INFLUENCES ON THE UTILIZATION OF ANTENATAL CARE AMONG REPRODUCTIVE AGE GROUP WOMEN IN MID-WESTERN DEVELOPMENT REGION OF NEPAL: A POPULATION-BASED STUDY USING THE NEPAL MULTIPLE INDICATOR CLUSTER SURVEY (MICS) DATA 2014

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ABSTRACT:

Background: Antenatal care (ANC) provides an opportunity for health information and services that can significantly enhance the health of a pregnant women and their babies. In recent years, Nepal shown a visible progress in improving maternal death. However, maternal mortality rate (MMR) remains high mostly in mid-western region in Nepal comparison to other regions. This study aimed to identify the issue of antenatal care service utilization and influencing characters of women in mid-western region of Nepal.

Methods: The data from the Multiple Indicator Cluster Survey (MICS) conducted in Nepal by the Ministry of Health and Population with a technical support from UNICEF from February – June 2014 was applied. The analysis was conducted in 322 women who gave birth in last two years preceding the survey. Bivariate and multivariate logistic regression analysis was carried out to identify influencing factors associated with ANC utilizations

Results: Seventy-nine percentage of women attended ANC visits. Out of them only fifty-four percentage of women attended complete (four or more) ANC visits. This study identified the following factors affecting antenatal care utilization: Maternal age, education, wealth index, listening to radio and watching television. The following factors affect complete (four or more visits) antenatal care utilization: Education, Sub-region, wealth index and watching television.

Conclusion: Overall ANC utilization was so high. Frequency of antenatal care visits is not satisfactory among women in this region. Out of 257 who received ANC care, only 54% women received complete ANC (four or more visits). Parity, husband's education and residence had no effect on the utilization of antenatal care visits in this study. Women's age, education, wanted last child and wealth index had prominent effect on utilization of ANC service.

Keywords: Antenatal care; Reproductive health; Multiple indicator cluster survey; Nepal

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INTRODUCTION

Globally, complications associated with a pregnancy and childbirth is the leading cause of mortality and morbidity among women of reproductive age [1]. In 2015, it was estimated approximately 303,000 women died from those complications. The majority of the women,

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approximately 99% who died was from the developing countries i.e. Sub-Saharan Africa and South Asia [2]. Antenatal care (ANC) is a critical determinant of high maternal death rate and one of the fundamental parts of maternal human services on which the life of mother and children depend [3].

Antenatal care, a primary component of safe motherhood is mainly concerned with the birth preparedness and provides effective measure to handle pregnancy complications. Antenatal care main objective is to prevent, early detection, and prompt effective management of pregnancy related complications. Antenatal care provides the pregnant women an opportunity for the interventions that may be vital to her and upcoming baby life [4]. In a developing countries with a limited resources, there is a high need to ensure value for money. The utilization of antenatal care services is considered to be a cost-effective component of maternity care to reduce maternal mortality and morbidity in safe motherhood programs.

According to UNICEF 2011, globally only 53 percentage of the pregnant women attended the WHO recommended 4 antenatal care visits between years 2005 to 2010 [5]. In the same year, only 36 percentage of the pregnant women from low-income countries visited antenatal care center. In developed countries, antenatal care institution for a long time has been able to reduce maternal and neonatal mortality rate remarkably.

In Nepal, maternal mortality ratio (per 100 000 live births) is 258, which is higher than estimated in the world [1]. In expansion, there is an additional distinction in the utilization of antenatal care administrations among urban and rural pregnant women. Mass media plays a critical role in disseminating public health information, improving health knowledge and changing health behaviors. Lack of exposure to mass media is also affecting the under-utilization of antenatal care. The importance of mass media on motivating maternal health behaviors have been recognized in low-and-middle income countries [6]. In rural Malawi, women exposed to community driven the mass media like newspaper, television, and radio are more likely to use antenatal care services than non-exposed. It directly helped to reduce maternal mortality rate [7]. Mothers with secondary or higher education are twice as liable to get antenatal care. In Nepal, just 50% of the pregnant women make four or more ANC visits. There are considerable variation by foundation qualities, for example, women's age at pregnancy, parity, spot of pregnancy and women's education level.

The difficultly in accessibility and under-utilization of modern health services are one of the main reason behind poor health quality in developing countries [8]. Most common factors for under-utilization of ANC services in developing countries are women and husband’s educational level, parity, birth order, age of women at marriage and pregnancy, marital status, religion, caste /ethnicity, family size, accessibility and affordability [4]. ANC is an important for obtaining pregnancy related information and services that is useful to improve the health of women and their babies [9]. Empirical evidence shown that four ANC visit is required for normal pregnancy. Hence, WHO recommended at least four visits before delivery [10].

