

# Utilization of antenatal care services in a remote, tribal and hilly district of Himachal Pradesh: Challenges to access

Neha Purohit

Department of Community Medicine and School of Public Health, Post Graduate Institute of Medical Education and Research, Chandigarh, India

## ABSTRACT

**Background:** A traditional African phrase, 'A pregnant woman has one foot in the grave' expresses the immense health risks associated with pregnancy and childbirth. Antenatal care (ANC) is considered an important determinant to alleviate mortalities and morbidities associated with maternal health. **Objectives:** The study aimed to identify the utilization pattern of ANC services by pregnant women in a remote, tribal, and hilly district of Himachal Pradesh and to understand their healthcare needs during antenatal period. **Methods:** A community based descriptive, cross-sectional study was carried out in 41 far-flung villages of Lahaul and Spiti district in Himachal Pradesh, India, using a mixed-method approach of data collection. Purposive sampling was done to select 103 females who had experienced delivery in the past 2 years and were residents of Lahaul for minimum of 3 years. The participants were interviewed using a semi-structured questionnaire and the data were analysed by SPSS-20. **Results:** The study revealed high utilization of ANC services by indigenous women, but it was accompanied by physical, psychological, and financial hardships. The triple challenge of inadequacy of quality antenatal services, transport facilities, and unfavourable weather conditions compelled women to leave their communities in Lahaul and relocate to adjoining districts during the maternity period. **Conclusion:** Pregnancy is still a stressful event that disrupts the link between families and communities in such underserved areas. The study recommends the establishment of programs that promote availability of quality ANC services within the rural and remote communities.

**Keywords:** Antenatal care, maternal health, remote, tribal health, utilization

## Introduction

Antenatal care (ANC) is an essential element of primary healthcare provided to pregnant women to ensure a safe pregnancy and healthy baby.<sup>[1]</sup> The provision of ANC services has a positive impact on pregnancy as it enables identification of risk factors, early diagnosis and treatment of pregnancy

complications.<sup>[2]</sup> It is also used by primary care physicians as a means to educate women about nutrition, breastfeeding, family planning, spacing after childbirth and promote healthy lifestyle. Therefore, ANC is considered as a potentially important factor for mitigation of maternal and child morbidities and mortalities.<sup>[3]</sup>

The maternal health division of the Ministry of Health and Family Welfare, Government of India recommends minimum four antenatal contacts with the health system to increase the likelihood of safe deliveries.<sup>[4]</sup> According to national statistics, the proportion of pregnant women receiving four antenatal visits has increased in India from 37.0 to 51.2% during 2006–2016.<sup>[5]</sup> The change has been considerably low when compared to increase in

**Address for correspondence:** Dr. Neha Purohit,  
Department of Community Medicine and School of Public Health,  
PGIMER, Chandigarh - 160 012 India.  
E-mail: drnehapurohit1389@gmail.com

Received: 02-03-2021

Revised: 10-07-2021

Accepted: 12-07-2021

Published: 30-09-2021

### Access this article online

#### Quick Response Code:



Website:  
www.jfmprc.com

DOI:  
10.4103/jfmprc.jfmprc\_426\_21

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Purohit N. Utilization of antenatal care services in a remote, tribal and hilly district of Himachal Pradesh: Challenges to access. J Family Med Prim Care 2021;10:3374-80.

the proportion of institutional deliveries, which rose from 38.7 to 79%, mainly due to the conditional cash transfer schemes for institutional deliveries.<sup>[6]</sup> The low antenatal coverage has acted as an impediment to alleviate maternal mortalities and morbidities in the country, as about 25% of the preventable maternal deaths are attributed to conditions such as pre-eclampsia, eclampsia and antepartum haemorrhage, which could be detected and managed in the antenatal period.<sup>[7]</sup>

The low utilization of ANC can be attributed to various demand side and supply side factors that impede the confluence of antenatal women and health system. Several studies conducted in various countries have shown that factors like maternal age, parity, education, socioeconomic status, previous complicated obstetrical history, support from spouse, inadequate and poor quality of services, absenteeism of staff, distance from health care facility, cultural beliefs and practices are significantly associated with use of ANC.<sup>[8,9]</sup>

