

# A Study of Spatial Variation of Maternal Health Care Services in West Bengal

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**Abstract:** In this study we identify the inter-district disparity of maternal health care use in West Bengal. We use data from the National Family Health Survey (NFHS) carried out during 2015-16 across most district in India. This study focuses on the utilization of delivery and post delivery services especially antenatal and postnatal check-up and institutional services. We have used the ArcGIS software to show the utilization of maternal health care services across the districts. We also measure the maternal health care index on the basis of four or more ANC, institutional services and PNC for showing of district wise safe motherhood status. The study indicates of maternal health care services are not same across the districts. The performance of utilization of maternal health care services is highest in Kolkata followed by Howrah, Darjeeling and Nadia and the worst performance districts are Uttar Dinajpur, Maldah, Murshidabad. The inter-district differences in utilization are likely due to differences in availability and accessibility of services among the districts. The challenge is how to make safe motherhood strategies in the future more successful. To implement evidence-based strategies and micro-level programmes planning are needed for the safe pregnancy and maternal health outcome.

**Index Terms:** disparity, maternal health care, programmes, NFHS, GIS software.

**I. Introduction:** Maternal health is the health of women during pregnancy, childbirth and the postpartum period and maternal health care services are antenatal care (ANC), delivery care and postnatal care (PNC) services (WHO, 2016). Health care services during pregnancy and childbirth and after delivery are important for the survival and well-being of both the mother and the infant. Maternal health is not a women's issue. It is needed as a basis for social harmony and economic productivity; it also reduces costs and burdens to families, communities, service providers and the Treasury. Healthy mothers lead to healthy families and societies, strong health systems, and healthy economies (Africa Progress Panel, 2010).

Maternal health has been becoming a global concern because the lives of millions of women in reproductive age can be saved through maternal health care services. Despite efforts that have been made to strengthen maternal health care services, maternal mortality is still high in most of the developing countries (Gyimaha *et al.* 2006). According to the World Health Organization (2016) every day, approximately 800 women die from preventable causes related to pregnancy and childbirth and 99 percent of all maternal deaths occur in developing countries. The large number of maternal mortality, especially in developing countries has been due to the low level of maternal health care services. The lack of proper antenatal and post antenatal care services coverage, poor utilization of institutional delivery and high practice of home delivery might be some of the major reasons for the high maternal morbidity and mortality (Berhan *et al.* 2014). Maternal health-care services improve the overall health and well-being of women and children. Ghosh and Mistri (2015) suggest that delivery and post-delivery complications become the main controlling factor for the vulnerable pregnancy and maternal health outcome in West Bengal. According to Arokiasamy and Pradhan (2013), maternal health-care coverage is the outcome of three domains of health services availability and utilization that include ANC, care of delivery and PNC. ANC can reduce the health risks for mothers and their babies by monitoring pregnancies and screening for complications. Delivery at a health facility, with skilled medical attention and hygienic conditions, reduces the risk of complications and infections during labor and delivery. So, the most important factors towards reducing maternal mortality are care before delivery, place of delivery, the presence of personnel at the time of delivery and post-delivery care.

Maternal mortality ratio (MMR) estimates often mask variations between regions and sub-groups of population. Universal access to comprehensive reproductive health services remains an important determinant of low MMR. Inequity in access to maternal health services renders a greater burden of maternal deaths (Rai *et al.* 2012). In India, inter-state disparities in ANC, institutional delivery and PNC coverage has been reported. Coverage gap and inequity in the distribution of public maternal health services is strongly associated with high variations of a slow decrease in MMR.

Previously, studies reported interstate inequities in maternal health service coverage using nationally representative data (Montgomery *et al.* 2014; Mnutswamy *et al.* 2014; Pathak *et al.* 2010). However, most of the studies analyzed inequity in dimensions of socio-economic and demographic status while inequity across administrative regions is very rarely reported (Sanneving *et al.* 2013). Thus studies analyzing inequality along regional dimension especially inter-districts are lacking. In maternal health system, inter-district inequality analysis of a state could provide evidence for resource allocation decisions (Himanshu *et al.* 2017). Thus, this study aims to analyze the change in inter-district inequity of maternal health service coverage within West Bengal.

