



## Determinants of Antenatal Care Services Utilization among Pregnant Women Attending at Edward Michaud Memorial Hospital Kinondoni-Tanzania

Bertha Mwinuka<sup>1\*</sup> and Miriam Amosi<sup>2</sup>

<sup>1</sup>Department of Health Systems Management, School of Public Administration and Management, Mzumbe University, Morogoro, Tanzania

<sup>2</sup>Christian Social Services Commission, Tanzania

\*Corresponding e-mail: [bertham5@mzumbe.ac.tz](mailto:bertham5@mzumbe.ac.tz)

### ABSTRACT

**Introduction:** Health care services which a woman receives during pregnancy are important for her survival and the baby both during delivery and shortly after delivery. In the global context of high maternal morbidity and mortality, receiving effective antenatal care services help to prevent maternal and neonatal deaths which are preventable. **Objective:** To examine the determinants of antenatal care services utilization in Dar es Salaam, Tanzania. **Methods:** A quantitative case study was carried out and 164 women were randomly selected among the pregnant women who were attending Edward Michaud Memorial Hospital for ANC services. A questionnaire was used to collect data. Bivariate and multivariate logistic regressions were done by using SPSS to identify the association between the independent and dependent variables. **Results:** The results indicate that gender of head of household, marital status, insurance cover, and education were associated with utilization of ANC services and there were no significant associations with age, occupation, transport cost, distance, and parity. **Conclusion:** Awareness in communities should be raised on the importance of ANC utilization and ensuring the physical, information and financial accessibility of the ANC services will increase the utilization rate of services and hence avoid adverse pregnancy outcomes.

**Keywords:** Antenatal care, Utilization, Maternal death

### INTRODUCTION

Maternal mortality is still a global problem and a lot of women die about 830 women die from pregnancy or childbirth-related complications. In 2015, 303,000 women and adolescent girls died from pregnancy and childbirth-related complications. These deaths occurred in low-resource settings and most could have been prevented [1]. Developing regions account for almost 99% (302,000) of the global maternal deaths and sub-Saharan Africa alone accounts for approximately 66% (201,000) while in Southern Asia it is 66,000.

Across all MDG regions between 1990 and 2015, the MMR had declined and a significant decline over that period was in Eastern Asia (72%). As of 2015, the regions with the highest MMR are sub-Saharan Africa (546; UI 511 to 652) and Oceania (187; UI 95 to 381). Many countries have made very limited or no progress in achieving these goals [2]. In Tanzania, MMR per 100,000 live births is 556 and the deaths are mainly due to obstetric factors like limited access and utilization of the ANC services [3,4].

Epidemiological studies globally indicate that direct causes account for 73% of cases while indirect causes account for 27%. Socioeconomic and health system-related factors exacerbate these causes. It includes the young age of the mother, home delivery, absence of a skilled birth attendant physical inaccessibility of health facilities, and unmet need for family planning [5].

In the 1990s Focused Antenatal Care (FANC) model was developed and it was concerned more with parental deaths than ANC models that comprise at least eight contacts between the pregnant woman and the health care provider.

Regular contact with trained medical personnel during the ANC visit is very important for pregnant women and future children. The ANC helps the woman to understand her health status together with the warning signs during pregnancy and childbirth.

Together with other benefits which the women get during the ANC visit they also get micronutrient supplementation, treatment of different diseases, get vaccines as well as education on maternal and child health [6].

Several interventions have been taken by the government of Tanzania to increase utilization of ANC services with the focus of reducing the MMR but not all pregnant women in Tanzania initiate ANC promptly [7]. The interventions include increasing the coverage of deliveries at the health facility, pregnant women being attended by skilled health personnel, increasing the facilities with ANC services as well as expansion of Emergency Obstetric Care (EMOC) coverage. Despite all the intervention, the proportion of births and deaths are higher, early initiation of ANC is reported to be 24% and only 51% of women had more than 4 antenatal care visits in 2015/16 [8].

Considering previous studies, it's clear that the ANC utilization is low and this endeavors to assess the determinants of ANC service utilization among pregnant women who are attending Michaud Memorial Hospital Kinondoni, Tanzania.

