

Research Article

Focused Antenatal Care Uptake and its Determinant Factors among Women in Dodoma Region, Tanzania

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Abstract

Background

Antenatal care (ANC) are health services provided during pregnancy aiming at monitoring the pregnant woman regularly so that the risk factors can be identified as early as possible. If the women utilize the ANC services regularly as recommended, the risk for maternal morbidity and mortality could be reduced. The objective of this study was to determine the uptake of focused antenatal care visits among women in Dodoma region, Tanzania.

Methods

This was a cross-sectional survey study. Structured questionnaire with open- and closed- ended questions was administered to a sample of 800 women selected through multistage random sampling. Multivariable logistic regression model was used to determine the predictors of focused antenatal care visits.

Results

Almost all women 797 (99.6%) attended ANC at least once and 415 (51.9%) women had achieved four and more visits while 382 (47.7%) attended less than four ANC visits. The results of the multivariable logistic regression model showed that mother's age, place of residence, month first attends ANC and source of information were significantly potential predictors of the focused antenatal care uptake.

Conclusion

The uptake of FANC services among women in Dodoma region are below the WHO's recommendations. Factors significantly associated with FANC uptake were age of respondents, place of residence, month initiate

first ANC visit and source of information. It is therefore, recommended healthcare providers enhance health education promoting focused antenatal care uptake and early initiation of ANC visit in order to reduce maternal morbidity and mortality.

Key Words: Antenatal Care (ANC); Focused Antenatal Care (FANC); Determinant Factors; Women; Dodoma; Tanzania

Background

Antenatal care (ANC) is health services that a woman receives during pregnancy and provides an entry point for women to the health care system [1]. The aim of ANC is to monitor the pregnant women regularly during their pregnancies, so that the risk factors could be identified as early as possible. It provides an important opportunity to pregnant women and their families' best preparedness for childbirth, as well as informs them about pregnancy-related complications and the advantages of skilled delivery care at health facilities. ANC also provides opportunity for the health care providers to promote healthy behaviours such as breastfeeding, early postnatal care and family planning [2-4]. Information

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provided by healthcare providers is very important for the successful management of pregnancies and the subsequent wellbeing of the child. If the women utilized the ANC services regularly as recommended, the risk for maternal morbidity and mortality could be reduced[5,6].

Focused Antenatal Care (FANC) is a new model of antenatal clinic attendance introduced by the World Health Organization (WHO) that is goal-oriented with reduced number of required antenatal visits. According to WHO recommendation, all women with uncomplicated pregnancies should make at least four ANC visits which provide focused services shown to improve maternal outcomes. The timing of the ANC visits recommended by WHO is as follows; the first visit between 8-12 weeks of pregnancy, second between 22-26 weeks, third visit at 32 weeks and the fourth visit between 36-38 weeks. The reduced number of visits, focus on quality of care rather than quantity to improve the continuity of care. The integration of services in FANC model also intends to address some of the barriers to utilisation of ANC services in low income countries [1]. During ANC visits, women are counseled on topics such as birth preparedness, danger signs of pregnancy, family planning, nutrition and exclusive breast feeding. The WHO also recommends that women should receive sulfadoxine-pyrimethamine (SP), iron and folic acid tablets, tetanus-toxoid immunization and deworming during prenatal visits. Moreover, during ANC visit routine test for HIV should be done as an entrance point for prevention of mother-to-child transmission services (PMTCT) in HIV-endemic countries[1].

In 2002, Tanzania through Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) implemented FANC program adapted from the WHO guideline. The proposed timing was the first ANC visit before 16 weeks (ideally before 12 weeks but no longer than 16 weeks), second visits at 20-24 weeks, third visit at 28-32 weeks and the fourth visit at 36 weeks of pregnancy[3,7,8]. Despite the reduced number of visits, in Tanzania only 51% of pregnant women received the recommended four or more ANC visits during their last pregnancy [9]. Understanding the extents of ANC utilization and the reasons why women do not complete the four ANC visits is important in designing strategies to address the problem. The aim of this study was to determine the factors influencing the utilization of four or more ANC visits among women in Dodoma region.

