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Caste differentials in utilization of maternal healthcare services in rural North Karnataka

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Abstract

Trend and differentials in the utilization of maternal health care services are analysed in rural North-Karnataka by making a comparison between SC, ST, OBC and Forward caste women. A cross-sectional survey conducted in two rounds during 2012 and 2015 which included 4836 women in rural areas of eight districts of North Karnataka formed the focus of analysis.

Utilization of ANC services is satisfactory in terms of early and minimum ANC checkups but not satisfactory regarding receiving TT injections and IFA tablets. Utilization of maternal health services is comparatively better among women belonged to OBC category. Recent Health schemes have helped SC women and OBC women in better utilization of maternal health services than ST and forward caste women. Education of woman, better economic status of households and interaction with health workers promote utilization of services. Focus of future health schemes should be on ST women, and forward caste women especially from lower economic status and those who are deprived of formal education.

Keywords: Socially marginalized, deprived women, maternal health, healthcare services, India

1. Introduction

Maternal Health care refers to health care during pregnancy, child birth and post-partum periods, which not only decides the health outcomes of mothers and newborns but also reduces maternal and neonatal deaths drastically. Motherhood should be a positive and fulfilling experience for every woman. But for many mothers still it is associated with sufferings, ill health and even death sometime (Gyimah *et al.*, 2006) [2]. Many of National and State health schemes in India have focused on the most vulnerable population and disadvantaged groups in the country, so as to provide maternal health care services to all the women irrespective of their socioeconomic. In India, an important determinant of socio-economic inequities in nearly all spheres of well-being is caste. The official classification defines four categories of caste: Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs), and *Others* or Forward caste or 'General'. The SCs, constitute around 16.6% of the Indian population (17.1% for Karnataka), a large percentage of who live in rural areas and are landless agricultural laborers. The STs suffer economic and social deprivation and they comprise around 8.6% of India's population (7.0 % for Karnataka). OBCs and forward castes together comprise 75% of India's total population (76% for Karnataka) (Registrar General of India, 2011) [9].

India has made extensive efforts to reduce maternal mortality and to increase access to reproductive health care. Further, in India, as in many other settings, social structures prevent women from having access to maternal and reproductive health care (Sanneving *et al.*, 2013) [10]. Unequal utilization of maternal health care services among social groups is observed in the study of Kumar and Gupta (2015) [3], wherein Schedule Tribes women utilize comparatively lower level of full antenatal care (ANC) (14%), safe delivery (38%) and postnatal care (PNC) (34%) than 'other' caste women who utilized 21% full ANC, 66% safe delivery and 60% PNC. National Sample Survey 60th round data reveals that women belonging to lower caste (SC and ST) have relatively lower access to health services compared with women of 'other' caste (NSSO, 2006) [5]. According to NFHS4, receiving ANC services is lowest among ST and SC women (NFHS4, 2015-16).

A comparative study conducted in four southern states of India shows that women belonging to SC/ST are less likely to deliver their babies in health care institutions. In fact, these backward classes are unable to utilize other maternal health services as compared to 'other' caste (Navaneetham and Dharmalingam, 2002) [6]. Another study examining differentials in ANC in both northern and southern states explains that ANC is significantly poor among disadvantaged women both in south as well as north Indian states though South Indian women are comparatively better (Rani *et al.*, 2008) [8]. Similar differentials in maternal health and healthcare utilization were documented elsewhere (Agrawal and Agrawal, 2010; Maiti *et al.*, 2005; Kumar and Gupta, 2015) [1, 4, 3].

A recent review study showed that there are populations in India that seem to be systematically and consistently disadvantaged in terms of access to and use of maternal and reproductive health services like poor women, the poorly educated, adolescents, and members of SCs and STs. It was also documented that the main sources of inequity in maternal health in India, caste, place of residence, education, income and gender norms, are strong predictors of access to maternal health services (Sanneving, *et al.*, 2013) [10]. In this context, the present analysis of Utilization of Maternal Care services by various caste categories in rural North Karnataka becomes

much relevant. The main focus of the paper is to analyse the recent trend that has taken place in maternal health care utilization among SC and ST women separately compared to OBC and Forward caste women. The specific objectives are; first, to analyze the trend in utilization of maternal health care services by caste during recent years, second, to assess the determinants of utilization of maternal health care services by caste.

2. Material and Method

The present paper utilizes the data from Maternal, Neonatal and Child Health (MNCH) Household survey conducted under the project *Sukshema* carried out in 2 rounds; Baseline during 2012 and Endline survey during 2015. This is a cross-sectional survey conducted in a representative sample of households in 8 districts of North Karnataka. Altogether the survey covered a representative sample of 10,394 Ever Married Women (EMW) in the age group 15-34 and among them 4836 women experienced at least one pregnancy outcome during previous 3 years and these women form the focus of analysis in this paper. Among these women, 1941 belonged to SC, 585 women belonged to ST, 1876 to OBC category and remaining 434 women belonged to forward caste.

