	60.96
East	11.37	29.55	38.67	51.24	63.17	8.92	26.39	39.24	51.69	63.37	22.60	43.40	35.42	48.68	61.84
North-East	11.17	36.86	50.83	58.94	78.16	10.03	35.34	50.81	59.12	78.66	17.46	45.21	50.00	55.56	71.88
West	11.73	36.20	29.62	28.32	44.67	9.03	29.07	26.21	27.35	43.86	15.73	47.17	37.18	30.24	46.38
South	13.53	24.63	23.47	28.41	48.40	11.72	21.00	21.51	27.29	49.91	17.34	32.81	28.91	31.91	43.35
							NFHS II								
North	19.32	59.53	58.91	60.66	66.48	18.10	55.80	54.30	58.82	67.69	21.43	66.38	69.23	65.52	63.27
Central	9.40	29.25	46.44	57.05	69.51	7.80	23.67	43.72	55.73	69.80	15.99	50.94	60.06	64.02	67.83
East	14.37	40.14	49.56	61.95	75.00	10.59	37.16	49.35	62.54	75.54	34.19	60.74	51.54	57.65	68.49
North-East	11.82	44.76	51.91	53.49	64.94	11.27	44.13	52.73	54.17	65.03	15.79	48.72	47.37	44.44	60.00
West	18.98	40.55	33.16	35.37	49.20	16.30	34.36	27.90	30.39	48.29	22.24	50.09	44.09	46.46	51.40
South	17.23	25.72	21.09	28.79	42.64	14.63	22.66	20.50	28.09	41.95	23.35	31.95	23.44	30.68	45.28
							NFHS III								
North	23.71	57.14	50.77	56.19	62.96	19.73	50.62	46.26	57.24	62.71	30.57	69.99	64.12	52.58	64.57
Central	18.07	49.29	54.80	62.49	75.42	15.73	45.51	51.52	61.96	74.37	25.15	60.62	69.43	64.97	80.50
East	23.17	49.85	52.94	64.13	74.27	19.40	48.13	52.40	64.42	74.59	37.64	58.08	56.48	61.90	71.83
North-East	27.65	62.12	64.58	75.53	80.21	25.65	61.17	64.60	76.06	80.84	35.92	66.36	64.44	70.83	71.43
West	23.48	46.16	38.76	37.59	41.67	20.13	39.32	33.98	35.14	34.72	27.16	54.59	45.86	42.55	56.02
South	20.67	18.63	17.17	23.53	27.94	18.57	16.40	17.20	19.23	28.27	23.73	22.23	17.10	33.12	27.50

Source: Computed from NFHS I, II and III

Table 4

Proportion (per cent) of currently married women (age 15-49) who are currently using a contraceptive method

States	Total			Rural			Urban		
	NFHS I	NFHS II	NFHS III	NFHS I	NFHS II	NFHS III	NFHS I	NFHS II	NFHS III
Jammu and Kashmir	35.58	39.66	43.11	30.00	35.00	37.18	58.67	54.35	67.27
Himachal Pradesh	43.71	48.48	58.70	41.73	47.43	57.01	63.64	58.33	66.67
Punjab	43.58	50.00	56.65	41.24	45.80	55.57	51.02	64.08	56.84
Uttaranchal			48.07			43.58			67.42
Haryana	32.95	38.33	49.66	29.34	35.43	45.84	45.75	47.59	61.45
Delhi	52.46	53.66	59.85	52.00	45.95	50.51	52.60	54.52	56.47
Rajasthan	16.29	20.46	35.84	13.93	17.93	30.62	28.88	30.39	56.09
Uttar Pradesh	10.37	15.46	37.51	8.38	12.37	34.17	20.09	31.51	53.31
Bihar	12.58	9.84	25.02	10.58	8.98	23.09	25.76	18.77	39.66
Sikkim		37.50	48.00		35.71	45.03		50.00	56.63
Arunachal Pradesh	15.38	15.63	33.33	14.04	14.29	30.83	33.33	25.00	38.67
Nagaland	7.14	14.93	19.35	6.67	14.29	15.51	10.00	20.00	34.48
Manipur	22.73	25.33	50.00	18.99	25.45	45.90	31.25	28.57	60.64
Mizoram	40.00	37.04	50.00	35.71	28.57	43.87	43.75	46.15	55.26
Tripura	45.52	39.51	64.74	41.60	37.14	63.08	70.00	63.64	74.22
Meghalaya	10.00	14.74	17.54	7.87	9.76	14.03	22.73	46.15	36.51
Assam	28.38	28.37	49.75	26.35	27.57	47.39	49.26	41.46	67.94
West Bengal	46.77	50.98	64.35	43.37	47.40	61.32	58.34	66.91	77.58
Jharkhand			24.62			19.16			48.16
Orissa	21.40	23.94	36.60	20.26	22.74	34.29	28.13	34.23	51.28
Chhattisgarh			38.30			35.67			51.52
Madhya Pradesh	20.37	21.24	40.70	17.56	18.40	39.29	31.65	31.58	54.08

States	Total			Rural			Urban		
	NFHS I	NFHS II	NFHS III	NFHS I	NFHS II	NFHS III	NFHS I	NFHS II	NFHS III
Gujarat	28.70	36.18	55.22	25.19	31.19	52.78	36.51	44.81	59.36
Maharashtra	36.40	36.63	51.61	36.52	37.04	48.86	36.20	35.90	57.15
Andhra Pradesh	36.26	43.57	60.18	32.94	42.28	59.25	46.37	47.41	57.07
Karnataka	34.40	37.19	53.61	31.91	34.47	52.99	40.56	43.22	54.64
Goa	40.00	39.29	48.15	37.50	38.89	42.27	40.56	45.45	51.31
Kerala	51.21	52.61	64.98	49.58	51.29	62.59	55.78	58.22	70.03
Tamil Nadu	44.89	37.89	56.36	41.88	31.06	53.85	50.33	50.83	66.44
All India	26.18	28.41	44.25	22.72	24.78	40.61	38.00	41.13	55.95

Source: Computed from NFHS I, II and III.

Table 5

Proportion (per cent) of households by type of households (NFHS III)

States	Total		Rural		Urban	
	Nuclear	Non-Nuclear	Nuclear	Non-Nuclear	Nuclear	Non-Nuclear
Jammu and Kashmir	37.19	54.73	37.09	55.32	37.55	52.71
Himachal Pradesh	32.06	64.02	28.30	67.79	43.08	52.96
Punjab	30.91	62.51	28.84	63.77	34.80	60.13
Uttaranchal	39.98	55.54	39.54	55.64	41.27	55.24
Haryana	35.91	53.58	34.68	54.54	40.53	50.00
Delhi	50.76	44.52	53.00	42.00	50.56	44.74
Rajasthan	42.71	47.70	42.88	47.30	42.21	48.92
Uttar Pradesh	43.41	48.22	42.31	48.16	45.57	48.34
Bihar	40.00	46.90	40.16	48.13	39.64	44.12
Sikkim	48.70	47.47	49.12	46.49	47.72	49.75
Arunachal Pradesh	49.66	48.28	52.61	46.08	42.64	53.49
Nagaland	64.33	34.49	65.11	33.44	63.21	35.99
Manipur	50.58	47.59	53.96	44.34	45.18	52.78
Mizoram	51.65	47.64	60.00	39.79	41.27	57.41
Tripura	52.90	40.53	54.15	40.32	48.12	41.35
Meghalaya	64.50	35.32	66.02	33.85	60.87	38.82
Assam	57.18	39.56	55.47	42.06	63.72	29.97
West Bengal	46.75	45.65	52.05	40.74	38.51	53.29
Jharkhand	41.64	52.75	43.69	51.94	36.46	54.80
Orissa	45.54	45.59	46.39	44.98	42.89	47.48
Chhattisgarh	40.95	52.95	40.66	53.28	41.83	51.98
Madhya Pradesh	48.14	44.06	49.89	42.15	45.71	46.74
Gujarat	41.76	51.88	42.34	50.65	40.73	54.02
Maharashtra	38.91	55.60	33.55	58.48	41.81	54.03

States	Total		Rural		Urban	
	Nuclear	Non-Nuclear	Nuclear	Non-Nuclear	Nuclear	Non-Nuclear
Andhra Pradesh	48.91	43.28	43.65	43.88	52.01	42.93
Karnataka	35.19	53.56	31.15	55.96	42.90	49.00
Goa	41.19	49.80	37.35	51.22	44.98	48.39
Kerala	23.40	64.31	24.24	62.12	21.65	68.90
Tamil Nadu	60.40	34.12	59.64	33.41	61.11	34.78
All India	44.95	48.21	44.47	48.15	45.73	48.32

Source: Computed from NFHS III.

Table 3

Fertility trends and socio-economic development in India

States	Total fertility rate			Female Literacy		Female WPR		Urbanization	
	NFHS I	NFHS II	NFHS III	1991	2001	1991	2001	1991	2011
Jammu and Kashmir		2.71	2.38		50.32	48.63		22.45	27.04
Himachal Pradesh	2.37	2.14	1.94	40.41	58.37	68.38	27.75	43.67	29.55
Punjab	2.92	2.21	1.99	40.40	58.32	63.36	4.35	33.95	37.48
Uttaranchal		2.61	2.38		50.38	61.61		27.38	24.63
Haryana	3.09	2.38	2.09	33.55	47.17	56.34	9.72	27.22	29.53
Delhi	3.02	2.4	2.13	59.63	68.45	71.41	10.36	9.37	22.08
Rajasthan	3.85	3.76	3.21	20.44	44.34	44.69	19.04	23.49	19.04
Uttar Pradesh		4.06	3.82	28.24	54.11	56.48	11.75	18.34	13.14
Bihar		3.7	4	28.16	26.32	43.69	16.02	18.84	11.07
Sikkim		2.75	2.02		38.19	68.50		27.33	12.80
Arunachal Pradesh	4.52	2.52	3.03	32.36	35.04	50.64	36.34	36.54	17.21
Nagaland	3.26	3.77	3.74	41.20	52.19	65.53	41.46	38.06	27.52
Manipur	2.76	3.04	2.83	38.81	52.01	63.94	41.43	39.02	46.10
Mizoram	2.3	2.89	2.86	45.54	72.50	75.86	38.68	47.54	15.30
Tripura	2.67	1.87	2.22	39.79	55.97	73.13	16.93	21.08	18.60
Meghalaya	3.73	4.57	3.8	44.42	46.95	60.06	37.17	41.40	11.10
Assam	3.53	2.31	2.42	38.76	45.24	57.51	19.33	20.71	27.48
West Bengal	2.92	2.29	2.27	38.39	51.00	63.27	12.59	18.32	22.24
Jharkhand		2.76	3.31		31.62	47.30		26.41	13.38
Orissa	2.92	2.46	2.37	34.81	43.24	56.81	18.18	24.66	20.09
Chhattisgarh			2.62		43.07	52.20		40.04	23.18
Madhya Pradesh		3.43	3.12	31.38	41.24	51.39	29.21	33.21	34.49
Gujarat	2.99	2.72	2.42	38.36	49.39	62.12	19.44	27.91	38.69
Maharashtra	2.86	2.52	2.11	38.88	57.62	67.06	32.53	30.81	26.89

States	Total fertility rate			Female Literacy			Female WPR		Urbanization		
	NFHS I	NFHS II	NFHS III	1991	2001	2011	1991	2001	1991	2001	2011
Andhra Pradesh	2.59	2.25	1.79	36.57	43.76	53.80	34.63	35.11	30.92	33.99	38.57
Karnataka	2.85	2.13	2.08	38.75	49.22	60.59	28.95	31.98	41.01	49.76	62.17
Goa	1.9	1.77	1.79	43.68	67.31	74.21	25.13	22.36	26.39	25.96	47.72
Kerala	2	1.96	1.93	49.12	77.76	83.37	22.85	15.38	34.15	44.04	48.45
Tamil Nadu	2.48	2.19	1.8	40.50	57.14	66.98	30.37	31.54	25.73	27.82	31.16
India	3.39	2.85	2.68	36.11	45.13	56.99	22.48	25.60		24.81	27.21

Source: NFHS I, II and III; Census of India, 1991, 2001 and 2011.

Table 7
Content of medical and non-medical child care

States	Proportion (per cent) of children 12-23 years of age universally immunized	Proportion (per cent) of children below 1 years of age who are currently breastfeeding
Jammu and Kashmir	64.57	85.88
Himachal Pradesh	78.13	86.46
Punjab	57.49	83.00
Uttaranchal	62.28	86.83
Haryana	62.90	84.50
Delhi	62.95	81.82
Rajasthan	28.51	91.23
Uttar Pradesh	28.05	90.81
Bihar	35.93	92.16
Sikkim	78.63	100.00
Arunachal Pradesh	24.17	95.83
Nagaland	23.79	81.08
Manipur	52.14	93.33
Mizoram	43.52	88.89
Tripura	57.32	93.55
Meghalaya	39.43	86.11
Assam	31.08	98.67
West Bengal	65.98	95.07
Jharkhand	36.98	93.66
Orissa	51.29	95.21
Chhattisgarh	50.54	97.03
Madhya Pradesh	52.69	91.31
Gujarat	45.59	85.97
Maharashtra	62.89	88.84
Andhra Pradesh	48.23	83.96
Karnataka	52.36	83.47
Goa	78.54	72.73
Kerala	77.10	92.13
Tamil Nadu	84.31	73.64
India	49.38	89.73

Source: Computed from NFHS III

Table 8

Proportion (per cent) of Children (12-23 months) who are fully immunised according to household type and number of living children (NFHS III)

States	HH Structure		No. of Living Children				
	Nuclear	Non-Nuclear	1	2	3	4	5+
Jammu & Kashmir	35.92	64.08	27.27	35.71	23.05	7.79	6.17
Himachal Pradesh	27.34	72.66	34.00	48.00	11.33	4.67	2.00
Punjab	24.91	75.09	30.36	44.29	20.00	3.93	1.43
Uttarakhand	33.33	66.67	25.45	42.29	20.07	7.89	4.30
Haryana	29.59	70.41	25.08	46.78	16.95	7.46	3.73
Delhi	47.72	52.28	28.76	38.13	20.07	7.02	6.02
Rajasthan	41.62	58.38	26.57	38.65	17.87	9.18	7.73
Chhattisgarh	35.96	64.04	32.98	29.08	20.92	8.16	8.87
MP	42.91	57.09	29.75	38.35	17.03	7.53	7.35
UP	31.01	68.99	25.38	35.25	18.38	11.93	9.05
Bihar	27.47	72.53	23.36	32.89	23.68	10.86	9.21
West Bengal	44.28	55.72	39.10	36.68	13.32	7.09	3.81
Jharkhand	36.89	63.11	29.11	35.68	18.31	8.92	7.98
Orissa	42.51	57.49	40.53	34.32	14.50	8.28	2.37
Arunachal Pradesh	50.00	50.00	35.62	36.99	12.33	6.85	8.22
Assam	71.00	94.00	44.12	37.65	8.24	5.88	4.12
Manipur	40.87	59.13	35.13	39.74	15.64	6.41	3.08
Mizoram	44.37	55.63	23.84	38.41	23.84	7.28	6.62
Nagaland	69.85	30.15	18.91	35.82	15.92	12.94	16.42
Tripura	51.82	48.18	47.52	37.59	9.93	3.55	1.42
Meghalaya	64.71	35.29	18.95	25.49	18.30	10.46	26.80
Sikkim	50.27	49.73	40.00	31.79	13.85	8.21	6.15
Goa	44.74	55.26	43.79	39.13	11.80	3.42	1.86
Gujarat	36.92	63.08	73.00	112.00	45.00	23.00	16.00
Maharashtra	40.28	59.72	35.78	41.26	16.15	3.47	3.34
Andhra Pradesh	53.33	46.67	31.44	47.99	13.00	4.96	2.60
Karnataka	35.09	64.91	32.33	42.03	17.09	5.77	2.77
Kerala	27.21	72.79	40.00	43.94	10.00	4.24	1.82
Tamil Nadu	65.30	34.70	35.60	45.44	13.95	3.22	1.79
India	41.44	58.56	32.21	39.31	16.31	6.91	5.27

Source: Computed from NFHS III

Table 9

Proportion (per cent) of children Less than 1 year of currently breastfed according to household type and number of living children (NFHS III)

States	HH Structure		No. of Living Children				
	Nuclear	Non-Nuclear	1	2	3	4	5+
Jammu & Kashmir	65.65	34.35	29.45	29.45	22.60	9.59	8.90
Himachal Pradesh	76.92	23.08	35.37	42.68	13.41	4.88	3.66
Punjab	73.40	26.60	37.57	34.91	18.34	5.03	4.14
Uttarakhand	68.15	31.85	29.66	31.72	21.38	8.97	8.28
Haryana	67.62	32.38	33.33	34.56	14.37	7.95	9.79
Delhi	54.23	45.77	32.89	33.55	19.08	9.21	5.26
Rajasthan	63.37	36.63	30.99	26.98	15.12	12.95	13.95
Chhattisgarh	58.09	41.91	31.13	26.89	20.52	11.08	10.38
MP	61.06	38.94	28.48	26.20	20.14	12.59	12.59
UP	52.41	47.59	23.24	24.97	20.09	13.64	18.07
Bihar	58.20	41.80	28.73	22.55	16.10	14.04	18.57
West Bengal	49.40	50.60	37.29	35.53	15.03	6.60	5.55
Jharkhand	57.55	42.45	26.77	27.87	16.06	13.23	16.06
Orissa	54.01	45.99	38.74	30.56	14.78	10.04	5.88
Arunachal Pradesh	52.17	47.83	31.82	22.73	13.64	13.64	18.18
Assam	48.80	51.20	38.42	27.61	16.22	8.11	9.65
Manipur	53.66	46.34	31.71	29.27	19.51	9.76	9.76
Mizoram	56.25	43.75	29.41	29.41	17.65	11.76	11.76
Nagaland	40.00	60.00	16.67	23.33	20.00	13.33	26.67
Tripura	48.15	51.85	50.88	29.82	8.77	5.26	5.26
Meghalaya	38.71	61.29	22.58	24.19	16.13	14.52	22.58
Sikkim	55.56	44.44	36.36	27.27	18.18	9.09	9.09
Goa	61.54	38.46	43.75	37.50	12.50	6.25	0.00
Gujarat	57.94	42.06	30.92	32.64	19.63	9.33	7.48
Maharashtra	68.03	31.97	38.82	36.52	15.18	4.80	4.68
Andhra Pradesh	52.37	47.63	37.45	41.31	15.02	3.43	2.79
Karnataka	65.83	34.17	34.88	36.77	17.79	6.76	3.80
Kerala	79.55	20.45	47.24	35.64	12.43	2.76	1.93
Tamil Nadu	39.72	60.28	42.50	39.78	13.20	2.71	1.81
India	58.25	41.75	31.81	30.04	17.14	9.95	11.06

Source: Computed from NFHS III

Table 10
Summary of Binary Logistic Regression

Independent Variable	Proportion (per cent) of children 12-23 years fully immunised			Proportion (per cent) of children below 1 years who are currently breastfed		
	Odds Ratio			Odds Ratio		
	Total	Rural	Urban	Total	Rural	Urban
Household Structure (Ref Nuclear)						
Non-Nuclear	-0.021	0.038	0.067***	0.198*	0.167***	0.201***
Number of Living Children (Ref. Less than or equal to 2)						
3	0.0654*	0.564*	0.801*	0.110	0.179	0.219
4	0.405*	0.320**	0.619*	0.204	0.192	0.117
5+	0.170***	0.150	0.268***	0.075	0.075	0.405
Sex of Child (Ref. Male)						
Female	0.50***	0.023*	0.096***	0.129***	0.129***	0.123***
Caste of the HH Head (Ref. General)						
OBC	0.098**	0.012	0.021	0.235**	0.213	0.295***
ST	-0.109**	0.215*	0.125***	0.058	0.069	0.059
SC	-0.259*	0.283*	0.239***	0.093	0.047	0.365
Birth Order (ref. 1)						
2	0.302**	0.339**	0.199	0.757*	0.565***	1.370**
3	0.101	0.125	0.011	0.221	0.045	0.810*
4	0.092	0.134	0.095	0.30	0.012	0.305
5+	0.196**	0.265**	0.021	0.074	0.156	0.361
Desire for more children (ref. doesn't want)						
Want	0.020***	0.092	0.187***	0.866*	0.105*	0.560***
Undecided	-0.184	0.234	0.033	1.698*	1.831*	1.394*
Wealth Index (ref. Poorest)						
Poorer	1.196*	1.411*	1.971*	1.118*	0.751*	1.092*
Middle	0.906*	1.085*	1.788*	0.887*	0.510*	1.221*
Richer	0.518*	0.628*	1.511*	0.781*	0.453*	0.924*
Richest	0.453*	0.547*	1.409*	0.528*	0.210*	0.639*
Mother's Educational attainment (ref. No Education)						
Primary	1.731*	1.351*	1.211*	0.175	0.034	0.213
Secondary	1.223*	0.860*	0.848*	0.294**	0.174	0.286
Higher	0.741*	0.482*	0.577*	0.325*	0.197	0.306***
Mother's Working Status (ref. Doesn't Work)						
Worked last year	0.238	0.775***	1.008*	0.822	1.764	0.420
Currently working	0.123***	0.248**	1.205*	0.553*	0.442**	0.128**

Independent Variable	Proportion (per cent) of children 12-23 years fully immunised			Proportion (per cent) of children below 1 years who are currently breastfed		
	Odds Ratio			Odds Ratio		
	Total	Rural	Urban	Total	Rural	Urban
Partner's Educational Attainment (ref. No Education)						
Below or up to primary	1.481*	1.001	1.430*	0.009	0.055	0.223
Below or up to secondary	1.197***	1.263***	1.255**	0.053	0.048	0.290
Higher	0.073	1.144***	0.022	0.124	0.161	0.114
Mother's Nature of Employment (ref. Not Working)						
Skilled work other than agriculture	1.097***	0.814**	1.043	0.710	0.587	1.095
Agricultural	0.085	0.022***	0.030	1.459*	1.402*	0.166
Unpaid household worker	0.950***	0.801***	0.046			0.921***
Region (ref. North)						
Central	-0.034	0.295*	0.048	0.406*	0.377*	0.439*
East	1.622*	1.744*	1.294*	1.483*	1.558*	1.418*
North-East	0.105***	0.004	0.035	1.833*	0.909*	0.690*
West	1.709*	1.882*	1.540*	1.331*	1.328*	1.393*
South	1.093*	1.331*	0.071	0.526*	0.533*	0.548*
Constant	1.201*	1.423*	0.876**	0.474**	0.721**	0.202
-2 log likelihood	19853.16	11878.98	7902.93	10740.13	6793.29	3899.976

Significance Levels: *1%, **5%, ***10%

Nutrition Advice during Antenatal Care and Incidence of Low Birth Weight in India

Pallavi Gupta
Kaushlendra Kumar

Introduction

Infant mortality is a major public health problem in India. The primary adverse reproductive outcome underlying infant mortality is low birth weight (LBW). The low-birth-weight infants remain at a much higher risk of mortality than infants with normal weight at birth. In the neonatal period, when most infant deaths occur, the proportion of low-birth-weight infants, especially those with very low weight, is the major determinant of the magnitude of the mortality rate (McCormick, 1985). Differences in low birth weight rates account for the higher neonatal mortality rates observed in some groups, particularly those characterized by socioeconomic disadvantages. In addition to the impact on infant mortality, low birth weight is also associated with poor outcomes later in the life like malnutrition, infection, mental disorders, long term disabilities (Berkowitz and Papiemik, 1993).

Birth weight is a strong predictor of survival of the new born. The lower is the birth weight, the higher is the probability of death. Low birth weight (LBW) means birth weight less than 2.5 kg. According to Kraemer (1987), possible factors associated with low birth weight are maternal factors, socio-economic factors and quality of antenatal care received. Maternal factors include age of the mother, parity, anaemia level, diet intake during pregnancy, etc. The relationship between low birth weight and maternal factors has been found to be significant. Fraser and others (1995) have observed that there is a U-shaped relationship between the age of the mother at the time of the birth and the weight of the new born.

Among the many factors influencing the birth weight, maternal nutrition or diet intake during pregnancy is an important one (Gopalan, 1994). Nutritional deficiencies during pregnancy leads to serious implications related to the growth of the foetus. It is therefore necessary to have balanced diet during pregnancy. Antenatal care plays an important role in this aspect. It provides an opportunity to advise pregnant women about proper diet and good nutrition as necessary for normal birth. According to Sinha (2006), outcome of pregnancy in terms of birth weight of the new born improves significantly in for women who have received antenatal care. Thus, antenatal care plays an important role in safe pregnancy outcome and survival of baby as well as mother (Kenneth et al., 1985). There are several studies that have found significant relationship between quality of antenatal care and birth weight (Nair et al., 2000). Keeping the existing literature in mind, the present study examines the impact of nutritional advice during pregnancy as part of antenatal care on the birth weight.

Data and methods

The analysis is based on the data available through the National Family Health Survey, 2005-06 (NFHS-3). During the survey, the birth weight of all children born during five years preceding the survey was recorded either from the written record or from mother's recall. This information is available for 39,677 children who were born during five years preceding the survey.

The dependent variable used in the study is the dichotomous variable which has the value 1 if the birth weight was low and 0 otherwise. On the other hand, independent variables include region, place of residence, religion, caste, age of the mother, birth order, education of the mother and the father, wealth index, occupation of the mother and the father, antenatal check up during pregnancy, nutrition advice during pregnancy, body mass index and anaemia level of the mother, etc. Relevance of these variables in terms of the nutritional status of the mother and in the birth weight has been highlighted in a number of studies. Place of residence has great impact on antenatal care. Urban areas tend to have an advantage over rural areas in this regard. Religion and caste in India also play an important role in moulding the attitude and behaviour of the people. The association of the age of mother at birth and birth order with the weight at birth is also well known (Cooper, 1995). Both bi-variate and multivariate analyses have been carried out to analyse the impact of nutrition advice during antenatal care on the weight at birth. Odds ratios are used to interpret the effect of explanatory variables on the outcome variables - the weight at birth which is categorised as low if it is less than 2.5 kg and normal otherwise.

Results

Table 1 presents the percentage of low birth weight children by different background characteristics of women. The prevalence of LBW in India is estimated to be 21 per cent on the basis of data available through NFHS-3. The prevalence is higher in rural than in urban areas (23 per cent and 18 per cent respectively). There is however no significant difference in the prevalence of LBW in Hindu women compared to women of other religions. Prevalence of LBW has been found to be higher in Scheduled Castes and Scheduled Tribes as compared to other social classes.

The table also suggests that the prevalence of LBW is inversely related to the age of the mother at the time of birth. On the other hand, prevalence of LBW appears to increase with the order of the birth. The prevalence of LBW has been found to vary with the educational level of the mother, although the prevalence does not vary much with the wealth quintiles of the mother except the richest quintiles. Similarly, the prevalence of LBW is more or less same in working mothers as compares to non-working mothers.

By contrast, the prevalence of LBW differs significantly in women who received nutrition advice during pregnancy at the time of antenatal examination as compared to women who received no nutrition advice during antenatal examination or women who had no antenatal examination.

Table 2 shows the percentage of women who received and not received nutrition advice as part of antenatal care. Only 66 per cent of women received nutrition advice during ANC visit. In the rural areas, 40 per cent of the women did not get nutrition advice during antenatal visit compared to 21 per cent in the urban areas. Similarly, only 60 per cent Scheduled Castes/Tribes women received nutrition advice compared to 64 per cent OBC women and 74 per cent women of other classes. The proportion of women who did not get nutrition advice increased with the increase in the order of the birth. Similarly, only 46 per cent women from the lowest wealth quintiles group received nutrition advice compared to 87 per cent women in the richest quintiles group. The proportion not receiving nutrition advice has also been found to be higher in working mothers compared to non-working mothers.

In table 3, the prevalence of LBW in those mothers who received nutrition advice is given by background characteristics along with the prevalence of LBW in mothers who did not receive nutrition advice during pregnancy. The table shows that the prevalence of LBW in mothers who received nutrition advice during pregnancy is invariably lower than the prevalence in those mothers who did not receive nutrition advice irrespective of the background characteristics the woman. Overall, the prevalence of LBW was 26 per cent in women who did not receive nutrition advice during pregnancy compared to only

19 per cent in women who received nutrition advice during pregnancy. This shows that nutrition advice during pregnancy does have an impact on the prevalence of LBW.

Table 4 presents results of the logistic regression analysis. Rural women have 11 per cent higher chance of having an LBW baby compared to an urban woman. However, social class and religion differentials in the prevalence of LBW are not statistically significant. On the other hand second and third order births have lower probability of being LBW compared to first order birth. The same is true to births to women aged 29-35 years. Finally, women who received nutritional advice during pregnancy have 12 per cent lower probability of having an LBW baby compared to women who did not receive any nutritional advice.

Discussions and Conclusions

Low birth weight is a serious health problem among infants which greatly increases the risk of neonatal morbidity and mortality. In the present study, we have analysed the impact of nutrition advice during pregnancy on the prevalence of LBW. We found that the prevalence of LBW is significantly lower in women who received nutrition advice during pregnancy as compared to women who did not receive nutrition advice during pregnancy. The analysis suggests that nutrition advice should be made an integral part of antenatal care to reduce the prevalence of low birth weight which is a major contributing factor to neonatal, infant and under-five mortality.

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Table 1

Percentage of low birth weight children by background characteristics of women

Background Characteristics	Birth Weight		N
	Low	Normal	
Region			
North	28.1	71.9	1561
Central	22.7	77.3	1585
East	21.2	78.8	2801
North-East	17.1	82.9	467
West	21.6	78.4	3493
South	17.5	82.5	4987
Place of residence			
Rural	22.9	77.1	8103
Urban	18.3	81.7	6791
Religion			
Hindu	21.0	79.0	11971
Non Hindu	20.0	80.0	2922
Caste/tribe			
Scheduled Caste/tribe	23.8	76.2	3340
Other Backward Classes	20.4	79.6	5693
Others	19.7	80.3	5567
Mother's age at birth			
<20 years	28.5	71.5	969
20-34 years	20.5	79.5	13046
35-49 years	17.0	83.0	879
Birth Order			
1	21.7	78.3	5747
2-3	19.5	80.5	7536
4+	23.7	76.3	1610
Mother's Education			
No education	25.7	74.3	2932
Below Primary	27.6	72.4	1009
Primary completed but less than high school	21.8	78.2	5349
High school and above	16.1	83.9	5603
Father's Education			
No education	26.1	73.9	1829
Below Primary	22.0	78.0	929
Primary completed but less than high school	22.3	77.7	4763
High school and above	18.4	81.6	7368

Background Characteristics	Birth Weight		N
	Low	Normal	
Wealth index			
Poorest	24.8	75.2	1205
Poorer	24.8	75.2	1858
Middle	24.1	75.9	2793
Richer	21.3	78.7	3947
Richest	16.3	83.7	5090
Mother's Occupation			
Non Working	20.6	79.4	10611
Working	21.5	78.5	4282
Father's Occupation			
Non Working	28.3	71.7	152
Working	20.7	79.3	14737
Antenatal care services			
No ANC	33.0	67.0	543
Received ANC and not advised for nutrition	25.8	74.2	2112
Received ANC and advised for nutrition	19.4	80.6	12235
Total	20.8	79.2	14893

Table 2
Percentage of women who had gone for ANC and received advice for nutrition during their visit by background characteristics

Background Characteristics	Visit for ANC	Not advise for nutrition*	Advised for nutrition*
Region			
North	81.7	40.5	59.5
Central	71.2	57.4	42.6
East	63.3	29.2	70.8
North-East	72.4	37.6	62.4
West	90.8	25.7	74.3
South	95.0	11.0	89.0
Place of residence			
Rural	72.2	40.1	59.9
Urban	90.7	20.8	79.2
Religion			
Hindu	77.7	34.1	65.9
Non Hindu	75.2	33.7	66.3
Caste/tribe			
Scheduled Caste/tribe	72.9	40.4	59.6
Other Backward Classes	74.2	35.6	64.4
Others	85.4	26.2	73.8
Mother's age at birth			
<20 years	77.9	39.0	61.0
20-34 years	79.1	32.7	67.3
35-49 years	59.8	44.0	56.0
Birth Order			
1	88.3	25.5	74.5
2-3	82.3	31.2	68.8
4+	58.0	52.8	47.2
Mother's Education			
No education	62.0	51.8	48.2
Below Primary	82.7	35.3	64.7
Primary completed but less than high school	89.0	27.9	72.1
High school and above	96.9	12.4	87.6
Father's Education			
No education	60.8	48.7	51.3
Below Primary	76.5	36.6	63.4
Primary completed but less than high school	79.9	35.1	64.9
High school and above	88.4	24.1	75.9

Background Characteristics	Visit for ANC	Not advise for nutrition*	Advised for nutrition*
Wealth index			
Poorest	58.6	53.6	46.4
Poorer	69.2	45.1	54.9
Middle	80.0	35.4	64.6
Richer	90.0	26.3	73.7
Richest	97.3	12.7	87.0
Respondent's Occupation			
Non Working	80.3	30.7	69.3
Working	71.9	40.2	59.8
Husband's Occupation			
Non Working	80.0	36.2	63.8
Working	77.1	34.0	66.0
Total	77.2	34.0	66.0

* Percentage among those women who had visited for ANC.

