# **Original Research Article**

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# Maternal health situation in the empowered action group states: how far we reached: a comparative analysis of national family health survey-3 and 4

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# **ABSTRACT**

**Background**: Maternal health constitutes the health of women during pregnancy, childbirth, and the post-partum period. India is one the biggest contributor to maternal mortality, among all the states of India, the Empowered Action Group (EAG) states contributes 61.5% of total mortality, keeping in this view the study compared the NFHS-3 and NFHS-4 survey of the maternal health condition of EAG states of India and evaluated the relationship between maternal health status and predictors of EAG states of India in NFHS-3 and NFHS-4.

**Methods:** This cross-sectional study adopted descriptive secondary data analyses of two rounds of nationally representative sample surveys NFHS-3 and NFHS-4. The data were obtained by the demographic and health survey website after proper procedures and compared for various maternal health indicators of EAG states.

**Results:** In this investigation, progress has been observed from NFHS-3 to NFHS-4 however, the progress is very positive promising to growth. Where their full (antenatal care) ANC indicator growth is very steady. Education and domestic violence are still hampering the growth of full maternal health wellbeing.

**Conclusions**: Given the status of maternal health in India and more especially in EAG states, more improvement in the performance of maternal health-related activities is highly necessary for which health system strengthening coupled with strong political will and community mobilization are some of the urgent strategies required in the EAG states. Above all community, awareness has a greater role in improving the health status in these.

Keywords: NFHS, EAG, Full ANC, Institutional delivery, Postnatal care

# **INTRODUCTION**

Maternal health has always been a matter of concern for various societies. It was estimated that in 2015, roughly 303000 women died during and following pregnancy and childbirth among which 99% (302000) of the global maternal deaths in 2015, with sub-Saharan Africa alone accounting for roughly 66% (201000), followed by Southern Asia (66000). At the country level, India is estimated to account for 45000 maternal deaths (15%) of all maternal deaths occur in developing countries. Almost all of these deaths occurred in low-resource settings, and most could have been prevented. India is

one the biggest contributor to maternal mortality when it among the states of India EAG it contributes 61.5% of all maternal deaths in the country. 3.4 NFHS-4 with a response rate of <90% is the best platform, which represents the status of maternal health conditions. 5

The study aimed to compare the NFHS-3 and NFHS-4 survey of the maternal health condition in India and evaluated the relationship between maternal health status and predictors of EAG states of India in NFHS-3 and NFHS-4.

#### **METHODS**

It is a nationally representative cross-sectional study using a multistage cluster sampling design with internationally validated instruments.6 The study used data of EAG states (Bihar, Jharkhand, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Chhattisgarh, Odisha, and Rajasthan) a two-stage sample design in most rural areas and a three-stage sample design in most urban areas. In the former, the first stage involved a selection of population sampling units, i.e., villages, with probability proportional to population size (PPS), the second stage involved the systematic selection of households within each primary sampling unit. For the urban sample, the first stage was a selection of wards with PPS sampling in the next stage, one census enumeration block was selected by PPS from each selected ward; in the final stage, households were randomly selected within each selected census enumeration block.

# Study participants

Study participants were eligible women aged between 15 and 49 years among 8 EAG states of India a total of 33895 households and 40606 eligible women and 271849 households and 329054 eligible women respectively in NFHS-3 and NFHS-4 were interviewed. Out of those 14144 and 103984 women of NFHS-3 and NFHS-4 are included for the present study based on the last five years birth (live and still) history.

# Data analysis

The data was cleaned and analyzed with the help of statistical software SPSS version 20. Descriptive statistics were used to describe the socio-demographic characteristics and dependent variables of the participants. Data is presented in the form of a table and figures for comparison of the variables.

# Ethical consideration

Ethical clearance is taken from the institutional ethical committee along with data sets of two rounds of NFHS that were downloaded from the DHS website after submitting the research proposal on their website.

