

Does safe-motherhood programme reach poor in  
Uttar Pradesh, India?

**S.K. Mohanty<sup>1</sup> and Praveen Kumar Pathak<sup>2</sup>**

International Institute for Population Sciences (IIPS),  
Govandi Station Road, Deonar, Mumbai-400088, India.

<sup>1</sup>Associate Professor, Department of Fertility Studies, IIPS,  
Mumbai, email: [sanjayiips@yahoo.co.in](mailto:sanjayiips@yahoo.co.in); <sup>2</sup>Research Scholar,  
IIPS, Mumbai, email: [pkp\\_pathak@rediffmail.com](mailto:pkp_pathak@rediffmail.com).

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# **Does safe-motherhood programme reach poor in Uttar Pradesh, India?**

## **Abstract:**

This paper examines the trends and changes in birth assisted by skilled health professional, a key strategy under the safe motherhood promotion programme, among poor and non-poor in the populous state of India, i.e. Uttar Pradesh, using data from three rounds of National Family Health Survey (NFHS), 1992-2005. It further examines the relative role of public and private providers, social and economic correlates and reasons for non-use of natal care. Poor and non-poor are estimated for rural and urban areas using state specific poverty line cut-offs. Result shows that medical assistance at delivery has increased modestly during 1992-05, largely from private healthcare providers, whereas, public health services had stagnated. The safe motherhood services have largely benefitted the non-poor clients. Majority of mothers not seeking medical assistance for delivery reportedly don't perceive the need for medical assisted delivery. Residence, antenatal care visits, age and parity of mother affects the likelihood of birth assisted by skilled health professional.

## **Introduction:**

The progress in three health related millennium development goals (child mortality, maternal health and HIV/AIDS, malaria and other diseases) are slow and uneven, across and within the countries (Collin, S.M., *et al* 2007; Koblinsky, M., *et al* 2006; Lawn, J.E. *et al* 2006; Nanda,G., *et al* 2005; Carr, D. 2004; Kunst, A.E., and Houweling, T., 2001; De Brouwere, V., Van Lerberghe, W., 1998). Among these goals, inequalities in maternal health, measured by two monitoring indicators, namely, the maternal mortality ratio and births attended by skilled health professionals is maximum (Graham, W.J. *et al*, 2004; Houwleing *et al*, 2007). More specifically, the poor-rich gap in natal care utilization is disadvantages to the poor and widening in many developing countries including India (Mohanty and Pathak, 2009; Oomann, N., *et al* 2003). Also, increase public spending on health does not necessarily reaches the poor, as the expanded health services in many transitional population typically reaches the better off than the poor (Gwatkin,D.R., 2006; Deaton, A., 2003). Understanding the context-specific cause, along with socio-economic factors, of varying use of maternal health care is called for (Say, L., Raine, R., 2007).

In India, an estimated 221 million population are living below official poverty line of which 47 million resides in the most populous state of Uttar Pradesh (Planning Commission, 2007). The estimated maternal mortality ratio (MMR) had declined from 407 to 301 per 100,000 live births during 1998 to 2006 but was highest (at 517 per 100000 live births in 2006) in the state of Uttar Pradesh (Office of the RGI, 2006). While the maternal deaths in India contributes to about one-fifth of all maternal deaths in the world, the maternal deaths in Uttar Pradesh constitutes more than one fourth of all maternal death in the country. India's progress in reducing maternal deaths is crucial to the global achievement of Millennium Development Goal 5 (MDG-5) (Mavlankar *et al*, 2008). Further, the targets in reduction of MDGs in India (target of 100 by 2015) can not be realized unless it is improved in the state of Uttar Pradesh. On the other-hand, the births attended by skilled health professionals, a key component of safe motherhood programme had reached to about half of the deliveries in the country but only to a little over one-quarter of the deliveries in the state of Uttar Pradesh. Moreover, the ratio of the richest to the poorest wealth quintile was 4.5 for the country and 6.1 for the state (IIPS and ORC Macro 2007) indicating steep poverty gradient in maternal health care utilisation.

Over the years, there has been increasing commitment and efforts by the federal government to improve the health of mother and children. In the first two decades of India's independence, the maternal health care was limited to the promotion of family planning. The family planning programme was renamed to family welfare programme in 1977 with change in programme priority. The maternal and child health (MCH) become an integral part of the programme with the emphasis of reduction in infant and child mortality and promoting maternal care. Following the international safe motherhood conference (a global campaign to reduce the maternal mortality) in Nairobi, Kenya in 1987, the Government of India, redesigned the Maternal and Child Health (MCH) Programme to the Child Survival and Safe Motherhood (CSSM) programme in 1992 (GOI, 1993). More specifically it aimed at reduction in maternal mortality by promoting medical assistance at delivery, provision of aseptic delivery kits and strengthening of first referral units to deal with high risk and obstetric emergencies through Emergency Obstetric Care (EOC). The RCH programme, introduced in 1997 (MOHFW, 1997) was built on the CSSM programme with additional component of Reproductive Tract Infection (RTI) and Sexually Transmitted Infection (STI). The recently launched National Rural Health Mission (NRHM 2005-12) is more specifically designed to reaching poor families (families living below poverty line) with essential health services. It aimed at integrating health with determinants of health such as nutrition, sanitation, hygiene and safe drinking water (MOHFW, 2005). It also aims at promoting institutional deliveries among poor by cash incentive to the households living below poverty line. While the MCH and RCH programme were implemented with financial assistance from international donors, the NRHM is built upon the own resources (an estimated \$9.5 billion). Among other things, these documents emphasised on reduction of poverty and improving the accessibility and availability of quality health services, particularly to the poor, marginalised, women and children.

