Utilization of Antenatal Care Services in Rural Area of Nepal

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Abstract

Background: Utilization of ANC services was low in Nepal despite the significant efforts to maximize its services, i.e. four ANC visits with Skill Birth Attendant, 2 TT vaccines and at least 180 days for Iron folic tablets for pregnant women. Moreover, the prevalence of received prenatal services among rural mothers was lower than the urban mothers. Addressing maternal health requires the understanding of ANC services received by mothers during the designing and delivering of ANC Services to the rural mothers.

Objectives: the present study was conducted to assess the factors that determine the utilization of antenatal care services in terms of ANC visits with health personnel, receiving days of iron tablets & number of took TT vaccine in rural area of Nepal.

Methods: Both bivariate and multivariate approaches were used to determine the associated factors for receiving ANC services. Independent t test was used to compare the mean difference of ANC visits and number of iron receiving days based on mother's characteristics. Significantly associated variables in independent t test were applied for linear regression model. To determine the associated factors of 2 TT vaccines, univariate and multivariate binary logistic model was applied. Statistically significant variables in univariate binary logistic model were applied for multivariate model. P-values less than 0.05 were considered as significant**.**

Results: Ethnicity and types of family were significantly associated with 4 ANC visits in multivariate linear model. Mothers from Brahmin/Chhetri ethnicity and Joint family had higher ANC visits than Dalit/Janajati and Nuclear family mothers (P < 0.001, P = 0.004 respectively). Only ethnicity was found significant predictor for receiving 180 days iron tablets, as Dalit/Janajati mothers had lower iron receiving days (P < 0.001). The multivariate analysis showed that education and parity were the strong influencing factors for completing 2 TT vaccines during pregnancy. Literate mothers were more likely to complete 2 TT vaccine (OR = 2.338, P = 0.028). Similarly, the likelihood for completing 2 TT vaccines among primiparous mothers were 2.7 times higher than multiparous mothers (P = 0.006).

Conclusion: Ethnicity is seen influencing factor of ANC visits and iron receiving days; also the type of family appeared as the significant predictor of ANC visits. Education of mothers and

parity are found as the factors associated with TT vaccine of pregnant women in rural area. Hence, efforts should be directed towards Dalit/Janajati mothers to receive ANC services. It is also essential to uplift the awareness of the family/mothers about the availability of prenatal services and family planning program.

Key words: ANC services, Iron tablets, TT vaccine, Linear Regression, Binary Logistic

Introduction

World Health Organization (WHO) estimated that more than 500,000 mother's die each year because of pregnancy and related complications. It was found that about 88 percent to 98 percent of all maternal deaths could be avoided by proper handling during pregnancy and labor.[1] Of the estimated 927,000 pregnancies that take place in Nepal every year, 40 percent of the pregnancies are considered to be highly risky for both the mother and the child.[2] World Health Organization now recommends a 4-visit ANC schedule for low risk pregnancies.[3] Other interventions shown to be beneficial to mother and child include routine iron and folate supplementation in areas with a high prevalence of anemia, serologic screening for and treatment of syphilis, routine measurement of fundal height, malaria prevention, and tetanus immunization.[4]

Government of Nepal implemented safe motherhood program since 1991 with the aim for reducing maternal and neonatal mortalities by addressing factors related to various morbidities, death and disability caused by complications of pregnancy and childbirth.[5] The Iron Supplementation Program for pregnant women to prevent from Anemia was introduced as part of Ministry of Health and Population's (MOHP) nutrition program, covering all 75 districts of Nepal. The program involved distributing iron-folate supplements to pregnant women through health facilities and outreach clinic. Female Community Health Volunteers (FCHVs) have also been mobilized to supply iron tablets to pregnant women under the Iron Supplementation Program[5]. Likewise, Maternal and Neonatal Tetanus Elimination Program was also introduced under Safe Motherhood Program in Nepal. Tetanus toxoid vaccination of pregnant women and clean delivery practice was the key strategy to achieve this success.[6]