**II. Objectives of the Study:** - Major objectives of the present study are as follows:

1. To study the intra-district variation of maternal health care services.
2. Find out maternal health care index in the study area.

**III. Database and Methods:** - This research work has been developed with the help of secondary data. Secondary data have been collected from the 2015-16 National Family Health Survey (NFHS-4) report under Ministry of Health and Family Welfare (MoHGW) provides information on population, health and nutrition for India and each state and union territory. The secondary data and information also collected from the different books, journals, Sample Registration System report, and government sites. Intra-district analyses of maternal health care services have been mapped through ArcGIS-10.3 software. Maternal health care index is estimated by (i) the percentage of four or more ANC visits (H1), (ii) the percentage of institutional deliveries (H2) and (iii) the percentage of women with a postnatal check within two days of birth (H3).

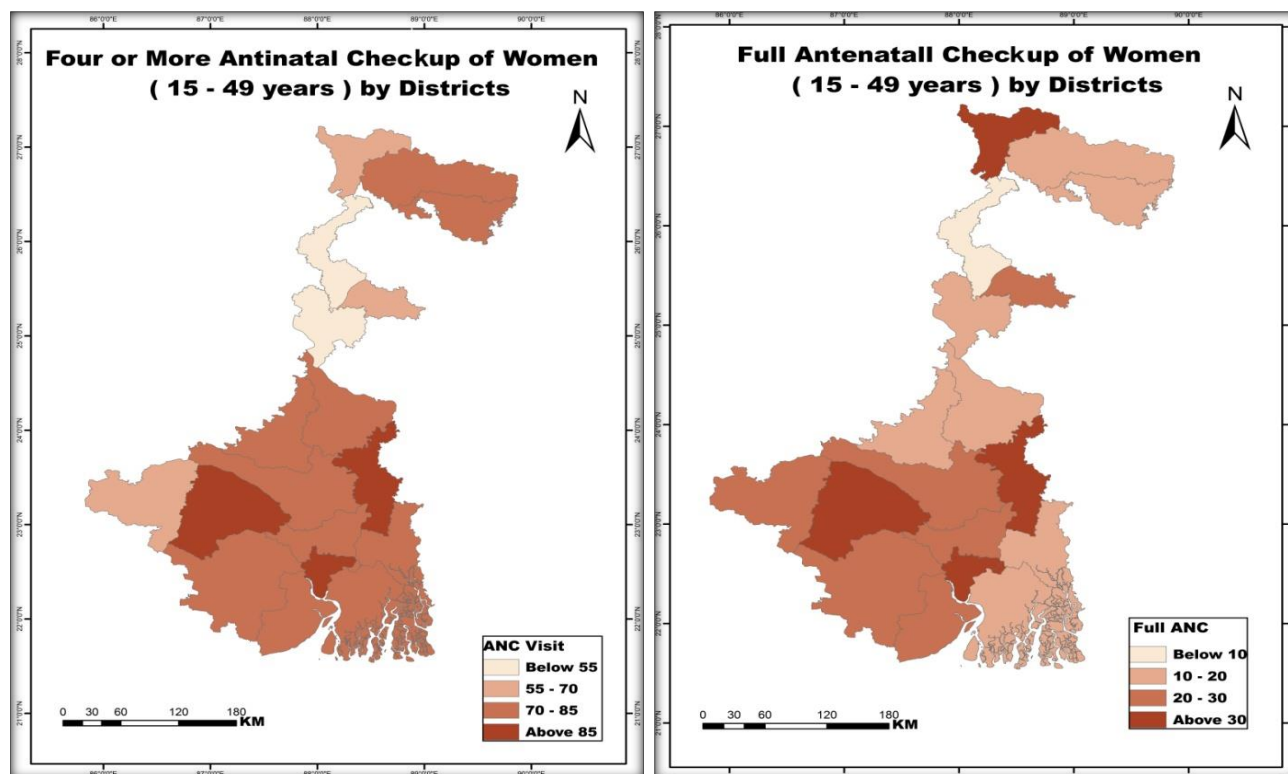
Health Care Index =  $1/3 (H1 \text{ Score} + H2 \text{ Score} + H3 \text{ Score})$ , where Score =  $H - \text{MinH}/\text{MaxH} - \text{MinH}$