Understanding of the trends and change in natal care and its contextual determinants among poor and non-poor may be helpful for evidence based programme to achieve the MDGs. Hence, the broad objective of the paper is to examine the trends and change in natal care and its contextual determinants in the state of Uttar Pradesh. However, the specific objectives are:

- 1) to examine the trends and changes in births attended by skilled health professionals among poor and non-poor
- 2) to assess the relative role of public and private health service providers in births attended by skilled health professionals
- 3) To understand the effects of selected social-economic, demographic and contextual determinants of natal care

## **Data and Methods**

The data for the present analyses are drawn from the three rounds of National Family Health Survey (NFHS) conducted in the country in similar line with other Demographic and Health Surveys (DHS), during 1992-2006. All these rounds of survey are nationally representative and covered more than 99 percent of country's population. They were primarily designed to provide reliable information on fertility, mortality, contraceptive use, health and health care utilisation and related estimates in the country and state level, separately, for the rural and urban areas. These were done by questioning the ever-married women in the reproductive ages 15 to 49. The surveys also collected data from the sampled households on consumer durables, household amenities and housing quality of the households. Detailed descriptions of the survey design of the NFHS and the findings are available in the various reports at the national and state levels (IIPS and ORC Macro 1993, 2000, 2007). We refer the period between 1992-93 and 1998-99 as 1992-98, 1998-99 and 2005-06 as 1998-05 and 1992-93 to 2005-06 as 1992-06. It may be mentioned that the state of Uttaranchal was created in the year 2000 from the undivided Uttar Pradesh. While the NFHS 3 sample is separately done for Uttar Pradesh and Uttaranchal, it was not so in earlier rounds. We have excluded the sample of Uttaranchal to make the estimates comparable for the state of Uttar Pradesh. We primarily used the child and household file containing the information on assistance at delivery and household amenities and consumer durables for the state of Uttar Pradesh.

Moreover, in 1998-99 and 2005-06 survey, the questions on births attended by skilled health professionals were asked for the last two births with a reference period of three and five years respectively while it was for three births during last four years preceding the survey in 1992-93. To make the estimates comparable, the births attended by skilled health professionals for the last two births in three years preceding the survey is computed uniformly for three

periods. The total number of births analyzed are 4797, 2590 and 3930 (un-weighted cases) respectively for the year 1992-93, 1998-99 and 2005-06 respectively. The assistance at birth by any medical professionals such as doctor or Auxiliary Nurse Midwives (ANM) /nurse/midwife/Lady Health Visitor (LHV) or other health personnel are termed as births attended by skilled health professionals or medical assistance at delivery. We have used the term births attended by skilled health professionals, medical assistance at delivery, and safe delivery interchangeably. The analysis has been carried out using appropriate state weights.

Data on income or expenditure are usually not collected in DHS and therefore, the wealth status of household population based on the ownership of household assets and amenities, consumer durables and size of land holding, has been largely used as a proxy for economic status of the households (Montgomery et al., 2000; Filmer & Pritchett, 2001; Vyas & Kumaranayake, 2006; O'Donnell *et al*, 2008). In NFHS 3, for the first time, a wealth index using the principal component analysis (PCA) is available to the researcher and used in its report. However, the index has been subject to criticism as it did not take into account the rationale in selection of indicators, inter-state and rural-urban differentials in a large and heterogeneous country like India (Misra and Dillip 2008; Mohanty 2008).

We have constructed the wealth index for the state of Uttar Pradesh for all the three periods (1992-06). The wealth status is estimated by using the PCA from a set of economic proxies, separately for rural and urban areas. The STATA 10.0 is used in analyses. From the composite wealth index, a percentile distribution is obtained and the cut-off point of poor and non-poor are made for rural and urban areas separately, using the state specific poverty estimates. The poverty estimates of 1993-94 (50<sup>th</sup> round) close to NFHS 1, the poverty estimates of the year 1999-2000 (55<sup>th</sup> round ) close to NFHS 2 and the poverty estimates of 2004-05 ( 61<sup>st</sup> round) close to NFHS 3. For example, about 25.3 (based on mixed recall period consumption ) percent rural population in the state of Uttar Pradesh were below poverty line in 2004-05 and so the cut-off point of poor for the year 2005-06 has been kept at 25.3 percent for rural Uttar Pradesh (Planning Commission, 2007).

Bivariate analysis is carried out to understand the trends, change and differentials in births attended by skilled health professionals over time by wealth status of population. Non-poor and poor ratio, defined as the ratio of the poorest wealth quintile is used to measure the gap in

utilization of delivery care. Logistic regression models are used to assess effect of socioeconomic and demographic variables on use of professional delivery care while adjusting for potential confounding variables. To examine the effect of time on utilization of skilled delivery care, we have pooled the data of three periods for estimating the odds ratios in logistic regression models.