However, the maternal mortality ratio (MMR), 281 per 100,000 live births[7], is still high among the South Asian Countries. Forty-two percent of pregnant women suffer from nutritional anemia[7]. Twenty six percent mothers received no ANC services, 40 percent did not take iron tablets during pregnancy, and 37 percent did not complete 2 TT vaccines in their last pregnancy in Nepal. Moreover, the prevalence of received prenatal services among rural mothers (4 ANC visits: Rural-26%, Urban-51.9%; Iron tablets received: Rural-56.9%, Urban-74.9%; 2+ TT vaccine received: Rural-61.8%, Urban-72.4%) were lower than the urban[7]. Addressing maternal health requires the understanding of ANC services received by mothers during the designing and delivering of ANC Services to the rural mothers.

In this article, major three component of ANC services i.e. ANC visits with health personnel, receiving days of iron tablets & number of took TT vaccine are investigated. These 3 services of prenatal care were easily available in most of the rural area. In spite of the availability of these

services, significant rural mothers were still not utilizing these services. Specially, focus is given in the article to the socio-demographic factors of mothers.

Methods

The cross-sectional descriptive quantitative study on 'Utilization Antenatal Care Service' was conducted in the purposively selected area of the Shanischare Primary Health Care Center (PHCC), the largest government health institution at community level, of Jhapa District. The service area of PHCC was four VDCs, such as Arjundhara, Khudunabari, Budhabare & Shanischare including 3 sub-health posts (SHP) within these VDCs. SHP is the smallest governmental health institution at community level. VDC is the second smallest administrative unit of the state. Very few studies on this subject are carried out in rural settings and none have been undertaken in this area of the country.

This study was approved by the Central Department of Population Studies, Tribhuvan University, Nepal. Working approval was obtained from Shanischare PHCC and concerned VDCs. Verbal consent was taken from each respondent. Before obtaining the consent, the respondents were informed at least about the purpose of the study, procedure of maintaining confidentiality, the collective use of data collected, the academic use of the findings and the right not to participate in the study.

The household survey was carried out from 3rd January to 14th February 2010 using semi-structured interview schedule. The universe of the study was 835 mothers having baby aged up to 11 months recorded in child immunization records of PHCC and SHPs. The sample was estimated 252 mothers. The mothers were selected using systematic sampling from the list of immunization records. The quality assurance of data was through daily assessment via questionnaires filled-in by the researcher himself; in cases of error or incompleteness of data, corrective measures (revisit) were implemented immediately.

Statistical Analysis

Data were entered in Epi-data 3.0 software and were exported to SPSS 16 version for the analysis. Frequency was measured to demonstrate the characteristics of mothers (independent variables) and ANC services received by mothers. Similarly, frequency and mean were presented in all three dependent variables (prenatal care). Bivariate descriptive statistic such as comparison of mean of continuous dependent variables (number of ANC visits and number of iron receiving days) was presented in accordance with the background characteristic of mothers. Cross- table analysis was done to present the status of TT vaccines received by the mothers during pregnancy with their background characteristics.

The independent t-test was performed to test if there was significant mean difference in number of ANC visits and number of iron receiving days taking into account the mother's characteristics. The statistically significant variables in independent t-test were applied in multivariate linear regression analysis to determine the factors influencing the ANC visits and iron receiving days.

The categorical variables were used as predictors; therefore, dummy variable was created and applied for linear regression analysis. Binary logistic regression model was used to find out the factors influencing the completion of 2 or more TT vaccines by pregnant rural mothers. Only statistically significant variables in univariate binary logistic model were used in multivariate binary logistic model. P-values less than 0.05 were considered as significant.