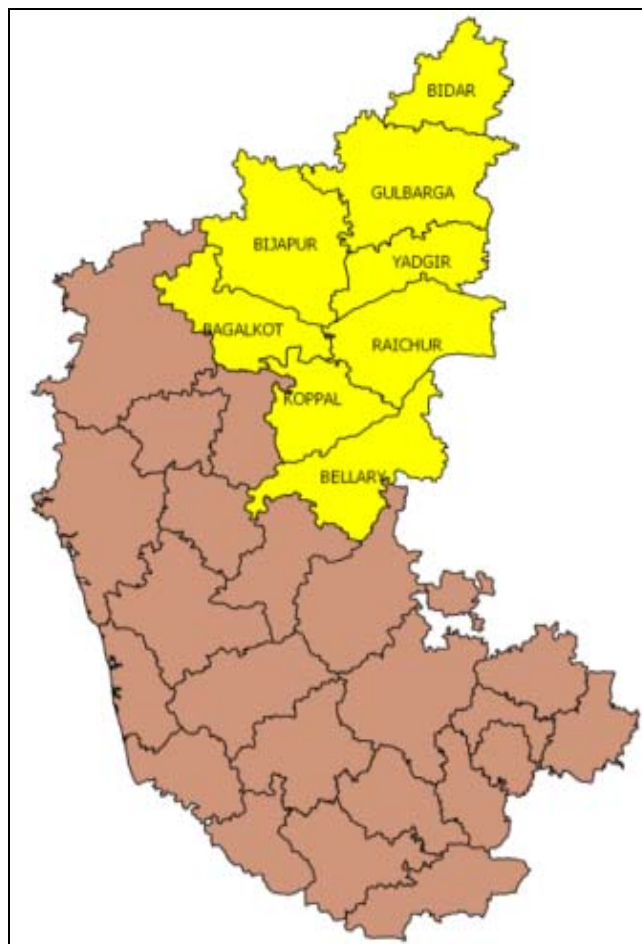


Fig 1: Study area

A multistage stratified sampling method was used to select sample. The Primary Sampling Units (PSUs), which are villages, were selected with probability proportional to population size (PPS) at the first stage, followed by the

random selection of households within each PSU in the second stage. In each village, a total of 30 households with an ever married woman aged 15-34 years were selected (15 SC/ST and 15 non-SC/ST households). The listing provided

the necessary frame for selecting households at the second stage with equal probability and without replacement using systematic random sampling (for more details on sampling procedure see also PRC and KHPT (2013)).

In this paper to understand the caste differentials, women were categorized into 4 Caste categories namely, SCs, STs, OBCs, and Forward caste. To analyze the utilization of Maternal Health care services, 3 services have been considered here; Ante Natal Care services (ANC), Delivery services and Post Natal Care Services (PNC). The data has been analyzed by bivariate tables and the association has been checked by Chi-square test of significance (for 95% CI). Further, Binary Logistic Regression analysis has been applied after checking for multicollinearity between independent variables. To make sample representative of the population, proper weights have been used during analysis.

3. Result and Discussion

3.1 Getting Ante Natal Care Services (ANC)

Under ANC, total 6 services have been analysed. Table 1

Table 1: Proportion of women received different ANC services during their last pregnancy by caste

| Particulars | All | SC | ST | OBC | Forward Caste | χ ² p-value |
|---------------------------------------|------|------|------|------|---------------|------------------------|
| Number of women | 4836 | 1941 | 585 | 1876 | 434 | - |
| Got Pregnancy confirmation test | 91.9 | 89.8 | 88.6 | 93.3 | 93.5 | <0.001 |
| Registered Pregnancy | 89.8 | 89.8 | 92.0 | 89.9 | 87.1 | 0.079 |
| Received ANC during First trimester * | 68.2 | 65.4 | 63.1 | 72.0 | 62.4 | <0.001 |
| Received 3+ ANC checkups * | 77.5 | 73.2 | 77.8 | 80.8 | 72.3 | <0.001 |
| Received TT 2/ Booster | 52.8 | 53.8 | 50.7 | 54.5 | 44.8 | <0.001 |
| Received 100+ IFA Tablets | 23.3 | 18.6 | 25.3 | 25.2 | 24.0 | <0.001 |

*Considered further for Multivariate analysis and Binary Logistic Regression Analysis

3.2 Getting first trimester ANC checkup

Table 2 gives proportion of women received first trimester ANC checkup during their last pregnancy by various background characteristics according to caste. First trimester ANC checkup is comparatively better at 72% among OBC and less at 62% among forward caste. Analysis by Round clearly indicates the trend that has taken place in getting first trimester ANC checkup during previous 3 years among all the 4 caste categories. Overall, the proportion has increased from 64% during Baseline to 73% during Endline. The difference is statistically significant.