Methods

Study Setting

The study was conducted in Dodoma Region, Tanzania. The Region is divided into seven districts, which are Chamwino, Chemba, Kondoa, Bahi, Mpwapwa, Kongwa, and Dodoma Urban. However, the study was

conducted in four districts namely, Dodoma Urban, Kondoa, Kongwa and Chamwino districts. The 2012 Nation Population Census [10] estimated that the Region has about 2,083,588 people. The Average Annual Intercensal Growth Rate is 2.1% and population density is 50 people per sq.km. The percentage of women of reproductive age is 44.1% of the total female population in Dodoma Region. The Region has a total of seven hospitals (5 public; 2 private), 32 Health Centres (26 public; 6 private) and 269 dispensaries.

Design and Participants

A cross sectional study design was used targeting women of reproductive age (18-49 years old) who had at least one child in the past two years. Women who were not willing to participate, those who were sick or had mental health problems were excluded from the study.

Sample Size Determination and Procedure

A formula ($n = z^2 p (1-p) / e^2$) was used to determine the sample size of study participants where n = Sample size; z = z score for 95% confidence interval, which is 1.96; p = Prevalence in previous studies (percentage of women who had four or more ANC visits in Dodoma was 43% [9]); e = tolerable error (set at 5%). The estimated sample size was $n = 377$, 10% was added due to non-response fear and multiplied by a design effect of 2 due to the multistage nature of the sampling method. Therefore, the minimum sample size based on the formula was 791 but a total of 800 participants were studied.

A multistage sampling technique was used to select sample units from the targeted population. In the initial stage, the list of all districts in Dodoma Region was obtained. Dodoma Municipality was selected purposively because it was the only urban district in the region with people of different backgrounds. Three other districts were selected randomly namely, Kondoa, Chamwino and Kongwa. In the second stage, two sub districts called (wards) were randomly selected from each of the four selected districts using a table of random numbers and a total of eight wards were obtained. In the third stage, two villages/streets were selected randomly from each of the eight wards using a table of random numbers, making a total of 16 villages/streets. From each of the 16 selected village/streets, all households with women who had children below five years of age were eligible for the study. Therefore, from each of 16 selected villages/streets, 50 participants were selected from the randomly selected households. Within the households, only one respondent was selected. In the households where there were more than one woman qualifying to participate in the study, a woman who had the youngest child was selected assuming she could remember most of the events that occurred when she was pregnant.

Data Collection Technique and Procedure

Structured questionnaire with open and closed-ended questions was prepared in English and translated to Kiswahili the national language. Before the actual data collection process, the pilot study was conducted with 25 women in one village which was not part of the study catchment area to ensure the consistency of the data collection tools. Two research assistants collected data via face to face interviews. Both research assistants were graduate primary school teachers from outside the community, who underwent a two days training before data collection. We conducted field work from November 2013 to June 2014. The research assistants were regularly supervised by researcher for proper data collection. All the questionnaires were checked for completeness and consistency in daily basis. Data was cleaned, edited and coded before data analysis.

Variables

The dependent variable was focused antenatal care uptake. For the purpose of this study, the number of FANC visits was categorized into dichotomous variables; FANC visits < 4 denotes low uptake and FANC visits \geq 4 denoting adequate uptake. The independent variables were age, ethnic group (tribe), religious, marital status, number of children, level of education, occupation, place of residence, distance to nearby health facility, time spent in Reproductive and Child Health Clinic, months first attend ANC, decision making to attend ANC, source of information and attitude towards health care providers.

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Sciences Software (SPSS) version 21. All probabilities were two-tailed and p-values <0.05 were regarded as significant. To permit quantitative analysis, data were converted into numeric codes representing measurement variables. To answer the research questions, data were analysed based on relationship among the study variables (independent and dependent). Descriptive statistics such as frequency, mean and standard deviation were used to analyse socio-demographic characteristics of participants and number of ANC visits. Logistic regression analysis was used to determine factors associated with the uptake of FANC visits among women in Dodoma Region. Simple logistic regression model was first used to examine the association between each of the background characteristics and the uptake of four or more ANC visits. Variables that were statistically significant and biologically plausible in univariate analysis were entered into a multivariable logistic regression model in order to identify the

factors associated with the uptake of FANC services, while accounting for other potential confounders. The results of the model were presented using odds ratios (OR) and 95% confidence interval (C.I).

