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Original Research Article

Impact of intervention on adequate antenatal care and associated factors among Baiga tribal women of Madhya Pradesh: a case-control study

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ABSTRACT

Background: This study was done to report on adequate antenatal care services owing to the impact of IEC intervention among deprived Baiga tribal women.
Methods: Intervention study of 367 tribal women having a reproductive age of 15 to 49 year of 24 villages from district-Dindori. Pre-tested, administered intervention tools were implemented in intervention groups (12 villages) to enhance women's knowledge for the use of ANC services (phase-I) and in phase-II impact evaluation survey of mother's antenatal care utilization and related details were collected from mothers of both intervention and control group. Based on baseline indicators, a carry forward IEC-intervention study was taken considering the case-control design. Logistic regression analysis was used to identify the associated factors.
Results: Use of ANC services 82.3% was found to have increased by 10.3% from baseline (72%); it was found significantly higher (88%) in the intervention group while lower (76.1%) in the control group. As regards 60% women received more than 3 ANC check-ups remarkably higher by 13% in the intervention group. Health institution child births 44.8% were found meaningfully improved by 36.8% from baseline (8%); also, it was revealed higher (49.7%) in the intervention group than lower (40%) in the control group. Women's education and exposure of previous pregnancy has found strong association with adequate antenatal care in intervention groups.
Conclusions: A comparatively high proportion of the use of ANC services and institutional child birth were found in the intervention group. Improving the access to more quality health services in other tribal communities may necessitate the intervention research.

Keywords: ANC services, Baiga tribal women, IEC-intervention, Logistic regression analysis, Maternal health

INTRODUCTION

Pregnancy and childbirth related health issues are the major cause of women's death in developing countries like India. Maternal health is explained by antenatal care practices which is an important predictor of safe delivery, health information and services that can help to improve mother and infant's health.[1,2] Additionally, antenatal care (ANC) has a positive impact on the utilization of postnatal care services whereas, postnatal and intra-partum care is considerably able to reduce maternal mortality because most deaths occur in the first week after delivery.[1,3,4] A declining death rate has been observed in women during pregnancy and after pregnancy as per the Registrar General of India.[5] But, in the rural and tribal segment of population, availability and accessibility of health care providers is low in tribal dominant districts in Madhya Pradesh. The proper pregnancy care depends on timely health care check-ups which influences the health and well-being of the mother. However, improper pregnancy care leads to the probability of occurrences of complications during the

pregnancy and is the main reason for the death of mothers during delivery. In support of improving mothers' health, the Millennium Development Goal (MDG) 5 has focused on reducing maternal mortality and achieving universal access to reproductive health care.[6] Uses of maternal health care services are not adequate in rural India especially in tribal communities. The study report shows that about 80% of maternal deaths and 98% stillbirth were caused by direct obstetric complications; primarily haemorrhage, sepsis, complications, abortion, preeclampsia, eclampsia and prolonged/obstructed labour.[7-10] Therefore, proper maternal care practices, knowledge and attitude towards maternal health can improve and save the maternal health condition and also reduce the death rates.

The tribes have established 8.6% of total country (India) population and are majorly distributed in hilly, forested areas of the country. Madhya Pradesh is the most populous state in the country with 43 communities notified as Scheduled tribes (ST) population. India's tribes are marginalized with 40.6% living below poverty line (BPL) and 41% without formal education.[5] The tribal dominant district Dindori is still ranked backward where the study was conducted and reported about 72% of Baiga women had taken at least one ANC check-up and having lower knowledge of maternal health care services and they have strong traditional and cultural faith.[11,12] In addition to the child health status observed, the traditional and cultural norms are an emerging factor for new born morbidities among Baiga tribe.[13]

The Baiga tribe is one of particular vulnerable tribal groups (PVTGs) out of three in Madhya Pradesh who are the most ancient and primitive aboriginal tribe of India. They are poor, isolated, socially backward, illiterate and economically weak.[14] In this paper, an attempt has been made to study the impact of an intervention and determinants of the use of antenatal care services in intervention versus control groups which have equally distributed due to homogeneous characteristics of tribe. The rationale includes the tribe's history of illiteracy, early marriages, early pregnancy and low awareness consequently the reason for underutilization of antenatal health care services. The study intended to realize the effectiveness of IEC (information education and communication) intervention education by comparing the research outcomes of intervention vs. control areas. And, also describe the associated factors with the adequate antenatal care of the women in reproductive age.