Table 3
Incidence of LBW among women by nutrition advice during pregnancy under ANC services, by background characteristics

Background characteristics	Low birth weight children among women who were	
	Not advised for nutrition	Advised for nutrition
Region		
North	32.3	26.4
Central	24.0	21.1
East	26.0	19.5
North-East	19.1	16.9
West	26.8	20.0
South	21.5	17.0
Place of residence		
Rural	27.8	21.2
Urban	21.8	17.6
Religion		
Hindu	26.5	19.5
Non Hindu	23.3	19.0
Caste/tribe		
Scheduled Caste/tribe	26.5	22.2
Other Backward Classes	26.7	18.9
Others	24.7	18.7
Mother's age at birth		
<20 years	29.8	26.1
20-34 years	25.7	19.3
35-49 years	21.2	15.4
Birth Order		
1	27.7	20.4
2-3	24.3	18.3
4+	25.9	22.2
Mother's Education		
No education	26.9	24.4
Below Primary	31.6	26.8
Primary completed but less than high school	26.7	20.4
High school and above	18.9	15.7
Father's Education		
No education	27.6	24.5
Below Primary	20.5	22.3
Primary completed but less than high school	27.2	20.8
High school and above	24.6	17.3

Background characteristics	Low birth weight children among women who were	
	Not advised for nutrition	Advised for nutrition
Wealth index		
Poorest	24.1	24.5
Poorer	30.2	22.2
Middle	26.7	22.9
Richer	27.5	19.8
Richest	19.0	15.9
Mother's Occupation		
Non Working	26.0	19.3
Working	25.4	19.9
Father's Occupation		
Non Working	50.0	23.1
Working	25.5	19.4
Total	25.8	19.4

Table 4
Odds ratios social and demographic characteristics and Low Birth Weight

Background Characteristics	Sig.	Exp(B)	95 % CI for Exp(B)	
			Lower	Upper
Region				
North®				
Central	0.00	0.66	0.56	0.79
East	0.00	0.54	0.46	0.63
North-East	0.00	0.45	0.33	0.60
West	0.00	0.66	0.57	0.77
South	0.00	0.48	0.42	0.56
Place of residence				
Urban®				
Rural	0.03	1.11	1.01	1.23
Religion				
Hindu ®				
Non-Hindu	0.70	0.98	0.87	1.09
Caste/tribe				
Scheduled Caste/ Tribes®				
OBC	0.30	0.94	0.84	1.05
Others	0.17	0.92	0.82	1.04
Mother's age at birth				
<20 years ®				
20-34 years	0.05	0.85	0.72	1.00
35-49 years	0.01	0.69	0.53	0.90
Birth Order				
1 ®				
2-3	0.00	0.86	0.78	0.94
4+	0.42	0.94	0.80	1.10
Mother's Education				
No education ®				
Below Primary	0.00	0.32	0.11	1.56
Primary completed but less than high school	0.11	0.90	0.79	1.02
High school and above	0.00	0.72	0.61	0.84
Wealth index				
Poorest ®	0.64	1.04	0.87	1.26
Poorer	0.26	1.11	0.93	1.33
Middle	0.77	1.03	0.85	1.24
Richer	0.06	0.82	0.66	1.01
Richest				
Antenatal care services				
Received ANC and not advised for nutrition®				
Received ANC and advised for nutrition	0.03	0.88	0.78	0.99

Socio-Economic Inequalities in Underweight Children in India

Joemet Jose

Introduction

While underweight is a characteristic of all countries in the world, the prevalence varies between countries (Wagstaff, 2000). The percentage of children under five years of age who are underweight is almost 20 times as high in India as would be expected in a healthy, well-nourished population and is almost twice as high as the average percentage of underweight children in sub-Saharan Africa (Arnold et. al., 2009). Anthropometric indicators of nutrition in India are among the worst in the world. Even today, nearly half of the children in India are underweight. (Deaton and Dreze, 2009). The improvement in nutrition appears to be slow relative of what might be expected in the light of India's recent high rates of economic growth (Deaton and Dreze 2009). Many social scientists have explored socio-economic inequalities in child health and nutrition in India (Roy et al., 2004; Joe et al., 2009; Radhakrishna and Ravi, 2004). Many studies have pointed out the negative association of the prevalence of under nutrition and socio-economic inequalities. Health inequality is higher in populations in which average health is high compared to populations where average health is low (Wagstaff and Watanabe, 2000; Pathak and Singh, 2011).

Inequality of any kind is most often associated with socio-economic indicators of deprivation. Deaton and Dreze (2009) observed that the trend of economic inequalities along several dimensions increased substantially while there was high rate of economic growth, especially the rural-urban inequalities at national and state levels. Unequal growth in income leads to unequal improvements in health as well. Many of the published

literature on the relationship between income inequality and health outcomes indicate a significant association between these two. These studies have also shown that the burden of ill health is disproportionately distributed among different economic groups (Macinko et al., 2003).

"Weight-for-age" can be seen as a comprehensive indicator of nutrition, which captures stunting as well as wasting. Both stunted and wasted children are likely to fall in the "underweight" category (Deaton and Dreze, 2009). Underweight outcomes are used to measure the aspect of health promotion as it confounds the effects of both short term and long term health and nutrition problems (Joe et al., 2009). Based on these understanding, this study makes an attempt to verify socio-economic inequalities in underweight children in different regions in India.

Data and Methods

The study is based on the data available through the National Family Health Survey, 2005-06 (NFHS 3). For the purpose of regional analysis, the country is divided into six major geographic regions as classified in the NFHS-3 which provides data on weight for age for 41306 children under five years of age along with a number of background characteristics associated with the mother and the family of the child.

In order to quantify the degree of socio-economic inequality in underweight children, the concentration index (CI) is calculated. The concentration index for grouped data is computed using the following formula:

$$CI = (p_1L_2 - p_2L_1) + (p_2L_3 - p_3L_2) + \ldots\ldots\ldots + (p_{T-1}L_T - p_TL_{T-1})$$

where p is the cumulative proportion of the sample ranked by economic status, L is the corresponding concentration curve ordinate and T is the number of groups.

The concentration index ranges between +1 and -1 and possesses certain attractive properties as compared to other measures of health disparities (Wagstaff et al., 1991). When there is no income-related inequality, the concentration index is zero. A negative concentration index indicates disproportionate concentration of the health variable among the poor. If the health variable, is 'bad' such as ill health, a negative value of the concentration index means ill health is largely concentrated amongst the poor. For example, in the case of the prevalence of underweight children, a negative CI would indicate that children from the poorest households are most likely to be under weight. On the other hand, if the health variable is 'good', a positive value of CI would imply that most of the good health is concentrated among the rich and the affluent class of the society. The larger is the value of the CI, irrespective of the sign of the index, the greater is the degree of inequality.

Results and Discussion

The analysis shows that the prevalence of underweight varied significantly among different regions of India. Highest prevalence (47 and 49 per cent) were reported in central and eastern regions respectively. The prevalence was the lowest in the southern region of India (32 per cent). This shows that the prevalence of underweight children varies considerably across different regions of India.

It is also clear from table 1 that the proportion of underweight children decreases with the increase in the wealth quintiles in all regions as well as separately in rural and urban areas. On the other hand, the male-female difference in the proportion of underweight children is presented in table 2 and the difference varies by different regions of the country as well as by different wealth quintiles. In the country as a whole, the proportion of underweight children in the poorest quintiles in higher in male as compared to female children. A similar situation prevailed in northern, central, west and southern regions of the country with the difference being very large in the southern region. In the north-eastern region, however, the proportion of underweight children is substantially higher in female children compared to male children. In the richest wealth quintiles, on the other hand, the proportion is higher in male children in all regions except the central region. It is clear that there is no general pattern in male-female differential in the prevalence of underweight across regions and along different wealth quintiles.

Values of the concentration index are given in table 3 by gender and by spatial location. All concentration indexes are negative which implies that the concentration of underweight children is high in the lowest wealth quintiles group in rural and urban areas as well as in all regions. The table suggests that inequality is the highest in the southern region of the country while it is the lowest in the central region. Similarly, inequality is high in the urban areas in all regions. It also appears that regions with low proportion of underweight children have high concentration index which reflect high socio-economic inequalities. For instance, the highest proportion of underweight children was recorded in central region and the lowest socio-economic inequality (concentration index value of -0.1360) was recorded in the same region. On the other hand, regions where the proportion of underweight children was very low showed a very high socio-economic inequality. For instance, in the southern region the concentration index is very high but the prevalence of underweight is the lowest. This shows a negative association between the proportion of underweight children and socio-economic inequality with regard to underweight. The concentration index values show that the socio-economic inequality with regard to underweight is relatively high in urban areas irrespective of regions. The same however is not true for gender.

Conclusions

The analysis shows that the burden of underweight is disproportionately distributed among the poor irrespective of gender or spatial location. The analysis also reveals that there is a negative association between the proportion of underweight children and socio-economic inequality. The analysis suggests that any health policy concentrates solely on reducing the proportion of underweight children may not contribute to reducing socio-economic inequalities. The analysis suggests that children belonging to poor households need high attention as most of the underweight prevalence are concentrated in poor children.

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Table 1

Prevalence of under-weight by wealth quintiles

Quintiles	North		Central		East		North east		West		South		India	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Poorest	54.5	52.3	63.2	57.6	56	59.2	41.7	44.3	54.8	55.3	58.6	45.7	58.5	56.7
Poorer	40.9	46.3	48.7	49.4	53.5	52.4	45.2	42.9	56.6	50.9	44.3	44.5	49.4	49.4
Middle	39.4	38.4	52.3	42.2	45.3	42.5	32.1	33.7	52.8	49.5	32.1	35.6	43.5	41
Richer	34.5	32.4	41.3	36.1	34.5	36.1	23	21.1	37.5	31.8	29.1	27.7	35	32.6
Richest	20.5	18.9	23.5	22.3	16.4	15.3	12	8.3	24.8	22.4	14.2	15.4	20.3	18.5
Total	27.8	38.9	39.5	49.1	35.6	51.3	25.3	37	33.7	44.4	27.1	34.9	32.8	45.7

Table 2

Prevalence of underweight by wealth quintiles

Region	North		Central		East		North east		West		South		India	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Poorest	53.1	51.5	58.6	57.1	59.1	59.2	38.9	50.3	55.9	54.7	52.0	43.8	57.1	56.3
Poorer	47.1	45.0	47.7	51.1	50.9	54.2	43.2	42.8	54.7	48.3	45.0	43.9	48.8	50.0
Middle	37.7	39.7	43.3	45.4	39.6	46.7	32.7	34.4	50.0	50.3	34.1	35.2	40.2	42.9
Richer	33.0	33.2	36.0	40.4	35.1	36.2	21.4	22.1	37.3	32.2	29.1	27.5	33.5	33.7
Richest	21.0	18.3	21.3	25.3	17.3	14.7	11.4	9.2	24.4	24.0	14.8	14.5	20.0	19.4
Total	36.0	35.8	46.2	48.1	47.9	50.0	34.0	36.8	40.7	39.0	32.5	31.4	42.0	43.0

Table 3
Concentration index for underweight by gender and spatial location

Region	Urban	Rural	Male	Female	Total
North	-0.1716	-0.1561	-0.1791	-0.1846	-0.1818
Central	-0.1662	-0.0913	-0.1439	-0.1273	-0.1360
East	-0.2321	-0.0989	-0.1668	-0.1499	-0.1584
North East	-0.2079	-0.1600	-0.1922	-0.2061	-0.1994
West	-0.1784	-0.1572	-0.1917	-0.1911	-0.1912
South	-0.2215	-0.1545	-0.2107	-0.2007	-0.2061
India	-0.1917	-0.1513	-0.1889	-0.1869	-0.188

Impact of Socio-Economic, Demographic and Health Related Factors on Reproductive Health Behaviour among Ever Married Rural Women

Rashed Alam

Introduction

In the past few years, issues related to reproductive health have been increasingly perceived as social problems. They have emerged as a matter of increasing concern throughout the developed and developing countries. Women's reproductive health is relatively a new area of health intervention in Bangladesh and recently it is an important issue. Among women, married adolescents are particularly vulnerable to reproductive health problems in Bangladesh. The program of Action of the International Conference on Population and Development (ICPD), held in Cairo in 1994, has defined reproductive health in a comprehensive manner to encompass physical, mental, and social well-being in all matters relating to the reproductive system and its functions. Thus, in contrast to earlier approaches that focussed on specific aspects of reproductive health, such as safe motherhood, maternal and child health and family planning, the reproductive health approach is concerned not only with pregnancy related health issues but also with health and human right issues relevant to reproductive health and sexuality that arise within and outside the child bearing age. Reproductive health means that people are able to have a responsible, satisfying and safe sexual life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so (UN Population Fund, 1995).

Many countries have become increasingly involved in monitoring reproductive rights and use the reporting procedures for international human rights instruments that their governments have ratified. In Bangladesh, barriers towards establishment of women's sexual and reproductive health rights include illiteracy, and higher gender inequality (Mondal et al, 2010). Studies on reproductive health rights reveal a wide range of socio-

economic and demographic factors which affect women's empowerment, education and reproductive health rights. The socioeconomic and demographic characteristics of people in a particular society are likely to be different from each other. These may also vary from one geographical setting to another. In Bangladesh, knowledge of family planning is widespread, but its practice is limited and most of the women do not get the fulfilment of their basic reproductive rights or equal power (Save the Children Fund, 2011).

The Government of Bangladesh seeks to create conditions whereby the people of Bangladesh have the opportunity to reach and maintain the highest attainable level of health. In 1998, the government adopted Health and Population Sector Strategy (HPSS) to provide a package of essential health care services to the people of Bangladesh and to slow down population growth. The main sectoral objective of HPSS is to maintain the momentum of efforts to lower fertility and reduce mortality through reduction in maternal mortality and morbidity and the burden of communicable diseases. Barkat and others (1998) have suggested that the essential services package identified in HPSS should consists of basic reproductive and child health services, including family planning, maternal care and immunisation as well as control of selected communicable diseases, limited curative care and behaviour change communication. Following HPSS, the Health and Population Sector Program (HPSP) was formulated by the government in 1998 which was subsequently reformulated as Health, Nutrition and Population Sector Program (HNPSP), 2003-2006. The vision and targets outlined in the Interim Poverty Reduction Strategy Paper (I-PRSP) of the government have been adopted as the overarching long-term policy framework for HNPSP. The reproductive health approach reflects the conceptual linking of the discourse on human rights with that on health (Chowdhury, Kabir and Hossain, 2000). In consonance with the scope of reproductive rights and reproductive health adopted at the International Conference on Population and Development, interventions required to ensure reproductive health are multi-pronged and cover a broad range of traditional health, family planning and mother and childcare services. The Programme of Action has called upon the countries to strive to make accessible through the primary health care system, reproductive health to all individuals of appropriate ages as soon as possible, and not later than the year 2015(United nations, 1995).

The aim of the present study is to analyse how socio-economic, demographic and health related factors influence the reproductive health of women in the context of children ever born and medical check up the women during their last pregnancy. The study has also made an attempt to determine factors that are associated with the children ever born to women and medical check up of the women during their last pregnancy.

Data Source

The analysis presented here is based on the information collected from a sample of 500 women in Bogra district of Bangladesh. The district comprises of 25 union parishads, 310 mouza and 341 villages spread over a geographical area of 420.64 sq km. The population of the district is 588783 with 51.9 per cent males and 48.1 per cent (Bangladesh Bureau of Statistics, 2001). The sample was selected through a multi-stage sampling procedure. In the first stage, the Bogra Sadar thana was selected out of nine thana of Bogra district purposively. Within the Bogra Sadar thana, 30 villages out of 341 villages in the thana were selected. Finally, within the selected villages, households were selected.

Method

The path analysis procedure was applied to analyse the data. Path analysis is a standardized multiple regression analysis in which a chain of relationships among the variables, arranged in an orderly manner, is examined through a series of regression equations (Duncan, 1971). In this procedure, for each endogenous variable in the model, successive reduced from equation is obtained by first regressing the endogenous variables on the exogenous variable and then regressing the endogenous variables on the exogenous variables and the intervening endogenous variables that come in sequence from cause to effect. While the first reduced form of equation of a particular endogenous variable gives the total effect, the last equation provides the direct effects. Successive deduction of path coefficients from first to second equation, from second to third equation, etc, gives the indirect effects.

The given model used in the present analysis is a recursive path model in which each variable is measured to be dependent upon all prior causal variables. Under additional assumption of linearity and additivity, the system of equation for the model can be written as follows:

$$X_7 = P_{71}X_1 + P_{72}X_2 + P_{73}X_3 + P_{74}X_4 + P_{75}X_5 + P_{76}X_6 + P_{7v}R_v$$

$$X_8 = P_{81}X_1 + P_{82}X_2 + P_{83}X_3 + P_{84}X_4 + P_{85}X_5 + P_{86}X_6 + P_{87}X_7 + P_{8w}R_w$$

$$X_9 = P_{91}X_1 + P_{92}X_2 + P_{93}X_3 + P_{94}X_4 + P_{95}X_5 + P_{96}X_6 + P_{97}X_7 + P_{98}X_8 + P_{9x}Rx$$

where, P_{ji}'s are path coefficients from X_i to X_j and R_u, R_v, $R_{w,}$ R_x and R_z are random disturbance terms. These systems of equations are known as structural equations. These selected variables give the estimates of path coefficients and helps in understanding the important links between various variables considered in the causal model. For the purpose of analysis, all the variables are transformed into normal forms by subtracting the respective means and dividing by the respective standard deviation. The regression coefficients thus obtained are the path coefficients.

Results and Discussion

Education is one of the most important socio-economic characteristics. There goes a proverb "education is the backbone of a nation". In the present study, 26 per cent of the women surveyed were illiterate, 22.5 per cent had education up to primary level, 49.5 per cent up to secondary level and only 2 per cent had higher level of education. On the other hand, one third of the respondent's husband were illiterate, 24 per cent had primary level education, 39 per cent had secondary education and only 4 per cent had higher level education.

Occupation is one of the most important socio-economic characteristics. Most of the respondents in the present study (91.0 per cent) were housewives. Only 2 per cent were in service, 6 per cent were labourers and only 1 per cent were engaged in business. At the same time, 22.5 per cent of respondent's husband were farmers, 32 per cent businessmen, 25 per cent labourers while 18 per cent were service. A very small proportion of women surveyed (2.5 per cent) had no husband. Majority of women were having family income ranging between 5001-9000 taka where as the average monthly family expenditure was less than or equal to 5000 taka in almost half of the women surveyed. Electricity was available in the house of about 73 per cent of the respondents.

Most of the women surveyed were in the age group 20-34 years (64.5 per cent). Age at marriage is closely related to fertility (especially family sizes), the duration of marriage life and the stability of the marriage. While early marriage of women is conducive to high fertility, late marriage is argued to have a fertility reducing effect (Coale, 1975).Becoming mother at an early age is harmful to both the mother and the child. In the present study, most of the respondents (89.0 per cent) were married before 18 years of age. Moreover, about two third of the respondents or their husband were using some family planning method whereas about two-third of the women surveyed had two or less children.

Table 2 presents zero order correlation coefficients of various socio-economic demographic and health related variables. Results of the path analysis are presented in table 3. It may be seen from table 2 that only five of the ten variables have statistically significant correlation coefficients. The analysis reveals that out of 21 possible paths, 12 paths are statistically significant for medical checkup during last pregnancy. It may also be observed that age of respondent (X_1), respondent occupation (X_3) and breast-feeding of last child (X_9) negative significant direct effect on medical check up during last pregnancy while respondent's education (X_2), family income (X_6), and age at marriage (X_7) have positive significant direct effect. On the other hand, the effect of husband education (X_4), husband occupation(X_5) and children ever born (X_8) have insignificant direct effect on medical check up during last pregnancy.

Total effect of exogenous variables: respondent occupation (X_3), husband occupation (X_5) and family income (X_6) is in negative direction but for others, it is in positive direction. Similarly, total effects of endogenous variables age at marriage (X_7) and children ever born (X_8) are in positive direction except for the duration of breast-feeding of the last child (X_9) which is negative.

Total effect of age of the respondent (X_1) on medical check up during last pregnancy is 0.265, of which about 23.75 per cent is transmitted through its implied effect and indirect effect about 12.69 per cent and 52.59 per cent are age at marriage and children ever born respectively in the same direction, about 10.96 per cent is duration of breast-feeding in the opposite direction. Total effect of respondent education (X_2) on medical check up during last pregnancy is 0.474, of which about 24.18 per cent is spread through its implied effect and indirect effect about 27.73 per cent and 18.63 per cent are age at marriage and duration of breastfeeding respectively in positive direction and about 29.46 per cent is children ever born in negative or opposite direction. Total effect of respondent occupation (X_3) on medical check up during last pregnancy is -.108, of which about 18.52 per cent is transmitted through its implied effect and indirect effect about 27.78 per cent, 12.96 per cent and 40.74 per cent are age at marriage, children ever born and duration of breast-feeding respectively in negative direction. Total effect of husband education (X_4) on medical check up during last pregnancy is 0.112, of which about 13.64 per cent is transmitted through its implied effect and indirect effect about 73.48 per cent and 5.30 per cent are age at marriage and duration of breastfeeding respectively in the positive direction, about 7.58 per cent is children ever born in the opposite direction.

Negative directions are observed in the direct effects of endogenous variables like duration of breastfeeding of last child. Total effect of husband occupation (X_5) on medical check up during last pregnancy is -0.067, of which about 33.03 per cent is transmitted through its implied effect and indirect effect about 31.19 per cent and 29.05 per cent are children ever born and duration of breastfeeding respectively in the negative direction, about 6.73 per cent is age at marriage in positive direction. Total effect of family income (X_6) on medical check up during last pregnancy is -0.019, of which about 13.03 per cent is acted through its implied effect and about 25.05and10.02 per cent are age at marriage and children ever born in the opposite direction then about 51.90 per cent works through duration of breastfeeding in the opposite direction.

Conclusions

Reproductive health is an emerging issue in Bangladesh. The analysis presented here concludes that acceptance of medical checkup during last pregnancy have great potential

to enhance women's reproductive health behaviour which was not satisfactory in the surveyed population. The analysis also suggests that most of the respondents were not aware about the age at marriage. It is also observed that age of the respondent, respondent's education and husband education have significant positive direct effect on medical checkup during last pregnancy. Respondent's occupation, monthly family income, age at marriage and children ever born also have indirect significant effect on medical checkup during last pregnancy.

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Table 1

Socio-economic, demographic and health related characteristics of the study on women reproductive health behaviour, Bogra sadar upzila, Bangladesh.

Categories	Frequency	Percentage
Respondents education		
Illiterate	130	26.0
Primary	114	22.5
Secondary education	246	49.5
Higher education	10	2.0
Husbands education		
Illiterate	165	33.0
Primary	120	24.0
Secondary education	195	39.0
Higher education	10	4.0
Respondents occupation		
Housewife	455	91.0
Service	10	2.0
Business	5	1.0
Labour	30	6.0
Husbands occupation		
Farmer	113	22.5
Service	90	18.0
Business	160	32.0
Labour	125	25.0
No husband	12	2.5
Monthly family income		
≤5000	120	24.0
5001-9000	220	44.0
9001-13000	94	18.5
13001-20000	56	11.0
20001+	10	2.0
Family expenditure		
≤5000	230	46.0
5001-9000	173	34.5
9001-13000	65	13.0
13001-20000	25	5.0
20001+	7	1.5
Modern facility(electricity)		
Yes	365	73.0
No	135	27.0
Age of respondents		
15-19	43	8.5
20-24	122	24.5

Categories	Frequency	Percentage
24-29	118	23.5
30-34	83	16.5
35-39	75	15.0
40-44	25	5.0
45-49	35	7.0
Age at marriage		
≤18	445	89.0
>18	55	11.0
Children ever born		
≤2	328	65.5
>2	172	34.5
Family member		
<4	298	59.5
4-8	172	34.5
>8	30	6.0
Taking family planning methods		
Yes	373	74.5
No	127	25.5
Physical problem during last pregnancy		
Yes	190	38.0
No	310	62.0
Breast feeding to last child		
Yes	452	90.5
No	48	19.5
Medical checkup during last pregnancy		
Yes	228	45.5
No	272	54.5

Table 2

Zero Order Correlation Coefficients among the Selected Variables of medical checkup (during last pregnancy) for women reproductive health behaviour

Variables	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	1.000	-0.373**	0.006	-0.028	-0.158*	0.136	0.003	0.607**	0.120	-0.238**
X_2		1.000	0.009	0.592**	-0.274	0.171*	0.380**	-0.470**	-0.040	0.342**
X_3			1.000	-0.018	0.054	0.362**	-0.021	-0.022	-0.004	-0.011
X_4				1.000	-0.372**	0.204**	0.331**	-0.166	-0.023	0.192**
X_5					1.000	-0.108	-0.147*	-0.088	-0.113	0.018
X_6						1.000	0.166	0.039	-0.030	0.051
X_7							1.000	-0.105	-0.090	0.214**
X_8								1.000	0.035	-0.152*
X_9									1.000	-0.090
X_{10}										1.000

Note: ** Significant at the 0.01 level, * Significant at the 0.05 level.

Table 3

Analysis of direct and indirect effects on medical check up during last pregnancy through endogenous and exogenous variable

Variable	Total association	Total effect	Non-causal effect*	Indirect effect Via			Other variables (Implied effect)	Direct effect
				X_7	X_8	X_9		
X_1	-0.238	0.265	-0.503	0.110	0.456	-0.095	-0.206	
X_2	0.342	0.474	-0.132	0.320	-0.340	0.215	0.279	
X_3	-0.011	-0.108	0.097	-0.030	-0.014	-0.044	-0.020	
X_4	0.192	0.112	0.080	0.097	-0.010	0.007	0.018	
X_5	0.018	-0.067	0.085	0.022	-0.102	-0.095	0.108	
X_6	0.051	-0.019	0.070	0.125	0.050	-0.259	0.065	
X_7	0.214	0.017	0.197		-0.005	-0.088		0.110
X_8	-0.152	0.312	-0.464			0.184		0.128
X_9	-0.090	-0.021	-0.069					-0.021

Note: Non-causal effect = Total association – Total effect

Table 4
Total effect of endogenous and exogenous variables on medical checkup during last pregnancy

Selected variable	Percentage of indirect effect via			Other variables (Implied effect)	Direct effect
	X_7	X_8	X_9		
X_1	12.69	52.59	10.96	23.76	
X_2	27.73	29.46	18.63	24.18	
X_3	27.78	12.96	40.74	18.52	
X_4	73.48	7.58	5.30	13.64	
X_5	6.73	31.19	29.05	33.03	
X_6	25.05	10.02	51.90	13.03	
X_7		2.46	43.35		54.19
X_8			58.97		41.03
X_9					100.00

Appendix

Variables used in the analysis

X1	Age of the respondent
X2	Respondent education
X3	Respondent occupation
X4	Education of husband
X5	Occupation of husband
X6	Family income
X7	Age at marriage
X8	Children ever born
X9	Breastfeeding of the last child

Reproductive Morbidity and Treatment Seeking Behaviour of Currently Married Women in Eastern States of India

Kasturi Mondal
Chander Shekhar

Introduction

The magnitude of women's reproductive health problems in India is immense. The figures highlight not only the enormity of the poor health status of women, but also the sharp disparity between developing and developed countries. The limitation of the population control approach was recognised through experiences of women all over the world, including India. It was also recognised that women suffer silently from a large number of reproductive illnesses which are termed as silent emergency. This understanding lead to women's health researchers and activists focussing more on women's health, especially in the field of reproductive health.

Many women and men suffer from reproductive morbidity such as reproductive tract infections (RTIs), menstruation problems, etc. RTI often cause discomfort and loss of economic productivity. The most serious long-term squeal arises in women include pelvic inflammatory disease (PID), cervical cancer, infertility, spontaneous abortion and ectopic pregnancy which may even lead to death. Among many health problems that affect the well being of individuals and families alike, reproductive morbidity reflects in an exemplary way the relatedness between illness and a woman's status. According to WHO estimates, reproductive ill health accounts for 33 per cent of the total disease burden in women as compared to 12.3 per cent for males. Despite this significant figure, in many South-Asian countries the magnitude of reproductive morbidity has not been adequately defined (WHO, 1995).

Reproductive morbidity is a broad concept that encompasses health problems related to reproductive organs and their functions within and outside the childbearing period. Reproductive morbidity can be broadly categorised into three subgroups: obstetric morbidity, gynecological morbidity and contraceptive morbidity. Obstetric morbidity refers to ill health in relation to pregnancy and childbirth. Gynecological morbidity includes health problems outside pregnancy such as RTI, menstrual problems, cervical ectopic pregnancy, infertility, cancers, prolapse and problems related to intercourse. Contraceptive morbidity includes conditions, which result from efforts to limit fertility, whether they are traditional or modern methods. Reproductive morbidity in general, is

an outcome of not just biological factors but also of women's poverty, powerlessness and lack of control over resources as well. Malnutrition, infection, early and repeated childbearing and high fertility also play an important role in poor maternal health conditions in India.

Global emergence of sexually transmitted infections has also bought attention to women's reproductive and sexual health. Women's reproductive and sexual health had for decades been a neglected area of international research (Graham and Campbel, 1999; Sen and Snow, 1994). Now, these issues feature more prominently in policy and programme development of government and non-governmental organizations (Muller et al., 1991). Concern with sexual and reproductive health gained momentum with the International Conference on Population and Development (United Nations, 1994). The Programme of Action that emerged from the Conference articulated the need to meet the reproductive health requirements of Individuals. In the context of India, the impetus to bring these and related issues in to the public domain begun with a community based epidemiological study of gynecological morbidity in Maharashtra (Bang et al., 1989). According to WHO (1995) over one third of all healthy life lost among adult women is due to reproductive health problems. They often deal with unwanted pregnancy; suffer due to unsafe abortions, problems resulting from the use of contraception, risk of RTI and STI including HIV infections.

Prevalence of reproductive tract infections (RTI) is detrained by number of factors. An association between pelvic inflammatory diseases (PID) and extramarital sexual relation of women and men has been well documented (Ooman, 2000). Use of contraception especially, IUD, female sterilisation and abortion also increases risk of RTI/STI (Gittlesohn et al., 1994, Bhatia and Cleland, 1995). Obstetric experiences of women and certain routine procedures during gynecological examination may also lead to contracting RTI. Lack of menstrual and personal hygiene is also found to be associated with RTI. In addition, there are socio-economic and cultural determinants of RTI. Studies have shown strong association between women's livelihood, work and their reproductive health (Oomen, 2000). In the study of adolescent girls in Rajasthan, it is found that large proportion of girls were not aware of menstruation when they first experienced it (Khanna and Goyal, 2005). A study conducted in Ahmednagar in Maharashtra (Barua and Kurzk, 2001) shows that the married adolescent girls often went untreated in case of menstrual problem and RTI.

In India, married women are reluctant to seek medical treatment because of lack of privacy, absence of a female doctor at the health facility, the cost of treatment and their subordinate social status. This reluctance exacerbates when symptoms are embarrassing,

as they are with RTI, especially among adolescents. A "culture of silence" shrouds gynecologic morbidity throughout India and elsewhere. Furthermore, women, more so than men, tend to regard RTI symptoms as normal discomfort and therefore often do not seek treatment. The present study highlights net effects of selected socioeconomic and demographic factors on the prevalence and treatment seeking behaviour for selected reproductive health problems (RTI/STI and menstruation) among women aged 15-49 years in the eastern states of India.

Need for the Study

Though there has been increasing concern over the general health and morbidity status of women in India, yet more attention is required to the reproductive morbidity among women. There is paucity of evidence about various dimensions of reproductive morbidity. On the other side, recent efforts in developing countries including India, especially in the eastern states of India to study reproductive morbidity at the community level suggest a high prevalence of menstruation and reproductive tract morbidities. Given the prevalence of the reproductive morbidity, it is necessary to understand and identify the underlying correlates. Therefore the present study focuses upon the eastern states of India - Orissa, Jharkhand, Bihar, and West Bengal. Except West Bengal rest of the three states are EAG states which are economically and socially backward states of India. Reproductive morbidity is high in these states. So, it is important to look at the problems of reproductive morbidity and identify its demographic and socio-economic determinants in these states.

Objectives

- To understand the morbidity pattern among the women aged 15-49 years in the eastern states (Bihar, West Bengal, Jharkhand and Orissa) of India.
- To study the treatment seeking behaviours of women in the eastern states (Bihar, West Bengal, Jharkhand and Orissa) of India.

Data and Methodology

The present study is based on the data available through the District Level Household and Facility Survey, 2007-08 (DLHS-3). The District Level Household and Facility Survey is a nationwide survey covering 601 districts from 34 states and 6 Union Territories of India. The survey collected information from 643944 ever married women aged 15-49 years regarding family planning, contraception, reproductive morbidity and other socio-demographic aspects. Among the ever married women, 604840 were currently married.

For the present study, only currently married women in the age group 15-49 years belonging to eastern states (Bihar, West Bengal, Jharkhand and Orissa) of India are analysed. Bi-variate and multivariate analyses have been carried out for the purpose. Main focus of the study is to understand the morbidity pattern among women.

The paper is divided into two parts. The first part of the paper presents descriptive statistics and cross tabulations while the second part presents results of the multivariate analysis. The binary logistic regression model is as follows:

$$\ln (P_i / (1-P_i)) = b_0 + b_1x_1 + b_2x_2 + b_3x_{3+.....} + b_ix_i$$

where, P_i = Probability of occurrences of outcome variable,

b_0 = Intercept,

$b_1, b_2, b_3 ... b_i$ is the regression coefficient of $x_1, x_2,$ and $x_{3.....}$ x_i respectively.

Results and Discussion

The analysis shows that the women's reproductive morbidity differs by different socioeconomic and demographic factors (table 1). Women of rural background suffer more from menstrual problems and RTI/STI than women of urban areas. Muslim women suffer more from menstrual problems (28.2 per ent) and RTI/STI (24.2 per cent) compared to women of other religions. Similarly, reproductive morbidity is high among Scheduled Castes women and women belonging to other castes. Education has a positive impact of reproductive morbidity. Women with less than ten years of education experience more reproductive problems than women with more than 10 years of education. Age at marriage also has a positive impact on the women's reproductive health problems. Women married before 18 years of age suffer more from these problems. Reproductive morbidity is also very high in women with at least 30 years of age. Women belonging to the middle wealth quintiles families experience more menstrual problems and reproductive tract infections.

The prevalence of different menstruation problems suggests that around 8 per cent of women of Bihar suffer from the problem of no period whereas 74 per cent of women of Jharkhand experience painful period. Similarly, the prevalence of irregular periods is high (37 per cent) in the women of Orissa. Internal menstrual bleeding is also high (8.2 per cent) in Orissa but blood clots/excessive bleeding is high (17 per cent) in Bihar.

Table 3 shows the prevalence of RTI in the eastern states. Women of West Bengal suffer more from the problem of itching or irritation over vulva. The prevalence of pain in lower abdomen not related to menses and the prevalence of pain during intercourse are also high in West Bengal. On the other hand, the prevalence of ulcer around vulva is high in Jharkhand.

Table 4 shows the type of treatment seeking behaviour. About 57 per cent of women of Orissa suffering from menstrual problems go to government allopathic centres for treatment. This proportion is only 13 per cent in Bihar where more than 70 per cent women go to private allopathic centres for treatment. In West Bengal, around 11 per cent women go to Ayush centres for treatment of menstrual problems. Religious or faith healing is strong in Bihar whereas in Jharkhand, religious or faith healing is only 18 per cent.