Himachal Pradesh is a north Indian state, which despite its mountainous landscape, fares better in the health indicators when compared to other states.<sup>[10]</sup> But the maternal health indicators reveal that the progress has not been equitable across all the districts of the state.<sup>[11]</sup> Lahaul and Spiti inhabits only 0.48 percent of state's population, despite being the largest district of Himachal Pradesh in terms of area. It is rural district with population growth rate of -5.1% and low population density of 2 per square kilometre.<sup>[12]</sup> The physical and climatic conditions of the district are hostile for human inhabitation and heavy snowfall cuts Lahaul from the rest of state for six months every year.<sup>[13]</sup> This is likely to affect the utilization of healthcare services in maternity period. The objectives of the study were to identify the utilization pattern of antenatal healthcare services by pregnant women and to understand their healthcare needs during antenatal period for provision of need-based care to the indigenous women.

## Methods

A community based descriptive, cross-sectional study was carried out in the tribal district of Lahaul and Spiti in Himachal Pradesh, India. Considering the total population of the district, i.e., 31,564, and birth rate of 16.2; it was estimated that the district has 511 deliveries in a year. Bearing in mind, the geographical constraints and low population density in the district, the sample size was computed at 103 women who had experienced delivery in past two years (to cover 10% of total births in past 2 years). The sampling technique used was multistage sampling. The district is constituted by two blocks- Lahaul and Spiti. Lahaul was randomly selected as the study block. First survey units (FSUs) were identified in the block and selection of FSUs was made according to Probability Proportion to Size (PPS).

A list of households having women who experienced delivery in the past 2 years in 41 FSUs was acquired from health workers

to cover the sample size. Women in age group of 18-45 years, who had experienced childbirth in the past two years and were resident of Lahaul for a minimum 3 years were interviewed using a semi-structured questionnaire in May 2018. Women who were not willing to participate and who had already been interviewed during pilot phase were excluded from the study. The tool had three sections on socio-demographic profile of respondents, utilization of antenatal healthcare services and challenges faced during the latest pregnancy. The quantitative data were entered in Statistical Package for Social Sciences (SPSS-20) and analysed through descriptive statistics and cross-tabulations. The qualitative data were transcribed and analysed for similarities and differences manually by generation of themes.

Administrative approvals were taken from district level authorities before the beginning of the study. The respondents were informed about the purpose of study and were assured regarding confidentiality of data. Written consent was obtained from all the participants before the interview to validate their willingness to participate in the survey.

## Results

The demographic details of the participants are presented in Table 1. It was cardinal to investigate the parity and history of previous pregnancies of the mothers to get a better understanding of pregnancy outcomes in the past. 16% respondents reported having miscarriages and/or still births in their past pregnancies. 96% respondents had birth spacing of more than two years. One-fifth women reported having inter-pregnancy interval of more than five years, which made them vulnerable to a greater risk of eclampsia and premature deliveries.

The pattern of utilization of antenatal healthcare services by 103 respondents is presented in Tables 2 and 3. All the respondents were registered and had mother and child health (MCH) card. 96% participants visited a health facility within the first trimester. The reasons cited for late access by rest of the respondents were irregular periods, social stigma of being a widow, failure of Copper-T and misconception of definitive association between pregnancy with vomiting. It was analysed that in 89% of pregnancies, females made four to nine antenatal visits to health facilities. In 11% pregnancies, women made less than four ANC visits to the health facility. Distance to the health facility, transport shortage, and support to take care of family members in their absence were the reasons for lower number of ANC visits.

At least one ANC visit was made in government facility in Lahaul in 93% pregnancies. This was usually the first visit to confirm pregnancy due to non-availability of other sources to procure pregnancy testing kits. The utilization of primary health facilities was found to be low (6%). Respondents highlighted the inadequacy of primary health institutions to provide ANC and cited shortage/absenteeism of staff,

**Table 1: Demographic Profile of respondents**

Age (years)	n (%)	Age at first pregnancy (years)	n (%)
19-24	26 (25%)	15-20	27 (26%)
25-30	38 (37%)	21-26	49 (48%)
31-36	27 (26%)	27-32	22 (21%)
37-44	12 (12%)	33-38	5 (5%)
Religion		Caste	
Buddhism	64 (62%)	Scheduled tribe	88 (86%)
Hinduism	39 (38%)	Scheduled caste	13 (12%)
Education level		Educational level of spouses	
No formal education	9 (9%)	No formal education	1 (1%)
Up to primary level	7 (6%)	Up to primary level	8 (8%)
Up to secondary level	24 (23%)	Up to secondary level	20 (19%)
Senior secondary level and above	63 (62%)	Senior secondary level and above	74 (72%)
Occupation		Per head monthly income (INR)	
Home makers	89 (86%)	0-5000	40 (39%)
Public sector	9 (9%)	5001-10000	27 (26%)
Private sector	2 (2%)	10001-20000	28 (27%)
Self-owned work	3 (3%)	>20000	8 (8%)
Family size		Parity	
<5	14 (14%)	1	45 (44%)
≥5	89 (86%)	2	40 (39%)
		3	18 (17%)

