Economic Inequality in Preventive Maternal and Child Health Care: A Study of Rural India

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Abstract: *This paper examines inequalities in terms of economic well being in the preventive care of maternal and child health (MCH) in rural India based on a wealth index constructed from available information. The study makes use of the data of District Level Household Survey (DLHS-Round II, 2002-2004) under the Reproductive and Child Health (RCH) project. Frequency distribution and bi-variate analysis depicts the scenario of MCH services of women and children belonging to different economic strata and according to their background characteristics. Multilevel analysis has been carried out to find out the individual as well as community level effect on utilizing preventive health care services. A summary measure of Gini concentration index has been used to examine the extent of economic inequality in MCH service utilization. The findings reveal that economic well-being status of the household to which women or children belong, plays a crucial role in explaining the variation in service utilization. There is concentration of women deprived to take adequate maternal care amongst the poorest wealth quintile. Inequality in utilization is found to be more pronounced for between groups compared to within the wealth quintiles. The paper notes that factors that can be easily influenced like improved access to facilities, through both supply side initiatives as well as generating social awareness regarding the importance of preventive care, and affordability of the households towards usage of these services needs to be stressed upon in national policies.*

Key Words: *Inequality; wealth index; maternal and child health; health care utilization*

1. Introduction

Equal access to health care has been viewed as one of the prime concern towards ensuring 'Health for All'. However, in many parts of the developing world, a number of inhibiting factors prevent such equality in access to and utilization of health care services. Inequality in health care is considered to have different dimensions, based on an individual's age, place of residence, economic ability, ethnicity and gender. Among these domains of inequality, poverty, manifest in absence or deficient economic power remains as one of the most powerful barriers towards utilization of health care. Evidence around the world

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suggest that, being poor is positively correlated with poorer health status and negative health outcomes, much of it responsible to poor uptake of preventive, promotive and curative aspects of health care services by these groups of people belonging to the lower economic strata. Public provisioning of health care services across the developing world had provoked questions regarding identifying the proper beneficiaries as the target of public subsidies and carefully oriented policy measures aimed at ensuring equal access and use of health services among these disadvantaged population groups.

Women and children among the poor are more vulnerable in terms of access to health care. In other words, maternal and child health care services are more likely to demonstrate sharp inequality in utilization. There is a general consensus that maternal care plays a crucial role in the improvement of women's reproductive health in developing countries (Magadi *et al.* 2000, Bhatia and Cleland 1995, Becker *et al.* 1993). Among the reproductive health parameters, antenatal care (ANC) and safe delivery has important position as these are directly related with maternal mortality, loss of fetus, loss of infant etc. Antenatal care comprises of routine health check up by a doctor, consumption of iron supplement and injection of tetanus toxoid vaccine during pregnancy. Delivery conducted by health professionals (doctor, nurse, auxiliary nurse midwife and trained Dai) ensures safety of mother as well as the child.

This paper attempts to examine the degree of inequality in utilization of preventive aspects of maternal and child health in rural India, based on a nationally representative District Level Household Survey (DLHS) under the Reproductive and Child Health (RCH) project of the Government of India conducted by the International Institute for Population Sciences, across the country during 2002-04. Focus has been given to the preventive aspects in particular, mainly because of the thrust of the recently launched National Rural Health Mission by the government, along the lines of the Millennium Development Goals is on reducing inequalities in access to and utilization of health care, as a part of curbing the incidence of maternal and infant mortality. Since much of the deaths of the mother as well as her children, during the initial years of life can be successfully prevented by proper antenatal care, safe delivery practices and proper immunization of the children against vaccine preventable diseases, presence of significant inequalities in these domains of service utilization can have far-reaching consequences, impeding the aforesaid efforts. The exercise is primarily oriented towards identifying the magnitude of economic inequality among the rural Indian population, based on a wealth index that has been constructed particularly for the present analysis, as the DLHS-RCH

data do not have any separate variable on income or household expenditure. It has also been tried to examine the possible effects of community and individual level variables on the utilization of preventive health care, in order to identify any community level characteristics on inequality, through multi-level analysis. In the later part of the paper attempt has been made to capture the extent of inequality for each of the elements of preventive maternal and child health care mentioned earlier, using conventional summary measures of inequality, like the Gini coefficient.

The paper is arranged as following: the next section provides a background to the study and brief review of the earlier studies in this area along with a snapshot of the maternal and child health scenario in India. Section 3 describes the data and the methodology adopted in the construction of the wealth index, multi-level analysis and inequality measures. In section 4, the results and answer the objectives of the study has been given. Conclusion has been drawn in section 5, identifying the possible areas of policy intervention.

2. Background

The nexus between poverty and ill-health as well as poor uptake of health services has been well documented in literature. Persistence of inequality in different dimensions of health care use has been documented between nations and within nations, between different population groups. In almost all of the studies, economic ability has been identified as one of the most significant barriers of access to and utilization of health care. In case of preventive health care, the availability of health facilities does not necessarily mean creation of demand and utilization (Obermeyer 1993, Basu 1990) suggesting the overriding importance of access to financial resources towards improving and ensuring utilization of health care services. Economic accessibility is an important factor in availing maternal and childcare. Women from affluent households are more likely to avail themselves of adequate maternal care than from poorer households do. A study in rural Cote D' Ivore in the mid- 1980s suggested households in the topmost income quintile was twice more likely to seek care as a family in the lowest quintile. Similar differences were also evidenced in immunization coverage in Peru (UNDP 1993). Poor-rich inequalities favouring the rich with respect to malnutrition were also found in South Africa (Zere & McIntyre 2003). Wagstaff (2002), in his cross-national comparison of health inequalities, found poor children in poorer countries are less likely to get immunized or ORT in case of diarrhoea in spite of increased incidence of diarrhoea among the poorer quintiles.

Another study in Nigeria found that income of the household exerts considerable influence in child survival, particularly in the early years of life and likelihood of a child getting immunized increase with the economic status of the household (Gage *et al.* 1997). In terms of health outcomes, Wagstaff (2000) identified significant inequality in child mortality in his cross-country study, and opined that unequal access to financial resources as one of the major barriers impeding access to preventive as well as curative health services.

In the Indian context, however, there is a dearth of quality studies aiming to analyze the extent and causes of economic inequality leading to inequality in access and utilization. The main reason may be attributed to the lack of information regarding household income or consumption in most of the demographic and health surveys (DHS). Visaria and Gumber (1998) had attempted to study such inequalities using the National Sample Survey Data on Morbidity and Treatment of Ailments during 1980s, for the states of Maharashtra and Gujarat. They found immunization to raise with monthly per capita consumption expenditure quintiles, with sharp differences among the bottom 30 percent and topmost 20 percent of the population. Hospitalized deliveries and registration of mothers for pre and post-natal care were also similarly related. Another study found that 24 percent of the Indians in the poorest quintile did not seek medical care when they were ill compared to only 9 percent in the richest quintile (Misra *et al.* 2003). However, the study found coverage of immunization and antenatal care is much less unequal compared to curative care, as among the poor 93 percent utilized immunization-related services, 74 percent sought antenatal care and 63 percent for delivery related inpatient stays. A recent work based on the Indian National Family Health Survey (DHS in India), found full vaccination rates to be about four times higher in the richest quintile than the poorest, and observed similar patterns for medical treatment of acute respiratory infections. Probability of child deaths was also found to be inversely related with household wealth status (Rutstein & Johnson 2004). For maternal care too, more than three antenatal visits to health facilities were about four times higher in the richer households.