METHODS

Study setting

Country-India is with 28 states and 8 union territories. The Madhya Pradesh state is the largest state in terms of tribal population comprising 51 districts. Dindori district is still a backward district with 65% of Baiga population habituating in tribal hilly, dense forest areas of the district population. The Indian Council of Medical Research (ICMR)- National Institute of Research in Tribal Health (ICMR-NIRTH) has conducted a study on 'determinants of utilization of maternal health care services among this primitive tribe- Baiga in Dindori district of MP, 2011-12.[15] The studied 24 villages have been categorized in two equally sub groups; (1) intervention group- to women receive the IEC intervention (12 villages), (2) control group- women do not receive any IEC intervention (other 12 villages) for this study having conducted in 2013 to 2016 to measure the impact of intervention.

Study design, sampling and baseline indicators

The survey of baseline indicators was performed earlier as details. The sample size was estimated by standard statistical technique. A sample of 500 ever-married women have been interviewed from 24 selected villages in 3 tribal blocks. The sampling procedure has been adapted with probability proportion to size (PPS) of block population to assess the health care service utilization and awareness on maternal health issues. Of them, 380 women had experienced maternity in the last three years and among them about 72% women had received at least one antenatal check-up. Furthermore, most of the child birth deliveries are reported at home (92%) and only one-third women had knowledge about the utility of such services. On the basis of observed indicators and recommendations of a concerned scientific advisory committee and an institutional ethics committee the work has been carried forward and also received monetary support from the funding agency (Division of Reproductive and Health Nutrition, RHN, ICMR, New Delhi). Therefore, further this study has been taken with a case-control study design for measuring the effectiveness of IEC intervention. The study was in two phases and studied 24 villages divided equally into two sub groups intervention and control.

Phase-I: implementation of IEC intervention in intervention group (12 villages)

IEC intervention tools and implementation strategy

The full information on MCH issues were developed and converted as intervention tools in the appearance of banners, posters, pamphlets, slogans, booklets, flip chart, etc. with the consultation of state health personnel and used for implementation to creating awareness building among mothers in intervention group with the support of their BMO (block medical officer) and gross root health workers (ASHA, ANM and Anganwadi). The IEC intervention communicated in 3 ways; mass communication (through formulated village level committees, health education camps, writing slogans on the wall, displaying banners, distributing/pasting of pamphlets), group communication (educating for motivation and influencing them by lectures) and interpersonal communication- implemented face to face communication individually to currently pregnant

mothers). The all-IEC intervention strategy was provided in 3 rounds in a specific interval of 3 months to explore IEC-intervention in an extensive sense to seek increased awareness on the issues and mobilize towards health institutions for availing the health services particularly during pregnancy and childbirth. A total 36 group communications were conducted; in the 1st round 206 women participated and in subsequent rounds it increased to 242 and 253. Interpersonal communication with 60 women in 1st round, and it increased in subsequent rounds to 80 and 84 women participated. Observations viewed, women not easily asked but they listen seriously during the 1st round implementation. They tried to speak-health related issues in 2nd round and subsequently during the 3rd round implementation, they understood that it is important for our health and agreed to follow it.

Phase-II: The impact evaluation survey of both intervention and control villages (24 villages) was carried out. Data has to be collected using a survey tool which was used in the baseline survey. The relevant information was recorded by conducting an individual interview method in 2016 by trained investigators.

Inclusion criteria

The inclusion criteria were considered for (i) who have exposure to maternity preceding three years, (ii) women available at the time of survey and willing to participate in the study.

