Predictors of antenatal care visits among pregnant women in Kinondoni district in Tanzania

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Abstract
Background: Antenatal care is one of the determinants of maternal mortality. Through antenatal care, a pregnant mother can be served with several treatments including danger signs of complications hence, serving her from death and other related complications.
Objectives: This study assessed predictors of antenatal care visits among pregnant women.
Methods: The study employed a cross-sectional design in which 424 pregnant women who had started antenatal care visits in the selected public dispensaries in the Kinondoni district were involved. A three-stage sampling technique was used to select wards, dispensaries, and women for this study. Data were collected using a questionnaire administered face-to-face by a researcher. a Chi Binary logistic regression model was used to determine significant predictors of antenatal care visits.
Results: The results showed that the majority of pregnant women (69.5%) started the first antenatal care visit late. The predictors of antenatal care visits among pregnant women were; testing for HIV/AIDS would prevent ANC attendance during the first antenatal care visit (OR = 1.92, 95% CI: -1.09, -0.21), household size (OR = 2.46, 95% CI: -1.62, -0.18) and family planning method (OR = 1.52, 95% CI -0.87, 0.04).
Conclusion: The government and stakeholders should provide programs and interventions concerned with ANC services to communities. Also, women and their partners should be encouraged to use family planning methods and testing for HIV/AIDS during the first ANC visits.

Keywords: *Antenatal Care (ANC); timing of ANC; week of gestation; pregnant women; first trimester.*

Introduction

Antenatal Care (ANC) service is inevitable for mothers and children since it ensures the good health of the mother and the unborn child during pregnancy. Effective antenatal care is when a pregnant woman initiates the ANC service early and attains adequate visits. In this context, a pregnant woman was counted early when initiating ANC service up to the 12th week of gestation. The World Health Organization (WHO) guideline provided a new recommendation that there should be eight (8) ANC contacts or visits at specified intervals for women with no underlying pregnancy complications (WHO, 2016).

Antenatal care is one of the determinants of maternal mortality of which a pregnant mother can be served with several treatments including danger signs of complications that can lead to maternal mortality. Globally, between 1990 and 2013 the total number of maternal deaths decreased by 45% from 523,000 to 289,000 and the maternal mortality rate declined by 45% from 380 to 210 maternal deaths per 100,000 live births. In Sub-Saharan Africa, the maternal mortality rate declined from 990 to 510 maternal deaths per 100,000 live births between 1990 and 2013 (WHO, 2014).

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Maternal mortality continues to be a major challenge in Sub-Saharan Africa, although efforts are being employed to reduce the trend to meet the Sustainable Development Goal (SDG 3, Ensure healthy lives and promote well-being for all at all ages). In Tanzania, the maternal mortality rate increased from 454 to 556 maternal deaths per 100,000 live births between 2010 and 2015/16 (URT, 2010: 2016). This puts Tanzania among the countries with the high maternal mortality rate in the world. A high maternal mortality rate can be reduced if the quantity and quality of ANC services are improved, pregnant women initiate antenatal care within the first trimester of pregnancy, and adhere to the recommended number of ANC visits.

This study adopted Andersen's behavioural model of health service utilization. This model was developed by Andersen in 1968 and modified by Andersen and Newman in 2005. The model discusses the factors that influence the utilization of health services. This means that the factors discussed in the model were social structures, health beliefs, and demographic factors or individual characteristics (education, occupation, age, sex, and family size). Also, enabling factors which include material resources, level of knowledge, social relations, health insurance and other opportunities available in the community can lead to the usage of health services. This model did not include testing for HIV/AIDS during the utilization of health services. Currently, testing for HIV/AIDS is a key factor for pregnant women in ANC visits.