Results

Table 1 gives the overall information of mother's characteristics. The mean (SD) maternal age was 24.58 (5.4) years (range: 15 to 40 years). However, mean (SD) age at birth was slightly lower than mean age of mothers, i.e. 24.12 (5.38) years. Likewise, mean (SD) age at marriage was 18.9 (3.4) years (range: 12 to 30 years). Out of the total mothers interviewed, 86 percent were literate and median year of schooling was 8 years. Seventy nine percent mothers were involved only in the housework chores. The average distance from home to nearest health facility among the family/mothers was 37.4 (SD 21.9) minutes. Mothers interviewed from Brahmin/Chhetri ethnicity, Joint family and multiparous were more than half of the samples (53.2%, 57.1% and 56.0% respectively).

Around 68 percent mothers received ANC service from SBA (Doctor/Nurse/ANM) while 31 percent mothers received from trained professionals (HA/AHW/MCHW). Less than one percent visited pharmacist to receive ANC services. Around 72 percent mothers received ANC services from community level health centers (PHCC/SHP/Outreach Clinic). One out of five (21.7%) mothers visited private centers for ANC services.

The mean (SD) ANC visit was 4.9 (1.9) times. Eight out of ten (79.4%) mothers were found to have visited the ANC more than four times (recommended number of visit). Only 3 percent mothers had not visited any service centre for pregnancy check up. Seventy four percent mothers received 2 or more tetanus (TT) injections during their pregnancy. Only 6 percent mothers had not received TT injection. On an average (SD), the mothers received iron tablets for 144 days (66) during their last pregnancy. Fifty six percent mothers received iron tablets for more than 180 days (recommended days) while 9 percent did not receive iron tablets during their last pregnancy (Table 2).

ANC visits for Pregnancy Checkups

The no. of ANC visits were significantly different between ethnicities (P < 0.001); with Dalit and Janajati mothers (others) was significantly lower than the mean visits of ANC. Literacy status of mothers influence the ANC visit. Literate mothers had higher no. of ANC visits than illiterate mothers. The mean ANC visit of literate mothers and the illiterate mothers were 5.08 and 3.50 respectively. Statistical analysis supported this mean difference among literate and illiterate mothers (P < 0.001). Significant mean difference in ANC visit was measured between the mothers representing Nuclear and Joint family (P < 0.001). Mothers from joint family had higher ANC visit than the mothers from Nuclear family. Mothers having first pregnancy had higher ANC visit than second or higher no. of pregnancy. The mean difference of number of ANC visits

between Primi Para and Multi Para mothers was found to be 0.883 (P < 0.001) which was statistically significant. The mean difference of ANC visits by mothers according to their age at birth of baby, occupation and accessibility to health services was found statistically insignificant (Table 3).

Adjusted R square showed 0.195 with increasing level from starting model of stepwise linear regression. The predictors of first model was ethnicity (khas-1 and Others-0), second was model first & types of family (Joint-1 and Nuclear-0), third was model second & literacy status (Literate-1 and Illiterate-0), and fourth was model third & parity (primi para-1 and multi para-0). Among these variables, ethnicity and types of family were found statistically significant at 0.05 significance levels in multivariate model. Likewise, literacy status measured significant at 0.10 significant levels. However, parity was not found significant. The result showed that Brahmin/Chhetri mothers were more likely to have higher (t = 4.476, P < 0.001) ANC visits, compared to mothers from Dalit/Janajati. Similarly, mothers representing Joint family received nearly 3 times higher (t = 2.890, P = 0.004), and literate mothers around 2 times higher (t = 1.941, P = 0.053) number of ANC visits than the mothers representing nuclear family and the illiterate mothers respectively (Table 3).

Receiving Number of Days for Iron Tablets

The number of iron receiving days by mothers was found to be statistically significant with the ethnicity (P < 0.001), types of family (P < 0.001), literacy status (P < 0.001) and parity (P = 0.004) of mothers. Brahmin/Chhetri mothers, on average, received iron tablets for 58.7 days higher than Dalit/Janajati mothers. Mothers from the Joint family and literates had received iron tablets for significantly higher number of days than the mothers from the Nuclear family (Mean difference = 25.6) and illiterates (mean difference = 45.3) respectively. The mean difference between the number of iron receiving days between the primi para and multi para mothers was 23.7 days, with primi para mothers were found to have received iron tablets for higher number of days (Table 4).