Nepal has significantly improved its maternal health services, which helped in reducing MMR. Despite, its effort, lots of improvement is needed [11]. Nepal is situated between two giant nation India and China. Nepal has high MMR than its neighbor countries (i.e. 174 deaths per 1000,000 in India and 22 deaths per 100,000 in China) [11]. Nepal has got five development regions. Mid-western region is the largest region by land area with around 3.5 million population. Low education level, extreme poverty and accessibility are the main problems of this region. It has lowest percentage of ANC visits [12].

The Nepal MICS [13] data is important for monitoring the situation on mother and children in the country. In this study, further analysis of the MICS data was done with an aim of exploring the socio-demographic, obstetrics, household and media exposure factors associated with the utilization of ANC services in mid-western region. Mid-western region has the highest number of maternal morality rate and has less number of antenatal care visits during pregnancy. Objective of this research was to explore the relationship of socio-demographic characteristics, household characteristics, obstetrics characteristics and media exposure with antenatal care services utilization and to determine factors that influence on the utilization of antenatal care attendance in mid- western region of Nepal.

METHODS

Data source

The Nepal MICS data collected thorough a cross –sectional study design. Data was collected from all three sub-region of mid-western development region of Nepal i.e. Tarai, hill and mountain. The study population was reproductive age women (15-49 years) who had given live birth within last 2 years preceding the research. According to MICS, 4 sets of questionnaires were used. Household questionnaire, a questionnaire of individual women, an under-5 questionnaire, administered to mothers (or caretakers) for all children less than five years of age living in the household and a water quality-testing questionnaire. This study obtained data from Nepal UINCEF Office.

Data collection

According to MICS, before data collection, master training of trainers was held. Then, residential training for field workers was given. Training consists of lectures on interviewing techniques and interviews between trainees to gain experience. We used utilization of ANC and complete (four or more visits) utilization of ANC as our outcome variable.

Altogether, 14 explanatory variables were included in the analysis to assess their association with utilization of ANC and complete utilization of ANC based on MICS data and previous studies in developing countries. Most of the variables were nominal and ordinal scale. The variables include socio-demographic characters like maternal age, education, sub-region, residence and marital status, obstetrics characteristics like parity and wanted last child, household characteristics like wealth index quintile, religion and ethnicity and media exposure like listening to radio, watching television and reading newspaper.

Maternal age was classified into 3 categories: 15-24 years, 25-34 years and 35-49 years. Education has been categorized into 5 categories: none, primary, secondary and higher. Similarly, there was 3 categories in sub-region i.e. mountain, hill and Terai. Residence categorized into urban and rural. For descriptive purpose parity was classified into 4 categories – 1, 2-3, 4-6 and 7+. For inferential statistics parity was classified into 3 categories: 1, 2-3 and 4+. Wanted last child into yes or no. For descriptive purpose wealth index quintile was classified into 5 categories: poorest, second, middle, fourth and richest. In inferential studies, wealth index was classified into 3 categories: poorest, middle and richest. Religion has got 5 categories i.e. Hindu, Buddhist, Christian, Muslim and others. Ethnicity classified into disadvantaged and advantaged groups. In descriptive media exposure was classified into almost everyday, at least once a week, less than once a week and not at all. For inferential statistics media exposure was classified into sometimes and never.

Frequency and percentage (mean, standard deviation where applicable) was calculated for the descriptive part of the study. Bivariate analysis was done using Pearson's Chi- square to categorical data to find out the association between socio-demographic characteristics, obstetric characters, household characteristics and media exposure with ANC utilization and complete ANC (four or more visits) utilization. The binary logistic regression analysis was used to study the strength of associations between independent and dependent variables. The odds ratios with 95% confidence intervals (CI) were calculated. Statistical significance was defined as a two-sided P value less than 0.05 in all analyses.

The study approval was taken from the Ethical Review Committee for Research, Chulalongkorn University. (158.1/59: 08/11/2016).

RESULTS

Characteristics of participants

From the total of 322 women, 257(79.8%) visited the health center to see antenatal care for at least once while remaining 65 women (20.9%) did not visit even once during the course of pregnancy. Out 257 women who attended antenatal care, 174 (67.7 %) women visited ANC clinic four or more times. 16(6.3%) women visited only once, 26 (10.1%) visited two times and 41 (15.9 %) women visited three times during their last pregnancy.