## **Results**

### *Sample characteristics*

Table 1 presents the percentage distribution of sample live births (0-36 months), three year preceding the survey according to place of residence and other selected socio-demographic characteristics during 1992-06 in the state of Uttar Pradesh. During 1992-93, about 40% of births were to mothers belonging to poor households and 60% of births were to non-poor households. The proportion of births to poor was about 30-31% during 1998-06. The distribution of births by mothers education showed that, about 78% births were to illiterate mothers in 1992-93 and it had come down to 64% in 2005-06 while it has increased for secondary and higher educated mothers. This is probably due to improvement in educational level as well as reduction in fertility level in the state. But the differential in mother's age at delivery has not shown any change, more particularly among the adolescents. Similarly, the distribution of births by parity suggests a little change in fertility level over the years. In 1992-93, about 43% of the births were to women of parity four and above which was 41% in 2005-06. The patterns are similar in rural and urban areas.

### ***Births attended by skilled health professionals***

Table 2 presents the trends in births attended by skilled health professionals by poor and non-poor and place of residence in Uttar Pradesh. It also gives the non-poor and poor ratio, measures of relative economic inequality. On average, the births attended by skilled health professionals has reached only to a little over than one-fourth of the live births and remained stagnated for the poor. It has increased from 22% in 1992-93 to 24 % in 1998-99 and further to 29% in 2005-06. With respect to wealth quintile (not shown in the table), the differences among rich and poor are high. In 2005-06, about 75% of births among the richest quintile were assisted by skilled health professionals compared to 13% in the first wealth quintile. Further, the estimates of birth assistance among poor and non-poor showed that during 1992-05, while it has increased by 4% among the poor, it was 24% among the non-poor. Rich-poor ratio of births attended by skilled health professionals had increased from 2.2 to 3.1 during 1992-98 and further declined to 2.7 during 1998-06. Thus, the larger gain in coverage of natal care has been among the non-poor than that of poor in the state of Uttar Pradesh. Moreover, the CSSM programme had hardly reached the poor in the state.

Though the pattern is similar in the rural and urban areas, here appears a glaring rural-urban divide in the births attended by skilled health professionals in the state. First, the coverage of births attended by skilled health professionals has been substantially higher in the urban areas compared to rural areas. The prevalence of births attended by skilled health professionals has increased in rural areas from 17% to 18% during 1992-98 and further increased to 23% during 1998-06. It has increased from 50% to 53% during 1992-98 but marginally declined to 51% in urban parts of Uttar Pradesh during 1998-06. Second, while the professional assistance at delivery in rural Uttar Pradesh continues to rise, it had stagnated

in urban Uttar Pradesh during 1998-06. The economic inequality has been substantially higher in the urban areas (1.7, 2.8 & 2.6) than their rural counterparts (1.7, 2.4 & 2.1) as indicated by rich-poor ratio over past 15 years.

### ***Socio-demographic differentials in delivery care among poor and non-poor***

The socio-demographic differentials in the coverage of birth attended by skilled health professionals among poor and non-poor are shown in table 4. On average, most of the mothers who resides in urban areas, better educated, whose husbands had also achieved more than secondary level education, belonging other caste groups, of first parity and received any antenatal visits, had medical assistance at delivery among, both poor and non-poor compared to their counterparts. However, the differences among the poor and non-poor remained large, even among these sub-groups over the years. The analyses suggest that poverty is the key factor in utilisation of natal care services. For example, among women with similar education (say, secondary and above education) the delivery care was 20% percent among women belonging to poor households compared to 57% among women belonging to non-poor households during 2005-06. More specifically, there has not been significant improvement in the births attended by health professionals among the poor women belonging to different groups over the years. For example, among poor women, 15% adolescent mothers were medically assisted at delivery in 1992-93 compared to 21% in 2005-06. We also attempted to understand the use of natal care by pregnancy complications among poor and non-poor mothers. It may be mentioned that the questions on pregnancy complications in different rounds of NFHS are not similar. Therefore, we have computed a variable to measure any pregnancy complications using available set of questions in respective datasets.

Result shows that a large proportion of institutional deliveries are done to pregnancy complications, irrespective of poverty status. For example, 43% of women with any pregnancy complications received skilled medical assistance at delivery compared to only 20% women with no pregnancy complications. However, this also varies by poverty status i.e., among poor mothers, 33% mothers with any pregnancy complication receive skilled delivery care while 48% non-poor mothers received the same in the state during 1992-93.

### ***Use of delivery care by source of provider***

We further attempted to understand the trends and change in natal care by source of provider. The sources of provider are classified into three groups, namely, deliveries at home, public health centre and private health centre. The coverage of professional assisted deliveries in Uttar Pradesh is lowest in the country. Majority of delivery in the state are at home without any professional assistance irrespective of place of residence, poverty status and time. However, it has declined from 88% to 84% during 1992-98 and further to 79% in 1998-06. Among the poor more than 90% deliveries are carried out at home compared to 73% among the non-poor in the state. The rich-poor ratio also indicates that the prevalence of delivery at home is higher among poor (0.9 & 0.8 during 1992-06) over past 15 years in Uttar Pradesh. We also observed the higher prevalence of home delivery even in the urban areas of the state. It may be mentioned that a very small proportion of home deliveries are assisted by medical professionals.

