Neonatal Mortality in Indian Regions: The hidden factor behind the slow progress of children's well being

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Extended Abstract

Indian government has spent sustained resources on different child survival programmes over the past decades. Initial progress was reflected by the rapid decline in the infant and child mortality rates, but from the last decade of the Twentieth Century the rate of decline was very slow and now it is more or less stagnant. Since 1976 there was a steady decline in the infant mortality rate in India but, the rate of decline was very slow since the beginning of the 1990s, and between 1993 and 2006 really it showed that the infant mortality rate was mostly stagnated. The rate was also quite high in rural areas compared to urban areas over the years. Another interesting thing is to be noted here that gap between rural and urban mortality was decreasing very rapidly till 1990, but later the gap was more or less constant till 2006. The rural-urban differential reduced over time due to intervention of different health care and developmental programmes. However, there still exists a constant difference due to more socio-economic and infrastructural benefits enjoyed by the urban sector compared to rural sector in the country. Further, it is observed that though infant mortality rate has declined in rural India, the gap between the infant mortality rate and the neonatal mortality rate has narrowed. The decline in neonatal mortality is considerably slower. Thus decline in the infant mortality rate was largely due to reduction in post-neonatal mortality, with neonatal mortality rates not contributing as substantially. This indicates that deaths of infants within the first four weeks have relatively greater significance in determining the level of infant mortality rate in rural areas of India. As a result, currently almost two-thirds of the IMR is being contributed by the Neonatal mortality rate. The majority of neonatal deaths, particularly in India take place in rural India Therefore, it is important to understand the determinants of neonatal mortality. Further reductions in infant mortality rates, to a large extent, depend on reducing the neonatal or more specific, early-neonatal mortality. The neonatal deaths

have only been identified as a global priority and that there is urgent need for further research in this area.

The present study uses the data of National Family Health Surveys (I, II & III) to examine different reasons for the stagnation of neonatal mortality rates over different regions in rural India. The **objectives of the study** may be stated as follows:

(i) Using birth history data from National Family Health Survey, risk factors (Hazard ratios) for neonatal mortality of different regions are determined by controlling the effect of different categories of each of the maternal, socio–economic, health care and environmental covariates. Here, Cox proportional hazards model is used for the analysis.

(ii) To compare different regions and states of India, and also to identify any significant change over different periods of National Family Health Survey (NFHS), the early neonatal (0 - 7 days) and neonatal (0 – 28 days) mortality rates by different regions and also for selected states of India (rural) included in each region are obtained using Kaplan-Meier method.

(iii) To identify the impact of different parameters (socio-economic, demographic and environmental), on important programme variables (e.g., immunization to pregnant women, IFA consumed during pregnancy and the place of delivery), odd ratios are determined for all the regions.

The Sample Registration System (SRS) under the Registrar General of India (Ministry of Home Affairs) provides estimates of births and deaths at state/national level. The Indian data provided by SRS do not give information by Socio-economic characteristics, making the analysis of socio-economic inequalities in mortality impossible. Thus, the alternative source of data on child mortality is household survey and estimating mortality rates from survey data involves the use of fertility histories. Using birth history information, survival of children born during the periods as well as age specific risks can be obtained. The National Family Health Surveys are valuable resources to obtain child mortality rates from the birth history data of ever married women aged 13 to 49 years.

During neonatal period biological factors and maternal factors strongly affect the mortality. Whereas, after the neonatal period, post neonatal and child mortality are attributed mainly to childhood diseases and accidents, which are governed by the social development and programmatic factors. The factors responsible for mortality in childhood which are included in

the present study are as follows: (a) *maternal Factors* like, age of the mother at birth; preceding birth interval; birth weight of the baby etc.; (b) *socio-economic and demographic factors*, like place of residence; caste and religion; education of mother; standard of living index; Mother's exposure to mass media; sex of the child etc.; (c) *programmatic factors* like, number of Antenatal (ANC) checkup by health professional received during pregnancy; delivery in medical facility; full consumption of Iron and Folic Acid (IFA) etc; and lastly, (d) *community & Environmental factors* like, distance from hospital; distance of nearest transport facility; village electrification etc. This is true that the above said factors or characteristics are not exhaustive but it mostly covers the important and significant determinants of mortality among neonatal and infants.

Again, there is no doubt that, there are large differences in neonatal mortality from state to state within India. The differences in child survival among geographical regions are very important factor for regional planning. Reasons for such differences vary in nature. For better understanding of the determinants of mortality, the states are clubbed into five geographic regions of the country (north, central, east, west, south), and different aggregate estimates are shown for these regions. This is also necessary because at state level sample size for the neonatal mortality is small and hence difficult to give appropriate estimate. So, here we have to find out the regional variations in different aspects of socio-economic and demographic characteristics with respect to neonatal mortality in rural India. For the analytical convenience only major states in India (17 in numbers) are considered for the analysis.

Our analysis mainly tried to understand the reasons of persistently high early neonatal and consequently neonatal mortalities in the rural India in different regions and states using NFHS data. In most of the regions among different demographic, socio-cultural and maternal variables, early age of pregnancy, birth interval less than 24 months, literacy level below middle school, lower standard of living are the important factors found responsible for high persistent neonatal mortality. Nutritional deficiency among the mothers causes the birth of low weight babies and hence increases the risk of death among infants. Among programme factors: receiving of at least two doses of TT injection during pregnancy, consumption of IFA tablets, more than two ANC checkup, more institutional delivery are important determinants to reduce the death of newborn. Similarly, consideration of different developmental factors identified 'village electrification' as the most prominent indicator for mortality in the early childhood. Other factors like long distance of hospital from village and poor transport facility in the village create barriers for utilization of

different MCH services that in turn affect the neonatal deaths. Now importance of all these factors is not equally same in different regional levels. For example, children born to mother belonging to lower standard of living and who were less exposed to media has greater chance of death in neonatal stage in central region, where neonatal mortality is high compared to other regions. In northern and western regions similar result has been observed for children of Schedule Caste community. Muslims in eastern regions show more relative risk of neonatal death compared to others. In west and south media plays a major role in neonatal deaths.

Neonatal as well as early neonatal mortality rates were highest in Central region. Between 1990-92 and 1996-98 neonatal mortality rates declined. However the rate of decline in early neonatal mortality suggests that the efforts undertaken to lower early neonatal death were not fruitful. This clearly needs more emphasis to programme efforts to improve the surviving condition of neonates particularly in the states of Rajasthan, Uttar Pradesh and Madhya Pradesh, Gujrat, Assam, Orissa, Jammu & Kashmir.

Using logistic regression analysis, different socio-cultural and developmental correlates were obtained for the use of reproductive and child health care services provided by the Government. It is observed that women: younger and older with lower level of education belonging to households having lower standard of living, minimum exposure to media, living in villages with hospital far away from home and having no electricity are less likely to receive recommended doses of tetanus injection during pregnancy. Similar factors are also responsible for non-consumption of IFA tablets. Further, non-institutional deliveries among SC, ST, Muslim communities and mothers' aged greater than or equal to 35 years are moderately high. This may be due to the fact that, benefits of delivering in the health facility still not known or accepted. So the extent of these inequalities and also the causes behind these inequalities leading to deprivation need constant monitoring for the revision of different policy measures in reducing infant mortality or more specific neonatal mortality in India. This region specific analytical research may help in formulating better strategies towards desired public health programmes in different regions of India.