**IV. Study Area:** - The state of West Bengal (area - 88752 km<sup>2</sup>) is located in the eastern part of India that extends from the Himalaya in the north to the Bay of Bengal in the South. West Bengal lies approximately between 21°25'N to 26°50'N latitudes and 86°30'E to 89°58'E longitudes. According to Census of India 2011, West Bengal has a total 91347736 population. The study region comprises 19 districts. According to NFHS-4, among women with a live birth in the five years preceding the survey, only 77% and 22% women had received four or more and full antenatal care during pregnancy for their most recent live birth. Around three-fourth of live birth delivered in health facility in which 57% and 19% birth delivered in public and private health facility. The percentage of institutional delivery in the state is slightly high from the national average. Still, the state is far behind the target of hundred percent institutional delivery services. Above sixty four percent women received a postnatal check within two days of birth for their most recent birth in the five years preceding the survey NFH.

**V. Antenatal Care:** - Antenatal care is a kind of medical supervision given to a pregnant woman and her baby starting from the time of conception up to the delivery of the baby. Antenatal care is important because it helps to maintain the mother in good health during pregnancy. Improved ANC can help to reduce perinatal, neonatal and infant mortality (Mondal, 2017). ANC services are provided by medical and paramedical professionals consist of the regular physical checks with weight, height, and blood pressure measure, Haemoglobin level test, consumption of IFA, Tetanus (TT) injection and the growth status and position of the foetus. These primary services are made compulsory to be provided during the ANC check up from the health facility. At least four checkups are made compulsory to complete the full ANC course in order to prevent and protect women from pregnancy-related complication faced during the pregnancy and till the delivery. The Reproductive and Child Health program emphasizes that a pregnant woman must have at least three antenatal visits during pregnancy receive at least two tetanus toxoid injections and should take supplementary iron in the form of IFA tablet at least for three months (Government of India, 1999). In West Bengal, 88 percent of mothers received antenatal care (ANC) for their last birth from a health professional in which 79% from a doctor and 9% from an auxiliary nurse midwife (ANM), lady health visitor (LHV), nurse, or midwife during the pregnancy of their last birth and in the five years preceding the survey NFH (2015-16). It is found that there are substantial differences district wise in the number of antenatal care visits, tetanus toxoid injection taken and IFA tablet consumed in West Bengal.

According to Navaneetham and Dharmalingam (2002), the health impact of antenatal care is dependent on how often women receive antenatal care and at what time during pregnancy women start obtaining antenatal care. Slightly more than half of the women (55%) had their first ANC visit during the first trimester of pregnancy, which is the lower than the national level (59%). The best districts are Darjeeling, Kolkata and Howrah where 81%, 76% and 74% women took an ANC in the first trimester of pregnancy. The worst performance district is Uttar Dinajpur (37%) followed by Purba Medinipur (42%) and Maldah (43%). So, almost sixty percent pregnant women hadn't received at least three ANC check up in these three districts.

Seventy-seven percent of mothers had four or more ANC visits during the last pregnancy. The 92 percent women had at least four or more ANC visits during their last pregnancy in Nadia district followed by Bankura (90%) and Howrah (87%). The poor performance was observed in Uttar Dinajpur district where only 4 out of 10 women and in the district Maldah where around 5 out of 10 women had received four or more ANC visits during pregnancy. It is very alarming that the half of pregnant women of these two districts did not undergo four or more ANC checkup.