The major issues that emerge from the review of earlier studies suggest that inequality in access and utilization of health services is a global phenomenon, and economic ability is an important determinant of the care-seeking behaviour, particularly for the poorer households. However there is also some evidence asserting that inequality is much less in the domains of preventive health care vis-à-vis curative care, with higher dependence of poorer households for services like maternal health care and immunization

on the publicly provided services, because most of this services, at least on principle, are generally free or charged nominally. The reproductive and child health service is a key component of the publicly provided basic health services. The National Population Policy (NPP 2000), National Health Policy (NHP 2002) and recently launched National Rural Health Mission (NRHM 2005) emphasized enhancing the utilization of health services in general and reproductive health services in particular among poorer and disadvantageous segment of the population. The question that naturally arises involves defining the poor and examining the situation of the poor relative to other groups in maternal and child health care utilization and health outcomes.

2.1 Maternal and Child Health in India

In a developing country like India beset with the problems of maternal morbidity and mortality, ill health and death among infants and children in large parts of the country, policy efforts and programmes exist since a long period of time involving various steps of the government to combat with this problem. District Level Household Survey (DLHS) under the Reproductive and Child Health (RCH) project is one of them, directed to supplement evidence of maternal and child health problems, utilization pattern and quality and competence of service provided.

The maternal and child health (MCH) programme was started in India in the early 60s. In the 1960s and 70s, maternal health services within the programme focused on antenatal care and the high-risk approach, but nevertheless the level of maternal mortality remained high in the country until mid-1980s. Maternal health care services in reducing maternal morbidity and mortality gained prominence since the safe motherhood initiative of 1987 and following the 1994 Cairo Conference (ICPD). It is believed that good antenatal care and training of traditional birth attendants to improve their delivery practices may help in reducing maternal mortality. With an aim to improve health status of women and children and to reduce maternal morbidity and mortality, Child Survival & Safe Motherhood (CSSM) programme was launched in India on 20th August 1992. The CSSM envisaged the package of the following maternal health care: early registration of pregnancy, at least 3 antenatal check ups, universal coverage with TT vaccine, universal coverage with IFA tablets, advice on adequate food, nutrition and rest, timely detection/identification and referral of obstetric/maternal complications, clean deliveries

by trained personnel, promotion of institutional deliveries especially for the women with obstetric history and risk factors, and birth spacing.

In spite of these efforts and programs, maternal and child health situation in the country has not improve remarkably. Women more specifically rural women, do not attend to their most common health problems (Hazra *et al.* 2005). The World Bank report has rightly remarked that although government programmes in India have gone a long way in reducing the number of women dying from maternity related causes, the number of pregnancy related deaths in rural areas in the country is still among the world's highest. Therefore, in the present study it is intended to focus on the rural area, for which the village level information is available in the used dataset.

3. Materials and Methods

3.1 Data

The present paper uses the dataset of District Level Household Survey (DLHS) under the Reproductive and Child Health (RCH) project (Round 2, 2002-04). The second round of the survey was carried out in two phases 2002-03 and 2004. A systematic multistage stratified sampling design was adopted for the purpose of data collection. In total, all the 593 districts of the country were surveyed. Information was collected on various indicators pertaining to RCH that would assist policymakers and programme managers to formulate and implement the goals set for RCH programmes. There were total five questionnaires: i) households questionnaire, ii) women's questionnaire, iii) husband's questionnaire iv) village questionnaire and v) health questionnaire. A total of 5,07,622 eligible women (currently married women ages 15-44 years) were interviewed out of 6,20,107 households.

In District Level Household Survey, every woman who delivered at least one child in the preceding three years of survey was asked about the type of antenatal care and delivery care. The full ANC comprises of at least one TT injection, more than 100 IFA tablets and at least three ANC visits. Safe delivery is defined as either institutional delivery or home delivery assisted by either Doctor or Nurse or Trained Birth Attendant (*Dai*). Information regarding the birth history of each child of a woman was also collected and information on immunization was collected from women's latest two birth in the last three years prior to the survey. The present analysis considers only the latest birth to minimize the possible error due to recall lapse.

3.2 Methodology

Construction of Wealth Index

It is to be noted that, as mentioned earlier, paucity of suitable economic variables in the national level surveys on health care utilization (apart from the NSS rounds) hampers meaningful analysis of health inequality in the population. Nevertheless, some methods have been suggested to study such effects from large scale survey data in the absence of data on income or expenditure (Rutstein & Johnson 2004, Filmer & Pritchett 2001). In India, the two rounds of National Family Health Surveys, includes some variables that can be incorporated in the construction of wealth index. The DLHS-RCH dataset, which is used in the present analysis, has comparatively lesser scope of analysis of economic status of households. The information available in the aforesaid dataset are on type of house, source of drinking water, type of toilet facility, type of fuel used for cooking and source of lighting. For the present study, the methodology of construction of DHS wealth index given by Rutstein & Johnson (2004) has been followed. Here it is worth mentioning that although the dataset that have been used does not include all the household assets and utility services, instead of using straightforward the conventional standard of living index (SLI), it will carry more weight if we construct an index that certainly reflects the economic well-being condition of a household. Nevertheless, the constructed wealth index should be interpreted with the caution that it does not capture the economic affluence, or the absence of it, for individual households. It can, at the best, provide an approximation of the economic well-being and financial capacity of the household. A number of techniques exist for construction of any index based on individual scores. There are various ways to assign weighting values to the indicator variables. Ad hoc weights work to a certain extent, but they are arbitrary with regard to researcher and are difficult to assign when the wealth ordering is not readily apparent (Rutstein & Johnson *op. cit.*). Filmer and Pritchett (2001) recommended using principal component analysis (PCA) to assign the indicator weights and the same procedure has been used here using the SPSS software, through the factor analysis procedure. This procedure first standardizes the indicator variables (calculating z-scores), then the factor coefficient scores (factor loadings) are calculated. Finally, for each household, the indicator values are multiplied by the loadings and summed to produce the household's index value.

In order to find out the differential pattern of utilization of maternal and child health care services among those belonging to different economic strata, wealth quintiles have been used. These quintiles are based on the distribution of the household population rather than on the distribution of households. The distribution is population based since it is thought that most analyses are concerned with poor people rather than poor households. Quintiles are used instead of other percentiles as a compromise between limiting the number of categories to be tabulated and adequately representing the relationship between wealth and the phenomenon of interest. The first quintile has been referred as the poorest quintile and the 5^{th} as the richest quintile.