There has been continuous increase in deliveries at private health centres, from 5% in 1992-93 to 8% in 1998-99 and 15% in 2005-06. This increase has been observed cutting across the poverty status and the place of residence. While it has increased from 7% to 19% among non-poor, it has increased from 1% to 5% among the poor. On the other hand, the deliveries in public health centres have remained stagnated at a low level of 7% during 1992-

05. While it has marginally increased from 3% to 4% among the poor, it has declined from 10% to 8% among the non-poor. In other-words, the natal care in public health centres remained at abysmal low level. Moreover, the use of delivery care from public provider has declined by half (from 17% to 9%) in urban areas, more among poor than non-poor. If we compare such estimates for other states of India, the use of professional assistance at delivery, on average, was 91% in Tamil Nadu and 69% in Maharashtra (IIPS and ORC Macro, 2007). The public health centres, which are supposed to be main driver of RCH services, are not used by either poor nor among non-poor and have not improved over the years. There might be supply related factors, the quality of care and other constraints for low utilisation of services in public health centres. While the quality, availability and accessibility might be the factors in public health centres, it is affordability that matters in use of private health care.

We highlight few interesting findings from the above analyses. First, the phenomenon of home delivery continues to remain large in the state, especially among the poor. Second, the delivery care at public health centres remained lower in the state and even deteriorated over the years. Third, the use of private delivery care is on increase, both among the non-poor and non-poor.

### ***Determinants of safe delivery among poor and non-poor***

In order to understand the effect of selected socio-demographic correlates on the likelihood of having in births attended by skilled health professionals, three separate set of logistic regression model has been used i.e., among poor, non-poor and overall sample mothers, considering the binary nature of the dependent variable. The analyses are carried out by using the polled data for three period of time i.e., 1992-93, 1998-99 and 2005-06. The independent variables controlled in the model are place of residence, maternal education,

paternal education, age of mother at time of delivery (years), parity, religion, caste, antenatal care visit, any pregnancy complication, mass media exposure and time. The result indicates that among poor mothers in model-1, odds of having safe delivery are significantly higher among urban, educated above secondary level, with low parity, belonging to other backward caste (OBC) group, received antenatal care and reported any pregnancy complications. Interestingly, the effect of time has shown a significantly negative effect suggesting that odds of having safe delivery among poor mothers are 31% less likely during 2005-06 than poor mother during 1992-93. The effect of paternal education, mother's age at delivery and religion has no significant effect on odds of safe delivery among poor mothers in the state.

Among non-poor mothers in model-2, the likelihood of having safe delivery is significantly higher among urban, more than secondary educated couples, among mother (20 years or more), with low parity, non-Hindu and non-Schedule Caste/Schedule Tribe (SC/ST), received antenatal care, exposed to mass media and reported any pregnancy complications. The effect of time was also found significant suggesting that non-poor mother during 2005-06 were 16% less likely to have safe delivery than in 1992-93. In model-3, we examined the effect of socio-demographic characteristics on the likelihood of having safe delivery among all the mothers. We find that place of residence, maternal and paternal education, age of mother at delivery, parity, religion, caste, antenatal care, mass media exposure, pregnancy complications and time have significant effect on the odds of having safe delivery. Mothers from urban area with above primary education, at higher ages, with low parity, being non-Hindu and non SC/ST were more likely to have safe delivery. The antenatal care visit, exposure to mass media and any pregnancy complications were also positively affecting odds of safe delivery. Again, time has significant negative effect on the odd of having safe delivery

in 2005-06 suggesting that over time the likelihood of having safe delivery has declined in the state.

### ***Reasons for non use of delivery care***

Table 6 presents the major reasons for not seeking medical assistance at delivery among poor and non-poor mothers by place of residence in Uttar Pradesh. It may be noted that among overall sample, majority of mothers who had not sought any medical assistance at delivery reported that they don't feel it is necessary or customary (81%) followed by mothers who reported that it costs too much (9%). The differences among poor and non-poor are small indicating the contextual factors operating in utilisation of natal care. The perception on cost of services was higher among poor (10%) compared to non-poor mothers (8%). The other reasons were relatively small for both poor and non-poor.

### ***Discussion and Conclusion***

The study attempted to understand the trends in utilisation of natal care services among poor and non-poor mothers in the state of Uttar Pradesh. Data from three rounds of National family Health Survey are used in the analyses. The results revealed a low level, but increasing trends in births attended by skilled health professionals in the state of Uttar Pradesh during 1992-06. However, the increase is more pronounced among the non-poor than the poor, both in rural and urban areas. While, the professional care has reached to a little over than one-quarter of live births, it is largely from the private providers, irrespective of poverty status and place of residence. The worrying factor is the decline in births attended by skilled health professionals from public health centres, both among poor and non-poor and more specifically in urban areas. In fact, while the majority of births in the states of Tamil Nadu and Kerala are assisted by public health centres, it is abysmally low in the state of Uttar

Pradesh. It is unlikely for many poor mothers to afford the natal care in the private sector, though increase has been noticed over the years.

The multivariate analyses suggested that after adjusting for various confounding variables, maternal and paternal education, caste, antenatal care and pregnancy complications have a statistically significant positive effect on the likelihood of receiving medical assistance at delivery by health professional in the state. The role of religion was found to be very weak in influencing use of natal care. The role of time dummies was found significant and negative suggesting that there appears negative effect of time on likelihood of receiving safe delivery care in Uttar Pradesh. However, among poor mothers, place of residence, maternal education, parity, antenatal care and any pregnancy complication remained strong predictors. The effect of paternal education, mother age at delivery, caste, and religion does not play any significant role. Among non-poor mothers, the role of place of residence, maternal and paternal education, parity, caste, religion, exposure to mass-media, antenatal care and pregnancy complications are very strong and statistically significant.