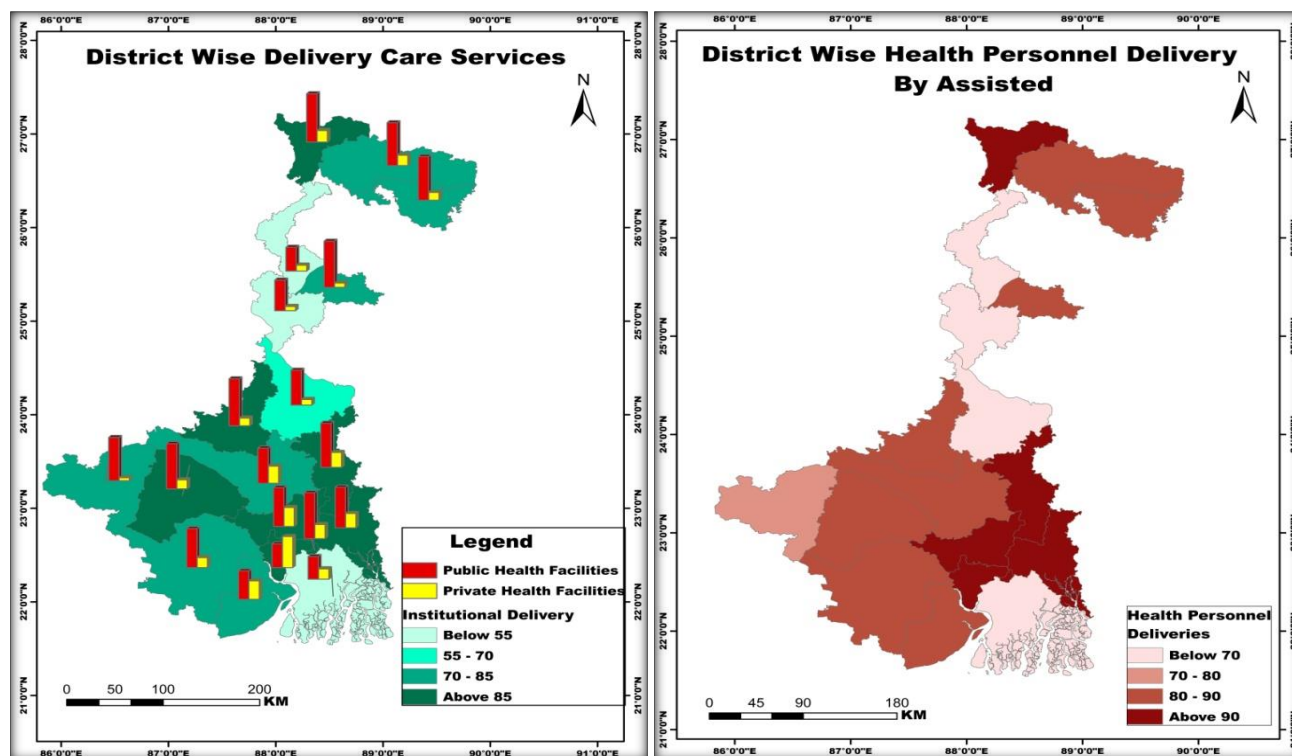


For 91 percent of their last births, mothers received iron and folic acid (IFA) supplements, but only 28 percent consumed them for the recommended 100 days or more. It is very alarming that about three-fourth of women did not consume a sufficient number of IFA tablets at least three months during pregnancy. The percentage of mothers took IFA is highest in Bankura (47%), Darjeeling (42%) and Kolkata (42%) and lowest consumed in Uttar Dinajpur (only 6%), Maldah (19%) and Koch Bihar (20%).

Ninety-one percent of last births were protected against neonatal tetanus through tetanus toxoid vaccinations given to the mother. The proportion of women received two or more TT injections during the pregnancy are highest in Murshidabad (97%), North 24 Pargana and Darjeeling. The proportion of mothers receiving two or more tetanus toxoid injection during pregnancy for the most recent birth is substantially lower than the state average in the districts Puruliya (79%) and Uttar Dinajpur (85%).