Multilevel analysis

In the analysis, if there is a significant random effect, then the interpretation of the estimates is not as simple as the estimates obtained through logistic regression analysis. This is because for the random effect model, there is no longer a well defined probability of utilizing health services for an individual instead the exponents of estimates may be regarded as the odds ratio of the average probability of utilizing the same. Also simple logistic regression technique fails when the data is clustered or grouped where each group consists of n_i observations and standard error derived under the standard logistic regression model are too small. Hence, it is better to consider the random effect model, which gives consistent estimation of coefficients as well as the standard error and the excess variation between the groups (which denote the heterogeneity). Because, for women from different villages with similar characteristics, the probability of utilizing health care services differs depending on the development of the village. To analyze such kind of data, multilevel models are suggested. Multilevel (hierarchical) models were specifically designed to handle the violation of the assumption of independence among observations, and to examine the effect on individuals of variables that are shared among individuals. These models allow to distinguish "within-cluster" from "between-cluster" associations.

DLHS data clearly reflects the hierarchical structure - Villages, Households, and Individuals. In this study, multilevel techniques for dichotomous responses are used to analyze structured data. This technique splits variation into separate components corresponding to the levels in the hierarchy. Thus, it is possible to explore not only the individual level background characteristics but also the extent to which these differences are attributed to the context in which they live. On an average, one woman was

interviewed per household; therefore the variations within the household are ignored in the present analysis.

Random effects analysis explains variation between villages, within village between individuals two level model has been constructed. Random effects also capture the unobserved factors (variability) that influence at the individual and community level. Multilevel statistical model used in the present study is:

$$Y_{ij} = P_{ij} + e_{ij}$$

$$\log[\, P_{ij} / (1- P_{ij}) \,] = \beta X_{ij} + \gamma Z_j + U_j + e_{ij}$$

Y_{ij} denotes the response for individual 'i' in village 'j'

P_{ij} denotes the probability of individual 'i' in village 'j' utilizing the health care services

$\log[\, P_{ij} / (1- P_{ij}) \,]$ denotes logit of the model

X_{ij} and Z_j are the vectors of individual level and community level attributes respectively.β and γ are the vectors of their respective estimated parameter coefficients. U_j and e_{ij} are the random effect, representing unobserved factors operating at the community and individual levels.

In the multilevel analysis, the individual level variables are first introduced one by one, in the form of dummy variables, as predictors (of receiving full ANC, preferring for safe delivery and full immunization) in order to control for homogeneity among women as well as children both at the household and community levels. Then systematically, the individual level and community level variables were introduced in to the model. For the analysis of the data by using multi-level techniques, MLwiN package is used and data is structured according to the requirement of the package.

Gini Concentration Index

This index measures the distribution of one variable relative to another variable. Gini concentration ratio measures the proportion of the total area under the diagonal and that lies in the area between the diagonal and the Lorenz curve. The following formula expresses the area on the graph contained between the curve and the diagonal as a proportion of the entire area below the diagonal:

$$G_i = \sum_{i=1}^{n} X_i Y_{i+1} - \sum_{i=1}^{n} X_{i+1} Y_i$$

where X_i and Y_i are the respective cumulative proportions of women in different quintiles and percentages of women utilized the service facilities.

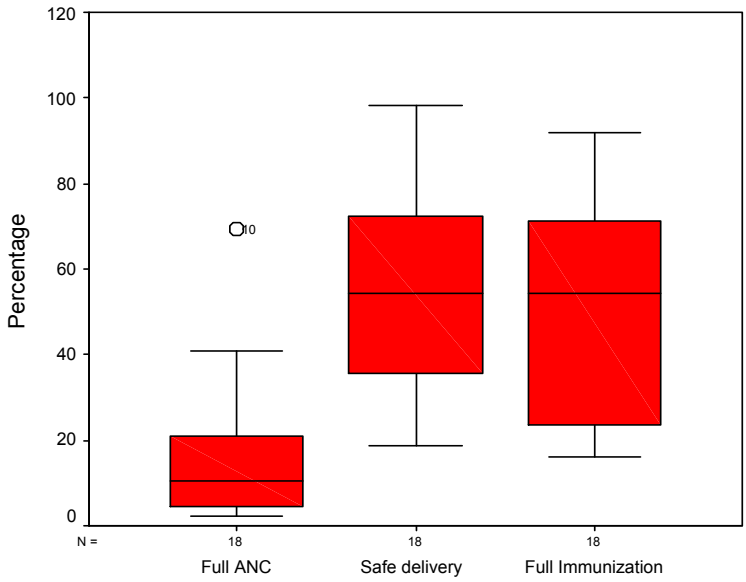
4. Results

Utilization of Maternal and Child Health Care in India

The scenario of maternal and child health care utilization in India, as emerging from our analysis of the DLHS-RCH data, along with its major states are presented in Table 1 and Table 2. The results depict a very poor utilization of maternal health care services at the national as well as at the state level. Only around 12 per cent of women have received full ANC and around 45 per cent of women have taken proper delivery care. Although there exist a wide interstate variation, in some states like Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan (which are referred as Empowered Action Group (EAG) states) very negligible proportion of women have taken full antenatal care. The most fatal consequence of improper delivery care in developing countries is high maternal mortality rate. It is unfortunate that most of the maternal deaths are due to preventable causes of infection arising form unhygienic conditions and breach presentation at the time of delivery and eclampsia (Singh and Singh 2005). A safe delivery needs to be conducted by doctor, nurse and other trained health personnel in order to save the life of both mother and child. However, the extent of delivery care is also alarming in the aforementioned states.

The vaccination of children against six serious but preventable diseases (tuberculosis, diphtheria, pertussis, poliomyelitis and measles) has been an important intervention in the Child Survival and Safe Motherhood Programme of the Government of India (Government of India 1994). DLHS asked the mother whether the child had received a vaccination against tuberculosis (BCG); diphtheria, whooping cough (pertussis), and tetanus (DPT); poliomyelitis (polio) and measles. For DPT and polio, information was also collected on the number of doses of vaccine given to the child. The results indicate that around 26 per cent of children have not received any kind of vaccination and only around 42 per cent of children have been given all the required doses of vaccination i.e., full vaccination. The south Indian states perform quite well in this respect, with around 70 percent of the children on an average completely immunized. The picture is dismal for the northern and north- eastern states where only 20 to 25 per cent of children have been fully immunized which explains to a certain extent high childhood mortality rates in these states.

Figure 1. Utilization of maternal and child health services in major States of India



Box plots have been used for a comprehensive understanding of the maternal and child health scenario in rural areas of the major Indian states. Box plot is a summary plot based on the median, quartiles, and extreme values. The box represents the interquartile range which contains the 50 per cent of values. The whiskers are lines that extend from the box to the highest and lowest values, excluding outliers. A line across the box indicates the median. Very low level of utilization of MCH services as well as wide inter-state variation in all the three health parameters is seen from Figure 1 especially for receiving full antenatal care.

Economic inequality in health care utilization

It is revealed from the findings that not only the proportion of women receiving full ANC is very low in India; it varies greatly across different wealth quintiles of women. The situation of full ANC according to different wealth quintile is given Table 4. Around five per cent of women belonging to poorest wealth quintile are receiving full antenatal care against about 30 per cent of women from the richest quintile. In states like Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, only around two per cent of women from the poorest quintile has received full antenatal care. The corresponding values for Haryana, Jharkhand and Assam are also lower than the national average.