**Table 2: Details of ANC visits by the respondents**

First ANC visit	n (%)	Total number of ANC visits	n (%)
≤12 weeks	99 (96%)	<4	11 (11%)
>12 weeks	4 (4%)	≥4	92 (89%)
Number of health facilities visited for antenatal care			
1	34 (33%)		
2	45 (44%)		
≥3	24 (23%)		
Number of ANC visits as per health facility	Health facilities in Lahaul n (%)	Public health facilities outside Lahaul n (%)	Private facility outside Lahaul n (%)
1	7 (6.8%)	15 (14.6%)	6 (5.9%)
2	21 (20.5%)	11 (10.7%)	3 (2.9%)
3	30 (29.3%)	8 (7.7%)	8 (7.7%)
≥4	38 (36.6%)	15 (14.6%)	10 (9.8%)
Did not visit	7 (6.8%)	54 (52.4%)	76 (73.7%)
Distance travelled by respondents to access complete antenatal care (in kilometres) (one way)	Number of respondents	Total cost of transport to reach providers for all ANCs (INR)	Number of respondents
0-50	21 (21%)	0	21 (21%)
51-150	16 (16%)	101-500	31 (30%)
150-200	22 (21%)	501-1000	19 (18%)
201-250	20 (19%)	1001-2000	24 (23%)
251-500	24 (23%)	2001-10000	8 (8%)

lack of medicines and diagnostic tests as major reasons for not availing the services. A unique finding of the study was that 74% of females shifted their place of residence to nearby districts [Table 4]. The major reasons mentioned for the relocation were lack of quality care (lack of specialists, poor skills of nurses, old and unreliable equipment, irregular supply of medicines) in health centres of Lahaul, difficulties to reach the health facilities, bad experiences of previous pregnancies, expected delivery date during winter months,

and speciality referral by primary care physicians. The women faced psychological and financial distress due to relocation with relatives or in a rented accommodation away from their homes. 55% mothers reported uneasiness and lack of comfort during the maternity period due to shift of place. The financial cost of living differed with the span of stay outside Lahaul and ranged from three thousand to fifty thousand rupees. 26% females did not make a shift to other districts due to safe deliveries in Lahaul in the past or financial constraints.

**Table 3: Details of utilization of ANC services**

Type of health facility accessed for prenatal tests	n (%)	Type of health facility accessed for tetanus toxoid (TT) vaccination	n (%)
Government facility in Lahaul	90 (87%)	Government facility in Lahaul	91 (88%)
Private facility in Lahaul (Not available)	0 (0%)	Government facility in another district	10 (10%)
Government facility in another district	4 (4%)	Private facility in another district	1 (1%)
Private facility in another district	9 (9%)	Did not get TT vaccination	1 (1%)
Number of ultrasound		Place of ultrasound	
1	18 (17%)	Government facilities in Lahaul	59 (60%)
2	67 (65%)	Government facilities in Lahaul and other districts	15 (16%)
≥3	13 (13%)	Government facilities in Lahaul and private facilities in other districts	12 (12%)
Did not take	5 (5%)	Private facilities in other districts	12 (12%)
Cost of consultation fee for complete antenatal care (INR)		Cost of all ultrasounds (INR)	
0	88 (85%)	0	74 (76%)
500-1500	4 (4%)	500-1500	9 (9%)
1501-2500	10 (10%)	1501-2500	10 (10%)
2501-3500	1 (1%)	2501-4000	5 (5%)
Number of months of iron intake		Source of iron tablets	
<3	8 (8%)	Government facility	94 (91%)
≥3	93 (90%)	Private facility	8 (8%)
Did not take	2 (2%)	Didn't get/buy	1 (1%)
Number of months of calcium intake		Source of calcium tablets	
<3	26 (25%)	Government facility	39 (38%)
≥3	76 (74%)	Private facility	15 (15%)
Did not take	1 (1%)	Both government and private facilities	48 (47%)