Table 4 also shows treatment seeking behaviour for RTI/STI. In Orissa, majority of women seek treatment from government hospital. The treatment seeking at the PHC level is also high in Orissa. But in Bihar and West Bengal, this proportion is quite low. Very few women seek treatment from NGO or Trust hospital/clinic in the four states. Treatment in private hospital or clinic is high in Jharkhand (63 per cent).

Results obtained from the multivariate logistic regression analysis are presented in table 5. Women from rural background are more likely to suffer from menstruation and reproductive tract infections than their urban counterparts. Chances of menstruation problems and RTI are relatively high in Muslim women and women belonging to other religions compared to Hindu women. Probability of menstruation problems and RTI/STI is relatively higher in women with less than 10 years of education compared to women with at least 10 years of education. Women who marry after 30 years of age face higher risk of menstrual problems and RTI/STI. Household wealth quintiles has a significant impact on the reproductive morbidity. Women of middle group of household wealth quintiles face higher risk of menstruation problems and RTI/STI.

Table 6 presents results related to the treatment seeking behaviour. Women from the urban areas are more likely to seek treatment of menstrual problems than women of rural areas. However, in case of RTI/STI urban women are 13 per cent less likely to go for treatment than rural women. Muslim women and women from other religions are 16 per cent and 43 per cent less likely to receive treatment than Hindu women. Women with less than 10 years of schooling are 49 per cent and 45 per cent less likely to seek any type of treatment for menstrual problems and RTI/STI respectively compared to women with no schooling. The same is true for women with at least 10 years of schooling. Women belonging to middle wealth quintiles families are 34 per cent less likely to receive treatment for menstruation problems. Women belong to richer families are also 16 per cent less likely to received treatment for menstrual problems. However in case of RTI/STI, women from middle wealth quintiles household are 38 per cent less likely to seek for treatment whereas the women belonging to the richest wealth quintiles household are 20 per cent less likely to go for the treatment.

Discussions and Conclusions

The present study shows that women from rural background suffer more from menstruation problems and RTI/STI. Residence is a significant factor in reproductive morbidity. Women from a rural background may be suffering from reproductive problems due to non availability of health services and also due to the lack of knowledge about reproductive morbidity. Muslim women supper significantly more from menstruation problems and RTI/STI. Scheduled Castes women also suffer more from these problems. Education has a positive impact on reproductive morbidity. Household income also has a positive impact on reproductive morbidity. Women marrying before 18 years of age have higher chances of menstruation problems and RTI/STI. Most of the women go for government hospitals for seeking treatment to these problems.

Reproductive morbidity remains a neglected area of research and exploration but reproductive health needs and status of women in the developing countries, like India, require attention. The present study indicates that prevalence of reproductive morbidity, including menstrual problems and RTI/STI is very common among rural women in the eastern states of India. Appropriate policy and programme measures should be taken up to address these issues effectively.

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Table 1

Percentage distribution of selected Reproductive Morbidity problems among women of eastern states of India by background characteristics.

Background characteristics	Reproductive Morbidity	
	Menstruation Problem	RTI/STI Problem
Types of Residence		
Rural	23.6	19.5
Urban	20.8	17.2
Religion		
Hindu	22.4	18.3
Muslims	28.2	24.2
Others	20.4	19.3
Caste		
Scheduled Castes	25.3	19.8
Scheduled Tribes	17.7	14.7
Other Backward Castes	21.9	19.1
Others	25.4	20.8
Education		
No Education	22.5	18.8
<10 years	24.4	20.2
>10 years	18.3	14.3
Age at marriage		
Below 18 years	24.0	20.1
19-30 years	19.9	15.5
>30 years	28.9	15 .8
Age of women		
<25 years	24.1	17.9
25-20 years	21.5	19.4
>30 years	24.4	19.5
Wealth quintiles		
Poor	23.1	18.8
Middle	25.1	21.6
Rich	21.4	17.9

Table 2

Prevalence of different Menstruation related problems in eastern states of India.

Menstruation related problems (N)	Eastern State of India			
	Bihar	West Bengal	Jharkhand	Orissa
No period	7.7	4.5	7.4	5.8
Pain full period	63.2	55.7	73.9	25.7
Frequent or short periods	9.1	6.0	8.9	13.1
Irregular periods	20.4	30.5	19.3	36.9
Prolonged bleeding	9.9	7.5	8.0	8.7
Inter-menstrual bleeding	7.5	2.6	3.5	8.2
Blood clots/excessive bleeding	17.0	16.3	11.4	5.4

Table 3

Prevalence of different RTI/STI related problems in eastern states of India.

RTI/STI related problems	Eastern State of India			
	Bihar	West Bengal	Jharkhand	Orissa
Itching or irritation over vulva	4.5	10.7	5.0	3.4
Boils/Ulcers/Warts around vulva	2.1	2.3	2.7	0.9
Pain in lower abdomen not related to menses	7.0	9.7	7.0	2.6
Pain during urination or defecation	4.2	5.0	3.7	1.5
Swelling in the groin	1.2	1.5	0.7	0.5
Pain full blister like lesions in and around vagina	0.7	0.4	0.8	0.3
Low backache	15.3	15.2	14.1	5.0
Pain during sexual intercourse	3.6	4.5	3.8	0.9
Spotting after sexual intercourse	0.7	0.4	1.0	0.2

Table 4
Treatment seeking behaviour of Reproductive morbidity among the eastern states of India.

	Eastern State of India			
	Bihar	West Bengal	Jharkhand	Orissa
	Treatment of Menstruation Problems			
Govt Allopathic	12.9	21.6	20.0	56.2
Private Allopathic	70.3	43.7	53.4	24.4
Ayush	5.1	10.2	1.5	4.8
Herbalist/Traditional Healer	29.9	38.0	46.1	32.0
Religious/Faith Healing	24.7	21.2	17.9	23.1
Others	2.5	6.0	2.4	3.5
	Treatment of RTI/STI problems			
Government hospital	5.2	8.8	14.8	30.3
Government dispensary	0.8	0.4	0.7	0.8
UHC/UPH/UFWC	0.1	0.2	0.4	0.6
CHC/Rural Hospital	0.4	6.1	0.5	14.7
PHC	3.1	3.5	6.1	16.6
Sub centre	0.4	2.3	1.3	1.8
VCTC/ICTC	0.0	0.0	0.1	0.1
RTI/STI Clinic	0.1	0.0	0.0	0.1
Ayush Hospital/Clinic	0.6	0.9	1.2	1.5
Other Public Medical sector	0.3	0.5	0.4	0.5
NGO/Trust Hospital/Clinic	0.1	0.2	0.3	0.8
Private Hospital/Clinic	55.6	38.0	62.4	24.0
RTI/STI Clinic	1.9	0.9	2.5	0.7
Ayush Hospital/Clinic	4.7	10.3	3.4	1.8
Other Private Medical sector	2.0	0.8	1.3	1.4
Out reach/MPC Camp in village	0.5	0.0	0.2	0.1
Chemist/Medical Shop	17.9	3.8	1.5	8.3
Home Remedy	3.4	1.0	3.9	4.8
Traditional Healer	2.6	3.4	1.9	4.4
Other	15.7	27.6	8.5	5.1

Table 5
Results of Logistic regression analysis of Menstruation problems and RTI problems by background characteristics.

Background characteristics	Menstruation problems Exp (B)	RTI/STI Problems Exp (B)
Types of Residence		
Rural®		
Urban	0.876**	0.86**
Religion		
Hindu®		
Muslims	1.25**	1.317**
Others	1.241**	1.602**
Caste		
Schedule Caste®		
Schedule Tribe	0.611**	0.614**
Other Backward Castes	0.821**	0.93**
Others	1.013	1.038
Education		
No Education®		
<10 years	1.14**	1.109**
>10 years	0.935*	0.868**
Age at marriage		
Below 18 years®		
19-30 years	0.823**	0.747**
>30 years	1.428*	0.813
Age of women		
<25 years®		
25-20 years	0.906**	1.165**
>30 years	1.064*	1.156**
Wealth quintiles		
Poor®		
Middle	1.033	1.132**
Rich	0.908**	1.002

Note: Level of significance **p<0.001;*p<0.05; ®= Reference category.

Table 6

Results of Logistic regression analysis showing the treatment seeking behaviour of Menstruations problems and RTI/STI problems by background characteristics.

Background characteristics	Menstruation problems	RTI/STI Problems
	Exp (B)	Exp (B)
Types of Residence		
Rural®		
Urban	1.08	0.873**
Religion		
Hindu ®		
Muslims	0.99	1.161*
Others	1.22	1.438**
Caste		
Schedule Caste®		
schedule Tribe	0.689**	0.96
Other Backward Castes	0.418**	0.582**
Others	0.827*	0.945*
Education		
No Education®		
<10 years	0.517**	0.558**
>10 years	0.642**	0.774**
Age at marriage		
Below 18 years®		
19-30 years	4.64**	1.841*
>30 years	3.322**	1.40
Age of women		
<25 years®		
25-20 years	0.582**	0.445**
>30 years	0.99	0.692**
Wealth quintiles		
Poor®		
Middle	0.662**	0.621**
Rich	0.841**	0.805**

Note: Level of significance **p<0.001;*p<0.05; ®= Reference category.

National Rural Health Mission in the Context of the Health of Women and Children

M Baliarsingh

Introduction

Public health initiatives for India's more than 1 billion people are aimed at mitigating disease burden and improving health. These endeavours have been on for the past several decades. A few notable of these endeavours include Universal Immunisation Programme, Child Survival and Safe Motherhood Program, Reproductive Child Health Program, and Integrated Child Development Scheme. Both the National Health Policy 1983 and the National Population Policy 2000 give high priority to primary health care services. In line with these national policies, a major thrust of successive state plans has been to provide improved medical care to the rural population (Martinez et al., 1995; Peters et al., 2002).There is however little evidence of users accessing the health system in this manner (Babu et al., 2000). There appear major barriers to the planned access of rural populations to primary care services. Knowledge of health–seeking behaviour of the rural population targeted within the current health policy and factors influencing them are potentially of considerable value in identifying effective and efficient services (Misra et al., 2003). In India, over 55000 women die due to complications of pregnancy and delivery and 13 lakh children die before their first birth day while 16 lakh children fail to see their fifth birth day every year. India has the highest number of births in the world, over 2. 62 crore per year, these are the hair rising numbers, and the highest in the world.

The National Rural Health Mission is a flagship programme of the country which aims at providing accessible, affordable, accountable, effective and reliable primary health care services, especially, to the poor and vulnerable sections of the population. It also serves

as overarching umbrella to existing health and family welfare programmes including Reproductive and Child Health Programme and addresses health related issues through sector-wide approach encompassing sanitation and hygiene, nutrition and safe drinking water as basic determinants of good health.

NRHM also seeks to reduce the maternal mortality rate (MMR) in the country from 407 to 100 maternal deaths per 1,00,000 live births, infant mortality rate (IMR) from 60 to 30 infant deaths per 1000 live births and the total fertility rate (TFR) from 3.0 to 2.1. NRHM provides an opportunity for health administrators to (a) provide need-based health care (b) ensure that public health services reach the under-served segments through revitalized health system and (c) enable poor and marginalised communities to take better care of their health.

NRHM has put rural public health care firmly on the agenda and is on the right track with the institutional changes it has brought within the health system. The Mission is very important in the context of the health of women and children particularly in the rural areas. Lack of appropriate care during pregnancy and childbirth and inadequacy of services for detecting and managing complications are responsible for most of the maternal deaths. According to a study, 37 per cent of all pregnant women in India receive no prenatal care during pregnancy. Moreover, women in the rural areas are less likely to receive prenatal care than women in urban areas (18 per cent and 42 per cent, respectively). This is a cause of great concern as these deaths are preventable.

WHO estimates show that out of the 536 000 maternal deaths globally each year, 117 000 (22 per cent) occur in India. In addition to these, millions suffer from pregnancy related morbidity. According to global burden of disease estimates for the year 2004, India contributes 21 per cent of the disability adjusted life years (DALYs) lost due to maternal conditions. Public health initiatives over the last two to three decades have helped India improve health indicators such as life expectancy and total fertility rate substantially but some crucial indicators like maternal mortality ratio (MMR) and infant mortality rate (IMR) have stagnated at around 400 maternal deaths per 100 000 live births and 60 infant deaths per 1000 live births, respectively, in the 1990s. There is little evidence that, despite a series of national level safe motherhood policies and programmes over the last two decades, there is little evidence that maternity has become significantly safer in India.

NRHM Implementation Framework

Key features to achieve goals of NRHM include making the public health delivery system fully functional and accountable to the community, human resources management, community involvement, decentralization, rigorous monitoring and

evaluation against standards, convergence of health and related programmes from village level upwards, innovations and flexible financing and interventions for improving the health indicators. Building the capacity of village-level government institutions to help them control and manage public-health services is one of the key aims of the Mission. There is also plan to improve access to health care at the household level through the village "link workers" called ASHA (Accredited Social Health Activist).

The vision of the Mission is described in terms of milestones that the Mission intends to reach. These milestones include:

- To provide effective healthcare to rural population throughout the country which have weak public health indicators and weak infrastructure.
- To increase public spending on health from 0.9 per cent GDP to 2-3 per cent of GDP, with improved arrangement for community financing and risk pooling.
- To undertake architectural correction of the health system to enable it to effectively handle increased allocations and promote policies that strengthen public health management and service delivery in the country.
- To revitalize local health traditions and mainstream AYUSH into the public health system.
- Effective integration of health concerns through decentralized management at district, with determinants of health like sanitation and hygiene, nutrition, safe drinking water, gender and social concerns.
- To improve access to rural people, especially poor women and children to equitable, affordable, accountable and effective primary health care.

The objectives of the Mission as outlined in the Mission document are listed below:

- Reduction in child and maternal mortality.
- Universal access to public services for food and nutrition, sanitation and hygiene and universal access to public health care services with emphasis on services addressing women's and children's health and universal immunisation.
- Prevention and control of communicable and non-communicable diseases, including locally endemic diseases.
- Access to integrate comprehensive primary health care.
- Population stabilization, gender and demographic balance.
- Revitalize local health traditions & mainstream AYUSH.
- Promotion of healthy life styles.

Maternal and child health is a key component of the Mission. Specific activities being carried out under the Mission to address the felt maternal and child health needs of the rural people include:

- Registration and provision of care to pregnant women throughout the period of pregnancy. Registration of a pregnant woman for ANC should take place as soon as the pregnancy is suspected ideally in the first tri-master (before or at 12th week of pregnancy). However, even if a woman comes late in her pregnancy for registration, she should be registered, and care given to her according to gestational age.
- At least three antenatal care check-up of every pregnant woman. First visit to the antenatal clinic as soon as pregnancy is suspected/between the 4th and 6th month (before 26 weeks), 2nd visit at 8th month (around 32 weeks) and 3rd visit at 9th month (around 36 weeks). Provision of ante natal checkup and associated services such as IFA tablets and Tetanus Toxoid immunisation, etc.
- Testing of the urine of pregnant women for albumin and sugar. Estimate haemoglobin level. Refer all pregnant women to PHC for RPR test for syphilis. Refer cases of abnormal pregnancy and cases with medical and gynecological problems to Health Assistant Female (LHV) or the Primary Health Centre. Conduct deliveries in her area when called for. Supervise deliveries conducted by Dais and assist them whenever called in. Refer cases of difficult labour and newborns with abnormalities help them to get institutional care and provide follow up to the patients referred to or discharged from hospital.
- ANM will identify the ultimate beneficiaries, complete necessary formalities and obtain necessary approvals of the competent authority before disbursement to the beneficiaries under Janani Suraksha Yojana (JSY) and by 7th of each month will submit accounts of the previous month in the prescribed format to be designed by the State. ANM will prepare a monthly work schedule in the meeting of all accredited workers to be held on every 3rd Friday of every month, which is mandatory.

Activities related to the promotion of family planning methods under NRHM cover the following areas:

- Utilise the information from the eligible couple and child register for the family Planning programme. She will be squarely responsible for maintaining eligible couple registers and updating at all times. Spread the message of family planning to the couples and motivate them for family planning individually and in groups. Distribute conventional contraceptives and oral contraceptives to the couples, provide facilities and to help prospective acceptors in getting 22 family planning services, if necessary, by accompanying them or arranging for the dai/ASHA to accompany them to hospital. Provide follow-up services to female family planning

acceptors, identify side effects, give treatment on the spot and refer those cases that need attention by the physician to the PHC/Hospital.

- Establishing female depot holders, help the Health Assistant Female in training them, and provide a continuous supply of conventional contraceptives to the depot holders. Building rapport with acceptors, village leaders, ASHA, dais and others and utilise them for promoting family planning. Identification of women leaders and help the female health assistant to train them. Participate in Mahila Mandal meetings and utilise such gatherings for educating women in family planning.

Identifying women requiring help for medical termination of pregnancy and refer them to nearest approved institution. Educate the community of the consequences of septic abortion and inform them about the availability of services for medical termination of pregnancy.

Identifying cases of malnutrition among infants and young children (zero to five years) give the necessary treatment and advice and refer serious cases to the Primary Health Centre. Distribute Iron and Folic Acid tablets as prescribed to pregnant nursing mothers, and young children (up to five years) as per the guidelines. Administer Vitamin A solution to children as per the guidelines. Educate the community about nutritious diet for mothers and children. Coordinate with Anganwadi Workers.

Immunising pregnant women against toxoid, administer DPT vaccine oral polio vaccine, measles vaccine and BCG vaccine to all infants and children, (Hepatitis-B in pilot areas) as per immunisation schedule, ensure injection safety.

Geographical distance often poses as the primary barrier to access health care. In a large country like India, people living in remote areas, where there is either no or very poor transportation facilities, cannot even reach the nearest public health structure, and hence remain perpetually out of reach of the health system. Geographical distance becomes more crucial during the periods of epidemics, especially in the tribal areas, and contributes towards the higher mortality. It becomes more crucial for pregnant women living in remote areas to access health facilities, which results in high maternal and infant mortality.

Study Area

Odisha is one of the poorest and least developed states of India with regard to productivity, industrial output, employment, per capita income, social development and health status (Shaban and Bhole, 2000). Over 40 per cent of its 3.68 crore inhabitants live below the poverty line (Misra et al., 2003). Government health services have been bogged

by long-term inadequacies that bias access to health care in general, to the detriment of those very women most at risk in childbearing. More than 80 per cent of Odisha's population lives in rural areas, with 66 per cent of villages having a population of less than 500 (Martinez and Callumbien, 2001). Despite significant investments in the rural sector in the last decade, health indicators in the state remain poor. Rural health facilities often lack basic equipment and their full component of qualified medical staff because of unfilled posts or staff absenteeism (Devarajan and Shah, 2004; Planning Commission, 2002).

Kandhamal district is one of the high focus districts in Odisha with regard to health and human development indicators. Kotagarh block of Kandhamal district consists of one PHC covering above 50,000 population and more than 150 km from district hospital Phulbani (Kandhamal). Srirampur is 35 km from Kotagarh without connectivity, communication, electricity and tap water. There are eight sub centres and 10 Gram Panchayats under Kotagarh block.

Methods and Material

The present study is based on the information collected from 40 below poverty line households in three villages of Srirampur Gram Panchayat of Kotagarh block, namely Tikarigaon, Matikada and Jubaguda. All the families selected were JSY beneficiaries. The case study approach was adopted for collecting the information through direct interview on the basis of a semi structured interview schedules that considered general perception of health needs in local community, perception about the role of medical and paramedical staff, health workers and details of a maternal and child health care received during one year prior to the study.

Findings

- About 30 per cent pregnancies were not registered anywhere and the women were not familiar with ASHA, ANM and MPHWs.
- About 55 per cent expected mothers did not received complete antenatal care and child immunisation during their last births.
- About four-fifth of the women were not told about the expected date of delivery, danger signs of pneumonia, or pregnancy complications by heath workers.
- More than 90 per cent women did not received post natal care.
- There is no village sanitation committee. No village health and nutrition day observed.
- There is only one Janani express for the entire block that too is used personally by the doctor and BPO at the Kotagarh NRHM office.

- There is lack of communication and transportation facility in the villages covered so expected mothers can't reach in time to the health centre for emergency care.
- More than 60 per cent JSY beneficiaries did not receive full incentive. Those who received the incentive had to spend 500-600 hundreds rupees first as tips and other expenses at the PHC level for getting their work done after delivery, that too not on time.
- Although, a new PHC at Srirampur Gram Panchayat has been officially inaugurated, yet it is severely deficient in terms of equipments, infrastructure and health personnel.
- Interestingly, since last one year Srirampur PHC has become army camp for naxal operations without the knowledge of CDMO/Doctor/DPM/BPO under NRHM. These personnel neither visited nor aware or bother about the condition of the PHC.
- There is no 24x7, emergency and speciality services with regard to mother and child health at nearby PHC so patients face lots of problems sometimes lost their life.
- Most of the respondents reported that doctor and staff asked money.
- After delivery, the mother and the child were not dropped at home.
- Corruption and exploitation by health personnel and paramedical staff was quite common with regard to JSY incentive
- For institutional deliveries, delivery kits like hand gloves and related hospital items are to be purchased by the expectant woman. If these items are provided by the hospital extra money is charged.
- There is no labour room/waiting room at the PHC so expectant mothers have to wait under the tree till doctor/nurse arrives.
- The behaviour of the health personnel is very rough and inhumane towards poor patients.
- No staff stays at the primary health centre because of lack of basic amenities and fear of extremists.
- Srirampur primary health centre is looked after by a temporary supporting staff from the village who is physically handicapped.
- Doctor and pharmacist come to the village only on market day. They distribute some medicines and carry out health check up for 2-3 hours and leave the village before 4 pm.
- There is no option to reach the hospital from nearby villages. There is a sub centre in the nearby village but there is no manpower, no infrastructure, no equipments and no medicines.
- There are village level health workers but most of the times they remain beyond the reach of the people.

A woman aged 26 of Srami village near Srirampur developed pregnancy related complications. Since there was no transportation facility, her relatives carried her on cot to the primary health centre 35 km away. It took 8-10 hours to reach the health centre. On way to the primary health centre, labour pains started and she was in a critical condition when she reached the primary health centre. Luckily she survived but lost her newborn baby. If Srirampur PHC would have been functional the new born would have survived.

Another woman aged 30 years gave birth to a low birth weight girl. The woman had pneumonia during pregnancy and did not receive any ante natal care. She had to pay Rs 200 to the hospital staff for delivery in the hospital. When she came to know that there was some financial incentive for below poverty line families under JSY she had to pay Rs 500 to get Rs 1400.

Conclusions

An integral component of NRHM is the safe motherhood intervention in the form of Janani Suraksha Yojana (JSY) for reducing maternal and neo-natal mortality. JSY is a 100 per cent centrally sponsored scheme under the umbrella of NRHM which integrates cash assistance with antenatal care during the pregnancy, institutional care during delivery and immediate post-partum period in a health centre by establishing a system of coordinated care by field level health workers. Though the scheme has been successful in pushing up institutional delivery rate in some high focus states, the ambitious goals of reducing maternal mortality may not be possible if 'quality' aspects are ignored. Addressing the issues of quality in maternal health service delivery is important not just to decrease the maternal mortality and reduce maternal morbidity but also to instill confidence in the public health system thereby increasing the demand for institutional deliveries. Overall, the situation of primary health care services were grim in the villages covered under the study. Absence of medical and paramedical staff, lack of transportation, connectivity, and distance of health facilities are major causes. These issues have major implications for the development of the health system and need to be addressed for the success of NRHM.

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Table 1
Rural Health Institutions Norm as per Government of India

Health institutions	Villages covered	Population covered	Distance covered (km)
Sub centre	4	3000-5000	2.6
Primary Health Centre	29	20000-30000	6.6
Community Health Centre	158	80000-120000	15.6

Table 2
Access of the health centre by ever married women rural women age 15-49 distance from the nearest health facilities, India 1998-99

Distance	Sub centre	PHC	PHC/ Sub centre	Dispensary/ Clinic	Hospital	Any Health facility
Within village	33.0	13.1	36.5	28.3	9.7	47.4
<5 Km	39.7	28.4	40.8	32.4	25.0	38.9
5-9Km	16.3	29.2	15.3	17.4	25.1	9.7
10+Km	9.6	28.8	7.0	21.7	40.0	3.9
Missing	1.4	0.5	0.3	0.2	0.2	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Median	1.3	4.9	1.0	2.4	6.7	0.0

Source: NFHS-II

Table 3
Characteristics of village principal respondents

Characteristics	Total Number	%
Gender		
Male	24	60
Female	16	40
Caste		
Scheduled Caste	20	50
Scheduled Tribes	18	45
General	2	5

Table 4
Kotagarh block health facilities

Health Institutions	Villages covered	Population covered	Distance covered (km)
Sub centre	6-10	6000-10000	5-10
PHC	80-100	40000-60000	30-40

Dimensions and Challenges of National Rural Health Mission on Reproductive and Child Health Care in Andhra Pradesh

D Sai Sujatha
D. Mahammad Rafi

Introduction

The state of Andhra Pradesh was formed on November 1, 1956. It is the fifth largest state and also the fifth most populous state of India with a population of 8.17 crores. The density of population is 277 per sq km and the sex ratio is 978 females per 1000 males. The literacy of the state is 60.47 per cent, with male literacy of 73.32 per cent and female literacy of 50.43 per cent. Since its formation in 1956, the state has made considerable progress in various health indicators. As a result of various health policies and National Programs, there has been considerable improvement in the general health status of the population. Considerable achievements have been made over the last six decades to improve health standards, such as life expectancy, child mortality, infant mortality, and maternal mortality. However, the state is still lagging behind in achieving certain key indicators of reproductive and child health. The infant mortality is 56 per 1000 live births and the expected outcome under NRHM is 30 per 1000 live births by 2012. Maternal mortality is 195 maternal deaths per 1,00,000 live births and the NRHM goal is 100 by the year 2012.The total fertility rate is 2.0 children per women and the goal is to reach 1.5 children per women (table 2). In spite of the progress made, a high proportion of the population, especially in rural areas, continues to suffer and die from preventable diseases, pregnancy and child birth related complications as well as malnutrition. In addition to old unresolved problems, the health system in the state is facing emerging threats and challenges. The rural public health care system is in unsatisfactory state due to rising cost of health care, non availability of health personnel and medicines leading to expensive private sector health care. Similar to India, Andhra Pradesh is also in the

midst of an epidemiological and demographic transition – with the problems of increased chronic disease burden and a decline in mortality and fertility rates leading to an ageing of the population. Malnutrition affects a large proportion of children. An unacceptably high proportion of the population continues to suffer and die from new diseases that are emerging; apart from continuing and new threats posed by the existing ones.

Methods and Material

The present paper discusses the dimensions of the NRHM and challenges in providing quality health care to women and children of Andhra Pradesh. The discussions are based on data available through the sample registration system, District Level Household and Facility Survey, 1998-99 (DLHS-1), 2002-04 (DLHS-2) and 2007-08 (DLHS-3) and rural health statistics bulletins.

An overview of reproductive and child health in Andhra Pradesh. The Maternal mortality rate (MMR) in the state was at 154 in 2004-06 which has improved from 195 in 2001-03 and is the fifth lowest in India after Kerala, Tamil Nadu, Maharashtra and West Bengal (Table 1). Maternal health care package is the main programme of NRHM to strengthen RCH care. In Andhra Pradesh 96 per cent of the women had received at least one antenatal care service (DLHS -3). However, mothers receiving full antenatal care decreased from 44.2 per cent to 37.9 per cent. Institutional deliveries improved progressively from 51 per cent in DLHS-1 and 61 per cent in DLHS-2 to 72 per cent in DLHS-3.

The infant mortality rate (IMR) of the state registered a consistent decrease from 110-120 in 1970s to 66-70 in 1990s. The all India estimate of IMR was about 130 during the 1970s which declined to about 70-80 during the 1990s. The reduction of IMR in the state is keeping pace with the national trend. However performance of the state has been much slower than that in other south Indian states, with Kerala registering an IMR of 13 per 1000 live births which is comparable to that of developed countries. The IMR in Andhra Pradesh was 54 in 2007 which has reduced from 59 in 2003 but is nowhere close to the target of 30 for 2012.

To promote child survival and reduce infant mortality, NRHM envisages new born care, breastfeeding and food supplementation at the right time and a complete package of immunisation for children. In a recent review, Andhra Pradesh reported 87 FRUs and 240 PHCs to provide newborn care services. The median duration of exclusive breastfeeding of the youngest surviving child in Andhra Pradesh is only 5.4 months. Sixty seven per cent children aged 12-23 months has received full immunisation. The coverage of full immunisation has shown a marginal increase of four percentage points from 63 per

cent in DLHS-2 to 67 per cent in DLHS-3. During the period of NRHM, full immunisation in children 12-23 months increased from 60.2 per cent to 67.1 per cent. However, children with diarrhoea receiving ORS has decreased from 57.8 per cent to 43.3 per cent (Government of Andhra Pradesh, 2009).

The knowledge of any modern contraceptive method among currently married women is universal in Andhra Pradesh. The contraceptive prevalence rate among currently married women is 67 per cent which improved from 63 per cent in DLHS-2 and 59 per cent in DLHS-1. The Unmet need for contraception decreased by 3 percentage points between DLHS-2 to DLHS-3 from 11.5 per cent to 8.5 per cent. Use of modern contraceptive methods has increased marginally from 62.4 per cent to 65.1 per cent after the implementation of NRHM. The total fertility rate in 2007 was 1.9 which is better than the national target for 2012.

Among ever married women age 15-49 years, 21.3 per cent have experienced one or the other menstruation related problem, mainly painful period (59.5 per cent) followed by irregular period (35.2per cent), prolonged bleeding (13.8 per cent) and scanty bleeding (13.1 per cent). Seventy-two per cent of ever married women aged 15-49 years have heard of HIV/AIDS. Main mode of transmission of HIV/AIDS reported by women is unsafe sex (68.5 per cent).

Interventions for Reducing MMR and IMR

a) Comprehensive emergency obstetric and neonatal care. The state of Andhra Pradesh has strengthened First Referral Units with comprehensive emergency obstetric and neonatal care (CEmONC) services. As of now 151 CEmONC Centres have been set up with the objective of providing life-saving emergency care to mothers and children. Every CEmONC centre is designed to have 4 obstetricians, 1 pediatrician, 1 anaesthetist, blood bank or blood storage centre. To prevent deaths from hypothermia and infections, it is proposed to procure and supply newborn baby kits (a hygienic infant wear) to all SC/ST/BPL newborn babies and low birth weight babies delivered in government institutions. Till now, 1.20 lakhs new born care kits were distributed in the state.

b) Skilled birth attendant (SBA) training. Under this scheme, 23 districts have been identified, 130 district level master trainers and 2132 SNs/ ANMs have been trained as SBA, against the target of 5275.

c) Birth waiting homes. The state has constructed 38 birth waiting homes at distant and interior tribal PHCs under this scheme. Each birth waiting home has a provision for a small kitchen and bathroom. Women from interior habitations can reach the PHC before the expected date of delivery so as to prevent complications of delayed labour.

d) Institutional deliveries. Institutional deliveries in the state increased from 12.78 lakh in 2006-07 to 13.30 lakh in 2007-08. During the year 2008-09, the state had 14.20 lakhs institutional deliveries. The proportion of institutional deliveries in the state has increased from 59.4 per cent to 71.8 per cent.

The state has operationalised 194 FRUs against the target of 228 and 800 PHCs are being upgraded to provide round the clock maternal and child health services (Table 3). Once in fortnight Specialist Service Clinic is being provided for the same. Two districts are implementing Integrated Management of Neonatal & Childhood Illness (IMNCI) and 1555 persons have been trained so far. About 20.20 lakh Village Health & Nutrition Days (VHND) have been held since the launch of NRHM.

e) Accredited Social Health Activist (ASHA). ASHA acts as health resource person-of-first-resort in all maternal and child health matters and as a bridge between the ANM and the village and is accountable to the Panchayat. The state has identified and selected 70700 ASHAs. Among them 55400 have been placed in rural areas, 5300 in urban areas and 10000 in the tribal areas. The last Tuesday of every month is observed as ASHA day for effective monitoring and ensuring timely payment of incentives.

f) Janani Suraksha Yojana (JSY). JSY is a safe motherhood intervention under NRHM. The objective is to promote institutional deliveries and reduce maternal and infant mortality. In Andhra Pradesh, 22.1 per cent of the institutional deliveries after January 1, 2004 have been provided financial assistance under JSY. The number of JSY beneficiaries in the state increased from 1.67 lakhs in 2005-06 to 4.29 lakhs in 2006-07 and 5.63 lakhs in 2007-08. A total of 4.50 lakh beneficiaries have availed of the services in 2008-09. The state has accredited 1100 private institutions under the scheme (Table 3).

g) Village Health and Sanitation Committee (Gram Panchayat Health Committee). In Andhra Pradesh 21916 Village Health Sanitation Committees have been formed with the objective of ensuring optimal use of health services in the village, improving participation of the village level health and sanitation committees in maintaining quality health services and preventing occurrence of epidemics in the village.

Milestones of Andhra Pradesh

The state has achieved some significant milestones under NRHM to provide efficient and quality health care services to the people. These include:

a) *Rural emergency health transport scheme*. Under this scheme, on average, 4500 emergencies are attended per day.

b) *Health information help line (104)*. This is a unique, innovative scheme implemented for the first time in India. The main objective of the scheme is to

assist the people in rural and interior areas who face difficulty in getting access to a qualified doctor and in getting information on any health problem. The Service is provided round the clock through the toll free number. Today, it addresses 34000 calls per day.

The state is steadily progressing towards attaining the goals and objectives of NRHM. A total of 690 PHC have been strengthened with three Staff Nurses each to make them functional round the clock. A total of 58 sub-divisional hospitals, 120 community health centres and 16 district hospitals are functioning as FRUs. About 17 districts have functional Mobile Medical Units.

The availability of medical officer at the PHC level is much better in the state as compared to many other states (Gill, 2009). Similarly, presence of paramedical staff at CHC, PHC and SC levels is much better in the state. With 100 per cent of CHCs and 85 per cent of PHCs holding comprehensive range of medicines, Andhra Pradesh outstrips the other states as far as drug supplies are concerned.

Challenges

Despite hundreds of crores available under the NRHM, the state has failed to set up any new CHC or PHC during the four years between 2005-06 and 2008-09. There is a shortfall 387 CHCs and 464 PHCs in the rural areas and 63 CHCs, 63 PHCs and 303 sub-Centres in the tribal areas of the state.

