

ON SOME SOCIOECONOMIC AND DEMOGRAPHIC DETERMINANTS OF ANTENATAL CARE UTILIZATION DAGON MYOTHIT (EAST) TOWNSHIP, YANGON REGION*

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Abstract

This study aimed at determining the factors influencing the utilization of Antenatal Care (ANC) among ever-married women aged 15-49 years who were asked to give information on the utilization of ANC for their latest live birth preceding the survey. A community-based cross sectional analytical study was conducted from October to November, 2016 among 515 mothers residing in urban and rural areas of Dagon Myothit (East) township. Binary logistic regression model was used to investigate the socioeconomic and demographic characteristics on the basis of having and not having ANC. The results indicate that higher educated woman exerts a stronger positive influence on the use of ANC service. With respect to husbands' education, women with higher educated husbands were found to be significantly more likely to use antenatal care. It has been found that woman's working status plays a critical role in using ANC. It has been observed that husband's occupation group was related to the use of ANC services. Women from the first quintile and second quintile of the wealth index have negative relation to ANC utilization. Women aged 15-19 have negative effect on the ANC usage. It has been found that women who resided in urban area have more chance to use ANC service. With respect to household head, women with husbands head are more likely to use ANC service.

Keywords: Antenatal Care, Binary Logistic Regression

Introduction

Every year, approximately eight million women suffer pregnancy-related complications and over half of million die all over the world. In developing countries women death from pregnancy-related complications (one in 16 women) are much higher compared to one in 2800 in developed countries. Each death or long-term complication represents an individual tragedy for the woman, her partner, her children and her family. More tragically, most deaths are avoidable. The main causes are known, and more than 80% of maternal death could be prevented or avoided through actions that are proven to be effective and affordable, even in the poor countries of the world (WHO, 2004). Throughout the world nations are striving to fulfill their international obligations and achieving the Sustainable Development Goals (SDGs). Out of the 17SDGs, target 3.1 concerned with Maternal Mortality Ratio (MMR) is to reduce the global MMR to less than 70 per 100,000 births in 2030. There are indicators to monitor achievements and progress in achieving SDG: MMR and delivery by skilled health persons and contraceptive prevalence rate, adolescent birth rate, ANC coverage and unmet need for family planning services. Among these indicators, ANC coverage is one of the important indicators to reduce the MMR. Antenatal care is the care of pregnant women during their pregnancy period. Aim of ANC is to assist women to remain healthy, finding and correcting adverse conditions when present, and thus aid the health of the unborn. One of the strategies for reducing maternal mortality is the provision of ANC. To prevent unwanted outcomes of pregnancy, ANC is the most important method to detect the pregnancy problems in the early period. Proper ANC reduces both direct and indirect cost of

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medical care for patients and governmental health expenditure due to complications. ANC constitutes screening for health and socioeconomic conditions likely to increase the possibility of specific adverse pregnancy outcomes. Therefore, this paper attempts to study some socioeconomic and demographic effects on ANC utilization.

Data and Methods

A sample survey was conducted in Dagon Myothit (East) Township, Yangon Region in November, 2016 which had both urban and rural setting as a case study. The Stratified Random Sampling was employed to interview the ever-married women aged 15-49 years who were asked information on the last births in this township. Binary Logistic Regression analysis was applied to determine the socioeconomic and demographic effects of ANC usage. This study did not address the frequency of ANC.

Results and Discussion

Background History of Dagon Myothit (East) Township

Dagon Myothit (East) township is located in the easternmost part of Yangon, Myanmar. It shares borders with Hlegu township in the north, South Dagon township in the east, North Dagon township in the south and North Oakkalarpa township in the west. The total area is 91.03 (kilo meter square). This township composes of 29 wards, 1 village tract and 2 villages. The number of households was 33,913 and the total population is 165, 628 in this township. The urban population and rural population are 156, 244 and 9, 384. The sex ratio is 95.4 percent which indicates that there are 95 males for 100 females in this township.¹ The township has 19 primary schools, 4 middle schools and 2 high schools.

