Assessment of Antenatal Care Services Utilization and Its Associated Factors

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ABSTRACT

Background: Every pregnant woman supposed to have Antenatal care visits at least four times during 4th, 6th, 8th and 9th month of gestation. This contributes to the reduction in maternal mortality. The main objective of the study was to assess the utilization of antenatal care services and its associated factors in Pokhara Metropolitan.

Methods: A community based cross-sectional analytical study was conducted in Pokhara Metropolitan between 16th May 2019 to 30th June 2019 among 325 mothers using probability proportional to size sampling and face to face interview. Ethical approval was obtained from Nepal Health Research Council. Data analysis was done using SPSS version 22 and Chi-square test and binary logistic regression analysis was performed.

Results: A total of 97.2 percent mothers had at least one time visit for ANC checkup while 88.6 percent mothers received four ANC visits as per protocol. A total of 94.6 percent mothers got counseling on early detection and management of complications, 95.9 percent consumed iron and folic acid and 94.3 percent consumed de-worming tablets. Mothers health literacy mobile phone ownership (AOR=11.26, 95% CI: 9.70-13.03), husband's attitude towards ANC (AOR=6.71, 95%CI: 1.60-28.10), awareness on pregnancy complications (AOR=4.62, 95% CI: 2.53-21.73), and which is

decision making on household expenditure by self (AOR 8.57%, 95% CI: 3.64-9.48) history of abortion (AOR=5.22, 95%CI: 1.71-15.30) were the factors associated with ANC service utilization.

Conclusions: Majority of the pregnant women were found to be utilizing ANC services. Mobile phone ownership, health literacy, husband's attitude towards ANC, decision making on household expenses, awareness on pregnancy complications and history of abortion were the significant factors associated with ANC service utilization.

Keywords: Antenatal care; factors associated; Pokhara; utilization.

INTRODUCTION

Every woman aspire having positive pregnancy experience[1] which is achieved through regular antenatal visits with skilled health workers. Sustainable Development Goals (SDG) has target 3.1 to reduce the global maternal mortality rate to less than 70 per 100,000 live births by 2030.[2] Maternal health is priority program of Government of Nepal recommending at least 4 ANC visits by pregnant women.[3] In Nepal, Maternal mortality ratio declined from 539 to 239/100,000 live births in past two decades.[4] 84% of women received ANC from skilled provider for their most recent birth[4] showing need of awareness and encouragement to timely seek first ANC.[3] Developing countries share a major burden of all maternal deaths.[5,6] Despite the success around the world in extending ANC services, ANC coverage is still unsatisfactory in Southeast Asia.[7,8] ANC utilization was found to be higher in poorer women as compared to their richer counterparts.[9] This study was conducted to assess the factors associated with utilization of antenatal care in Pokhara, Nepal.

METHODS

A community based cross sectional analytical study was conducted among mothers residing in Pokhara Metropolitan, Kaski district, Nepal. Study population consisted women of reproductive age (15-49) who are living in Pokhara and who have given at least one birth in the past 12 months. The sample size of 325 was determined by using the Cochran's formula for finite population and assessing the total expected pregnancy

at Pokhara Metropolitan which was 12,263, also the proportion of ANC service utilization (P) is 0.69 and allowable error (d) is 0.05. Sampling was done using probability proportional to size, Among 33 wards of Pokhara Metropolitan, more than 50% wards were studied to find out the ANC service utilization status. Out of 33 wards, 17 wards were selected for study using lottery method. Then, required number of respondents were calculated for each single selected ward by using proportionate method. Face to face interview was conducted using four domains schedule comprising of predisposing, enabling and need factors related questions adopted from various studies including ANC service utilization. Ethical approval was obtained from the Nepal Health Research Council. Data was collected from 16th May 2019 to 30th June 2019. The Chi-square test was used to observe the statistical association between categorical variables. The predictors of ANC service utilization were assessed using binary logistic regression analysis. Andersen and Newman Behavioral Model (ANBM) for utilizing the health service framework was used to systematically identify the factors that influence individual decision to use available health care services.[10] The model states that predisposing factors and enabling factors reflect the means or logistics required to obtain the services.[11]

RESULTS

Table 1. Antenatal Care utilization status among mothers. (n=325)