Despite availability of funds, majority of CHCs and PHCs lacked basic facilities. Physical infrastructure is below standard, and mobile medical units are functioning without essential equipments and medical officers. There is lack of planning and absence of adequate monitoring. The Reproductive and Child Health Scheme suffers in terms of institutional and antenatal care. The objective of convergence of all the National Disease Control Programmes remains un-achieved. There is also a shortfall of up to 39 per cent in the immunisation programme.

Availability of CEmOC services is very poor in most parts of the state. A study on obstetric facility assessment (Sridhar, 2001) in two districts reported that only district headquarters hospitals had CEmOC facilities. This indicates the urgent need to improve and strengthen availability of CEmOC services to achieve drastic reductions in the maternal and child mortality.

Between 1998 and 2002, 470 PHCs in the state were strengthened to work as round-the-clock Mother and Child Health Centres. However, these centres have not been effective. There is an urgent need to develop and strengthen the round the clock MCH Centres to provide basic EmOC services to the rural women.

Strategies

NRHM has injected new hope for the health care delivery system in India. However, it continues to face diverse challenges which need to be addressed if its goals are to be achieved. Improvements in the health of the population contribute to economic development and vice versa. This bidirectional relationship justifies increased investment in health. NRHM should be an integral part of the Five Year Plans and the health budget should be increased to 2-3 per cent of GDP. Improved funding is necessary for the public health sector to treat common health conditions, rather than providing private health insurance. There is a need to prioritize health and increase allocation for health in the state budget. The location of health in the state list rather than in the concurrent list in the Indian Constitution poses major problems for service delivery. Health care delivery cannot be improved to provide a seamless service without the removal of these barriers (Jacob, 2011). The performance of NRHM varies significantly across the districts of the state. Districts with already good health situation have shown marked improvement. Improving governance and stewardship within NRHM is necessary for improving the overall performance.

Health care cost for average Indian usually results in catastrophic out-of-pocket expenditure and is a well recognised cause of indebtedness. The total health budget for India is about 1 per cent of the country's GDP. Most developed nations prioritize health care and provide 5-10 per cent of their GDP. The diversion of funds through private health insurance schemes for the corporate hospitals, takes away funding from the public health care system. In Andhra Pradesh, private hospitals are grabbing major amount of public funding through the Rajiv Arogyasree Health insurance Scheme. Instead if it is made mandatory to utilise this amount in the public health system, at least in the urban areas, it will benefit larger number of people.

NRHM has focussed on rural health only. Many parts of urban areas especially slums and suburban areas have similar health care needs and currently have glaring deficiencies. The National Urban Health Mission should be accorded the same status as the NRHM. Both efforts should be coordinated and combined into a National Health Mission.

NRHM currently employs process indicators to measure its implementation. The measures used are related mainly to finance, infrastructure and personnel. There is need to shift to outcome indicators (Jacob, 2011).The evidence also indicates that a commitment to increasing government health spending may be necessary but is not sufficient to achieve NRHM goals. The absorptive capacity of the state is an important constraining factor. Just committing resources is not enough. It is important to realise that resources commitment for health must go hand-in-hand with the capacity to utilise the resources

effectively. This calls for addressing existing inefficiencies, trying alternative approaches to service delivery, and possibly a greater focus on outputs and outcomes.

There is need to improve the health information system as part of the process of monitoring health and functioning of the public health system. NRHM already has a programme of community monitoring and social audit which needs to be strengthened in order to monitor use of funds and empower local communities.

The goals of NRHM clearly state the need to impact upon the social determinants of health. There is a need to increase the synergy and coordination between different government programmes such as Integrated Child Development Scheme, Mahatma Gandhi National Rural Employment Guarantee Act and the NRHM.

NRHM has made a significant impact on health care delivery in the state. However, greater political, administrative and financial commitment is required for it to make a substantial impact on health outcomes. There is need to develop systems to monitor and audit performance and health indices for corrections.

The health care system has flaws, both at conceptual and operational levels. However, there is no simple solution to the problem. There is a need for continuous monitoring and appraisal, allowing for regular mid-course corrections. Unfortunately, health is a prime example where good politics and good policy diverge. Politicians and the government should see the ethical issues related to equity and lack of conviction to provide services for the poor. Health is a human right. Universal health care should not remain an aspiration but should become operational. Panchayath Raj Institutions (PRIs) are seen as critical to the planning, implementation, and monitoring of NRHM. PRI involvement in various health related activities should be looked in totality and there has to be synergy between different activities. It is recommended that orientation of PRI members should be incorporated in all health related activities. NGOs could be involved in PRI strengthening in a variety of ways, including: consciousness raising, provision of technical advice, support in participatory planning, capacity building and facilitating monitoring processes, such as community and social audits to improve accountability.

Decentralised planning is given a central place in the implementation of NRHM. Unfortunately, this crucial fact has not permeated to the district health system in the state. There has been no village level planning to meet the health needs of the people so far. The need to have a health system that is responsive to the local health situation and the health needs of the people is of paramount importance if the felt and actual health needs of the community are to be addressed. The Village Health Committees should take the active role in rationalising their health priorities and drawing up action plan to address these needs.

Conclusions

The progress of NRHM in Andhra Pradesh is mixed. Activities under the Mission have transformed health care delivery to rural populace with increasing accessibility to quality services and the opportunity to participate actively in managing these services as well. There is an increase in institutional deliveries and JSY beneficiaries, excellent emergency ambulance service with a single state wide call number, well designed training modules and good quality training to ASHA, availability of quality drugs at all levels, improved utilisation of untied funds at all levels, functional disease surveillance system and computerisation up to PHC level are some of the achievements. However, many of NRHM goals are yet to be achieved. Poor utilisation of allocated funds and shortage of medical professionals and administrators have hobbled the initiative.

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Table 1
RCH out come indicators

SN	RCH outcome indicator	Andhra Pradesh		India	
		DLHS-2 (2002-04)	DLHS-3 (2007-08)	DLHS-2 (2002-04)	DLHS-3 (2007-08)
1	Mothers who received 3 or more antenatal care check-up's (%)	86.0	89.4	50.4	51.0
2	Mothers who had full antenatal check-up (%)	44.2	37.9	16.5	19.1
3	Institutional deliveries (%)	59.4	71.8	40.9	47.0
4	Children 12-23 months age fully immunized (%)	60.2	67.1	45.9	54.1
5	Children age 6-35 months exclusively breast fed for at least 6 months (%)	41.9	32.3	22.7	24.9
6	Children with diarrhoea in the last two weeks who received ORS (%)	57.8	43.3	30.3	33.7
7	Use of any modern contraceptive method (%)	62.4	65.1	45.2	47.3
8	Total unmet need for family planning-both spacing and terminal methods (%)	11.5	8.5	21.4	21.5

Source: DLHS -3

Table 2
Progress on key Indicators

Indicator	Andhra Pradesh		India	
	Trend (*Year & Source*)		Current Status	NRHM Goal (2012)
Maternal Mortality Ratio (MMR)	195	154	254	<100
Infant Mortality Rate (IMR)	59	54	55	<30
Total Fertility Rate (TFR)	2.2	1.9	2.7	2.1

Table 3
Technical Interventions

SN	Indicators	*Achievement up to March 2009*		Target
		Number	%	
1	No. of First Referral Units (FRUs) operationalised	194	85.1	228
2	No. of PHCs operationalised to provide 24 hours services	800	100	800
3	No. of Private Institutions accredited under JSY	1100	NA	NA
4	No. of Districts implementing Integrated Management of Neonatal & Childhood Illness (IMNCI)	2	8.7	23
5	No. of people trained in IMNCI	1555	NA	NA
6	No. of Village Health & Nutrition Days (VHNDs) held	2020000	NA	NA

Source: NRHM MIS Report, April 2009

Infant and Young Child Feeding Practices
A Comparison of EAG and Non-EAG States

Akash Kumar
Sayeed Unisa

Introduction

Adequate nutrition is critical to child health and development. The period from birth to two years of age is particularly important because of the rapid growth and brain development that occurs during this time. Breast milk is the preferred source of nutrition for the newborn from nutritional, gastrointestinal, immunological, developmental, and psychological perspective. It results in both short-term and long-term benefits to the child and the mother and protects children against a variety of acute and chronic disorders. Breastfeeding confers protection against diarrhoea and pneumonia which are two important causes of mortality, particularly in the early months of life. Artificially fed children have an increased risk of long term diseases including asthma and other atopic conditions, diabetes, celiac disease, increased blood pressure atherosclerosis in later adulthood and chronic diseases. Artificial feeding is also associated with a greater risk of childhood leukaemia.

Breastfeeding is the normal way to feed an infant and ideally all babies should be exclusively breastfed for the first six months of life (Binns and Davidson, 2003). World Health Organization suggests that the yellowish milk, known as colostrum, should be given to baby because it provides protection against infection. Colostrum acts as natural laxative to help clear Conium from the intestine of the new born. Breastfeeding should continue with the addition of supplementary foods throughout the second half of the first year. Breastfeeding beyond the first year offers considerable benefits to both mother and child, and should continue as long as mutually desired (Bahl et al., 2005). Supplementary

foods are commodities intended to supplement a general ration and used in emergency feeding programmers for the prevention and reduction of malnutrition and mortality in vulnerable groups.

In some situations, for health or convenience, expressed breast milk is required and infants fed this way still fall within the definition of exclusive breastfeeding (Webb et. al., 2001). The management of some maternal conditions, such as engorgement or mastitis, may also include the expression of breast milk. In addition, there has been an increasing interest in breast milk expression and pasteurization as a means of preventing mother to infant transmission of the HIV virus (Jeffery et. al, 2003; Saadeh, 2005).

Human milk's superiority over artificial milk is reflected in the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) feeding choices hierarchy, which states that where it is not possible for the biological mother to breastfeed, the first alternative, if available, should be the use of human breast milk from other sources. Human milk banks should be made available in appropriate situations' (WHO/UNICEF, 1980). This hierarchy of feeding preferences reflects the evidence that whilst mother's own milk is always superior to alternatives, donor milk contains many of the immune protective and bio-active properties lacking in artificial baby milk and is thus the next best option for feeding full-term and pre-term infants alike (McGuire, Henderson and Fowlie, 2004; Tully, Lockhart-Borman and Updegrove, 2004).

International and national guidelines on the infant feeding recommend that infants should begin breastfeeding within one hour of birth and should be exclusively breastfed for the first six months of life to achieve optimal nutrition, survival, growth and development. India is one of the few countries in Asia to fully implement the International Code of Marketing of Breast Milk Substitutes with the enactment of the Infant Milk Substitutes, Feeding Bottles and Infant Foods Act. However, direct and indirect violation of the Act continues unabated.

Infant and Young Child Feeding Practices

Exclusive breastfeeding. Exclusive breastfeeding in the early months of life is correlated strongly with increased infant survival and lowered risk of illness, particularly from diarrhoeal diseases. To achieve optimal growth, development and health, WHO recommends that infants should be exclusively breastfed for the first six months of life.

Initiation of breastfeeding. The Baby-friendly Hospital Initiative (BFHI) assessment tool suggests that the baby should be placed "skin-to-skin" with the mother within the first half-hour following delivery. Within the first hour, assistance with positioning and attachment should be given, or if the mother has had a caesarean section, within an hour

of when she is able to respond. Often, mothers who have undergone caesarean section need extra help with breastfeeding. Otherwise, these mothers on average initiate breastfeeding much later and terminate breastfeeding sooner. Optimally, the baby should be breastfed before any routine procedure (such as bathing, weighing, umbilical cord care, administration of eye medications) is performed. Early breastfeeding enhances bonding, increases chances of breastfeeding success, and generally lengthens the duration of breastfeeding.

Complementary feeding. To gain a full understanding of whether complementary foods are introduced at the appropriate time, it is also important to know if foods are introduced too early or too late. To obtain a full picture of the timeliness of complementary feeding, it is necessary to collect additional information the number of babies who are not breastfed, who are exclusively breastfed, and who – in addition to being breastfed are receiving plain water only, or supplements (other foods or liquids) at various ages. Feeds should also be adequate, safe and properly fed. Work is currently under way to identify suitable indicators for measuring these key aspects of complementary feeding.

Need for the Study

One of the goals set to reduce the infant mortality in India is the promotion of breastfeeding. There is still need for improvement in the infant and neonatal survival of children. Malnutrition, poor maternal and adolescent nutrition are the major determinants of this challenge. In India every second child is malnourished and every fourth child suffers from low birth weight. Health professionals need to further explore ways through which relationships may be developed and sustained that provide the range of support required by adolescent mothers to enable them to continue breastfeeding. Therefore an attempt has been made in this paper to examine the infant and young child feeding practices in EAG and non EAG states.

Breastfeeding is mainly influenced by social environment, especially by maternal grandmothers and other elderly women in the community. Although breastfeeding is acceptable to all, infants are first introduced to sugary water after birth around the 3rd or 4th day after delivery. This is to avoid the colostrum that is generally discarded by the mother as it is considered heavy, thick, coarse, dirty, toxic, and harmful to children's health. Exclusive breastfeeding is not practised, as breast milk alone is considered inadequate and water essential to cool the baby and quench the thirst. However, this is rarely implemented because of very close birth spacing and an increasing trend of mothers working outside the home.

Objectives

The broad objective of the study is to understand the current scenario of breastfeeding in EAG and non EAG states. The specific objectives are:

- To examine the association of socio-economic determinants with the initiation of breast feeding.
- To study the duration of breast feeding by socio-economic characteristics.
- To study the pattern of semi-solid and solid food given to children by their ages.

Data and Methodology

The analysis is based on the data available through District Level Household and Facility Survey 2007-2008 (DLHS-3). The focus of DLHS-3 has been on the utilisation of basic child health services such as coverage of ante natal care and immunisation which influence infant and child mortality.

Logistic regression analysis has been used to identify the determinants and facilitating factors for colostrum and breastfeeding of the child. Dependent variables for the analysis are dichotomous. The independent variables used are residence, sex of child, religion caste, age of mother, working status, and education status and wealth index.

Cox proportional hazard model has also been used for finding the survival status of children who were still breastfeeding at the time of the survey. Cox (1972) model has been proposed as appropriate for analysis of the duration of breastfeeding (Huffman and others, 1987, Mac, 1981). The benefit of using hazard model is that censoring of nursing by either survey or by the death of the child is taken into account. This technique is similar to regression analysis but it is also useful to analyse the process of survival, in which termination may occur at any point.

The hazard function at time t (here it is stopping or termination of breastfeeding), denoted by $\alpha(t,z)$ is expressed as

$$\alpha(t,z) = \lambda(t)*Exp\ \Sigma Xi\beta i$$

where Xi is explanatory variables βi are regression coefficients and $\lambda(t)$ is the baseline hazard. It is assumed that the explanatory variables influence the hazard by the same degree at each point of time (hence the term "proportional hazard").

Findings and Discussion

Creating awareness among mothers is the best way for correct breast feeding practice is one of the important components of RCH programme. Table 1 depicts the percentage of children receiving colostrum in EAG and non–EAG states. The percentage of children receiving colostrums is to some extent higher in urban areas than in rural areas. Mother's

education has positive association with children receiving colostrums. There is an increase in the percentage of children receiving colostrum with the increase in the wealth index. The sex difference in the percentage of children receiving colostrum is negligible. More or less same pattern prevails in EAG and non-EAG states.

Table 2 presents results from the logistic regression analysis. Children born to women aged 20-34 have higher chance of receiving colostrum in both EAG and non EAG states. In the case of residence, conflicting pattern in EAG and non EAG states can be seen. With raise in mother's education, the likelihood of receiving colostrum by children increases. On the other hand, non-working women are less likely to give colostrums to children as compared to working women.

Table 3 presents results of bi-variate analysis. One-third (35 per cent) of children were breastfed within 24 hours of birth (including children whose mothers started breastfeeding within one hour after birth) in EAG states and virtually less than one –third (31 per cent) of the children were breastfed only after 24 hours in EAG states. Approximately more than half (55 per cent) of children were breastfed immediately in non-EAG states and while only 12 per cent children were breastfed after 24 hours of birth. The percentage of children breastfed immediately after birth was higher in urban areas, educated mothers and in richest households. A higher proportion of children belonging to religions other than Hindu and Muslim were breastfeed immediately after birth in both EAG and non-EAG states. Among those women who got information about breastfeeding at the time of delivery, the proportion breastfeeding the child immediately after birth was more in non-EAG states than in EAG states.

Table 4 shows results from the logistic regression analysis in which breastfeeding within 24 hours has been considered as the dependent variable. In case of the age of the mother at the time of the birth, the odds ratios are not significant in EAG states but significant in non-EAG states. In case of residence, odds ratio is significant in EAG states but no in non-EAG states. In case of mother's education, odds ratios are significant in both EAG and non-EAG states. These difference highlight the differing social and cultural environment in EAG and non-EAG states as regards breastfeeding within 24 hours of birth.

Table 5 presents patterns of feeding and exclusive breastfeeding in children below three years of age in EAG states. It may be seen from the table that among children below 2 months of age, 65.5 per cent were exclusively breastfed while only 2 per cent were fully weaned. After 5 months of age, percentage of children exclusively breastfed declines sharply. It is remarkable to observe that even among the children aged 2-3 years, more than 50 per cent are fully weaned. In about 16 per cent children, the mother started giving

plain water when they were less than 2 months old. About 30 per cent of children were given semi-solid foods when they were 6 to 8 months old and about 26 per cent children were given solid foods in this age group. A large percentage (73.3 per cent) of children were given solid foods when they completed 1 year of age. This shows that most of the mothers prefer to give solid foods to their child only after they complete age of 1 year.

Table 6 depicts the feeding pattern and in non-EAG states and there is not much difference in the pattern from EAG states. About 60 per cent children below 2 months of age were exclusively breastfed while only 2.4 per cent were fully weaned. After age of 5 months, percentage of children who are exclusively breastfed declines sharply and this percentage are very low after age of 8 months. Among children 2-3 years old, more than 45 per cent were fully weaned. About 10 per cent children received plain water when they were less than 2 months old. About 32 per cent children were given semisolid foods when they were 6 to 8 months old. A large percentage (77 per cent) of children were given solid foods when they completed age of 1 year.

Conclusions

Improvement in child care and feeding practices can impact nutritional status of the child. The present study was an attempt to understand the infant and young child feeding practices in EAG and non-EAG states. The main focus has been on whether the children receive colostrum immediately after birth, whether they were breastfed within 24 hours of birth and the age at which they start receiving semi-solid/solid food. The analysis indicates that proportion of children receiving colostrum is much higher in non-EAG states than in EAG states. There is positive association between the education and initiation of breast feeding in both the EAG and non-EAG states. In case of EAG states, around one third of children were breastfed after birth within 24 hours whereas this percentage is more than half for non-EAG states.

Among children below two months of age, more than half are totally dependent on breastfeeding in EAG states. After the age of five months, percentage of children who were exclusively breastfed declined sharply and more than 40 per cent children 2-3 years of age were fully weaned in EAG states. About 32 per cent children were given semi- solid food when they were 6 to 8 months old and about 31 per cent were given solid food at the same age. The mean length of breast feeding is higher in rural areas than urban areas. Mother's education has significant effect on breastfeeding in EAG states. Mother's age is also significant in the continuation of breast feeding. Children of EAG states receive other liquids about one and a half month earlier than children in non-EAG states whereas children in non-EAG states receive semi-solid or solid food at a younger age than children

of EAG states. Breastfeeding 'messages' are not sufficient as a strategy to influence infant feeding practice. Evidence shows that telling mothers to breastfeed doesn't work. Indeed they have the right to more than message

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Table 1
Initiation of breastfeeding by background characteristics

Background characteristics	EAG States	Non-EAG States
Age of mother		
15-19	68.8	82.6
20-24	75.3	86.2
25-29	75.4	87.8
30-34	72.4	87.5
35-39	69.7	86.4
40-44	67.4	84.3
45-49	64.6	84.1
Residence		
Rural	73.5	85.9
Urban	74.6	88.3
Education		
No education	69.2	81.2
Up to 5 years	75.2	84.7
6-10 years	80.2	88.9
11 or more years	86.3	91.7
Religion		
Hindu	74.7	86.1
Muslim	65.4	86
Others	84.1	89.8
Social group		
Schedule castes	72.5	85.4
Schedule tribes	83.5	86.4
Other backward classes	70.5	87.5
Others	76.4	86.9
Working status		
Working	80.3	86.7
Not working	86.1	87.1
Wealth index		
Poorest	72.1	81.3
Second	71.7	84.2
Middle	73.1	85.9
Fourth	75.2	87.1
Richest	79.2	89.9
Advice given about breastfeeding		
Advice given	83.7	89.6
Not given	69.6	82.9

Background characteristics	EAG States	Non-EAG States
Sex of child		
Boys	73.8	86.6
Girls	73.6	86.9
Total	73.7	86.7

Table 2

Logistic regression analysis for colostrums given child by background characteristics in EAG and other states, in DLHS 07-08

Background Characteristics	EAG Exp(B)	Non-EAG Exp(B)
Age of mother		
15-19®		
20-24	1.51***	1.28***
25-29	1.46***	1.36***
30-34	1.32***	1.33***
35-39	1.07	1.41***
40-44	0.95	1.23
45-49	1.19	1.461
Residence		
Rural®		
Urban	0.67***	1.15***
Education		
No education®		
Up to 5 years	1.28***	1.25***
6-10 years	1.56***	1.78***
11 or more years	2.67***	2.31***
Religion		
Hindu®		
Muslim	1.00	0.81***
Others	0.57***	0.97
Caste		
Schedule Caste®		
Schedule Tribes	1.05	0.97
Other backward classes	1.09	0.98
Others	1.11	1.03
Working status		
Working women®		
Not working women	0.62***	0.83***
Wealth index		
Poorest®		
Second	0.87	1.18
Middle	0.70	1.27***
Fourth	0.77	1.14
Richest	0.68	1.27***

Background Characteristics	EAG Exp(B)	Non-EAG Exp(B)
Sex of child		
Boys®		
Girls	1.15***	0.99
Advice given about breast feeding		
Advice given®		
Not given	1.81***	1.51***

Level of significance: *** p < 0.01; ** p < 0.05; * p < 0.10 ® = Reference category

Table 3
Breastfeeding by background characteristics

Background Characteristics	EAG States			Non- EAG States		
	Immediately	Within 24 hours	After 24 hours	Immediately	Within 24 hours	After 24 hours
Age of mother						
15-19	32	33.8	34.2	51.9	32.5	15.7
20-24	36.4	34.4	29.2	54.5	31.6	13.9
25-29	36.4	34.1	29.5	55.6	31.9	12.5
30-34	32.8	34.1	33.1	56.2	32.6	11.3
35-39	29.7	33.9	36.4	57.2	32.4	10.4
40-44	25.4	32.7	41.9	56.7	31	12.3
45-49	25.8	31.5	42.7	62.5	28.2	9.2
Residence						
Rural	34	34.1	31.9	56.1	31.3	12.6
Urban	39.2	34.1	26.7	52.6	34	13.4
Education						
No education	29.3	34.1	36.6	52.1	31.4	16.5
Up to 5 years	37.1	34.6	28.3	55.8	31.4	12.8
6-10 years	43.8	34.4	21.9	57.4	31.6	11
11 or more years	47.4	32.6	20	54.9	34.1	11
Religion						
Hindu	36.1	33.7	30.2	54	31.8	14.2
Muslim	22.7	34.3	43	53.9	33.7	12.4
Others	41.5	44.7	13.8	60.4	30.9	8.7
Social Groups						
SC	32.9	33.7	33.5	52.8	32.1	15.1
ST	46.9	36.1	17	61.6	29.7	8.8
OBC	29.5	34.2	36.3	56.5	29.5	14
Others	40.1	32.8	27.1	50.5	36	13.4
Working status						
Working	49	32.2	18.8	49.7	35.6	14.7
Not working	48.5	34.6	16.8	52.7	32.7	14.7
Wealth index						
Poorest	32.3	34.4	33.3	55.1	32.1	12.8
Second	31.2	35	33.8	57.3	29.9	12.9
Middle	35.4	33.6	30.9	58.2	29.3	12.5
Fourth	38.4	33.3	28.3	55.8	31.5	12.8
Richest	42.4	33.2	24.4	51	35.9	13.1
Advice about breast Feeding						
Advice given	45.7	34.1	20.2	57.6	31.4	11
Not given	29.4	33.7	36.8	49.6	34.2	16.2

Background Characteristics	EAG States			Non- EAG States		
	Immediately	Within 24 hours	After 24 hours	Immediately	Within 24 hours	After 24 hours
Sex of child						
Boys	34.8	34.2	31	54.9	32	13
Girls	34.6	34	31.4	55.6	31.8	12.6
Total	34.7	34.1	31.2	55.3	31.9	12.8

Remarks: SC=Schedule castes, ST=Schedule Tribes, OBC= other backward classes

Table 4

Regression analysis for breastfeeding of those child who breastfed within 24 hours after birth by background characteristics in EAG and other states, in DLHS 07-08

Background Characteristics	EAG States Exp(B)	Non-EAG States Exp(B)
Age of mother		
15-19®		
20-24	1.02	1.15**
25-29	1.09	1.30***
30-34	1.19	1.32***
35-39	0.98	1.31***
40-44	0.92	1.52***
45-49	0.70	1.43
Residence		
Rural®		
Urban	0.72***	1.01
Education		
No education®		
Up to 5 years	1.30***	1.28***
6-10 years	1.54***	1.47***
11 or more years	1.90***	1.55***
Religion		
Hindu®		
Muslim	0.65***	1.05
Others	1.13	1.22***
Caste		
Schedule Caste®		
Schedule Tribes	1.01	1.53***
Other backward classes	0.84**	1.28***
Others	1.05	0.97
Working Status		
Working women®		
Not working women	1.07	1.03
Wealth Index		
Poorest®		
Second	0.99	1.11
Middle	1.10	1.21
Fourth	1.03	1.07
Richest	1.01	0.89

Background Characteristics	EAG States Exp(B)	Non-EAG States Exp(B)
Sex Of Child		
Boys®		
Girls	0.98	1.06**
Advice given about breast feeding		
Advice given		
Not given	0.72***	0.73***

Remarks: *** p < 0.01; ** p < 0.05; * p < 0.10 ® = Reference category

Table 5
Feeding patterns and exclusive breastfeeding for children in different age groups

Age in months	Never/Not Currently Breastfeeding	Exclusive Breastfeeding	Plain Water	Other Fluids	Semisolid Food	Solid Food
< 2	2	65.5	16	10.4	0.5	2.2
2-3	2.9	53.0	16.8	18.9	1.9	3.4
4-5	4.1	32.6	16.5	28.5	9.6	6.5
6-8	5.6	8.6	7.2	21	30	26.2
9-11	9.1	1.4	2.1	4.9	22.4	58.9
12-17	17.5	0.6	0.8	1.3	5	73.3
18-23	31.5	0.1	0.5	0.6	1.8	62.6
24-35	51.4	0.1	0.2	0.3	0.6	43.2
Total	10.8	2.3	1	1.6	1.8	12.3

Represents figures for children of currently married women aged 15-44 years.

Table 6

Feeding patterns and Exclusive Breastfeeding for children in different age groups

Percentage of children aged under 3 years being fed in different way in EAG states

Age in months	Never/Not Currently Breastfeeding	Exclusive Breastfeeding	Plain Water	Other Fluids	Semisolid Food	Solid Food
<2	2.4	60.3	10.7	23.8	0.2	2.2
2-3	2.6	46	10.1	37.3	1	2.7
4-5	4	30.6	10.3	45.2	6	3.3
6-8	4.4	10.8	5.4	32.1	31.5	15.2
9-11	6.4	1.9	1.2	8.6	28.9	52.2
12-17	11.1	0.5	0.4	1.9	6.8	77.8
18-23	19.2	0.1	0.2	0.8	2.9	74.2
24-35	36.8	0.1	0.1	0.3	0.8	57.1
	9	3.3	0.9	4	2.7	17.7

Remarks: Represents figures for children of currently married women aged 15-44 years.

Fertility Transition in India

Aalok Ranjan

Introduction

In recent years, fertility transition has received a neglected attention in demographic research in India. For example, out of approximately 200 research papers published in Demography India, the leading population journal of the country, during the period 2000 through 2009, there is not a single paper that has been devoted specifically to fertility transition. This is so when reduction in fertility in India still remains a major demographic and development challenge. Although, fertility appears to be declining throughout the country, yet transition in fertility appears to be slower than expected. The National Population Policy 2000 had aimed at achieving the replacement fertility by the year 2010, a goal which was reiterated under the National Rural Health Mission launched in 2005. However, latest estimates based on the sample registration system suggest that this goal could not be achieved. (Government of India, 2012). A married woman, in India, still has, on average, about 4 live births during her entire reproductive life. India's National Population Policy 2000 calls for promoting vigorously the small family norm to achieve replacement fertility and to promote delayed marriage for girls, not earlier than 18 years of age and preferably after 20 years of age so as to achieve stable population by the year 2045 at a level consistent with the requirements of sustainable economic growth, social development, and environmental protection (Government of India, 2000).

The promotion of small family and delayed marriage of girls reflect two dimensions of fertility transition - the dimension of birth limitation and the dimension of delayed child bearing. The dimension of birth limitation is captured through the reduction in the

total fertility rate. On the other hand, delayed child bearing is important in the context of population momentum which is the tendency of the population to grow for some time after fertility has reached the replacement level (Frejka, 1982; Keyfitz, 1971; Merrick, 1989). Population momentum is primarily the consequence of a young population age structure (Bongaarts, 1994). Attention to this neglected issue is essential because population momentum accounts for a substantial proportion of projected population growth in India (Chaurasia and Gulati, 2008).

There are two options to address population momentum. The first is to reduce fertility below the replacement level. The second is to raise the average age of women at child bearing as it has been observed that fertility in a given year is significantly affected by shifts in the timing of births (Bongaarts, 1994). When successive cohorts of women start their child bearing earlier and space their births closer together, fertility for that period temporarily rises. A delay in the onset of child bearing and wider spacing of births, on the other hand, leads to a temporary decline in period fertility and hence in the population growth rate. Incorporating the dimension of the delay in childbearing in any analysis of fertility transition is therefore important in the context of population stabilisation.

This paper is organised as follows. The next section of the paper develops the methodology used for analysing fertility transition on the two dimensional space - the dimension of birth limitation and the dimension of delayed child bearing. A fertility transition index has been developed to analyse fertility transition in the two dimensional space. The third section of the paper describes the sources of data used for analysing the transition in fertility while the fourth section presents results of the analysis at the national, state and district levels. The policy and programme implications of the analysis are discussed in section five of the paper.

Measurement of Fertility

Fertility of a population can be measured in terms of either the intensity or the incidence of child bearing. The intensity of child bearing is measured in terms of exposure of a specific category of women to conception and child birth. Intensity is also termed as occurrence-exposure rate (Hoem and Hoem, 1989) or the rate of the first kind (Calot, 2002). Incidence, on the other hand, is measured in terms of exposure of all women in the age category. Incidence rates are also termed as frequencies or rates of the second kind or reduced rates. Intensity and incidence are however directly related and have relative advantages and disadvantages. The choice between the two depends upon their intrinsic properties and measurement issues. Fertility intensities are advocated on theoretical grounds. When they include all relevant dimensions of fertility, they can represent

instantaneous probability that a woman in specific category gives birth (Hoem 1976). They are independent of the earlier child bearing behaviour of the woman. Incidence rates, on the other hand, do not reflect the risk of child bearing but have the additive property.

Estimation of the intensity or incidence of fertility requires information about occurrence of birth and population exposed to the risk of birth. In situations where information about the population exposed to the risk of birth is not available, numerator analysis has been advocated (Ravenholt and Frederiksen, 1968; Reynolds, 1972; Chidambaram, 1965; Balasubramanian, 1972). Numerator analysis is based on the distribution of live births in a given period by age and parity. The key concept in numerator analysis is 'excess' fertility. Excess category may be defined either in terms of the age of the woman or in terms of birth order. Hamilton (1968) has defined 'excess fertility' as all births to mothers under 15 or over 40 years of age, births above first parity for mothers 15 to 19, births above second parity for mothers 20-24, births above third parity for mothers 25 to 29, births above fourth parity for mothers 30 to 34, and births above fifth parity for mothers 35 to 39.

Numerator analysis is particularly useful in analysing the impact of fertility regulation programmes (Bertrand, Magnani and Knowles, 1994). A fertility regulation programme may target reducing the proportion of births to women above a certain parity (e.g., 3rd and higher order births) or to women below a certain age (e.g., below 20 years of age). It is also argued that numerator analysis is more sensitive to short-term changes in individual fertility than the conventional fertility measures (Ryder, 1982; Srinivasan and Freymann, 1990).

The total number of live births reported in a year or during a reference period may be distributed by the age of women and the order of the birth in the following manner:

Age of woman	Birth order		
	<3	≥3	Total
15-19 years	b_{11}	b_{12}	$b_{1.}$
20-49 years	b_{21}	b_{22}	$b_{2.}$
Total	$b_{.1}$	$b_{.2}$	$b_{..}$

Clearly

$$b_{..} = b_{11} + b_{12} + b_{21} + b_{22}$$

or

$$b_{21} = b_{..} - (b_{11} + b_{12} + b_{22})$$

$$b_{21} = b_{..} - ((b_{11}+b_{12}) + (b_{12}+b_{22}) - b_{12})$$

or

$$b_{21}/b_{..} = 1 - [(b_{1.}/b_{..}) + (b_{.2}/b_{..}) - (b_{12}/b_{..})]$$

or

$I = 1 - (w + o - s)$

where

I = proportion of births to women aged at least 20 years old and birth order <3.

w = proportion of births to women aged less than 20 years

o = proportion of 3rd and higher order births

s = proportion of 3rd and higher order births to women aged less than 20 years.

The index I is an indicator of fertility which takes into account the two dimensions of fertility transition - the dimension of fertility limitation and the dimension of delayed child bearing. Obviously, I varies from 0 through 1. When all births during a reference period are 1st and 2nd order births to women aged at least 20 years old, I=1. On the other hand when all 1st ad 2nd order births are confined to women aged <20 years and all 3rd and higher order births are confined to women aged at least 20 years, I=0. Clearly, higher is the value of the index *i,* the more advanced is the transition in fertility.

It is also clear from the above that the index *i* is determined by three proportions - proportion of 3rd and higher order births (o), proportion of births to women aged less than 20 years (w), and the proportion of 3rd and higher order births to women aged less than 20 years. The proportion of 3rd and higher order births is an indicator of birth limitation. The progression from second to third birth is argued to be a crucial component of fertility change (United Nations, 1997) and a decline in fertility would be reflected by a decrease in the proportion of 3rd or higher order births. The reason is that in situations where women would tend to limit their family size, higher order births would become more infrequent. These expectations have been borne out in a number of studies (Prasartakul et al., 1987; Srinivasan et al., 1992; Singh 2002).