The analyses further highlight the lower demand for natal care as four-fifths of mother did not feel it necessity of availing the delivery care at health centres. This phenomenon remained universal more particularly, among rural poor mothers. It shows that there is an urgent need to create the awareness and hence demand for natal care and improve the health facility at public health centres. Some of the poor mother also reported that opposition from the husband or family members, high cost of delivery care services, unavailability of transport services and far distance as other major obstacle.

The promotion of institutional deliveries has been emphasized for reduction of maternal and child mortality and for improving the maternal health in India through Reproductive and Child Health (RCH, 1996) programme. Despite the increasing emphasis on institutional deliveries, the use of such services in general and among the poor remained low.

The progress towards maternal health of the millennium declaration cannot be realised unless there will be improvement in the service utilisation in the public health centres in the state. This raises the concern on the state of public health, particularly, the quality of care and availability of facilities at the health centres.

## References

- Anwar, A.T.M.I., Kilewo, J., Chowdhury, M.K., Dasgupta, S.K.** (2004) Bangladesh: Inequalities in utilization of maternal health care services-evidence from Matlab, *Health, Nutrition and Population (HNP) Discussion Paper*, World Bank, Washington, DC.
- Becker, S., David, H. P., Ronald, H.G, Connie, G. & Black, R. E.** (1993) The determinants of use of maternal and child health services in metro Cebu, the Philippines. *Health Transition Review* 30 (1), 77-89.
- Carr, D.** (2004) Improving the Health of the World's poorest people, *Health Bulletin 1*, Population Reference Bureau, Washington DC.
- Collin, S.M., Anwar, I., Rosmans, C.** (2007) A decade of inequality in maternity care: antenatal care, professional attendance at delivery, and caesarean section in Bangladesh (1991-2004), *International Journal of Equity in Health*, 6: 9.
- Deaton, A.** (2003), "Health, inequality and economic development", *Journal of Economic Literature*, Vol.41, No.1, pp. 113-158.
- DeBrouwere V, Van Lerberghe W.** (1998) [Unmet obstetric needs]. Paris: L'Harmattan.
- Fedler, J.L.** (1981) A review of literature on access and utilisation of medical care with special emphasis on rural primary care, *Social Science and Medicine* 15C, 129-142.
- Filmer, D. & Pritchett, L.H.** (2001) Estimating wealth effects without expenditure data- or tears: An application to educational enrollments in states of India, *Demography*, 38 (1), 115-132.
- Government of India (GOI)**, (1993) Child Survival and Safe Motherhood Programme-India. New Delhi: Ministry of Health and Family Welfare.
- Graham W.J., Fitzmaurice, A.E., Bell, J.S., Cairns, J.A.** (2004) The familial technique for linking maternal death with poverty. *Lancet*; 363: 23-7.
- Gwatkin, D.R., Johnson, K. A., Rutstein, S., Pande, R.** ( 2000) Socioeconomic differences in health, nutrition, and population. *World Bank*, Washington:
- Gwatkin, D.R., Bhuiya, A., Victora, C.** (2004). Making health systems more equitable. *Lancet*; 364:1273-80.
- Gwatkin, D. R.** (2005) How much would poor people gain from faster progress towards the millennium development goals for health? *Lancet* 365, 813-17.
- Hatt, L., Stanton, C., Makowiecka, K., Adisasmitha, A., Achadi, E., Ronsmans, C.,** (2007) Did the strategy of skilled attendance at birth reach the poor in Indonesia? *Bulletin of the World Health Organization*; 85:774-782.
- Houweling, T.A., Ronsmans, C., Campbell, M.R.O. & Kunst, A.E.** (2007) Huge poor-rich inequalities in maternity and child care in developing countries, *Bulletin of the World Health Organisation* 85 (10), 745-54.
- International Institute for Population Sciences (IIPS) & ORC MACRO.** (2007) *National Family Health Survey (NFHS -3), 2005-06*: India: Volume I. Mumbai: IIPS.

**International Institute for Population Sciences (IIPS) & ORC MACRO.** (2000) *National Family Health Survey (NFHS -2), 1998-99*: India, Mumbai: IIPS.

**International Institute for Population Sciences (IIPS).** (1995) *National Family Health Survey (NFHS -1), 1992-93*: India, Mumbai: IIPS.

**Koblinsky, M., Matthews, Z., Hussein, J., Mavalankar, D., Mridha, M.K., Anwar, I., Achadi, E., Adjei, S., Padmanabhan, P., van Lerberghe, W.,** (2006) Going to scale with professional skilled care. *Lancet* 368(9544):1377-1386.

**Kozel, V., Khate, D., Parker, B. & Raghunath, M.** (2003) Poverty measurement, monitoring and evaluation in India: An overview, *Economic and Political Weekly*, Vol 38 (4): 296-301

**Kroeger, A.** (1983) Anthropological and socio-medical health care research in developing countries, *Social Science and Medicine* 17(3), 147-161.

**Kunst, A.E., Houweling, T.,** (2001) A global picture of poor-rich differences in the utilisation of delivery care. *Studies Health Serv Organ Policy*; **17**: 297–316.