Factors	Number	Percent (%)
Heard about ANC services		
Yes	319	98.2
No	6	1.8
Utilized at least one ANC services		
Yes	316	97.2
No	9	2.8
Frequency of ANC visit		
No visit at all	9	2.8
1st -3rd visits	28	8.6
≥4th visits	288	88.6
Place of ANC visit (n=316)		
Private health institutions	63	19.9
Government health institutions	253	80.1
IEC /BCC on pregnancy		
Yes	296	93.7
No	20	6.3
Information on danger signs		
Yes	304	96.2
No	12	3.8

As depicted in table 1, many of the mothers had heard about ANC services (98.2%). Most of the mothers utilized ANC services (97.2%) and ANC utilization as per protocol was 88.61 percent. More than three quarters of the mothers visited government health institutions (80.1%) for ANC.

Table 2. Antenatal Care Services utilized by mothers. (n=325)

Counseling on early detection & management of complications		
Yes	299	94.6
No	17	5.4
TT immunization		
Yes	307	97.2
No	9	2.8
Iron and folic acid tablets consumption		
Yes	303	95.9
No	13	4.1
De-worming tablet consumption		
Yes	298	94.3
No	18	5.7
Reason for not using ANC services (n=9)		
Felt no need of ANC services	2	22.2
Busy with household works	3	33.3
Not aware of the services	1	11.2
Need to go for work	3	33.3
Satisfied with provided services (n=316)		
Yes	277	87.7
No	39	12.3
Reason for dissatisfaction (n=39)		
Unclean environment	13	33.3
Unfriendly behavior of health workers	15	38.5
Lack of beds during emergencies	11	28.2

As described in table 2, a total of 94.6 percent mothers got counseling on early detection and management of complications during pregnancy and 97.2 percent were vaccinated with Tetanus toxoid, 95.9 percent mothers consumed iron and folic acid tablets and 94.3 percent of them consumed de-worming tablets.

Association between the predisposing factors, enabling factors and need factors with the utilization of ANC services was assessed using Chi-square test and logistic regression as depicted in tables below.

Table 3. Predisposing factors for ANC service utilization.					
Variables	**Utilization of ANC services**		**Chi-square statistics**	**p-value**	**UOR (95%CI)**
	≥4 ANC	**<4 ANC**			
Age					
<20 years	16(76.2%)	5(23.8%)			1
20-30 years	203(91.9%)	18(8.1%)		0.027*	3.52(1.15-10.73)
≥30 years	69(83.1%)	14(16.9%)	7.88	0.464	1.54(0.48-4.89)
(Mean ± SD) = (26.47± 4.49), minimum=16, maximum=41 years					
Mobile phone ownership					
Yes	280(90.9%)	28(9.1%)	30.70	<0.001*	11.25(4.02-31.40)
No	8(47.1%)	9(52.9%)			1
Family type					
Joint	139(93.3%)	10(6.7%)	5.95	0.015*	2.51(1.17-5.39)
Nuclear	149(84.7%)	27(15.3%)			1
Age at first pregnancy					
<20 years	50(80.6%)	12(9.4%)			1
≥20 years	238(90.5%)	25(9.5%)	4.82	0.024*	2.28(1.08-4.85)
(Mean ± SD) = (22.61± 3.69), minimum=14, maximum=35 years					
Previous use of ANC					
Yes	127(90.7%)	13(9.3%)		0.001*	13.67(3.76-49.27)
No	5(41.7%)	7(58.3%)	23.269		1
Income quintile					
≥40,000(above Md)	155(95.1)	8(4.9)	13.59	<0.001*	4.22(1.86-9.55)
<40,000(below Md)	133(82.1)	29(17.9)			1
(Median ± IQR) = (40,000±25,000), minimum=8,000, maximum=200,000					

*p ᵃ value from Fisher exact test, *-Significant at p value <0.05, Ref category (UOR=1)*

Table 3 shows that maternal age, mobile phone ownership, family type, age at first pregnancy, previous history of ANC service utilization and income quintile were found to be statistically associated predisposing factors for the ANC service utilization.

Table 4. Enabling factors for ANC service utilization.