#### **RESULTS**

# Socio-demographics distribution of the participants

The socio-demographics of the study participants n=40606 (NFHS-3) and n=353480 (NFHS-4) and the study was conducted in all EAG states of India, the study participants were recruited from the urban and the rural settings, 32.7% and 67.3% from NFHS-3 whereas 21.1% and 78.9% from NFHS-4. Hindu was the dominant religion among both the survey study participants with 82.5% and 84.4% followed by Muslim 14.9% and 13.2%, Christian 0.6% and 1%, others (Sikh, Jain, and Buddhist)

1.93% and 1.4% in NFHS-3 and NFHS-4 respectively. The participants from the OBC caste had a higher percentage of participants 44.1% and 47.9% in NFHS-3 and NFHS-4 respectively. The age distribution of the participants for  $\leq 17$  years (under the high-risk pregnancy) was 31.2% and 12.7% followed by 18 to 34 years 68.7% and 87.0%, ≥35 (under the high-risk pregnancy) was 0.1% and 0.3% in NFHS-3 and NFHS-4 respectively. As per the education status of the respondent's majority of them were not undergone any education was 55.0% and 38.6%, primary 13.2% and 15%, secondary 24.9% and 37.6%, higher 6.9% and 8.9% in NFHS-3 and NFHS-4 respectively Table 1. The percentage of registered pregnancy is high among NFHS-4 while compared to NFHS-3 which was 72% and 34% among EAG stats of India (Figure 1).

Table 1: Socio-demographics distribution of the participants.

| Variable                             | NFHS-3         | NFHS-4          |
|--------------------------------------|----------------|-----------------|
|                                      | (14144), n (%) | (103984), n (%) |
| Age of women at 1st delivery (Years) |                |                 |
| ≤17                                  | 4414 (31.2)    | 13232 (12.7)    |
| 18-34                                | 9721 (68.7)    | 90425 (87)      |
| ≥35                                  | 9 (0.1)        | 327 (0.3)       |
| <b>Education status</b>              |                |                 |
| No education                         | 7785 (55)      | 40086 (38.6)    |
| Primary                              | 1861 (13.2)    | 15575 (15)      |
| Secondary                            | 3521 (24.9)    | 39087 (37.6)    |
| Higher                               | 977 (6.9)      | 9236 (8.9)      |
| Residence                            |                |                 |
| Rural                                | 9524 (67.3)    | 82042 (78.9)    |
| Urban                                | 4620 (32.7)    | 21942 (21.1)    |
| Religion                             |                |                 |
| Hindu                                | 11670 (82.5)   | 87787 (84.4)    |
| Muslim                               | 2111 (14.9)    | 13775 (13.2)    |
| Christian                            | 89 (0.6)       | 1007 (1)        |
| Others                               | 274 (1.93)     | 1415 (1.4)      |
| Caste                                |                |                 |
| General                              | 3447 (24.4)    | 16406 (15.8)    |
| OBC                                  | 6234 (44.1)    | 49840 (47.9)    |
| SC                                   | 2806 (19.8)    | 20937 (20.1)    |
| ST                                   | 1631 (11.5)    | 15524 (14.9)    |
| Wealth index                         |                |                 |
| Poor                                 | 7067 (50)      | 61079 (58.7)    |
| Middle class                         | 2374 (16.8)    | 17509 (16.8)    |
| Rich                                 | 4703 (33.3)    | 25396 (24.4)    |

The maternal health condition in the EAG states

There is a 3% increase in full ANC status among EAG states from 7-10% in NFHS-3 and NFHS-4 respectively. Under institutional delivery, there is an increase in women delivered in an institution 31-75% in NFHS-3 and NFHS-4 respectively. It is also been noticed that there is a huge increase in postnatal checkups took place 23-71% in NFHS-3 and NFHS-4 respectively (Figure 2).

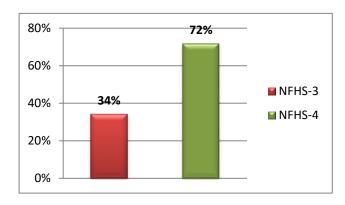


Figure 1: Received MCP card.