**Lawn, J.E., Tinker, A., Mridha, M. K. & Anwar, I.** (2006) Where is maternal and child health now? *Lancet* 368 (9546), 1474-7.

**Mavalankar, D., Vora, K., Prakasamma, M.** (2008) Achieving Millennium Development Goal 5: is India serious? *Bulletin of World Health Organisation*, Vol 86 (4): 243-44

**Ministry of Health and Family Welfare (MOHFW)** (1997) Reproductive and Child Health Programme: Schemes for Implementation, New Delhi, Department of Family Welfare (MOHFW).

**Ministry of Health and Family Welfare (MOHFW)** (2005) *National Rural Health Mission (2005-12)*. Department of Family Welfare, New Delhi, India.

**Mishra, U.S., Dilip, T.R.** (2008) Reflections on wealth quintile distribution and health outcomes, *Employment and Political Weekly* 43 (48):77-82.

**Mohanty, S.K.,** (2008) Poverty among elderly in India, Paper presented at Regional Conference on Demographic scenarios, employment and social security issues of aged in South Asia, 10-11 November 2008, New Delhi.

**Mohanty, S.K., Pathak, P.K.** (2009) Rich-poor gap in utilization of reproductive and child health services in India, 1992-2005, *Journal of Biosocial Science*, Vol 41 (3): 381-398

**Montgomery, M.R., Gragnolati, M., Burke, K.A. & Paredes, E.** (2000) Measuring living standards with proxy variables, *Demography*, 27: 155-174 .

**Nanda, G., Switlick, K., Lule, E.,** (2005) Accelerating progress towards achieving the MDG to improve maternal health: A collection of promising approaches. Health, Nutrition and Population (HNP) Discussion Paper No: 31969

**O'Donnell,O., Doorslaer,E.V., Wagstaff,A.& Lindelow, M. (2008)** Analyzing health equity using household survey data, available online at <http://www.worldbank.org/poverty/health/data/index.htm>

**Office of the Registrar General (2006)** Maternal Mortality in India: Trends, causes and risk factors, New Delhi.

**Oomann, N., Lule, E., Chhabra, R.,** (2003) Inequalities in health, nutrition and population-Rajasthan , India, *Health, Nutrition and Population (HNP) Discussion Paper*, World Bank, Washington, DC.

**Planning Commission, Government of India** (2007) *Poverty Estimates for 2004–05*. URL: <http://planningcommission.nic.in/news/prmar07.pdf>.

**Say, L., Raine, R.,** (2007) A systematic reviews of inequalities in the use of maternal health care in developing countries: examining the scale of the problem and the importance of context, *Bulletin of the World Health Organization*, 85:812–819.

**Sen, G.** (2001) Health Deteriorates. *The Hindu*, 20<sup>th</sup> July, 2001.

**Singh, L. & Singh, C. H.** (2007) Rich-Poor gap in maternal care: The case of Northeast India”, *Asian Population Studies*, 3(1), 79-94.

**UNICEF.** Progress on maternal mortality, Geneva, 1996.

**Vyas, S. & Kumaranayake, L.** (2006) Constructing socio-economic status indices: how to use principal component analysis, *Health Policy and Planning* 21 (6), 459-468.

**Wagstaff, A.** (2002) Poverty and health sector inequalities, *Bulletin of World Health Organization* 80 (2), 97-105.

**Table 1: Trends in distribution of live births<sup>a</sup> by key socio-demographic characteristics in Uttar Pradesh (1992–06)**

Characteristics	1992-93			1998-99			2005-06		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
<b>Economic status</b>									
Poor	42.0	35.1	40.4	30.2	28.6	30.2	29.2	29.9	30.5
Non-poor	58.0	64.9	59.6	69.8	71.4	69.8	70.8	70.1	69.5
<b>Maternal education</b>									
Illiterate	82.2	53.9	78.0	71.3	40.1	66.0	69.1	43.0	63.7
Primary	7.7	11.3	8.3	14.8	14.0	14.7	10.6	12.7	11.1
Secondary	9.0	23.2	11.4	10.4	24.0	12.7	18.5	31.2	21.1
Higher	0.4	11.7	2.3	3.5	22.0	6.6	1.9	13.0	4.1
<b>Paternal education</b>									
Illiterate	37.1	27.8	35.5	29.3	19.0	27.6	32.7	27.3	31.6
Primary	17.8	19.5	18.1	15.6	11.6	14.9	11.7	11.8	11.7
Secondary	38.7	33.8	37.9	36.4	38.1	36.7	45.1	44.3	44.9
Higher	6.5	18.9	8.5	18.7	31.3	20.8	9.3	15.7	10.6
<b>Age of mother at delivery (years)</b>									
<20	14.3	9.2	13.4	19.6	12.5	18.4	13.9	9.6	13.0
20-29	60.4	65.1	61.2	60.1	65.7	61.0	65.0	69.8	66.0
30+	25.3	25.8	25.4	20.3	21.8	20.6	21.1	20.6	21.0
<b>Parity</b>									
1	17.5	22.1	18.2	17.8	21.0	18.3	16.8	21.0	17.7
2-3	38.1	41.3	38.6	39.6	45.7	40.6	41.0	44.7	41.8
4+	44.5	36.6	43.1	42.6	33.3	41.0	42.1	34.4	40.5
<b>Religion</b>									
Hindu	86.8	55.7	81.6	85.0	66.2	81.8	82.3	66.4	79.0
Muslim	13.2	44.3	18.4	15.0	33.8	18.2	17.7	33.6	21.0
<b>Caste</b>									
Schedule caste/Schedule Tribe	21.6	9.0	19.5	27.3	12.2	24.7	28.4	20.5	26.8
Other Backward Caste	na	na	na	32.4	21.5	30.5	52.0	43.9	50.4
Others	78.4	91.0	80.6	40.3	66.3	44.7	19.5	35.5	22.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>N</b>	<b>4551</b>	<b>926</b>	<b>5477</b>	<b>2290</b>	<b>461</b>	<b>2751</b>	<b>3342</b>	<b>855</b>	<b>4197</b>

