International Journal of Humanities and Social Science Research
ISSN: 2455-2070; Impact Factor: RJIF 5.22
Received: 13-12-2018; Accepted: 16-01-2019
www.socialsciencejournal.in
Volume 5; Issue 1; January 2019; Page No. 78-87

Determinants of inequalities in maternal health care utilization among social groups: A study of tribal dominant EAG States, India

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Abstract
In India, the MDGs drove progress and considerable changes in several important areas like income and poverty, education, inequality, health and mortality. EAG states which are one of the highest indigenous population concentric regions in India were destitute in socioeconomic, demographic and health indicators and many were, even so, less than the national average. So it was essential to address the socioeconomic and health inequity existing in the region and to measure the improvements, how far we needed to reach the MDGs with specific attention on the disadvantaged population. The objective of the study was to access the changes in development indices with changing the health status of mother and child of the tribal population and its significant contributing covariates. DLHS-2 & 3 data have been used to fulfil the objective. Bivariate & multivariate have used for analysis. Fairlie decomposition technique has employed to decompose the gap between social groups in the use of maternal healthcare. The results show that the poverty ratio among the STs was exorbitantly high across the region. The status of the region shows it either extremely or severely food insecure, and hence it causes for poor health status for the EAG states in general and the tribal community in particular. The health index has the lowest weight (0.468) whereas it was highest for the education (0.723), and the income index (0.545). In India, the pace development to reach the MDGs is much slower and need to impetus it with proper velocity for universal accessibility of health and developmental services with particular focus on the disadvantageous population to eradicate the poverty and to reduce their socioeconomic and health inequality.

Keywords: antenatal care, EAG states, inequalities, maternal health, safe delivery, tribal

1. Introduction
The United Nations adopted the Millennium Declaration on 8 September 2000 comprising the MDGs known as Millennium Development Goals, an outcome of deliberations in the United Nations Millennium Summit. It presented a new vision to the global efforts on development over the next 15 years. Out of its eight goals, the goal first, third and fifth was directly linked to the women regarding their betterment of health and socioeconomic status. Worldwide there were many national, and regional attempts have taken to achieve it universally. Although at many levels the efforts through policy and programs try to change the initial picture but comprehensively the target was not met [1]. So again this MDGs target has further moved in a way for formal consultations on development agenda for post-2015 in the form of Sustainable Development Goals [2]. It was based on three dimensions of development, namely, economic, social and environmental was seventeen goals were reconstructed and goal third "Good Health and Well Being" is inclusively incorporate all domains of health for the universal and quality health services for all [2].

In India, still, these goals were not entirely achieved although the regional variation was one of the important factors. India has a wide variation in a socioeconomic and cultural context so to run any such universal program for betterment would not work simultaneously and with the same pace of coverage [3]. Geographical limitations regarding connectivity network make the location remote and hence, it makes improper services availability and less cost-effective as well as affects the quality, quantity and proper delivery of health care utilisation services in general and maternal health care in particular. While analysing India's achievements in MDGs, it can be noted that India has tried to make significant advances in securing the MDGs. Although it has been said that India achieved the MDG 1 target way before 2015, but the outcome is not evenly distributed. The role of national-level policy like MGNREGA has played a vital role in reducing poverty in India by 32% and prevented about 14 million people from falling into the poverty trap during 2004-05 to 2011-12[4]. The issues continue to be the same as at the time of the announcement of MDGs, as could be deducted from the 12th Plan (2012-17) national health outcome for health system identified by the Planning Commission, namely, Reduction of Maternal Mortality Rate (MMR) to 75 by 2017. Therefore, at the Sustainable Development Summit of the United Nations in September 2015, India and other countries have signed the declaration on the 2030 agenda for Sustainable Development, comprising of seventeen Sustainable Development Goals (SDGs) [2].

In India, the EAG States are one of the most backwards regions and recognises the need for addressing health inequity existing in the region. Since the region has a maximum percentage of the socioeconomically disadvantaged population, the disparities among the different sections of the population are quite prominent. Regarding maternal mortality ratio, the position is not much better in these EAG states especially in tribal dominance states like Odisha (222) and Madhya Pradesh (221) while the all India average for MMR works out to 167 in the period 2011-13 [1, 2]. Scheduled Tribes (STs) are historically marginalised, and disadvantaged social groups officially recognised and listed by the Constitution of India [5]. According to the Census of

India (2011), the total population of India—STs contribute 8.6 [6]. The Constitution of India has secured them special status and made the provision of reservation in politics, education and jobs for them. Various other arrangements like drafted the laws to abolish the social inequities and development programs specially designed to cater their needs [7]. Nevertheless, these tribal communities continue to face multiple disadvantages compared with their counterpart population groups [8, 9, 10]. The tribal population has worse social and economic development indicators than the rest of the population [11]. The same goes for their demographic and health indicators as well. STs have substantially lower wealth compare to other social groups in the country [12]. The life expectancy of these social groups is relatively small and their child and adult mortality relatively high [13, 14].