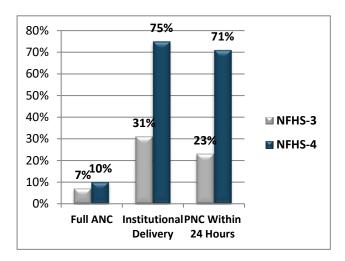


Figure 2: Maternal health condition in the EAG states.

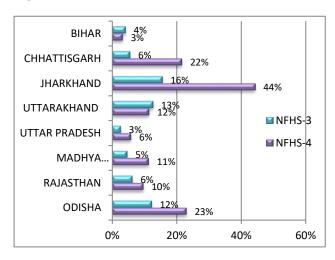


Figure 3: Full ANC in the EAG states.

# Full ANC in the EAG states

Among the study participants Jharkhand has shown high growth in conducting full ANC when compared to NFHS-3 and NFHS-4 was 16-44% followed by Odisha 12-23%, Chhattisgarh 6-22%, Madhya Pradesh 5-11%, Rajasthan 6-10%, Uttar Pradesh 3-6%, but there are two

such states where full ANC decreased Uttarakhand 13-12% and Bihar 4-3% in NFHS-3 and NFHS-4 respectively (Figure 3).

# Institutional delivery in the EAG states

All the states in EAG states have shown increased growth in conducting institutional delivery when compared to NFHS-3 and NFHS-4. Odisha 36-85%, Rajasthan 30-84%, Madhya Pradesh 26-81%, Uttar Pradesh 21-68%, Uttarakhand 33-69%, Jharkhand 18-62%, Chhattisgarh 14-70% and Bihar 20-64% in NFHS-3 and NFHS-4 respectively (Figure 4).

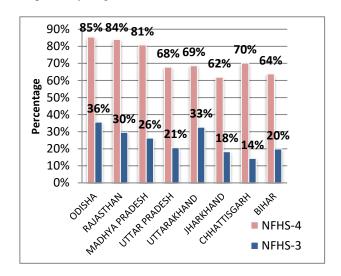


Figure 4: Institutional delivery in the EAG states.

# Distribution of place of delivery in NFHS-3 and-4

There is a decrease in-home delivery when compared with NFHS-3 and NFHS-4. There is a very positive increase in delivery in the government setting which is 56% in NFHS-4 which was 13% in NFHS-3. When it comes to the delivery in a private setting there is there are no satisfactory increases in NFHS-4 (19%) when compared to NFHS-3 (18%) (Figure 5).

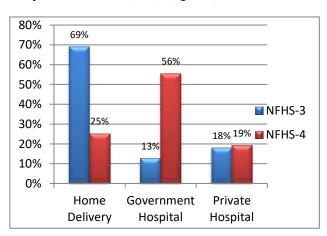


Figure 5: Distribution of place of delivery in NFHS-3 and NFHS-4.

#### Post-natal checkups within 24 hours of delivery

All the states in EAG states have shown good growth in receiving postnatal care within 24 hours of delivery when compared to NFHS-3 and NFHS-4. Odisha 42-67%, Rajasthan 28-81%, Madhya Pradesh 17-77%, Uttar Pradesh 29-65%, Uttarakhand 18-69%, Jharkhand 28-62%, Chhattisgarh 12-67% and Bihar 24-68% in NFHS-3 and NFHS-4 respectively (Figure 6).

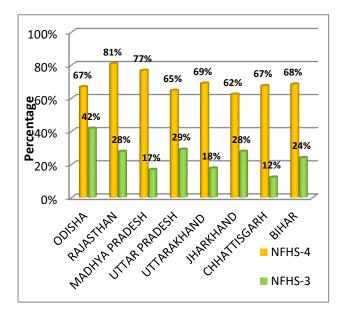


Figure 6: Post-natal checkups within 24 hours of delivery.