## MATERIALS AND METHODS

### Study Design and Settings

A quantitative case study was conducted to assess determinants of ANC service utilization in Dar es Salaam. The study was carried out at Sinza ward, in Kinondoni municipality in Dar es Salaam. Kinondoni municipality has an estimated population of 1,775,049 [9]. This area has been chosen because it is one of the places with a mixed population and the Edward Michaud Memorial Hospital offers a wide range of services to the local community at affordable costs and serves quality ANC services.

### Sample Size and Sampling Techniques

This study employed the Yamane (1967) formula to come with the optimal sample size of 164 participants who reflected the idea of the entire population. A simple random technique was employed to obtain the study participants.

### Data Management and Analysis

The collected data were cleaned to check for completeness, accuracy, consistency, and detection of some errors. Statistical Package for Social Science (SPSS) was used for data analysis. Presentation of the data was done by using tables to give a clear picture of the research findings at a glance.

### Model Specification

Maternal healthcare services are either utilized or not hence the choice of using a binary logistic model. The assumption here is that the likelihood of an individual to utilize or not to utilize ANC is determined by some explanatory variables such that:

$$Y_i = \beta X_i + \varepsilon_i$$

Where  $Y_i$  a dependent variable is made up of antenatal care (A),

A=1 if a woman received antenatal care and 0 otherwise

$X_i$  represents a number of independent variables,  $\beta$  is a vector of parameters to be estimated and  $\varepsilon_i$  is stochastic disturbance term or error term.

Since  $Y_i$  represent a binary logistic model was estimated which represent antenatal care utilization.

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \varepsilon_i$$

### Ethical Consideration

The research was approved by Mzumbe University. The respondents were well informed about their voluntary participation in the study. During fieldwork, informed consent both verbal and written was sought from the respondents

who voluntarily accepted to be involved in the study. All information obtained was confidential and used only for the study.

## RESULTS AND DISCUSSION

### Demographic Characteristics

A response rate of 81.92% was recorded whereby the majority (49.3%) of the respondents' had an age group of 29-39 while those with the age group of 18-28 years account for 27.20% of the respondents and 23.30% had age group 40+ years. Regarding the gender of the head of household, the results showed that 56.6% of participants revealed that males were the head of household while 43.4% were female. More than half (50.70%) of the study participants were married while those who were divorced and separated were 29.40% and 27% respectively. Study participants with no education were composed by 27.20% while those with primary education were 23.50%, secondary education 26.50% and those with tertiary education were 22.80% as indicated in Table 1.

**Table 1 Demographic characteristics**

Characteristics	Attributes	(N=136)	(%)
Age (years)	18-28	37	27.20
	29-39	67	49.30
	40+	32	23.50
Gender of the head of household	Male	77	56.60
	Female	59	43.40
Marital status	Married	69	50.70
	Divorced	40	29.40
	Separated	27	19.90
Education level	None	37	27.20
	Primary education	32	23.50
	Secondary education	36	26.50
	Tertiary education	31	22.80

### Determinants of ANC Services Utilization

To analyze the determinants of ANC services utilization the study employed a binary logistic model to test the relative importance of the independent variables or simultaneously effects of the independent variables on the dependent variable of the utilization of ANC service.

The logistic regression model for different variables is as follows:

$$P = \frac{e^z}{1 + e^z}$$

Where, P=Probability of reproductive women utilizes health care, Z=the linear combination of independent variables and is expressed as:

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p$$

X's is the independent variable and  $\beta_s$  regression parameter estimate. The Logistic Regression Model output was summarized and explained in Table 2.

Table 2 Estimated Logistic Regression Equation for utilization of ANC

Attribute	B	S.E.	Wald	df	Sig.	Exp (B)
Gender of the head of household	-2.589	1.441	3.228	1	0.072*	0.075
Age group	-0.338	0.257	1.724	1	0.189	0.714
Occupation	-3.035	1.911	2.522	1	0.112	0.048
Education	1.543	0.836	3.408	1	0.065*	4.678
Marital status	-15.156	6.044	6.287	1	0.012***	0.000
Family size	1.077	0.782	1.9	1	0.168	2.937
Parity	-0.685	0.579	1.403	1	0.236	0.504
Distance to health facility	0.089	0.391	0.051	1	0.821	1.093
Insurance	3.769	1.912	3.887	1	0.049**	43.356
Transport cost	0.002	0.001	2.573	1	0.109	1.002
Constant	27.226	13.781	3.903	1	0.048	6.67E+11

