



## Original Article

# Factors determining institutional delivery in eastern part of India

Madhumita Mukherjee<sup>a</sup>, Manas Pratim Roy<sup>b\*</sup>

<sup>a</sup>Department of Community Medicine, Patna Medical College and Hospital, Patna, India, <sup>b</sup>Department of Pediatrics, Safdarjung Hospital, New Delhi, India

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### ABSTRACT

**Objective:** Institutional delivery (ID) plays a vital role for determining the outcome of pregnancy and ensuring care to mother and newborn. The present study aims to find out the correlates of ID from the eastern part of India. **Materials and Methods:** Data from National Family Health Survey 4 were analyzed for three states – Bihar, West Bengal, and Jharkhand, keeping district as a unit of analysis. Correlation and regression were used for finding out the determinants of ID. **Results:** Overall, 67.8% of deliveries were conducted in hospitals. All the three states were able to improve performance on related health parameters like antenatal care. After adjusting for other variables, on multiple linear regression, female literacy was significantly related to ID. **Conclusions:** Social parameters need to be focused for encouraging ID.

**KEYWORDS:** India, Institutional delivery, Maternal health, National Family Health Survey 4

### INTRODUCTION

Out of 287,000 maternal deaths in 2010, most occurred in developing world [1]. India, being one of the key contributors in maternal death globally, still records more than 100 maternal deaths per 100,000 live births, many of them being preventable [2]. For reducing this burden, Janani Suraksha Yojana (JSY) was introduced in 2005, with the objective of conducting all deliveries to the health facility. Keeping Accredited Social Health Activist (ASHA) at the frontline, it targeted financial barriers of getting delivery done in a hospital and started providing cash incentives for the same. Approaching with an aim to change health-seeking behavior and a unique approach for community participation, the scheme was successful, as evident from unprecedented rise in the proportion of institutional delivery (ID) in the country. Mobilization of village mothers to hospitals and helping them in getting the incentives pushed the proportion of ID from a meager 38.7% to groundbreaking 78.9%, within a span of 10 years. Some drawbacks were pointed out by previous researches persistent in the scheme, delayed payment, and additional out of pocket expenditure being few of them [3]. Still, JSY has been highly acclaimed as a “game changer” for boosting ID.

To sustain the momentum and raise the bar higher, there is a need to analyze the success. One of the key steps to increase ID further would be to understand correlates of ID. The factors responsible for pushing beneficiaries to hospital vary, according to geographic distribution, socioeconomic factors, and

rituals, among others. Till now, only a handful of studies ever tried to analyze data from multiple states of the country. The present paper makes a sincere effort to find out the correlates of ID from the eastern part of India – as evident from the latest National Family Health Survey (2015–2016) (NFHS 4) [4]. For that, three states were picked up from the area – each one recording worse proportion of ID than the national average of 78.9%.

### MATERIALS AND METHODS

Data were retrieved from NFHS 4 for three states situated in the eastern part of India – Bihar, West Bengal, and Jharkhand. The district was considered as the unit for analysis. A total of 81 districts were taken into account. Among independent variables, female literacy, age at marriage, teenage pregnancy, four or more antenatal care (ANC) visits, early ANC registration and consumption of 100 iron and folic acid (IFA) tablets during pregnancy were considered.

Women aged between 15 and 49 years were considered in the studied survey. For assessing early marriage, the question was asked to women aged between 20 and 24 years whether they got married before 18 years of age. For teenage pregnancy, women aged 15–19 years who were pregnant during survey or delivered baby before the survey were considered.

#### \*Address for correspondence:

Dr. Manas Pratim Roy,  
Department of Pediatrics, Safdarjung Hospital, New Delhi - 110 029, India.  
E-mail: manas\_proy@yahoo.co.in

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Early registration means getting starting ANC checkup in the first trimester.

The study was conducted in accordance with the Declaration of Helsinki. Informed written consent was not taken because the study was a retrospective analysis of anonymous data. Descriptive statistics (mean and standard deviation) was calculated for each variable. The correlation was tested between ID and rest of the variables. Spearman correlation coefficient was used. Multiple linear regression was used for assessing the role of independent variables on ID.  $P < 0.05$  was considered statistically significant. PASW for Windows software (version 19.0; SPSS Inc., Chicago, USA) was used.

## RESULTS

Figure 1 compares three states in different parameters. In all parameters except early marriage and teenage pregnancy, WB performs better than rest two states.