Measurements of variables

The study focuses on the utilization of the all (five) antenatal health care services viz. (i) antenatal check-ups, (ii) at least 3 ANC check-ups, (iii) antenatal check-ups in the first trimester, (iv) consumption of IFA tablets at least for 3 months and (v) at least 1 or more tetanus toxoid (TT) injection. The covariate (explanatory) variables have been used on their theoretical and empirical importance as individual level characteristics viz. women age, age at marriage, birth orders and women education.

Outcome and exposure variables

The outcome variables of antenatal care services were re-coded in dichotomous category; a) received antenatal check-ups (yes =1, no =2), b) frequent use of antenatal check-ups (at least 3 ANC visit =1, less than 3 ANC visit =2), c) antenatal check-ups in first trimester (yes =1, no =2), d) consumption of IFA tablets (90+) at least 3 month (yes=1, no=2) and e) received TT injection (1 or more dose=1, no dose=2). The estimated effects of covariates, the odds ratio (OR) for each covariate are tabulated.

The data were scrutinized, processed, validated and analysed with SPSS software version 22.0 for the results. Simple percent distribution used to examine the level of utilization of antenatal care services among mothers in intervention and control groups. Logistic regression analysis used to estimate the effect of covariates on the utilization of antenatal care services. The 95% CI (confidence interval) is used to see the precision, large CI indicates low level of precision of the odds ratios which measure the association between an exposure and outcome, commonly used in case-control studies for strengthening the association.

Ethical clearance

Ethical approval was obtained from the Institute Ethics Committee (IEC) of National Institute for Research in Tribal Health, Jabalpur, Madhya Pradesh, India (No. RMRCT/Ethics Committee/1428/2012). IEC approved the study protocol for the selected district. All participants gave informed consent. In the case of illiterate, consent was taken in the presence of a witness.

RESULTS

The results expressed in three sections; background characteristics of study participants, antenatal health care service utilization and its determinants in intervention versus control groups;

Socio-demographic and women characteristics details (intervention versus control)

The socio-demographic outlines of both intervention and control group have shown a closely similar situation in terms of most of the people are living in nuclear family (82.7%) and accommodate in single room (60%), 52% of people were illiterate, most of the household (99%) using wood/animal dung for cooking food, 17.3% family using drinking water from river/stream and 1.4% family form springs, and only 70% houses are having electric connection. Maximum people are occupied in agricultural work (61.3%) and only 3.1% in service (government job). Women characteristics found that around 40% of the women were in higher parity (birth order) in both intervention and control groups. About 1% of women in intervention and 0.5% of women in control areas had experienced stillbirths/abortions. Significant proportions (more than 70%) of the women were found to be illiterate and mainly occupied in agricultural works. The mean age of women (respondent) was 25.2 years for antenatal check-ups. Nine of every tenth women were married before the age of 19 years presented shown in Table 1.

Antenatal health care service utilization (intervention versus control)

The level of antenatal care service utilization has been depicted in Table 2. The observations are discussed as below:

Received ANC check-ups

Out of all 367 women, 82.3% women had taken at least one antenatal check-up. It (antenatal check-ups) was

found significantly (χ^2=8.783, p<0.05) higher among women in the intervention group (88%) as compared to control group (76.1%). About 60% of women from intervention and 46% of women from the control group had received at least three antenatal check-ups during pregnancy.

Table 1: Background characteristics of the sample (intervention and control groups).

Variables	Intervention group	Control group	Number
Population covered	1231	1317	2548
Household covered	278	278	556
Ever married women	278	278	556
Variables	**Intervention group (%)**	**Control group (%)**	**Number (%) (N_{1+} N_2)**
Individual characteristics	N_1=191	N_2 =176	367
Women age (in years)			
<20	25 (13.1)	32 (18.2)	57 (15.5)
20-29	156 (81.7)	137 (77.8)	293 (79.8)
≥30	10 (5.2)	7 (4.0)	17 (4.6)
Marital status			
Currently married	187 (97.9)	167 (94.9)	354 (96.4)
Widowed/divorce	4 (2.1)	9 (5.1)	13 (3.6)
Previous birth order			
0-1	64 (33.5)	58 (33.0)	122 (33.2)
2-4	119 (62.3)	108 (61.4)	227 (61.9)
5+	8 (4.2)	10 (5.7)	18 (4.9)
Age at marriage in years			
<19	165 (86.4)	156 (89.7)	321 (87.9)
≥19	26 (13.6)	18 (10.3)	44 (12.1)
Ever had a still birth/abortion			
Yes	1 (0.5)	2 (1.2)	3 (0.8)
No	190 (99.5)	174 (98.8)	364 (99.2)
Education			
Illiterate	135 (70.7)	135 (76.7)	270 (73.6)
Primary	16 (8.4)	19 (10.8)	35 (9.5)
Middle	40 (20.9)	22 (12.5)	62 (16.9)
Occupation			
Agricultural work	118 (61.7)	106 (60.2)	224 (61.0)
Labour	67 (35.1)	70 (39.8)	137 (37.3)
Service	6 (3.1)	0 (0.0)	6 (1.6)