Empirical studies conducted in Africa in recent years have shown that factors associated with late antenatal visits to health centres include education to the pregnant woman, unplanned pregnancy, family income, parity, and distance to the health facility, (Lerebo et al., 2015; Serawit, 2015; Manzi et al., 2014; Tekelab and Berhanu, 2014). In Tanzania, Lweno (2013) found that adolescents' late utilization of antenatal services was due to low education and income, distance to health facilities, and poor attitudes towards reproductive health services. A study in Ulanga and Kilombero (Gross et al., 2012) found that perceived poor quality of antenatal care service, late recognition of pregnancy, and absence of support from husband or partner were among factors associated with late antenatal visits while a previous experience of a miscarriage or stillbirth were associated with early antenatal care visits. However, those studies did not include testing for HIV/AIDS during the utilization of health services. Currently, testing for HIV/AIDS is a key factor for pregnant women in ANC visits. This study included testing for HIV/AIDS because in Tanzania it is recommended to test for HIV/AIDS among partners during the first visit. Therefore, this study is aimed to assess the predictors of antenatal care visits among pregnant women in the Kinondoni district. A pregnant woman having a first ANC visit not more than the 12th week of gestation was considered to have an early ANC visit otherwise it was a late ANC visit.

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Materials and Methods
Study area
The study was conducted in the Kinondoni district in the selected public dispensaries. The target population of this study was all pregnant women who had started antenatal care visits in the selected dispensaries. The study focused on public dispensaries because they serve the majority of the population and there is no fee for maternity service. Kinondoni Municipal Council is found in the northern part of Dar es Salaam region in Tanzania.

Study design

The study adopted a cross-sectional research design because; it allows data to be collected at one point at a time. In this design, a qualitative and quantitative approach was employed.

Data types and sources
This study used qualitative and quantitative data from primary and secondary sources of data. Primary data were collected from the pregnant women attending ANC in public dispensaries while secondary data were extracted from "Mfumo wa Taarifa za Uendeshaji wa Huduma za Afya" (MTUHA).

Sample size
A total number of 424 pregnant women were selected from 14 public dispensaries. The minimum sample size was calculated at a 95% confidence level while the degree of precision "e" was set at 4.76%. However, when the precision was taken to be 4.5% the sample size became 475 and a 5% sample size became 384 respondents. Therefore, opted for precision between 4.5% and 5% which is 4.76%. The sample size was calculated by using the formula Kothari (2004) given y; $n = \frac{Z_{\alpha/2}{}^2 P(1-P)}{e^2}$

where: n = Sample size of pregnant women, Za/2 = 1.96 which is equivalent to 95% confidence level, P = Proportion of pregnant women assumed to be affected by the mentioned factors in the utilization of ANC, P is approximate to 50%, e = margin of error or allowable error is set to be 4.76% and α = level of significance = 0.05.

Data collection methods
The permission to collect data was allowed by the University of Dar es Salaam as well as the Regional Administrative Secretary in Dar es Salaam region and the Municipal Director of Kinondoni Municipal Council. Data were collected through a semi-structured questionnaire and administered through a face-to-face interview.

Sampling techniques
This study employed probability sampling which a three-stage sampling design was used in selecting wards, public dispensaries, and pregnant women. In the first stage, a systematic sampling technique was used to select wards while a simple random sampling technique was employed in the second and third stages. These techniques were used because the population was known and homogeneous.

Study variables
The dependent variable of the study was the timing of the first antenatal care visits and the dependent variables were Age, marital status, household size, parity, education, partner's/husband's education planned to have the pregnancy, employment status, partner's/husband's employment status, listening to a radio in a week, listening/watching a TV in a week, reading a newspaper in a week, testing for HIV/AIDS would prevent ANC attendance, use of family planning methods and health insurance.

Data processing, analysis, and presentation
Data were processed and analyzed in STATA version 14. In the analysis, a descriptive was conducted to explore the characteristics of pregnant women and a Chi-square test was employed to find out whether there is a significant association between the timing of first antenatal care visits and socio-

demographic and economic characteristics, media exposure, health system, and infrastructure and contraceptive utilization. Furthermore, a binary logistic regression model was used because the dependent variable is dichotomous such that a pregnant woman can initiate an ANC visit either early or late, if a pregnant woman initiates ANC visit early then the dependent variable (Y=0), and if a pregnant woman initiate ANC visit late then the dependent variable (Y=1) where the analyzed data were presented by using tables

Results
Socio-demographic characteristics of respondents
The findings presented in Table 1 show that (51.89%) of women were aged above 24 years, the majority of women (79.20%) were married, (91.42%) came from small households, (59.95%) had primary or no education, (71.53%) had planned to become pregnant and most of their partners/husbands (59.56%) had above primary school education.