The mean proportion of ID recorded in districts was 67.8% while 38.9% marriages were before legal age of 18 years. Four or more ANC visits were availed by one-third of the beneficiaries, whereas less than half mothers registered their pregnancy in the first trimester. On an average, 13.5% of mothers conceived during their teens [Table 1].

There was a wide variation between districts. While Kolkata recorded 95% ID, Sitamarhi did only 37.3% and Paschimi Singhbhum did 37.4%. In teenage pregnancy, Murshidabad was highest with almost one-third pregnancy were reported in that age group (29.5%) while Kolkata was lowest (4.8%). In Godda, 63.5% of women experienced early marriage. Madhepura and Sheohar recorded the lowest proportion (2.6%) of ANC women taking 100 IFA tablets. The highest female literacy was noted in North 24 Paraganas (82.9%) and lowest recorded in Madhepura (32.6%). Overall, 93.1% women in Nadia district had at least four ANCs. Only 19.6% from Paschimi Singhbhum had early registration of pregnancy.

Further analysis showed that in 44% districts, 80% or more IDs are taking place in public facility. In Dhanbad, only 33% IDs are taking place in government hospitals.

ID was directly correlated with female literacy, early marriage, teenage pregnancy, four or more ANC visits, and the relations were significant. It was correlated with a lower

proportion of early ANC registration [Table 2]. On regression, after adjusting for other variables, only female literacy was significant ( $P = 0.000$ ) [Table 3].

## DISCUSSION

In the present paper, data from three states in the eastern part of the country were analyzed to assess different correlates of ID. The total ID was 75.2% in WB, 63.8% in Bihar, and 61.9% in Jharkhand. The figures being comparable, contrast with the previous survey yields a distinctive picture. While for WB, 79% increase was modest in comparison to NFHS 3 (2005–2006), both Bihar and Jharkhand recorded more than 220% rise in ID within a span of 10 years – a fact that probably indicates, apart from dedicated ground works, the need of financial support for ID for selected states of the country [5]. This finding could be substantiated with the fact that Jharkhand and Bihar stand 30<sup>th</sup> and 33<sup>rd</sup>, respectively among Indian states/UTs in terms of Gross Regional Domestic Product per capita, a measure of economic activities, while WB is at 18<sup>th</sup> place [6]. Such incentive draws all those beneficiaries to

**Table 1: Percentage of demographic variables from three states of east India**

Variables	Mean	SD
ID	67.8	14
Female literacy	56.2	12.1
Early marriage	38.9	10.5
Teenage pregnancy	13.5	5.3
Four or more ANC visits	33.2	26.1
Early ANC registration	45.3	13.8
Consumption of 100 IFA tablets during pregnancy	15.9	10.8

ID: Institutional delivery, IFA: Iron and folic acid, SD: Standard deviation, ANC: Ante natal care

**Table 2: Correlation between institutional delivery and demographic variables from three states of east India**

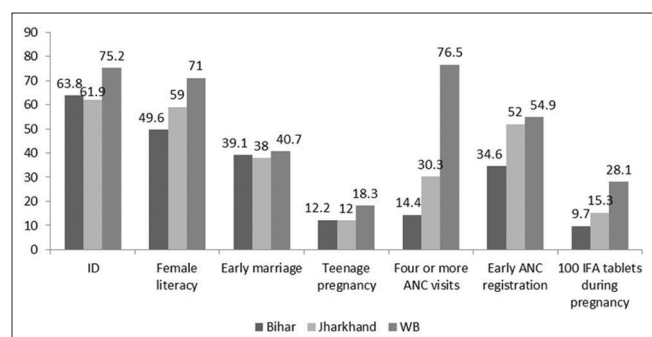
Variables	Spearman correlation coefficient	P
Female literacy	0.676	0.000
Early marriage	-0.270	0.015
Teenage pregnancy	-0.045	0.691
Four or more ANC visits	0.530	0.000
Early ANC registration	0.562	0.000
Consumption of 100 IFA tablets during pregnancy	0.570	0.000

IFA: Iron and folic acid, ANC: Ante natal care

**Table 3: Factors associated with institutional delivery from National Family Health Survey 4 for three east Indian states**