<sup>a</sup>All percentages were calculated using sampling weights. The unit of analyses was last two live births (0-36 months) to mothers in three years preceding survey; na: not applicable.

**Table 2: Trends in percentage of births attended by skilled health professional among poor and non-poor mothers by place of residence in Uttar Pradesh, 1992-06**

	1992-93			R:P ratio	1998-99			R:P ratio	2005-06			R:P ratio
	Poor	Non-Poor	Total		Poor	Non-Poor	Total		Poor	Non-Poor	Total	
<b>Rural</b>	12.2	20.8	16.6	1.7	9.6	23.3	18.4	2.4	13.2	28.4	22.9	2.2
<b>Urban</b>	29.4	51.5	49.6	1.7	19.6	54.8	53.2	2.8	20.4	53.0	51.2	2.6
<b>Total</b>	12.7	28.6	22.2	2.2	9.9	30.5	24.3	3.1	13.3	35.4	28.7	2.7

R: P ratio- refers to rich-poor ratio (non-poor/poor).

**Table 3: Socio-demographic differentials in birth assisted by skilled health professional<sup>a</sup> among poor and non-poor mothers in Uttar Pradesh (1992–06)**

Characteristics	1992-93			1998-99			2005-06		
	Poor (%)	Non-poor (%)	Total (%)	Poor (%)	Non-poor (%)	Total (%)	Poor (%)	Non-poor (%)	Total (%)
<b>Residence</b>									
Urban	36.9	50.4	49.9	21.2	54.6	53.1	23.9	52.2	50.9
Rural	12.1	20.7	16.8	9.6	23.3	18.3	13.0	28.8	22.9
<b>Maternal education</b>									
No	12.6	17.9	15.5	8.9	19.6	15.2	12.0	23.2	18.6
Primary	13.5	33.2	28.9	11.5	29.3	26.1	19.7	31.2	29.2
Secondary & above	16.1	60.5	57.4	30.4	54.9	53.1	20.3	57.0	53.6
<b>Paternal education</b>									
No	12.0	15.4	13.7	8.9	18.6	13.9	9.7	21.7	16.1
Primary	12.9	24.5	19.7	8.1	22.7	16.6	13.3	24.2	20.4
Secondary & above	13.6	35.8	30.1	12.3	35.6	31.0	18.1	42.8	37.7
<b>Mother's age at delivery (years)</b>									
<20	15.0	25.6	21.6	11.3	32.4	26.1	20.7	35.8	31.4
20-29	12.4	30.7	23.8	9.9	31.0	25.0	13.5	36.1	29.8
30+	12.3	24.4	19.2	9.1	27.0	19.7	9.6	32.4	23.0
<b>Parity</b>									
1	14.3	38.7	31.1	17.1	46.8	39.3	31.2	53.0	48.1
2-3	13.4	30.5	24.4	9.5	31.9	26.1	13.0	36.9	30.8
4+	11.8	21.2	16.8	8.0	20.2	15.4	9.1	23.7	17.9
<b>Religion</b>									
Hindu	12.4	28.8	22.0	9.9	30.4	23.6	13.3	37.9	29.5
Muslims	15.2	25.1	22.3	9.8	29.9	25.8	11.6	27.4	24.6
<b>Caste</b>									
Schedule Caste/Schedule Tribe	8.2	13.7	10.4	10.3	26.1	18.8	13.2	26.0	20.5
Other Backward Caste	na	na	na	8.9	23.1	18.7	13.3	33.3	26.9
Others	14.6	30.8	25.2	10.5	36.8	31.3	13.3	46.4	42.0
<b>Antenatal care visit</b>									
No	9.7	12.3	11.0	7.8	14.3	11.7	7.5	16.9	12.9
Yes	18.1	41.2	34.5	17.4	49.6	43.8	18.5	43.1	36.8
<b>Mass media exposure<sup>b</sup></b>									
No exposure	12.5	18.6	15.4	32.8	49.1	48.1	12.7	21.1	16.8
Any exposure	14.4	40.0	36.9	15.6	34.1	31.4	14.1	40.0	34.8
<b>Pregnancy complication<sup>c</sup></b>									
No pregnancy complication	10.6	26.5	20.1	14.9	8.9	12.2	17.2	40.4	31.5
Any pregnancy complication	33.1	48.3	43.2	10.7	29.2	22.7	15.8	37.4	30.8

<sup>a</sup> Safe delivery refers to institutional delivery or home deliveries assisted by health professionals (doctor, nurse, auxiliary midwife, trained birth attendant) for last two births (0-36 months) occurred three years preceding survey; <sup>b</sup> Mass media comprises of at least once a week exposure to television or radio; <sup>c</sup> Pregnancy complication includes sign of any convulsion or swelling or vaginal bleeding.