The increase in the proportion of women received early ANC checkup is observed among SC, ST and OBC women, and is found to be significant (Chi-square $p < .01$) only among SC and OBC women. Proportion of women receiving first trimester ANC has reduced (though not significant) among forward category. Further, more women in younger age group found to get early ANC checkups than the older group. The trend is very much prominent and significant among OBC category but the reverse trend has been observed in forward

gives the proportion of women received different ANC services during their last pregnancy by caste categories. More than 90% of the women had undergone urine test for pregnancy confirmation and had registered their pregnancy. Undergoing urine test is comparatively high among OBC and forward caste women whereas registration of pregnancy is found to be comparatively more among ST women. However, the same proportion of women are not getting first trimester ANC checkup as it is only 68%. Reduction is observed among forward caste, SC and ST women. Similarly, only 78% of the women reported that they had received at least 3 ANC checkups and it is again comparatively high among OBC women. Further, only 53% of the women had received TT injection/s. When it comes to getting 100+ IFA tablets, the proportion reduced drastically to 23%. The reduction in getting IFA tablets is observed among all the four caste categories. The differentials by caste categories for all ANC services are statistically significant (Chi-square $p < .01$) except registration of pregnancy.

category. As education of woman is concerned, illiterate woman found to get less early ANC checkups than educated women, and it is true for all the categories (Chi square $p < .05$).

Further, analysis by parity indicates that women usually go for first trimester ANC checkups during their first pregnancy (75%) than it is 3rd or higher order birth (62%). Contact with ASHA worker helps significantly in motivating the women to go for early ANC checkup, knowing or having contact with ASHA increases the proportion of getting early ANC care by 10% among all the women and around 16% among SC women. Contact with ASHA did not show any impact among ST women in this regard. On the contrary, having contact with ANM was not as effective as that of with ASHA. Similar to that of education, wealth index of the household is having a strong impact on first trimester ANC checkup. Statistically highly significant proportion of women were getting first trimester ANC checkup who are from wealthy households compared to their counterpart, and the differences are very prominent in all the 4 caste categories.

Table 2: Proportion of women received First Trimester ANC checkup during their last pregnancy by background characteristics according to caste

| Particulars | All | | | SC | | | ST | | | OBC | | | Forward Caste | | |
|---------------------|-------------|----------------|------------------|-------------|----------------|------------------|-------------|----------------|------------------|-------------|----------------|------------------|---------------|----------------|------------------|
| | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P |
| ALL | 4836 | 68.2 | | 1941 | 65.4 | | 585 | 63.1 | | 1876 | 72.0 | | 434 | 62.4 | |
| Round | | | | | | | | | | | | | | | |
| Baseline | 2499 | 64.1 | <0.001 | 1018 | 61.3 | 0.002 | 303 | 60.2 | 0.178 | 843 | 66.6 | <0.001 | 335 | 64.0 | 0.153 |
| Endline | 2337 | 72.6 | | 923 | 69.4 | | 282 | 65.6 | | 1033 | 77.0 | | 99 | 56.9 | |
| Age of woman | | | | | | | | | | | | | | | |
| 15-19 | 1069 | 71.1 | 0.073 | 481 | 67.3 | 0.433 | 151 | 68.1 | 0.198 | 373 | 76.5 | 0.007 | 64 | 57.7 | 0.038 |
| 20-24 | 2447 | 68.2 | | 975 | 66.1 | | 287 | 62.5 | | 955 | 72.1 | | 230 | 61.6 | |
| 25-29 | 1112 | 66.5 | | 407 | 61.1 | | 122 | 61.0 | | 464 | 70.6 | | 119 | 61.8 | |

| | | | | | | | | | | | | | | | |
|---------------------------|------|------|--------|------|------|--------|-----|------|-------|------|------|--------|-----|------|--------|
| 30-34 | 208 | 64.1 | | 78 | 66.0 | | 25 | 45.5 | | 84 | 61.2 | | 21 | 85.3 | |
| Education of woman | | | | | | | | | | | | | | | |
| Illiterate | 2464 | 62.1 | <0.001 | 1168 | 60.4 | <0.001 | 358 | 60.0 | 0.027 | 800 | 66.1 | <0.001 | 138 | 49.5 | <0.001 |
| Below High school | 1018 | 70.7 | | 404 | 71.0 | | 116 | 60.9 | | 391 | 75.1 | | 107 | 60.3 | |
| High school and above | 1354 | 76.6 | | 369 | 75.4 | | 111 | 75.3 | | 685 | 77.6 | | 189 | 74.2 | |
| Parity | | | | | | | | | | | | | | | |
| First | 1330 | 74.8 | <0.001 | 495 | 67.2 | 0.120 | 180 | 72.6 | 0.004 | 526 | 78.7 | <0.001 | 129 | 75.2 | <0.001 |
| Second | 1427 | 70.9 | | 530 | 68.6 | | 167 | 61.8 | | 583 | 75.3 | | 147 | 64.4 | |
| Third or more | 2079 | 62.0 | | 916 | 62.6 | | 238 | 56.6 | | 767 | 65.3 | | 158 | 51.1 | |
| Contact with ASHA | | | | | | | | | | | | | | | |
| Knows and met | 3607 | 71.1 | <0.001 | 1420 | 69.5 | <0.001 | 476 | 63.1 | 0.995 | 1398 | 75.1 | <0.001 | 313 | 65.4 | 0.025 |
| Don't know/ Never met | 1229 | 60.1 | | 521 | 53.8 | | 109 | 63.2 | | 478 | 64.0 | | 121 | 55.4 | |
| Contact with ANM | | | | | | | | | | | | | | | |
| Knows and Met | 3591 | 69.0 | 0.029 | 1439 | 66.7 | 0.068 | 474 | 61.6 | 0.100 | 1372 | 73.3 | 0.020 | 306 | 63.5 | 0.440 |
| Don't know/ Never met | 1245 | 65.7 | | 502 | 60.9 | | 111 | 70.7 | | 504 | 68.7 | | 128 | 60.1 | |
| Wealth Index | | | | | | | | | | | | | | | |
| Low | 1466 | 58.1 | <0.001 | 759 | 58.3 | <0.001 | 207 | 56.6 | 0.019 | 414 | 59.5 | <0.001 | 86 | 52.7 | <0.001 |
| Middle | 1570 | 71.1 | | 697 | 70.3 | | 191 | 64.6 | | 564 | 76.1 | | 118 | 57.8 | |
| High | 1744 | 74.7 | | 463 | 71.7 | | 184 | 70.8 | | 876 | 76.3 | | 221 | 74.2 | |