Variables	Coefficients	95.0% confidence		P
		Lower bound	Upper bound	
Female literacy	0.574	0.334	0.993	0.000
Early marriage	-0.179	-0.303	0.112	0.361
Teenage pregnancy	0.201	-0.062	0.470	0.130
Four or more ANC visits	0.203	-0.176	0.702	0.236
Early ANC registration	0.081	-0.279	0.493	0.583
Consumption of 100 IFA tablets during pregnancy	-0.027	-0.810	0.669	0.850

IFA: Iron and folic acid, ANC: Ante natal care



**Figure 1:** Comparison of different indicators related to institutional delivery in three East Indian states, National Family Health Survey 4

hospital who would otherwise deliver at home, courtesy to out of pocket expenditure one needs to withstand while opting for hospitalization of a pregnant woman for delivery. Even when medicines, meal and transport are free, hospitalization may incur loss of wages for lower economic group, posing an obstacle for deciding in favor of ID. Financial conditions have always played vital role for choosing hospital as place for delivery [7,8].

District-wise variation in certain demographic parameters and health-seeking behavior is an undeniable fact; a trend was noted by another study previously [9]. Every state does have some underserved areas due to interplay of several reasons. More than 100 such districts have recently been identified as “aspirational districts” and focused efforts are being put to upgrade them. They have been kept at the center of comprehensive primary health care, a project to strengthen primary health care in India.

In almost half of the districts, public hospitals cater to 80% of the ID. This is important, as the area under study seems to consider the financial burden associated with ID with great weightage, as witnessed by a huge jump in ID after the introduction of cash benefits under JSY. Previous researchers also found wealth as the major factor for selecting private hospitals as place for delivery [10,11].

The study supports the notion that female literacy could play a key factor in increasing ID. Being educated has the perks of having better knowledge about maternal care offered in the hospitals. It has also been mentioned that literacy may propel women to go beyond norms and ask questions about their conditions [12]. Researches from other developing countries also support this role of literacy [7,8,10,13-15]. Education empowers women to articulate their needs and strengthen their roles in the family, thus ensuring a voice in their reproductive life including pregnancies. In fact, it drives mothers to ensure better nutrition to their children in future [16].

Early marriage is another crucial factor. In fact, each year of education tends to differ the age of marriage for girls, thus helping them to avoid teenage pregnancy and a larger family. It also helps biologically to mature the pelvis of mothers and reduce the possibility of obstructed labor – an important cause of maternal mortality. Even in other developing countries, it poses as an important factor for home delivery [14,17,18].

Other factors such as number of ANC visits, early registration, and consumption of IFA tablets are also significantly related to ID. Studies from other counties also suggested that four or more ANC raises the chance of ID [7,13,15,19]. In fact, throughout pregnancy, a woman could be convinced for ID. The role of ASHA and ANM is thus very crucial for encouraging pregnant ladies for timely hospitalization before delivery. Positive counseling and promoting the mother for ID throughout pregnancy is a known strategy. In fact, certain factors like transport to the hospital (which was not considered in the present study) may also prove vital in otherwise motivated woman and health worker may counsel the ante-natal mother about planning such events well in advance. Repeated ANC visits help health worker to keep up the motivation level

among beneficiaries for hospital admission at the crucial hour of labor. Considering the fact that only one-third of the ANC mothers went for four or more ANC visits in our analysis, there is enormous opportunity for the system to intervene and reap the benefits.

It is also clear from analysis that early registration has a positive correlation with ID. A longer association with health-care delivery system is ensured when someone is opting for ANC in the first trimester. This fact probably plays a role in building a preference for ID among pregnant mothers.

A higher consumption of IFA tablets may indicate possible ID. In one way, it reflects maternal adherence to medical advices. Previous researchers also found a similar tendency [20]. Teenage pregnancy reduces the chance of ID, but the present paper found no such relation [18]. In India, 66% of IDs are conducted in public hospitals. In the present paper, 76% districts from the study area recorded a higher proportion of ID in the government sector.

No aspect of quality was considered in our study. Being ecological and use of secondary data are other disadvantages the article suffers from. The analysis was limited to three states, therefore, making generalization difficult for the entire country. Among strengths, covering 81 districts from three states makes the study free of local factors. Such analysis on NFHS 4 data is not very common.

## CONCLUSIONS

There are still enough chances for improving ID. Attention may be given to basic social parameters such as female literacy, early marriage, and teenage pregnancy to ensure ANC mothers are capable of taking decision for ID. In the long run, this could help in the realization of SDG targets in maternal and child health.

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## Conflicts of interest

There is no conflict of interest.

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