Schedule communities contribute about 50% of all maternal deaths in the country [15, 16]. One of the important factors that affect negatively the health situation prevailing in STs is poor utilisation of healthcare services. The same is true about the utilisation of maternal health care services [17]. Many pieces of literature that worked at national and sub-national levels have shown that the coverage of antenatal care and institutional delivery both are worse in tribal communities compared with the rest of the population [18, 19, 20]. They acknowledge that poor households' economic status, low educational status, the place of localities and lack of proper information and awareness are the major factors responsible for low level of utilisation of maternal health care services among socially deprived castes of this most deprived tribal dominance EAG states. With all these circumstances compel it for essential to study and understand the level and pattern and pace of maternal health care services utilisation in tribal dominance states. The objective of the study was to access the changes in development indices with changing the health status of mother and child of the tribal population and its significant contributing covariates.

2. Materials and Methods

2.1 Data Source

The present study used the DLHS second and third round which were held during 2002-04 and 2007-08 respectively. The total eligible women for the study region were 29,753 for DLHS second and 68,888 for DLHS third round. The sample for the study was the currently married women who have given birth in last five years and for the maternal health care services utilization in the study only the information for the recent birth has been considered.

2.2 Selection of Study Region

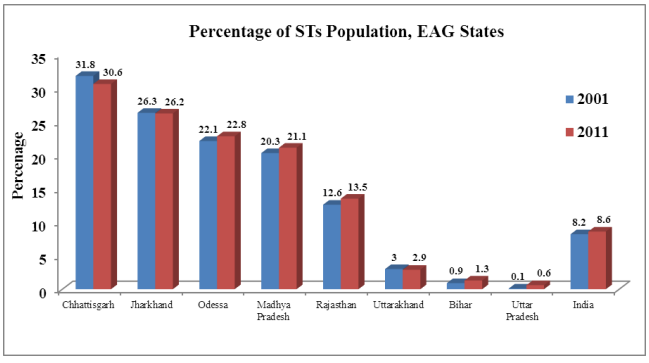

Fig 1: EAG states percentage of STs to total population, Census of India 2001-2011

The numbers of the literature suggested that in India, the maternal health care services utilisation is indigent among classes SCs/STs the social deprived [3, 17, 21, 22]. Hence, the study is based on one of the socioeconomically backwards areas of the India called Empowered Action Group (EAG) states which comprise of eight north India states. Among these states, there are four states where the proportion of STs Population to their total population is more than 20% over the last two censuses of India, and these are Chhattisgarh, Jharkhand, Orissa and Madhya Pradesh respectively by their size of STs Population proportion. So these states only selected for the study as tribal dominance state. These selected states were considered as a homogeneous region for STs Population since there all are adjoined to each other.

2.2 Outcome variables

The study has used full antenatal care (ANC) and safe delivery as indicators of maternal healthcare services. These variables are defined as follows.

2.2.1 Full Antenatal Care

In DLHS report the full ANC considered as those women who have visited for at least three antenatal check-ups and taken at least one tetanus injections and consumed iron-folic tables/syrups for at least 100 days during their pregnancy [23, 24, 25].

2.2.2 Safe Delivery

It is defined as any institutional delivery or home delivery assisted by medical professionals, like a doctor, an Auxiliary Nurse Midwife (ANM)/Lady Health Visitor (LHV) Trained Dai or other health personnel.

2.3 Predictors

The social group is the main predictor used in the analysis. Schedule Tribe is defined based on the respondent's self-report as belonging to STs, SCs and Others. In the DLHS, information on caste/ tribe was collected into four categories—SCs, STs, OBCs and others. In the present analysis, we considered all STs Population of the study region and referred to them as STs. The other three groups (SCs, OBC and others) are mentioned as the 'Non-tribal'. The low use of health services in a population may be attributed to an array of supply and demand factors [26, 27, 28]. Hence, the present study includes a number of social, economic and demographic factors to assess the contribution of them and to explain the gap in the use of maternal healthcare services between STs and the other group. These selected variables have found to be significantly associated with the use of maternal healthcare services in the study area. The variables used in the analysis are the population living States, place of residence, Mother's age, age at marriage (for DLHS second round), household wealth index, women's education, husband's education and birth order (for DLHS third round). For the safe delivery, full antenatal services utilisation was also considered as an independent variable.