Further, Binary Logistic Regression analysis of first trimester ANC checkup (First Trimester ANC=1; if not=0) clearly indicates that overall, getting first trimester ANC checkup increased by 28% from Baseline to Endline and the increase is more among OBC women and SC women (Table 3) and the trend is not significant among ST women. However, forward caste women have shown a declining trend of 46%. Similarly, Odds ratios of wealth index also found to be statistically highly significant. Overall the odds of getting first trimester ANC checkup are 70% more among wealthy women and it is more than double among forward category. Age of woman as such does not show any impact on first trimester ANC

checkup except forward caste category. Again, education of woman shows a strong impact on first trimester ANC checkup, getting education up to high school level increased the odds by 27% and high school and above education level by 43%. Similar to bivariate association, less proportion of women receive first trimester ANC checkups among higher order parity and the impact is more significant among forward caste. Contact with ASHA improves the early ANC checkups by more than 40% among SC women; on the other hand, contact with ANM is not so effective in getting first trimester ANC checkup.

Table 3: Results of binary logistic regression analysis for first trimester ANC Checkup by the women during their last pregnancy according to caste

| Background characteristics | Covariates | SC | ST | OBC | Forward Caste | All |
|----------------------------|------------------------------|----------|---------|----------|---------------|----------|
| Round | Baseline ^(R) | | | | | |
| | Endline | 1.337* | 1.252 | 1.394** | 0.537** | 1.282*** |
| Wealth Index | Low ^(R) | | | | | |
| | Middle | 1.557** | 1.322 | 1.815*** | 1.255 | 1.582*** |
| | High | 1.537** | 1.649* | 1.721*** | 2.119** | 1.705*** |
| Age of woman | 15-19 ^(R) | | | | | |
| | 20-24 | 0.933 | 0.917 | 0.916 | 1.594 | 0.975 |
| | 25-29 | 0.921 | 0.998 | 1.010 | 2.099* | 1.060 |
| | 30-34 | 1.127 | 0.642 | 0.707 | 7.31** | 1.033 |
| Education of woman | Illiterate ^(R) | | | | | |
| | Below High school | 1.456* | 1.032 | 1.32* | 0.981 | 1.270** |
| | High school and above | 1.65** | 1.717 | 1.249 | 1.394 | 1.433*** |
| Parity | First ^(R) | | | | | |
| | Second | 1.170 | 0.625 | 0.857 | 0.561* | 0.855 |
| | Third or more | 0.903 | 0.595 | 0.587*** | 0.348*** | 0.632*** |
| Contact with ASHA | Knows and met ^(R) | | | | | |
| | Don't know/Never met | 0.573*** | 1.056 | 0.704** | 0.622* | 0.675*** |
| Contact with ANM | Knows and met ^(R) | | | | | |
| | Don't know/Never met | 0.954 | 1.497 | 0.893 | 0.911 | 0.968 |
| Constant | | 1.383 | 1.564 | 2.056*** | 1.586 | 1.726*** |
| Cox and Snell R square | | 0.050 | 0.047 | 0.055 | 0.108 | 0.048 |
| -2 Log likelihood | | 1552.996 | 675.689 | 2754.708 | 639.385 | 5708.026 |

Note^(R) = Reference Category, *** <0.001, **<0.01, *<0.05

From the above results a positive trend has been observed in getting first trimester ANC during last 3 years except forward caste women in which case a reverse trend was observed. Wealth index of the household, education of woman and

contact with ASHA plays a determining role in motivating the women to go for ANC checkup during their first trimester of pregnancy.