Variables	Utilization of ANC services		Chi-square	p-value	UOR (95%CI)
	≥4 ANC	<4 ANC			
Husband attitude towards ANC service utilization					
Positive	274(92.6%)	22(7.4%)	51.36	0.001*	13.34(5.71-31.15)
Neutral & negative	14(48.3%)	15(51.7%)			1
Domestic work support during pregnancy					
Yes	269(90.6%)	28(9.4%)	13.08	0.002* a	4.55(1.88-11.00)
No	19(67.9%)	9(32.1%)			1
Dietary intake support during pregnancy					
Yes	275(89.9%)	31(10.1%)	8.15	0.013*a	4.09(1.45-11.53)
No	13(68.4%)	6(31.6%)			1
Social support during pregnancy					
Yes	277(90.8%)	28(9.2%)	23.87	0.001* a	8.09(3.09-21.12)
No	11(55.0%)	9(45.0%)			1
Emotional support during pregnancy					
Yes	276(90.5%)	29(9.5%)	17.29	0.001*a	6.34(2.39-16.78)
No	12(60.0%)	8(40.0%)			1
Support during ANC visits (n=317)					
Yes	271(92.5%)	22(7.5%)	9.11	0.010*	4.34(1.55-12.14)
No	17(73.9%)	6(26.1%)			1
Decision making on household expenditure					
Self	113(94.2%)	7(5.8%)	31.15	<0.001*	7.66(2.99-19.60)
Family together	135(92.5%)	11(7.5%)		<0.001*	5.38(2.56-13.26)
Husband	40(67.8%)	19(32.2%)			1

p[a] value from Fisher exact test, *-Significant at p<0.05

Enabling factors such as husband's attitude, domestic work support during pregnancy, dietary intake, social and emotional support during pregnancy, support during ANC and decision making on household expenditure were found to be significantly associated with ANC service utilization (table 4).

Table 5. Need factors for ANC service utilization.

Variables	Utilization of ANC services		Chi-square	p-value	UOR (95%CI)
	≥4 ANC	<4 ANC			
Awareness on pregnancy complications					
Yes	247(92.5%)	20(7.5%)	22.48	<0.001*	5.12(2.47-10.58)
No	41(70.7%)	17(29.3%)			1
Perceived importance of ANC attendance					
Important	265(93.0%)	20(7.0%)	43.75	<0.001[a]	9.79(4.50-21.24)
Not important	23(57.5%)	17(42.5%)			1
Pregnancy intention					
Intended	280(89.5%)	33(10.5%)	5.95	0.015*	4.24(1.21-14.86)
Unintended	8(66.7%)	4(33.3%)			1
FCHV home visit and counseling					
Yes	284(91.6%)	26(8.4%)	59.82	<0.001[a]	30.03(8.93-101.0)
No	4(26.7%)	11(73.3%)			1
History of abortion					
No	271(90.0%)	30(10.0%)	8.12	0.004[a]	3.72(1.42-9.69)
Yes	17(70.8%)	7(29.2%)			

p[a] value from Fisher exact test *-Significant

Table 5 shows that the need factors like awareness on pregnancy complications, perceived importance of ANC attendance, pregnancy intention, Female Community Health Volunteer's home visit and counseling, history of abortion were statistically associated with the utilization of ANC services.

Factors that were associated with ANC service utilization were further subjected for the multivariate analysis using logistic regression. After controlling the potential confounding factors, following factors were found to be significantly associated with the utilization of ANC services

Table 6. Multivariate analysis for ANC service utilization.

Variables	Utilization of ANC services		p-value	UOR (95%CI)	p-value	AOR (95%CI)
	≥4 ANC	<4 ANC				
Mobile phone ownership						
Yes	280(90.9%)	28(9.1%)	<0.001	11.25(4.02-31.40)	0.001*	11.26(9.70-13.03)
No	8(47.1%)	9(52.9%)		1		1
Husband attitude towards ANC service utilization						
Positive	274(92.6%)	22(7.4%)	0.001	13.34(5.71-31.1)	0.009*	6.71(1.60-28.10)
Neutral & negative	14(48.3%)	15(51.7%)		1		1
Decision making on household expenditure						
Self	113(94.2%)	7(5.8%)	<0.001	7.66(2.90-19.60)	0.001*	8.57(3.64-9.48)
Family together	135(92.5%)	11(7.5%)	<0.001	5.38(2.50-13.20)	0.042*	2.87(1.03-7.92)
Husband	40(67.8%)	19(32.2%)		1		1
Awareness on pregnancy complications						
Yes	247(92.5 %)	20(7.5 %)	<0.001	5.12(2.47-10.58)	<0.001*	4.62(2.53-21.73)
No	41(70.7 %)	17(29.3 %)		1		1
History of Abortion						
No	271(90.0%)	30(10%)	0.004[a]	3.72(1.40-9.60)	0.003*	5.22(1.71-15.30)
Yes	17(70.8%)	7(29.2%)		1		1