2.4 Statistical analysis

The Bivarite analysis has been used to examine the differences in the use of full antenatal care and safe delivery (medical assistance at delivery) between STs and the non-tribal. Multivariate analysis was carried out to understand the significant determinants of maternal health care utilisation in both groups. The Blinder–Oaxaca decomposition technique

is a used approach to identify and quantify the factors associated with inter-group differences in mean level of outcome [29, 30]. In the study, it has tried to reveal how the differences in the use of the maternal health care services between the tribes and non-tribes can be explained by the considered socioeconomic variables between the groups. This technique is not appropriate for the current analysis if the outcome is binary in nature [31]. Hence, we used the Blinder–Oaxaca decomposition model modified for binary outcomes to decompose the gap between tribal and non-tribal in use of maternal health care services [31]. For the decomposition analysis, we used the 'fairlie' command available in Stata 12. The exposure variables have tested for possible multicollinearity before entering them into the analysis. As the DLHS-3 used the multistage sampling design and standard errors were adjusted for weighting and clustering in all estimations. In the report of DLHS-3, all such details of the sampling weight have been given [24].

3. Results

3.1 Trends of full ANC and safe delivery in EAG states

Table 1 illustrated that in trends of maternal health care utilisation, Odessa had achieved better improvements in ANC (about 15% from 2002-04 to 24% in 2007-08) that other states of the group while in safe delivery, Madhya Pradesh gained (22%) highest among all selected states. The poorest improvement has been recorded in Jharkhand for both, full ANC (1%) and safe delivery (about 8%).

Table 1: Trends of maternal health care utilization in tribal dominance EAG states, DLHS-2, 2002-04 & DLHS-3, 2007-08

Background Characteristics	Full ANC				Safe Delivery			
	DLHS 2		DLHS 3		DLHS 2		DLHS 3	
	%	n	%	n	%	n	%	n
States								
Jharkhand	9.1	5721	10.1	18239	19.5	6212	27.3	18239
Odessa	14.9	6026	24.2	12375	30.7	6498	52.9	12372
Chhattisgarh	12.3	4017	15.0	10192	17.9	4389	33.1	10195
Madhya Pradesh	6.2	11442	9.6	28077	27.7	12655	53.1	28082
Place of Residence								
Rural	7.3	21954	10.3	53566	16.4	23662	34.8	53566
Urban	19.6	5252	23.3	15317	59.3	6091	73.0	15322
Mother's Age								
15-19 years	7.2	2392	10.4	7973	23.2	2606	44.3	7977
20-34 years	10.2	22546	14.1	48824	26.0	24723	45.4	48826
35-44 years	6.6	2268	11.0	12086	19.1	2424	34.2	12084
Caste								
Scheduled caste	7.6	4648	11.1	11317	19.9	5098	44.0	11321
Scheduled Tribe	6.5	7405	8.0	20690	10.3	7710	23.4	20687
Other	12.0	14729	16.7	36876	33.7	16493	54.2	36880
Religion								
Hindu	9.7	24905	13.5	59713	24.5	27218	44.8	59717
Muslim	6.7	1632	12.8	4218	31.6	1830	48.8	4220
Other	16.2	668	9.8	4952	34.6	705	20.8	4950
Standard Living Index#								
Low	5.9	18755	7.3	40800	13.1	20016	27.7	40800
Medium	12.0	5305	13.6	11028	36.0	6073	49.4	11028
High	28.1	3146	26.8	17054	73.5	3664	76.7	17060
Mother's Education								
Never Schooling	4.7	16725	NA	NA	13.2	17862	NA	NA
Primary	9.0	3287	12.3	5217	23.2	3659	40.9	5219
Middle	12.9	2981	15.6	19602	35.9	3428	54.0	19605
Higher	27.6	4214	36.4	9252	63.6	4805	83.2	9254
Husband's Education								
Never Schooling	4.5	9813	NA	NA	11.4	10381	NA	NA
Primary	6.8	4517	9.0	6142	17.9	4895	31.4	6141
Middle	8.0	4345	11.5	25251	24.4	4834	43.8	25253
Higher	17.9	8532	24.9	18106	44.1	9643	67.2	18111
Received Full ANC								
No	-	-	-	-	21	24581	38.9	59810
Yes	-	-	-	-	51.2	2625	72.4	9065
Total (N)	9.6	27206	12.2	68882	25.2	29753	40.2	68888

NA: Data not available

In antenatal care utilisation, urban has better improvement than its counterpart although the pace was not much better (changes only 3%). While in safe delivery services the rural move much ahead (from 16% to 35%) than urban (59% to 73%) although the rural-urban differential was much large. Younger women were predicted higher utilisation of safe delivery care. By social group, it was found that other caste has better improvements in full maternal health services utilisation compare to SCs and STs. Schedule Tribe has only 1.5% increment in full antenatal care and 13% in safe delivery services utilisation from 6.5% to 8% and 10% to 23% respectively. In the religious group, Muslims were in much better position regarding enhancing their ANC care compare to Hindu and Others while Hindus were performing better in safe delivery services than rest of categories. Similarly, the education of women and her husband and her

economic status matters much for improving the antenatal care utilisation in the study region. For safe delivery services utilisation, it has been observed that the women who went for ANC care were almost double prevalence for safe delivery care in the study region.