There exists a vast rich-poor gap in delivery care also. A higher proportion of women belonging to 4th and 5th quintile reported proper delivery care compared to those belonging to lower quintiles. Around 77 per cent of women from the richest quintile have delivered their child either at any institution or in home attended by trained birth personnel, whereas only 27 per cent of women from poorest quintile have taken such proper delivery care. Similar inter-quintile variation as in case of antenatal care persists in delivery care too in all the states.

Children from the poorest quintile of the women are more likely of not being fully immunized in India as a whole, as well as in the major states. Table 5 clearly shows that around 65 per cent of children from the richest quintile of the women are fully immunized whereas the percentage of children from the poorest quintile of the women is only about 27 per cent.

Figure 2a. Utilization of maternal and child health services in major States, for all those belonging to poorest quintile

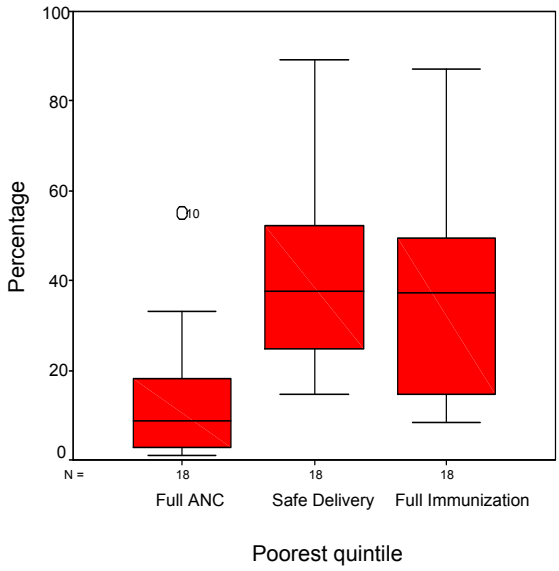
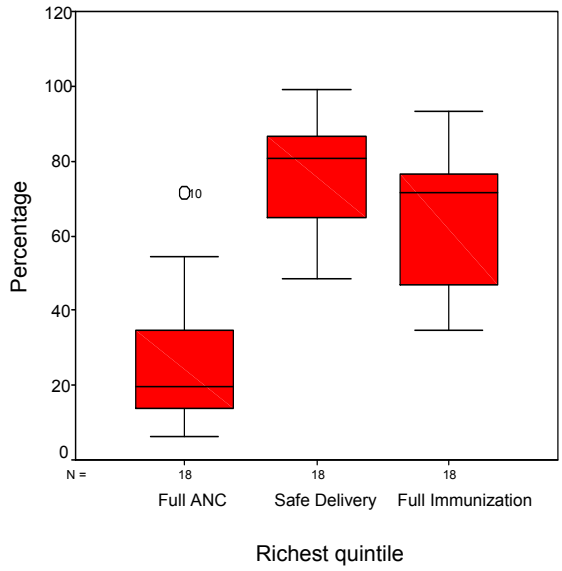


Figure 2b. Utilization of maternal and child health services in major States for all those belonging to richest quintile



The figures 2a and 2b elaborates the above findings more clearly. The maternal and child heath care is better if the women and children are belonging to economically well-off household than those belonging to poorer strata. In all the three parameters of MCH services, comparatively a higher proportion of women and children from richest quintile are availing the preventive heath care facilities, than those belonging to poorest quintile.

Bivariate Analysis

We have tried to examine the inequality in having full ANC, safe delivery and full immunization of the respondents according to select socio-economic and demographic characteristics. Besides the individual attributes, certain village-level characteristics influencing access to such services like connectivity by all weather road, distance from nearest town, government and private facility and mobile clinic facilities have been included. The results have been presented in Table 7 to Table 9.

It appears from the figures that variation in uptake of full ANC is not much among the quintiles, apart from the topmost one. The village level access factors included in our analysis, assume importance from the 4th quintile onwards, but it cannot be taken for sure that whether this access factors were primarily responsible for better use of the services, or better economic access supplemented improved access in this direction. Insights can be drawn only after multilevel multivariate exercises in the next section. In the case of safe delivery, it is a case of inequality at a considerable higher level of service usage. However, a couple of important points emerge from the analysis. Firstly, difference in usage is quite sharp as even within groups having better physical access, viz. connected by all weather roads, or having public health facility within the village for e.g., the topmost quintile (richest) has nearly three times more incidence of safe delivery compared to the lowest quintile (poorest). Secondly, for all the physical access parameters, as well as for some of the socio-cultural factors (caste, religion), the differences between the categories (or groups of classification) are less than the differences among the wealth quintiles. In other words, for women in the lowest quintile, proportion having safe delivery does not vary as much, irrespective of, say, distance from any government facility or caste membership as it is between the higher wealth quintiles for these characteristics.

Similar unequal pattern can also be observed regarding full immunization. Along the lines of the established view that education of both the parents positively influences immunization of children, it can be seen from the table that, inequality is less pronounced when both the couples are literate. Similar to our earlier observation regarding the comparative importance of physical and economic access factors, it can be seen for the case of immunization too, that variation within a quintile for each of these physical access parameters is much less pronounced compared to the differentials across the wealth quintiles, capturing economic inequality. For all the selected background variables, a general pattern of variation in full immunization levels is also noted. From very lo levels in the first quintile, the levels increase steadily till the third quintile, thereafter it gradually

tends to level off, suggesting the possibility of greater influence of economic ability towards immunization in the lower wealth quintiles.

Multilevel analysis

The results of the multilevel analysis are given in Table 10. It is evident that non-Hindus, Scheduled Caste / Scheduled Tribes and Other Backward Caste women are less likely to avail the maternal and child health services compared to their respective counterparts. The chances of utilizing such facilities increase with the increase in educational status of couple. If the last child is female, the women are less likely to take proper delivery care and also the child is less likely to be fully immunized. It is noteworthy to mention here that such sex differential in preventive care of children that typically persists in India is one of the leading causes of sex differential in childhood mortality (Singh *et al*. 2005). For the women aged more than 30 years, the likelihoods of receiving proper MCH services are significantly lesser compared to those of below 19 years of age. The economic condition of the household to which the women belongs is crucial in explaining the significant differential pattern of heath care utilization. Women from the richest quintile are around three times more likely to receive such maternal heath care services compare to women from poorest quintile.

The facilities available in the village are also having notable impact on heath care utilization even controlling for several socio-economic characteristics. Non-existence of road for connectivity to town or urban areas and longer distance from nearest town minimizes the chances of availing such services. As the distance from any Government health facilities as well as private health facilities increases, women are at lesser chance to take full antenatal care and proper delivery care. In case of immunization, distance from private health facilities does not matter at all. Of course if there are mobile clinics in the village, women as well as children are more likely to be benefited by the services rendered.

Individuals and community play an important role in their own health. The level of heterogeneity shows a distinction in the health care utilization behaviour of the Indian rural women. The random effects particularly at individual level corresponding to village level shows that there is lot of heterogeneity and unexplained variation within the communities. The community level effect (village effect) is found to be higher in case of receiving full ANC than the same for safe delivery and full immunization. This clearly

signifies that receiving full antenatal care is much affected by the community facilities. Hence the developmental status of any particular village in terms of existence of adequate health care service facilities is more important than individual behaviour which is not in the case of safe delivery and full immunization.

