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A community based study on utilization of antenatal care services by villagers in rural part of Eastern India

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Abstract: *Background:* Antenatal care (ANC) is the care provided throughout pregnancy to help and ensure that women go through pregnancy and childbirth in good health and that their newborns are healthy. In our rural parts of India till not all the antenatal women seeks the care from proper set up, due to various influencing reasons. *Aim:* This study aims to explore the trend of the antenatal care services sought by the pregnant mothers in rural area and the factors that would influence their such behaviors. *Methods & Material*: For such this descriptive community-based study was carried on in the Kawakhali village of Matigara-1 GP of Siliguri subdivision; interviewing the 363 post-natal mothers. The data was interpret using the SPSS software. *Result:* 88% were from Hindu, 76% were within 26yrs of age; 65% found to have educational level upto class X standard and 98% were homemaker.84% had their delivery in hospital set up. 352 out of 363 postnatal mothers had sought antenatal care and among them only two-third had faced regular antenatal visits. In comparison between women who undergone for at least four ANC visits and who did for maximum thrice; significant difference was observed in terms of age (p=0.002), religion (p=0.000), educational level (p=0.000), socio economic status (SES) (p=0.000), timing of registration (p=0.000); although occupation of the incumbent, type of family in which they belonged and the mode of delivery were not found to be significantly affected by the socio demographic profile. *Conclusion:* There is a need to increase education about importance of consumption of IFA tab, early detection of danger signs in pregnancy, increase education about family planning after delivery.

Keywords: Antenatal care, Community study, Community health status, Family planning, Maternal mortality.

Introduction

Pregnancy is one of the most important periods in the life of a woman, a family and a society Antenatal care (ANC) is the care provided throughout pregnancy to help and ensure that women go through pregnancy and childbirth in good health and that their newborns are healthy.

WHO defines ante natal care as 'A care which includes recording medical history, assessment of individual needs, advice and guidance on pregnancy and delivery, screening tests, education on self-care during pregnancy, identification of conditions detrimental to health during pregnancy, first-line management and referral if necessary.' So, antenatal care isthesystemic medical supervision of women during pregnancy. It preserves the physiological aspect of pregnancy and labor and to prevent or detect, as early as possible, all that is pathological [1]. The quality of care is more important than the quantity [2].

Antenatal Care (ANC) can serve a role in reduction of maternal mortality. ANC can help prevents maternal and neonatal deaths by identifying pregnancy-related complications early. ANC also offers an opportunity to educate women on obstetric danger signs and motivate them and their families to seek appropriate and timely referral. Accessing antenatal care in a timely manner enables women to receive information early in their pregnancy concerning the full range of screening tests available such as serologic screening for Human Immunodeficiency Virus (HIV) and syphilis. Other interventions

such as routine iron and folic acid supplementation, and routine measurement of fundal height, and tetanus immunization are beneficial to mother and child health [3]. The new World Health Organization (WHO) antenatal care model recommends a minimum of four visits and provides detailed instructions on the basic components of antenatal care across developed and developing countries [4].

The Government of India is committed to achieving the Millennium Development Goal of reducing the maternal mortality ratio by three quarters between 1990 and 2015. Therefore, reproductive and child health (RCH) program is strongly advocated in the current national plan to improve maternal health. In west Bengal 76.5% women take 4 or more antenatal visits, 75.2% practice institutional deliveries and 28.0% take 100 IFA tablets [5]. High maternal mortality can also be reduced by early registration of pregnancy, taking at least 4 antenatal visits, prevention and treatment of complications like-eclampsia, malpresentations, diabetes and hypertension.

Keeping this in mind, a study was conducted among the mothers who had delivered in preceding 12 months with the following objectives:

1. To assess utilization of antenatal care services of the women of reproductive age group (15-49 yrs) residing in Kwakhali village of Matigara block.
2. To determine the underlying factors influencing the utilization of antenatal care services in rural areas.