3.2 Trends of Full ANC and Safe Delivery in EAG States

Table 2: Trends of Full ANC and Safe Delivery in Tribal and Non-Tribal social groups in Tribal Dominance EAG States, DLHS-2, 2002-04 & DLHS-3, 2007-08

Background Characteristics	Full ANC				Safe Delivery			
	Non-Tribes		Scheduled Tribe		Non-Tribes		Scheduled Tribe	
	DLHS 2	DLHS 3	DLHS 2	DLHS 3	DLHS 2	DLHS 3	DLHS 2	DLHS 3
(N)	**19377**	**48193**	**7405**	**20690**	**21591**	**48201**	**7710**	**20687**
States								
Jharkhand	10.8	12.0	5.1	6.5	24.6	34.3	7.1	14.1
Odessa	17.2	27.8	9.2	14.7	37.3	62.9	13.7	26.6
Chhattisgarh	13.8	17.4	10.0	11.4	21.8	41.0	9.7	21.1
Madhya Pradesh	7.1	11.4	3.7	4.2	32.4	60.2	10.4	31.7
Place of Residence								
Rural	7.9	11.9	6.1	7.2	19.9	42.5	8.4	21.1
Urban	20.5	23.8	13.3	18.9	61.4	74.7	38.4	55.8
Mother's Age								
15-19 years	7.7	12.0	6.6	7.0	27.4	53.2	13.6	25.8
20-34 years	11.6	16.4	6.6	8.4	31.4	53.4	10.1	24.7
35-44 years	7.0	13.2	5.8	7.3	23.8	43.6	7.9	18.0
Age at Marriage								
<18	6.3	NA	5.6	NA	20.0	NA	8.0	NA
18 and above	18.2	NA	8.5	NA	46.4	NA	15.4	NA
Birth Order								
1	NA	19.4	NA	10.0	NA	65.8	NA	33.7
2-3	NA	15.8	NA	8.7	NA	49.1	NA	23.4
4 and above	NA	7.0	NA	5.3	NA	31.1	NA	13.6
Standard Living Index								
Low	6.0	8.0	5.8	6.4	15.7	34.1	8.3	19.5
Medium	12.0	13.9	12.9	12.1	37.1	51.6	22.6	37.1
High	28.7	26.8	19.0	27.0	73.9	77.4	63.6	65.9
Mother's Education								
Never Schooling	4.7	23.6	4.6	NA	15.9	50.1	8.0	34.3
Primary	8.3	12.6	12.4	11.4	25.2	46.3	12.3	26.7
Middle	13.1	16.4	12.4	12.4	38.8	58.7	14.5	34.7
Higher	28.6	36.8	19.8	31.9	66.7	85.5	34.0	60.8
Husband's Education								
Never Schooling	4.6	NA	4.4	NA	14.0	NA	7.4	NA
Primary	6.8	9.9	7.1	7.5	20.9	37.7	9.3	21.0
Middle	8.1	12.6	8.0	8.4	26.7	49.7	13.4	26.6
Higher	19.1	26.0	11.6	18.2	48.3	71.3	17.9	42.6
Received Full ANC								
No	-	-	-	-	25.6	47.0	9.1	21.4
Yes	-	-	-	-	58.5	78.2	20.3	46.5
Total	11.0	15.4	6.5	8.0	30.5	51.8	10.3	23.4

NA: Data not available

Table 2 shows the trends of maternal health care utilization among tribal and non-tribal population in tribal dominance EAG states for the time of 2002 to 2008. In full antenatal care services utilization, tribal mother were highly improved the prevalence only in certain categories like higher wealth indices (from 19% to 27%), higher status of education (about 20% to 32%) and urban dwellers (13% to 19%). While in non-tribal categories over all sects of population groups the improvement has been observed. Odessa was the state where higher improvement has been recorded irrespective of any social groups' not only full ANC services but in safe delivery utilization too. Urban was also important domain where higher improvements were accessed over the second and third round of DLHS surveys. Drastic change has occurred in either never schooling or higher educated tribal women, who received full antenatal care services, and the women who belongs to low income group of tribal categories in terms of availing the facility of safe delivery. Overall, the pace of accessing the safe delivery services was more than the antenatal care services in both groups of women.

3.3 Determinants of Full ANC in Tribal and Non-Tribal in EAG States

Table 3a showed the results of logistic regression that determines the determinants of full antenatal care services utilisation in tribal and non-tribal communities in 2002-04. It has clearly seen that the dwelling states (Odessa and Chhattisgarh), place of residence (Urban), age at marriage (more than the legal age at marriage), household's income level (higher the income) and education status (comparatively more educated) of women and her husband was significantly more likely for determines the full ANC utilization than there

reference categories in non-tribal communities in 2004. While in tribal groups, living states and educational status of women and her husband were the most significant determinants for the same services utilization.