On the other hand, the proportion of births to women aged less than 20 years is an indicator of delayed child bearing. It has been argued that fertility decline proceeds in two stages. The first stage of fertility decline is mainly due to rising age at marriage and the resulting increase in the age at first birth (Westoff, 1992). It has been observed that the latter is the age at first birth, the lower is the fertility (Sivakumar, 2000) and a decreasing proportion of births to women aged less than 20 years may be taken as an indicator of the increasing age at first birth.

Finally, the proportion of 3rd and higher order births to women aged less than 20 years may be taken as an indicator of narrow spacing of births as well as early child bearing. A decrease in this proportion implies either delayed child bearing or increased spacing between successive births. It is thus clear that the index *i* takes into consideration both the dimensions of fertility transition.

If we give double weight to *s*, the proportion of 3rd and higher order births to women aged less than 20, then the fertility transition index (FTI) is defined as

$FTI = 1 - (w + o)$.

It may be noted that *FTI* remains bounded from above by 1 but it is no longer bounded from below by 0 and may take even negative value which is equal to the proportion of 3rd and higher order births to women aged less than 20 years. In fact, as fertility decreases, *s* decreases and becomes insignificant compared to *w* and *o*. In the extreme case when all births in during a reference period are 1st and 2nd order births and confined to women at least 20 years old, *s* as well as *w* and $o = 0$ and $FTI = i = 1$ and we argue that fertility transition is complete.

Data

We use two data sets in the present analysis. The first data set is derived from the 2001 population census. During the 2001 population census, information was collected about any live births during one year prior to the census, age of the mother at the time of the birth and the order of the birth. This information is available for the total population as well as separately for rural and urban areas, for different social classes - Scheduled Castes, Scheduled Tribes and non Scheduled Castes/Tribes and for different religions. The distribution of births during one year prior to the census by the age of the mother at the time of birth and the order of the birth has been used to estimate the proportion of births to women aged 15-19 years and the proportion of 3rd and higher order births around the years 2000-01.

The second data set is available through the latest district level household survey (DLHS 2007-08) which covered around 0.7 million households in 611 districts (IIPS, 2010). The focus of DLHS 2007-08 is to provide health care and utilization indicators at the district level for the enhancement of the activities under the National Rural Health Mission (NRHM) which was launched by the Government of India in 2005 (Government of India, 2005). The survey covered around 1000-1500 households in each district. The households surveyed were selected through a stratified random sampling procedure. The sample included, wherever possible, both rural and urban areas within the district.

During DLHS 2007-08, information about all births during the period 1 January 2004 to the survey date was collected from currently married females in the reproductive age group. The survey date varied from state to state but all surveys were carried out during the period 2007-08. The present analyses is based on the information of the most recent birth. If a woman reported more than one birth during the reference period then only the most recent live birth is taken into account.

A comparison of the proportion of 3rd and higher order births, proportion of births to women aged 15-19 years and the implied fertility transition index during the period 2000-01 with the situation that prevailed at the time of DLHS 2007-08 (around 2007-08) facilitates an analysis of transition in the two dimensions of fertility - the dimension of birth limitation and the dimension of delayed child bearing - as well as in the fertility transition index. This comparison has been made for different population groups at the national level as well as across different states and districts of the country.

Fertility Transition in India

Country scenario. According to the DLHS 2007-08, the FTI in India was around 0.46 during the period 2007-08. The proportion of 3rd and higher order births among the most recent births reported during DLHS 2007-08 was around 41 per cent whereas the proportion of births to women aged less than 20 years was around 13 per cent (Table 1). It is also clear from the table that FTI in India decreased marginally between 2000-01 and 2007-08. During this period, the proportion of 3rd and higher order births decreased from around 47 per cent during 2000-01 to around 41 per cent during 2007-08 but the proportion of births to women aged less than 20 years increased sharply from around 7 per cent to almost 13 per cent which actually accounted for the decrease in FTI. Obviously, when both the dimensions of fertility transition are taken into consideration, there has been little change in fertility transition in the country. There has been some gain in the dimension of fertility limitation but this gain has been offset by the loss in the dimension of delayed child bearing and spacing between successive births.

The above observations present a rather bleak picture of fertility transition in India. DLHS 2007-08 suggests that more than 40 per cent births in the country are still 3rd and higher order births. At the same time, a more serious concern is that there has been a very rapid increase in the proportion of births to women aged less than 20 years. Obviously, concerns related to early child bearing and proper spacing between successive births have largely remained unattended.

Differentials in FTI by residence, religion and social class are significant not only in terms of the level but also the trend. FTI has been estimated to be lower in rural than in the urban areas and the least in Muslims as compared to Hindus and other religions. Similarly, FTI has been estimated to be the lowest in Scheduled Castes as compared to Scheduled Tribes and non Scheduled Castes/Tribes. However, the trend in FTI has been different in different population groups. The FTI has decreased in the rural population as well as in Hindus, Scheduled Castes and non Scheduled Castes/Tribes population but increased in Muslims and other religions as well as in Scheduled Tribes. These differing

trends are due to differences in the decrease in the proportion of third and higher order births and the increase in the proportion of births to women aged less than 20 years. For example, in Muslims, the proportion of 3rd and higher order births decreased by more than 8 absolute points between 2000-01 and 2007-08 while the proportion of births to women aged less than 20 years increased by less than 6 absolute points. By contrast, in Hindus, the proportion of 3rd and higher order births decreased by just around 2 absolute points while the proportion of births to women aged less than 20 years increased by almost 8 absolute points. Similarly, the proportion of 3rd and higher order births decreased by more than 10 absolute points whereas the proportion of births to women aged less than 20 years increased by around 6 absolute points in Scheduled Castes. By contrast, in the non Scheduled Castes/Tribes population, the proportion of 3rd and higher order births decreased by less than 6 absolute points whereas the proportion of births to women aged less than 20 years increased by almost 6 absolute points. A similar situation prevails in Scheduled Tribes also. Clearly, transition in both the dimensions of fertility has followed different path in different population groups. It is however clear that the dimension of delayed child bearing and proper spacing between successive births has remained neglected in all population groups.

State scenario. Across different states and Union Territories of the country, FTI varies widely. FTI was the highest in Puducherry which was the only territory in the country with an FTI of almost 0.85. In addition, in seven states and Union Territories - Goa, Kerala, Jammu and Kashmir, Andman and Nikobar, Chandigarh, Tamil nadu and Himachal Pradesh - FTI has been estimated to be more than 0.70. On the other hand, FTI has been estimated to be the lowest in Bihar followed by Uttar Pradesh. Bihar and Uttar Pradesh are the only two states and Union Territories in the country where the FTI was estimated to be less than 0.30 according to DLHS 2007-08. Other states and Union Territories where FTI has been estimated to be less than 0.50 are Jharkhand, Chhattisgarh, Rajasthan, Meghalaya, Dadra and Nagar Haveli, West Bengal and Karnataka. In these states, little attention appears to have been given to the dimension of delayed child bearing and birth spacing in the quest for fertility reduction.

As regards the trend in FTI, in 10 states and Union Territories, FTI has decreased between 2000-01 and 2007-08. These states and Union Territories are Bihar, Karnataka, Uttar Pradesh, Maharashtra, West Bengal, Chhattisgarh, Jharkhand, Tripura, Andhra Pradesh and Dadra and Nagar Haveli. The decrease in FTI, between 2000-01 and 2007-08, has been the fastest in Bihar, the state with the lowest FTI. In Uttar Pradesh also, the decrease in FTI has been very sharp. The decrease in FTI in Bihar and Uttar Pradesh is reflected in the decrease in FTI at the national level. In Bihar, there has been virtually no

change in the proportion of 3rd and higher order births between 2000-01 and 2007-08 while the proportion of births to women aged less than 20 years increased from 6 per cent to more than 15 per cent. Similarly, the proportion of 3rd and higher order births decreased only marginally in Uttar Pradesh but the proportion of births to women aged less than 20 years increased from 4 to 13 per cent. A similar situation prevailed in Karnataka and Jharkhand also. On the other hand, in Maharashtra, West Bengal, Chhattisgarh, Tripura and Andhra Pradesh, a substantial decrease in the proportion of 3rd and higher order births has been associated with a rapid to very rapid increase in the proportion of births to women aged less than 20 years.

On the other hand, the most rapid increase in FTI has been observed in Jammu and Kashmir followed by Arunachal Pradesh, Puducherry, Chandigarh, Madhya Pradesh and Meghalaya. In Jammu and Kashmir, Arunachal Pradesh, Puducherry and Chandigarh, there has been a very substantial decrease in the proportion of 3rd and higher order births between 2000-01 and 2007-08 but, at the same time, there has been virtually no increase in the proportion of births to women aged less than 20 years. Puducherry is the only state/Union Territory in the country where the proportion of births to women aged less than 20 years has also decreased. In Madhya Pradesh and Meghalaya also, there has been a substantial decrease in the proportion of 3rd and higher order births but the gain in the dimension of birth limitation in these states appears to have been offset to a large extent by the loss in the dimension of delayed child bearing and birth spacing. In Assam also, the proportion of 3rd and higher order births decreased by more than 15 absolute points but this decrease was offset by an increase of more than 7 absolute points in the proportion of births to women aged less than 20 years.

Figure 1 depicts the location of the states and Union Territories on the two dimensions of fertility transition - the dimension of birth limitation measured in terms of the proportion of 3rd and higher order births and the dimension of the delay in child bearing measured in terms of the proportion of births to women aged less than 20 years. The figure singles out three states - Karnataka, Andhra Pradesh and West Bengal - where the proportion of births to women aged less than 20 years is estimated to be more than 20 per cent. In Maharashtra and Karnataka also, this proportion has been found to be higher than other states and Union Territories. A very high proportion of births to women aged less than 20 years suggests that child bearing starts at an early age and there appears little child spacing. In these states, there has been some sharp decline in the proportion of 3rd and higher order births leading to a rapid transition in the dimension of fertility limitation but the dimension of the delay in child bearing and birth spacing appears to have been completely ignored. As such, these states rank quite low in terms of FTI.

Figure 1
Location of states on the two dimensions of fertility transition

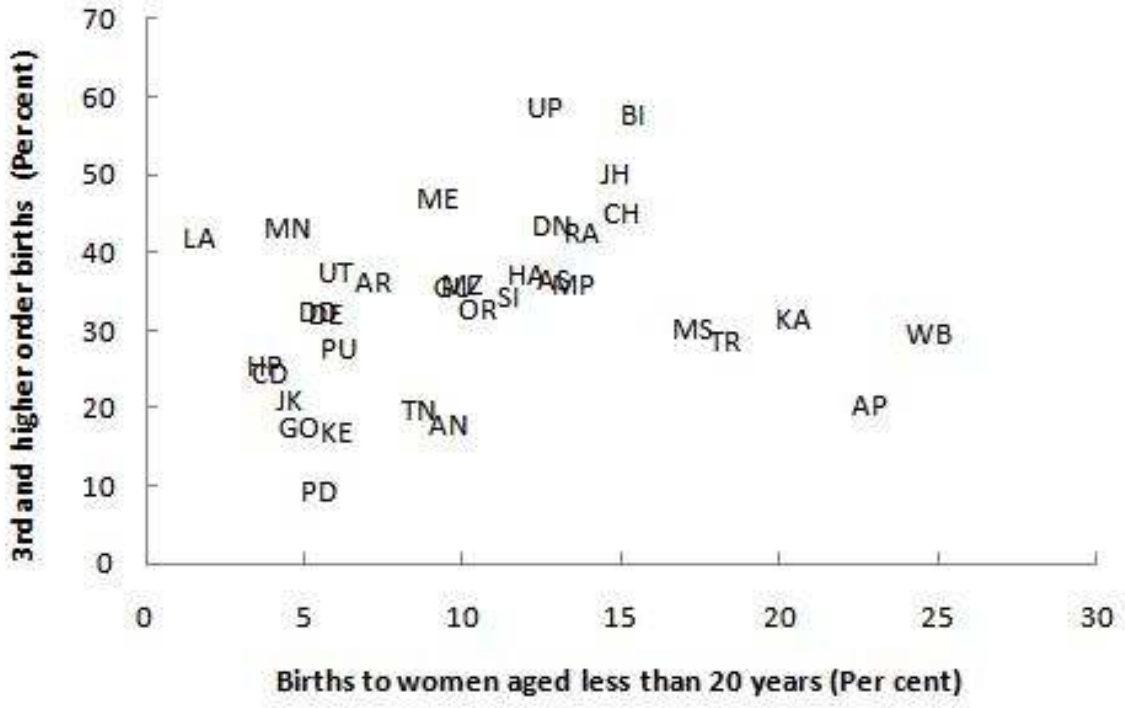

Figure 1 also singles out three states - Uttar Pradesh, Bihar and Jharkhand - where the situation appears to be precarious in both the dimensions of fertility transition. In these states, not only the proportion of 3rd and higher order births is highest in the country but also the proportion of births to women aged less than 20 years is quite substantial. That is why the FTI, in these states, is the lowest in the country.

District scenario. Analysis of fertility transition at the district level is not a regular feature in India. Registration of births in the country is compulsory by the Registration of Birth and Death Act of 1967 but there is gross under registration so that estimates of fertility based on the registration data carries little meaning. District level estimates of fertility in India have therefore been derived through the decennial population census using indirect techniques (Government of India, 1987, 1997; Mari Bhat 1996; Guilmoto and Rajan, 2002).

According to DLHS 2007-08, there were 9 districts in the country which had an FTI of more than 0.900 with district Pulwama of Jammu and Kashmir leading the list with an FTI of 0.959. Out of these 9 districts 6 are in Jammu and Kashmir, 2 in Kerala and 1 in

Puducherry. On the other hand, there were 6 districts where the FTI was estimated to be less than 0.200 - 3 in Uttar Pradesh, 2 in Bihar and 1 in Haryana. District Budaun of Uttar Pradesh has the lowest FTI among the 601 districts of the country.

On the whole, in 172 (29 per cent) districts of the country, FTI has been estimated to be less than 0.40. In these districts, fertility transition appears to be extremely slow either because the proportion of 3rd and higher order births remain exceptionally high or because of a very proportion of births to women aged less than 20 years. Out of these 172 districts, 120 are located in only three states - Bihar (37), Jharkhand (16) and Uttar Pradesh (64). In Bihar, FTI has been estimated to be less than 0.40 in all the 37 districts. In Uttar Pradesh, FTI was less than 0.40 in 96 per cent of the districts whereas this proportion was almost 73 per cent in Jharkhand.

On the other hand, in six states - Arunachal Pradesh, Delhi, Himachal Pradesh, Kerala, Punjab and Tamil Nadu - there was no district where the FTI was less than 0.40. FTI has also not been found to be less than 0.40 in any district of smaller states and Union Territories of the country.

By contrast, in 188 (31 per cent) districts, FTI is estimated to be at least 0.60 which suggests that there is a transition in both the dimensions of fertility in these districts. Most of these districts are located in Himachal Pradesh, Kerala, Tamil Nadu and Punjab. In Himachal Pradesh, FTI has been estimated to be at least 0.60 in all the districts. In Kerala, the FTI was estimated to be at least 0.60 in 93 per cent districts. In Tamil Nadu, this proportion was 90 per cent whereas in Punjab 80 per cent of the districts were having FTI of at least 0.60.

On the other hand, there were six states where there was not a single district with an FTI of at least 0.60. These states are Bihar, Chhattisgarh, Jharkhand, Meghalaya, Rajasthan and Uttar Pradesh. Low FTI in these states is primarily because of very high proportion of 3rd and higher births. In West Bengal, only around 10 per cent of the districts were having an FTI of at least 0.60 whereas in Haryana and Madhya Pradesh also, FTI was at least 0.60 in only one fifth of the districts.

Conclusions

The foregoing analysis presents an unsatisfactory scenario of fertility transition in India when analysed in the two dimensional space of fertility transition - the dimension of delayed child bearing and birth spacing and the dimension of birth limitation. It is evident that a neglected attention has been paid to the dimension of the delay in child bearing and birth spacing in India in the quest towards population stabilisation. The focus of population stabilisation efforts has always been and continues to be on birth limitation.

There have been gains in the dimension of birth limitation but because of gross neglect of the dimension of the delay in childbearing and birth spacing, there appears little progress in fertility transition in the context of population stabilisation. In order to minimise the impact of population momentum on population growth, it is essential that decline in fertility does not result in a decrease in the mean age of childbearing (Bongaarts 1994, Ryder 1980). This is possible only when child bearing is delayed and births are properly spaced.

The analysis highlights the need of revamping official fertility regulation efforts so that due attention is payed to the dimension of the delay in child bearing and birth spacing. An attempt, in this direction was made in 1996 when the traditional top down, target-based approach of family planning services delivery was replaced by the community needs-based approach. Unfortunately, this shift at the policy level could not be translated into any significant shift in programme planning, implementation and monitoring and evaluation of fertility reduction activities at the operational level. With the introduction of the community needs-based approach, there was a need to evolve a monitoring and evaluation system that was tailored to the new approach but little serious thought was given to this important necessity and the old system was retained.

One approach to focus on the dimension of the delay in child bearing and birth spacing is to evolve a system that helps in monitoring the two dimensions of fertility transition. The fertility transition index (FTI) developed in this paper may be the basis for this system. There are many advantage of FTI as compared to conventional measures like total fertility rate and birth rate. First, it explicitly takes into consideration the two dimensions of fertility transition - the dimension of the delay in child bearing and birth spacing and the dimension of birth limitation. Conventional measures of fertility such as the total fertility rate and the birth rate depend upon the dimension of birth limitation only. From programme perspective, it is important that any index takes into consideration both the dimensions of fertility transition.

The second advantage of FTI is that it is not data intensive. The information required to estimate FTI is routinely recorded in all health care delivery institutions. FTI can also be calculated on the basis of registered births even in situations where the registration of births is incomplete if it is assumed that there is no bias in the reporting and registration of births by the age of the woman or the order of the birth. Similarly, FTI can be estimated on the basis of hospital records if it is assumed that there is no selectivity in hospital admissions by the age of the women or by the order of the birth or both.

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Table 1

Fertility Transition Index (FTI) in India

Population group	Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births			FTI		
	2000-01	2007-08	Change	2000-01	2007-08	Change	2000-01	2007-08	Change
All	6.58	12.86	7.00	46.56	41.10	-5.46	.469	.460	-0.009
Rural	6.98	13.81	6.28	49.07	43.39	-5.68	.439	.428	-0.011
Hindu	6.74	14.48	6.83	45.02	42.74	-2.28	.482	.428	-0.054
Muslim	6.74	12.50	7.74	56.99	48.40	-8.59	.363	.391	0.028
Other Religions	3.73	8.75	5.76	40.11	32.25	-7.86	.562	.590	0.028
Scheduled Castes	7.54	14.74	5.02	51.02	45.26	-5.76	.414	.400	-0.014
Scheduled Tribes	6.57	12.95	7.20	54.02	43.58	-10.44	.394	.435	0.041
Non Scheduled Castes/Tribes	6.34	12.27	6.38	44.39	39.16	-5.23	.493	.486	-0.007

Source: Author's calculations

Table 2
Fertility Transition Index (FTI) in Indian States

State	Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births			FTI		
	2000-01	2007-08	Change	2000-01	2007-08	Change	2000-01	2007-08	Change
Andman and Nikobar	5.69	9.53	3.85	29.53	18.05	-11.47	0.648	0.724	0.076
Andhra Pradesh	14.43	22.92	8.48	28.41	20.72	-7.70	0.572	0.564	-0.008
Arunachal Pradesh	5.41	7.19	1.77	57.16	36.32	-20.84	0.374	0.565	0.191
Assam	5.79	12.88	7.09	51.59	36.58	-15.01	0.426	0.505	0.079
Bihar	6.03	15.33	9.30	57.94	57.86	-0.09	0.360	0.268	-0.092
Chandigarh	3.54	3.94	0.40	36.82	24.63	-12.19	0.596	0.714	0.118
Chhattisgarh	5.37	15.08	9.71	51.30	45.32	-5.98	0.433	0.396	-0.037
Daman and Dieu	3.72	5.44	1.72	34.55	32.64	-1.91	0.617	0.619	0.002
Delhi	3.77	5.66	1.89	40.51	32.33	-8.18	0.557	0.620	0.063
Dadra and Nagar Haveli	6.77	12.78	6.01	49.03	43.61	-5.42	0.442	0.436	-0.006
Goa	2.23	4.90	2.67	24.91	17.65	-7.27	0.729	0.775	0.046
Gujarat	4.12	9.69	5.57	41.99	35.91	-6.08	0.539	0.544	0.005
Haryana	7.55	12.01	4.45	43.46	37.42	-6.04	0.490	0.506	0.016
Himachal Pradesh	2.92	3.82	0.90	35.43	25.61	-9.82	0.616	0.706	0.090
Jharkhand	7.56	14.85	7.29	54.00	50.35	-3.65	0.384	0.348	-0.036
Jammu and Kashmir	2.66	4.54	1.89	56.69	21.22	-35.47	0.407	0.742	0.335
Karnataka	8.05	20.44	12.39	35.96	31.71	-4.25	0.560	0.478	-0.082
Kerala	4.93	6.03	1.10	21.76	17.00	-4.76	0.733	0.770	0.037
Lakshadweep	3.68	1.69	-1.99	49.01	42.16	-6.84	0.473	0.561	0.088
Meghalaya	3.94	9.24	5.30	62.47	47.19	-15.28	0.336	0.436	0.100
Manipur	2.73	4.50	1.77	49.06	43.43	-5.63	0.482	0.521	0.039
Madhya Pradesh	6.70	13.48	6.78	52.91	36.04	-16.88	0.404	0.505	0.101
Maharashtra	5.63	17.31	11.68	37.12	30.26	-6.86	0.572	0.524	-0.048

State	Proportion of births to women aged less than 20 years			Proportion of 3rd and higher order births			FTI		
	2000-01	2007-08	Change	2000-01	2007-08	Change	2000-01	2007-08	Change
Mizoram	4.51	9.97	5.45	50.31	35.97	-14.34	0.452	0.541	0.089
Nagaland	2.62		na	65.16		na	0.322		na
Orissa	4.47	10.44	5.97	44.26	33.05	-11.22	0.513	0.565	0.052
Puducherry	6.32	5.48	-0.83	22.72	9.57	-13.15	0.710	0.849	0.139
Punjab	2.93	6.13	3.20	37.56	27.85	-9.72	0.595	0.660	0.065
Rajasthan	7.89	13.84	5.95	52.37	42.64	-9.73	0.397	0.435	0.038
Sikkim	7.74	11.51	3.76	44.53	34.66	-9.88	0.477	0.538	0.061
Tamil Nadu	5.82	8.61	2.79	29.41	20.11	-9.30	0.648	0.713	0.065
Tripura	9.43	18.34	8.91	36.85	28.90	-7.95	0.537	0.528	-0.009
Uttar Pradesh	4.33	12.62	8.29	60.81	58.80	-2.00	0.349	0.286	-0.063
Uttarakhand	3.59	5.95	2.36	49.49	37.78	-11.71	0.469	0.563	0.094
West Bengal	11.32	24.72	13.40	38.80	29.72	-9.08	0.499	0.456	-0.043

Source: Author's calculations

Table 3
Location of states on the two dimensions of fertility

Proportion of 3rd and higher order births (*Per cent*)	Proportion of births to women aged less than 20 years (*Per cent*)				
	< 5	5-10	10-15	15-20	>= 20
< 20	Puducherry Goa	Kerala Andaman & Nikobar Tamil Nadu			
20-30	Jammu & Kashmir Chandigarh Himachal Pradesh	Punjab		Tripura	Andhra Pradesh West Bengal
30-40		Delhi Daman & Dieu Arunachal Pradesh Uttarakhand Mizoram	Assam Orissa Gujarat Sikkim Haryana Madhya Pradesh	Maharashtra	Karnataka
40-50	Lakshadweep Manipur	Meghalaya	Dadra & Nagar Haveli Rajasthan	Chhattisgarh	
>= 50			Jharkhand Uttar Pradesh	Bihar	

Table 4
Within state variation in the fertility transition index

State/Country	Fertility Transition Index (FTI)					
	Very low <0.20	Low 0.20-0.40	Average 0.40-0.60	High 0.60-0.80	Very high ≥0.80	Total
Andhra Pradesh	0	1	12	10	0	23
Arunachal Pradesh	0	0	11	5	0	16
Assam	0	2	15	10	0	27
Bihar	2	35	0	0	0	37
Chhattisgarh	0	6	10	0	0	16
Delhi	0	0	3	6	0	9
Gujarat	0	1	15	9	0	25
Haryana	1	1	14	4	0	20
Himachal Pradesh	0	0	0	11	1	12
Jharkhand	0	16	6	0	0	22
Jammu & Kashmir	0	0	5	3	6	14
Karnataka	0	8	10	8	1	27
Kerala	0	0	1	5	8	14
Madhya Pradesh	0	5	31	9	0	45
Maharashtra	0	6	17	10	2	35
Manipur	0	1	4	4	0	9
Meghalaya	0	2	5	0	0	7
Mizoram	0	1	4	3	0	8
Orissa	0	3	18	9	0	30
Punjab	0	0	4	16	0	20
Rajasthan	0	9	23	0	0	32
Tamil Nadu	0	0	3	22	5	30
Uttar Pradesh	3	64	3	0	0	70
Uttarakhand	0	1	5	7	0	13
West Bengal	0	4	13	2	0	19
Small States & UTs	0	0	9	9	3	21
India	6	166	241	162	26	601
	1.00	27.62	40.10	26.96	4.33	100.00

Source: Author's calculations

Table 5
Fertility Transition Index (FTI) in the districts of India, 2007-08

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
Andaman & Nikobar	Andamans	11.51	20.86	0.676
	Nicobars	6.98	14.42	0.786
Andhra Pradesh	Adilabad	18.58	36.15	0.453
	Anantapur	25.37	21.39	0.532
	Chittoor	22.35	17.06	0.606
	Cuddapah	23.66	22.32	0.540
	East Godavari	31.14	18.56	0.503
	Guntur	27.98	7.34	0.647
	Hyderabad	6.57	23.23	0.702
	Karimnagar	14.05	21.62	0.643
	Khammam	17.46	16.40	0.661
	Krishna	23.85	11.30	0.649
	Kurnool	20.47	23.15	0.564
	Mahbubnagar	25.00	35.39	0.396
	Medak	23.74	21.94	0.543
	Nalgonda	31.03	21.98	0.470
	Nellore	22.45	15.31	0.622
	Nizamabad	17.76	19.63	0.626
	Prakasam	30.00	18.42	0.516
	Rangareddi	15.53	17.80	0.667
	Srikakulam	32.37	14.98	0.527
	Visakhapatnam	24.42	26.74	0.488
	Vizianagaram	32.08	18.33	0.496
	Warangal	20.61	20.00	0.594
	West Godavari	20.71	9.47	0.698
Arunachal Pradesh	Anjaw	6.59	34.13	0.593
	Changlang	9.15	37.80	0.530
	Dibang Valley	5.81	22.82	0.714
	East Kameng	10.73	48.07	0.412
	East Siang	7.47	32.78	0.598
	Kurung Kumey	4.73	31.08	0.642
	Lohit	8.70	32.92	0.584
	Lower Dibang Valley	4.06	45.02	0.509
	Lower Subansiri	6.35	39.68	0.540
	Papum Pare	10.36	44.22	0.454
	Tawang	2.46	37.70	0.598

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Tirap	11.76	14.71	0.735
	Upper Siang	3.72	47.52	0.488
	Upper Subansiri	9.04	36.75	0.542
	West Kameng	8.49	30.89	0.606
	West Siang	9.88	25.93	0.642
Assam	Barpeta	12.63	39.58	0.478
	Baska	13.06	22.04	0.649
	Bongaigaon	14.00	35.01	0.510
	Cachar	11.33	48.08	0.406
	Chirang	11.03	39.10	0.499
	Darrang	12.60	36.64	0.508
	Dhemaji	15.98	37.87	0.462
	Dhubri	18.10	34.91	0.470
	Dibrugarh	8.47	31.42	0.601
	Goalpara	13.55	38.21	0.482
	Golaghat	11.03	28.31	0.607
	Hailakandi	14.19	50.43	0.354
	Jorhat	13.82	25.33	0.609
	Kamrup	12.43	16.95	0.706
	Kamrup Metro	8.72	24.10	0.672
	Karbi Anglong	11.40	14.51	0.741
	Karimganj	16.59	55.30	0.281
	Kokrajhar	16.43	38.10	0.455
	Lakhimpur	15.22	30.21	0.546
	Marigaon	17.46	34.91	0.476
	Nagaon	12.53	40.87	0.466
	Nalbari	7.56	25.00	0.674
	North Cachar Hills	7.63	26.69	0.657
	Sibsagar	6.39	29.44	0.642
	Sonitpur	11.55	38.60	0.498
	Tinsukia	10.39	37.92	0.517
	Udalguri	10.45	41.79	0.478
Bihar	Araria	17.44	63.91	0.186
	Aurangabad	17.33	51.62	0.310
	Banka	20.57	54.70	0.247
	Begusarai	17.68	58.69	0.236
	Bhagalpur	14.86	60.53	0.246
	Bhojpur	19.37	55.54	0.251

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Buxar	14.84	57.42	0.277
	Darbhanga	14.93	57.56	0.275
	Gaya	19.20	56.59	0.242
	Gopalganj	13.19	54.40	0.324
	Jamui	16.77	55.34	0.279
	Jehanabad	16.08	54.27	0.296
	Kaimur Bhabua	12.39	60.77	0.268
	Katihar	13.66	59.20	0.271
	Khagaria	14.81	60.77	0.244
	Kishanganj	11.89	61.96	0.262
	Lakhisarai	14.79	55.79	0.294
	Madhepura	18.48	58.31	0.232
	Madhubani	14.67	56.93	0.284
	Munger	15.17	50.25	0.346
	Muzaffarpur	11.11	55.56	0.333
	Nalanda	18.41	55.78	0.258
	Nawada	12.20	58.01	0.298
	Pashchim Champaran	14.75	63.60	0.216
	Patna	19.13	48.09	0.328
	Purba Champaran	16.62	58.61	0.248
	Purnia	11.90	63.10	0.250
	Rohtas	15.56	55.39	0.290
	Saharsa	18.83	55.27	0.259
	Samastipur	14.64	60.95	0.244
	Saran	9.98	57.62	0.324
	Sheikhpura	13.33	58.37	0.283
	Sheohar	13.76	63.06	0.232
	Sitamarhi	18.84	62.79	0.184
	Siwan	9.17	52.44	0.384
	Supaul	12.11	58.00	0.299
	Vaishali	18.26	53.53	0.282
Chandigarh	Chandigarh	3.94	24.63	0.714
Chhattisgarh	Bastar	15.50	49.79	0.347
	Bilaspur	18.08	50.89	0.310
	Dantewada	11.11	50.00	0.389
	Dhamtari	14.02	33.64	0.523
	Durg	10.85	38.98	0.502
	Janjgir-Champa	14.25	45.25	0.405

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Jashpur	10.54	47.06	0.424
	Kanker	16.72	42.82	0.405
	Kawardha	21.29	52.93	0.258
	Korba	13.53	44.27	0.422
	Koriya	18.81	47.02	0.342
	Mahasamund	15.48	40.00	0.445
	Raigarh	8.22	41.78	0.500
	Raipur	18.14	37.75	0.441
	Rajnandgaon	9.83	42.70	0.475
	Surguja	17.53	50.65	0.318
Daman & Dieu	Daman	7.77	22.97	0.693
	Diu	3.51	40.64	0.558
Delhi	Central	3.49	27.51	0.690
	East	4.15	33.22	0.626
	New Delhi	5.24	32.66	0.621
	North	3.20	37.60	0.592
	North East	5.25	37.65	0.571
	North West	8.33	35.33	0.563
	South	6.40	33.23	0.604
	South West	6.86	22.38	0.708
	West	7.26	29.44	0.633
Dadra & Nagar Haveli	Dadra Nagar Haveli	12.78	43.61	0.436
Goa	North Goa	3.93	17.47	0.786
	South Goa	6.15	17.88	0.760
Gujarat	Ahmadabad	5.78	22.67	0.716
	Amreli	6.99	38.24	0.548
	Anand	7.06	36.86	0.561
	Banas Kantha	11.02	41.21	0.478
	Bharuch	9.12	25.55	0.653
	Bhavnagar	7.82	32.90	0.593
	Dohad	14.99	58.93	0.261
	Gandhinagar	7.25	28.99	0.638
	Jamnagar	6.08	28.90	0.650
	Junagarh	5.99	34.15	0.599
	Kachchh	9.73	45.90	0.444
	Kheda	7.95	25.76	0.663
	Mahesana	8.64	32.92	0.584
	Narmada	11.08	40.82	0.481

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Navsari	4.37	22.82	0.728
	Panch Mahals	9.49	39.24	0.513
	Patan	10.88	44.90	0.442
	Porbandar	7.92	30.00	0.621
	Rajkot	5.77	27.69	0.665
	Sabar Kantha	11.29	40.75	0.480
	Surat	9.43	16.80	0.738
	Surendranagar	13.06	38.83	0.481
	The dangs	13.69	42.03	0.443
	Vadodara	12.04	28.83	0.591
	Valsad	11.62	29.93	0.585
Haryana	Ambala	4.26	26.74	0.690
	Bhiwani	13.86	37.65	0.485
	Faridabad	16.36	45.91	0.377
	Fatehabad	12.50	32.14	0.554
	Gurgaon	10.80	38.85	0.503
	Hisar	16.67	35.07	0.483
	Jhajjar	13.47	32.32	0.542
	Jind	11.18	37.70	0.511
	Kaithal	10.43	33.33	0.562
	Karnal	10.15	30.75	0.591
	Kurukshetra	7.27	29.07	0.637
	Mahendragarh	15.44	28.07	0.565
	Mewat	14.06	67.79	0.181
	Panchkula	7.41	26.60	0.660
	Panipat	12.92	43.54	0.435
	Rewari	11.45	29.29	0.593
	Rohtak	10.65	33.55	0.558
	Sirsa	11.23	30.80	0.580
	Sonipat	16.77	32.34	0.509
	Yamunanagar	8.36	30.77	0.609
Himachal Pradesh	Bilaspur	3.86	23.55	0.726
	Chamba	5.07	33.45	0.615
	Hamirpur	0.65	16.13	0.832
	Kangra	0.96	23.92	0.751
	Kinnaur	2.80	32.87	0.643
	Kullu	6.00	22.00	0.720
	Lahul Spiti	1.92	33.33	0.647