Lorenz curve and Gini concentration index

Lorenz curve and Gini Concentration Index have been computed as a summary measure of inequality to examine more closely the extent of economic inequality in MCH service utilization for India as a whole. The value of the Gini Index for full ANC, safe delivery and full immunization comes as 0.386, 0.255 and 0.228 respectively. Although the values are not very closer to one, these point out the presence of inequality in utilization to certain extent. There can be several reasons responsible for the low value of the Gini coefficient and these have been discussed in the next section.

5. Discussion

The broad idea of the present paper has been to capture the extent of inequality in access to and utilization of antenatal care and safe delivery for maternal care and complete immunization under child care, both largely preventive in nature in rural India. Following the thrust of programme orientation aiming uniform coverage of these preventive maternal and child health care services across the country, we were interested to examine how does economic or financial access promote or inhibit such usage.

As it can be seen from the results described in the preceding sections, absolute coverage for most of the services discussed is quite low for the country as a whole, not to speak of certain regions and pockets indicating much poorer performance in this respect. The fact that near about a quarter of the children had not received any immunization points towards the volatility of the situation and suggests of the different barriers - social, cultural, economic - negatively influencing availability, accessibility and affordability of uptake of such a crucial child health service. With such lower levels of coverage, any analysis of inequality and its consequent interpretation must consider that utilization itself, in absolute terms is low and as such, negative influences arising out of any inequality puts the disadvantaged section at further less advantageous position.

Although the data used, and the subsequent wealth index, which have been constructed for this paper does not facilitate strong conclusions on the existence of economic inequality, yet the results are suggestive enough of the clear pattern of unequal utilization of services emerging from the analysis. To be more specific, the poorer strata

of the population and that too the vulnerable segment of population are deprived of availing the maternal and child health care services. Inequality in utilization of maternal health care services is more pronounced in the case of safe delivery. One of the explanations could be that since delivery in institutions involves related expenditure, even in the absence of user charges, a majority of the women from poorer households can opt for low-cost alternatives. However, given the complex nature of decision-making regarding the nature of service to be solicited for at delivery, and cumulative barriers of physical access, social affiliations and other cultural notions that can put the women from the households in the lower quintiles at lesser chances of utilizing such care, it cannot be said *per se* that economic capacity solely governs and responsible for such unequal usage.

Another important finding from the present analysis is the fact that inequality is far more pronounced between the quintiles, compared to among the different categories of background attributes that can be thought of influencing service usage. Again, when the extent of inequality for the physical access variables is considered, low variation in this respect for women who otherwise enjoy better physical access to the facilities has been depicted. Taken together, it can be mentioned that economic access possibly plays a major role in explaining the variation in service utilization.

We have also tried to examine the possible effects of community-level characteristics vis-à-vis individual factors in explaining the observed variations. The findings suggest that community level effects were stronger than individual effects in the case of receiving full ANC than the same for safe delivery and full immunization. The result suggests that for antenatal care community level factors, mostly involving physical access parameters like availability of health facility, presence of mobile clinics or better connectivity with urban centres seems to influence individual decision-making to a larger extent. On the other hand, for proper care at delivery or immunization individual factors, including financial access may play a major role than the community characteristics.

In order to examine more closely the extent of economic inequality in MCH service utilization, the Gini Concentration Index, which have been constructed as a summary measure of inequality, indicates the presence of such inequality for India as a whole. There can be several reasons responsible for the low value of the Gini coefficient. Firstly, India as a unit of analysis is too heterogeneous for application of such summary index. Substantial variation at the state level within the country, even if limited only in the rural areas, can be masked when an aggregate measure is computed taking the entire country as the unit of analysis. Secondly, it is an accepted view that for preventive

services, that too for maternal and child health care, there is considerable reliance on the public sector by people across the country, cutting across economic classes. As such, inequality is expected to be less pronounced for these services, compared to curative care.

Since most of the services provided at the public sector facilities are free, at least in principle, and when utilization of such facilities is larger than private sector, economic reasons does not always play major role in determining the utilization of such facilities. Lastly, as it is difficult to separate the individual effects of physical, social and economic access parameters that together leads to service utilization, and such analysis is beyond the scope of the present exercise. Nevertheless, sufficient indication has emerged suggesting significant, and in certain cases sharp differentials in usage of MCH services across economic classes, which we have tried to approximate based on the constructed wealth index.

The findings of the present study are also suggestive of policy actions in the right directions. Preventive maternal and child health services, besides being important in its own right, is also crucial towards attaining favourable health outcomes for the mother and her child. Utilization of such facilities, in a uniform manner among the different population groups becomes imperative from such a viewpoint. As seen in the preceding sections, glaring differences among the population, when segregated based on their economic well-being, calls for corrective action of such imbalances. Factors that can be easily influenced like improved access to facilities, through both supply side initiatives as well as generating social awareness regarding the importance of preventive care, and affordability of the households towards usage of these services needs to be stressed upon in national policies.

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Table1: Percentage o women taken antenatal and delivery care in India and major States, 2002-04

Region	Antenatal Care				Delivery care		
	At least 3 ANC visit	At least one TT	Any ANC	Full ANC	Institu-tional	Home & assisted by trained personnel	Safe delivery
India	**39.5**	**76.6**	**67.5**	**12.1**	**29.8**	**20.8**	**44.5**
Andhra Pradesh	84.2	86.3	93.4	39.3	51.7	42.7	72.4
Assam	33.8	60.3	55.2	6.9	17.1	12.4	27.6
Bihar	13.8	72.6	31.3	3.0	15.9	10.3	24.5
Chhatisgarh	37.7	75.8	75.0	9.2	10.0	29.4	36.5
Gujarat	48.3	82.7	84.9	19.2	41.2	36.7	62.9
Haryana	40.8	84.0	85.6	8.9	27.3	32.7	51.1
Jammu & Kashmir	77.8	81.6	85.6	41.0	68.6	46.8	83.4
Jharkhand	21.0	64.9	42.3	4.6	10.1	9.5	18.7
Karnataka	74.1	83.0	88.9	24.3	45.7	30.5	62.2
Kerala	96.2	95.3	99.6	69.2	97.3	37.9	98.4
Madhya Pradesh	23.4	72.9	69.1	3.1	17.0	22.5	35.7
Maharashtra	62.4	89.2	90.8	21.0	44.2	31.0	61.6
Orissa	37.9	84.6	72.7	11.1	25.2	21.3	41.3
Punjab	59.0	85.8	87.4	13.5	43.0	67.3	81.4
Rajasthan	22.6	63.1	62.0	2.8	22.5	21.1	38.9
Tamil Nadu	92.8	97.4	99.1	20.4	80.0	39.7	88.1
Uttar Pradesh	16.9	66.1	52.7	2.4	16.0	11.1	25.3
West Bengal	55.1	91.1	88.9	10.0	34.7	34.3	57.3

Table2. Percentage of children with different type of vaccination in India and major States, 2002-04