Table 2: Distribution of the level of antenatal health care services and uses according to intervention and control groups.

Antenatal care	Intervention group (% of women) N_1=191	Control group (% of women) N_2=176	Total N=(N_1+N_2) =367
Received antenatal check-ups			
Yes	88.0*	76.1	82.3
No	12.0	23.9	17.7
Frequency of antenatal check-ups	n1=168	n2=134	n=302
≥3 visits	59.5	46.2	53.7
<3 visits	40.5	53.8	46.3
Timing of first antenatal check-ups			
First trimester	70.8*	46.3	59.9
After first trimester	29.2	53.7	40.1
Consumption of IFA tablets (90+)			
Yes	93.7*	85.5	89.9
No	6.3	14.2	10.1
TT vaccine (≥1)			
Yes	93.7	91.5	92.6
No	6.3	8.5	7.4

Continued.

Antenatal care	Intervention group (% of women) N_1=191	Control group (% of women) N_2=176	Total N=(N_1+N_2) =367
Place of child birth	N1=148	N2=182	N=330
Institutional child birth	49.7	40.0	44.8
Home child birth	50.3	60.0	55.2

χ^2 test statistics, *p<0.05

Time of first ANC check-ups

It was observed that about 71% women had taken their first antenatal check-ups in the first trimester (within 3 month of pregnancy) in the intervention group and it was found lower (46%) in the control group. The differences were found statistically significant (χ^2=19.160, p<0.05).

TT vaccination

Slightly higher (94%) women had been immunized by TT vaccination in intervention and it was 91.5% in the control group.

Consumption of iron folic acid tablets

Consumption of iron folic acid (IFA) tablets was found significantly higher (93.7%) in the intervention group while it was lower (85.5%) in the control group. At least three months consumption was also found significantly higher (59.3%) among women in the intervention group.

Place of childbirth

Institutional child birth 44.8% were found to have increased by 36.8% from baseline (8%) and it was attributed considerably higher (49.7%) in the intervention group while it is 40% in the control group.

Table 3: Logistic regression analysis on the determinants of the use of antenatal health care services in intervention versus control groups.

Variables	Coefficients of B (odds ratio) All outcome variable coded Yes=1, No=2									
	Antenatal Check-ups		At least 3 ANC visit		Timing for first ANC check-ups		Consumption of IFA tablet		TT vaccine	
Individual characteristics	**Int.**	**Con.**	**Int.**	**Con.**	**Int.**	**Con.**	**Int.**	**Con.**	**Int.**	**Con.**
Women age: <20(R)										
20-29	1.712	3.361	0.665	0.389	0.418	0.330	0.456	0.141	0.186	0.103
≥30	1.096	2.035	0.417	0.902	0.622	0.511	0.351	0.053	0.537	0.196
Pre. birth order: 0-1(R)										
2-4	1.292	0.679	0.819	0.694	0.188*	1.236	0.272	1.403	1.057	0.132
5+	0.643	1.210	0.891	0.187	0.415	2.964	0.236	0.225	0.463	0.654
Age at marriage: <19 years(R)										
≥19 years	1.006	0.636	1.388	0.281	1.111	0.895	0.861	2.078	2.163	0.414
Women's education: Illiterate(R)										
Primary	1.366	0.840	2.346	0.771	1.293	0.675	0.353*	0.702	0.833	0.452
Middle+	0.000	0.304	3.802	0.000	3.296*	2.790	0.404	0.417	0.927	0.285
N	191	176	191	176	191	176	191	176	191	176
Log likelihood	-2.137	-1.301	-2.17	-56.3	0.248	0.434	1.297	-21.02	-2.141	-18.82