Health Facilities

The health facilities for Dagon Myothit (East) township are 1 township hospital, 3 Urban Health Centers (UHCs), 1 Rural Health Center (RHC) and 4 Sub-Rural Health Centers (Sub-RHCs) included in this township. Three UHCs are UHC (1), UHC (7), and UHC(133). One RHC is Sit pin RHC. Four Sub-RHCs are (i) Ywar Thar Gyi (ii) Ma Lit (iii) Shan Te Gyi and (iv) 155 Sub-RHC.

Health Personnel at Urban Health Centers

The number of health personnel at UHCs is presented in Table (1). According to this Table, UHC (1) lack of doctor, staff nurse, trained nurse and Public Health Supervisor (PHS) II. This UHC is deficient in number of Mid Wives (MW). UHC (7) is just deficient in PHS II. UHC (133) lacks of doctor. This UHC is deficient in PHS II.

Table 1 Number of Health Personnel at Urban Health Centers

Position	UHC (1)	UHC (7)	UHC (133)
Doctor	-	1	-
Staff Nurse	-	1	1
Trained Nurse	-	1	1
Lady Health Visitor(LHV)	2	1	1
MW	2	5	5
PHS II	-	4	2

Data Source: Township Hospital at Dagon Myothit (East)

¹ “The 2014 Myanmar Population and Housing Census”

Health Personnel at Rural Health Centers and at Sub-Rural Health Centers

The number of health personnel at RHC and at Sub-RHCs is presented in Table (2). RHC (Sit pin), is lack of LHV and PHS II. Sub-RHC (Shan Te Gyi) is lack of PHS II.

Table 2 Number of Health Personnel at Rural Health Center and at Sub-Rural Health Centers

Position	RHC (Sit pin)	Sub-RHC (Ywar Thar Gyi)	Sub-RHC (Ma Lit)	Sub-RHC (Shan Te Gyi)	Sub-RHC (155)
HA	1	-	-	-	-
LHV	-	-	-	-	-
MW	2	1	1	1	1
PHS II	-	1	1	-	1

Data Source: Township Hospital at Dagon Myothit (East)

Survey Design

To obtain the required information on ANC utilization for latest live births of ever-married women aged 15-49 years, socio-demographic and health survey was conducted in Dagon Myothit (East) township of Yangon Region. The study population is approximately 4,238 women of the reproductive age (15-49), having delivered within two years prior to data collection. The data collection method used in this survey was personal interview method.

Sampling Design

The analytical cross section study was used to collect information that aimed at addressing the objective of the study. The sampling design that has been employed for data collection was a stratified random sampling. In line with this sampling design, four health care centers in this township were taken to be the stratum. These health centers were stratified into stratum I (UHC 1), stratum II (UHC 7), stratum III (UHC 133), and stratum IV (RHC Sit pin). Then, the respondents (ever married women who have delivered within two years prior to data collection) were selected with simple random sampling (without replacement) method from each stratum. The required data were collected from selected women, using the questionnaires and through face-to face interview.

Determining the Sample Size

In this study, the proportion of women who received ANC checkup at least once during pregnancies is assumed to be 0.5. The appropriate stratified random sample is chosen with a bound on the error of estimation B of 0.05(assumed) by using the following formula:

$$n \geq \frac{\sum (N_h^2 \hat{p}_h \hat{q}_h / w_h)}{N^2 D + \sum_{h=1}^L N_h \hat{p}_h \hat{q}_h}$$

Where N_h = Number of units in stratum h (each health care center)

\hat{p}_h = proportion of women who have received ANC checkup at least once during their pregnancy for stratum h (maximum possible proportion =0.5)

$\hat{q}_h = 1 - \hat{p}_h$ = proportion of women who have not received ANC checkup at least once during their pregnancy for stratum h (each health care center)

B = Bound on the error of estimation= 0.05

$$D = \frac{B^2}{4} = \frac{(0.05)^2}{4} = 0.000625$$

$w_h = \frac{N_h \hat{p}_h \hat{q}_h}{\sum N_h \hat{p}_h \hat{q}_h}$ = the fraction of observations allocated to stratum h (each health care center)

The sample size is

$$n \geq \frac{4490788.20}{(4238)^2 \times 0.000625 + 1059.5}$$

$$\geq 365.5 \approx 366$$

The required sample size is at least 366 women. In many social research surveys, the response rates are typically well below 100%. Therefore, the sample size 515 (366/.71) women (71% response rate assumed) is determined to collect the data in this study. Since the cost of sampling within each health care center (stratum) does not vary from stratum to stratum, the sample size of each stratum is determined by using the following Neyman allocation.

$$n_h = n \times w_h$$

where, n_h = sample size for stratum h.