The number of iron receiving days by mothers was found to be statistically insignificant with the age of mother at birth, occupation of mothers and health accessibility. The mean difference of number of iron receiving days between mothers of age (at birth of baby) less than 20 years and greater and equal to 20 years was found negligible (Table 4).

No of Times Received TT Vaccine

Only the literacy status and parity were found statistically significant in both univariate and multivariate models. Literate mothers were significant higher odds with compare to illiterate mothers in both models. Literate mothers were 2 times more likely to complete tetanus vaccination during pregnancy than the illiterate mothers (P = 0.028). Similarly, primiparous mothers were higher odds as compare to Multiparaous mothers, indicated that primiparous mothers were more likely complete recommended tetanus vaccination in their pregnancy than the multi parous (OR = 2.717, P = 0.003) (Table 5).

Discussion

Antenatal care allows for the management of pregnancy, detection and treatment of complications, and promotion of good health. However, women rarely perceive childbearing as problematic and therefore do not seek care which affects the utilization of maternal services[8], including ANC services. Therefore, this study observed the use of major three ANC services i.e. ANC visits for pregnancy checkup, iron receiving to prevent from anemia and receiving TT vaccine to prevent from maternal and neonatal tetanus in rural area.

The WHO recommends that a woman without complications should have at least 4 ANC visits to provide sufficient ANC[3]. The present study showed that 79 percent mothers completed 4 ANC in their last pregnancy which was higher than the previous studies.[7,9,10] The mothers from Brahmin/Chhetri ethnicity had significantly higher ANC visits than the mothers from Dalit/Janajati. The previous study conducted in two rural VDCs of Kathmandu district had also found similar results.[9] Mothers representing joint family has significantly higher ANC visit than the mothers from nuclear family consistent with the previous studies.[9] This study reveals that ANC visits of literate mothers were significantly higher than the illiterates. Other studies have shown that women with secondary education are more likely to receive at least four antenatal visits than women with less or without education.[9, 11-14] Primiparous mothers were found to have higher ANC visits than multiparous mothers. The previous study also supported to this statistically significant reduction of ANC visits with increasing parity.[8] Access to health services measured by the walking time to nearest health facility from the home, was found statistically insignificant with number of ANC visit which was similar to the study conducted in rural India.[8]

Tetanus toxoid injections are given during pregnancy for the prevention of neonatal tetanus, a major cause of death among infants. For full protection, a pregnant woman should receive at least two doses of TT Vaccine during each pregnancy. Five doses are considered to provide lifetime protection.[7] Nearly 3 out of 4 (74.2%) pregnant women received two or more tetanus injections during their last pregnancy which is higher than the national level indicator.[7] Study found that the education of mothers has a significant effect to complete 2 vaccines of TT during pregnancy consistent with the previous finding.[15-18] Parity and coverage of 2 TT vaccines during pregnancy has clear statistical significant association. The study conducted in Turkey was also of similar finding that the vaccinated women were significant in lower parity.[19] The primiparous mothers were significantly in higher proportion than the multiparous mothers.

MOHP has the policy to address the iron deficiency. It addresses iron supplementation for pregnant women only. The supplements are distributed as part of antenatal care at health facilities, outreach clinics and FCHV. It has been recommended that 60 mg iron a day starting from the beginning of the 2nd trimester through 45 days after delivery (Total 180 days in antenatal period and 45 day in postpartum period).[20] Only ethnicity was found the predictor for receiving iron tablets for recommended days during pregnancy. Brahmin/Chhetri mothers were more likely to consume iron tablets till recommended days during pregnancy than the mothers from Dalit/Janajati. The reason may be that Brahmin/Chhetri was the group with extensive cultural exposure in education and access to basic health services. In addition, the OECD has reported that Nepal's society is highly unequal, with huge differences in opportunities and access to basic

services; the difficulties are particularly severe for women, and indigenous (Janajati) and lower caste groups (Dalits). [21] Another study has stated that the existing structure of the state's public affairs is based on feudal practices which favor the "haves" rather than the "have-nots". Without fundamental reforms in the way the health care system provides health care to the masses, health care will continue to be inaccessible to disadvantaged groups such as the poor, women, children, rural and remote groups, and Dalits, Madheshi, and Janajati ethnic groups.[22]