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Mandi	6.82	17.05	0.761
	Shimla	5.71	31.43	0.629
	Sirmaur	5.65	29.03	0.653
	Solan	2.53	27.00	0.705
	Una	1.91	18.70	0.794
Jharkhand	Bokaro	17.76	44.16	0.381
	Chatra	16.00	55.84	0.282
	Deoghar	14.79	47.69	0.375
	Dhanbad	18.21	40.75	0.410
	Dumka	16.76	40.52	0.427
	Garhwa	15.76	58.33	0.259
	Giridih	17.48	45.85	0.367
	Godda	17.97	46.10	0.359
	Gumla	9.73	59.29	0.310
	Hazaribagh	17.13	45.37	0.375
	Jamtara	17.57	41.65	0.408
	Kodarma	17.23	55.77	0.270
	Latehar	12.11	59.40	0.285
	Lohardaga	12.95	55.41	0.316
	Pakaur	16.13	54.84	0.290
	Palamu	13.31	56.28	0.304
	Pashchimi Singhbhum	10.53	51.50	0.380
	Purbi Singhbhum	10.42	30.50	0.591
	Ranchi	14.15	42.14	0.437
	Sahibganj	18.73	51.93	0.293
	Seraikela	13.07	42.96	0.440
	Simdega	7.95	56.56	0.355
Jammu & Kashmir	Anantanag	3.35	1.78	0.949
	Badgam	2.59	2.59	0.948
	Baramula	2.42	1.88	0.957
	Doda	6.16	40.34	0.535
	Jammu	5.24	22.58	0.722
	Kargil	2.86	3.39	0.938
	Kathua	3.02	24.77	0.722
	Kupwara	5.47	43.21	0.513
	Leh Ladakh	2.93	33.89	0.632
	Pulwama	2.30	1.79	0.959
	Punch	9.00	50.48	0.405

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Rajauri	8.33	36.46	0.552
	Srinagar	1.63	2.61	0.958
	Udhampur	7.62	35.48	0.569
Karnataka	Bagalkot	27.35	45.01	0.276
	Bangalore	6.93	10.89	0.822
	Bangalore Rural	15.68	14.41	0.699
	Belgaum	18.98	31.53	0.495
	Bellary	21.74	36.34	0.419
	Bidar	24.62	37.24	0.381
	Bijapur	29.43	47.15	0.234
	Chamarajanagar	24.65	18.14	0.572
	Chikmagalur	9.09	15.79	0.751
	Chitradurga	24.26	22.43	0.533
	Dakshina Kannada	6.51	27.74	0.658
	Davanagere	22.07	32.76	0.452
	Dharwad	21.18	35.00	0.438
	Gadag	23.23	41.08	0.357
	Gulbarga	28.81	46.60	0.246
	Hassan	13.88	20.10	0.660
	Haveri	26.35	40.07	0.336
	Kodagu	8.30	17.90	0.738
	Kolar	17.87	29.28	0.529
	Koppal	33.77	46.19	0.200
	Mandya	21.60	7.51	0.709
	Mysore	19.66	21.37	0.590
	Raichur	27.21	43.26	0.295
	Shimoga	14.63	28.05	0.573
	Tumkur	18.18	25.97	0.558
	Udupi	3.13	21.43	0.754
	Uttara Kannada	4.57	28.31	0.671
Kerala	Alappuzha	2.49	6.97	0.905
	Ernakulam	3.76	9.68	0.866
	Idukki	4.46	6.93	0.886
	Kannur	4.63	10.68	0.847
	Kasaragod	6.04	30.20	0.638
	Kollam	2.76	7.83	0.894
	Kottayam	2.34	15.42	0.822
	Kozhikode	8.79	22.34	0.689

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Malappuram	10.79	34.99	0.542
	Palakkad	7.87	18.50	0.736
	Pathanamthitta	1.17	7.02	0.918
	Thiruvananthapuram	3.65	10.94	0.854
	Thrissur	9.45	11.44	0.791
	Wayanad	9.82	22.46	0.677
Lakshadeep	Lakshadweep	1.69	42.16	0.561
Meghalaya	East Garo Hills	10.44	46.52	0.430
	East Khasi Hills	6.78	39.45	0.538
	Jaintia Hills	9.94	45.13	0.449
	Ri Bhoi	10.10	38.22	0.517
	South Garo Hills	8.48	66.96	0.246
	West Garo Hills	7.44	60.79	0.318
	West Khasi Hills	10.16	46.78	0.431
Manipur	Bishnupur	3.61	34.02	0.624
	Chandel	6.77	48.18	0.451
	Churachandpur	5.46	51.54	0.430
	Imphal East	3.64	28.64	0.677
	Imphal West	1.14	28.57	0.703
	Senapati	6.99	50.82	0.422
	Tamenglong	5.84	55.25	0.389
	Thoubal	2.95	36.61	0.604
	Ukhrul	3.44	54.76	0.418
Madhya Pradesh	Balaghat	2.87	31.15	0.660
	Barwani	10.39	47.10	0.425
	Betul	8.52	41.64	0.498
	Bhind	15.02	34.04	0.509
	Bhopal	6.09	41.94	0.520
	Chhatarpur	11.81	39.70	0.485
	Chhindwara	9.28	26.65	0.641
	Damoh	14.45	38.05	0.475
	Datia	16.39	28.74	0.549
	Dewas	14.85	36.41	0.487
	Dhar	20.00	51.17	0.288
	Dindori	11.80	36.96	0.512
	East Nimar	12.92	39.48	0.476
	Guna	12.24	16.00	0.718
	Gwalior	14.29	20.63	0.651

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Harda	11.64	45.60	0.428
	Hoshangabad	13.38	45.77	0.408
	Indore	17.18	23.28	0.595
	Jabalpur	9.16	30.68	0.602
	Jhabua	18.04	59.15	0.228
	Katni	9.24	33.89	0.569
	Mandla	14.67	33.00	0.523
	Mandsaur	11.97	24.92	0.631
	Morena	19.05	27.08	0.539
	Narsimhapur	19.41	36.26	0.443
	Neemuch	10.79	33.61	0.556
	Panna	11.00	38.00	0.510
	Raisen	14.32	50.78	0.349
	Rajgarh	12.75	20.40	0.669
	Ratlam	11.54	40.17	0.483
	Rewa	16.20	29.81	0.540
	Sagar	11.60	37.35	0.510
	Satna	10.24	44.74	0.450
	Sehore	12.65	49.64	0.377
	Seoni	12.50	28.47	0.590
	Shahdol	13.68	30.53	0.558
	Shajapur	17.30	36.33	0.464
	Sheopur	12.96	44.97	0.421
	Shivpuri	15.63	14.51	0.699
	Sidhi	12.05	45.89	0.421
	Tikamgarh	18.28	25.38	0.563
	Ujjain	12.26	38.70	0.490
	Umaria	10.78	39.87	0.494
	Vidisha	12.45	20.39	0.672
	West Nimar	23.36	53.93	0.227
Maharashtra	Ahmadnagar	18.15	28.83	0.530
	Akola	10.73	29.76	0.595
	Amravati	11.88	31.80	0.563
	Aurangabad	26.20	39.04	0.348
	Bhandara	4.28	17.12	0.786
	Bid	26.02	37.13	0.368
	Buldana	22.48	28.19	0.493
	Chandrapur	5.88	13.03	0.811

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Dhule	19.10	35.82	0.451
	Gadchiroli	13.74	34.25	0.520
	Gondiya	5.66	25.66	0.687
	Hingoli	30.19	40.43	0.294
	Jalgaon	21.55	42.09	0.364
	Jalna	26.80	32.04	0.412
	Kolhapur	10.49	24.72	0.648
	Latur	26.28	33.42	0.403
	Mumbai	7.20	29.24	0.636
	Mumbai Suburban	9.75	26.27	0.640
	Nagpur	5.91	21.67	0.724
	Nanded	22.74	34.27	0.430
	Nandurbar	20.26	43.90	0.358
	Nashik	19.60	29.57	0.508
	Osmanabad	24.84	30.50	0.447
	Parbhani	26.08	38.71	0.352
	Pune	16.67	23.58	0.598
	Raigarh	6.60	27.92	0.655
	Ratnagiri	5.21	24.17	0.706
	Sangli	16.81	25.86	0.573
	Satara	12.45	20.75	0.668
	Sindhudurg	2.14	16.58	0.813
	Solapur	25.18	30.58	0.442
	Thane	11.99	29.79	0.582
	Wardha	5.83	16.67	0.775
	Washim	23.34	29.39	0.473
	Yavatmal	19.14	27.22	0.536
Mizoram	Aizawl	7.32	30.31	0.624
	Champhai	10.12	27.18	0.627
	Kolasib	9.46	38.65	0.519
	Lawngtlai	14.83	47.32	0.379
	Lunglei	8.14	47.77	0.441
	Mamit	11.88	39.67	0.485
	Saiha	10.48	29.75	0.598
	Serchhip	6.20	28.68	0.651
Orissa	Anugul	9.15	30.17	0.607
	Balangir	3.45	48.28	0.483
	Baleshwar	9.27	30.73	0.600

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Bargarh	10.15	33.46	0.564
	Baudh	8.41	38.63	0.530
	Bhadrak	2.85	30.38	0.668
	Cuttack	8.05	23.75	0.682
	Debagarh	11.15	29.00	0.599
	Dhenkanal	12.15	34.03	0.538
	Gajapati	15.05	54.30	0.306
	Ganjam	15.95	27.30	0.567
	Jagatsinghapur	3.83	19.14	0.770
	Jajapur	4.29	24.49	0.712
	Jharsuguda	6.40	33.60	0.600
	Kalahandi	5.99	50.23	0.438
	Kandhamal	8.08	40.07	0.519
	Kendrapara	4.15	30.03	0.658
	Kendujhar	14.79	32.30	0.529
	Khordha	7.36	13.57	0.791
	Koraput	21.79	37.43	0.408
	Malkangiri	19.41	54.12	0.265
	Mayurbhanj	15.33	33.33	0.513
	Nabarangapur	22.15	49.54	0.283
	Nayagarh	18.15	23.33	0.585
	Nuapada	8.09	33.09	0.588
	Puri	5.73	24.37	0.699
	Rayagada	13.41	43.73	0.429
	Sambalpur	6.15	25.82	0.680
	Sonapur	12.13	32.46	0.554
	Sundargarh	9.68	37.10	0.532
Puducherry	Karaikal	4.18	12.55	0.833
	Mahe	2.71	2.71	0.946
	Puducherry	6.31	14.41	0.793
	Yanam	10.16	9.09	0.807
Punjab	Amritsar	8.33	32.64	0.590
	Barnala	9.00	28.62	0.624
	Bathinda	8.33	23.61	0.681
	Faridkot	8.66	29.53	0.618
	Fatehgarh Sahib	4.23	21.48	0.743
	Firozpur	8.33	30.56	0.611
	Gurdaspur	4.96	27.10	0.679

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Hoshiarpur	2.23	21.34	0.764
	Jalandhar	2.89	31.05	0.661
	Kapurthala	3.45	27.59	0.690
	Ludhiana	6.36	27.54	0.661
	Mansa	8.67	26.33	0.650
	Moga	6.56	34.75	0.587
	Muktsar	7.37	35.44	0.572
	Nawanshahr	3.83	28.74	0.674
	Patiala	6.61	29.57	0.638
	Nupnagar	2.44	24.04	0.735
	Sangrur	8.68	21.56	0.698
	SAS Nagar Mohali	4.40	25.16	0.704
	Tarn Taran	7.41	33.70	0.589
Rajasthan	Ajmer	10.61	45.66	0.437
	Alwar	15.20	38.67	0.461
	Banswara	17.58	51.56	0.309
	Baran	14.22	44.02	0.418
	Barmer	6.32	56.84	0.368
	Bharatpur	17.96	38.37	0.437
	Bhilwara	18.16	47.43	0.344
	Bikaner	17.03	41.08	0.419
	Bundi	11.97	35.90	0.521
	Chittaurgarh	13.99	31.20	0.548
	Churu	14.72	43.15	0.421
	Dausa	16.09	45.71	0.382
	Dhaulpur	13.52	59.43	0.270
	Dungarpur	10.81	46.55	0.426
	Ganganagar	15.61	29.96	0.544
	Hamumangarh	15.25	27.68	0.571
	Jaipur	20.30	41.58	0.381
	Jaisalmer	14.70	48.33	0.370
	Jalore	8.76	47.41	0.438
	Jhalawar	19.41	27.13	0.535
	Jhunjhunun	15.17	28.28	0.566
	Jodhpur	12.33	43.49	0.442
	Karauli	16.73	50.37	0.329
	Kota	15.22	27.46	0.573
	Nagaur	13.62	39.29	0.471

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Pali	9.63	50.42	0.399
	Rajsamand	11.56	44.09	0.444
	Sawai Madhopur	14.65	34.78	0.506
	Sikar	13.30	35.70	0.510
	Sirohi	6.54	49.49	0.440
	Tonk	12.89	42.63	0.445
	Udaipur	11.63	44.65	0.437
Sikkim	East	9.87	28.34	0.618
	North	9.55	37.44	0.530
	South	12.96	34.49	0.525
	West	13.79	37.93	0.483
Tamil Nadu	Ariyalur	12.67	25.79	0.615
	Chennai	5.88	10.78	0.833
	Coimbatore	8.29	7.80	0.839
	Cuddalore	5.45	25.91	0.686
	Dharmapuri	18.69	25.70	0.556
	Dindigul	11.67	20.00	0.683
	Erode	10.37	5.49	0.841
	Kancheepuram	9.24	13.87	0.769
	Kanniyakumari	4.25	7.08	0.887
	Karur	9.63	23.53	0.668
	Krishnagiri	18.96	27.01	0.540
	Madurai	6.64	19.47	0.739
	Nagapattinam	7.05	24.90	0.680
	Namakkal	9.30	9.88	0.808
	Nilgiris	11.06	14.04	0.749
	Pudukottai	3.68	23.53	0.728
	Ramanathpuram	3.69	21.72	0.746
	Salem	18.39	13.90	0.677
	Sivganga	4.55	15.91	0.795
	Thanjavur	5.65	23.04	0.713
	Theni	13.14	20.57	0.663
	Thirunelveli	6.80	22.33	0.709
	Thiruvallur	6.97	15.98	0.770
	Thiruvarur	7.23	22.49	0.703
	Thoothukudi	2.45	18.14	0.794
	Tiruvannamalai	8.29	25.37	0.663
	Trichy	8.25	28.16	0.636

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Vellore	10.83	30.32	0.588
	Viluppuram	4.88	30.89	0.642
	Virudhunagar	8.09	19.08	0.728
Tripura	Dhalai	17.51	34.81	0.477
	North Tripura	17.18	38.65	0.442
	South Tripura	21.39	21.13	0.575
	West Tripura	17.17	19.58	0.633
Uttar Pradesh	Agra	14.73	55.56	0.297
	Aligarh	14.54	56.78	0.287
	Allahabad	14.85	56.62	0.285
	Ambedaker Nagar	9.31	55.85	0.348
	Auraiya	15.38	58.02	0.266
	Azamgarh	8.82	51.73	0.394
	Baghpat	12.65	54.42	0.329
	Bahraich	12.80	67.99	0.192
	Ballia	8.73	56.34	0.349
	Balrampur	10.16	66.62	0.232
	Banda	13.46	60.00	0.265
	Barabanki	11.55	63.87	0.246
	Bareilly	12.10	63.00	0.249
	Basti	9.84	57.56	0.326
	Bijnor	8.65	61.54	0.298
	Budaun	15.90	67.56	0.165
	Bulandshahar	13.47	54.11	0.324
	Chandauli	11.11	56.03	0.329
	Chitrakoot	11.52	64.21	0.243
	Deoria	12.34	50.38	0.373
	Etah	18.20	63.26	0.185
	Etawah	19.88	55.58	0.245
	Faizabad	11.01	57.14	0.319
	Farrukhabad	13.82	63.28	0.229
	Fatehpur	13.10	60.89	0.260
	Firozabad	12.58	57.06	0.304
	Gautam Buddha Nagar	12.80	57.73	0.295
	Ghaziabad	11.54	53.04	0.354
	Ghazipur	14.44	56.51	0.291
	Gonda	10.06	64.41	0.255
	Gorakhpur	13.29	46.24	0.405

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Hamirpur	12.68	51.41	0.359
	Hardoi	14.42	63.60	0.220
	Hathras	16.20	61.52	0.223
	Jalaun	15.88	48.10	0.360
	Jaunpur	6.96	56.52	0.365
	Jhansi	14.29	38.46	0.473
	Jyotiba Phule Nagar	10.87	58.98	0.301
	Kannauj	13.85	61.19	0.250
	Kanpur Dehat	10.72	54.55	0.347
	Kanpur Nagar	9.27	52.90	0.378
	Kaushambi	11.66	64.01	0.243
	Kheri	15.66	59.30	0.250
	Kushinagar	14.05	56.91	0.290
	Lalitpur	19.51	56.44	0.241
	Lucknow	8.92	51.69	0.394
	Maharajganj	15.38	53.67	0.309
	Mahoba	18.81	52.06	0.291
	Mainpuri	14.62	60.20	0.252
	Mathura	17.04	57.17	0.258
	Mau	5.95	57.91	0.361
	Meerut	10.34	55.56	0.341
	Mirzapur	13.55	58.59	0.279
	Moradabad	10.89	64.42	0.247
	Muzaffarnagar	10.34	54.99	0.347
	Pilibhit	10.94	58.97	0.301
	Pratapgarh	8.19	55.88	0.359
	Rae Bareli	9.79	61.21	0.290
	Rampur	11.08	67.06	0.219
	Saharanpur	7.27	52.21	0.405
	Sant Kabir Nagar	10.92	55.93	0.331
	Sant Ravidas Nagar	15.15	55.45	0.294
	Shahjahanpur	11.40	68.57	0.200
	Shrawasti	15.21	61.98	0.228
	Siddharthnagar	10.68	66.91	0.224
	Sitapur	11.95	63.05	0.250
	Sonbhadra	18.37	59.18	0.224
	Sultanpur	9.97	53.16	0.369
	Unnao	10.22	59.41	0.304

State	District	Proportion of births to women aged <20 years (Per cent)	Proportion of 3rd and higher order births (Per cent)	Fertility Transition Index (FTI)
	Varanasi	12.59	48.25	0.392
Uttarakhand	Almora	3.78	29.21	0.670
	Bageshwa	6.77	29.35	0.639
	Chamoli	3.33	26.67	0.700
	Champawat	9.48	45.40	0.451
	Dehradun	8.95	43.68	0.474
	Garhwal	1.92	35.58	0.625
	Hardwar	8.24	51.79	0.400
	Nainital	4.97	39.13	0.559
	Pithoragarh	5.08	28.25	0.667
	Rudraprayag	2.85	30.25	0.669
	Tehri garhwal	3.63	34.27	0.621
	Udham Singh Nagar	8.99	38.85	0.522
	Uttarkashi	4.19	39.94	0.559
West Bengal	Bankura	25.24	22.01	0.528
	Barddhaman	27.53	21.25	0.512
	Birbhum	32.02	28.57	0.394
	Dakshin Dinajpur	31.77	24.55	0.437
	Darjiling	17.15	23.01	0.598
	Haora	15.03	25.17	0.598
	Hugli	21.72	14.34	0.639
	Jalpaiguri	18.33	32.48	0.492
	Koch Bihar	28.72	31.23	0.401
	Kolkata	14.56	24.68	0.608
	Maldah	25.37	42.29	0.323
	Murshidabad	31.91	34.15	0.339
	Nadia	27.39	21.58	0.510
	North 24 Parganas	23.62	23.62	0.528
	Paschim Medinipur	33.22	22.37	0.444
	Purab Medinipur	20.62	20.06	0.593
	Puruliya	24.74	34.90	0.404
	South 24 Parganas	22.38	28.67	0.490
	Uttar Dinajpur	20.43	49.85	0.297

Contraceptives Use and Methods Choice among Currently Married Women in India

Sanjit Sarkar

Introduction

Contraception is considered as the direct method to regulate fertility. Hence, governments of most of the high fertility countries make special effort to promote contraception. India was the first country in the world to lauch official family planning programme in 1952 with the objective of reducing the birth rate and control population growth. The programme has experienced a significant growth in terms of financial support, service delivery, and range of contraceptive methods offered since its inception. The programme has since evolved through a number of stages and has changed direction, emphasis and strategies. During the first decade of its existence, family planning was considered more a mechanism to improve the health of mothers and children than a method of population control (Visaria, 2000; Visaria and Chari, 1998). During 1965-75 the programme was integrated with the maternal and child heath programme and after 1997 integrated with the reproductive and child health programme. The National Population Policy 2002 has also emphasised on unmet need of contraception. It affirms government commitment to the provision of quality services, information and counselling, and expanding contraceptive method choices in order to enable people to make voluntary and informed decisions (Santhya, 2003). Use of contraception has increased significantly due to government efforts from 13 per cent in 1970 to 40.7 per cent in 1992-93, 48.2 per cent in 1998-99 and 56 per cent in 2005-06. The National Family Health Survey 2005-06 suggests that 48.5 per cent of currently married women were using any modern method while 7.8 per cent were using traditional methods around the year 2005. Several studies

have been carried out to identify determinants of contraceptive use all over the world. Most of these studies show that women's education, media exposure, accessibility and source of contraception, child loss, place of residence etc. are significant predictors of contraceptive use (Okezie et al., 2010; NPC & ORC Macro, 2004; Koc 2000; Shreshtha 2000). Some of these studies indicate that desired family size and son preference are also important to understand contraceptive use (Asari, 1994). Furthermore, female autonomy and seclusion, equality between spouses linked with spousal communication, have been argued to influence contraceptive use (Dyson and Moore, 1983; Beckman, 1983; Hollerbach, 1983; Narzary, 2001).

Though knowledge of contraception is nearly universal in India, yet it is important to focus on comprehensive knowledge of different contraceptive methods. Table 1 shows that nearly 98 per cent women had knowledge of female sterilisation and more than 75 per cent have knowledge of pill, male sterilisation and condom. Around half of the currently married women have knowledge of traditional methods like, rhythm and withdrawal but knowledge about female condom is very low. Interestingly female sterilisation (36 per cent) is more popular than male sterilisation (1.1 per cent). It also indicates the sign of gender influence in the paternal society where females are key target of family planning. Though knowledge about emergency contraception and injectables are quite satisfactory but their use is very low among women.

Understanding the determinants of contraceptives use is very critical especially in population where heterogeneous socio-cultural factors play an important role. Unmet need for family planning is an important indicator for assessing the potential demand for family planning services. Contraception is the predominant intervention in this context but choices of contraceptives may vary. Hence, it is important to understand the socio demographic factors that affect contraceptive methods choice among currently married women.

Objectives

- To understand the contraceptive use and methods choice among currently married women in India.
- To examine the determinants of contraceptive methods choice among currently married women.

Data and Methodology

The present study utilises data collected during District Level Household and Facility Survey 2007-08 (DLHS-3). DLHS -3 was a nation wide survey which collected information

from 643944 ever married women aged 15-49 years regarding family planning, contraception, HIV/RTI and other socio-demographic aspects. Among the ever married women, 604840 were currently married. For the present study only currently married women were analysed. Descriptive statistics and cross tabulations were carried out to understand the use of contraception by different socio-demographic characteristics. Multinominal logistic regression analysis was applied to examine the relationship between contraceptive method choice and various socioeconomic and demographic factors. Formula applied for multinominal logistic regression is as follows:

$$Ln(P_2 / P_1) = b_0 + b_1x_1 + b_2x_2 + b_3x_{3+.....} + b_ix_i \quad (1)$$

$$Ln(P_3 / P_1) = b_0 + b_1x_1 + b_2x_2 + b_3x_{3+.....} + b_ix_i \quad (2)$$

Where, P_2 = Probability of P_2 with respect to P_1; P_3 = Probability of P_3 with respect to P_1; P_1 = Reference category; b_0 = Intercept; $b_1, b_2, b_3 ... b_i$ is the regression coefficient of $x_1, x_2,$ and $x_{3.....}$ x_i respectively.

Results and Findings

Table 2 shows differentials in contraceptives use among currently married women in India. Chi-square test is used to test statistical significance of the difference in contraceptive use. Age of the women is significantly associated with contraceptive use. Contraception use is the highest in the age group 35-39 years but the lowest in the age group 15-19 years. Education and religion play significant role in contraceptive use and methods choice. An inverse relationship is observed between education of women and use of modern contraceptive methods. Only 48.4 per cent of the women with more than 10years of schooling practice modern methods of contraception whereas 51.4 per cent women with less than five years of schooling practice modern methods of contraception. This inverse relationship may be due to the dominance of female sterilisation as modern method of contraception. Practice of traditional methods however shows positive relationship with the education of women. Contraceptive practice and choice of modern contraceptive methods are found higher in Hindu women compared to women of other religions but choice of traditional methods is the highest among Muslim women. Women's working status, number of living children, sex preference of child, knowledge of HIV and family economic condition are found to be significantly associated with contraceptive use and methods choice. Prevalence of contraception is very low among women who have no living child but the highest in women having 3-4 living children. Contraceptive use is higher in women who do not have preference for any sex compared to women who have explicit sex preference for children. Prevalence of contraception is higher in women having knowledge of HIV.

Table 3 shows prevalence of modern methods of contraception by different types of modern methods. Female sterilisation is positively related while use of condoms and pill is negatively related with the age of woman. About 91 per cent women aged 45-49 years were sterilised while prevalence of condom and pill in the age group 15-19 years was 44 per cent and 33 per cent respectively. Prevalence of condom was higher (33 per cent) in women with more than 10 years of schooling but the prevalence of sterilisation is higher (80 per cent) in women with less than five years of schooling. Prevalence of condom was higher in Muslim women (19 per cent) but prevalence of sterilisation was higher in Hindu women (78 per cent). A significant association exists between number of living children and use of modern methods. Prevalence of condom and pill is inversely related to the number of living children. Women having explicit sex preference prefer to use temporary modern methods rather than permanent modern methods. Prevalence of condom and pill increases with the increase in the wealth index.

Multivariate analysis. Results of the multinominal logistic regression analysis (table 4) show the preference of modern and traditional methods over the non-use of contraception. Women's age is found to be a significant predictor of the choice of modern methods relative to non use as well as choice of traditional methods relative to non use. Compared to women aged 45-49 years, women aged 35-39 years are 78 per cent more likely to choose modern methods whereas women aged 15-19 years are 61 per cent less likely to choose modern methods relative to non use of contraception. Compared to older women, younger women are significantly more likely to choose traditional methods relative to non use. Hindus women are 23 per cent more likely to choose modern methods relative to non use whereas Muslim women are 32 per cent less likely to choose modern methods relative to non-use but women of both religions are respectively 40 per cent and 21 per cent more likely to choose traditional methods over the non use. Choice of modern methods over non use is lower but choice of traditional methods over non use is higher in the rural areas compared to urban areas. Choice of modern as well as traditional methods relative to non use is lower in women who do not have any living child compared to women with more than four living children. Women having explicit sex preference are 66 per cent and 4 per cent less likely to choose modern methods and traditional methods respectively over non-use compared to women having no sex preference. Women with the richest wealth index are less likely to choose modern and traditional methods over non-use of contraception.

Table 5 shows the preference of condom use and other modern methods over sterilisation among those currently married women who are using any modern methods of contraception. Compared to older women use of condom and other modern methods

over sterilisation is significantly higher in younger women. Women's education, religion, residence, working status, living children, sex preference of child etc., are found to be significant predictors of condom use and other modern methods over sterilisation. Women with less than five years of schooling are 69 per cent and 55 per cent less likely to use condom and other modern methods respectively compared to women with more than 10 years of schooling. Choice of condom over sterilisation is 13 per cent lower but choice of other modern methods over sterilisation is 20 per cent higher in rural areas compared to urban areas. Choice of condom as well as other modern methods are significantly higher (nine and eight times respectively) in those women who have explicit son preference, compared to women having no son preference. Wealth index has a significant affect on the choice of condom and other modern methods over sterilisation. Women with richest wealth quintiles are more likely to choose modern methods over sterilisation in compared to women with other wealth quintiles.

Discussion and Conclusion

Main contribution of this paper is to enhance the understanding of contraceptive use and methods choice among currently married women of India using a nationally representative survey data. Findings of the study reveal that women's age is most important to understand the contraceptive use behaviour for both modern and traditional methods. The analysis shows that there is no significant difference in the use of traditional methods in young and old women. However, use of modern methods increases significantly with women's age. Although, use of modern methods is higher in older women yet women who are using any modern method, the choice of the method varies with age.

Muslim women are more likely to use any contraception but less likely to use modern methods compared to Hindu women. The difference may be because of different social and other barriers. Number of living children and sex preference are also important determining factors of contraceptive use and methods choice. Use of contraception especially use of modern methods increases with number of living children. Women who do not have any living child prefer condom as method of family planning but those who have more than two living children prefer sterilisation. Sex preference also effect contraceptive use.

In summary, women's age, education, religion, number of living children, sex preference, wealth index, etc. significantly effect the use of contraception and methods choice among currently married women of India. Use of contraceptive methods, especially modern methods, increases with women's age. Younger women prefer temporary

methods while older women prefer permanent methods. There is a need to give more attention to address the unmet need of contraception in younger women because contraceptive use is quite low in these women.

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Table 1
Knowledge and ever use of contraception

Method	Knowledge	Ever use
Female sterilisation	98.0	36.0
Male sterilisation	82.9	1.1
IUD	74.0	5.7
Pill	86.1	11.0
Emergency contraception	31.3	0.6
Injectable	52.8	0.6
Condom	75.0	13.2
Female condom	12.0	0.0
Rhythm	53.3	15.9
Withdrawal	40.5	9.2
Others	2.1	0.0

Source: DLHS-3

Table 2

Use of contraceptive methods of currently married women in India by selected socio–demographic back ground and their association.