Table 3a: Logistic Regression (Odds Ratio for the CI of 95%) showing the determinant of Full ANC in tribal and non-tribal in tribal dominance EAG states, DLHS-2, 2002-04

Background Characteristics	Non-Tribal			Tribal		
	Exp(B)	95 C.I. for EXP (B)		Exp(B)	95 C.I. for EXP(B)	
		Lower	Upper		Lower	Upper
States						
Jharkhand®						
Odessa	1.804***	1.598	2.037	2.018***	1.573	2.589
Chhattisgarh	1.496***	1.298	1.724	1.822***	1.400	2.372
Madhya Pradesh	0.600***	0.529	0.680	0.617***	0.464	0.820
Place of Residence						
Rural®						
Urban	1.303***	1.179	1.440	1.232	0.940	1.616
Mother's Age						
15-19 years®						
20-34 years	0.970	0.813	1.157	0.951	0.716	1.263
35-44 years	0.887	0.696	1.130	1.260	0.861	1.843
Age at Marriage						
<18 Years®						
18 and above	1.319***	1.192	1.460	1.135	0.944	1.364
SLI						
Low®						
Medium	1.316***	1.169	1.481	1.355***	1.030	1.783
High	2.355***	2.038	2.721	1.681**	1.084	2.606
Mother's Education						
Never Schooling®						
Primary	1.288***	1.109	1.495	1.795***	1.378	2.339
Middle	1.713***	1.476	1.988	2.233***	1.651	3.019
Higher	2.616***	2.251	3.040	3.084***	2.261	4.206
Husband's Education						
Never Schooling®						
Primary	1.091	0.923	1.289	1.274*	0.998	1.627
Middle	1.146*	0.971	1.353	1.596***	1.223	2.083
Higher	1.414***	1.212	1.651	1.400**	1.078	1.820

#Household Standard Of Living Index (SLI) ®: Reference category;
Level of Significance: ******* p<0.001, ****** p<0.05, *****p<0.01

Table 3b showed the results of logistic regression that determines the determinants of ANC services utilisation in tribal and non-tribal communities in 2007-08. It has found that in the non-tribal groups, the dwelling states (Odessa and Chhattisgarh), place of residence (Urban), mother's age, household's income level (higher the income) and education status (comparatively more educated) of women and her husband was significantly more likely for determines the ANC care services utilisation than there reference categories in non-tribal communities in 2007-08. While Madhya Pradesh in state group, higher birth order were less likely for antenatal care utilisation than their reference categories.

While in tribal communities, living states, place of residence as urban, household's wealth and mother education was more likely to go for full antenatal services care. Moreover, similarly the state of Madhya Pradesh and higher birth order were less likely to go for full antenatal care utilisation.

Table 3b: Logistic Regression (Odds Ratio for the CI of 95%) showing the determinant of Full ANC in tribal and non-tribal in tribal dominance EAG states, DLHS-3, 2007-08

Background Characteristics	Non-Tribal ANC			Tribal ANC		
	Exp(B)	95 C.I. for EXP (B)		Exp(B)	95 C.I. for EXP (B)	
		Lower	Upper		Lower	Upper
States						
Jharkhand®						
Odessa	1.991***	1.758	2.255	2.086***	1.562	2.787
Chhattisgarh	1.168**	1.008	1.353	1.347**	1.037	1.750
Madhya Pradesh	0.671***	0.593	0.758	0.610***	0.451	0.824
Place of Residence						
Rural®						
Urban	1.333***	1.205	1.475	1.410**	1.003	1.983
Mother Age						
<20 Year®						
20-29	1.252***	1.081	1.449	1.181	0.851	1.639
30 Years and above	1.443***	1.183	1.760	1.481*	0.954	2.301

Birth Order						
1®						
2-3	0.835***	0.762	0.915	0.877	0.703	1.094
4 and above	0.566***	0.475	0.676	0.581***	0.399	0.847
Wealth Index						
Poor®						
Middle	1.291***	1.133	1.470	1.495***	1.147	1.950
Rich	1.696***	1.497	1.921	2.000***	1.458	2.743
Mother's Education						
<5 Year®						
5-9 Year	1.092	0.937	1.272	0.997	0.755	1.317
10 or more year	2.026***	1.704	2.409	2.014***	1.388	2.923
Husband Education						
<5 Year®						
5-10 Year	1.255**	1.019	1.545	0.997	0.700	1.421
10 and more Years	1.561***	1.258	1.936	1.286	0.873	1.896

®: Reference category; Level of Significance: ******* p<0.001, ****** p<0.05, *****p<0.01