\*, \*\* and \*\*\* Means significant at 10%, 5% and 1% level respectively

### Gender of Head of Household

The study established statistical significant between the gender of the head of household and ANC service utilization. The result showed that being a female as head of household has 0.75 times less likely chance of utilizing ANC compared to a family whose head of household is male, with a significant p-value of 0.072 at a 10% significance level. This research result is along with the results of the study which was done in Kathmandu, Nepal, and found that husbands are more influential in the decision on utilization of ANC services [10]. The influence of the husband as the main decision-maker for a woman to utilization ANC services was also found in different studies like in Bangladesh, Burkina Faso, and some studies in Tanzania [11-13]. This may be attributed to the nature of a man being the head of the family so he has to make decisions which women (wife) have to agree with including the maternal health services like utilization of ANC services.

### Age

The age group of the pregnant women did not establish any significant association on utilization of the ANC services (p-value 0.189). This result is inconsistent with the study which was done in Ethiopia and revealed that the number of ANC visits increased significantly as the age of women increased [14]. Tekelab, et al. in their study concluded that women who are younger than 20 years were less likely to utilize ANC than those over 20 years [15]. The possible explanation for the insignificance association on this study may be due to the availability of information among the study respondents whereby the pregnant women are well informed and understand the benefit of ANC service utilization hence utilization of ANC services is not questionable.

### Occupation of the Pregnant Woman

The study also showed that maternal occupation has an impact on the utilization of ANC (p-value 0.112 at  $\alpha=10\%$ ). This implies that whether a pregnant woman is working or not does not influence the utilization of ANC services. This result is inconsistent with several studies which reported that women's occupation has a positive association with utilization of ANC services [4,16,17]. Regassa, in his study in Southern Ethiopia showed that women who are working in formal employment (such as in civil services) were 1.96 times more likely to use ANC services than their counterparts [18]. A study by World Bank found that ANC service utilization is influenced by the husband's occupation and the women whose husbands were unemployed and who were farmers were less likely to receive ANC services [19]. The role of occupation on utilization of ANC services was not a factor because ANC services are among the services which the government offers freely to pregnant women who visit the health facilities. Therefore it is not a must for pregnant women to money to utilize the ANC services.

**Education Level**

Education appears to be an important factor that influenced the utilization of ANC. Results found that women with higher education levels are 4.678 times likely to utilize ANC services compared to women with either low level or not educated. These results are resonating with the findings from different studies which showed that there is a significant association between maternal education and overall uptake of ANC services [20,21]. Its effect is related to greater awareness of risks of obstetric complications and a better-informed approach to dealing with them [22-24]. Analysis across and within the models indicate that education significantly determines utilization of the three models antenatal care, hospital delivery, and postnatal care whereby in all cases it increases the usage. Also, a woman with an educated partner is more likely to use ANC services [15]. This result may be attributed to the fact that educated women have a higher possibility of accessing and using some information from different sources compared to their counterparts and this increment of knowledge about specific issues.

**Distance to the Health Facility**

The physical proximity of health care services plays an important role in service utilization. This study has shown a negative association between distance to the health facility and ANC service utilization (p-value=0.821). This inference is inconsistent with the results of several studies which has revealed that there is a very strong association between distance and attendance of ANC while into most women in Nigeria, Mali and Zambia distance to the health facility is not a factor for underutilization of ANC services 71.5%, 69.7%, and 62.8% respectively [17,25-27]. This negative association between utilization and distance to the health facility may be attributed to the availability of the health facilities closer to where the pregnant women are residing and hence no transport cost involved as well as friendliness, quality, and availability of the ANC services during ANC appointment days.