Table 1: Socio-demographic characteristics of respondents

Variable	Category label	Frequency	Percentage
Age	Less or equal to 24	204	48.11
	Above 24	220	51.89
	Total	**424**	**100**
Marital status	Married	335	79.20
	Single	88	20.80
	Total	**423**	**100**
Household size	5 or less	384	91.42
	Above 5	36	8.57
	Total	**420**	**100**
Parity	No child	184	43.40
	One child	112	26.42
	Two or more children	128	30.19
	Total	**424**	**100**
Education	Up to primary education	253	59.95
	Above primary education	169	40.05
	Total	**422**	**100**
Partner's/Husband's education	Up to primary education	167	40.44
	Above primary education	246	59.56
	Total	**413**	**100**
Planned to have this pregnancy	Yes	294	71.53
	No	117	28.47
	Total	**411**	**100**

Economic characteristics and media exposure of the respondents
Table 2 presents the economic characteristics of the respondents and their partners. The majority of the respondents 241 (56.97%) and their partners/ husbands 412 (98.33%) were employed. Also, Table 2 shows that most of the respondents 287 (67.7%) were listening to the radio at least once a week, 292 (68.9%) were watching a TV at least once a week, and on the contrary, only 143 (33.7%) were reading a newspaper at least once a week.

Table 2: Economic characteristics and media exposure of the respondents

Variable	Category label	Frequency	Percentage
Economic characteristics			
Employment status	Employed	241	56.97
	Not employed	182	43.03
	Total	**423**	**100**
Partner's/Husband's employment status	Employed	412	98.33
	Not employed	7	1.67
	Total	**419**	**100**
Media exposure			
Listening to the radio for a week	No	137	32.31
	Yes	287	67.69
	Total	**424**	**100**
Listening/Watching TV in a week	No	132	31.13
	Yes	292	68.87
	Total	**424**	**100**
Reading a newspaper in a week	No	281	66.27
	Yes	143	33.73
	Total	**424**	**100**

Timing of the first ANC, level of awareness, and source of information on ANC services

Out of 424 pregnant women surveyed, 129 (30.5%) started their antenatal care visits early and 294 (69.5%) started late. This study revealed that the majority of women knew the recommended time to start the first ANC care visit which is during the first trimester (80.66%) and (83.73%) were aware of the total number of ANC visits. Also, this study pointed out the major sources of information on ANC visits among pregnant women as being relatives, media, and a visit to health institutions

Factors associated with the timing of the first ANC visit among pregnant women

Results for the chi-square test in Table 3 showed that there is a statistically significant association between the timing of the first ANC visit and household size ($P = 0.021$) as well as the woman's employment status ($P = 0.040$). Also, testing for HIV would prevent ANC attendance during the first ANC visit was significantly associated with the timing of the first ANC visit ($P < 0.0001$). Family planning methods were significantly associated with the timing of the first ANC visit ($P = 0.067$). Moreover, Table 4 shows that the variables age, education, marital status, parity, intention to pregnant and partner's education, travelling time, waiting time at the dispensary, health insurance media exposure (radio, TV, and a newspaper) were not significantly associated with the timing of the first ANC visit among pregnant women.