3.4 Determinants of Safe Delivery in Tribal and Non-Tribal in EAG States

Table 4a showed the results of logistic regression that determines the determinants of full antenatal care services utilisation in tribal and non-tribal communities in 2002-04. It has clearly seen that in non-tribal groups, the dwelling states (Odessa and Madhya Pradesh), place of residence (Urban), age at marriage (more than the legal age at marriage), house hold's income level (higher the income), education status (comparatively more educated) of women and her husband and the women used the Full ANC care was significantly more likely for determines the safe delivery utilization than there reference categories in non-tribal communities in 2004. While, the dwelling state of Chhattisgarh, comparatively higher age of mothers, were less likely for safe delivery care utilisation. In tribal communities, living states, place of residence, age at marriage, household's wealth status and women's education was most significant variables and was more likely for safe delivery care while the age of mother is less likely for safe delivery services utilisation than the reference categories.

Table 4a: Logistic Regression (Odds Ratio for the CI of 95%) showing the determinant of Safe Delivery in tribal and non-tribal in tribal dominance EAG states, DLHS-2, 2002-04

Background Characteristics	Non-Tribal (Safe Delivery)			Tribal (Safe Delivery)		
	Exp(B)	95% C.I. for EXP (B)		Exp(B)	95% C.I. for EXP (B)	
		Lower	Upper		Lower	Upper
States						
Jharkhand®						
Odessa	1.721***	1.557	1.902	2.611***	2.041	3.340
Chhattisgarh	0.670***	0.591	0.759	1.703***	1.301	2.231
Madhya Pradesh	1.312***	1.197	1.438	2.331***	1.827	2.975
Place of Residence						
Rural®						
Urban	2.532***	2.354	2.723	2.663***	2.171	3.266
Mother's Age						
15-19 years®						
20-34 years	0.634***	0.565	0.713	0.609***	0.490	0.757
35-44 years	0.624***	0.528	0.736	0.591***	0.428	0.818
Age at Marriage						
<18 Years®						
18 Years and above	1.517***	1.411	1.631	1.437***	1.225	1.686
Standard Living Index						
Low®						
Medium	1.591***	1.468	1.724	1.709***	1.365	2.139
High	3.531***	3.161	3.943	5.121***	3.513	7.466
Mother's Education						
Never Schooling®						
Primary	1.172***	1.061	1.295	1.415***	1.115	1.796
Middle	1.548***	1.398	1.713	1.320**	0.994	1.753
Higher	2.495***	2.238	2.782	2.741***	2.070	3.627
Husband's Education						
Never Schooling®						
Primary	1.142**	1.023	1.274	1.036	0.840	1.277
Middle	1.326***	1.191	1.477	1.211	0.963	1.523
Higher	1.524***	1.375	1.690	1.130	0.899	1.420
Received Full ANC						
No®						
Yes	1.758***	1.593	1.940	1.497***	1.188	1.885

#Household Standard Of Living Index ®: Reference category;
Level of Significance: ******* p<0.001, ****** p<0.05, *****p<0.01

Table 4b illustrated that in non-tribal groups, the dwelling states (Odessa and Madhya Pradesh), place of residence (Urban), mother's age (30+ years), household's income level (higher the income), education status (comparatively more educated) of women and her husband and the women used the Full ANC care was significantly more likely for determines the safe delivery utilization than there reference categories in 2008. While, the dwelling state of Chhattisgarh, comparatively higher age of mothers (20-29 years) and higher birth oder were less likely for safe delivery care utilisation. In tribal communities, living states, place of residence, mother's age, household's wealth status and women's and her husband's education and the women who went for was Full ANC care were most significant variables and was more likely for safe delivery care while the higher birth order is less likely for safe delivery services utilisation than the reference categories.

Table 4b: Logistic Regression (Odds Ratio for the CI of 95%) showing the determinant of Safe Delivery in tribal and non-tribal in tribal dominance EAG states, DLHS-3, 2007-08

Background Characteristics	Non-Tribal Safe Delivery			Tribal Safe Delivery		
	Exp(B)	95 C.I. for EXP(B)		Exp(B)	95 C.I. for EXP(B)	
		Lower	Upper		Lower	Upper
States						
Jharkhand®						
Odessa	2.491***	2.214	2.802	3.265***	2.546	4.186
Chhattisgarh	0.861**	0.756	0.979	1.350***	1.083	1.683
Madhya Pradesh	2.019***	1.820	2.241	2.639***	2.130	3.270
Place of Residence						
Rural®						
Urban	2.123***	1.911	2.358	2.645***	1.912	3.660
Mother Age						
<20 Years®						
20-29 years	0.982	0.869	1.108	1.166	0.920	1.477
30 Years and above	1.188*	0.995	1.419	1.361*	0.956	1.938
Birth Order						
1®						
2-3	0.503***	0.461	0.548	0.516***	0.433	0.615
4 and above	0.352***	0.307	0.403	0.338***	0.252	0.453
Wealth Index						
Poor®						
Middle	1.335***	1.209	1.475	1.267**	1.028	1.561
Rich	2.143***	1.934	2.375	2.518***	1.911	3.317
Mother's Education						
<5 Years®						
5-9 Years	1.233***	1.103	1.379	1.119	0.911	1.374
10 Years or more	2.450***	2.112	2.844	1.744***	1.280	2.375
Husband Education						
<5 Years®						
5-10 Years	1.013	0.871	1.178	1.264*	0.967	1.653
10 Years and more	1.246***	1.060	1.465	1.731***	1.284	2.333
Received full ANC						
No®						
Yes	2.169***	1.948	2.416	1.920***	1.547	2.383