Socio-demographic characteristics	Use of contraception			Any method	Chi-square	N
	No use	Modern methods	Traditional methods			
Age					1.442***	
15-19	88.6	6.8	4.5	11.4		57922
20-24	71.9	22.2	5.8	28.1		187498
25-29	48.2	44.8	6.9	51.8		219306
30-34	32.8	59.3	7.6	67.2		197675
35-39	28.4	63.6	7.6	71.6		182479
40-44	31.7	61.8	6.2	68.3		138835
45-49	38.0	58.2	3.5	62.0		102629
Education					88.119***	
<= 5 years	42.5	51.4	6.0	57.5		171579
5 to 10 years	43.5	49.2	7.1	56.5		316171
>10 years	42.2	48.4	9.3	57.8		131511
Religion					8.312***	
Hindu	43.3	50.3	6.1	56.7		835633
Muslims	56.8	34.2	8.7	43.2		131700
Others	45.7	48.1	5.9	54.3		119010
Women working status					3.754***	
Yes	50.8	44.0	4.7	49.2		79233
No	47.1	45.5	7.1	52.9		636923
No of living children					1.533***	
No Child	93.9	3.7	2.3	6.1		117339
1 to 2	45.9	46.4	7.6	54.1		473465
3 to 4	28.7	65.2	5.8	71.3		369674
More than 4	46.0	45.8	7.5	54.0		125866
Sex preference of child					5.754***	
Yes	76.9	14.8	8.2	23.1		125742
No	41.1	52.5	6.2	58.9		960600
Knowledge of HIV					1.877***	
Yes	39.8	53.3	6.8	60.2		642614
No	53.1	40.7	5.8	46.9		443700
Wealth Index					3.043***	
Poorest	59.9	33.9	5.5	40.1		158267
poorer	53.1	40.6	5.9	46.9		181983
Middle	45.5	48.3	6.0	54.5		209479
Richer	40.8	52.8	6.3	59.2		240170
Richest	36.0	56.3	7.5	64.0		296235

Note: Level of significance ***p<0.001; **p<0.05; *p<0.10

Table 3

Use of modern methods of contraception among currently married women in India by background characteristics

	Sterilisation		IUD	Pills	Injectable	Condom	Chi square	N
	Female	Male						
Age							6.511***	
15-19	17.3	0.5	4.3	33.2	0.6	44.2		3957
20-24	44.4	1.1	6.9	19.4	0.7	27.4		41655
25-29	61.8	1.5	5.7	13.0	0.4	17.5		98164
30-34	73.4	1.9	4.2	8.4	0.3	11.8		117295
35-39	80.9	2.2	3.0	5.8	0.2	8.0		116050
40-44	87.0	2.9	1.9	2.7	0.2	5.2		85766
45-49	90.8	4.3	1.0	1.2	0.1	2.6		59756
Education							2.805***	
<= 5 years	79.8	2.3	2.5	8.2	0.3	6.9		88190
5 to 10 years	68.7	1.7	4.9	10.9	0.3	13.5		155637
>10 years	45.4	1.6	9.2	9.9	0.4	33.4		63645
Religion							1.732***	
Hindu	77.6	2.4	2.9	6.7	0.2	10.2		420427
Muslims	56.9	1.2	5.2	16.4	0.7	19.5		44994
Others	64.2	2.1	8.3	11.2	0.6	13.6		57217
Women working status							3.488***	
Yes	80.7	3.4	2.7	6.3	0.3	6.6		34836
No	68.2	1.7	4.5	10.2	0.3	15.0		290093
No of living children							4.732***	
0	9.6	4.3	1.3	20.4	0.4	63.9		4344
1 to 2	62.7	2.2	5.9	11.2	0.4	17.7		219606
3 to 4	84.2	2.3	2.2	5.3	0.2	5.9		241067
More than 4	82.5	2.3	2.0	6.3	0.4	6.5		57626
Sex preference of child							6.379***	
Yes		0.0	12.7	35.5	1.1	50.7		18603
No	77.1	2.3	3.4	7.0	0.3	9.9		504036
Knowledge of HIV							1.614***	
Yes	69.8	1.9	4.8	8.6	0.3	14.6		342229
No	83.0	2.9	1.6	6.9	0.3	5.3		180395
Level of satisfaction							3.186***	
Fully Satisfied	75.2	2.3	3.5	7.0	0.3	11.7		464759
Partially satisfied	67.0	1.9	5.1	16.3	0.4	9.3		51629
Not satisfied	75.6	2.5	4.8	11.7	0.5	4.9		5945

	Sterilisation		IUD	Pills	Injectable	Condom	Chi square	N
	Female	Male						
Wealth Index							3.621***	
Poorest	82.7	3.8	1.4	8.0	0.3	3.9		53691
Poorer	83.3	2.5	1.6	8.0	0.3	4.3		73967
Middle	81.1	2.1	2.2	8.4	0.3	5.8		101271
Richer	76.5	2.0	3.4	8.2	0.3	9.6		126695
Richest	62.1	1.9	6.5	7.6	0.3	21.6		166902

Note: Level of significance ***p<0.001; **p<0.05; *p<0.10

Table 4

Multinominal Logistic Regression showing odds ratio in methods choice of contraception among currently married women in India

Socio-Demographic Characteristics	Modern methods vs Non Use			Traditional methods vs Non use		
	Odd ratio	95 % CL		Odd ratio	95 % CL	
		Lower	Upper		Lower	Upper
Age Groups						
15-19	0.384***	0.364	0.404	1.381***	1.274	1.498
20-24	0.525***	0.509	0.541	1.125***	1.055	1.200
25-29	0.949***	0.923	0.976	1.627***	1.530	1.730
30-34	1.562***	1.517	1.608	2.693***	2.533	2.864
35-39	1.781***	1.728	1.835	3.21***	3.016	3.417
40-44	1.408***	1.364	1.452	2.268***	2.124	2.423
45-49®						
Education						
<= 5 years	1.145***	1.118	1.172	0.715***	0.687	0.744
5 to 10 years	1.085***	1.065	1.106	0.821***	0.797	0.847
>10 years ®						
Religion						
Hindu	1.227***	1.201	1.252	1.457***	1.402	1.514
Muslims	0.68***	0.661	0.699	1.267***	1.208	1.330
Others ®						
Types of Residence						
Rural	0.954***	0.938	0.969	1.209***	1.176	1.243
Urban						
Women working status						
Yes	0.843	0.417	1.702	0.968	0.249	3.756
No ®						
No of living children						
0	0.061***	0.058	0.064	0.201***	0.186	0.217
1 to 2	1.059**	1.025	1.094	1.086**	1.024	1.152
3 to 4	1.862***	1.803	1.924	1.27***	1.197	1.347
More than 4 ®						
Sex preference of child						
Yes	0.377***	0.369	0.387	0.953**	0.922	0.986
No ®						
Wealth Index						
Poorest	0.428***	0.411	0.444	0.753***	0.707	0.803
Poorer	0.498***	0.484	0.512	0.815***	0.776	0.855
Middle	0.645***	0.631	0.66	0.84***	0.807	0.874
Richer	0.821***	0.807	0.837	0.872***	0.844	0.900
Richest ®						

Note: Level of significance ***p<0.001; **p<0.05; *p<0.10 ; ® = Reference category

Table 5

Odds ratios of contraceptive methods choice

Socio-Demographic Characteristics	Condom use vs Sterilisation			Other modern method vs Sterilisation		
	Odd ratio	95 % CL		Odd ratio	95 % CL	
		Lower	Upper		Lower	Upper
Age Groups						
15-19	56.619***	47.804	67.059	61.078***	51.453	72.505
20-24	16.649***	15.373	18.031	19.999***	18.232	21.938
25-29	9.557***	8.880	10.286	13.265***	12.151	14.481
30-34	5.757***	5.352	6.192	8.217***	7.529	8.967
35-39	3.645***	3.385	3.926	5.385***	4.929	5.883
40-44	2.23***	2.061	2.414	2.470***	2.245	2.718
45-49®						
Education						
<= 5 years	0.307***	0.294	0.321	0.448***	0.430	0.468
5 to 10 years	0.379***	0.367	0.391	0.568***	0.550	0.587
>10 years ®						
Religion						
Hindu	0.618***	0.595	0.642	0.514***	0.496	0.533
Muslims	1.267***	1.201	1.336	1.140***	1.084	1.199
Others ®						
Types of Residence						
Rural	0.87***	0.844	0.896	1.204***	1.169	1.240
Urban ®						
Women working status						
Yes	2.030**	1.909	2.151	2.450***	2.319	2.580
No ®						
No of living children						
0	15.633***	13.005	18.794	5.218***	4.311	6.316
1 to 2	1.035	0.960	1.116	1.062*	0.993	1.136
3 to 4	0.612***	0.568	0.660	0.634***	0.593	0.678
More than 4 ®						
Sex preference of child						
Yes	9.100***	5.471	15.100	7.860***	4.723	13.100
No ®						
Wealth Index						
Poorest	0.259***	0.230	0.291	0.868***	0.802	0.939
Poorer	0.267***	0.246	0.289	0.896***	0.846	0.949
Middle	0.320***	0.304	0.338	0.853***	0.817	0.891
Richer	0.446***	0.430	0.462	0.724***	0.700	0.749
Richest ®						

Note: Level of significance ***p<0.001; **p<0.05; *p<0.10 ; ® = Reference category.

Socio-economic Determinants of Awareness among Women about Government Health Programmes and It's Sources in Madhya Pradesh

Tushar Savarkar

Introduction

India is an extraordinarily heterogeneous country with different religions, ethnic groups, languages, and diversity in social and economic development. Indian society is based on the caste system which promotes socio-economic and political inequalities and, in turn affects educational and health equality. There exists a positive relationship between education and health. Health inequality means not only unequal health conditions or status but also inequality in the utilisation of health services and access to health related information and knowledge. Increasing health awareness is important in the utilisation of health services as increased awareness leads to change in behaviour which otherwise is a gradual and step by step process that depends on person's experiences and perceptions. Mass media often plays an effective role in creating awareness and influencing beliefs, attitude and practices. At the same time, inter-personal communication also contributes very significantly in improving health related awareness among people. Inter-personal communication may be between spouses, between relatives and friends or between health services provider and the beneficiary. Another important approach to health related awareness is the transfer of information and knowledge from elders to youngsters in the family.

In recent years, mass media, specially the electronic or e-media is playing an increasingly dominant role in building health awareness in the community. It is argued that e-media can contribute significantly in influencing people's behaviour. Parlato (1990) has argued that well designed media campaign can be effective in creating a positive

social environment for a behaviour that brings about a shift in the popular opinion. Piotrow and others (1990) have noted that mass media could be a powerful tool not only for creating awareness about new technology but also for stimulating people's desire for more information and facilitating their efforts to apply the information to their own behaviour.

In addition to conveying simple information through advertisements, the use of "enter- educate" approach has become an attractive communication strategy in recent years. This approach uses the entertainment component of mass media, such as song and drama. It is also believed that people may adopt behaviour faster if they are motivated by those whom they consider role models. The role model may be social, spiritual, political leaders or celebrities. Therefore, popular and respected entertainers are believed to be an effective means of motivating people to adopt new behaviours (Kincaid et al., 1988).

Olaleye and Bankola (1994), Bertrand and others (1987) and Piotrow and others (1990) have also argued that there is strong relationship between exposure to family planning messages through media and contraceptive behaviour. In the Indian context, it has been observed that utilisation of anti natal care services and immunisation is higher among women who were exposed to media compared to those who were not (IIPS, 2007).

In this paper, we have made an attempt to examine the extent of the reach of the information and messages related to government health programmes through different information channels - e-media, print media, inter-personal communication, etc. The study also examines the effectiveness of different information channels in transmitting health related information to the people.

Literature Review

There are two different views about media exposure and behaviour change. One view argues that there is less effect of mass media on behaviour because it is a gradual process. Others believe that if media is used properly there is a certain impact on attitude and behaviour. Hyman and Sheatsly (1974) argued that while mass media may be an effective means of influencing knowledge and attitudes, it exerts little impact on behaviour. The study conducted by Bertrand et al (1987), in Guatemala has also observed that there is very little impact of mass media on behaviour change.

Based on the experience of developed countries, a substantial body of literature suggests that exposure to mass media is neither necessary nor sufficient for behaviour change. Mass media, in fact, reinforces attitudes and produces only small changes in beliefs. The effect of mass media on behaviour is indirect and operates through various factors (Klapper, 1969). Bogue (1962) believes that personal contacts and selective

interaction are more important in motivating people to change their behaviour than exposure to mass media. Strasburgurger (1989) and Piotrow and others (1990), have argued that proper use of mass media can lead to change in the attitude and change in the behaviour. According to Piotrow and others (1990), mass media helps to acquaint with new technology and information which can help to change attitude and behaviour. Westoff and Rodriguez (1993) examined the relationship between exposure to media messages on family planning and a number of indicators of reproductive behaviour. They have observed that women who were exposed to media were more likely to use contraceptives and desire fewer children. The study has also documented a positive association between intensity of exposure and behaviour change.

There are many factors affecting exposure and behavioural change. Bankole (1994) has argued that age is negatively associated with exposure to family planning information. On the other hand, the number of living children tends to show a positive relationship with media exposure up to the eighth child, after which the association becomes negative. A similar pattern is explained by Westoff and Rodreiguz (1993) in Kenya. Education and ethnicity also show a positive association with media exposure.

According to the National Family Health Survey 2005-06, only 55 per cent of women in India were exposed to television once in a week, 23 per cent were regularly exposed to the print media and only 6 per cent were going to cinema hall at least once in a week. Exposure to mass media has been found to be influenced by the place of residence.

Inter-personal influence is thought to have a greater impact than mass communication, although it is not a necessary factor in producing change (Klapper, 1969). It has been observed that interventions that combine both mass media and interpersonal communication are more effective in behaviour change (Agha, 2000; Ashford et al; 2000).

Need for the Study

Role of different media and communication approaches in communicating health related messages and information to the people and in inducing behaviour change varies from situation to situation and is conditioned by a host of demographic, social and cultural factors. In situation where literacy is not universal, the approach to communicating health related message and inducing behaviour change may be different from situation where literacy is universal. It is therefore argued that exposure of women to the media is not the same in different parts of India as well as in different population groups. An analysis of exposure to media and sources of health related information bears significance in the context of formulating appropriate strategies to reach to the people so as to induce a positive change in heath related behaviour.

Objectives

- To examine the extent of reach of information and messages about selected government health programmes among women of Madhya Pradesh and India.
- To identify major communication channels for transmitting information and messages related to government health programs.

Data and Methodology

The study is based on the data available through the District Level Household and Facility Survey 2007-08 (DLHS-3). During DLHS-3 data were collected from 720320 households from 34 states and Union Territories of India excluding Nagaland in which 643944 ever married women aged 15-49 years were interviewed out of 46634 women were from Madhya Pradesh. Every woman surveyed in DLHS-3 was asked whether she had heard about or seen some message related to five aspects of health and family welfare - antenatal care, breastfeeding, family planning, institutional delivery, and prevention of sex selective abortion - and what was the source of information. The response obtained has been cross-classified by the basic demographic, social and economic characteristics of the respondents to analyse the extent of reach and major sources of health messages regarding government programs. For the purpose of comparison, the analysis has been carried out separately for India and Madhya Pradesh.

Findings and Discussions

Results of the analysis are presented in tables 1 through 5. The following conclusions may be drawn from these tables.

- There is not much difference in the exposure of women in Madhya Pradesh to health related information and messages as compared to India.
- Exposure to health related information and messages varies by demographic, social and economic characteristics of the respondents.
- Exposure to health related information and messages decreases with the increase in the age of the respondent.
- Exposure to health related information and message increases with the increase in the educational status of the woman.
- Exposure to health related information and messages is substantially higher in urban as compared to rural areas.
- There is a wide gap in the exposure to health related information and messages among women belonging to lowest wealth quintiles as compared to women belonging to the richest wealth quintiles.

- Exposure to health related information and messages is the poorest in Scheduled Tribes women followed by Scheduled Castes women. The exposure is the highest in women of other castes.
- The exposure to health and related information and messages is the poorest among Hindu women compared to women belonging to other religions.
- The most common source of health related information and messages were relatives and friends in Madhya Pradesh as well as in India. However, in women having at least higher secondary level education, belonging to the richest wealth quintiles and living in the urban areas, e-media appears to be the main source of health related information and message.
- In some population groups, health personnel have been found to be a major source for health related information and message.
- Other sources of health related information and messages are not very prominent among the women surveyed.
- There is very little difference in the extent of knowledge and awareness and sources of information and messages across different health related issues - antenatal care, breastfeeding, family planning, institutional delivery and prevention of sex selective abortions.

Conclusions

The analysis suggests that demographic, social and economic characteristics of women play an important role in their exposure to health related information and messages about government health programmes which may have a significant impact on their health related behaviour. The analysis also suggests that inter-personal communication between relatives and friends remains the most important source of health related messages and information, although the dominance of electronic media has increased in the elite section of the society. The analysis also highlights the important role that health professionals can play in creating health awareness and in inducing behaviour change. Last but not the least, the analysis also suggests that there appears no single, universal prescription for building community awareness about government health programmes. Rather, there is a need to evolve population sub-group specific strategies for building awareness about government health programmes so as to increase the utilisation of services being made available through the public health care delivery system and through national health programmes. It is also expected that the population group specific approach will also contribute to health related behaviour change in a more effective manner.

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Table 1

Health information/messages received about antenatal care by women from different sources

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Age Group														
15-24	87.7	41.5	6.0	74.5	75.9	5.2	7354	88.0	43.5	12.7	70.5	67.6	6.4	160676
25-34	87.4	43.3	8.7	74.0	74.9	5.3	7913	88.1	48.7	17.5	69.0	65.9	6.5	202197
35 and Above	81.3	31.4	3.8	70.5	77.7	3.4	1314	81.8	38.0	11.0	66.2	67.8	6.4	38442
Educational Level														
No Education	80.5	24.0	0.7	24.0	77.4	3.8	8720	78.7	24.8	1.2	68.0	72.4	6.1	168548
Primary	91.1	42.9	3.4	42.9	75.2	6.2	2936	88.7	39.8	6.1	71.5	68.2	5.9	58556
High School	95.4	60.7	11.4	60.7	74.0	5.3	3749	94.5	57.9	20.4	71.1	64.1	6.4	121928
HS and Above	98.7	87.0	41.0	86.6	70.2	10.0	1177	98.1	77.9	47.5	67.0	56.7	7.8	52282
Type of Residence														
Rural	84.8	34.0	4.2	24.6	76.7	5.0	13228	84.4	37.3	9.8	71.4	67.7	6.7	287806
Urban	96.1	70.0	17.0	31.1	71.6	5.1	3354	95.2	64.5	26.7	64.8	64.6	5.9	113508
Wealth index quintiles														
Poorest	75.4	17.0	1.2	74.7	77.2	3.9	4721	74.8	16.0	1.6	71.3	70.6	6.1	72523
Second	86.5	27.0	1.7	76.6	77.8	4.6	4622	80.1	25.6	3.5	71.3	72.2	7.0	76491
Middle	92.1	45.0	3.7	73.8	75.7	5.5	2940	88.2	38.8	7.5	72.2	69.1	6.5	78047
Fourth	96.3	66.0	11.0	71.4	74.2	5.9	2292	93.6	55.3	15.9	69.3	65.7	6.4	84638
Richest	98.0	84.0	29.0	70.3	69.5	6.8	2006	97.6	74.8	36.4	64.7	59.6	6.2	89542

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Caste														
SC	89.0	38.0	2.1	71.4	76.0	4.9	2727	86.7	41.5	10.0	70.3	67.3	6.2	73586
ST	75.6	22.0	7.1	80.9	73.3	4.1	4493	81.9	32.5	12.4	76.7	64.1	6.8	67502
OBC	91.0	45.0	17.0	72.9	77.1	4.9	6781	87.3	43.9	13.8	67.6	70.8	6.2	160778
Other	95.1	64.0	7.1	69.7	74.7	7.3	2547	92.3	60.6	22.5	66.5	61.7	7.0	92003
Religion														
Hindu	86.6	40.0	6.6	74.0	75.4	5.1	15692	88.0	44.9	14.4	70.7	67.7	6.5	299605
Muslim	95.4	61.0	14.0	72.5	78.8	5.3	778	85.7	43.6	11.7	63.6	68.6	6.7	60319
Christian	93.3	46.0	21.0	78.6	78.6	11.0	30	84.3	48.4	27.1	67.8	58.7	5.7	21276
Other	93.9	79.0	30.0	77.9	77.9	6.5	82	89.4	59.2	21.1	67.7	55.4	5.7	20114

Table 2

Health information/messages received about breastfeeding by women from different sources

Background Characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Other			E-media	Print	Health Personnel	Friends/ Relatives	Other	
Age Group														
15-24	87.6	42.0	5.6	67.9	61.4	7.0	7353	86.1	46.3	13.1	67.1	68.0	6.6	160676
25-34	87.5	42.0	7.9	67.0	61.4	8.1	7914	86.5	51.0	17.5	66.0	67.0	7.2	202200
35 and Above	80.6	31.0	3.3	61.7	68.5	7.1	1314	79.2	40.7	11.7	60.8	69.2	7.5	38442
Education Level														
No Education	81.1	23.0	0.9	64.8	78.2	6.8	8720	75.9	28.0	1.5	60.7	73.9	7.1	168548
Primary	89.8	43.0	3.0	67.0	75.4	8.6	2936	86.7	42.5	6.5	66.8	68.4	6.4	58556
High School	94.9	61.0	11.0	70.4	73.2	7.2	3748	93.3	59.6	20.7	70.1	64.3	6.8	121933
HS and Above	98.5	85.0	35.6	69.7	68.9	10.4	1177	97.8	79.0	45.8	69.2	58.1	7.9	52281
Types of Residence														
Rural	85.1	33.0	3.9	67.2	77.4	7.6	13228	82.5	40.1	10.0	66.1	68.6	7.3	287809
Urban	94.2	68.0	15.9	66.1	69.5	7.3		93.6	66.2	26.7	65.8	65.3	6.3	113508
Wealth index quintiles														
Poorest	77.4	17.0	1.3	64.6	79.1	6.4	4721	72.4	18.4	1.8	62.3	74.1	7.1	72523
Second	86.4	27.0	1.9	68.4	78.9	7.8	4622	78.6	28.3	4.0	64.3	73.3	7.7	76492
Middle	90.7	45.0	3.6	67.2	75.0	8.4	2941	85.7	41.6	7.7	67.4	69.2	7.3	78049
Fourth	94.3	66.0	8.8	67.1	71.6	7.6	2292	91.8	58.0	16.1	67.7	65.3	6.8	84638
Richest	96.9	83.0	27.4	68.1	68.3	7.9	2006	96.5	76.3	36.1	66.7	60.3	6.4	89541

Background Characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Other			E-media	Print	Health Personnel	Friends/ Relatives	Other	
Caste														
SC	86.3	38.0	3.9	65.3	75.2	7.6	2727	84.7	44.9	10.6	66.7	67.9	6.9	73585
ST	79.7	22.0	2.3	68.9	76.1	7.0	4493	82.2	31.3	11.0	70.6	68.2	8.1	67502
OBC	89.6	45.0	6.5	67.4	76.7	6.8	6781	84.3	47.6	14.6	64.5	70.4	6.5	160782
Other	94.0	63.0	15.4	64.8	73.2	10.0	2547	90.9	63.3	22.6	64.8	62.2	7.4	92003
Religion														
Hindu	86.6	40.0	6.1	66.8	75.8	7.6	15692	86.0	47.7	14.8	67.0	68.5	7.1	299608
Muslim	94.0	60.0	12.2	69.6	74.4	6.3	777	83.0	47.7	12.2	60.5	67.7	6.8	60320
Christian	93.3	50.0	14.3	78.6	75.0	3.6	30	83.0	45.0	23.3	64.6	61.9	5.9	21276
Other	92.7	71.0	31.6	67.1	64.5	11.8	82	90.8	60.0	20.7	68.3	59.0	7.1	20114

Table 3

Health information/messages received about family planning by women from different Sources

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Age Group (Years)														
15-24	93.7	44.0	6.5	70.9	76.3	6.8	7353	90.2	51.0	15.6	64.1	67.2	7.6	160676
25-34	95.2	45.0	8.7	74.6	75.7	7.7	7914	91.9	54.7	19.8	65.4	65.9	8.1	202200
35 and Above	91.9	32.0	4.2	72.2	76.7	6.2	1314	87.2	43.0	12.5	62.8	68.6	7.6	38442
Educational level														
No Education	91.5	25.0	0.6	72.2	78.0	6.3	8721	85.3	30.0	1.6	62.6	74.2	7.2	168548
Primary	95.0	46.0	3.2	73.8	75.0	7.1	2936	90.2	47.8	8.1	66.7	67.8	7.4	58556
High School	98.1	67.0	14.0	73.8	74.3	7.5	3749	95.2	66.8	25.5	66.4	62.1	8.0	121932
HS and Above	99.4	91.0	44.0	71.6	70.3	12.6	1177	98.6	85.5	53.1	64.2	54.6	9.5	52282
Type of Residence														
Rural	93.3	35.0	4.2	74.4	77.5	7.0	13228	88.5	43.2	11.6	66.2	68.2	8.1	287810
Urban	98.2	75.0	20.0	66.6	70.5	8.0	3354	96.3	73.0	31.1	61.1	63.0	7.3	113508
Wealth index quintiles														
Poorest	89.1	17.0	1.1	73.3	78.2	6.0	4721	82.1	19.7	2.0	65.2	73.4	7.2	72523
Second	94.5	30.0	2.0	75.6	78.9	6.9	4622	85.8	31.0	4.6	65.8	73.2	8.3	76492
Middle	96.4	49.0	4.7	72.6	75.9	7.9	2941	90.3	46.0	9.9	67.3	68.9	8.1	78048
Fourth	98.1	71.0	11.0	69.8	72.8	7.3	2292	95.2	64.2	19.1	64.6	64.3	7.8	84638
Richest	98.8	90.0	33.0	68.9	69.0	9.2	2006	98.2	83.8	42.1	61.4	57.5	7.7	89541

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Caste														
SC	95.4	40.0	4.4	69.6	77.7	6.8	2727	91.3	48.0	12.4	65.1	67.6	7.7	73586
ST	89.0	23.0	2.3	79.4	74.2	6.5	4493	83.7	35.5	13.0	73.6	65.3	8.6	67502
OBC	96.1	48.0	7.6	71.7	77.1	7.1	6782	91.8	50.7	16.1	63.0	70.3	7.5	160782
Other	98.0	69.0	18.0	68.4	74.5	9.0	2547	94.0	69.0	27.0	61.4	61.0	8.1	92003
Religion														
Hindu	94.2	42.0	7.0	72.8	76.1	7.2	15693	92.1	51.2	17.1	66.3	67.7	8.0	299609
Muslim	96.5	66.0	13.0	70.9	74.6	6.9	777	87.2	52.6	13.5	56.7	66.8	7.0	60319
Christian	96.7	48.0	21.0	96.6	79.3	6.9	30	79.3	54.4	29.2	62.7	58.1	7.8	21276
Other	97.6	83.0	29.0	77.5	73.8	10.0	82	93.0	63.7	23.4	65.1	58.2	8.1	20114

Table 4

Health information/message received about institutional delivery by women from different sources

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Age Group (Years)														
15-24	81.9	41.0	5.8	74.6	76.9	5.2	7353	79.0	42.7	11.9	69.7	66.5	6.6	160676
25-34	80.8	42.5	8.3	74.4	75.6	5.9	7913	79.0	48.3	16.3	68.2	64.9	6.7	202200
35 and Above	74.4	31.0	4.5	71.2	78.0	3.6	1314	71.3	38.7	10.7	65.2	67.0	6.5	38442
Educational level														
No Education	73.7	23.4	0.7	73.7	78.2	4.3	8720	67.6	24.7	1.1	66.7	71.7	6.3	168548
Primary	84.6	41.0	3.4	75.4	76.2	5.5	2936	78.8	38.7	5.6	71.2	66.7	6.1	58556
Highschool	89.5	59.9	10.8	75.6	74.9	5.8	3749	86.3	56.1	18.5	70.4	63.2	6.7	121932
HS and Above	95.8	84.9	38.7	71.4	70.4	10.6	1177	93.2	75.9	42.6	66.4	56.4	7.9	52281
Types of Residence														
Rural	78.3	32.9	4.1	76.1	77.9	5.1	13228	74.4	37.0	9.1	70.5	66.7	6.8	287809
Urban	90.4	68.6	16.6	68.1	70.9	6.4	3353	88.2	62.8	24.6	64.5	63.8	6.3	113508
Wealth index quintiles														
Poorest	68.9	16.6	1.2	74.7	78.3	4.0	4721	63.6	15.9	1.5	70.4	69.7	6.0	72523
Second	80.1	26.6	1.7	78.1	78.9	4.8	4622	69.4	25.3	3.3	70.2	70.9	7.0	76492
Middle	85.2	43.9	3.9	74.7	75.5	6.1	2941	78.0	38.1	6.7	71.4	67.8	6.9	78049
Fourth	89.2	64.3	10.1	70.1	75.7	5.9	2292	85.1	53.3	14.4	68.5	64.9	6.8	84638
Richest	94.0	82.3	27.5	70.1	69.5		2007	91.6	72.7	33.2	64.4	59.4	6.4	89541

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Caste														
SC	81.2	36.3	4.0	71.5	75.8	5.3	2728	78.6	40.2	9.2	69.3	66.2	6.5	73587
ST	69.8	23.0	2.2	81.1	74.2	4.4	4493	70.6	32.8	12.0	77.0	63.0	6.6	67502
OBC	85.0	43.9	7.2	72.9	77.9	5.2	6781	78.3	43.4	12.9	67.0	69.4	6.5	160782
Other	88.7	63.0	15.6	71.3	76.0	7.6	2547	83.5	60.1	21.1	65.3	61.4	7.2	92003
Religion														
Hindu	80.3	39.7	6.5	74.3	76.3	5.4	15693	78.9	44.4	13.5	69.7	66.7	6.7	299608
Muslim	90.1	60.1	12.4	73.3	77.4	5.1	777	74.9	43.4	10.8	62.0	67.0	6.6	60319
Christian	86.7	42.3	11.5	88.5	69.2	7.7	30	75.1	47.9	25.8	68.5	56.9	5.8	21276
Other	86.6	76.1	28.2	73.2	76.1	8.5	82	82.6	58.7	18.8	69.6	57.6	6.5	20114

Table 5

Health information/message received about prevention of sex selective abortion by women from different sources

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Age Group														
15-24	63.6	52.2	6.3	57.2	72.7	4.9	7353	63.5	54.9	14.4	58.0	57.4	6.4	160676
25-34	63.0	55.1	10.0	57.4	71.5	5.7	7913	64.6	61.7	21.2	55.5	54.3	6.6	202201
35 and Above	50.8	41.8	6.0	54.0	78.4	5.1	1314	53.0	51.7	20.1	50.9	59.6	5.8	38442
Educational level														
No Education	47.8	32.4	0.6	54.3	78.8	5.0	8721	46.5	31.8	1.0	54.6	73.0	5.4	168548
Primary	67.7	51.8	2.3	56.8	72.4	4.9	2935	59.6	49.9	4.0	56.1	64.0	6.2	58556
Highschool	81.5	68.3	11.5	59.7	68.4	5.0	3748	75.8	65.0	20.4	57.4	50.5	6.6	121932
HS and above	95.5	89.4	36.0	61.3	60.1	8.2	1177	90.6	82.4	45.4	56.4	40.2	7.7	52282
Types of Residence														
Rural	56.5	44.2	4.6	57.5	75.3	5.4	13228	56.2	52.5	15.5	56.1	57.7	6.5	287809
Urban	85.2	75.8	17.1	56.2	65.0	5.2	3353	80.4	73.2	25.3	57.1	51.5	6.2	113508
Wealth index quintiles														
Poorest	38.8	23.5	1.1	54.4	82.5	4.8	4721	35.7	27.4	2.6	53.8	72.7	5.6	72523
Second	55.7	35.9	2.0	57.8	78.0	5.2	4622	47.7	39.2	4.4	57.4	67.6	6.1	76493
Middle	72.0	51.5	3.1	56.7	72.4	5.3	2941	60.2	54.3	9.1	58.2	58.8	7.3	78049
Fourth	84.6	71.3	9.1	57.7	68.1	5.1	2291	75.5	67.8	21.2	56.5	50.0	6.7	84639
Richest	93.1	88.1	27.7	58.7	59.7	6.3	2006	88.9	81.1	39.8	55.5	42.6	6.3	89541

Background characteristics	Madhya Pradesh							India						
	Heard/ seen	Sources of Health Messages					N	Heard/ seen	Sources of Health Messages					N
		E-media	Print	Health Personnel	Friends/ Relatives	Others			E-media	Print	Health Personnel	Friends/ Relatives	Others	
Caste														
SC	64.4	46.6	4.5	53.2	73.9	4.8	2728	62.5	53.8	11.3	53.6	58.6	6.6	73586
ST	35.5	36.3	3.8	64.2	72.6	6.1	4493	41.6	38.0	7.4	63.9	61.7	7.8	67502
OBC	71.0	52.8	6.8	55.7	74.0	5.0	6781	65.2	59.9	20.8	54.3	56.1	6.1	160782
Other	84.5	70.8	17.1	58.2	67.8	5.8	2548	77.0	66.6	22.8	57.5	52.0	6.4	92003
Religion														
Hindu	61.3	51.7	7.6	56.7	72.6	5.3	15693	64.8	57.2	15.4	56.8	58.1	6.3	299608
Muslim	82.0	68.9	12.7	61.5	70.8	5.2	778	57.7	62.3	30.9	52.4	48.9	6.0	60320
Christian	53.3	68.8	12.5	75.0	93.8	6.3	30	46.9	73.5	59.8	43.7	25.1	7.5	21276
Other	80.5	83.3	31.8	71.2	59.1	4.5	82	70.1	56.5	17.5	67.1	46.2	11.0	20114

Level and Determinants of Self-reported Obstetric Morbidity in India

Mayank Prakash

Introduction

With the decrease in the risk of death due to complications of pregnancy and delivery - commonly known as maternal mortality - obstetric mortality has been suggested as an alternative indicator of maternal health. (Brace et al., 2004; Danel et al., 2003; Waterstone et al., 2001). Obstetric morbidity has far reaching consequences for physical, social and psychological and other dimensions of health of women. Although, obstetric morbidity and maternal death measure similar medical problems, the incidence of obstetric morbidity is much higher than that of maternal mortality (Wen et al., 2005). WHO defines obstetric morbidity as morbidity in a pregnant woman resulting from any cause related to or aggravate by the pregnancy or its management but not from accidental or incidental causes. The lifetime risk of maternal death is commonly used to measure the obstetric risk in women (Chaurasia, 2006). Similarly, severe morbidity, or near-miss maternal mortality, has been proposed as a supplementary indicator for monitoring and improving the quality of maternity care (Allen et al., 2010). However, knowledge about the magnitude of obstetric morbidity is still very limited in most of the developing countries. A study in rural Alwar district of Rajasthan, India has estimated that there are 16.5 obstetric morbidity for every maternal death (Datta et al., 1980). Results of more recent studies suggest that this figure may be far too low and there may as many as 100 obstetric morbidity for every maternal death. This means that more than 61.8 million women suffer from significant ill health annually as a result of pregnancy and delivery (Koblinsky et al., 1993).

The five major causes of maternal deaths are haemorrhage, eclampsia, unsafe abortion, sepsis, and obstructed labour. These causes culminate into death whose certainty is often accompanied and aggravated by various socioeconomic and religious factors that sometimes restrain proper treatment seeking (Chaurasia, 2006). There are social and medical causes associated with pregnancy complications such as delay in decisions to seek care as well as delay in accessing and receiving care. Other social causes such as inequality in providing proper nutrition, education and medical treatment may affect women's health. Malnutrition, infection, early and repeated child bearing and high fertility also play an important role in poor maternal health condition in India. Lack of access to health care along with the poor quality of the delivery system and its responsiveness to women's needs make them more vulnerable to maternal morbidity which is an outcome of not just biological factors but of women's poverty, powerlessness and lack of control over the resources as well (Sontakke et al., 2009).

Obstetric morbidity has far reaching implications in terms of negative effect on women's health and well being. Women have to undergo the trauma of pain and discomfort (Turan, 2007). Nevertheless women's perception regarding obstetric morbidity, feeling of low self-esteem, embarrassment, and guilt are some social barriers to reporting and utilizing services for obstetric morbidity (Narayan, 2000).

The growing concern for understanding factors that contribute to maternal death have stimulated an interest in investigating the levels and causes of maternal morbidity. The present study is an attempt in this direction. It analyses the level of self reported obstetric morbidity among the Indian women, investigates factors associated with obstetric complications and examines the treatment seeking behaviour.

Data and Methodology

Data for the present study data has been drawn from District Level Household and Facility Survey 2007-08 (DLHS-3) which covered more than 6 lacs of ever married women aged 15-49 years across the country. The present study is confined to only 216013 women who had delivered a child during five years prior to the survey. Self reported information regarding pregnancy, delivery and post delivery complications were collected from these women. The dependent variables for the study included complications during pregnancy, delivery and within six weeks after delivery and treatment of complications. On the other hand, independent variables included age of mother at the time of the birth, parity, place of residence, social class, religion, education of the mother wealth quintiles index and regions. The 34 states and Union Territories of the country were divided into six regions for the purpose of analysis (IIPS, 2010).

Bi-variate and multivariate analysis techniques have been used to find out the association between the dependent and independent variables. Logistic regression analysis has been carried out to calculate odds ratios to interpret the effect of the explanatory variables on dependent variables.

Results

Details regarding the background characteristics of the surveyed women are given in table 1. Prevalence of obstetric morbidity by different background characteristics of the respondents is given in table 2 while treatment seeking behaviour in relation to different types of obstetric morbidity is presented in table 3. Variation in the self reported obstetric morbidity is very much evident from these tables. One reason for this variation is that all morbidity is self reported and therefore is subject to perception bias of respondents belonging to different socio-economic groups.

Table 4 shows results of the binary logistic regression analysis for self reported obstetric complications. The table gives odds ratio of reporting obstetric complication against the reference category. Compared to women aged below 25 years, women aged 25-25 years and 35 years and above are less likely to report delivery and post delivery complications but the difference is not significant in case of pregnancy complications. On the other hand, compared to women with parity 1, women with 2 and higher parity are less likely to report pregnancy and delivery complications but more likely to report post delivery complications. Muslim women are more likely to report obstetric complications compared to Hindu women but women of other religions are less likely to report these complications. Women belonging to other backward classes and other classes are more likely to report obstetric complications than Scheduled Castes/Tribes women. Compared to illiterate women, educated women are more likely to report obstetric complications but women with at least higher secondary education are less likely to report post delivery complications. In case of wealth quintiles, the pattern is mixed. On the other hand, compared to women from the northern region of the country, women belonging to central and eastern region are more likely to report obstetric complications whereas women from other regions are less likely to report obstetric complications.