The mean age of the respondents (15-49) was 25.32 years. 166 (51.6 %) of women fell under the age group of 15- 24. Whereas, 128 (39.8%) women were in the age group 25-34 and remaining 28 (8.7%) falls in 35+ age group of women. From the information obtained, about 141 (43.7%) women never received any education at all. About 66 (20.4%) women were with primary education, 78 (24.2%) were with secondary education and only 28 (8.7%) had received higher education. Higher number of women had children 2-3. 158 (49.0%) women had 2-3 numbers of children. About

Table 1 Association of antenatal care utilization

Characteristics	Complete utilization			Utilization of ANC		
	Total	Incomplete utilization	Complete utilization	Total	Non utilization	Utilization
Maternal age (years)		(p=0.813)			(p=0.000)	
15-24	142	44 (30.8)	98 (69.2)	166	24 (14.5)	142 (85.5)
25-34	99	35 (34.7)	64 (65.3)	128	28 (21.5)	100 (78.7)
35-49	16	6 (33.3)	10 (66.7)	28	13 (48.1)	15 (51.90
Education status		(p=0.000)			(p=0.000)	
None	99	47 (47.5)	52 (52.5)	140	41 (29.8)	99 (70.2)
Primary	51	14 (27.5)	37 (72.5)	66	15 (22.7)	51 (77.3)
Secondary	72	14 (19.4)	58 (80.6)	78	6 (7.7)	72(92.3)
Higher	35	7 (20.0)	28 (80.0)	38	2 (5.3)	36 (94.7)
Region		(p=0.004)			(p=0.000)	
Mountain	29	16 (55.2)	13 (44.8)	45	12 (30.2)	29 (69.8)
Hill	124	43 (34.7)	81 (65.3)	165	41 (25.3)	124 (74.4)
Terai	104	24 (23.1)	80 (76.9)	112	10 (8.0)	102 (92.0)
Husband's education		(p=0.712)			(p=0.404)	
None	142	43 (30.3)	99 (69.7)	179	37 (20.7)	142 (79.3)
Primary	47	16 (34.0)	31 (66.0)	55	8 (14.5)	47 (85.5)
Secondary	24	10 (41.7)	14 (58.3)	34	10 (28.6)	25 (71.4)
Higher	43	13 (30.2)	30 (69.8)	54	10 (17.3)	43 (82.7)
Obstetric characters						
Parity		(p=0.839)			(p=0.566)	
1	86	29 (33.7)	57 (66.3)	108	22 (20.4)	86 (79.6)
2-3	129	42 (32.6)	87 (67.4)	158	29 (18.4)	129 (81.6)
4+	42	12 (28.6)	30 (71.4)	56	14 (25.0)	42(75.0)
Wanted last child		(p=0.188)			(p=0.000)	
Yes	232	72 (31.0)	160 (69.0)	283	51 (18.0)	232 (82.0)
No	25	11 (44.0)	14 (56.0)	39	9 (26.5)	25 (73.5)
Household characteristics						
Wealth Index		(p=0.000)			(p=0.000)	
Poorest	121	56 (46.7)	64 (53.3)	174	54 (31.0)	120 (69.0)
Middle	95	16 (16.8)	79 (83.2)	105	10 (9.5)	95 (90.5)
Richest	41	10 (26.2)	31 (73.8)	43	1 (2.3)	42 (97.7)
Ethnicity		(p=0.265)			(p=0.068)	
Disadvantaged	108	42 (36.1)	69 (63.9)	178	35 (24.5)	108(75.5)
Advantaged	149	44 (29.5)	105 (70.5)	144	29 (16.3)	149 (83.7)
Media exposure						
Newspaper		(p=0.652)			(p=0.933)	
Sometimes	126	39 (31.0)	87 (66.4)	158	32 (19.7)	126 (80.3)
Not at all	131	44 (33.6)	87 (66.4)	164	33 (20.1)	131 (79.9)
Radio		(p=0.063)			(p=0.000)	
Sometimes	117	30 (26.3)	87(73.7)	131	14 (10.0)	117 (90.0)
Not at all	140	52(37.1)	88 (62.9)	191	51 (26.7)	140 (73.3)
Television		(p=0.008)			(p=0.001)	
Sometimes	88	19 (21.6)	69 (78.4)	97	9 (8.3)	88 (91.7)
Not at all	169	64 (37.9)	105 (62.1)	225	56 (24.9)	169 (75.1)

174 (54.2%) of women fall into poorest categories. 72 (22.2 %), 33 (10.3%) and 29 (8.9%) falls under second, middle and fourth categories respectively. Least women i.e. 14 (4.3%) women were in richest categories. Almost more than 50 percent women never exposed to media. About 164 (51.0%) never read newspaper, 191(59.4%) never listened radio and 225 (70%) never watched television.