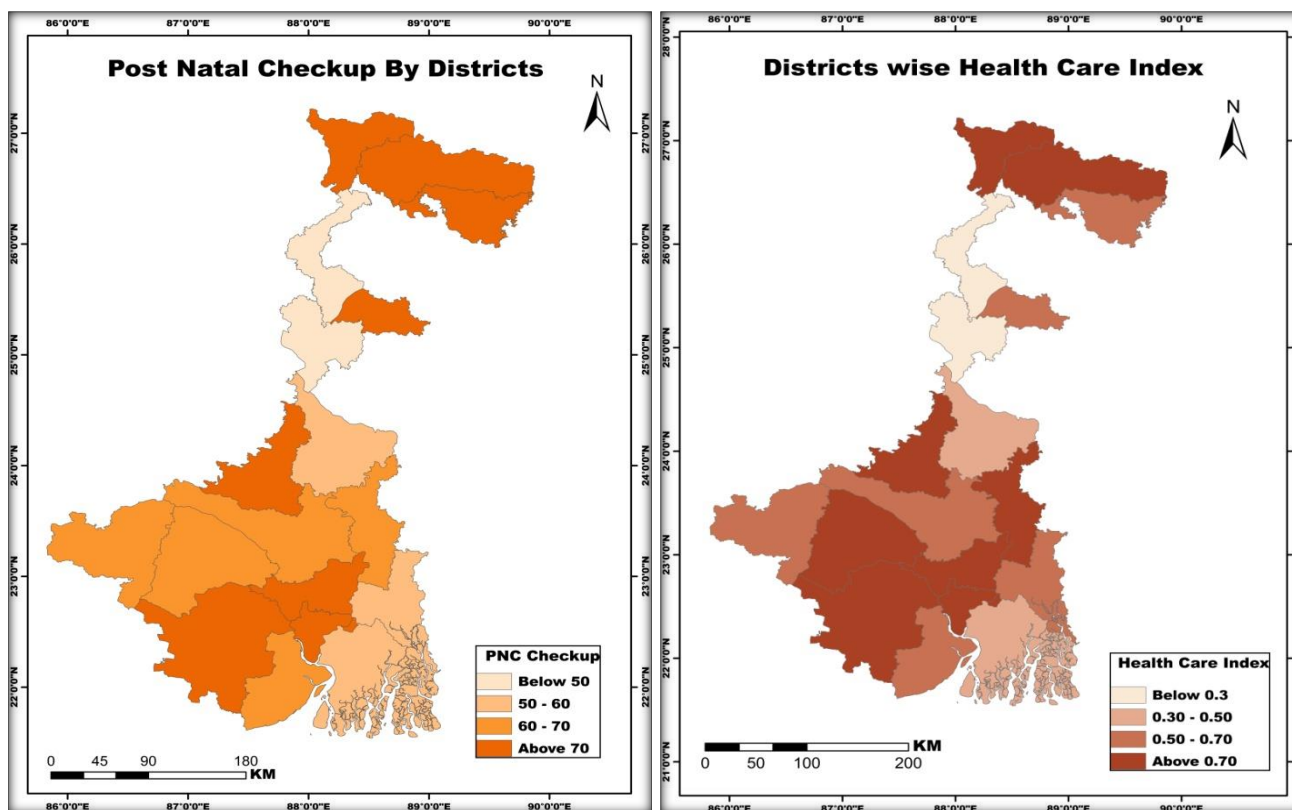
**VI. Delivery Care Services:** - It is well known to all of us that giving birth in a medical institution under the supervision of trained health care providers promotes child survival and reduces the risk of maternal mortality. An important indicator of health service coverage is the proportion of births where the women delivered in a health facility where obstetric complications can be managed (Koblinsky *et al.* 1995; Maine *et al.* 1995).

**1. Institutional Deliveries:** - Three-fourths of births take place in a health facility (mostly a government facility) and 24 percent take place at home. The percentage of births in a health facility increased substantially in the 10 years between NFHS-3 and NFHS-4, from 42 percent in NFHS-3 to 75 percent in NFHS-4. There are variations in the extent of institutional delivery services across the district of the state. The performance of thirteen districts out of nineteen districts is high from the national as well as the state average. Kolkata and Darjeeling both districts are occupied the first rank with ninety-five percent institutional delivery, while Uttar Dinajpur has achieved lowest rank with only forty-seven percent institutional delivery followed by South 24 Pargana (52%), Maldah (55%) and Murshidabad (64%). The performance of the four districts is lagging much behind from the target delivery services coverage (100%). The positions of Darjiling (76%), Birbhum (74%), Dakshin Dinajpur (73%), Kolkata (72%) etc. have the high percentage of births delivered in a public health facility and lowest in S 24 Pargana (36%), Howrah (38%) and Uttar Dinajpur (38%). The proportion of birth delivered in a private facility is lowest in Puruliya, Maldah, Dakshin Dinajpur, Murshidabad, and Uttar Dinajpur etc. and highest in Howrah (49%) and Hooghly (30%).