Intervention: Int., Control: Con, (R) Reference category, * p<0.05

Determinants of antenatal health care service utilization (intervention versus control)

The outcome of five services of ANC coverage were analysed to determine the responsible socio-demographic factor by using logistic regression analysis presented in Table 3 of intervention versus control group. Interpretation of each ANC services component with women background characteristics and its estimated coefficients to viewed in the height of association is discussed below:

Antenatal check-ups

Five years of schooling women were found more likely to use antenatal check-ups in intervention groups. Women who were in the age group of 20-29 years, and equal or greater than 30 years were found likely to have higher use of ANC services in both intervention and control groups.

At least 3 antenatal check-ups

Antenatal visits at least three or more were found likely 2 times higher among mothers who have been educated in

intervention groups. Women who got married after completion of 19 year of age are more likely to prefer three antenatal check-ups in the intervention group.

Timing of first antenatal visit

In the intervention group it is found that the women 5-year schooling likely prefer to use first ANC services in the first trimester while women schooling up to middle had significantly preferred (OR=3.296; p<0.05). The exposure of previous pregnancy as the number of 2 or more births were found significantly higher (OR=0.188; p<0.05) in the intervention group.

Consumption of IFA tablets

Educated women resulted in a significant impact (OR=0.353; p<0.05) on scheduled consumption of IFA tablets in the intervention group. While, women who exposed 2 child births and married after 19 years of age were seen more likely to consume IFA tablets in the control group.

TT vaccination

Women having age at marriage above 19 years and women having 2 or more births were found more likely to receive TT vaccination in the intervention group. Moreover, significant association was found regarding the level of education for taking the TT vaccination in intervention groups.

DISCUSSION

In this study, use of ANC services 82.3% were found to have increased by 10.3% from baseline (72%); it was significantly higher (88%) in the intervention group than lower (76.1%) in the control group. With regard to 60% women received more than 3 ANC check-ups strangely higher by 13% in the intervention group in comparison to the control group. Health institution child births 44.8% were found significantly improved by 36.8% from baseline (8%); also, it was revealed higher (49.7%) in the intervention group than lower (40%) in the control group. The first ANC check-ups within three months of pregnancy in the intervention group found higher by 24.5% comparatively from the control group. A hospital-based study in a rural health training centre (RHTC) Bareilly, Uttar Pradesh, 2013 found that about 24.7% pregnant women received full antenatal care services during pregnancy.[16] The study of Belgaum, Karnataka showed 39.5% of pregnant women were under full antenatal care.[17] Women's education has a significant role in utilization of ANC services. Women living in rural India have little or very less access to health care resources due to illiteracy and low awareness. A qualitative study in rural areas of south Odisha on use of maternal health care services was found emerging owing to transportation and financial constraints.[18] Moreover, lack of educational facilities, distance to medical facilities, cost and transportation problems, cultural, religious, and family influence create a huge negative impact on women for not utilizing health care services.[19,20] In another study conducted in Krishna Nagar village, 2013 has depicted the similar findings and concluded that maternal literacy is a primary factor for utilizing ANC services.[21] The traditional childbirth practices in rural areas are mostly due to unawareness and lack of information regarding the ANC health care services which exposed the most common reasons for conducting childbirth at home.[22]

In our study, mother's education was also found to be an important predictor for the use of antenatal health care services. The order of birth was found to be an important element in the utilisation of safe delivery services. The exposure of pregnancy as an order of birth is a significantly important element in the utilisation of antenatal care services.[23] It is pragmatic that during pregnancy and delivery, timely appropriate care must be provided as an opportunity to prevent or manage the direct causes of maternal mortality (haemorrhage, obstructed labour, unsafe abortion, infection, etc). Although, maternal health care facilities play a significant role in the health and well-being of both mother and child. As per World Health Organization (WHO) recommendations during pregnancy 3 ANC-check-ups are compulsory for low-risk pregnancies as well as the reducing maternal and infant mortality.[24]