Material and Methods

A community based descriptive study with cross-sectional design was conducted from April - June 2015 among married women in the reproductive age group (15-49 years) who had delivered in preceding 12 months [to get all information of ANC services she had received] residing in study area. Unmarried mothers, seriously ill mothers, divorcee and nonresident women of study area mothers not available during the time of data collection were excluded from the study.

The study was done in Matigara 1 gram panchayat of Matigara block of siliguri Subdivision. In this gram panchayat-1 out of total 5 villages Kauakhali, kalamjote, thiknikata villages were selected randomly. This was the field practice area of North Bengal Medical College.

Sample size and Sampling technique: it was done using the formula-

$(Z_{\alpha}2)^2 P(1-P)/d^2 = n$

$Z_{\alpha}2$= confidence level at 95% (standard value of 1.96)

P= women who had three or more ANC was 66% in Darjeeling district of West Bengal [5].

d= margin of error at 5% (standard value of 0.05)

The calculated sample size was 345. Taking 5% non response rate the final sample size was 363. Systematic random sampling technique was followed First house was chosen with the help of local health worker from the list of eligible women supplied from sub centre and consecutively women were interviewed until reach the total sample.

Permission to conduct the study was obtained from the Institutional Ethics Committee, North Bengal Medical College and informed consent from the mothers was taken. The purpose of the study was explained to the respondents. Age of child was ascertained from birth certificate, hospital discharge certificate, mother and child protection card (MCPC).

The data were collected using a predesigned pretested structured interview schedule and relevant records and reports (antenatal card, laboratory investigation reports and prescriptions). In the proforma the questions were asked about the age of the mother's at birth, parity, religion, type of families, educational status and occupational status, socioeconomic status (Modified BG Prasad classification 2015) and as predictor variables of maternal health care seeking behaviour.

All the information regarding antenatal check up (ANC), iron and folic acid tablets consumption during pregnancy place of delivery, number of ANC visit, mode of

delivery immunization status, physical examination in 4 visits, laboratory investigation done, health education related to Rest, Diet, Personal hygiene, Breast feeding, Family planning, Danger sign and Counting foetalmovement, were reviewed from available records.

Local health worker was contacted and purpose of our study was briefed. Her cooperation was sought for smooth conduction of the study. Data were collected using face-to-face interviews with individual women using a structured questionnaire at their home or in their village. Prior to data collection women were informed of the aim of the study and assured that their identity and the information they provided would be treated as confidential and they would remain anonymous. Verbal consent was obtained before collecting information. Maximum 3 times visit was given to every house to minimize drop out. During the collection of data records review was done from Mother & Child Protection Card or any other documents related to ANC services.

The records related to other previous pregnancies were also consulted. All collected data was compiled in a master table manually. Data was analysed using principles of descriptive statistics and all data was presented using frequency distribution table and by suitable diagrams. For categorical variables Frequency and percentage were calculated. The Chi-square test was used to compare between the study participants, who took at least three antenatal care visits and more and who did not. Criteria of significance used in the study were $p<0.05$.

Results

Total 363 women were interviewed. As shown in table 1, out of total study population 88.15% were Hindu and more than 76% belongs to 20- 25 yrs of age group. 67.22% of women belong to schedule caste and more than 65% has completed class V-X. 95.8 % of the study population was home maker and more than 57% were belongs to nuclear family.

Among the study population 33.8% of the mothers belonged to high class family followed by 28.6% were belonged to upper middle class family and 5.5 % were belonged to poor socioeconomic class. Majority (84.8%) of the mothers had delivered their children at North Bengal medical college & hospital followed by 8.2% at home and only 6.8% at private hospital. Majority (66.1%) of the children had delivered by normal vaginal route followed by 33.9% by Caesarean Section.