**2. Skilled Assistance during Delivery:** -Skilled assistance includes a doctor, auxiliary nurse midwives, nurses, midwives, and lady health visitors. Assistance during childbirth can influence the birth outcome and the health of the mother and the newborn. A skilled attendant can manage complications of pregnancy and delivery or refer the mother and/or the baby to the next level of care (NFHS, 2015-16). In the five years before the survey, 8 in 10 live births (82%) were delivered by a skilled provider. The percentage of deliveries assisted by health personnel recorded is still quite high in many districts from the state average. The best performances are in Kolkata, Darjeeling, Howrah, N 24 Pargana, Hooghly and Nadia where 98%, 95%, 92%, 93%, 92% and 91% of the births are delivered by skilled assistance. And the worst position districts are Uttar Dinajpur (58%), Maldah (62%), S 24 Pargana (67%) and Murshidabad (70%).

**VII. Postnatal care:** - The Postnatal period is defined as the first six weeks after birth. This period is critical to the health and survival of a mother and newborn. Lack of care in this time period may result in death or disability as well as missed opportunities to promote healthy behaviors, affecting women, newborns, and children. In West Bengal, 64 percent of mothers had a postnatal check within 42 days of the birth which is slightly lowest from the national level. There has district wise variation of the proportion of women with a postnatal check-up in West Bengal. The lowest percentage of women with a postnatal had in Maldah, which is slightly higher from the half of the state average level, followed by Uttar Dinajpur (49%), Murshidabad (53%) and S 24 Pargana (57%). The best performance are observed in Darjeeling, Kolkata, Howrah and Birbhum districts where around eight out of ten have received a postnatal check-up.



**Health Care Index:** - The overall maternal health care status is the outcome of three domain services- delivery care services, ANC and PNC. District wise health care index is estimated on the basis of these three criteria. The best performance districts are Kolkata, Darjeeling, Howrah, Nadia, and North 24 Pargana. The worst performance districts are Uttar Dinajpur, Maldah, Murshidabad, South 24 Pargana etc.

**VIII. Conclusion:** - There is district wise variation of maternal health care status in West Bengal. Basically, the transition districts of north and south Bengal (Uttar Dinajpur, Maldah and Murshidabad) along with South 24 Pargana, Puruliya are suffering by the unmet need for an antenatal and postnatal check-up and lack of institutional delivery. Major initiatives were taken by the Government to motherhood status in the last two decade, till recently, coverage of delivery and post-delivery cares are low in these districts; nearly half of deliveries take place at home in Uttar Dinajpur, and the coverage of postnatal check-up is less than fifty percent in Maldah (37%) and Uttar Dinajpur (49%). These are the basic reason behind their lower position in safe motherhood status. Three districts such as Uttar Dinajpur, Maldah and Murshidabad are having a maximum percentage of Muslim community. The Muslims are governing by different kinds of taboo related to maternal health (Ghosh & Mistri, 2015) as well as lack of health care facilities and rural infrastructure basically *pucca* road and poor transport condition and another course is most of the villages are located in the remote part like India Bangladesh border. Poor medical infrastructure is the reason behind of lower health care status in Puruliya and South 24 Pargana. Moreover, it is fact that it's become hard to convince people among the lower status districts to adopt the modern medical infrastructure during the time of pregnancy. In most cases, they prefer home delivery over the institutional delivery. So the delivery and post-delivery complications are major governing factors for the pregnancy and maternal health outcome for these districts. On the other hand, other districts of the study area are an active role in terms of to improve the maternal health care status such as Kolkata, Hooghly, Howrah, Darjeeling etc. Hilly area Darjeeling and Jalpaiguri, and the *Rarh* Bengal included Bankura and Paschim Medinipur districts providing medical facilities is the reason for maternal health status. The challenge is how to make safe motherhood strategies in the future more successful for lower maternal status areas. To improve the maternal health status of West Bengal, Government should focus on these districts where maternal health is in a frightful condition, and also should be taken different strategies which give privileges to the pregnant women and awareness about the pregnancy of family members should be necessary. Policy and programmes designed to implement evidence-based strategies and micro-level programmes planning are needed for the safe pregnancy and maternal health outcome for the districts. Monitoring, effective implementation, and evaluation are essential for success.

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