The corresponding allocation for each stratum (healthcare center) is presented in Table (3). The sample size for each stratum is 126,198, 78, and 113 respectively.

Table 3 Sample Size for Each Stratum

Strata	N_h	\hat{p}_h	\hat{q}_h	$N_h \hat{p}_h \hat{q}_h$	$w_h = \frac{N_h \hat{p}_h \hat{q}_h}{\sum N_h \hat{p}_h \hat{q}_h}$	$N_h^2 \hat{p}_h \hat{q}_h / w_h$	Sample Size of Each Stratum $n_h = n w_h$
I	1034	0.5	0.5	258.5	0.24	1, 113,704.17	$n_1 = 515 \times 0.24 = 126$
II	1633	0.5	0.5	408.25	0.39	1,709,416.03	$n_2 = 515 \times 0.39 = 198$
III	642	0.5	0.5	160.5	0.15	686,940	$n_3 = 515 \times 0.15 = 78$
IV	929	0.5	0.5	232.25	0.22	980.728	$n_4 = 515 \times 0.22 = 113$
	4238			1059.5		4,490,788.20	$n = 515$

Factors Affecting on the Antenatal Care Usage

Based on data of ANC Usage in Dagon Myothit (East) township in Yangon region, the significant factors of ANC usage are studied by using Binary Logistic Regression model.

Dependent Variable

Dichotomous dependent variable is created for ANC usage, namely

Y=1, if woman has received ANC checkup at least once during their pregnancy

Y=0, if woman has not received ANC checkup at least once during their pregnancy

Independent Variables

These variables are categorized as follows:

X_{i1} = Woman's education level

= 1, if woman's education level is primary

= 2, if woman's education level is secondary

= 3, if woman's education level is higher

= 4, if woman's education level is no education (reference category)

X_{i2} = Husband's education level

= 1, if husband's education level is primary

= 2, if husband's education level is secondary

= 3, if husband's education level is higher

= 4, if husband's education level is no education (reference category)

X_{i3} = Woman's Exposure to media

= 1, more frequent (if ith respondent most frequently listened to the radio or watched television or read newspapers or magazines at least once a week)

= 2, less frequent (reference category)

X_{i4} = Woman's working status

= 1, if woman is working (during last 12 months)

= 2, if woman is not working (reference category)

X_{i5} = Husband's occupation group

= 1, if husband's occupation is own business

= 2, if husband's occupation is private employee

= 3, if husband's occupation is company staff

= 4, if husband's occupation is government staff

= 5, if husband's occupation is daily wages

= 6, if husband's occupation is casual worker

= 7, if husband do not work (reference category)

X_{i6} = Wealth index

= 1, if poorest (first wealth quintile)

= 2, if poorer (second wealth quintile)

= 3, if middle ((third wealth quintile)

- = 4, if richer (fourth wealth quintile)
- = 5, if richest (fifth wealth quintile) (reference category)
- X_{i7} = Age group
 - = 1, if age group is 15-19 years
 - = 2, if age group is 20-34 years
 - = 3, if age group is 35-49 years (reference category)
- X_{i8} = Place of residence
 - = 1, if place of residence is Urban
 - = 2, if place of residence is Rural (reference category)
- X_{i9} = Birth order (number of children)
 - = 1, if woman has one child
 - = 2, if woman has 2-4 children
 - = 3, if woman has 5-9 children (reference category)
- X_{i10} = Head of Household
 - = 1, if husband is head of household
 - = 2, other (reference category)
- X_{i11} = Household Size