**Marital Status**

Marital status appears to be an important factor that influenced the utilization of ANC among pregnant women. The results showed that being an unmarried woman has 0.1 times less likely chance of utilizing ANC compared to a married woman (p-value 0.012). Similar to studies in Rwanda, Namibia, Ghana the results showed that unmarried women were less likely to utilize ANC services than married women [26,28,29]. This result may be attributed to the support which married women get from their partners. The poor utilization rate among the unmarried ones may be due to the fear of public ridicule so they avoid ANC services so as not to expose their pregnancy to the public when they are going to the health facility for ANC services. In addition, women who have no partners might be experiencing financial difficulties that might prevent them from attending ANC services once service accessibility requires money.

**Parity**

Parity was found to have a negative association with ANC utilization (p-value=0.236). Contrary to the results of the current study, literature has shown that parity is significantly associated with ANC utilization [30-32]. The negative association may be attributed to experience for those who have had previous pregnancies without attending ANC clinic and have a positive outcome and for the prime gravid women it might be due to ignorance on the importance of ANC services.

**Insurance Cover**

The findings revealed that insurance cover was statistically significant on the utilization of ANC services. The results showed that pregnant women with health insurance cover have a 43.356 times more likely chance of utilizing ANC compared to maternal women without health insurance cover (p-value 0.049). This study is along with another study in Tanzania which concluded that having health insurance was associated with proper timing of 1<sup>st</sup> ANC attendance (AOR=1.89, p<0.001) [33]. Three studies have shown that health insurance coverage is a critical factor to improve access to and quality of maternal and perinatal care through protection against unexpected financial setbacks [34,35]. The reason for the utilization of ANC services among insured pregnant women is the surety of accessibility of ANC services for the issue of affordability is already manageable and sometimes they utilize the services with the mind of attending the health facility to use their money which they have paid when subscribing to the insurance scheme.

**Transport Cost**

The research results showed that transportation cost is a significant factor for the utilization of the ANC services

among pregnant women. This implies transport costs to the health facilities have 1.001 times less likely chance of utilizing ANC services. Like in Tanzania, the study in Rwanda reported that transport cost of 1\$ to the health facility on every visit is the reason for the inaccessibility of ANC services [36]. Furthermore, Nyathi, et al. in their study said that high transport cost for antenatal care visits is a barrier to accessibility of ANC services and the cost becomes higher to those women who need to be accompanied by a family member [37]. Studies in Ethiopia and Zimbabwe reported that unaffordable transport cost and financial dependence on men has made some women fail to access the ANC services. This is possible because most women have a low income as the result they fail to afford the transport costs and hence inaccessibility of the health facilities and access to the ANC. Also, pregnant women find it distressing to walk long distances or take two or more buses to get ANC services.

### CONCLUSION

Findings indicate that marital status, level of education, of the pregnant woman, gender of the head of the house, insurance cover, were potential factors for utilization of the ANC. Parity, age, transport cost, occupation, and distance to health facility were the factors that showed a negative association with utilization of ANC services among the pregnant women who were attending at Edward Michaud Memorial Hospital- Kinondoni. Ensuring the physical, information and financial accessibility of the ANC services will increase the utilization rate of services and hence avoid adverse pregnancy outcomes. Since ANC services are subsidized to most health facilities, strategies to ensure availability, improvement of education, and empowerment of women should be in place to increase understanding and utilization of ANC services. Further studies which examine women's experiences of health service providers and health institutions should be conducted to improve understanding of the reasons for low ANC utilization.

### DECLARATIONS

#### Acknowledgments

The authors would like to thank the management of Edward Michaud Memorial Hospital- Kinondoni district for allowing us to conduct this study at their facility. Also, we are thankful to the health provider and pregnant women for making the data collection process successful.

#### Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

#### Authors' contributions

All authors participated in all phases of the study including topic selection, design, data collection, analysis, interpretation as well as writing the manuscript for publication.

#### Source of Funding

Self-funding.