®: Reference category; Level of Significance: ******* p<0.001, ****** p<0.05, *****p<0.01

3.5 Result of the decomposition analysis

We used Fairlie decomposition analysis to quantify the contribution of different socioeconomic and demographic predictors explaining the gap in the use of maternal healthcare services between STs and the non-tribal. Summary results of the decomposition analysis are presented in Table 5a.

Table 5a: Summary result of Fairlie decomposition analysis showing the mean differences in the use of maternal healthcare services among STs & Other group in study region, DLHS-3, 2007–08

	Full ANC	Safe Delivery
Mean prediction among STs	0.150	0.359
Mean prediction among non-tribes	0.215	0.628
Raw Differential	0.065	0.269
Total explained	0.051	0.136
Explained	64.8	74.7
Unexplained	35.2	25.3

Table 5b: Decomposition analysis of the social gap in the use of the Full ANC services in EAG states

Full ANC	Coefficient	P>z	[95 Conf.	Interval]
Mother Age	-0.002	0.000	-0.002	-0.001
Birth Order	0.004	0.000	0.003	0.005
Place of Residence	0.006	0.000	0.003	0.010
Women Education	0.016	0.000	0.013	0.019
Husband Education	0.003	0.001	0.001	0.005
States	-0.010	0.000	-0.012	-0.008
Wealth Index	0.033	0.000	0.026	0.040

Table 5c: Decomposition analysis of the social gap in the use of the Safe Delivery services in EAG states

Safe Delivery	Coefficient	P>z	[95 Conf.	Interval]
Full ANC	0.014	0.000	0.013	0.016
Mother Age	0.000	0.000	0.000	0.001
Birth Order	0.011	0.000	0.010	0.012
Place of Residence	0.020	0.000	0.017	0.023
Women Education	0.018	0.000	0.016	0.021
Husband Education	0.003	0.010	0.001	0.006
States	0.006	0.000	0.005	0.008
Wealth	0.062	0.000	0.054	0.070

Table 5b & 5c presents the details of decomposition analysis of the social gap in the use of the maternal healthcare services in tribal dominance EAG states. To make our result more convenient, we present the coefficient in terms of percentage (Fig. 2). A positive contribution indicates that particular variable is widening the gap in the use of the services between STs and the non-tribal. The converse holds true for a negative contribution. Household wealth is the main contributor explaining 33% for full antenatal care to 62% for safe delivery of the gap in between STs and the non-tribal mothers. Woman's education is another important contributor explaining 16% to 18% of the gap in the use of the maternal healthcare services. Importantly, antenatal care visit has a greater contribution in explaining the gap in medical assistance at delivery as 14% between women of tribal and non-tribal. Husband's education and the place of residence are two other contributors widening the social gap within the use of these maternal healthcare services. Woman's age and state of dwellings narrowed the gap, though its contribution is negligible.