## Maternal health status concerning education

Education plays an important factor in an increase in maternal health status in both NFHS-3 and NFHS-4. In NFHS-3, 88% of educated women undergone full ANC when compared to uneducated women only 13%, similarly, in NFHS-4, 83% of educated women undergone full ANC when compared to uneducated women only 17%. In NFHS-3, 74% of educated women undergone institutional delivery when compared to uneducated women only 13%, similarly, in NFHS-4, 68% of educated women undergone institutional delivery when compared to uneducated women 32%. But in NFHS-3 there is a difference that 45% of educated women undergone postnatal checkups within 24 hours whereas 55% of uneducated women undergone postnatal checkups within 24 hours, In NFHS-4, 67% of educated women undergone postnatal checkups within 24 hours when compared to uneducated women only 33% (Figure 7).

# Maternal health status distribution concerning wealth index

There is an increase in full ANC status among poor wealth mothers when compared to 2 rounds of NFHS which is 12% in NFHS-3 and 36% in NFHS-4. The same type of difference noticed while accessing institutional

delivery which is 19% in NFHS-3 and 53% in NFHS-4 among poor wealth mothers. While among poor wealthy mother's postnatal checks within 24 hours there is no such type of difference noticed which is 50% in NFHS-3 and 51% in NFHS-4 (Figure 8).

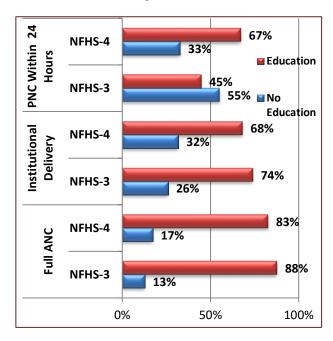


Figure 7: Maternal health status concerning education.

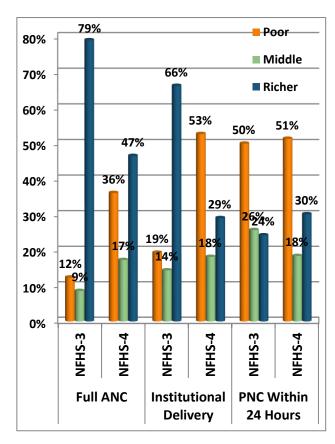


Figure 8: Maternal health status distribution concerning wealth index.

# Maternal health status distribution concerning domestic violence

In due course of time, domestic violence is decreased from 65.8-10.6% in NFHS-3 and NFHS-4 respectively which is also reflects on maternal health status. In NFHS-3, 87% received full ANC whereas only 13% of women who undergo domestic violence received full ANC. In NFHS-4, 86% received full ANC whereas only 14% of women who undergo domestic violence received full ANC. In NFHS-3, 71% received institutional delivery whereas only 29% of women who suffered from domestic violence received institutional delivery. In NFHS-4, 88% delivered in the institution whereas only 12% of women undergoing domestic violence delivered in the institution. In NFHS-3, 78% received PNC within 24 hours whereas 22% of women who undergo domestic violence received PNC within 24 hours. In NFHS-4, 75% received PNC within 24 hours whereas only 25% of domestic violence victims had PNC within 24 hours (Figure 9).

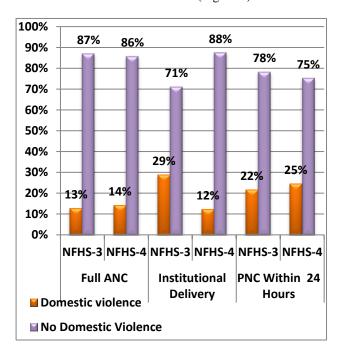


Figure 9: Maternal health status distribution with respect to domestic violence.