Table 4: Proportion of women received at least 3 ANC checkups during their last pregnancy by background characteristics according to caste

| Particulars | All | | | SC | | | ST | | | OBC | | | Forward Caste | | |
|-----------------------|-------------|----------------|------------------|-------------|----------------|------------------|-------------|----------------|------------------|-------------|----------------|------------------|---------------|----------------|------------------|
| | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P | Total cases | Prop. Received | χ ² P |
| ALL | 4836 | 77.5 | | 1941 | 73.2 | | 585 | 77.8 | | 1876 | 80.8 | | 434 | 72.3 | |
| Round | | | | | | | | | | | | | | | |
| Baseline | 2499 | 74.6 | <0.001 | 1018 | 70.5 | 0.027 | 303 | 75.9 | 0.315 | 843 | 77.7 | <0.001 | 335 | 71.6 | 0.508 |
| Endline | 2337 | 80.5 | | 923 | 75.8 | | 282 | 79.5 | | 1033 | 83.6 | | 99 | 74.8 | |
| Age of woman | | | | | | | | | | | | | | | |
| 15-19 | 1069 | 80.6 | 0.010 | 481 | 77.5 | 0.166 | 151 | 83.7 | 0.001 | 373 | 81.4 | 0.053 | 64 | 82.1 | 0.005 |
| 20-24 | 2447 | 77.6 | | 975 | 72.6 | | 287 | 80.4 | | 955 | 81.3 | | 230 | 71.0 | |
| 25-29 | 1112 | 74.9 | | 407 | 69.3 | | 122 | 65.0 | | 464 | 81.1 | | 119 | 66.0 | |
| 30-34 | 208 | 74.0 | | 78 | 74.0 | | 25 | 63.6 | | 84 | 71.6 | | 21 | 91.2 | |
| Education of woman | | | | | | | | | | | | | | | |
| Illiterate | 2464 | 71.4 | <0.001 | 1168 | 68.5 | <0.001 | 358 | 72.8 | 0.001 | 800 | 75.9 | <0.001 | 138 | 55.2 | <0.001 |
| Below High school | 1018 | 82.4 | | 404 | 80.1 | | 116 | 83.6 | | 391 | 83.7 | | 107 | 80.1 | |
| High school and above | 1354 | 84.0 | | 369 | 80.6 | | 111 | 89.2 | | 685 | 85.0 | | 189 | 81.7 | |
| Parity | | | | | | | | | | | | | | | |
| First | 1330 | 86.7 | <0.001 | 495 | 81.6 | <0.001 | 180 | 89.6 | <0.001 | 526 | 88.9 | <0.001 | 129 | 84.2 | <0.001 |
| Second | 1427 | 78.6 | | 530 | 76.4 | | 167 | 80.3 | | 583 | 80.2 | | 147 | 74.4 | |
| Third or more | 2079 | 70.8 | | 916 | 66.8 | | 238 | 67.9 | | 767 | 75.8 | | 158 | 62.0 | |
| Contact with ASHA | | | | | | | | | | | | | | | |
| Knows and met | 3607 | 81.5 | <0.001 | 1420 | 77.7 | <0.001 | 476 | 80.1 | 0.014 | 1398 | 84.6 | <0.001 | 313 | 77.4 | <0.001 |
| Don't know/ Never met | 1229 | 66.4 | | 521 | 60.6 | | 109 | 68.4 | | 478 | 70.4 | | 121 | 61.0 | |
| Contact with ANM | | | | | | | | | | | | | | | |
| Knows and Met | 3591 | 80.1 | <0.001 | 1439 | 76.4 | <0.001 | 474 | 78.7 | 0.319 | 1372 | 83.7 | <0.001 | 306 | 74.3 | 0.119 |
| Don't know/Never met | 1245 | 69.7 | | 502 | 62.6 | | 111 | 73.9 | | 504 | 72.8 | | 128 | 68.0 | |
| Wealth Index | | | | | | | | | | | | | | | |
| Low | 1466 | 70.0 | <0.001 | 759 | 68.5 | <0.001 | 207 | 71.7 | 0.033 | 414 | 72.0 | <0.001 | 86 | 63.4 | <0.001 |
| Middle | 1570 | 78.6 | | 697 | 77.5 | | 191 | 79.9 | | 564 | 81.0 | | 118 | 69.1 | |
| High | 1744 | 82.8 | | 463 | 75.5 | | 184 | 82.6 | | 876 | 85.3 | | 221 | 81.4 | |

3.3 Getting at least 3 ANC checkups

Further, total number of ANC checkups received during pregnancy has been analyzed by background characteristics according to caste. Overall, 78% of women had received at least 3 ANC checkups and it was highest among OBC (81%) and forward (72%) caste women (Table 4). Proportion of women getting at least 3 ANC checkups increased by six percent (from 75 to 81%) from Baseline to Endline and the difference is statistically significant. Though, improvement has been observed in all the caste categories, significant improvement is observed only among SC and OBC women. More women in younger age group found to get at least 3 ANC checkups than those in their 30s, and it is significant among ST and forward women. Education of woman is found to play a major role in promoting women to go for frequent ANC checkups, as education increases the proportion of getting at least three ANC also increases. Though, the impact of education is evident in all the categories, but it is more among ST women.