Table 3: Significant factors associated with the timing of the first ANC visit among pregnant women

Variables	Response	Timing of the first ANC		P-Value
		Early	Late	
		n (%)	n (%)	
Household size	5 or less	110(26.3)	273(65.2)	0.021
	Above 5	17(4.1)	19(4.5)	
Employment status	Employed	83(19.7)	157(37.2)	0.040
	Not employed	46(10.9)	136(32.2)	
Testing for HIV/AIDS would prevent ANC attendance.	Yes	71(17.1)	106(25.6)	0.000
	No	55(13.3)	182(44)	
Use of family planning methods	Yes	43(10.2)	125(29.7)	0.067
	No	86(20.4)	167(39.7)	

Table 4: The non-significant factors with the timing of the first ANC visit among pregnant women

Variable	Response	Timing of the first ANC		P-Value
		Early	Late	
		n(%)	n(%)	
Age	24 or fewer years	63(14.9)	141(33.3)	0.427
	Above 24 years	67(15.8)	153(36.1)	
Education	Up to Primary	70(16.6)	183(43.5)	0.134
	Above primary	58(13.8)	110(26.1)	
Marital status	Married	103(24.4)	232(55)	0.716
	Not married	25(5.9)	62(14.7)	
Parity	Nulliparous	58(13.7)	125(29.6)	0.608
	Primiparity	30(7.1)	82(19.4)	
	Multiparity	41(9.7)	87(20.6)	
Intention to pregnancy	Yes	98(23.9)	196(47.8)	0.194
	No	31(7.6)	85(20.7)	
Partner's education	Up to Primary	70(16.6)	183(43.5)	0.134
	Above primary	58(13.8)	110(26.1)	
Partner's employment status	Employed	127(30.3)	285(68)	0.906
	Not employed	2(0.5)	5(1.2)	
Radio	Yes	80(18.9)	185(43.7)	0.859
	No	49(11.6)	109(25.8)	
TV	Yes	81(19.4)	204(48.9)	0.691
	No	42(10.1)	90(21.6)	
		123(29.5)	294(70.5)	
Newspaper	Yes	40(9.5)	102(24.1)	0.460

	No	89(21)	192(45.4)	
Travelling time in minutes	40 or fewer minutes	72(17.3)	143(34.4)	0.214
	Above 40 minutes	56(13.5)	145(34.9)	
Waiting time in minutes	60 or fewer minutes	48(11.8)	84(20.7)	0.107
	Above 60 minutes	78(19.2)	196(48.3)	
Health insurance	Yes	11(2.6)	22(5.2)	0.680
	No	116(27.6)	272(64.6)	

Predictors of antenatal care visits among pregnant women

A binary logistic regression model was performed. The dependent variable was the timing of the first ANC visit measured as "1 = Early ANC visit referred to initiation of ANC service up to 12th weeks of gestation "and "0 = Late ANC visit referred to initiation of ANC services after 12th weeks of gestation"; coded as binary responses. The independent variables which significantly associated with the timing of antenatal care visits were included in the model. Those variables are household size, Employment status, testing for HIV/AIDS that would prevent ANC attendance during the first ANC visit, and use of family planning methods.

The logistic regression results in Table 5 revealed only three variables were significantly associated with the timing of the first antenatal care visits. Testing for HIV/AIDS would prevent ANC attendance was highly significantly associated with the timing of the first antenatal care visit (1% level of significance). Household size was significantly associated with the timing of the first antenatal care visit among pregnant women (5% significance level). The use of family planning methods had a weak association with the timing of the first antenatal care visit among pregnant women (10% level of significance). Employment status was not statistically significant with p-values of 0.131. This implies that employment status is not an important factor in influencing late antenatal care visits among pregnant women.

Moreover, the findings in Table 5 for odds ratios revealed that testing for HIV/AIDS would prevent ANC attendance during the first antenatal care visit was 1.92 (95% CI: -1.09, -0.21) times less likely to influence pregnant women to start the first antenatal care visit late. Also, women from households with more than five people were 2.46 (95% CI: -1.62, -0.18) times less likely to start the first antenatal care visits late compared to women from households with less or equal to 5 people. Also, a pregnant woman who had not used any family planning method before pregnancy was 1.52 (95% CI: -0.87, 0.04) times less likely to start the first antenatal care visit late compared to a woman who used any family planning method. Furthermore, the unemployed pregnant woman was associated with 1.41 (95% CI: -0.10, 0.78) times more likely to start the first antenatal care visit late compared to the employed woman (Note: *All the odds ratios less than one (1) were reciprocated (1/odds ratios) to get the meaningful interpretation)*