### REFERENCES

- [1] Say, Lale, et al. "Global causes of maternal death: A WHO systematic analysis." *The Lancet Global Health*, Vol. 2, No. 6, 2014, pp. e323-33.
- [2] WHO, UNICEF, and BANK W. UNFPA. "Trends in maternal mortality: 2000 to 2017: Estimates by WHO, UNICEF." *UNFPA, World Bank Group and the United Nations Population Division*, 2019.
- [3] Lwelamira, James, John Safari, and Angelina Stephen. "Utilization of maternal postnatal care services among women in selected villages of Bahi District, Tanzania." *Current Research Journal of Social Sciences*, Vol. 7, No. 4, 2015, pp. 106-11.
- [4] Khanal, Vishnu, et al. "Under-utilization of antenatal care services in Timor-Leste: Results from Demographic and Health Survey 2009-2010." *BMC Pregnancy and Childbirth*, Vol. 15, No. 1, 2015, pp. 1-7.
- [5] Tesfaye, Gezahegn, et al. "Magnitude, trends and causes of maternal mortality among reproductive aged women in Kersa health and demographic surveillance system, eastern Ethiopia." *BMC Women's Health*, Vol. 18, No. 1,

- 2018, pp. 1-10.
- [6] Annie, Kearns, Hurst Taylor, Caglia Jacquelyn LA. "Focused antenatal care in Tanzania. Women Heal Initiat (Internet)." 2014, pp. 1-13.
- [7] Konje, Eveline Thobias, et al. "Missed opportunities in antenatal care for improving the health of pregnant women and newborns in Geita district, Northwest Tanzania." *BMC Pregnancy and Childbirth*, Vol. 18, No. 1, 2018, pp. 1-13.
- [8] TDHS. Tanzania Demographic and Health Survey Indicator Survey (TDHS-MIS) 2015-2016. Dar es Salaam, Tanzania, Rockville, Maryland, USA MoHCDGEC, MoH, NBS, OCGS, ICF. 2016, pp. 1-630.
- [9] Tanzania, N. B. S. "Population and housing census: Population distribution by administrative areas." *Ministry of Finance, Dar es Salaam*, 2012.
- [10] Upadhyay, Priti, et al. "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*, Vol. 11, No. 1, 2014, pp. 1-11.
- [11] Simkhada, Bibha, Maureen A. Porter, and Edwin R. Van Teijlingen. "The role of mothers-in-law in antenatal care decision-making in Nepal: A qualitative study." *BMC Pregnancy and Childbirth*, Vol. 10, No. 1, 2010, pp. 1-10.
- [12] Wai, Kyi Mar, et al. "Are husbands involving in their spouses' utilization of maternal care services? -A cross-sectional study in Yangon, Myanmar." *PloS One*, Vol. 10, No. 12, 2015, p. e0144135.
- [13] Nyamtema, Angelo S., et al. "Factors for change in maternal and perinatal audit systems in Dar es Salaam hospitals, Tanzania." *BMC Pregnancy and Childbirth*, Vol. 10, No. 1, 2010, pp. 1-7.
- [14] Fenta, Setegn Muche, Girum Ayenew, and Berhanu Engidaw Getahun. "Magnitude of antenatal care service uptake and associated factors among pregnant women: Analysis of the 2016 Ethiopia Demographic and Health Survey." *BMJ Open*, Vol. 11, No. 4, 2021, p. e043904.
- [15] Tekelab, Tesfalidet, et al. "Factors affecting utilization of antenatal care in Ethiopia: A systematic review and meta-analysis." *PloS One*, Vol. 14, No. 4, 2019, p. e0214848.
- [16] Pandey, Srijana, and Supendra Karki. "Socio-economic and demographic determinants of antenatal care services utilization in Central Nepal." *International Journal of MCH and AIDS*, Vol. 2, No. 2, 2014, pp. 212-19.
- [17] Sina, Owoseni Joseph. "Factors affecting the utilization of antenatal care among pregnant women in Moba Lga of Ekiti state, Nigeria." *International Journal of Traditional and Complementary Medicine*, Vol. 1, No. 1, 2016, pp. 20-30.
- [18] Regassa, Nigatu. "Antenatal and postnatal care service utilization in southern Ethiopia: A population-based study." *African Health Sciences*, Vol. 11, No. 3, 2011, pp. 390-97.
- [19] World Bank. "Healthy Development: The World Bank Strategy for Health, Nutrition and Population Results." *The World Bank*, 2007.
- [20] Kalule-Sabiti, Ishmael, Acheampong Yaw Amoateng, and Mirriam Ngake. "The effect of socio-demographic factors on the utilization of maternal health care services in Uganda." *African Population Studies*, Vol. 28, No. 1, 2014, pp. 515-25.
- [21] Akunga, Daniel, Diana Menya, and Mark Kabue. "Determinants of postnatal care use in Kenya." *African Population Studies*, Vol. 28, No. 3, 2014, pp. 1447-59.
- [22] Bulatao, Rodolfo A., and John A. Ross. "Which health services reduce maternal mortality? Evidence from ratings of maternal health services." *Tropical Medicine & International Health*, Vol. 8, No. 8, 2003, pp. 710-21.
- [23] Mirach, Tsega Hagos, Getu Debalkie Demissie, and Gashaw Andargie Biks. "Determinants of community-based health insurance implementation in west Gojjam zone, Northwest Ethiopia: A community based cross sectional study design." *BMC Health Services Research*, Vol. 19, No. 1, 2019, pp. 1-8.
- [24] Tsegay, Yalem, et al. "Determinants of antenatal and delivery care utilization in Tigray region, Ethiopia: A cross-sectional study." *International Journal for Equity in Health*, Vol. 12, No. 1, 2013, pp. 1-10.