Table-1: Socio-demographic profile of the study population (N=363)

Factors	Frequency	Percentage
1. Distribution of the subjects according to their 'age group'		
<20	27	7.43
20-25	276	76.03
26-30	52	14.34
>30	8	2.20
2. Distribution of subjects according to their 'Religion'		
Hindu	320	88.15
Muslim	43	11.85
3. Distribution of subjects according to their 'Caste'		
Scheduled caste	244	67.22
Scheduled Tribe	19	5.23
Other Backward Caste	44	12.12
General	56	15.43
4. Distribution of subjects according to their 'Education level'		
Illiterate	47	12.95
Non formal education	4	1.10
Class I-IV	32	8.81
Class V-X	236	65.02
Above Class X	44	12.12
5. Distribution of the subjects according to their 'Occupational status'		
Home Maker	348	95.87
Work outside	15	4.13
6. Distribution of subjects according to the 'Type of family' in which they belong		
Joint	208	57.30
Nuclear	155	42.70
7. Distribution of the subjects according to their 'Socioeconomic status' they belong		
I poor	20	5.50
II lowere middle	60	16.54
III upper middle	104	28.65
IV high	123	33.88
V upper high	56	15.43

Factors	Frequency	Percentage
8. Distribution of subjects according to their 'Place of delivery'		
Government Medical College hospital (NBMC)	308	84.84
Private Hospital	25	6.89
Home delivery	30	8.27
9. Distribution of subjects according to the 'Type of delivery' as they underwent		
Normal Vaginal	240	66.11
Caesarean Section	123	33.89
10. Distribution of subjects according to the 'Delivery outcome'		
Life Birth	352	96.97
Still Birth	11	3.03
11. Distribution of subjects according to their 'Age at first pregnancy'		
<18	32	8.82
18-20	156	42.97
21-25	114	31.40
>25	24	6.61

Fig-1: Distribution of the study population according to their registration status in antenatal care services. [N= 363]

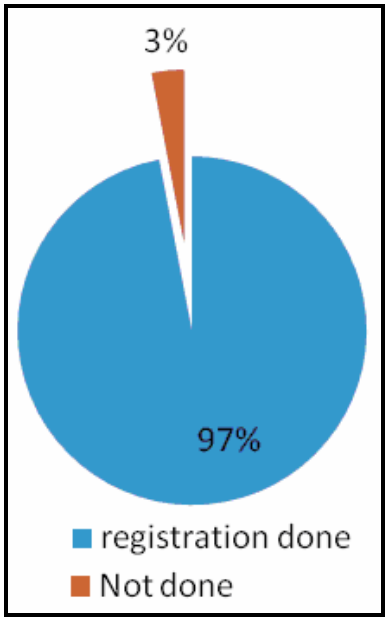

Figure 1 revealed that out of total (363) participant almost 97% (352) were registered during ante natal period. As found in table 2, 89.7% had registered in Government hospital set up and 48.8% were registered during first trimester (≤12weeks).

Table-2: Pattern of utilisation of antenatal services [n=352]		
Ante natal care (ANC) services	**Frequency**	**Percentage**
1. Distribution of the study population who received antenatal services; according to their 'place of ANC registration' [n=352]		
Government setup	316	89.77
Private	36	10.23
2. Distribution of Distribution of the study population who received antenatal services; according to their 'Gestational age at registration (in weeks)'[n=352]		
≤12	172	48.86
≥13	180	51.14
3. Distribution of the study population who received antenatal services; according to their 'Number of ANC visits' [n=352]		
Only 1	352	100.00
Maximum 2	336	95.45
3	300	85.22
All 4 and or more	235	66.76
4. Distribution of the study population who received IFA tablets amongst who utilisedantenatal services [n=352]		
Yes	347	98.57
No	5	1.43
5. Distribution of the study population who received IFA tablets amongst who utilised antenatal services; according to 'number of IFA tablets received' [n=347]		
<=30	8	2.30
31-60	12	3.45
61-100	89	25.75
101-149	208	59.95
150-180	30	8.65
6. Distribution of the study population who received IFA tablets amongst who utilised antenatal services; according to 'number of IFA tablets consumed' [n=347]		
<=30	10	2.88
31-60	10	2.88
61-100	99	28.53
101-149	201	57.93
150-180	27	7.78
7. Distribution of the study population who received injection tetanus toxoid amongst who utilisedantenatal services [n=352]		
Yes	345	98.01
No	7	1.99