Table 2 Multivariate logistic analysis of influencing factors associated with utilization of ANC

Study variables	Unadjusted OR 95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Maternal age (years)				
15-24	1		1	
25-34	0.609 (0.332 -1.117)	0.109	0.940 (0.453-1.948)	0.867
35-49	0.178 (0.075-0.420)	0.000	0.302 (0.102-0.899)	0.031
Education				
None	1		1	
Primary	1.467 (0.741-2.904)	0.272	0.853 (0.361-2.016)	0.717
Secondary	5.117 (2.062-12.698)	0.000	1.84 (0.626-5.413)	0.268
Higher	7.889 (1.771-35.131)	0.007	2.397 (0.444-12.945)	0.310
Sub-region				
Mountain	1		1	
Hill	1.35 (0.648-2.813)	0.424	1.139 (0.482-2.692)	0.766
Terai	4.951 (1.961-12.504)	0.001	1.47 (0.444-4.868)	0.528
Wealth index				
Poorest	1		1	
Middle	4.21 (2.037-8.699)	0.000	2.658 (0.979-7.220)	0.550
Richest	20.898(2.507-174.202)	0.005	13.335 (1.136-156.692)	0.039
Listening radio				
Never	1		1	
Sometimes	3.214 (1.678-6.154)	0.000	2.451 (1.120-5.364)	0.025
Watching television				
Never	1		1	
Sometimes	3.564 (1.643-7.728)	0.001	0.919 (0.332-2.544)	0.871

Factors associated to utilization of antenatal care

In bivariate analysis, a number of variable such as maternal age, educational status, wanted last child, wealth index quintile and watching television showed statistically significant (*p*-value < 0.05) association with utilization of ANC (Table 1). Multivariate logistic regression showed that women from age 35-49 years has negative relationship with increasing age of a mother. With increasing age, there was less likely to use ANC (aOR=0.302 CI: 0.102-0.899). Mother receiving secondary education was 5 times more likely to use antenatal care that mothers without education at all. (Unadjusted OR=5.117; CI: 2.062-12.698). Result shows mothers from Terai Sub- Region were more likely to use ANC than women from Mountain and Hill Sub-regions (OR=4.95; 95% CI: 1.961-12.698). Wealth index has strong relationship with ANC use. Increasing wealth of a women's household also increased the women getting ANC visits, as adjusted OR shows women in the richest quintile were 13 times more likely to visit ANC than women in the poorest quintile (aOR=13.335; 95% CI: 1.136-156.692). In unadjusted OR it shows significant association of ANC use with listening to radio and watching television. In adjusted OR, it was observing that women exposed to media, listening radio was significantly associated with utilization of ANC (p-value < 0.05). Mother who listens to radio was 2.4 times more likely to utilize ANC (OR=2.4; 95% CI: 1.120-5.364) (Table 2).

Factors associated with complete utilization of antenatal care

In bivariate analysis, a number of variables such as educational status, region, wealth index quintile and watching television showed statistically significant (*p*-value < 0.05) with complete (four or more visits) utilization of ANC (Table 1).

Multivariate logistic analysis adjusted OR shows secondary education status of women and middle wealth index has significant association with complete utilization of ANC. Mother with a higher status of education was more likely to have four or more ANC visits. Pattern shows women higher education are 2.7 times more like to receive complete ANC than women with no education at all. Wealth Index quintile shows negative association with the complete utilization of ANC. Mother with middle wealth index household were more likely to use ANC than mother with poorest and richest wealth index (OR=3.256; 95% CI: 1.396-7.598) (Table 3).

Table 3 Multivariate logistic analysis of influencing factor associated with complete utilization of ANC

Study variables	Unadjusted OR 95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Education				
None	1		1	
Primary	2.392 (1.152-4.968)	0.019	1.63 (0.690-3.890)	0.264
Secondary	3.687 (1.830-7.434)	0.000	2.652 (1.124-6.259)	0.026
Higher	3.460 (1.141-8.490)	0.007	2.71 (0.924-7.989)	0.069
Wealth Index				
Poorest	1		1	
Middle	4.459 (2.327-8.547)	0.000	3.256 (1.396-7.598)	0.006
Richest	2.426 (1.119-5.259)	0.025	1.577 (0.497-5.002)	0.439

DISCUSSION

ANC utilization was similar to the previous report presented by NDHS 2011 and DoHS 2011 of Nepal. 16 (6.3%) women visited antenatal care only once, 26 (10.1%) women visited antenatal care twice, 41 (15.6 %) women visited three times and 174 (67.6 %) women visited recommended four or more ANC.