Ethical Considerations

Ethical clearance was obtained from the University of Dodoma, Institutional Research Review Committee. Permission was also sought from the Regional Administrative Secretary of Dodoma, District Administrative Secretaries of (Dodoma Municipality, Chamwino, Kondoa and Kongwa) and District/Municipal Council Directors. The permission letters obtained were then presented to the respective District Medical Officers and the local leaders who granted permission to conduct the study in their areas. Verbal consent was also obtained from each participant before data participating in the study.

Results

Socio Demographic Characteristic of the Study Participant

A total of 800 women with children less than two years old were recruited and participated in the study from the four selected districts. The majority of respondents 499 (62.4%) were Wagogo and 193 (24.1%) were Warangi. Age-wise, 523 (65.5%) respondents were between 20 and 34 years old with the minimum and maximum age of 18 and 49 years respectively. The mean age of respondents was 29.23 with standard deviation of 7.255. Majority of respondents 681 (85.4%) were married and 439 (54.8%) had 2-4 children. Results show that 148 (18.5%) of the women had no formal education but high proportion of women 562 (70.3%) had primary education. Moreover, about 633 (79.1%) of respondents were peasants and the majority 600 (75%) were living in rural area (Table 1).

Extent of ANC Utilization among Respondents

During the survey an inquiry was made about ANC attendance during the previous and most recent pregnancy. It was observed that almost all women 797 (99.6%) attended ANC at least once and 415 (51.9%) women had attended four and more visits. Although, pregnant women are advised to start ANC immediately once they recognise that they are pregnant, only 245 (30.6%) attended first ANC between one and three months (Table 2). Generally, the mean period of first ANC visit was 4.28 months with a standard deviation of 1.384. The minimum and maximum periods were one and nine months of pregnancy respectively. This implies that some women attended ANC late during pregnancy, limiting their opportunity to be screened for infections and micronutrient deficiencies.

Table 1: Socio demographic characteristics of respondents in Dodoma Region

Variable (N=800)	Frequency	Percent
Age in years		
< 20	65	8.13
20-34	523	65.38
35-49	203	25.37
Do not remember	9	1.12
Ethnic group		
Wagogo	499	62.4
Warangi	193	24.1
Others	108	13.5
Religion		
Christian	583	72.9
Muslims	217	27
Marital status		
Married	683	85.4
Single	69	8.6
Separated	25	3.1
Divorced	12	1.5
Widowed	11	1.4
Number of children		
1	171	21.4
2-4	439	54.8
5 and more	190	23.8
Education		
No formal education	148	18.5
Primary education completed	562	70.3
Secondary education	81	10.1
Tertiary education	8	1.0
Employment		
Employed	34	4.3
Self employed	133	16.6
Peasant	633	79.1
Place of residence		
Urban	200	25
Rural	600	75

Determinant Factors of Focused Antenatal Care Uptake

Binary logistic regression model was first used to identify the predictors of FANC Uptake. The results indicated that mother's age ($p < 0.016$), place of residence ($p < 0.001$), month first attendance ($p < 0.001$) and source of formation ($p < 0.017$) were strong predictors of the FANC uptake. Regarding the age a mother, results have shown that the likelihood a woman to attend four or more ANC visits increases with an increase in