Ante natal care (ANC) services	Frequency	Percentage
8. Distribution of the study population who received injection tetanus toxoid amongst who utilisedantenatal services; according to number of tetanus toxoid injection as they received [n=345]		
1	12	3.48
2	333	96.52
9. Distribution of the study population who received antenatal care according to type of examinations received [n=345]		
BP	324	92.05
Weight	340	96.60
Pallor	188	53.41
Oedema	152	43.18
PA Examination	230	65.34
10. Distribution of the study population who received antenatal care according to type of investigations suggested and undergone [n=345]		
Blood for Haemoglobin	336	95.45
ABO grouping & Rh typing	336	95.45
VDRL	289	82.10
Fasting (FBS) and Post Prandial blood sugar (PPBS)	295	83.80
Others (HBsAg for Hepatitis B, HIV, TSH etc.)	274	77.84
Urine for Routine examination (RE) with Albumin and sugar	305	86.64
Stool for OPC	98	27.84
Ultrasonogram (USG)	208	59.09
11. Distribution of the study population who received antenatal care according to type of advices given [n=345]		
Diet	305	86.64
Rest/sleep	215	61.07
Immunization	305	86.64
Physical activity	154	43.75
Personal cleanliness	98	27.84
smoking, alcohol consumption, others	76	21.59
Family planning	261	74.14
Breastfeeding and Newborn care	300	85.22
Warning/Danger sign	56	15.90

Among the registered women more than 85% had more than three antenatal visits and almost one third had all 4 antenatal visits. Majority of the women (96%) were fully immunized with TT vaccine followed by 3.48 % i.e., received only one dose of TT vaccine. Among the study population 65.7% of women consumed 100 or more IFA tablets followed by 28.5% of women received 61-100 IFA tablets. During antenatal visits, progression of overall weights wese measured in 96.6% of cases, 92.05% women had their blood pressure measured, 65.34% women had an abdominal examination but only 53.4% women had experienced pallor examination.

On laboratory investigations, 95.45% reported of having a blood test for haemoglobin estimation and Blood grouping; 82.1% had a blood test for VDRL; 83.8% had their blood for FBS/PPBS and 77.84% reported of testing a blood for HBsAg/ HIV/TSH etc., About 86% had an urine examination for R/E including albumin. About 27.8% reported of having stool test for Oligomeric Procyanthocyanides (OPC) and 59.09% had ultrasonography (USG) of pregnancy profile.

Regarding counselling/advice related to ANC, again 86.64% of the study population was advised about diet and immunisation followed by breast feeding and new born care (85.22%) and family planning (74.14%). However advice regarding personal cleanliness (27.84%), smoking and alcohol consumption (21.59%), and warning signs (15.9%) was not adequate.

In comparison between women who undergone for at least four ANC visits and who did 1-3; significant difference was observed in terms of age, religion, educational level, socio economic status (SES), timing of registration. About 53.58% of the study population who took at least four ANC visits were of age group more than 25 years while 69.26% were 25 years and below and the difference was statistically significant ($P < 0.05$). Among Hindu 71.02% had completed at least 4 ANC visits where as only 31.58% had done it ($p<0.000$). Similarly 76.62% of the study population who had education above primary level had more number of ANC visits

than 25% who were either illiterate or non formally educated and it was statistically significant ($P < 0.01$). Significantly more women with a higher SES (Class I, II and III) (60.12%) utilised ANC services as compared to those of lower SES (Class IV and V) (73.56%, $P < 0.01$). Again 56.98% of the pregnant women who got them registered early, went for more number of antenatal check-ups than 39.45% women who registered late which was also statistically significant ($P < 0.01$). Concerning the place of delivery, the women who had delivered their children at institution (69.3%) had adequate ANC as compared to home (30.4%) (P<0.0001). The influence of type of family and occupation, mode of delivery was not statistically significant ($P > 0.05$) [Table-3].