This research article intensely focused on knowing the adequate antenatal care and its determinants in vulnerable Baiga tribal mothers living in very backward regions. This tribe has low awareness and underutilization of maternal and child health (MCH) services as well as erroneous perception of pregnancy care and safe delivery.[25-27] As per mortality statistics, the Madhya Pradesh state has ranked one of the highest maternal mortality ratio (MMR) of 221 in India.[28] The underutilization of health care services affecting the survival of both mother and child. In rural-tribal areas in Madhya Pradesh, mostly women are socially backward, economically poor and illiterate with less awareness of health care services. In respect to new-born baby health is also very sensitive and at the risk of survival.[29] Also, the deprived health conditions of the mothers and its consequences of still births in the country are the key issues.[30] Women's illiteracy, age at marriage (<19 years) and low awareness of maternal and child health care services were found to be the risk factors significantly associated with conducting delivery at home among Baiga tribal mothers.[31] In this concern, the present article tries to convince and provides significant insight on health policy interventions for prevention of identified factors affecting the adequate ANC services during pregnancy. In this concern, only the interventions campaign can influence and improve the use of ANC services and change the attitude for pregnancy care. However, intervention strategy is not available to those most in need in tribal/rural areas.

The major strength of the study is to improve the use of ANC services of tribal women by implementing an intervention campaign with effective strategy as they are living in difficult terrains with poor socioeconomic conditions.

Its limitation is that intervention campaigns were done in small samples owing to the study's completion as research usefulness in favour to the beneficiaries (tribal women) particularly during pregnancy and childbirth. Despite the limitation, the study findings would force the implementation of research in vulnerable tribal populations to improve the utilization of maternal and child health care services.

CONCLUSION

Use of ANC services 82.3% were found to have increased from baseline (72%); reported significantly higher (88%) in the intervention group compared to lower (76.1%) in the control group. With regard to 60% women received more than 3 ANC check-ups strangely higher in intervention than in the control group. Health institution delivery 44.8% were found significantly improved from baseline (8%); higher (49.7%) in the intervention group than lower (40%) in the control group. Women's education and exposure to previous pregnancy were found to have a strong association with adequate antenatal care in the intervention group. Improvement of the use of ANC services in the intervention area shows that the IEC intervention was useful and effective. Improving the quality health services during maternity in other tribal communities may necessitate the implementation of the interventions.