Table 2: Extent of ANC utilisation

Variable	Frequency(N=800)	Percent (%)
ANC attendance		
Yes	797	99.6
No	3	0.4
Timing of first ANC		
No visit	3	0.4
1-3 months	245	30.6
4-6 months	502	62.8
7-9 months	41	5.1
Do not remember	9	1.1
Number of ANC visits		
No visit	3	0.4
4 visits and above	415	51.9
Less than 4 visits	382	47.7

mother's age ($OR=1.024$, $p < 0.016$). With respect to the place of residence, the results revealed that women living in urban area ($OR=0.577$, $p < 0.001$) were significantly less likely to attend four or more ANC visits in compare to women residing in rural area. Regarding the month when a woman attends ANC for the first time, the results have shown that the likelihood a woman to attend four or more ANC visits decreases with an increase in months of first ANC visit ($OR 0.261$, $p < 0.001$). Regarding the source of information that the woman has, the results have shown that FANC visits among women are lower among women who rely on newspapers as a source of information compared to those who rely on health care providers ($OR 0.125$, $p < 0.017$) as indicated in Table 3.

Multivariable Logistic Regression Model of Predictors of the Focused Antenatal Care Uptake

The results in multivariable logistic regression model displayed in table 4 showed that, the effect of mother's marital status ($p= 0.146$) was no longer significant. However, the mother's age ($p=0.043$), place of residence ($p=0.008$), month first attend ANC ($p=0.000$) and source of information ($p= 0.044$) were significantly potential predictor of the FANC uptake. Results of the multivariable logistic regression model indicated that the likelihood a woman to attend four or more ANC visits increases as age of the mother increased ($OR=1.023$, $p < 0.043$). With regard to the place of residence, the results showed that the uptake of FANC was significantly lower among women who stayed in urban area compared to those who stayed in rural area ($OR=0.613$, $p < 0.008$). Regarding the month when a woman attends ANC visit for the first time, results showed that the likelihood a woman to attend four or more ANC visits decreases with an increase in months first attended ANC visits ($OR 0.212$, $P < 0.000$). With regard to the source of information that the woman has, results showed that the uptake of FANC visits was significantly lower among women

Table 3: Unadjusted Odds ratios (OR) for the predictors of Focused Antenatal care uptake			
Effect	OR	C.I	P -VALUE
Age in years	1.024	[1.004, 1.044]	.016
Ethnic group (tribe)			.176
Warangi	1.257	[.783, 2.018]	.344
Wagogo	.914	[.603, 1.386]	.671
Religious belief			
Christian	.822	[.601, 1.125]	.221
Marital status			.076
Married	3.097	[.815, 11.773]	.097
Single	1.933	[.472, 7.922]	.360
Separated	1.500	[.316, 7.124]	.610
Divorced	2.667	[.466, 15.252]	.270
Number of children	1.005	[.936, 1.080]	.882
Educational level			.215
Tertiary	.403	[.048, 2.062]	.275
Secondary education	.360	[.072, 1.801]	.214
Primary education completed	.254	[.079, 1.333]	.105
Occupation			.268
Formal employment	.942	[.648, 1.133]	.756
Self employment	.558	[.274, 1.370]	.107
Place of residence			
Urban	.577	[.417, .797]	.001
Distance to nearby health facility			
Within 5 Km	.830	[.549, 1.257]	.380
Time spent in Reproductive and Child Health Clinic			.705
Less than 1 hour	.787	[.558, 1.364]	.403
1- 2 hours	.872	[.448, 1.381]	.550
Months first attend ANC	.261	[.194, .352]	.001
Decision making to attend ANC			.430
Relative	1.923	[.471, 5.861]	.434
Husband	2.318	[.556, 8.508]	.205
Both, wife and husband	1.662	[.631, 6.649]	.372
Source of information			.148
Radio	.717	[.319, 1.612]	.421
Television	.611	[.268, 2.062]	.242
Newspaper	.125	[.023, .692]	.017
Others	.677	[.222, 1.395]	.492
Attitude towards health care providers			
Friendly	.985	[.723, 1.342]	.922

Reference Categories: *Ethnic group*= others; *Religious belief*=Muslim; *Marital status* = Widowed; *Occupation* = Peasant; *Distance to RCH* = More than 5 km; *Time spent in RCH clinic* = More than 2 hours; *Place of residence*=Rural; *Decision maker* = Relatives; *Source of Information* = Health Service Providers; *Attitude towards health care providers* = Unfriendly

who rely on newspapers as a source of information as compared to those women who rely on health care providers (OR 0.176, P < 0.044).