**Table 4: Details of Relocation to other districts during maternity period**

Trimester during shift of place of residence	n (%)	
First trimester	13 (13%)	
Second trimester	17 (16%)	
Third trimester	46 (45%)	
Did not change	27 (26%)	
Distance travelled to reach the shifted residence (in kilometres)		
100-200	53 (70%)	
201-300	10 (13%)	
>300	13 (17%)	
Mode of transport used to reach shifted residence	Range of cost of transport (INR) (one way)	
Taxi	47 (62%)	600-3000
Own vehicle	20 (26%)	0
Bus	7 (9%)	50-250
Flight	2 (3%)	1500-3000
Type of shifted residence		
Self-owned	21 (28%)	
Relative's place	24 (31%)	
Maternal house	6 (8%)	
Rented	25 (33%)	
Cost of living due to shifted residence (INR)		
0	50 (66%)	
1-10000	15 (20%)	
10001-20000	7 (9%)	
20000-50000	4 (5%)	

### Services utilized under antenatal care

59% women confirmed that all the ANC check-ups were performed by doctors while the rest of participants reported getting antenatal check-up by health workers as well as doctors.

All the respondents confirmed that their weight, blood pressure, urine strip tests and blood investigations for iron were checked regularly. The quality of tests was reported to be satisfactory in government facilities of the district by the respondents. 5%

of the women reported being compelled to visit neighbouring district for thyroid tests due to its non-availability in the district. Almost all the respondents (99%) reported getting tetanus toxoid (TT) vaccination during pregnancy. Physical examination was performed routinely during ANC visits. All the respondents were satisfied with the behaviour of the staff.

All the respondents confirmed being counselled for importance of proper nutrition at least once during the antenatal period. Only 2% respondents did not take the iron folic acid tablets due to severe nausea and no perceived benefit of consuming the tablets. The details of iron folic acid and calcium intake are shown in Table 3. 85% women took the calcium supplement of 500 milligram once daily instead of the recommended dose of 1 gram. Respondents reported irregular intake of calcium tablets due to unavailability in government pharmacies. It was noted that majority of respondents were not advised to take iron and calcium tablets at different intervals and they reported intake of both the tablets together, which could have lowered the absorption of minerals. Apart from these supplements, 8 respondents reported buying additional medicines for ailments as dental pain, gall stones, thyroid diseases, and restricted growth of the foetus during the antenatal period.

5% participants reported not getting ultrasound done due to long distance to health facility (more than 30 km) and perceived low benefit of the diagnostic. Availability of only one physician performing ultrasonography in Lahaul, increased the distance and time to access ultrasound services. Lack of canteen facility was other issue cited by 22% females since they had to start early from home to travel long distances and remained without food throughout the day. 76% respondents had undergone two to three scans in the prenatal period. 30% of the participants reported that they found sonography reports inaccurate and unreliable, mainly due to outdated machines in the health centre. This forced the women to access private facilities which brought additional costs. Few respondents reported using the ultra-sonographic services of medical camps organized by tertiary care centres of the state during summers.

10% respondents described that they faced complications as colic pain, backache, high blood pressure, and vaginal bleeding during the prenatal period. 7/10 women travelled outside Lahaul for management of the complications due to unavailability of emergency medical care. This magnified the risks of mortalities and morbidities during pregnancy. The challenges identified by women to access ANC were high financial costs, inherent risks of travelling tedious distances during vulnerable times, arrangement of accommodation in different districts, security issues and lack of social support due to relocation, stress of leaving young children in Lahaul, long waiting times, non-availability of medicines in government hospitals, unreliable sonography, and consultations with multiple doctors.

## Discussion

ANC entails continuous monitoring of health of mothers and foetus, regular prenatal diagnostic tests, provision of iron and

calcium supplements, and two doses of tetanus toxoid.<sup>[14]</sup> It is also a determinant for institutional deliveries and postnatal care; and hence, there is need for more emphasis on early and adequate ANC utilization. It is essential to understand the needs and pattern of health service utilization by women in order to raise the acceptability of preventive services and for sustainability of distant communities.<sup>[15,16]</sup> It also becomes important from the perspective of primary care physicians, implementers and policy makers to simulate services as per the needs of the community, which eventually would lead to better utilization of services, satisfaction from the point of beneficiaries as well as the providers and ultimately better health outcomes.