**Table 4: Trends in birth assisted by skilled health professional from source of provider among poor and non-poor mothers by place of residence in Uttar Pradesh, 1992-06**

	1992-93	1998-99	2005-06	1992-93	1998-99	2005-06	1992-93	1998-99	2005-06
	Home delivery			Delivery at public health centre			Delivery at private health centre		
				Total					
Poor	96.0	94.4	90.8	3.2	3.2	4.0	0.9	2.5	5.3
Non-poor	83.0	78.9	73.3	9.7	10.7	8.1	7.3	10.3	18.5
Total	88.2	83.6	78.7	7.1	8.4	6.9	4.7	8.0	14.5
				Rural					
Poor	96.2	94.6	91.0	2.9	3.1	4.0	0.9	2.3	5.1
Non-poor	89.9	84.4	78.9	7.0	8.9	7.9	3.0	6.7	13.1
Total	92.9	88.0	83.4	5.1	6.8	6.4	2.0	5.1	10.1
				Urban					
Poor	87.1	84.6	84.0	12.9	6.7	4.0	0.0	8.8	12.0
Non-poor	63.9	60.8	59.1	17.1	16.8	8.7	19.1	22.4	32.2
Total	65.3	61.8	60.0	16.8	16.3	8.5	17.9	21.8	31.5

**Table 5: Determinants of birth assisted by skilled medical professional<sup>a</sup> among poor and non-poor mothers in Uttar Pradesh (1992–2006)<sup>†</sup>**

Characteristics	Poor mothers (N=3793)	Non-poor mothers (N=7383)	All mothers (N=11176)
	Odds Ratio	Odds Ratio	Odds Ratio
<b>Residence</b>			
Urban	1.00	1.00	1.00
Rural	0.35***	0.39***	0.36***
<b>Maternal education</b>			
No	1.00	1.00	1.00
Primary	1.19	1.18**	1.20***
Secondary & above	1.58**	2.31***	2.38***
<b>Paternal education</b>			
No	1.00	1.00	1.00
Primary	1.17	1.16	1.16**
Secondary & above	1.14	1.34***	1.32***
<b>Mother's age at delivery (years)</b>			
<20	1.00	1.00	1.00
20-29	0.97	1.20**	1.15*
30+	1.03	1.56***	1.43***
<b>Parity</b>			
1	1.00	1.00	1.00
2-3	0.60***	0.56***	0.56***
4+	0.51***	0.45***	0.45***
<b>Religion</b>			
Hindu	1.00	1.00	1.00
Non-Hindu	0.95	0.78***	0.82***
<b>Caste</b>			
Schedule Caste/Schedule Tribe	1.00	1.00	1.00
Other Backward Caste	1.33*	1.32***	1.34***
Others	1.13	1.60***	1.60***
<b>Antenatal care visit</b>			
No	1.00	1.00	1.00
Yes	2.38***	2.93***	2.79***
<b>Mass media exposure<sup>b</sup></b>			
No exposure	1.00	1.00	1.00
Any exposure	1.10	1.39***	1.42***
<b>Pregnancy complication<sup>c</sup></b>			
No pregnancy complication	1.00	1.00	1.00
Any pregnancy complication	1.98***	1.40***	1.52***
<b>Year groups</b>			
1992-93	1.00	1.00	1.00
1998-99	0.76*	1.04	0.97
2005-06	0.69***	0.84**	0.79***

<sup>a</sup> Safe delivery refers to institutional delivery or home deliveries assisted by health professionals (doctor, nurse, auxiliary midwife, trained birth attendant) for last two births (0-36 months) occurred three years preceding survey; \* Multivariate model controls for variables in the table; OR- Odds ratio; 95% confidence intervals (CI) are meant to gauge whether a particular annual trend is statistically different from 1.0; \*\*\*Significant at 1% level of significance, \*\*Significant at 5% level of significance, \*Significant at 10% level of significance; <sup>†</sup> based on pooled data set for all three rounds of NFHS.

**Table 6: Main reasons for not seeking birth assisted by skilled health professional\* among poor and non-poor mothers in Uttar Pradesh, NFHS-3, 2005-06**

Main reasons	Poor mothers	Non-poor mothers	All mothers
<b>Total</b>			
Not necessary/not customary	78.9	81.8	80.9
Cost too much	10.1	7.9	8.6
Husband/family do not allow	4.4	4.3	4.3
Too far/no transport	3.6	2.0	2.5
Facility not open/No female provider	1.6	1.7	1.7
Don't trust facility	1.4	2.3	2.0
<b>Rural</b>			
Not necessary/not customary	79.0	81.5	80.2
Cost too much	9.9	7.6	8.8
Husband/family do not allow	4.5	4.6	4.6
Too far/no transport	3.7	2.3	3.0
Facility not open/No female provider	1.6	1.8	1.7
Don't trust facility	1.3	2.2	1.8
<b>Urban</b>			
Not necessary/not customary	75.0	83.1	82.8
Cost too much	16.7	7.8	8.2
Husband/family do not allow	na	3.8	3.6
Too far/no transport	na	1.2	1.1
Facility not open/No female provider	4.2	1.7	1.7
Don't trust facility	4.2	2.5	2.5

\* Sample includes only those mothers who had not sought any medical assistance at delivery for last two births three year preceding the survey; n.a.- not applicable.