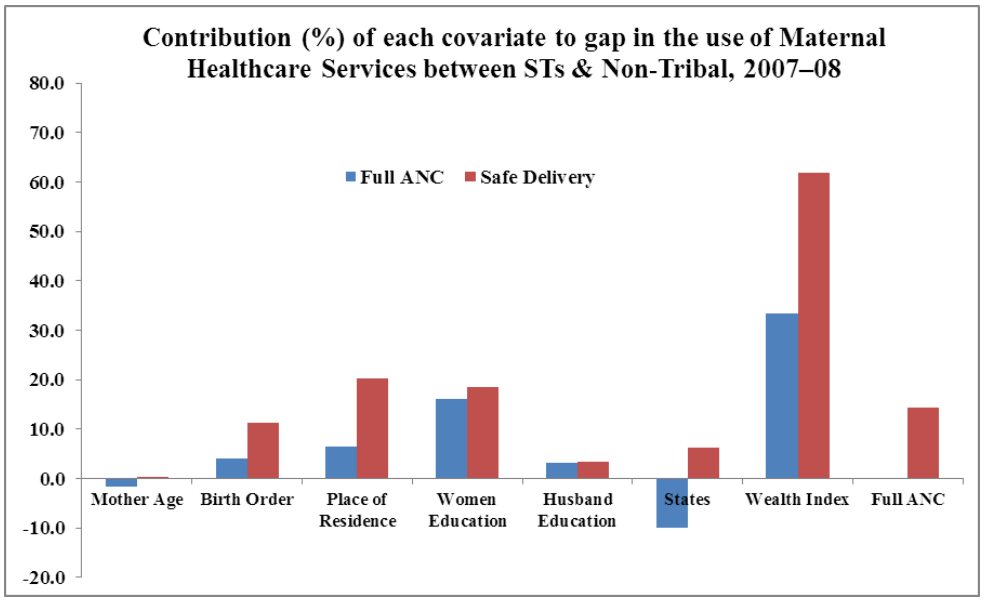

Fig 2: Result of Fairlie decomposition analysis showing contribution of each covariate to gap in the use of maternal healthcare services between social groups, 2007–08.

4. Discussion

To identify the determinants that are responsible for the poor use of maternal health care services among tribal and non-tribal communities is vital from policy perspectives. The results show the lower use of the maternal health care services among the women of tribal than the non-tribal. Our results are well consistent with the findings of previous national and sub-national studies from the country [3, 18, 21, 32, 33]. Lower utilisation of the maternal health care services among these tribal women is mainly due to their disadvantageous position in the society for all kind of resource utilization. These findings of the study further provide an understating of the respective contributions of the factors like household wealth, woman's education, place of residence, etc. which explain the disparity between scheduled tribe and non-tribe in the utilisation of the maternal healthcare services. The study uses Fairlie's decomposition method and decomposes the average gap in the usage of the maternal health care services between tribal and non-tribal mothers of tribal dominance region of EAG states to accomplish this kind of results. The results illustrated that the vast differences in maternal health care utilisation are due to differences in the distribution of household wealth, the level of educational attainment, utilisation of full antenatal check-ups and place of residence.

It is so obvious that household economic status turns out to be the largest contributor and cause for much widening the social gap in the utilisation of maternal healthcare services. The effect of household wealth status on the use of maternal health care services has widely documented [3, 21, 22, 34, 35, 36]. It is argued that due to limited resources, poor scheduled caste households do not pay for healthcare expenses. While the remaining non-poor are wealthier and better educated and have well able to deal with travel for their health needs, [37] all of which may facilitate the use of the maternity care.

Women's and her husband's education is another important

contributor to creating a gap in the use of maternal healthcare services among studied social groups. A poorly educated tribal woman and her less educated husband are associated with no or very limited awareness of any health services and less knowledge of the benefits of preventive health care. The poor communication with the husband and family members on health-related issues and poor decision-making power of the women within the family is responsible for reducing the potential for healthcare demands from providers and resultant poor services utilisation [38].

To explain the wide gap for utilisation of maternal health care in tribal women, rural as the place of residence is a very significant factor. The number of literature have argued that the role of geographical factors have a much significant on the use of maternal health care services [39, 40] and further it become so inaccessible if it remotely located as a village or rural regions where there is a limited service provision [41]. In rural, still, the pregnancy is considering as well a natural state for a woman rather than they think it requires any medical care that intended to safeguard their health and well-being [42]. The full ANC utilisation has a significant contribution in explaining the gap in the use of medical assistance at delivery between tribal and non-tribal mothers. Such influence of the antenatal care could be understood by the fact that beyond the role of detecting malformation issues and other risk factors during pregnancy, antenatal check-up also acts as a means of awakening the women on the advantages of giving birth in medically controlled conditions. A few researchers have examined the factors affecting maternal healthcare utilisation in India. Caste, along with the wealth status of the household, women and her husband's educational attainment, place of dwellings, has been found to be significantly associated with maternal healthcare use [3, 17, 21]. Socially deprived castes have always lagged and are less likely to use maternal health care compared with rest of the population [18, 19, 20].

5. Conclusion

As the part of the conclusion, it would be said that there is a high degree of inequity that exists among different categories of population points out in two important areas, which the study region needs to look in for addressing the health inequities. The first important area is, of course, within the health sector itself. Within this, both supply and demand side of health needs to be addressed through appropriate health seeking and health care interventions respectively [43]. The other important area in which the region needs to work out is regarding the integration of all health sectors with other relative domains such as education, transportation and communication, livelihood promotion, etc. Given this, the following are some of the challenges that the region needs to overcome to improve the health situation of inhabitants in the region. Social status more specifically the caste-wise health inequity is quite visible. The non-tribal population is more privileged as compared to tribal that necessitates caste specific measures. The geographical remoteness or inaccessibility is another crucial factor which needs to be looked in a while strategising the health services in those areas. The inequity between educationally deprived and educationally superior people also needs to be addressed. Since the level of education is one of the key factors that influence the health-seeking behaviour of people, appropriate measures regarding BCC, IEC, IPC, etc. need to be initiated.

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