*-Significant at p value <0.05

DISCUSSION

This community based cross-sectional study tries to assess Antenatal care utilization among child bearing mothers in Pokhara. In this study, 97.2 percent of the mothers had made at least one time visit for checkup. This finding is somehow consistent (94.8%) with the study conducted in Nepal[12] The coverage of four ANC visits as per protocol was found 88.6 percent which is also consistent with the study conducted in Nepal (83.4%)[12].

The current study found age of the mother is not significantly associated with ANC service utilization which is consistent with the study conducted in Ethiopia[10] however the findings is not consistent with the study conducted in Gorkha[13] and Makwanpur[14] districts of Nepal. The reason might be due to the differences in the geographical structure of the study areas and moreover the cultural differences between women of Kaski, Gorkha and Makwanpur districts. In our study, women belonged to the age group of 20-30 years had a higher rate of antenatal care attendance however, a study done by using the demographic and health survey data[15] and another study done in Indonesia[16] had found that women of older age group had a higher rate of antenatal attendance. The difference might be due to older women tend to be more aware about their health and well-being due to their experience as compared to the younger ones. Women who had mobile phone was associated with higher ANC service utilization which is consistent with the study conducted in Nigeria.[17]

Age at first pregnancy was not associated with ANC service utilization whereas a study from Gorkha, Nepal showed significantly associated with ANC service utilization.[13]

Decision making on household expenditure was found significantly associated with ANC service utilization which is consistent with the study conducted in eastern Nepal.[18] Present study shows that husband's attitude is associated with ANC service utilization and similar observations were made in a study conducted in Kathmandu, Nepal.[19] The effect of a husband's attitude on utilization of ANC has been well documented in other studies conducted in Ethiopia[20,21]

Mothers who were aware of the pregnancy complications has higher rate of ANC service utilization (92.5%) than mothers who were unaware of pregnancy complication (70.7%). findings of the present study was consistent with the study from Ethiopia[21,22] and south Sudan.[23] History of abortion was found significantly associated with ANC service utilization. This finding was consistent with the study conducted in Slum Areas of Pokhara Sub-Metropolitan, Nepal.[6] The similarity in data may be due to, as both studies are conducted in Pokhara with similar study population and context.

CONCLUSIONS

The level of complete ANC coverage among mothers who gave birth in the past 12 months was found to be very good in Pokhara Metropolitan. Majority of the mothers visited government health institutions for ANC service utilization. Among those who utilized ANC services, all the mothers had access to blood pressure monitoring, weight monitoring and fetal heart rate monitoring.

Mobile phone ownership, husband's attitude towards ANC and decision making on household expenses, awareness about pregnancy complications and history of abortion were the significant factors of ANC service utilization in Pokhara Metropolitan. The study identifies the need to look into factors such as husband's involvement in ANC service to increase ANC service utilization. Focus should be done on enhancing the women's autonomy within the family improving their ability to earn and control income and chose their own health. It is important targeting women's who are older in age and are considerably less advantaged in educational campaigns to promote sufficient antenatal care, family planning and safe motherhood programs.

REFERENCES

1. WHO. WHO recommendations on antenatal care for a positive pregnancy experience. 2016(ISBN 978 92 4 154991 2). Assessed from: https://www.who.int/publications/i/item/9789241549912

2. United Nations T. Transforming our world: The 2030 agenda for sustainable development. Division

for Sustainable Development Goals: New York, NY, USA. 2015. Assessed from: https://sdgs.un.org/2030agenda

3. Department of Health Services. Annual Report 2016/17. 2017. [Download PDF]

4. Ministry of Health, New ERA, ICF. Nepal Demographic and Health Survey 2016. Kathmandu, Nepal: Ministy of Health, New ERA, and ICF, 2017. [Download PDF]

5. World Health Organization, UNICEF. Trends in maternal mortality: 1990-2015: estimates from WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. 2015. [Download PDF]