Similarly, women from all caste categories get more number of ANC checkups during first parity than their counterpart, and these differences are statistically significant. Further, contact with ASHA improved getting at least 3 ANC checkups, from 66 to 82% ($p < .001$) and similar trend has been observed in all the 4 caste categories. Among SCs, contact with ASHA worker increased the proportion getting at least 3 ANC checkups from 61 to 78% and among ST women from 68 to 80%. Contact with ANM also has its impact on getting at least 3 ANC checkups except for ST and forward caste women. This clearly indicates that the interaction with frontline workers like ASHA and ANM is having a strong and positive impact in motivating the women to go for more number of ANC checkups during their pregnancy. Again the economic status of households plays a significant role in getting frequent ANCs, overall only 70% of the women had received more than 3 ANC checkups among poor compared

to 83% among rich women ($p < .001$), and it is true for all caste categories (Table 4).

Further, Binary Logistic Regression for getting at least 3 ANC checkups (At least 3 ANC=1, if not=0) during pregnancy by background characteristics (Table 5) indicates that women getting more access to health care services during pregnancy are increased by 20% in rural North Karnataka from Baseline to Endline and it is 35% increase for SC women. This indicates that the impact of NHM is more among SC category women and ST women are not benefited as that of SC women. On the other hand a slightly declining trend has been observed among forward caste women. The significant level of Odds ratio by wealth index again confirms the impact of economic condition on getting better health care services. High Wealth Index increased the frequent utilization of health facilities by 71% among OBC and 80% among forward caste women.

Impact of age of woman is found to be not so significant in all the caste categories except that of OBC; whereas impact of education of woman is found to be significant in getting more number of ANC checkups except ST women. Among SC category, proportion getting at least 3 ANC checkups increased by 65%, among OBC by 35% and more than double among forward from illiterate group to at least high school education. Parity of woman continued to show its negative impact even in Binary Logistic Regression as women during their first pregnancy get more access to ANC checkups than higher order pregnancy. This phenomenon has been observed in all the caste categories. Again contact with ASHA and interaction with her shows a positive impact as no contact with ASHA worker reduced the accessibility to at least 3 ANC checkups by 50%. This impact is significant in all the caste categories except ST women. Contact with ANM also found to be a significant factor among SC and OBC women and overall it reduced the proportion of women received at least 3 ANC checkups by 35%.

Table 5: Results of binary logistic regression analysis for at least 3 ANC checkups by the women during their last pregnancy according to caste

| Background characteristics | Covariates | SC | ST | OBC | Forward caste | All |
|----------------------------|------------------------------|----------|----------|----------|---------------|----------|
| Round | Baseline ^(R) | | | | | |
| | Endline | 1.346* | 1.077 | 1.182 | 0.967 | 1.204* |
| Wealth Index | Low ^(R) | | | | | |
| | Middle | 1.437* | 1.387 | 1.354* | 1.151 | 1.361** |
| | High | 1.130 | 1.558 | 1.718*** | 1.809* | 1.557*** |
| Age of woman | 15-19 ^(R) | | | | | |
| | 20-24 | 1.059 | 1.190 | 1.457* | 0.620 | 1.178 |
| | 25-29 | 1.325 | 0.735 | 1.869** | 0.800 | 1.367* |
| | 30-34 | 1.753 | 0.960 | 1.103 | 3.825 | 1.410 |
| Education of woman | Illiterate ^(R) | | | | | |
| | Below High school | 1.649** | 1.587 | 1.351* | 2.825*** | 1.579*** |
| | High school & above | 1.413 | 1.916 | 1.105 | 2.273** | 1.380** |
| Parity | First ^(R) | | | | | |
| | Second | 0.792 | 0.506* | 0.444*** | 0.519* | 0.540*** |
| | Third or more | 0.406*** | 0.302** | 0.349*** | 0.411** | 0.371*** |
| Contact with ASHA | Knows and met ^(R) | | | | | |
| | Don't know/Never met | 0.538*** | 0.666 | 0.539*** | 0.554* | 0.552*** |
| Contact with ANM | Knows and met ^(R) | | | | | |
| | Don't know/Never met | 0.617** | 0.807 | 0.584*** | 0.803 | 0.65*** |
| Constant | | 3.642*** | 5.387*** | 5.44*** | 3.718** | 4.517*** |
| Cox and Snell R square | | 0.073 | 0.084 | 0.067 | 0.123 | 0.068 |
| -2 Log likelihood | | 1363.721 | 519.613 | 2222.500 | 549.776 | 4731.865 |

Note ^(R) = Reference Category, *** <0.001, ** <0.01, * <0.05

Thus, getting at least 3 ANC checkups during pregnancy shows a positive trend among SC women during recent years. Women from higher economic households, educated and having contact with frontline health workers usually go for frequent ANC checkups. This gives clear indication that now emphasis is required for women belonged to ST category, and even for forward category women belonged to lower income and illiterate group. ASHAs and ANMs should give special attention to contact such women.

3.4 Getting Delivery services

Under delivery services, 2 issues are considered; type of facility availed during delivery and duration of stay at hospitals after delivery.

3.5 Place of delivery

Here, place of delivery has been analyzed both by public versus private as well as by different categories like Health Sub-Centre (HSC), Primary Health Centre (PHC), Community Health Centre (CHC), Taluka Hospital (TH) and District Hospital (DH). It is important to mention here that as high as 22% of the deliveries in rural areas of North

Karnataka took place at home and it is high at 31% among ST women and 24% among SC women which needs an immediate attention of concerned authorities. Proportion of home deliveries reduced from 26 to 18% from baseline to endline (results not shown). On the other hand, more than 25% of the women from OBC and forward caste approached private hospitals during delivery and it is less than 15% among SC and ST women.