This study conducted with the same objectives, in far-flung district of Lahaul and Spiti, revealed high utilization of services by the indigenous women. The findings were consistent with previous researches in rural and tribal areas.<sup>[10,17,18]</sup> This could be credited to high literacy rate of women and their spouses, women's autonomy to access care, support from family and perceived fear of adverse outcomes due to aggravated incidence of spontaneous abortions and still births in the area.<sup>[1,19]</sup> 74% of the pregnant women accessed government facilities for ANC services due to lack of private facilities near to home and low socio-economic status.<sup>[17]</sup> The inadequate calcium intake was attributed to its irregular availability at government facilities in Lahaul as well as other districts. 9% and 24% of them availed private facilities for prenatal tests and sonography respectively due to perceived unreliable results and long waiting times in government facilities. The primary health care system in Lahaul remained underutilized mainly due to shortage/absenteeism of staff and unavailability of medicines and diagnostics.<sup>[17]</sup>

The triple challenge of non-availability of comprehensive quality healthcare services, low transport facilities, and unfavourable weather conditions impelled women in pregnancy to leave their residence in Lahaul and relocate to adjoining districts, despite their desire for local birth. This also led to fragmentation of care and exposure of women to multiple caregivers. The study confirmed that women expected comprehensive antenatal services closer to their homes and demanded for better emergency medical care, skilled workforce, functioning equipment for ultrasound, eateries in the hospitals, regular enrichment of medicine supplies and efficient ambulance services.<sup>[8]</sup> This highlighted the overarching influence of health system-related factors, which brought physical, psychological as well as financial hardships.

Despite the existence of several health programmes to provide free ANC services in India, women spent enormous amount of money for seeking ANC. This expenditure was incurred due to shift made to other districts, unavailability of medicines and diagnostics facilities at the health centres and lack of health insurance.<sup>[19,20-22]</sup> Various studies have found that the economic burden of maternal healthcare expenditure is one of the prime reasons that hinder access to medical care.<sup>[23,24]</sup> But in this study, women prioritized safety and reported saving or borrowing money or selling assets for maternity period, rather than avoiding

care. The long periods spent at saving money for maternal care could be one of the reasons for long inter-pregnancy intervals among women in the district.

Social and psychological circumstances engender anxiety, insecurities, social isolation, and lack of control over home and work life. This powerlessness to self-manage conditions in life emerge as a risk factor for diseases and are greater determinants of health in vulnerable populations than a lack of access to healthcare.<sup>[25,26]</sup> Therefore, it is imperative to provide care to women within their communities, in presence of their support systems. This can be facilitated through creation of mobile health teams, since it has been suggested that there is a positive association between mobile outreach health services and utilization of ANC in conflict and remote areas.<sup>[27]</sup> Telemedicine has improved access to healthcare by reducing distance and costs for the people. Telemedicine unit in Lahaul has relatively bridged the gaps between specialist care and the underserved population, but it remains underutilized for antenatal services.<sup>[28]</sup> The use of telemedicine for ensuring availability of ultrasound and blood tests for antenatal women could probably solve the issues related to diagnostics in the area. Various studies have proved the feasibility and success of providing diagnostic services through telemedicine in hard-to-reach areas and the possibilities to train rural healthcare provider to conduct ultrasounds effectively.<sup>[29]</sup>

The confidence in local maternity care and primary healthcare physicians can be enhanced through regular trainings and upskilling of the available human resources to provide emergency care. There is a need to establish protocols and train the staff to ensure proper identification and continuous risk assessment of women with low-risk pregnancies. This shall also motivate the medical staff to encourage ANC and deliveries in the district. Additionally, it is necessary to develop mechanisms for reliable land and air transport to ensure timely transport of the mothers. This can be done through collaborative efforts between the community and health system. Despite the fact that local access to surgical and anaesthetic services is desirable, there is good amount of evidence that even without local access to caesarean deliveries, favourable outcomes can be sustained within an integrated perinatal care system.<sup>[30,31]</sup> The women with high risk pregnancies who would have to travel to nearby districts due to lack of access to operative delivery should be covered under state or national insurance schemes to compensate for their travel and accommodation related costs. It is also important to prepare the referral hospitals in other districts of the state to provide culturally competent care, and to make the women feel comfortable in absence of their community members.<sup>[31]</sup>

It is the first study highlighting the problems faced by pregnant women in Lahaul and Spiti in access to ANC, despite the high demand for services. Additionally, it also provides recommendations for provision of quality services within the communities. The limitation of the study was possibility of recall bias due to inclusion of women who had experienced pregnancy within the previous 2 years in the study. The researcher though

felt that the experience of pregnancy was deeply engraved in the minds of the participants that they remembered circumstances in detail despite the amount of time passed. Another limitation was that the list of potential participants was taken through health workers of the area, and it might have missed women who did not come in contact with the health system.