- [25] Browne, Joyce L., et al. "Health insurance determines antenatal, delivery and postnatal care utilisation: Evidence from the Ghana Demographic and Health Surveillance data." *BMJ Open*, Vol. 6, No. 3, 2016, p. e008175.
- [26] Owusu-Sekyere, Ebenezer, and Anthony Chiaraah. "Demand for health Insurance in Ghana: What factors influence enrollment?" *American Journal of Public Health Research*, Vol. 2, No. 1, 2014, pp. 27-35.
- [27] Ahinkorah, Bright Opoku, et al. "Examining barriers to healthcare access and utilization of antenatal care services: Evidence from demographic health surveys in sub-Saharan Africa." *BMC Health Services Research*, Vol. 21, No. 1, 2021, pp. 1-16.
- [28] Rashid, Mamunur, and Diddy Antai. "Socioeconomic position as a determinant of maternal healthcare utilization: A population-based study in Namibia." *Journal of Research in Health Sciences*, Vol. 14, No. 3, 2014, pp. 187-92.
- [29] Rurangirwa, Akashi Andrew, et al. "Determinants of poor utilization of antenatal care services among recently delivered women in Rwanda; A population based study." *BMC Pregnancy and Childbirth*, Vol. 17, No. 1, 2017, pp. 1-10.
- [30] Joshi, Chandni, et al. "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*, Vol. 14, No. 1, 2014, pp. 1-11.
- [31] Agus, Yenita, and Shigeko Horiuchi. "Factors influencing the use of antenatal care in rural West Sumatra, Indonesia." *BMC Pregnancy and Childbirth*, Vol. 12, No. 1, 2012, pp. 1-8.
- [32] Gitonga, Eliphas. "Determinants of focused antenatal care uptake among women in tharaka nithi county, Kenya." *Advances in Public Health*, Vol. 2017, 2017.
- [33] Kibusi, Stephen M., et al. "Health insurance is important in improving maternal health service utilization in Tanzania-analysis of the 2011/2012 Tanzania HIV/AIDS and malaria indicator survey." *BMC Health Services Research*, Vol. 18, No. 1, 2018, pp. 1-10.
- [34] Lassi, Zohra S., et al. "Essential interventions for maternal, newborn and child health: Background and methodology." *Reproductive Health*, Vol. 11, No. 1, 2014, pp. 1-7.
- [35] Vesel, Linda, et al. "Kangaroo mother care: A multi-country analysis of health system bottlenecks and potential solutions." *BMC Pregnancy and Childbirth*, Vol. 15, No. 2, 2015, pp. 1-16.
- [36] Hitimana, Regis, et al. "Cost of antenatal care for the health sector and for households in Rwanda." *BMC Health Services Research*, Vol. 18, No. 1, 2018, pp. 1-9.
- [37] Nyathi, Leoba, et al. "Investigating the accessibility factors that influence antenatal care services utilisation in Mangwe district, Zimbabwe." *African Journal of Primary Health Care and Family Medicine*, Vol. 9, No. 1, 2017, pp. 1-5.