Wealth index is measured by a composite score of several indicators of household possession. This was based on the questions about whether the household has facilities and items as drinking water (1. lake, 2. stream/ creek 3. unprotected well, 4. protected well 5. rain water, 6. tube well, 7. piped into house/compound and 8. purified water), toilet facility (1. none, 2. bucket (surface latrine), 3. traditional pit latrine, 4. water seal (improved pit latrine), and 5. flush), source of lighting (1. candle, 2. battery, 3. private generator, 4. private solar, and 5. electricity), possession of vehicles (bicycle, side car, motorcycle, car/truck/van, bullock cart, boat, motor boat, 4-wheel tractor), and generator, television, non-mobile telephone, mobile-telephone, computer, internet, sewing machine and refrigerator. The weight for the drinking water is set as 8, the weight of the toilet facility is set as 5, the weight of the source of lighting is set as 5, and the weight for possession of each vehicle, generator, television, non-mobile telephone, mobile-telephone, computer, internet, sewing machine and refrigerator is set as 1 each. Then each type of drinking water, toilet facility and source of lighting is assigned a score according to the order of each type in questionnaire. Scores are recoded as a 1 if the household has a “yes” answer to the question (for example the household has television) and 0 if it does not have a “yes” answer. Wealth index formula is defined as

$$\text{Wealth Index} = \frac{\sum W \times S}{\sum W} \times 100$$

where W = weight of asset for each household

S = Score of asset for each household

Binary Logistic Regression Model for ANC Usage

For details, the frequency and percentage distributions of the groups are presented in Table (4).

Table 4 Distribution of Women by the ANC Usage (Dagon Myothit East Survey)

Class Name	Frequency	Percentage
Women who have received ANC	449	87.2%
Women who have not received ANC	66	12.8%

Data Source: Dagon Myothit (East) Survey (2016)

As shown in Table (4), it can be seen that the data set has 515 women which can be classified into two sub groups such as $n_1 = 449$ (87.2%) cases in the first group (Women who have received ANC service), and $n_2 = 66$ (12.8%) in the second group (Women who have not received ANC service).

Summary results for significant independent variables of ANC usage are shown in Table (5) and Table (6).

Table 5 Model Fitting Information for Binary Logistic Regression Model with Significant Independent Variables of ANC Usage

Model fitting criteria	χ^2 value	df	<i>p</i> -value
Omnibus Tests of Model Coefficient	148.026	21	0.000
Hosmer and Lemeshow (H-L) Tests	2.851	8	.943
-2 Log Likelihood	246.325		
Cox & Snell R- Square	.250		
Nagelkerke R- Square	.467		
Overall Correct Prediction	89.9%		

Data Source: Dagon Myothit (East) Survey (2016)

According to the Omnibus tests of model coefficients, it was found that the binary logistic regression model for ANC usage is significant (Chi-Square = 148.026, df = 21, $p = 0.000$). There is no evidence of lack of fit based on the H-L statistic, so apparently any lack of fit (Chi-Square=2.851, df = 8, $p = 0.943$). The existence of a relationship between the independent variables and the dependent variable is supported according to the -2 log likelihood value (246.325). According to the results of Cox & Snell R^2 and Nagelkerke R^2 , 25 % and 46.7 % of variation in ANC usage can be explained by the variation of the independent variables. Overall, 89.9% of the women are predicted correctly.