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REFERENCES

1. Bloom SS, Lippeveld T, Wypij D. Does antenatal care make a difference to safe delivery? A study in urban Uttar Pradesh, India. Health Polic Plan. 1999;14(1):38-48.
2. WHO recommendations on Antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2007.
3. Bhatia JC, Cleland J. Determinants of maternal care in a region of South India. Health Transit Rev. 1995;5:127-42.
4. Li XF, Fortney JA, Kotelchuck M, Glover LH. The postpartum period: the key to maternal mortality. Int J Gynecol Obstet. 1996;54(1):1-10.
5. Census of India (2011). Office of Registrar General and Census Commissioner, India. Available from: https://censusindia.gov.in/. Accessed on 4 March 2024.
6. United Nations Economic and Social Council. MDG 5. Improve maternal health. Available from: https://www.un.org/en/ecosoc/about/mdg5.shtml. Accessed on 11 November 2019.
7. Li XF, Fortney JA, Kotelchuck M, Glover LH. The postpartum period: the key to maternal mortality. Int J Gynecol Obstet. 1996;54(1):1-10.
8. PAI-MDG-brief (2005). The Key to Achieving the Millennium Development Goals. Universal Access to Family Planning and Reproductive Health. Available from: https://resourcecentre.savethechildren.net/node/6320/pdf/6320.pdf.Accessed on 4 March 2024.
9. Stanton C, Lawn JE, Rahman H, Wilczynska-Ketende K, Hill K. Stillbirth rates: delivering estimates in 190 countries. Lancet. 2006;367(9521):1487-94.
10. Molzan Turan J, Johnson K, Lake Polan M. Experiences of women seeking medical care for obstetric fistula in Eritrea: implications for prevention, treatment, and social reintegration. Glob Public Health. 2007;2(1):64-77.
11. Kumar D, Goel AK. Use of antenatal care services and knowledge among Baiga women in Madhya Pradesh. Indian J Sci Res. 2016;7(1):197-200.
12. Kumar D, Goel AK, Ghanghoria V, Ghanghoria P. A qualitative study on maternal and child health practices among Baiga tribe of Madhya Pradesh in Central India. J Community Health Manage. 2016;3(1):23-7.
13. Kumar D, Singh TB. Stillbirth issues and challenges in India. J Community Health Manage. 2017;4(2):47-9.
14. Tewari DN. Primitive tribes of Madhya Pradesh-strategy for development. Government of India, Ministry of Home Affairs, Tribal Development Division, New Delhi. 1984.
15. Annual Report of year 2011-12 of ICMR-NIRTH, Jabalpur, Madhya Pradesh. Available from: https://www.nirth.res.in/publications.php. Accessed on 2 September 2021.
16. Singh JP, Kariwal P, Gupta SB, Singh AK, Imtiaz D. Assessment of nutritional status among adolescents: a hospital based cross sectional study. Int J Res Med Sci. 2014;2(2):620-4.

17. Metgud CS, Katti SM, Mallapur MD, Wantamutte AS. Utilization patterns of antenatal services among pregnant women: a longitudinal study in rural area of north Karnataka. Al Ameen J Med Sci. 2009;2(1):58-62.
18. Mahapatra M. Equity in utilization of health care services: Perspective of pregnant women in southern Odisha, India. Indian J Med Res. 2015;142(2):183-9.
19. Akum FA. A qualitative study on factors contributing to low institutional child delivery rates in northern Ghana: the case of Bawku municipality. J Community Med Health Educ. 2013;3:236.
20. Joyce A, Bredesen DNP, RN. Women's use of healthcare services and their perspective on healthcare utilization during pregnancy and childbirth in a small village in northern India. Am Int J Contemp Res. 2013;3(6):1-9.
21. Gupta RK, Shora TN, Verma AK, Jan R. Knowledge regarding antenatal care services, its utilization, and delivery practices in mothers (aged 15-49 years) in a rural area of North India. Trop J Med Res. 2015;18(2):89-94.
22. Mumbare SS, Rege R. Ante natal care services utilization, delivery practices and factors affecting them in tribal area of North Maharashtra. Indian J Community Med. 2011;36(4):287-90.
23. Wong EL, Popkin BM, Guilkey DK Akin AS. Accessibility, quality of care and prenatal care in the Philippines. Soc Sci Med. 1987;24(11):927-44.
24. Anandalakshmy PN, Talwar PP, Buckshee K, Hingorani V. Demographic, socioeconomic and medical factors affecting maternal mortality-an Indian experience. J Fam Welfare. 1993;39(3):1-4.
25. Chaurasia AR. Obstetric risk and obstetric care in central India. Soc Change. 2006;36(4):48-66.
26. Kumar D, Vishwakarma A, Goel AK. Tribal newborn culture: An observation. Indian J Matern Child Health. 2015;17(2):1-4.
27. Kumar D, Verma A, Sehgal VK. Neonatal mortality in India. Rural Remote Health. 2007;7(4):833.
28. Singh TB, Kumar D. (2016). Maternal health status in India. J Community Health Manage. 2016;3(2):95-6.
29. WHO and UNICEF. Antenatal care in developing countries promises, achievements and missed opportunities (1990-2001). An analysis of trends, levels and differentials. Geneva: WHO and UNICEF. 2003.
30. Kumar D, Goel AK, Singh TB. Estimation of risk factors for conducting delivery at home among Baiga women in Madhya Pradesh: a multinomial logistic regression analysis. Int J Sci Res. 2017;6(2):957-62.

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