# DISCUSSION

From the latest NFHS-4, it is depicted that there is progress in maternal health indicators among all EAG states of India exceptional few states where still have a dismal picture as far as some maternal health indicators are concerned. NFHS-4 survey is far better than the NFHS-3 survey in receiving mother and child protection (MCP) card which is adapted to monitor the status of maternal health for the provision of appropriate health services. The MCP card has got a major role in maternal well-being and thereby fetal wellbeing. It can serve as a ready reference during ANC and during the time of labor as well and help make medical decisions during these

periods. Improvement of the indicators delineated above in the results section is of utmost importance for the improvement of maternal health status in any state, so also in EAG states. The provision of ANC helps in the maintenance of safe motherhood. ANC consists of various routine clinical examinations and investigations for assessing healthy motherhood. It would provide a clue for early intervention in case of abnormality. For which four mandatory ANCs are required at different stages of labor. In India especially the interventions for anemia are done during pregnancy. TT and IFA tablets are being provided regularly for the maintenance and well-being of pregnancy. During the survey period of NFHS-3 among EAG states, there was a very has a low consumption of iron and folic acid (IFA) Tablets which amount to only half of women being protected against anemia in comparison to NFHS-4. A systematic review suggests that in malaria-prone areas routine IFA should be provided to the adolescent population.8 As most of the EAG states are prone to malaria which affects the health of the mother thus they should be provided with IFA regularly and their consumption should be improved through various advocacy and communication measures. Furthermore, child care and maternal care depend on the status of hemoglobin level which could be supplemented by IFA. World health organization guidelines emphasize regular ANC check-ups. The current NFHS-4 data is not showing any satisfactory increase picture of one of the most important maternal health indicators is a which is full ANC, among EAG, states only increased by 3% when compared to NFHS-3, but when we see individual states of EAG except for Bihar and Uttarakhand all states have made notable progress. Similar studies in Bihar show that there is less utilization of maternal health care services like ANC and health center visits. 9,10 Following regular ANC the care of the impending mother during the process of parturition is of utmost importance from the perspective of maternal health and neonatal health which is greatly dependent upon the outcome of the process of parturition and the preceding care during the antenatal period. Needless to mention that compared to home deliveries institutional deliveries end up with more success without or minimal complications in a delivery outcome.<sup>4</sup> However, owing to a lack of resources in India practice of home deliveries was reduced during NFHS-4. Now day's referral networks of EAG states where well developed and strengthened by the implementation of JSY.<sup>11</sup> There is a very positive increase in institutional delivery among all EAG states of India which is depicted by Figure 2 and 4. Institutional delivery has also had a positive relationship between education status as Figure 7 shows that those women were educated they mostly deliver in an institution as a similar study was conducted by Elo and concluded the same. Albeit the institutional deliveries are an increasing trend in Indian and similarly deliverers in government settings are also growing and home delivery is reducing in the current survey which is depicted in Figure 5, but still, there is a higher percentage of the population still delivering in a private setting because of the caesarean section (CS) deliveries are more

in private hospitals which seems to be very high compared to the standards set by WHO as reported by NFHS-3 and 4 data.<sup>12</sup> As the proportion of CS deliveries are more common in the private sector it gives one indication that the private hospitals are more inclined towards CS deliveries and are most likely for money minting. It may also happen that the low level of CS deliveries in the public sector is an indication of a lack of competent health workforce in the form of specialists; both obstetricians and Anesthetists as well. Hence, necessary steps need to be taken to deploy the required number of specialists so that CS deliveries could be conducted as and when needed.4 The increase is very marginal between NFHS-3 and NFHS-4. The care given to the mother during her postpartum period by any health personnel within 24 hours of birth is much higher than in NFHS-3 when we compare NFHS-4 (Figure 2 and 6).

## Strengths

The main strength of the study is its sample size and its large representation.

#### Limitations

The percentages are mutually exclusive as their population size is different. Missing cases are excluded for computing percentages.

#### **CONCLUSION**

The improvement is required in all aspects of maternal health, pregnancy, childbirth, and postpartum care. Education and domestic violence are forming hurdles in the progress of maternal health status for which health system strengthening coupled with the strong political will and community mobilization are some of the urgent strategies required in the EAG states.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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