Table 6 Summary Results for the Binary Logistic Regression Model of ANC Usage

Variables	B	S.E	Wald	df	P-value	Exp(B)	95% CI	
							Lower	Upper
Constant	-4.349**	1.697	6.564	1	0.010	0.013		
Woman's Education level								
Primary	.781	.928	.709	1	.400	2.183	.354	13.449
Secondary	1.676*	.923	3.294	1	.070	5.343	.875	32.638
Higher	4.295***	1.475	8.473	1	.004	73.297	4.067	1321.029
Husband's Education level								
Primary	-.520	2.054	.064	1	.800	.595	.011	33.302
Secondary	3.057**	1.332	5.270	1	.022	21.257	1.564	289.008
Higher	3.409***	1.350	6.379	1	.012	30.222	2.146	425.674
Woman's working Status								
Working	2.659***	.778	11.674	1	.001	14.275	3.107	65.598
Husband's Occupation Group								
Group (1)	1.406**	.674	4.347	1	.037	4.081	1.088	15.306
Group (2)	1.482**	.657	5.087	1	.024	4.400	1.214	15.945
Group (3)	3.891***	1.191	10.670	1	.001	48.964	4.741	505.635
Group (4)	2.509**	1.234	4.135	1	.042	12.292	1.095	138.002
Group (5)	1.687***	.630	7.171	1	.007	5.404	1.572	18.580
Group (6)	1.884**	.750	6.312	1	.012	6.579	1.513	28.602
Wealth Index								
Poorest (First Quintile)	-1.803***	.586	9.466	1	.002	.165	.052	.520
Poorer (Second Quintile)	-1.453**	.597	5.930	1	.015	.234	.073	.753
Middle (Third Quintile)	-.568	.611	.866	1	.352	.566	.171	1.875
Richer (Fourth Quintile)	-.077	.907	.007	1	.920	.926	.156	5.481
Age Group								
15-19	-1.746*	.900	3.766	1	.052	.174	.030	1.081
20-34	.068	.420	.026	1	.872	1.070	.470	2.438
Place of Residence								
Urban	.826**	.404	4.190	1	.041	2.284	1.036	5.038
Head of Household								
Husband	1.240**	.580	4.567	1	.033	3.455	1.108	10.771

*** denotes significant at 1% level, ** denotes significant at 5% level and * denotes significant at 10%

Data Source: Dagon Myothit (East) Survey (2016)

According to Table (6), the coefficient of woman's secondary education level is statistically significant at 10 % level and it is positive in relation to the ANC usage. The odds ratio suggests that compared to uneducated women (reference category), women with secondary education level are 5 times more likely to use ANC service. The 95 % confidence interval suggests that the magnitude of the effect could be anywhere from a .875 fold increase to a 32.638 fold increase. The coefficient of woman with higher education level is statistically significant at 1% level and its sign is positive. The odds ratio suggests that those women are 73 times more likely to use ANC service compared to uneducated woman (reference category). The 95 % confidence interval suggests that the magnitude of the effect could be anywhere from a 4.067 fold increase to a 1321.029 fold increase.

The coefficient of husband's secondary education level is statistically significant at 5 % level and it has positive relation to ANC usage. The odds ratio means that women whose husbands have secondary education level, those women have larger multiplicative factor of 21 indicating the progressively higher chance of ANC usage than women whose husbands are

uneducated (reference category). The 95 % confidence interval suggests that the magnitude of the effect could be anywhere from a 1.564 fold increase to a 289.008 fold increase. The coefficient of husband's higher education level is statistically significant at 1% level and it is positively related to the ANC usage. The odds ratio suggests that women whose husbands have higher education level are 30 times more likely to use ANC service than women whose husbands are uneducated (reference category). The 95% confidence interval suggests that the magnitude of the effect could be anywhere from a 2.146 fold increase to a 425.674 fold increase.

The coefficient of woman's working status is statistically significant at 1% level and it is positively related to usage of ANC service. It has been found that, working women are 14 times more likely to use ANC service than non working women (reference category). The 95% confidence interval suggests that the magnitude of the effect could be anywhere from a 3.107 fold increase to a 65.598 fold increase.

The coefficients of husband's occupation group (1) (husbands do own business), and group (2) (husbands are private employees), group (4) (husbands are government staff) and group (6) (husband is casual worker) are statistically significant at 5% level and the coefficient of group (3) (husbands are company staff) and group (5) (husbands are daily wages) are statistically significant at 1 % level. It has been found that there is positive influence on the ANC usage. The odds ratio of the women whose husbands do own business appears to be 4 times more likely to use ANC than women whose husbands do not work (reference category). When women whose husbands are private employees, those women are 5 times more likely to use ANC than women whose husband does not work (reference category). It has been found that women whose husbands are government staff, those women are 12 times more likely to use ANC than women whose husbands do not work (reference category). When women whose husbands are casual workers, those women are 7 times more likely to use ANC than women whose husbands do not work (reference category). When women whose husbands are company staff, those women are 50 times more likely to use ANC service than women whose husbands do not work (reference category). The 95 % confidence interval suggests that the magnitude of the effect could be anywhere from a 1.088 fold increase to a 15.306 fold increase in occupation group (1), from a 1.214 fold increase to a 15.945 fold increase in occupation group (2), from a 4.741 fold increase to a 505.635 fold increase in occupation group (3), from a 1.095 fold increase to a 138.002 fold increase in occupation group (4), from a 1.572 fold increase to a 18.580 fold increase in occupation group (5), and from a 1.513 fold increase to a 28.602 fold increase in occupation group (6).