Table-3: Socioeconomic factors influencing the trends of ANC visits among the study population (n=352)

Socio-demographic profile	1-3 visits done (n= 117)	All 4 visits done (N=235)	chi^2 test(p value)
Age group(in yrs)			
≤25 (n=296)	91(30.74)	205(69.26)	$chi^2 = 5.22$
26 & above (n=56)	26(46.42)	30(53.58)	p=0.002
Religion			
Hindu (n=314)	91(28.98)	223 (71.02)	$chi^2 = 23.78$
Muslim (n= 38)	26(68.42)	12(31.58)	p=0.000
Education			
Illiterate and NF literate (n=48)	36(75.00)	12(25.00)	$chi^2 = 52.58$
Class I –X (n=261)	61(23.38)	200(76.62)	p=0.000
Above class X (n= 43)	20(46.51)	23(53.49)	
Occupation			
Home Maker (n=337)	113	224	$chi^2 = 0.304$
Work outside (n= 15)	4	11	p=0.580
Type of family			
Joint (n=201)	74(36.81)	127 (63.19)	$chi^2 = 0.27$
Nuclear (n=151)	43(28.47)	108(71.53)	p=0.1
Socio-Economic Status			
Up to class III (n=178)	71(39.88)	107(60.12)	$chi^2 = 7.17$
Class IV & V (n= 174)	46(26.43)	128(73.56)	p=0.003
Timing of registration			
≤ 12 wks (n=172)	34(19.77)	138(80.23)	$chi^2 = 30.15$
>12 wks (n=180)	83(46.11)	97(53.89)	p=0.000
Mode of delivery			
Normal Vaginal (n= 233)	76(32.61)	157(67.39)	$chi^2 = 0.11$
Caesarean Section (n=119)	41(34.45)	78(65.55)	p=0.99
Place of delivery			
Institutional (n=329)	101(30.70)	228(69.30)	$chi^2 = 14.63$
Home delivery (n=23)	16(69.56)	7(30.44)	p=0.000

Discussion

The present study was conducted in rural areas of Matigara block of siliguri Subdivision of Darjeeling district, West Bengal to study the utilization of antenatal care services among the women having the children of less than one year of age. The study was conducted during the period of April – June 2015.majority of the women(76.03%) in this study were in the age group of 20-25 years where Kakati R et al. [6] in a study done in rural area of Jorhat district Assam, found that 50% of the women were in the age group of 26-30 years.

This study showed 97% registration of pregnancy, of which 48.8% registered within 12 weeks. According to NFHS III – India [6], 76% women preceding the survey received ANC, and only 44% started antenatal care during the first trimester of pregnancy. The extent of registration and early registration was in accordance with the findings of previous studies in India and abroad; such as studies conducted by Basu*et al.* at Kolkata [7] (100%, 65.26%) Roy *et al*., at Lucknow [8] (100% and 53.7%), Sharma *et al.,* at Lucknow [9] (98.6% and 58.5%), Ashwini *et al*., at Belgaum [10] (100% and 42.6%), Javali*et al.,* at Karnataka [11] (100% and 56.5%), Koppad*et al*., at Kakati [12] (96.6% registration), Birmeta *et al*., at Ethiopia [13] (87% and 42%), Zhao *et al*., at Shanghai (90.1% registration but only 19.7% early registration) [14].

In the present study 84.8% women had delivered in govt. hospital followed by 8.2% had delivered at home. The findings of the present study is found to be similar with the study done by *Kakati R et al* at Jorhat district Assam [6] (79.6% institutional delivery and 10% home delivery) and also better than the similar study conducted by Srivastava A et al in Rohilkhand Region [15] revealed that 50.4% had delivered at government hospital followed 32% at home.