Table 4: Adjusted Odds ratios (aOR) for the predictors of focused Antenatal Care Uptake

Effect	aOR	C.I	p -VALUE
Age in years	1.023	[1.001, 1.045]	.043
Marital status			.146
Married	4.184	[.947, 18.488]	.059
Single	3.384	[.701, 16.339]	.129
Separated	1.849	[.323,10.585]	.490
Divorced	5.388	[.780, 37.218]	.088
Place of residence			
Urban	.613	[.426, .883]	.008
Months first attend ANC	.212	[.152,.295]	.000
Source of information			.248
Radio	1.058	[.756,1.479]	.743
Television	1.444	[.572,3.643]	.437
Newspaper	.176	[.032,.957]	.044
Others	1.431	[.526,3.892]	.483

Reference Categories: *Marital status = Widowed; Place of residence=Rural; Source of Information = Health Service Providers*

Discussion

Extent of ANC Utilization among Respondents

ANC attendance is the key entry point for pregnant women to receive different health promotion interventions and disease preventive services. It promotes the use of health facility services during delivery and postpartum care services. It is expected also to reduce maternal morbidity and mortality [2,11]. Fortunately; Dodoma like other places in Tanzania, ANC attendance is high as the study results showed that almost all women 99.6% attended ANC at least once during pregnancy. This finding is similar to the finding of the previous study conducted in Southern Tanzania which showed that 99.8% of respondents reported to have attended antenatal clinic at least once during their last pregnancy [12]. Similar findings from Tanzania Demographic Health Survey (TDHS)[9] showed that 99.2 % of women received ANC from skilled healthcare providers at least once in Dodoma Region. The coverage of ANC attendances was high almost in all parts of the country whereby 98 % of women reported attending ANC at least once [9]. The possible explanation for the universal coverage of one ANC visit in Dodoma could be the community mobilization and sensitization on the importance of ANC visits by healthcare providers. Other reasons for universal coverage observed in earlier studies include: women seeking care for anemia and malaria prophylaxis, tetanus immunization and assurance of the wellness of unborn babies. It has also been reported that women attend ANC once for registration purposes and

to secure a clinic card in order to be accepted at the health facility in case of complications during pregnancy or childbirth [13]. This may also be a motivation for women to attend ANC in Dodoma Region.

Although ANC attendances coverage at least one visit was very high, timing of the first ANC visit was very late. The results showed that, only 30.6 % of women attended first ANC between one and three months of pregnancy which is the recommended period for ANC booking. The minimum and maximum periods for ANC booking were one and nine months of pregnancy, implying that, some women initiated first ANC visit during the last month of pregnancy. This is dangerous because it limits their opportunity to undergo regular checkups of their health and early identification of risk factors. Similar results of late ANC attendances among pregnant women was observed in the TDHS [9] results where only 24 % of women had their first ANC visits in the first trimester while 73.5% of women attended ANC in the second and third trimesters of pregnancy. This translates to less opportunity for receiving regular scheduled checkups before delivery. Observations made in Ethiopia indicated late timing of the first ANC. Out of 369 respondents, only 47.2% made their first ANC visits during the first trimester and the remaining 52.8% started ANC late, either in the second or third trimester[14].

The current study indicates that only 52 % of the women in the study area had attended ANC four times and more. Similar finding was observed from TDHS [9], which showed that only 50.7% of respondents had four or more ANC visits during pregnancy. The finding of this study is also consistent with the finding of a study conducted in Kenya which showed that the uptake of focused antenatal care was slightly higher than half (52%)[15]. Other studies done by Ayalew, et al.,[16] and Chorong, et al.,[17] also showed that the uptake of FANC among women was low (35.3% and 32% respectively). The WHO [11] recommends pregnant women without complication to attend at least four antenatal visits. Some women in the study area may not be able to attend all four ANC as recommended because of late ANC booking, as only 30.6 % of women in this study attended first ANC between one and three months. Regular ANC visits as scheduled helps women to finish all necessary health intervention which results into reduced risk of maternal and child morbidity and mortality.