Table 5: Logit model and odds ratios for the timing of ANC among pregnant women

Late ANC visits	Coefficient	Odds Ratio	P>z	95% CI
Household size				
5 or less				
Above 5	-0.899	0.41	0.014**	-1.62, -0.18
Use of family planning				

Yes				
No	-0.417	0.66	0.074*	-0.87, 0.04
Testing for HIV/AIDS would prevent ANC attendance				
No				
Yes	-0.651	0.52	0.004***	-1.09, -0.21
Employment status				
Employed				
Not employed	0.342	1.41	0.131	-0.10, 0.78

***significant at 1%;**significant at 5%; * significant at 10%

Discussion

The study has revealed that only 30.5% of pregnant women started their first antenatal care visit early. This figure is higher than that obtained in the Tanzania Demographic and Health Survey and Malaria Indicator Survey 2015-2016 (URT, 2016) which revealed that only 24% of pregnant women in Tanzania had their first ANC visit early.

This difference could be due to an increase in mobilization and education provision to communities about good reproductive health in Kinondoni Municipal Council. Kinondoni Municipal Council is collaborating with MDH to mobilize about good reproductive health especially early booking for first ANC services. The difference could be because Kinondoni district is an urban area in Dar es Salaam city while the Demographic and Health Survey and Malaria Indicator Survey 2015-2016 was conducted in urban as well as rural areas.

The findings of this study showed that testing for HIV/AIDS would prevent ANC attendance was highly significantly associated with the timing of the first antenatal care visit (1% level of significance). Household size was significantly associated with the timing of the first antenatal care visit among pregnant women (5% significance level). The finding is similar to (Rurangirwa et al, 2017 & Ekholuenetale et al, 2020) who found that household size is statistically associated with the utilization of antenatal care services. Also, this result is contrary to (Lweno, 2013 & Kabiri et al, 2020) who found that household size was not influenced ANC timely however the effects were not significant.

The use of family planning methods had a weak association with the timing of the first antenatal care visit among pregnant women (10% level of significance). The finding contradicts (Lweno, 2013; Ajayi et al, 2018 &Hotchkiss et al, 2013) who found that the use of family planning methods may influence a woman to use or attend ANC timely. Employment status was not statistically significant with p-values of 0.131, implying that employment status is not an important factor in influencing late antenatal care visits among pregnant women. This finding is similar to the study by (Low et al., 2005; Rurangirwa et al, 2017; Kabiri et al, 2020 &Hijazi, 2018) who found that employment status was positively insignificant to influence women to attend antenatal care. But the studies done by (Mametja, 2009; Manyeh et al, 2020; Islam et al, 2022 &Ali et al, 2018) revealed a statistically significant influence on antenatal care visits among pregnant women which is contrary to insignificant to this study.

Conclusion

This study has revealed that late antenatal visits among pregnant women are still high since 69.50% of the studied women started their first antenatal care visit late.

This study also revealed that the majority of women knew the recommended time to start the first ANC care visit, which is during the first trimester (80.66%), and (83.73%) were aware of the total number of ANC visits. Also, relatives, media, and a visit to health institutions were pointed out as the major sources of information on ANC visits among pregnant women. Moreover, household size, testing for HIV/AIDS, and the use of family planning methods were revealed to be the variables associated with late antenatal care visits among pregnant women. Lastly, the study identified testing for HIV/AIDS would prevent ANC attendance was highly significantly associated with the timing of the first antenatal care visit.

Recommendations
The Ministry of Health, Community Development, Gender, Elders, and Children in collaboration with stakeholders need to provide continuous education on antenatal care services; strengthen education on contraceptive utilization, and provide education to communities on the importance of testing for HIV/AIDS during pregnancy.

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