6. Sharma D, Pokharel HP, Budhathoki SS, Yadav BK, Pokharel RK. Antenatal Health Care Service Utilization in Slum Areas of Pokhara Sub-Metropolitan City, Nepal. Journal of Nepal Health Research Council. 2016;14(32):39-46. [PubMed]

7. World Health Organization. Maternal mortality fact sheet update on 10 february 2018 [Internet]. 2018.

8. Wang W, Alva S, Wang S, Fort A. Levels and trends in the use of maternal health services in developing countries. 2011. Assessed from: [Download PDF]

9. Mehata S, Paudel YR, Dariang M, Aryal KK, Lal BK, Khanal MN, et al. Trends and Inequalities in Use of Maternal Health Care Services in Nepal: Strategy in the Search for Improvements. BioMed research international. 2017;2017:5079234. doi:https://doi.org/10.1155/2017/5079234

10. Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. The Milbank Memorial Fund Quarterly Health and Society. 1973:95-124. doi: 10.1111/j.1468-0009.2005.00428.x

11. Tesfaye G, Chojenta C, Smith R, Loxton D. Application of the Andersen-Newman model of health care utilization to understand antenatal care use in Kersa District, Eastern Ethiopia. PloS one. 2018;13(12):e0208729. doi: 10.1371/journal.pone.0208729

12. Thapa M, Yadav S, Bhujel K. Utilization of Antenatal care services in present pregnancy among the women attending in a Teaching Hospital for delivery. Nepal Journal of Obstetrics and Gynaecology. 2016;11(1):26-9.[Article]

13. Awasthi MS, Awasthi KR, Thapa HS, Saud B, Pradhan S, Khatry RA. Utilization of Antenatal Care Services in Dalit Communities in Gorkha, Nepal: A Cross-Sectional Study. Journal of pregnancy. 2018;2018:3467308. doi: 10.1155/2018/3467308

14. Pandey S, Karki S. Socio-economic and Demographic Determinants of Antenatal Care Services Utilization in Central Nepal. International journal of MCH and AIDS. 2014;2(2):212-9. Retrieved from: [PMC4948147]

15. Joshi C, Torvaldsen S, Hodgson R, Hayen A. Factors associated with the use and quality of antenatal care in Nepal: a population-based study using the demographic and health survey data. BMC pregnancy and childbirth. 2014;14(1):94. Retrieved from: [Article]

16. Agus Y, Horiuchi S. Factors influencing the use of antenatal care in rural West Sumatra, Indonesia. BMC pregnancy and childbirth. 2012;12(1):9. Retrieved from: [Article]

17. Jennings L, Omoni A, Akerele A, Ibrahim Y, Ekanem E. Disparities in mobile phone access and maternal health service utilization in Nigeria: a population-based survey. International journal of medical informatics. 2015;84(5):341-8. doi: 10.1016/j.ijmedinf.2015.01.016

18. Deo KK, Paudel YR, Khatri RB, Bhaskar RK, Paudel R, Mehata S, et al. Barriers to utilization of antenatal care services in Eastern Nepal. Frontiers in public health. 2015;3:197. Available from: [Article]

19. Upadhyay P, Liabsuetrakul T, Shrestha AB, Pradhan N. Influence of family members on utilization of maternal health care services among teen and adult pregnant women in Kathmandu, Nepal: a cross sectional study. Reproductive health. 2014;11(1):92. doi: 10.1186/1742-4755-11-92

20. Berhe KK, Welearegay HG, Abera GB, Kahsay HB, Kahsay AB. Assessment of antenatal care utilization and its associated factors among 15 to 49 years of age women in Ayder Kebelle, Mekelle City 2012/2013; a cross sectional study. American Journal advance drug delivery. 2014;62:75. doi:

10.4172/2161-1165.S2-003

21. Abosse Z, Woldie M, Ololo S. Factors influencing antenatal care service utilization in hadiya zone. Ethiopian journal of health sciences. 2010;20(2). doi: 10.4314/ejhs.v20i2.69432

22. Dutamo Z, Assefa N, Egata G. Maternal health care use among married women in Hossaina, Ethiopia. BMC health services research. 2015;15(1):365. doi: 10.1186/s12913-015-1047-1

23. Mugo NS, Dibley MJ, Agho KE. Prevalence and risk factors for non-use of antenatal care visits: analysis of the 2010 South Sudan household survey. BMC pregnancy and childbirth. 2015;15(1):68. doi: 10.1186/s12884-015-0491-6