Table 5 shows the results of binary logistic regression analysis for treatment seeking behaviour related to pregnancy and post delivery complications. Compared to younger women, older women are more likely to seek treatment for pregnancy complications but compared to women of parity 1, women of higher parity are less likely to seek treatment for both pregnancy and post delivery complications. Similarly, compared to rural women, urban women are more likely to seek treatment. The same is true to women belonging to

other backward classes and other classes compared to Scheduled Castes/Tribes women. It is also clear that with the increase in education of the mother and wealth quintiles, the probability of seeking treatment increases in case of both pregnancy as well as post delivery complications. On the other hand, women from central, east and north-east regions of the country have a higher probability of seeking treatment for pregnancy complications compared to women of the north region whereas women of west and south regions have a higher probability. In case of post delivery complications, only women of the north-east region have a lower probability of seeking treatment compared to women of north region.

Summary and Conclusion

Main conclusions of the present analysis of self reported obstetric complications and their treatment in Indian women may be summarised as under:

- Nearly 60 per cent of the women have reported complications during pregnancy and during delivery. However only about 36 per cent reported post-delivery complications.
- Reporting of obstetric complications varies widely with the background characteristics of the respondents. This variation may be due to both actual incidence of obstetric morbidity and perception about obstetric complications.
- Only around half of the women reporting pregnancy and post delivery complications seek treatment. Treatment seeking as well as place of treatment varies with demographic, social and economic characteristics of the respondents.
- There is a clear preference for non-government institutions to seek treatment for obstetric complications. This may be due to poor quality of services available through government hospitals.
- Regional variations in the place of treatment are important. In the north-eastern region, there is a clear preference for government hospitals. In other regions, non-government hospitals are preferred more.

The present study is an endeavour to examine the level and determinants of self reported obstetric complications and subsequent treatment seeking behaviour of women. Results from univariate analysis indicate the high prevalence of obstetric morbidity among women. High prevalence of obstetric complications is consistent with findings of other studies. Bang et al (1989) showed in their study that 92 per cent of participants suffered from obstetric morbidity where as Thapa and Basnet (1998) discerned that an "overwhelming majority" of women in their study suffered from obstetric problems. The adjusted results from multivariate analysis show a positive association of obstetric complications with place of residence, education, and wealth quintiles. It reveals that

urban, educated and rich women are more likely to experience obstetric morbidity. Similar findings are observed in a study in Orissa (Sahu, 2004). Similarly, a study in Mumbai slums showed that women having high income were more likely to report their problems as compared to their counterparts (Garg et al., 2001). One of the plausible explanations for these findings could be that educated women are more aware about their health conditions and hence there is more reporting by them. Similarly women belonging to upper wealth quintiles group are expected to be more cautious about their health and so a condition which is morbid for them may not be a morbid condition for women belonging to lower wealth quintiles group. In a similar fashion there is more awareness about health conditions among urban women and so there is more reporting of morbidities. These findings can also be understood in views of Sen (2001) who has emphasised that socially disadvantaged individuals will fail to perceive and report illness because individual's assessment of own health is directly related to their social experiences.

Findings of the study also reveal the cultural context of obstetric complications in terms of caste and religious differentials. It shows that women from higher caste groups are more prompt in reporting obstetric complications as compared to women belonging to ST/SC. Again it could be attributed to women's perception about their own health and its subsequent reporting. As ST/SC are the most disadvantageous community, they are mostly uneducated and may not be aware about obstetric complications. They may also fail to report these complications because they consider them as normal unless their problems get aggravated (Bhatia et al., 1997). Moreover, religious difference in the prevalence of obstetric morbidity is also apparent from the study and Muslim women are more vulnerable to obstetric complications against their counterparts. Results from multivariate analysis clearly bring out regional variation in prevalence of obstetric complications and women belonging to central and eastern parts are more vulnerable to all these three types of complications. This finding is not unexpected as majority of states belonging to these regions have been given the status of Empowered Action Group (EAG) states except West Bengal and have registered poor performances on other socio-economic and demographic indicators and need special emphasis.

Despite the high prevalence of obstetric complications, treatments seeking for these complications is relatively low and little more than half of women underwent their treatment. More importantly except north-eastern region, government hospitals are not the most preferred place for treatment seeking. Only 42 per cent women went to government facility for treatment of pregnancy complications and even lower than that, only 32 per cent, went to theses centres for post delivery complications. These findings

have two implications. First, they highlight the issue of negligence on the part of women regarding their health. Second, they show apathy of women towards utilization of government services. Women's reluctance towards availing government services can be attributed to the quality of services being delivered to them. Adjusted results from multivariate analysis show that factors like mother's age, caste, religion, education, and wealth index have positive association with treatment seeking in both pregnancy and post delivery complications; whereas treatment seeking is negatively associated with the parity of mother. This negative association may be because women of higher parity are more experienced and they often refrain treatment of these complications unless they perceive it to be major one.

Thus, the study clearly brings out the level and determinants of obstetric complications. It also draws attention towards widespread imbalance in treatment seeking of these obstetric complication and skewed treatment seeking at private centres. From the study, it can be concluded that present situation demands effective Information, Education and Communication (IEC) campaigns, educating and making women more aware regarding obstetric problems and improving the quality of government services. Educating women will also help in reporting the problem accurately, which will help in quantifying the magnitude of problem. This will help the government in priority setting for the health policy intervention.

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Table 1
Respondents by the background characteristics, DLHS 2007-08

Background Characteristics	Percentage	Number (N)
Mother's age at Birth		
Below 25 years	51.8	112358
25-35 years	42.3	90316
35 and above	6.0	13339
Parity		
1	28.9	60747
2	28.4	59915
3	17.6	38339
4+	25.1	56996
Place of residence		
Rural	72.0	175555
Urban	28.0	40458
Caste		
ST/SC	36.1	79426
OBC	40.8	85937
Others	23.1	46564
Religion		
Hindu	74.6	162602
Muslim	15.0	30950
Others	10.4	22461
Respondent's education		
No education	42.0	97014
Primary	14.7	32358
High school	30.3	62842
High school and above	13.0	23799
Wealth Quintile		
Poorest	18.3	44625
Second	19.2	45611
Middle	19.5	43963
Fourth	21.0	43301
Richest	22.0	38470
Region		
North	19.3	39650
Central	26.9	59834
East	19.8	46901
North-East	11.5	25840
West	9.8	19285
South	12.8	24503
Total	100.0	216013

Note: N refers to unweighted number

Table 2
Obstetric complications by background characteristics, DLHS 2007-08

Background Characteristics	Complication during pregnancy	Complication during delivery	Post delivery complication
Age at Birth			
Below 25 years	59.0	62.2	36.7
25-35 years	58.8	59.7	36.1
35 and above	58.7	59.9	39.9
Parity			
1	60.6	62.7	33.3
2	56.1	58.6	33.3
3	57.4	60.0	37.8
4+	60.5	62.5	43.6
Place of residence			
Rural	58.8	62.2	39.2
Urban	58.4	57.9	30.1
Caste			
ST/SC	55.0	58.8	35.2
OBC	60.9	62.3	38.1
Others	60.3	62.8	35.9
Religion			
Hindu	58.7	62.5	36.4
Muslim	66.2	63.1	45.1
Others	47.8	47.1	26.6
Respondent's education			
No education	58.9	63.8	41.8
Primary	59.3	61.0	38.3
High school	58.2	59.0	33.2
High school and above	58.7	56.6	26.2
Wealth Quintile			
Poorest	60.3	65.3	44.5
Second	60.1	64.7	42.8
Middle	57.0	60.1	37.9
Fourth	58.4	59.2	33.3
Richest	57.9	56.8	26.8
Region			
North	57.0	62.2	30.7
Central	61.3	64.2	43.0
East	70.5	78.8	48.7
North-East	48.5	49.5	30.2
West	54.3	56.1	32.2
South	50.0	38.8	22.9
Total	58.7	61.0	36.7

Table 3

Treatment for obstetric complications by background characteristics, DLHS 2007-08

Background characteristics	Pregnancy complications			Post delivery complications		
	Government	Others**	Total*	Government	Others**	Total*
Mother's age at birth						
Below 25 years	41.0	61.3	56.9	32.3	69.0	58.1
25-35 years	41.4	60.9	54.9	32.2	69.2	57.6
35 and above	40.0	61.6	44.6	27.8	73.4	52.7
Parity						
1	39.6	62.4	63.4	34.5	66.8	60.7
2	42.0	60.1	59.3	35.2	66.4	59.3
3	43.6	58.9	52.5	32.8	68.6	56.5
4+	40.0	62.3	43.6	26.0	75.3	53.9
Place of residence						
Rural	42.8	59.3	50.8	32.0	69.3	54.9
Urban	37.8	64.8	67.1	31.9	69.4	66.3
Caste						
ST/SC	53.9	48.4	49.0	41.8	59.7	51.0
OBC	35.9	66.5	55.5	25.9	75.3	59.9
Others	35.2	66.9	63.9	30.4	71.0	63.2
Religion						
Hindu	40.5	61.8	54.6	31.7	69.7	57.4
Muslim	38.0	64.5	58.1	28.2	73.2	61.8
Others	53.6	48.3	56.0	47.4	54.0	48.4
Respondent's education						
No education	42.2	59.8	41.7	27.6	73.6	51.9
Primary	47.2	55.3	54.2	35.4	66.1	56.3
High School	44.0	58.3	66.3	37.9	63.6	63.2
HS and above	28.5	73.6	75.5	28.4	73.1	72.1
Wealth Quintiles						
Poorest	44.7	56.9	37.7	29.2	71.8	48.5
Second	44.6	57.4	44.5	30.5	71.0	52.6
Middle	46.9	55.5	54.5	36.0	65.5	57.5
Fourth	44.7	58.0	63.6	35.9	65.7	62.6
Richest	30.9	71.4	73.3	28.0	73.3	70.8

Background characteristics	Pregnancy complications			Post delivery complications		
	Government	Others**	Total*	Government	Others**	Total*
Region						
North	53.7	48.9	57.6	47.1	54.5	56.7
Central	32.9	69.1	48.9	22.4	78.9	58.0
East	29.2	72.2	46.0	20.9	79.9	53.2
North-East	70.0	32.6	49.8	65.3	36.4	43.3
West	35.9	66.9	72.3	32.6	68.8	68.8
South	42.1	61.1	78.9	40.7	61.6	76.6
Total	41.2	61.2	55.3	32.0	69.4	57.5

Note: Total of government and other treatment facility is more than 100 since it is a multiple response question

*Total shows the percentage of women who sought treatment

**Others include private.

Table 4
Odds ratios assessing the association between background characteristics and obstetric complication

Background Characteristics	Pregnancy complication	Delivery complication	Post-delivery complication
	Odds Ratio	Odds Ratio	Odds Ratio
Mother's age at Birth			
Below 25 years®			
25-35 years	0.995	0.952***	0.890***
35 and above	0.985	0.928***	0.857***
Parity			
1®			
2	0.842***	0.852***	1.017*
3	0.870***	0.829***	1.132***
4+	0.947***	0.838***	1.285***
Place of residence			
Rural®			
Urban	0.981**	0.973**	0.857***
Caste			
ST/SC®			
OBC	1.108***	1.090***	1.085***
Others	1.059***	1.076***	1.131***
Religion			
Hindu®			
Muslim	1.393***	1.055***	1.471***
Others	0.774***	0.635***	0.790***
Respondent's education			
No education®			
Primary	1.155***	1.035***	1.037***
High School	1.198***	1.088***	1.037***
HS and above	1.275***	1.058***	0.953**
Wealth Quintile			
Poorest®			
Second	1.031***	1.084***	0.991
Middle	0.999	1.054***	0.931***
Fourth	1.050***	1.040***	0.822***
Richest	0.999	0.951***	0.681***

Background Characteristics	Pregnancy complication	Delivery complication	Post-delivery complication
	Odds Ratio	Odds Ratio	Odds Ratio
Region			
North®			
Central	1.198***	1.040***	1.475***
East	1.846***	2.222***	1.797***
North-East	0.777***	0.685***	0.960*
West	0.887***	0.741***	1.051***
South	0.705***	0.355***	0.673***

***1% level of significance, **5% level of significance, *10% level of significance

Table5

Odds ratios assessing the association between various background characteristics and treatment seeking behaviour

Background Characteristics	Treatment seeking for	
	Pregnancy complication	Post delivery complication
	Odds Ratio	Odds Ratio
Mother's age at Birth		
Below 25 years®		
25-35 years	1.090***	1.045**
35 and above	1.038*	1.002
Parity		
1®		
2	0.860***	0.944***
3	0.811***	0.954**
4+	0.729***	0.973
Place of residence		
Rural®		
Urban	1.086***	1.063***
Caste		
ST/SC®		
OBC	1.055***	1.172***
Others	1.183***	1.220***
Religion		
Hindu®		
Muslim	1.186***	1.196***
Others	1.049***	0.879***
Respondent's education		
No education®		
Primary	1.358***	1.119***
High School	1.688***	1.298***
HS and above	1.957***	1.578***
Wealth Quintile		
Poorest®		
Second	1.153***	1.104***
Middle	1.423***	1.244***
Fourth	1.708***	1.389***
Richest	2.081***	1.732***

Background Characteristics	Treatment seeking for	
	Pregnancy complication	Post delivery complication
	Odds Ratio	Odds Ratio
Region		
North®		
Central	0.989	1.287***
East	0.964***	1.146***
North-East	0.848***	0.688***
West	2.036***	1.829***
South	2.579***	2.518***

Note: p***<1% level of significance, p**<5% level of significance, p*<10% level of significance

Lifestyle diseases
A comparative study of Rural and Urban Women

Kshipra Jain

Introduction

The decline in mortality during the twentieth century has resulted in a change in the

almost double in the next 25 years. Most of this increase will occur in the developing countries (Gupta et al., 2004).

Development transition in India is currently affecting the lifestyle, socio-economic status and dietary habits of the people which has an impact on their health. Several reports in the last two decades have indicated escalation in the incidence of lifestyle disease in India. The World health Organization (WHO) has identified India as one of the nations that are going to have most of the lifestyle disorders in the near future. A recent study suggests that the incidence of hypertension, obesity and heart disease is increasing at an alarming rate, especially in the young, urban population (Rudra, 2008). It is estimated that, the probability of an Indian suffering from a lifestyle disease is four per cent greater than people from other nationalities (Rudra, 2008).

The prevalence of lifestyle diseases affects not only an individual but also the entire economy. WHO estimates that mortality from diabetes, heart disease and stroke costed about $210 billion in India in the year 2005 which is expected to increase to about $ 333.6 billion over the next 10 years. This means that these diseases will take away country's gross national income to a huge extent by 2015.

The present study has been carried out in the above context. It examines pattern of lifestyle diseases among women in India. Woven in the patriarchal structure of society women in India remain the most vulnerable to all forms of health hazards. Although, attention has been paid to other health hazards of women, there is little information about lifestyle diseases. It is generally believed that lifestyle diseases affect only the urban population but one may expect increasing prevalence of lifestyle diseases in the rural areas also. The paper also seeks to analyse differentials in the prevalence of these diseases in rural and urban settings across various socioeconomic groups.

Methods and Materials

The analysis is based on the data available through the India Human Development Survey 2005 (IHDS). IHDS is the collaborative project of the University of Maryland and National Council of Applied Economic Research, New Delhi. It is based on a nationally representative sample of 41,554 households with the exception of Andaman and Nicobar Islands and Lakshadweep.

The present study is limited to ever married women in the age group 15-49 years. The total sample size is 91591, 61150 rural and 30441 urban. Bivariate and multivariate analysis techniques have been used to analyse differentials in the prevalence of high blood pressure, heart diseases, diabetes and asthma among ever married women residing in urban and rural areas across socioeconomic groups.

Results

Background characteristics of the women surveyed are presented in table 1. The prevalence of four lifestyle diseases - high blood pressure, heart disease, diabetes and asthma - is presented in table 2 by the background characteristics of women surveyed. The prevalence of high blood pressure has been found to higher than other diseases in both urban and rural areas. Moreover, the urban-rural gap is also wider in case of high blood pressure than in other diseases. In the urban areas, the prevalence of high blood pressure is followed by the prevalence of diabetes, heart diseases and asthma. However in the rural areas, the prevalence of high blood pressure is followed by the prevalence of asthma, heart disease and diabetes. The prevalence of high blood pressure, heart diseases and diabetes is higher in urban than in rural areas but the prevalence of asthma is higher in the rural areas. Table 2 suggests that although prevalence of lifestyle diseases is in general higher in urban than in rural areas yet rural women have their own lifestyle specific problems, the most important of which is asthma.

It is also clear from table 2 that the prevalence of lifestyle diseases varies widely by demographic, social and economic characteristics of women in both rural and urban areas. In some cases, the influence of the background characteristics of the woman has direct relevance to the prevalence of the lifestyle diseases. In other cases, the influence is not so straightforward. For example, the prevalence of high blood pressure increases with age, education and religion of the woman but the relationship is not so straightforward in case of heart diseases as well as diabetes and asthma.

Results of the logistic regression analysis are given in table 3. Compared to women aged 15-24 years, women aged 45 years and above are more likely to have all the four lifestyle diseases. Similarly, compared to illiterate women, educated women are more likely to have high blood pressure and diabetes but the relationship is not so straightforward in case of heart diseases and asthma. On the other hand, compared to Hindu women, Muslim women are more likely to have high blood pressure and heart diseases but are less likely to have asthma whereas women of other religions are more likely to have high blood pressure and diabetes. In case of caste, the difference does not appear to be significant in most of the cases. The same is true for wealth quintiles. Finally, compared to rural women, urban women are more likely to have high blood pressure and diabetes but less likely to have asthma.

Discussion

The present analysis clearly shows that lifestyle diseases are becoming serious public health challenge as far as health of women is concerned. In order to address this

challenge, there is a need to increase health awareness among women. Good health and nutritional status is very much in the hands of the individual and largely depends on their lifestyle. Timely intervention in those stages of development in which environmental conditions shift and risk factors emerge, may help to prevent and control lifestyle diseases as these diseases are largely our own creation. The challenge for the health care delivery system in India is to address both the challenge of infectious and parasitic diseases as well as the challenge of degenerative diseases,

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Table 1

Distribution of ever married women by background characteristics, 2005

Background Characteristics	Rural	Urban
Age		
15-24	78.20	21.80
25-34	73.10	26.90
35-44	72.30	27.70
45+	70.50	29.50
Education		
Illiterate	85.50	14.50
Up to 5 standard	75.50	24.50
6-10 standard	61.60	38.40
10 standard and above	37.60	62.40
Religion		
Hindu	75.10	24.90
Muslim	64.30	35.70
Other	71.90	28.10
Caste		
Brahmin	62.10	37.90
OBC	74.70	25.30
SC	79.00	21.00
ST	90.20	9.80
Other	63.60	36.40
Wealth Index		
Poor	92.20	7.80
Poorer	86.60	13.40
Middle	75.60	24.40
Rich	66.70	33.30
Richest	51.30	48.70
N	61150	30441

Source: Author's calculation based on IHDS data, 2005-06

Table 2

Distribution of ever married women suffering from Lifestyle diseases by place of residence and background characteristics, 2005

Background Characteristics	Lifestyle Diseases							
	High Blood Pressure		Heart Diseases		Diabetes		Asthma	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Age								
15-24	17.30	34.30	8.70	11.20	6.60	13.60	12.40	6.10
25-34	20.70	34.30	7.10	8.50	8.00	18.10	13.30	6.30
35-44	20.00	37.70	8.20	10.80	7.70	14.50	16.80	6.80
45+	20.50	40.20	14.20	13.20	9.10	22.10	12.60	4.50
Education								
Illiterate	14.50	26.30	8.10	8.50	3.80	9.50	13.20	6.80
Up to 5 standard	19.40	35.70	10.10	9.70	7.40	12.90	22.60	8.00
6-10 standard	27.80	38.70	9.00	11.50	12.70	17.70	12.50	5.40
10 standard & above	37.00	43.10	7.70	11.10	23.80	24.10	7.50	5.50
Religion								
Hindu	17.60	35.70	7.70	10.00	7.10	16.80	15.30	6.50
Muslim	29.50	36.70	16.70	11.30	6.70	13.80	4.60	4.90
Other	37.20	44.40	8.60	13.20	19.40	23.00	13.80	5.90
Caste								
Brahmin	24.30	35.30	22.40	15.90	9.00	16.80	16.10	5.30
OBC	19.10	34.60	6.40	9.10	7.60	16.70	16.50	6.60
SC	15.80	30.10	8.50	9.80	5.40	15.10	14.40	6.50
ST	7.10	24.50	3.10	4.40	2.20	15.20	5.10	0.00
Other	26.50	41.60	11.20	10.90	11.40	17.30	11.60	6.00
Wealth Index								
Poor	13.40	32.50	7.00	14.50	6.10	9.70	12.30	6.50
Poorer	17.50	23.50	7.30	6.50	3.20	9.40	9.60	3.00
Middle	23.30	31.80	9.40	11.40	8.30	9.50	15.80	8.70
Rich	19.70	36.30	10.00	9.50	7.30	18.10	21.00	6.00
Richest	29.00	41.10	9.80	10.60	16.20	21.10	12.60	5.90
All	19.90	36.30	8.60	10.40	7.80	16.80	14.30	6.20

Source: Author's calculation based on IHDS data, 2005-06

Table 3

Odds ratio of selected Lifestyle diseases with background characteristics

	Lifestyle Diseases			
Background Characteristics	High Blood Pressure	Heart Diseases	Diabetes	Asthma
Age				
15-24				
25-34	1.12	1.056	1.415**	1.09
35-44	1.355***	1.109	1.433**	0.911
45+	1.591***	1.532**	2.089***	0.788
Education				
Illiterate				
Up to 5th standard	1.596***	1.234	1.63***	1.104
6-10 th standard	2.141***	1.262*	2.628***	0.904
10 th standard and above	2.744***	1.244	3.62***	0.654**
Religion				
Hindu				
Muslim	1.591***	1.821***	0.991	0.406***
Other	2.021***	1.104	1.777***	1.051
Caste				
Brahmin				
OBC	1.09	0.514	1.297	1.065
SC	0.995	0.683*	1.046	0.941
ST	0.603*	0.265	0.499	0.422**
Other	1.13	0.646	1.212	1.022
Wealth Index				
Poor				
Poorer	0.904	0.824	0.667	0.899
Middle	1.197	1.171	1.258	1.261
Rich	1.228	1.03	1.69***	1.135
Richest	1.462***	1.016	1.871***	1.248
Residence				
Rural				
Urban	1.523***	1.117	1.296**	0.518***

Source: Author's calculation based on IHDS data, 2005-06

***significant at 99% level of significance

**significant at 95% level of significance

*significant at 90% level of significance

Love Matters
Youth of Mumbai Metropolitan
Juggling between True Love and Time Pass

Nidhi Sharma

Context

Romantic and sexual relationships are central to the lives of adolescents and youths. Further, the development and negotiation of romantic relationships is considered an important and normative developmental task of growing up with the emergence of, and experimentation with, sexual behaviours which are integrated into romantic relationships with age. Sex is part of a healthy life, and developing interest in sex is natural as younger teens undergo hormonal and other physical changes while older teens begin to behave like young adults. Although, there is no clear age at which sexual activity becomes appropriate, yet, for some youths, experience of intercourse happens too soon and often with little knowledge about the risk involved.

The Indian Scenario

Premarital partnerships among youths, including those not involving sexual intercourse, are widely discouraged in India. However, despite strict sanctions including parental violence, loss of reputation and swiftly arranged marriages to someone other than the romantic partner, up to 10 per cent of young women and 15–30 per cent of young men form such partnerships. Little is however known about the nature of these relationships whether they are romantic or casual. Recent studies of sexuality in India suggest that pre-marital sex is not as rare as is generally believed and young people often lack adequate information in order to protect themselves from complications associated with unsafe sex including sexually transmitted infections. But youths are not a homogenous group and their attitude, experience and vulnerability to sex differ.

According to social cognitive theory, people learn new behaviours by observing others and imitate behaviours they have observed insofar as those behaviours are perceived to have functional value. Sexuality in the Indian society is seen as a cultural construct which differs with age, social class and gender, division of labour, freedom of social life and kinship arrangements. Further, in low income communities in metropolitan cities, there is a mix of traditional and modern values, norms and practices regarding sexuality and sexual behaviour, especially among youths. The low income communities in metropolitan areas are also known for overcrowded living conditions resulting in relaxation of restrictive social norms and sexual segregation. The metropolitan context also exposes some young people to liberal sex culture, offers varied avenues for sexual experiences through its vast sex industry and provides anonymity that greatly enhances the opportunity for sexual liaisons. In addition, opportunity structures of low income slums in metropolitan cities, where youth have easy access to erotic literature, influences their articulation of sexuality and enhanced indulgence with different type of sexual partners in continuously expanding sexual networks. With modernisation and influenced by mass media, the socio-cultural milieu has changed significantly and adolescents and youths are now often tempted to have sex even before marriage.

Objectives

The present study aims to study the romantic and sexual relationships among youths living in urban slums in the city of Mumbai. The study also aims to explore the attitude towards romantic and emotional relationships, sex and sexuality conduct and changing norms shaping these behaviours among unmarried youths living in low-income metropolitan area.

Data and Methods

Findings are based on triangulation of data from 54 in depth interviews and a survey of 1239 young men aged 18-29 years selected from three low income slum communities selected through randomized clustered sampling technique under the project entitled "Alcohol use and risky sexual behaviour among migrants in low income slum areas of Mumbai, India." The reference period of the study was September 2005 through August 2009. The study collected comprehensive information on different dimensions of youth behaviour including their perception about sex and sexuality, intimate relationships and premarital sex, masculinity, alcohol use and linkages with different types of risk taking by triangulating ethnographic, qualitative and quantitative data. Further, an attempt was also made to capture various dimensions of relational satisfaction.

Results

Brief profile of the sexual and emotional relationships of the respondents. Forty per cent men reported to ever had sex with a girlfriend. This highlights the high prevalence of premarital sex. However, only 22 per cent men reported to have girlfriend currently. Interestingly, 80 per cent of these relationships were reported to have resulted in sex. Further, 10 per cent of these men reported sex with more than one girlfriends in the last one year. The analysis of the type of relationship reveals that there is further typology in this relationship which also decides the emotional and sexual intentions of the relation. Out of all those men who reported sex with the girlfriend in the last one year, one fourth had relationship with relatives or neighbours or with a co-worker. Such relationship had no emotional thread attached to it. They were largely for sexual benefits. One of the respondent reported, "I did penetrative sex first time at the age of 17 with a girl who was working in my factory and that was my first sexual experience."

Partnerships and sexual relations. Three out of four romantic relationships are found to have resulted into sexual intercourse. The emotional quotient in these relationships was not the basis for sex. One of the respondents who reported to have sex with his girl friend in second meeting quoted "She was looking very sexy but she was dark complexion. I thought that sex doesn't see the colour". Another respondent said, "My first penetrative sexual experience happened at the age of 18 years and it happened with a girl who was staying adjacent to my house... I asked her for friendship but my friends always said what is just friendship, do sex with her and one day in the village field I did, first time with her... now she is married and stays in other city...".

Another important finding that substantiates the wide prevalence of casual sex is that 22 per cent of the respondents reported that the "girlfriend" was married and living with her husband. But in these respondents, the sex with the women was steady without any intention of future commitment, based more or less on the recent phenomenon of "friends with benefits". For example, a 21 years old youth stated "There is a married woman in my neighbourhood. She always used to stare me..... one day when I saw that she was alone, I went to her house and started talking to her for the first time. I immediately held her and said that I love you very much and I kissed her. She also told me that she also love me very much and said that she wanted to have sex with me as her husband does not satisfy her and fulfill her sexual needs." Another respondent reported, "I had sex with my second girlfriend and not with the first. Although, I intended to have sexual intercourse with my first girl friend and she also wanted to have the sexual pleasure as was evident during our interactions up to touching and kissing but we did not get the opportunity. One day my second girlfriend informed me that her parents had gone out

for the whole day and were likely to return only late in the evening. Though I did not have any intension to have sex with her when I met her and was not at all prepared for sex but after listening that her parents were not in the house, I got prepared and we had sexual intercourse in her house."

Perceived relational satisfaction. In order to capture various dimensions of relational satisfaction, a number of psychological scales were used where information on different components of these scales were collected on a five point scale as part of quantitative survey by mixing direction of those statements as a strategy to minimize stereotypes. Subsequently, these items were converted into scales after changing direction of various statements and after testing their reliability based on intra-class correlation coefficients. A brief description of these variable and scales is presented below. All these scales were computed by recoding a continuous Guttmann's scale created by merging statements concerning exposure to the variable of interest canvassed on ten point scale after testing of reliability and normalising the scale.

Condom attitudes. It is computed by recoding a continuous Guttmann's scale developed by merging a series of statements.

Self assessment as a sexual partner. Computed by recoding a continuous Guttmann's scale created by merging seven statements concerning exposure to different forms of sexual stimuli.

Communication relationship with girl friend. Computed by recoding a continuous Guttmann's scale created by merging six statements concerning communication relationship with girl friend.

Relationship satisfaction with girl friend. Computed by recoding a continuous Guttmann's scale created by merging seven statements concerning relationship with girl friend

Table 1 shows the effect of perceived relational satisfaction from the girlfriend as well as self assessment as a sexual partner on three core indicators of sexual association, namely condom use attitude, sexual partners in the last 12 months and coercive sex in the last 6 months. The table suggests that higher satisfaction with the girlfriend translates into better sexual behaviour in terms of multi partner, less coercive sex but at the same time it shows negative impact on condom use behaviour. Better communication with the girlfriend affects condom use and multi partner engagement positively as more open relationship results into more positive attitude for condom use whereas coercive sex moves in opposite direction. Interestingly, moderate open relationships perform best in all the three indicators. A persons self assessment as sexual partner can also have strong bearing on the way he behaves. It is also evident from the table 1 that where number of

sexual partners and coercive sex are severely affected by this self assessment. Being satisfied by self results in reduced multi partner engagement and also reduces coercive sex. This may be result of better confidence and so less need of sexual experimentation that may be responsible for pushing these men to go to partners of unknown identity and leading to multi partner engagement.

Partner progression correlates. As one moves from one partner to multi partner relationship, many risks increase. Transition from one to another partner is based on the perceived relational satisfaction along with perceived risk and the concept of fun and freedom. Those respondents who reported more than one girlfriends also displayed dissimilar risk behaviour with these partners. The partners were categorized as first, second and third based on the perception of closeness and relationship. A large proportion of encounters with first girlfriend were reported to be unprotected as 44 per cent respondents reported never using condom with the first partner whereas only 4 per cent reported every time condom use. Alcohol use was also high as 21 per cent reported to have alcohol with this partner before sex while 17 per cent reported that they usually consumed alcohol before sex with this respondent. One out of every ten men reported that they always had forced sex with this partner which indicates high level of coercion. According to one respondent as "She was studying in a college. I told her that toady she will be absent in the college....We went in a garden, I bought cold drink 'Pepsi' and mixed few tablets in it. After consuming cold drink she came closer to me and in five-ten minutes she started kissing me... I took her to a lodge in nearby area and rented room for 8 hours...she was very excited... may be because of pills...we had sex 3 times... I used condom all the time."

Similar behaviour when studied for 2nd and 3rd and 4th partners revealed that alcohol use increased to 11 to 14 per cent. Coercive sex also increased from 9 to 11 per cent in case of subsequent partners. Interestingly, the most crucial indicator for sexual health and STI/HIV prevention, condom use seemed to have decreased a little with the increase in the number of partners. This can be due to risk perception and attitude towards safe sexual behaviour. With the second girlfriend, 54 per cent men reported that they did use condom in the last sex. This proportion has been found to have further increased to 56 per cent with the third and the fourth partner. One of the respondent reporting relationship with more than one girlfriends said "He wants to enjoy life before marriage. Enjoyment means having sex and affairs with girls. There are about 8-10 girls in his area to whom he often visits and has sexual relationship with.... He said that these are faithful girls and don't have relations with other except respondent so he does not uses condom with them."

Conclusions and Recommendations

The nature of sex and romantic relations seems to be changing in the study population. The concept of true love is fast being replaced by casual sex and friends with benefits as premarital sex is on the rise. The risky behaviour among youths is also increasing dangerously. Casual sex for fun is increasing and the partner type is varied. Peer-pressure is playing a crucial role in pushing the friendship relationship to sexual relationships. As the multi partner engagement is increasing, the use of condom is decreasing. This is especially true for young men as they have more freedom and social power. Self assessment as sexual partner is found to strongly affects the behaviour and sexual liaisons. The relational satisfaction is also crucial as it has direct bearing not only on multiple partner engagement but also on coercive sex and sexual experimentation. Gone are the days when behaviour could be changed through strict societal norms and restriction in the form of cultural taboos. Youths today are changing and revolting to conservativeness of the society. The policy makers, therefore, need to focus attention on the needs and well-being of youths. The findings of the present study highlight the need for programme interventions to ensure that youths are fully informed and equipped to make safe choices and negotiate wanted outcomes, while positively influencing their peer networks. Findings also highlight the importance of peer networks, which can have a positive or negative impact on the safety and wantedness of young people's relationships.

One potential limitations of the study is that the sample may have under reported their romantic, physical and sexual experiences as such relationships are usually carried on secretly. Secondly, study is cross sectional. Therefore, inferring causation is not possible.

Table 1

Bivariate analysis showing the effect of perceived relational satisfaction indicators on the safe sexual attitude and coercive sex

	Condom use attitude		Total no. of sexual partner in last 12 months		Coercive sex with girl friend ever in last 6 months	
	More positive	Moderately positive	1-2 partners	3 or more partners	No	Yes
Relationship satisfaction with girlfriend						
Not satisfied	47.6	52.4	52.4	47.6	42.9	57.1
Satisfied	26.9	73.1	76.9	23.1	61.5	38.5
Communication relationship with girlfriend						
Less open	33.3	66.7	33.3	66.7	33.3	66.7
Moderately open	25.0	75.0	70.8	29.2	62.5	37.5
More open	50.0	50.0	65.0	35.0	45.0	55.0
Self assessment as sexual partner						
Not satisfactory	40.0	60.0	40.0	60.0	33.3	66.7
Somewhat satisfactory	33.3	66.7	59.3	40.7	50.0	50.0
Satisfactory	44.4	55.6	70.4	29.6	60.0	40.0
Total	36.2	63.8	66.0	34.0	53.2	46.8