## Conclusion

Despite maternal health being the central focus of numerous safe motherhood policies and programmes, the study highlighted that India is still far from achieving universal health coverage and right to healthcare in terms of ANC. It reflected the inequities faced by pregnant women in access to care due to geographic and climatic conditions of the district and urban-rural healthcare service disparity. Enforced relocation to distant hospital facilities due to partial availability of quality services, low trust in local maternity care and transport difficulties, elevated the physical, social, cultural, financial, and emotional risks for women in underserved areas of India. Pregnancy can be labelled as a stressful event that disrupts the link between women and their families as well as communities in such isolated areas. The study recommends establishment and facilitation of programs that promote availability of quality ANC services within the rural and remote communities.

## Acknowledgements

The study was undertaken as a part of research dissertation submitted to Tata Institute of Social Sciences. The author would like to acknowledge the study participants and the health workers of Lahaul for their co-operation and support.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

1. Abosse Z, Woldie M, Ololo S. Factors influencing antenatal care service utilization in Hadiya zone. *Ethiop J Health Sci* 2010;20:75-82.
2. Ali N, Elbarazi I, Alabboud S, Al-Maskari F, Loney T, Ahmed LA. Antenatal care initiation among pregnant women in United Arab Emirates: The Mutaba'ah study. *Front Public Health* 2020;8:211.
3. Kuhnt J, Vollmer S. Antenatal care services and its