Determinant Factors of Focused Antenatal Care Uptake

The findings of this study demonstrated a significant association between age of respondents, place of residence, month first ANC visit and source of information with the uptake of FANC. With regard to the age of respondents, the study showed that the number of ANC visits were likely to increase as age of the mother increased. This result was similar with the findings of the study conducted elsewhere which also demonstrated that younger women were less likely to use antenatal care services than older women [18-21]. It has also been reported from other studies that

age is often presented as a proxy for accumulated experience, including the use of maternal health services [22- 23]. This means that, older women may have more knowledge and place more value on modern healthcare services [24]. However, during ANC visits, older women may be told by healthcare providers to attend more visits because older age is a biological risk factor [23]. This could also apply to women in Dodoma Region.

Regarding place of residence, results showed that the uptake of focused antenatal care was significantly lower among women who stayed in urban area compared to those who stayed in rural area. This finding differs from results of the study conducted in Ethiopia which showed that women in urban area were more likely to use ANC services compared to women from rural area [14]. A study conducted by Bbaale[2] also showed that being in a rural area compared to one in urban area reduces the utilization of antenatal care contents provided to pregnant women during ANC visits. The observed differences in this study could be due to continuous health education on the importance of attending ANC visits regularly by healthcare providers in healthcare facilities including primary healthcare facilities. However, ANC services can be provided through outreach program reducing the geographical barrier in accessing service in rural area.

Regarding the month when a woman makes ANC visit for the first time, the results showed that the likelihood for a woman to attend four or more visits decreases with an increase in months of the first ANC visits. This finding is similar with the results of a study conducted by Muyunda[25], which showed that majority of women who booked the first ANC in the first trimester attended four or more visits compared to those who booked the first ANC in the third trimester. Late initiation of the first ANC visit may make it impossible for the woman to attend all recommended four or more visits. Also, she may not be able to receive necessary interventions thus risking the health of both the woman and the unborn baby.

Regarding source of information, study results showed that women who relied on the information from the newspapers were less likely to have more ANC visits compared to those who received information from healthcare providers. This finding is similar with the results from a study conducted in Uganda, which showed that inadequate exposure to media contributes to low utilization of FANC [26]. This could be due to the fact that many people in Tanzania rarely read newspapers and rely on a verbal tradition (word of mouth) more than anything else. Findings from other studies also showed that media penetration among women influenced the utilisation of ANC [27-29]. However, healthcare providers in the study area are in a better position to inform women about the importance of more ANC visits as recommended.

Study Limitation

This study used cross sectional survey design on which the data on dependent and independent variables was collected at the same point in time and therefore, no causal interpretation can be made on the relationships between variables. However, women who had history of poor outcome of pregnancy or early neonatal deaths were not included in the study and therefore the result cannot be generalized.

Conclusion

The uptake of FANC services among women in Dodoma region are below the WHO's recommendations. Most women did not make the recommended number of four or more ANC visits. Factors significantly associated with FANC uptake identified in this study are age of respondents, place of residence, month initiate first ANC visit and source of information. This study adds knowledge to the field of reproductive and child health, especially on the determinant factors for the uptake of FANC. It is therefore, recommended healthcare providers enhance health education promoting focused antenatal care uptake and early initiation of ANC visit. More emphasize should be on women staying in rural area and young women in order to reduce maternal morbidity and mortality.

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References

1. WHO UNICEF (2003) Antenatal care in developing countries: Promises, Achievements and Missed opportunities: An analysis of trends, levels, and differentials: 1990–2001. Geneva, New York: WHO & UNICEF.
2. Bbaale E (2011) Factors influencing the utilisation of antenatal care content in Uganda. *AMJ* 4(9): 516-526.
3. Magoma M, Requejo J, Campbell O, Cousens S, Meriardi M, et al. (2013) The effectiveness of birth plans in increasing use of skilled care at delivery and postnatal care in rural Tanzania: a cluster randomized trial. *Tropical Medicine and International Health* 18(4): 435–443.