Regions	Immunization					
	Polio	DPT	BCG	Measles	Any immunization	Full immunization
India	**52.5**	**53.1**	**70.7**	**52.4**	**73.7**	**41.6**
Andhra Pradesh	81.6	77.7	92.4	73.9	94.7	62.0
Assam	26.8	35.1	58.5	35.3	64.5	16.1
Bihar	28.5	29.1	42.2	23.2	43.7	19.3
Chhatisgarh	66.7	66.7	86.5	65.4	88.0	55.5
Gujarat	67.5	64.3	84.8	64.4	88.6	52.3
Haryana	72.5	73.4	82.9	67.6	86.6	59.9
Jammu & Kashmir	52.9	43.6	94.2	84.7	96.3	35.0
Jharkhand	28.1	28.9	42.4	24.6	44.4	19.7
Karnataka	82.1	82.5	91.7	77.5	93.4	71.3
Kerala	88.9	90.2	97.2	89.3	99.1	79.8
Madhya Pradesh	39.7	36.0	69.3	43.9	76.2	24.6
Maharashtra	81.6	89.0	96.0	88.8	97.8	74.1
Orissa	68.5	68.5	89.9	71.1	92.4	55.1
Punjab	81.8	81.8	87.6	78.0	89.5	73.5
Rajasthan	29.9	29.3	55.3	30.0	60.9	18.3
Tamil Nadu	95.8	96.9	98.9	95.8	99.6	91.8
Uttar Pradesh	32.8	33.5	55.5	34.2	58.8	23.8
West Bengal	52.5	68.1	84.9	66.4	88.9	53.7

Table 3: Distribution of women in the different wealth quintiles

Region	Wealth index				
	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
India	**27.7**	**15.4**	**20.1**	**19.1**	**17.7**
Andhra Pradesh	11.3	13.3	20.6	31.5	23.3
Assam	27.9	6.6	10.5	34.5	20.6
Bihar	50.9	15.7	18.4	6.7	8.3
Chhatisgarh	39.7	31.7	17.4	7.2	3.9
Gujarat	13.8	15.8	18.9	26.0	25.5
Haryana	3.9	12.0	24.3	29.0	30.8
Jharkhand	70.2	13.9	9.2	3.7	3.0
Jammu & Kashmir	11.0	4.7	9.0	21.6	53.8
Karnataka	4.9	10.0	26.0	40.9	18.2
Kerala	2.8	2.9	3.5	14.0	76.8
Madhya Pradesh	34.3	30.9	17.0	9.6	8.3
Maharashtra	16.3	20.6	21.6	23.1	18.4
Orissa	57.3	15.2	12.0	8.2	7.4
Punjab	2.7	10.1	24.8	18.7	43.6
Rajasthan	24.6	14.1	22.5	24.8	14.0
Tamil Nadu	4.3	10.7	24.7	43.1	17.2
Uttar Pradesh	30.4	19.1	32.0	8.3	10.2
West Bengal	48.5	10.7	10.1	17.3	13.4

Table 4: Percentage of women received full ANC according to wealth quintiles

Region	Full ANC				
	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
India	**5.3**	**8.0**	**9.4**	**17.5**	**30.0**
Andhra Pradesh	33.0	32.5	35.2	41.3	48.8
Assam	4.7	5.1	5.7	5.4	16.5
Bihar	1.5	2.3	3.8	5.9	10.8
Chhatisgarh	6.6	9.7	10.5	13.4	21.7
Gujarat	12.6	14.9	15.4	17.6	34.0
Haryana	2.8	5.7	6.9	8.2	14.0
Jammu & Kashmir	9.1	23.8	19.7	25.9	54.5
Jharkhand	3.3	6.7	7.4	12.9	15.0
Karnataka	18.2	21.3	19.2	24.4	36.0
Kerala	55.0	56.1	53.0	68.0	71.4
Madhya Pradesh	2.3	2.6	2.8	4.4	8.8
Maharashtra	18.5	15.7	17.2	21.3	34.9
Orissa	8.2	12.3	14.2	18.9	22.7
Punjab	9.4	7.5	9.7	14.2	17.8
Rajasthan	1.7	2.0	1.8	4.1	6.5
Tamil Nadu	18.8	14.8	19.2	19.7	28.6
Uttar Pradesh	1.1	2.0	2.5	4.0	6.1
West Bengal	9.1	8.3	9.8	9.7	17.5

Table 5: Percentage of women gone for safe delivery according to wealth quintiles

Region	Safe delivery				
	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
India	**27.2**	**38.9**	**41.8**	**59.8**	**77.4**
Andhra Pradesh	52.4	69.9	69.8	74.2	86.6
Assam	15.2	19.9	23.4	27.5	60.5
Bihar	17.1	26.7	30.2	36.7	52.3
Chhatisgarh	31.4	39.1	33.9	42.9	76.5
Gujarat	42.5	51.9	57.4	69.3	85.3
Haryana	30.6	38.6	45.5	50.8	66.5
Jammu & Kashmir	54.5	65.9	74.7	84.2	89.0
Jharkhand	14.6	24.9	28.4	40.7	51.4
Karnataka	48.0	56.4	52.5	63.2	84.2
Kerala	89.1	96.5	91.3	98.2	99.3
Madhya Pradesh	24.8	32.5	43.3	54.5	74.5
Maharashtra	46.4	53.3	55.6	69.0	86.7
Orissa	33.1	44.4	48.4	61.4	78.0
Punjab	68.3	70.0	72.8	83.6	90.1
Rajasthan	28.7	35.7	36.1	44.1	64.8
Tamil Nadu	83.4	81.9	83.6	90.0	96.6
Uttar Pradesh	18.5	24.1	25.5	32.3	48.5
West Bengal	50.1	58.4	59.7	62.1	83.7

Table 6: Percentage of children (aged 12-35 months) fully immunized according to wealth quintiles

	Full immunization				
Region	**1st quintile**	**2nd quintile**	**3rd quintile**	**4th quintile**	**5th quintile**
India	**26.6**	**37.7**	**39.9**	**55.9**	**65.2**
Andhra Pradesh	48.8	60.8	59.5	63.9	70.0
Assam	9.4	10.3	12.1	15.8	34.5
Bihar	12.1	19.0	23.3	37.1	46.7
Chhatisgarh	49.6	53.3	63.6	69.5	75.9
Gujarat	34.9	43.1	43.9	57.0	73.8
Haryana	33.7	45.3	54.5	62.1	75.3
Jammu & Kashmir	13.0	26.9	25.0	34.0	40.2
Jharkhand	14.6	26.7	30.0	45.2	60.0
Karnataka	53.9	61.7	66.5	75.1	81.6
Kerala	77.6	79.7	69.8	80.5	80.2
Madhya Pradesh	19.1	21.1	25.3	38.1	51.5
Maharashtra	67.2	72.3	78.9	75.3	76.4
Orissa	49.2	62.6	56.6	67.4	73.1
Punjab	40.0	63.1	63.0	77.6	83.8
Rajasthan	8.4	15.5	14.2	22.9	45.8
Tamil Nadu	87.0	88.4	91.2	93.1	93.4
Uttar Pradesh	17.0	24.4	24.3	29.0	41.8
West Bengal	48.3	52.3	52.7	64.0	67.5

Table 7: Percentage of women received full ANC according to selected background attributes and for different wealth quintiles