In accordance with the global database provided by the UNICEF, 53 percent of women attended the recommended ANC visit i.e. at least 4 visits during normal pregnancy during the period of 2005 to 2010. In low-income countries scenario is different, only 36 percent of women visited four or more antenatal care. From 1990 to 2009, women visiting ANC at least once was increased from 64 percent to 81 percent. A study done by Lindsay Cristina in Brazil in 2012 found 92 percent of women utilized ANC at least once during pregnancy. In Laos PDR, Manithip, et al. [14] concluded about 51 percent of overall ANC utilization. Multiple studies show the trend of utilizing in ANC is going up. Establishment of new health center, providing flexible facilities, government being more conscious about reducing maternal mortality rate, active role of 0unteer (FCHV) in each ward, implementation of safe motherhood program and enthusiastic involvement of NGO/INGO may have positive influence in the increasing utilization of antenatal care services overall.

One of the most influential factors, which promote the utilization of health care services during pregnancy, is socio-demographic character of women. Respondent's age, education, husband's education and other are the characteristics observed and analyzed by researcher to evaluate socio-economic status. ANC utilization has statistically significant association with maternal age. In case of complete and incomplete utilization maternal age is not significantly associated. Fekede's study [15] shown that maternal age 15-24 were more likely to attend than other age groups. This study shown strong association between women's education status and utilization of antenatal care. In similarity with this study, many previous studies have shown the utilization of antenatal care service is positively associated with mother's status of education. In Nepal it was shown that about 90 percent of women with secondary and higher level of education attended ANC clinic, compared with 43 percent of women with lower or no education at all. Region (ecological zones) shows a strong association with utilization of ANC [11]. However, there is no statistically significant association between region and complete utilization of antenatal care. The antenatal care utilization varies with region. Women from Terai region are more likely to use antenatal care. Study done in Bangladesh by Amin [7], shows difficult in accessibility and under-utilization of modern health services are one of the main reasons behind poor health quality in developing countries. In pregnancy, husband's role is very crucial and influential. In Nepal, most of the economic condition of a household depends upon husband's income. Husband education is the crucial factor, which affects the utilization of overall health services by wife. Many studies have shown the effect of husband's education on wife's health and decision about her health. Another study done in Nepal by Mullany [16], found that the education status of husband's showed effect on the receipt of four or more numbers of antenatal care visit. A randomized controlled trial on ANC in Nepal found that education women and their husband's together resulted in more utilization of antenatal care [16]. In this study, however there is no significant association found between husband's education and women's utilization of antenatal care services. The result of this study is similar with the study done by Pa Pa Win, et al. [17], which shows no association

between parity and utilization of ANC. In contrast, there were many studies, which shows positive association between parity and ANC utilization. The study of Navaneetham, et al. [18], his study outline higher parity with less utilization of ANC services. National Demography and Health Survey stated that young and low parity were more likely to use ANC service. Some women fight it difficult to attend antenatal care due to the responsibilities of other children [8]. Multiple studies confirmed that the people with a low economic status have poor understanding and utilization of preventive, promotive and curative aspects of health care services [19]. Most of women from higher index households had better odds of attending four or more antenatal care visits. The study from 2006 Nepal DHS also found that women from higher wealth index used antenatal care more frequently than those from lower wealth index households [20]. In another study done in Pakistan by Nisar 2003 [21], echoes that wealth index of households had significant association with utilization of antenatal care. Women from rich wealth index quintile is twice more likely to use antenatal care services.

Watching television has statistical significance in complete utilization of antenatal care. This finding is similar with the finding of Mondal [22] done in Rajasthan India, in his study it was found that women more exposed to media was more likely to utilize antenatal care than not exposed women. Women from high wealth index household have more access to health information than women from low wealth index households. This may be another reason for high wealth index women utilizing complete antenatal care services.

CONCLUSIONS

The study shows more number of women used ANC services. Overall ANC utilization was 79.8%. Out of 257 who received ANC care, only 54% women received complete ANC (four or more visits) Parity, husband's education and residence had no association with the utilization of antenatal care visits in this study. Women's age, education, wanted last child and wealth index had prominent effect on utilization of ANC service. It shows a strong relation with middle wealth index, wanted last child and listening to radio in multivariate analysis (p-value < 0.05). Regarding the test of the relationship between complete utilization of ANC and variables of interest, there are also some relationships determined. A statistically significant was observed with education status of women, wealth index and watching television (p-value < 0.05).

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