Conclusion

The utilization of ANC services was encouraging in study area which showed the higher utilization rates of all three ANC services than the National statistics. Ethnicity appeared as the major influencing factor for completing 4 ANC visits and the recommended iron receiving days. Likewise, type of family appeared as predicting the frequency of ANC visits. Education and parity were found as the influencing factors for completing the 2 TT vaccines during pregnancy. Hence, efforts should be directed towards Dalit/Janajati mothers to receive ANC services. It is also essential to uplift the awareness of the family/mothers about the availability of prenatal services and family planning program.

Acknowledgement

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Table 1: Descriptive Statistics of Independent Variables (Mother's Characteristics)

Variables	Categories	N (%)	Variables	Categories	N (%)
	Total	252 (100.0)		Total	252
Ethnicity	Brahmin/Chhetri (1)	134 (53.2)	Age at Birth*	<20 years (1)	67 (26.6)
	Dalit/Janajati (2)	118 (46.8)		≥20 years (2)	185 (73.4)
Types of Family	Nuclear (1)	108 (42.9)	Parity	Primipara (1)	111
	Joint (2)	144 (57.1)		Multipara (2)	141
Literacy Status	Literate (1)**	216 (85.7)	Occupation	Housework	199
	Illiterate (2)	36 (14.3)		Out Home	53 (21.0)
Access to Health	≤30 minutes (1)	143 (56.7)			
	>30 minutes (2)	109 (43.3)			

*Age of Mothers at Birth of Baby, **Primary, Secondary, Higher Secondary

Table 2: Descriptive Statistics of Received ANC Services (Dependent Variables)

Variables	Categories		N	Percent
	Total		25	100.0
No. of ANC Visits for Pregnancy Check Up (Scale- Mean Comparison & Linear Regression)	No ANC visits-0		8	3.2
	1-3 times		44	17.5
	4+		20	79.4
	Mean ANC visit		4.9 ± 1.9	
No. of Times Took TT Vaccine (Dummy- Cross table and Logistic Regression)	No Received TT-0	0 & 1 = 0	16	6.3
	1		49	19.4
	2+	2+ = 1	18	74.2
	Mean No. of TT Received		1.8 ± 0.7	
No. of Days Took Iron Tablets (Scale-Mean Comparison & Linear Regression)	No Received		23	9.1
	Up to 90 Days		52	20.6
	91-179 Days		36	14.3
	180+ (Recommended)		14	56.0
	Mean No. of Days Took Iron		133.9 ± 66.0	

Table 3: Association between Socio-demographic Variables and Number of ANC Visits

	Independent t-test				Linear Regression		
Variables	Mean ANC Visits (SD)	Mean Difference (95% CI)	*Std. Error	P value	β	t	P value
Ethnicity							
Brahmin/Chhetri	5.51 (1.621)	1.389 (0.938-1.840)	0.229	0.000	0.274	4.476	0.000
Dalit/Janajati	4.12(2.009)				Reference		
Types of Family							
Joint	5.35 (1.783)	1.144 (0.678-1.609)	0.236	0.000	0.181	2.890	0.004
Nuclear	4.20(1.952)				Reference		
Educational Status							
Literate	5.08(1.826)	1.583 (0.924-2.243)	0.335	0.000	0.122	1.941	0.053
Illiterate	3.50 (2.063)				Reference		
Age of Mothers at Birth of Baby							
<20	5.19(1.861)	0.459 (-0.083 to 1.001)	0.275	0.097		NA	
≥20	4.74(1.956)						
Parity							
Primi Para	5.35 (1.633)	0.883 (0.424-1.343)	0.240	0.000	0.098	1.570	0.118
Multi Para	4.47(2.072)				Reference		