In the present study 66.7% of the women had more the three antenatal visits. Similar findings were found in the study by *Kakati R et al* [6] where 68.7% women had more than 3 ANC visits. This result is contrast to the similar study conducted by Shrivastava A [15] find that only 16.3% of women had three ANC. The study done by *Basu et al*. [7] revealed that 91.05% of the study population took at least three ante natal services during their last pregnancy period. As per NFHS-4 [5] India, about 51% had at least four ANC visits.

In this study, it was evident that 68.6% of pregnant women had received and consumed more than100 tablets of IFA; similar to study at Karnataka [11] where 65.6%, mothers consumed at least 100 IFA tablets. Moreover NFHS-4 [5] revealed that Seventy-eight percent of all women with a birth in the past five years were given or purchased iron and folic acid (IFA) tablets during the pregnancy for their most recent birth, but only 30 percent took the tablets for at least 100 days. On the contrary, 43.96% of the study population took at least 100 IFA tablets at Kolkata (Basu et al) [7], Kakati [12] where 48.4% mothers consumed at least 100 IFA tablets.

In the present study 96.5% of the women were immunized with 2 doses of TT. This findings are a bit higher than the similar study conducted by Srivastava A [15] (83.4%). comparable to NFHS-4 (89%) [5], Kolkata (100%),(Basu et al) [7] Lucknow (95.5%) [9], Belgaun (98.4%) [10], Jorhat (90%) [6]. In contrast, lower results were observed at Kakati (50%) [12] And at Etawah (46%) [16].

In the present study, the study population were asked about the components of ANC offered at least once; recording of weight and blood pressure was done for 96.6% and 92.05% of the study population respectively 65.34% had an abdominal examination, 95.45% had their blood test for haemoglobin and blood grouping; 86.64% had routine urine test; and ultra-sonography was the least utilised component (59.09%); which was almost similar to some other previous studies conducted at Kolkata (basu et al) [7] Lucknow [9], Belgaum [10], Karnataka [11].

In our study, 91.05% of the study population took at least three ante natal services during their last pregnancy period which was corroborative with the findings by Roy *et al*., (85.5%) [8], Sharma *et al*., (78.4%) [9], Javali*et al*., (83.1%) [11]. However findings of some other previous studies conducted by Ashwini *et al*. [10], Birmeta *et al*. [13], and

Zhao *et al*. [14], demonstrated lower results where 29.8%, 66.3% and 49.7% respectively had at least three ante natal check-ups. As per NFHS-4 [5] India, 51% had at least 4 ANC visits.

In the present study utilization of antenatal care services were significantly associated with the age of the women at last child birth, religion, education, socio-economic status, time of registration and place of delivery (P<0.05). Our findings are consistent with report of *Basu et al.* [7]. The association between the utilization of ANC services with occupation and type of family were found to be statistically not significant in the present study similarly *Kakati R et al.* [6] *and Basu et al.* [7] in their study find these not significant (p<0.05).

Among the different determinant this study revealed that less age was the determinant for more ANC visits. Maternal education is a very strong and consistent predictor of utilization of ante natal services; In our study, more women of higher SES utilized ANC services more as compared to women with poor SES; it may be due to transport cost to the health facilities where the ANC services are being provided. The good effect of early registration was also found on utilisation of antenatal care in this study. Encouraging early registration may ensure better maternal health in near future.

Conclusion

Maternal mortality is an important public health problem in developing country like India. Early detection of risk factors can reduce maternal mortality. This could be achieved through proper antenatal screening and health care services throughout the pregnancy period. Analyzing the information revealed from the current study it is concluded that, receiving and utilizing ANC services is not satisfactory related to delayed registration, <4 ANC visits, <100 tablet intake. There is a need to increase education about importance of consumption of IFA tab, early detection of danger signs in pregnancy. There is also a need to increase education about family planning after delivery.