When we analyze type of public facility utilized by the women for delivery, it is observed that around one-fourth of the women approached PHC for their delivery. The phenomenon of comparatively higher popularity of PHCs for delivery is observed among all the four caste categories. Next most common public facility utilized by the women is Taluka hospital. Around, 14% of the women preferred Taluka hospitals during their last delivery. Only eight percent of the women had gone to District Hospital. The caste variation in the utilization of both public versus private hospitals as well as the type of public facility used by the women during their delivery was statistically highly significant, both during Baseline as well as Endline (Chi-square $p < .001$).

Table 8: Distribution of women delivered during previous 3 years by place of delivery and Duration of stay at hospital by caste

| | All | SC | ST | OBC | Forward caste | χ ² p |
|--------------------------|------|------|------|------|---------------|------------------|
| Place of delivery | | | | | | |
| Number of women | 4533 | 1844 | 551 | 1737 | 401 | <0.001 |
| Home | 22.1 | 24.1 | 31.4 | 19.9 | 18.4 | |
| Private Hospital | 21.9 | 15.0 | 13.0 | 26.7 | 25.6 | |
| Public hospitals | 56.0 | 60.9 | 55.6 | 53.5 | 56.0 | |
| HSC | 0.9 | 0.4 | 1.4 | 0.9 | 1.7 | |
| PHC | 23.7 | 25.4 | 22.9 | 23.6 | 21.6 | |
| CHC | 8.2 | 9.3 | 5.5 | 7.4 | 12.0 | |
| TH | 14.1 | 15.5 | 15.6 | 13.1 | 14.0 | |
| DH | 8.1 | 9.2 | 10.3 | 7.6 | 5.9 | |
| Other Public | 0.9 | 1.3 | 0.2 | 0.9 | 0.8 | |
| Duration of stay* | | | | | | |
| Number of women | 3558 | 1424 | 396 | 1404 | 334 | 0.009 |
| Less than 1 day/24 hours | 34.0 | 37.4 | 30.0 | 34.2 | 29.5 | |
| 24 hrs to < 48 hrs | 15.6 | 16.4 | 18.2 | 15.0 | 14.5 | |
| 2 Days to 7 Days | 42.2 | 40.3 | 42.7 | 42.6 | 44.3 | |
| More than 7 Days | 8.1 | 5.8 | 9.2 | 8.1 | 11.7 | |

*Only for Normal deliveries

Hence, though home deliveries are declining, still substantial proportion of deliveries take place at home especially among SC and ST women. Opting private hospitals for delivery is more among OBC and forward women. If at all women prefer public health facilities for their delivery, it is usually PHCs or THs. Women from rural areas of North Karnataka, going to DHs for their delivery are less than 10%. This clearly indicates the importance of creating awareness among SC and ST women about importance of institutional delivery.

3.6 Early discharge from the hospital after delivery

Staying at hospitals for a minimum period of 48 hours after

delivery is equally important as that of institutional delivery. Hence, how long women stay at hospitals after normal delivery is also analysed here by caste. As indicated in Table 8, around 34% of the women had got discharged within a day and it is as high as 37% among SC women. Another 16% of the women had got discharged from the hospital between 24 - 48 hours. This clearly indicates that nearly half of the women did not get medical attention after 2nd day of delivery. Early discharge is observed more among SC women. Variation in the duration of stay at hospital by caste is found to be statistically highly significant ($p < .01$).

Table 9: Results of Binary Logistic Regression analysis for Early discharge from Hospitals after their last delivery (Only for Normal Deliveries)

| Background characteristics | Covariates | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|----------------------------|----------------------------|-------|--------|---------------------|-------|
| | | | | Lower | Upper |
| Round | Baseline ^(R) | | | | |
| | Endline | 0.000 | 0.735 | 0.630 | 0.858 |
| Wealth Index | Low ^(R) | | | | |
| | Middle | 0.626 | 1.051 | 0.861 | 1.282 |
| | High | 0.074 | 1.201 | 0.982 | 1.469 |
| Age of woman | 15-19 ^(R) | | | | |
| | 20-24 | 0.414 | 0.917 | 0.745 | 1.129 |
| | 25-29 | 0.487 | 0.911 | 0.699 | 1.186 |
| | 30-34 | 0.020 | 0.603 | 0.394 | 0.924 |
| Education of woman | Illiterate ^(R) | | | | |
| | Below High school | 0.357 | 0.912 | 0.748 | 1.110 |
| | High school and above | 0.003 | 0.747 | 0.617 | 0.906 |
| Parity | First ^(R) | | | | |
| | Second | 0.004 | 1.342 | 1.097 | 1.642 |
| | Third or more | 0.000 | 1.607 | 1.295 | 1.994 |
| Place of delivery | HSC/PHC/CHC ^(R) | | | | |
| | TH/DH/Other Public | 0.000 | 0.438 | 0.368 | 0.521 |
| | Private | 0.000 | 0.378 | 0.309 | 0.461 |
| Caste | SC ^(R) | | | | |
| | ST | 0.400 | 0.888 | 0.672 | 1.172 |
| | OBC | 0.901 | 1.012 | 0.841 | 1.217 |
| | Forward | 0.110 | 0.798 | 0.604 | 1.053 |
| | Constant | 0.000 | 2.266 | | |