With respect to wealth index, the coefficient of the first quintile of the wealth index is statistically significant at 1 % level and the coefficient of second quintile of the wealth index is significant at 5% level. Their signs are negative. It has been found that, the poorest women (women from the first wealth quintile) are 83% less likely to use ANC and the poorer women (women from the second wealth quintile) are 77% less likely to use ANC than the richest women (women from the fifth wealth quintile) respectively (reference category). The 95% confidence interval suggests that the magnitude of the effect could be anywhere from a .052 fold decrease to a .520 fold decrease for the coefficient of poorest women and the magnitude of the effect could be anywhere from a .073 fold decrease to a .753fold decrease for the coefficient of poorer women.

The coefficient of age group 15-19 is negative effect on ANC usage and it is significant at 10 % level. Women in the age group 15-19 are 83 % less likely to use ANC service than women in the age group 35-49 (reference category). The 95 % confidence interval suggests that the magnitude of the effect could be anywhere from a .030 fold decrease to a 1.018 fold decrease.

The coefficient of place of residence is statistically significant at 5 % level and its sign is positive. The odds ratio suggests that compared to women who live in rural area (reference category), women who reside in urban areas are about 2 times more likely to use ANC. The 95% confidence interval suggests that the magnitude of the effect could be anywhere from a 1.036 fold increase to a 5.038 fold increase.

It has been found that the coefficient of head of household is statistically significant at 5% level and it is positively related to usage of ANC service. It has been found that, women whose husbands head are 4 times more likely to use ANC service than women whose other head (reference category). The 95% confidence interval suggests that the magnitude of the effect could be anywhere from a 1.108 fold increase to a 10.771 fold increase.

Discussion

This study provides some information regarding factors influencing the utilization of ANC among ever-married woman aged 15-49 years who was asked to give information on the ANC utilization for her latest live birth preceding the survey. It is found that higher educated woman exerts a stronger positive influence on the use of ANC service. This implies that women's education plays a critical role in using antenatal care service. With respect to husbands' education, women with higher educated husbands were found to be significantly more likely to use antenatal care. One possible explanation for this result is that husbands can influence the wife's decision to seek modern health care services. It has been found that woman's working status plays a critical role in using ANC service in this township. It has been observed that husband's occupation group related to the use of ANC services. The reason is that the more wealthy family use ANC service than less affordable or less wealthy family. The coefficients of the poorest and poorer woman have negative relation to ANC utilization. It can be explained that those women may need extra cost for medicine, costs for transportation and costs related to access health care services. Women age 15-19 have negative effect on the ANC usage which means that those women are less likely to seek maternal health care services than older women. It has been found that women who resided in urban area have more chance to use ANC service. The reason is due to fact that availability and accessibility of health services are more convenient in urban areas than in rural areas. With respect to household head, women with husbands as household head are more likely to use ANC service.

Conclusion

Based on the results of this study, it was found that higher educated women, higher educated husbands, working women, women whose husbands have occupation, and women who resided in urban area and women with husbands as household head have more chance to use ANC. Women from the poorest wealth quintile, and poorer wealth quintile and women aged 15-19 have negative relation to ANC utilization. Hence, health education programs intended to enhance community use of ANC service should be strengthened with special focus for women with low or no education. On the other hand, involving husbands during health education is also

necessary as they can play a role in encouraging their wives to use ANC. Information on services provided free of charge by public health institutions should be extended to community and volunteer health worker training/ refresher training should be frequently performed in order to scope of ANC services and enhance the ability of pregnant women to reach them for getting accessibility of health care services.

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