Recommendations:

1. To educate people by village level worker like ASHA regarding early registration of pregnancy and adequate number of ANC visit
2. Improvement of facility for investigation such as HIV testing, HBsAG, VDRL by proper implementation of RCH II guideline
3. Counseling regarding contraception should be ensured for proper birth spacing.
4. The situation can be improved and women may be more receptive by improving educational status of the couple.

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References

1. Kadapatti MG, Vijayalaxmi AHM. Antenatal Care the Essence of New Born Weight and Infant Development. *International Journal of Scientific and Research Publications,* 2012; 2(10):1.
2. 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.
3. Dhakal S, Teijlingen ER, Stephens J, Dhakal KB, Simkhada P, Raja EA et al. Antenatal care among women in rural Nepal: a community based study. *Online Journal of Rural Nursing and Health Care,* 2011; 11(2):76-87.
4. Simkhada B, Teijlengen ER, Porter M, Simkhada P. Factors affecting utilization of antenatal care in developing countries: systematic review of the literature. *J Adv Nurs*, 2008; 61(3):244-260.

5. Antenatal care indicators (Table no. 39). International Institute for Population Sciences (IIPS) and ICF. 2017. *National Family Health Survey (NFHS-4), India*, 2015-16: Assam. Mumbai: IIPS [Accessed on 08 October 2020]. Available from: *http://www.indiaenvironmentportal.org.in/files/file/Assam.pdf*
6. Kakati R, Barua K, Borah M. Factors associated with the utilization of antenatal care services in rural areas of Assam, India. *Int J Community Med Public Health*, 2016; 3: 2799-2805.
7. Basu M, Chatterjee S, Roy S, Chowdhury G. Utilization of ante natal care services and it's determinants by women admitted in a tertiary care hospital of Kolkata. *Saudi J Health Sci*, 2015; 4:92-98.
8. Roy MP, Mohan U, Singh SK, Singh VK, Srivastava AK. Determinants of utilization of antenatal care services in rural Lucknow, India. *J Family Med Prim Care*, 2013; 2:55-59.
9. Sharma V, Mohan U, Das V, Awasthi S. Utilization pattern of antenatal care in Lucknow under National Rural Health Mission. *Indian J Community Health*, 2012; 24:32.
10. Ashwini S, Shivaswamy MS, Katti SM, Mallapur MD. Profile of Antenatal Women attending Urban Health Centre, Khasbag, Belgaum. *Med Innovatica*, 2012; 1:43-48.
11. Javali R, Wantamutte A, Mallapur MD. Socio-demographic factors influencing utilization of Antenatal Health Care Services in a rural area-A cross sectional study. *Int J Med Sci Public Health*, 2014; 3:308-2.
12. Koppad RS, Walvekar PR, Mallapur MD. Utilization of antenatal care by pregnant women residing in kakati sub centre-a cross sectional study. *Indian J Public Health Res Dev*, 2014; 5:160-164.
13. Birmeta K, Dibaba Y, Woldeyohannes D. Determinants of maternal health care utilization in Holeta town, central Ethiopia. *BMC Health Serv Res*, 2013; 13:256.
14. Zhao Q, Huang ZJ, Yang S, Pan J, Smith B, Xu B. The utilization of antenatal care among rural-to-urban migrant women in Shanghai: A hospital-based cross-sectional study. *BMC Public Health,* 2012; 12:1012.
15. Srivastava A, Mahmood SE, Mishra P, Shrotriya VP. Correlates of Maternal Health Care Utilization in Rohilkhand Region, India. *Ann Med Health Sci Res.* 2014; 4(3):417-425.
16. Kumar S, Srivastava DK, Jaiswal K, Jain PK, Singh CM, Rani V. A cross sectional study to assess antenatal coverage and antenatal health seeking behavior in rural etawah. *Indian J Prev Soc Med*, 2011; 42.

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