(R) Reference Category

As indicated in the Table 9, early discharge from the hospitals has reduced during recent years by about 25% in the study area and the change is significant. Getting early discharge is comparatively more among high wealth index households though not significant. Education of woman reduces early discharge from the hospitals after normal delivery by 25%, on the other hand increase in parity increases early discharge. Most of the early discharges after normal delivery take place at HSC, PHC or CHCs, and it more among OBC women, though the caste variation is not significant statistically.

Hence, though the proportion of early discharge has reduced during recent years, still quite a large proportion of women found to get discharged from the hospitals within 48 hours in rural North Karnataka and is more among SC women. Hence, special attention is required from the concerned authorities of public health facilities to implement strict measures, so that women and newborns stay at least for 48 hours in the hospitals after delivery.

3.7 Getting Post Natal Care (PNC) Services

Getting Post Natal checkup after delivery is equally important as that of ANC services. It gives required medical attention to the women and newborns and also reduces most of the complications thus avoids maternal and neonatal mortality. As per the guidelines of NHM, all women were asked whether they had received PNC checkup soon after their delivery, and specifically on 3rd and on 7th day of delivery. As indicated in Table 10, overall 66% of the women received PNC checkup soon after their delivery and it is comparatively more among ST women though caste variation is statistically not significant. This indicates that usually women get PNC checkup if it is an institutional delivery irrespective of their caste. On the other hand, getting PNC on 3rd day of delivery reduced to 38% and as observed, comparatively it is more among ST women (40%). Caste variation with regard to getting PNC on 3rd day is highly significant ($p < .001$).

Table 10: PNC care received by the women delivered during previous 3 years by caste

| Indicators | All | SC | ST | OBC | Forward caste | $\chi^2 p$ |
|-----------------------------|------|------|------|------|---------------|------------|
| Number of women | 4533 | 1844 | 551 | 1737 | 401 | |
| Received Postnatal Check up | 65.7 | 63.6 | 69.8 | 66.4 | 63.5 | 0.243 |
| Received PNC on Third day | 38.0 | 36.2 | 40.2 | 38.1 | 39.2 | <0.001 |
| Received PNC on Seventh day | 16.6 | 13.7 | 15.2 | 17.0 | 22.8 | <0.001 |

Getting PNC on 7th day is still reduced to 17% which indicates that quite a large proportion of women do not get PNC checkup on 7th day of their delivery in rural North Karnataka. Proportion of women getting PNC on 7th day is as low as 14 and 15% among SC and ST women respectively, 17% among OBC women and 23% among forward caste women. Variation between four caste categories on PNC checkup on 7th day is also statistically highly significant ($p < .001$).

Hence, analysis of getting PNC care by caste clearly indicates that attention is required to get PNC checkup up to 7th day, more so among SC and ST women. During the time of discharge from the hospital, health staff should create awareness among the women to visit back for follow-up checkup on 3rd and 7th day. If importance of follow-up checkup on 3rd and 7th day is informed to the women, definitely they will come back for follow up. Hence, still emphasis is required on SC and ST women to popularize institutional delivery, to stay at hospitals for a longer duration after delivery and to approach the health facilities for follow-up checkup after getting discharged from the hospitals.

4. Conclusion and Recommendations

Overall quality of ANC services has improved in rural North-Karnataka during recent years especially in getting first trimester ANC and at least 3 ANC checkups. Attention is still required to provide TT injections and IFA tablets to every pregnant woman. The National health schemes have made significant changes among SC and OBC women but not so among ST and Forward caste women. Education of woman and better economic condition of households play a significant and determining role in making the women to receive minimum required ANC services irrespective of caste of woman. Contact with ASHA also makes significant impact in this regard.

Getting early discharges from the hospitals especially when it is a normal delivery needs an attention of officials of public health system. Similarly, awareness has to be created among women regarding importance of follow-up checkups after delivery. High proportion of home deliveries in rural areas of North Karnataka especially among SC and ST women needs an immediate attention of Policy Makers and concerned officials. Home deliveries are comparatively more among ST women and women in 30s and among illiterate women especially from low wealth index households.

Proper utilization of MCH services including ANC services, institutional delivery, staying at hospitals for minimum required duration after delivery and getting follow-up checkups after delivery though seems to be improved during recent years among all the caste categories, but comparatively SC and OBC women are benefitted more. ST groups are showing improved access to PNC as well. The government schemes and the focused outreach interventions may have led to these improvements. However, the ST and even Forward caste women with lower economic status and less education require continuing focus of our interventions. Overall, the results reiterate that minimum formal education, improvement in economic status of households and interaction with frontline health workers has a greater impact in motivating the women to utilize the available health services effectively.

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