Occupation of Mothers

Housework	4.86 (2.010)	0.010 (-0.523 to 0.543)	0.269 0.970	NA
Out Home	4.85 (1.657)			

Health Accessibility (in minutes)

≤30	4.93 (1.879)	0.169 (-0.317 to 0.654)	0.247 0.495	NA
>30	4.76 (2.018)			

*standard error of difference

Table 4: Association between socio-demographic variables and No. of Days Receiving Iron Tablets

		Independent t-test			Linear Regression		
	Mean (SD)	Mean Difference (95% CI)	Std. Error *	P value	β	t	P value
Ethnicity							
Brahmin/Chhetri	161.4 (45.2)	58.7 (44.0-73.4)	7.477	0.000	0.40	6.700	0.000
Dalit/Janajati	102.6 (71.9)				Reference		
Types of Family							
Joint	144.9(58.6)	25.7 (9.4-41.9)	8.259	0.000	0.07	1.125	0.225
Nuclear	119.2 (72.5)				Reference		
Educational Status							
Literate	140.3 (62.3)	45.3 (22.6-68.1)	11.55	0.000	0.05	0.800	0.403
Illiterate	95.0 (74.7)				Reference		
Age of Mother at Birth							
< 20	133.7 (69.9)	0.2 (19.1-19.6)	9.773	0.981	NA		
≥ 20	133.9 (64.7)						
Parity							
Primi Para	147.1 (57.6)	23.7 (7.4-40.0)	8.256	0.004	0.09	1.566	0.119
Multi Para	123.4 (70.4)				Reference		
Occupation of Mothers							
Housework	131.8 (67.9)	9.8 (10.3-29.9)	10.20	0.340	NA		
Out Home	141.6 (58.2)						
Health Accessibility (in minutes)							
≤30	132.94 (65.7)	2.1 (14.5-18.7)	8.407	0.802	NA		
> 30	135.06						

*standard error difference; NA-Not Applicable

Table 5: Association between socio-demographic variables and TT Vaccination Status

Factors	Status of TT Vaccine N (%)		Univariate Binary Logistic- OR (95% CI)	Multivariate Binary Logistic- OR (95% CI)
	Vaccinated 2 & over	No or Incomplete		
Ethnicity				
Brahmin/Chhetri	106 (79.1)	28 (20.9)	1.729 (0.978-3.057)	NA
Dalit/Janajati	81 (68.6)	37 (31.4)	1	
Types of Family				
Nuclear	113 (78.5)	31 (21.5)	0.597 (0.338-1.054)	NA
Joint	74 (68.5)	34 (31.5)	1	
Educational Status				
Literate	168 (77.8)	48 (22.2)	3.132 (1.511-6.490)**	2.338(1.098-4.9770)***
Illiterate	19 (52.8)	17 (47.2)	1	1
Age of Mother at Birth				
< 20	54 (80.6)	13 (19.4)	1.624 (0.819-3.222)	NA
≥ 20	133 (71.9)	52 (28.1)	1	
Parity				
Primi	95 (85.6)	16 (14.4)	3.162 (1.679-5.955)*	2.717(1.417-5.212)*
Multi	92 (65.2)	49 (34.8)	1	1
Occupation of Mothers				
Housework	145 (72.9)	54 (27.1)	0.703 (0.338-1.465)	NA
Out Home	42 (79.2)	11 (20.8)	1	
Health Accessibility				
≤ 30	109 (76.2)	34 (23.8)	1.274 (0.723-2.246)	NA
> 30	78 (71.6)	31 (28.4)	1	

*P<0.001, **P<0.01, ***P<0.05