	Full ANC				
Back ground variables	**1st quintile**	**2nd quintile**	**3rd quintile**	**4th quintile**	**5th quintile**
Religion					
Hindu	5.5	8.2	9.7	18.7	29.4
Other	4.3	6.6	7.1	12.1	32.8
Caste					
General	5.3	8.8	9.4	15.4	28.3
OBC	4.4	6.7	7.9	15.3	28.4
SC/ST	5.2	7.0	8.6	13.1	23.3
Couple's education					
Both illiterate	3.1	4.6	6.3	10.6	18.2
Anyone literate	5.4	4.7	5.5	6.1	10.6
Both literate	9.7	12.2	12.8	18.1	29.9
Sex of the last child					
Male	3.8	4.9	6.3	11.1	16.8
Female	4.8	7.3	8.5	14.4	27.3
Age of women at the time of last birth					
<=20	3.8	4.9	6.2	11.0	16.8
21-30	5.1	7.6	9.7	15.3	23.5
31 & above	5.5	7.5	8.9	15.2	28.5
Year of last birth					
<=2000	5.3	7.0	8.6	13.3	24.5
2001-2002	5.0	7.3	8.3	14.8	27.0
2003 or later	4.5	7.1	8.6	15.1	28.9
All weather road					
Yes	3.3	11.9	26.7	26.1	44.1
No	5.1	7.5	8.6	15.5	27.9
Distance from nearest town					
<= 5 km	4.4	6.6	7.6	14.7	30.7
6-10 km	4.2	7.4	8.0	14.3	26.0
11 km & above	5.5	7.3	9.3	14.5	24.5
Distance from any Govt. health facility					
Within village	5.9	8.6	9.7	16.2	29.4
<= 5 km	4.6	5.9	7.9	12.8	23.8
6 km & above	3.3	6.3	6.1	10.8	16.4
Distance from any private health facility					
Within village	5.0	7.6	8.5	16.2	29.9
<= 5 km	4.6	6.1	8.3	14	26.1
6 km & above	5.0	7.5	8.5	13.6	24.9
Mobile clinic for village					
No	4.9	7.6	8.8	17.0	31.0
At least one	8.0	10.0	12.1	19.8	27.1

Table 8: Percentage of women gone for safe delivery according to selected background attributes and for different wealth quintiles

	Safe delivery				
Back ground variables	**1st quintile**	**2nd quintile**	**3rd quintile**	**4th quintile**	**5th quintile**
Religion					
Hindu	27.5	39.2	42.4	62.2	78
Other	25.6	36.8	37.8	48.5	75.9
Caste					
General	30.1	42.7	44.8	55.4	78.5
OBC	26.0	37.9	40.5	60.3	77.2
SC/ST	24.6	34.6	38.3	49.8	67.1
Couple's education					
Both illiterate	19.8	27.7	31.0	39.6	49.8
any one literate	26.0	34.0	35.3	46.8	57.3
Both literate	40.9	52.4	53.8	65.0	80.8
Sex of the last child					
Male	30.6	39.6	44.9	59.1	69.7
Female	26.4	37.3	39.9	54.3	74.2
Age of women at the time of last birth					
<=20	30.6	42.2	45.9	58.6	74.5
21-30	25.3	37.0	40.6	55.6	76.4
31 & above	19.4	27.8	29	42.2	68
Year of last birth					
<=2000	25.3	36.4	39.3	52.8	72.9
2001-2002	25.8	37.0	39.7	54.4	75.0
2003 or later	26.8	38.3	43.1	58.1	76.5
Pregnancy complication					
No	5.2	8.2	9.3	17.3	29.1
At least one	5.6	7.5	9.6	18	32.7
All weather road					
Yes	28.1	39.1	42.6	58.2	76.7
No	22.7	33	35.3	46.7	67.7
Distance from nearest town					
<= 5 km	26	37.2	41.3	58.1	78.4
6-10 km	24.9	37.4	40.3	56.2	75.5
11 km & above	26.5	37.2	40.4	52.9	72
Distance from any Govt. health facility					
Within village	29.2	40.2	44.4	57.7	77.5
<= 5 km	24.8	36.1	38.7	53.8	72
6 & above	20.9	31.7	33	44.7	62.5
Distance from any private health facility					
Within village	27.6	38.3	41.1	56.6	77.6
<= 5 km	26.2	37.7	41.1	59.2	76.6
6 km & above	25.2	36.4	40	52.2	71.2
Mobile clinic for village					
No	26.7	38.1	40.7	58.7	77.2
At least one	31.0	43.4	47.1	64.8	78.2

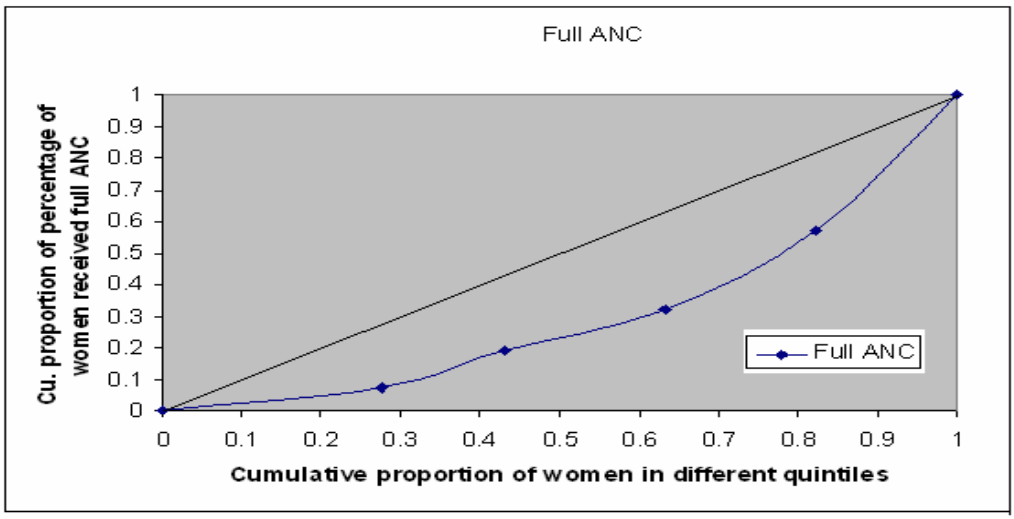
Table 9: Percentage of children (aged 12-35 months) fully immunized according to selected background attributes and for different wealth quintiles