- implications for vital and health outcomes of children: Evidence from 193 surveys in 69 low-income and middle income countries. *BMJ Open* 2017;7:e017122.
4. Guidelines for Antenatal Care and Skilled Attendance at Birth by ANMs/LHVs/SNs, Maternal Health Division Ministry of Health and Family Welfare Government of India, 2010. Available from: [https://nhm.gov.in/images/pdf/programmes/maternal-health/guidelines/sba\\_guidelines\\_for\\_skilled\\_attendance\\_at\\_birth.pdf](https://nhm.gov.in/images/pdf/programmes/maternal-health/guidelines/sba_guidelines_for_skilled_attendance_at_birth.pdf). [Last accessed on 2020 Jun 19].
  5. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-4), 2015-16. Mumbai: IIPS; 2017. Available from: <http://rchiips.org/nfhs/pdf/NFHS4/India.pdf>. [Last accessed on 2020 Jun 21].
  6. Gupta SK, Pal DK, Tiwari R, Garg R, Shrivastava AK, Sarawagi R, *et al*. Impact of Janani Suraksha Yojana on institutional delivery rate and maternal morbidity and mortality: An observational study in India. *J Health Popul Nutr* 2012;30:464-71.
  7. Say L, Chou D, Gemmill A, Tuncalp O, Moller AB, Daniels J, *et al*. Global causes of maternal death: A WHO systematic analysis. *Lancet Glob Health* 2014;2:e323-33.
  8. Ali SA, Dero AA, Ali SA, Ali GB. Factors affecting the utilization of antenatal care among pregnant women: A literature review. *J Preg Neonatal Med* 2018;2:41-5.
  9. Yadav AK, Sahni B, Jena PK, Kumar D, Bala K. Trends, differentials and social determinants of maternal healthcare services utilization in rural India: An analysis of pooled data. *Womens Health Rep* 2020;1. doi: 10.1089/whr. 2019.0022.
  10. Parashar A, Mazta SR, Dhadwal DS, Thakur A, Singh H, Sharma K, *et al*. Status of maternal care and immunisation services in a hilly state of north India: A cross sectional study, *Int J Reprod Contracept Obstet Gynecol* 2016;5:2607-11.
  11. National Health Systems Resource Centre, Ministry of Health and Family Welfare. Government of India. Health Management Information Systems Analysis. Himachal Pradesh across districts. April 2014- September 2014.
  12. Census of India 2011, District Census Handbook, Lahaul and Spiti, Available from: [https://censusindia.gov.in/2011census/dchb/0203\\_PART\\_B\\_DCHB\\_LAHUL%20&%20SPITI.pdf](https://censusindia.gov.in/2011census/dchb/0203_PART_B_DCHB_LAHUL%20&%20SPITI.pdf). [Last accessed on 2020 Jun 22].
  13. District Lahaul and Spiti, geographical conditions. Available from: <https://hplahaulspiti.nic.in/geographical-conditions/>. [Last accessed on 2020 Jun 22].
  14. 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 rural area of North India. *Trop J Med Res* 2015;18:89-94.
  15. Atuhaire R, Atuhaire LK, Wamala R, Nansubuga E. Interrelationships between early antenatal care, health facility delivery and early postnatal care among women in Uganda: A structural equation analysis. *Glob Health Action* 2020;13:1830463.
  16. Hoang H, Le Q, Odgen K. Women's maternity care needs and related service models in rural areas: A comprehensive systematic review of qualitative evidence. *Women Birth* 2014;27:233-41.
  17. Varma GR, Kusuma YS, Babu BV. Antenatal care service utilization in tribal and rural areas in a South Indian district: An evaluation through mixed methods approach. *J Egypt Public Health Assoc* 2011;86:11-15.
  18. Roy MP, Mohan U, Singh SK, Singh VK, Srivastava AK. Determinants of utilisation of antenatal care services in rural Lucknow, India. *J Fam Med Prim Care* 2013;2:55-9.
  19. Ogbo FA, Dhami MV, Ude EM, Senanayake P, Osuagwu UL, Awosemo AO, *et al*. Enablers and barriers to the utilization of antenatal care services in India. *Int J Environ Res Public Health* 2019;16:3152.
  20. Singh V. Promoting antenatal care: Identifying policy levers in Indian context. *Eur J Public Health* 2020;30. doi: 10.1093/eurpub/ckaa165.725.
  21. Singh P, Kumar V. Insurance coverage under different health schemes in Uttar Pradesh, India. *Clin Epidemiol Glob Health* 2016;5:33-9.
  22. Kumar V, Mishra AJ. Quality of health care in primary health care system: A reflection from Indian state. *Int J Health Syst Disaster Manag* 2015;3:136-40.
  23. Rani M, Bonu S, Harvey S. Differentials in the quality of antenatal care in India. *Int J Qual Health Care* 2008;20:62-71.
  24. Mohanty SK, Srivastava A. Cost and utilisation of hospital based delivery care in empowered action group (EAG) states of India. *Matern Child Health J* 2013;17:1441-51.
  25. Wilkinson R, Marmot M, editors. *Social Determinants of Health: The Solid Facts*. 2<sup>nd</sup> ed. World Health Organisation, Geneva. 2003. Available from: [https://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0005/98438/e81384.pdf](https://www.euro.who.int/__data/assets/pdf_file/0005/98438/e81384.pdf). [Last accessed on 2020 Jun 30].
  26. Wallerstein N. Powerlessness, empowerment, and health: Implications for health promotion programs. *Am J Health Promot* 1992;6:197-205.
  27. Edmond K, Yousufi K, Naziri M, Higgins-Steele A, Qadir AQ, Sadat SM, *et al*. Mobile outreach health services for mothers and children in conflict-affected and remote areas: A population-based study from Afghanistan. *Arch Dis Child* 2020;105:18-25.
  28. Chellaiyan VG, Nirupama AY, Taneja. Telemedicine: New technology, new promises? *Indian J Community Health* 2019;31:438-41.
  29. Clover-Brown I. Delivering Prenatal Care through Telemedicine in Rural Latin America: A review. College of Natural Sciences at The University of Texas at Austin. 2017. Available from: [https://cns.utexas.edu/images/CNS/Sample\\_Thesis-Telemedicine-Clover-Brown.pdf](https://cns.utexas.edu/images/CNS/Sample_Thesis-Telemedicine-Clover-Brown.pdf). [Last assessed on 2020 Jul 07].
  30. Leeman L, Leeman R. Do all hospitals need caesarean delivery capability? An outcomes study of maternity care in a rural hospital without on-site caesarean capability. *J Fam Pract* 2002;51:129-34.
  31. SOGC policy statement. No. 251- Returning birth to aboriginal, rural, and remote communities. *J Obstet Gynaecol Can* 2010;32:1186-8.