	Full immunization				
Back ground variables	**1st quintile**	**2nd quintile**	**3rd quintile**	**4th quintile**	**5th quintile**
Religion					
Hindu	27.5	38	40.9	59.6	67.1
Other	20.1	34.5	31.7	38.1	59.7
Caste					
General	31.4	43.9	43.2	53.2	65.8
OBC	22.6	36.2	36.1	57	66.2
SC/ST	27.6	36	42.4	56.8	59.9
Couple's education					
Both illiterate	19.4	27.2	29.8	44.8	35.9
Any one literate	25.5	33	34.2	47	45.7
Both literate	46.2	56.2	55.2	65.7	71.5
Sex of the last child					
Male	27.1	37.4	40.7	55.6	65.5
Female	25.5	37.7	38.2	56.1	64.4
Age of the mother at the time of last birth					
<=20	29.0	40.5	42.6	56.5	61.1
21-30	26.8	38.5	41.1	57.5	67.5
31 & above	19.6	26.7	25.6	41.8	56.3
Year of last birth					
<=2000	29.4	37.8	40.1	55.4	64.1
2001-2002	25.7	37.4	38.7	55.7	64.7
2003 or later	21.5	37.3	41.9	57.3	68.9
All weather road					
Yes	26.4	39	40.4	56.9	66.4
No	26.2	34.3	37.3	53.1	59.7
Distance from nearest town					
<= 5 km	23.3	35.9	37.7	54.3	65.7
6-10 km	24.6	35.5	39.6	57.1	67.6
11 km & above	28.8	39.7	40.8	56	62.7
Distance from any Govt. health facility					
Within village	29.8	40.7	43	56.8	67.1
<= 5 km	24.6	35.5	36.9	55.4	62.5
6 km & above	21.3	33.9	35.8	51.5	55.7
Distance from any private health facility					
Within village	26.3	39.4	38	56	65
<= 5 km	26.6	37.3	38.9	58.6	66.4
6 km & above	26.2	36.4	41.8	53.6	63.7
Mobile clinic for village					
No	25.3	36.4	38.8	54.6	64.7
At least one	33.8	44.1	43.7	61.6	66.9

Table 10: Results of Multilevel Analysis

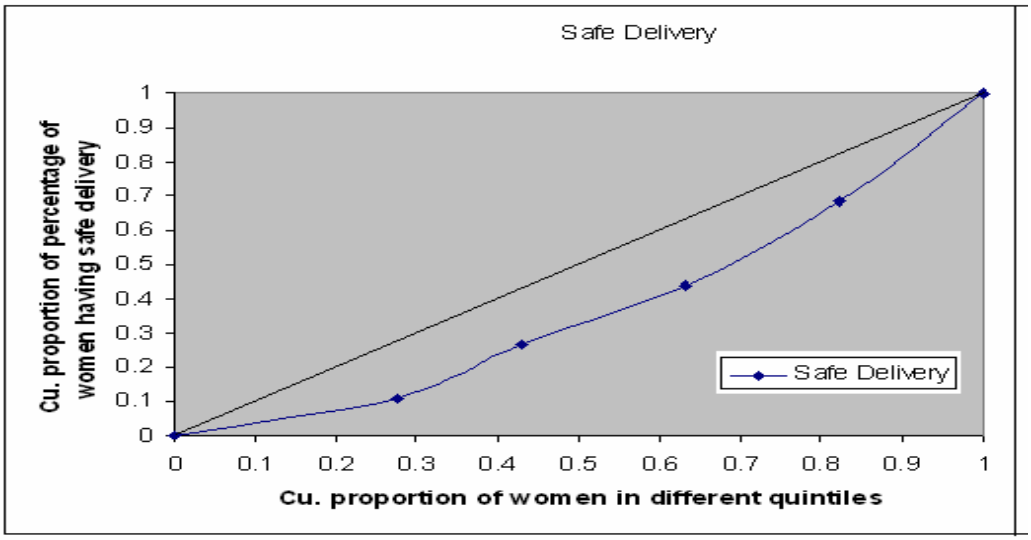
Back ground variables	*Exp B*		
	Antenatal Care	**Safe Delivery**	**Full Immunization**
Religion			
Hindu			
Other	0.87*	0.89*	0.91*
Caste			
General			
OBC	0.92*	0.88*	0.97*
SC/ST	0.89*	0.76*	0.95*
Couple's education			
Both illiterate			
any one literate	1.17*	1.23*	1.04*
Both literate	2.06*	2.31*	1.19*
Sex of the last child			
Male			
Female	1.00	0.96*	0.98*
Age of women at the time of last birth			
<=20			
21-30	1.05*	0.86*	1.01*
31& above	0.89*	0.74*	0.99*
Year of last birth			
<=2000			
2001-2002	1.07*	1.08*	0.97*
2003 or later	1.17*	1.16*	0.95*
Wealth index			
1st quintile			
2nd quintile	1.26*	1.31*	1.05*
3rd quintile	1.44*	1.45*	1.06*
4th quintile	1.93*	1.96*	1.12*
5th quintile	2.93*	3.51*	1.18*
All weather road			
Yes			
No	0.87*	0.74*	0.95*
Distance from nearest town			
<= 5 km			
6-10 km	0.92*	0.95*	1.02*
11 km & above	0.89*	0.91*	1.01*
Distance from any Govt. health facility			
Within village			
<= 5 km	0.74*	0.76*	0.97*
6 km & above	0.61	0.66*	0.94*
Distance from any private health facility			
Within village			
<=5 km	0.89*	0.94*	1.01
6 km & above	0.93*	0.88*	0.99
Mobile clinic for village			
No			
At least one	1.11*	1.16*	1.04*
Constant	*-2.626*	*-0.511*	*0.368*
Village effect	**1.476**	**0.812**	**0.072**
Individual effect	**1.000**	**1.000**	**0.141**

Figure 3. Lorenz Curve for full ANC



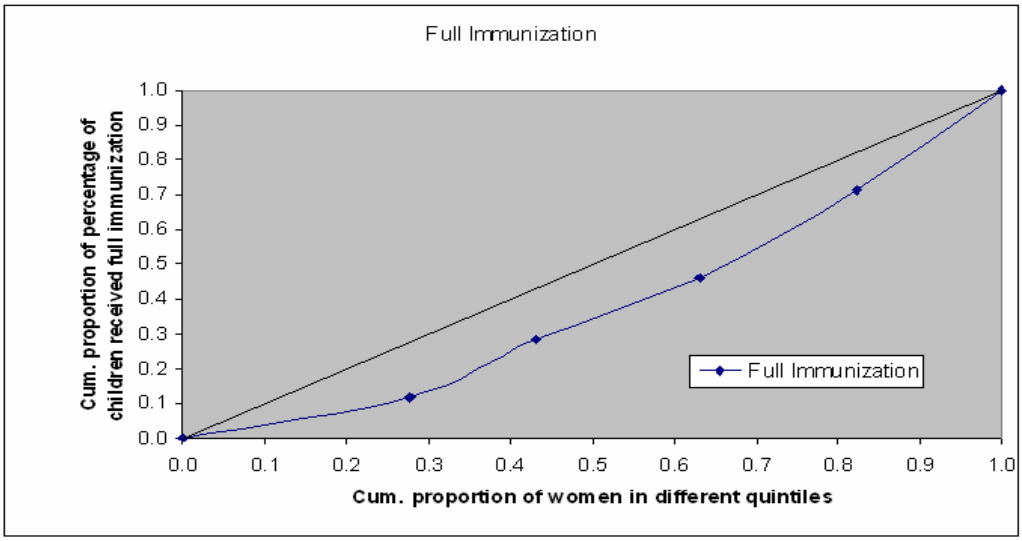
Gini Coefficient = 0.386

Figure 4. Lorenz Curve for safe delivery



Gini Coefficient = 0.255

Figure 5. Lorenz Curve for full immunization



Gini Coefficient = 0.228