4. Awusi VO, Anyanwu EB, Okeleke V (2009) Determinants of antenatal care services utilization in Emevor Village, Nigeria. *Benin Journal of Postgraduate Medicine* 11: 21-26.
5. Agus Y, Horiuchi S (2012) Factors influencing the use of antenatal care in rural West Sumatra, Indonesia. *BMC Pregnancy and Childbirth* 12: 9.
6. Babalola S, Fatusi A (2009) Determinants of use of maternal health services in Nigeria: Looking beyond individual and household factors. *9*: 43.
7. WHO (2007) Everybody's business: Strengthening health systems to improve health outcomes– WHO's Framework for Action. Geneva: World Health Organization.
8. MOH Report (2005) Health services in Tanzania.
9. Tanzania Demographic and Health Survey and Malaria Indicator Survey 2015-2016.
10. National Bureau of Statistics (2013) The 2012 Population and Housing Census for the United Republic of Tanzania.
11. WHO Report (2010) Trends in Maternal Mortality.
12. Mpembeni RMN, Killewo JZ, Leshabari MT, Sirel N, Massawe SN, et al. (2007) Use pattern of maternal health services and determinants of skilled care during delivery in Southern Tanzania: implications for achievement of MDG-5 targets. *BMC Pregnancy and Childbirth* 7: 29.
13. Ntambue AML, Malonga KF, Dramaix-Wilmet M, Donnen P (2012) Determinants of maternal health services utilization in urban settings of the Democratic Republic of Congo – A Case study of Lubumbashi City. *BMC Pregnancy and Childbirth* 12: 66.
14. Belayneh T, Adefris M, Andargie G (2014) Previous Early Antenatal Service Utilization Improves Timely Booking: Cross-Sectional Study at University of Gondar Hospital, Northwest Ethiopia. Volume 2014, Article ID 132494, 7 pages.
15. Gitonga E (2017) Determinants of Focused Antenatal Care Uptake among Women in Tharaka Nithi County, Kenya, *Hindawi -Advances in Public Health*; Volume 2017, Article ID 3685401, 4 pages.
16. Ayalew TW, Nigatu AM (2017) Focused antenatal care utilization and associated factors in Debre Tabor Town, northwest Ethiopia. *BMC Res Notes* 11: 819.
17. Chorongo D, Okinda FM, Kariuki EJ, Mulewa E, Ibinda F, et al. (2016) Factors influencing the utilization of focused antenatal care services in Malindi and Magarini sub-counties of Kilifi county, Kenya. *Pan Afr Med J* 25(Suppl 2): 14.
18. Dario MD, Owoyokun KE (2010) Factors Affecting the Utilization of Antenatal Care Services in Ibadan, Nigeria. *Benin Journal of Post Graduate Medicine* 12: 3-13.
19. Titaley CR, Dibley MJ, Roberts CL (2010) Factors associated with underutilization of antenatal care services in Indonesia: results of Indonesia Demographic and Health Survey 2002/2003 and 2007. *BMC Public Health* 10: 485. doi: 10.1186/1471-2458-10-485
20. Pallikadavath S, Foss MRM, Stones WR (2007) Antenatal Care in Rural Madhya Pradesh: Provision and Inequality. *Population Resource Centre, Madhya Pradesh* 05-16.
21. Reynolds HW, Wong EL, Tucker H (2006) Adolescents' Use of Maternal and Child Health Services in Developing Countries. *International Family Planning Perspectives* 32(1): 6-16.
22. Navaneetham K, Dharmalingam A (2002) Utilization of maternal health care services in Southern India. *Soc Sci Med* 55(10): 1849-1869.
23. Gleit DA, Goldman N, Rodriguez G (2003) Utilization of care during pregnancy in rural Guatemala: does obstetrical need matter? *Soc Sci Med* 57(12): 2447-2463.
24. Reynolds HW, Wong EL, Tucker H (2006) Adolescents' use of maternal and child health services in developing countries. *Int Fam Plan Perspect* 32(1): 6-16.
25. Muyunda B, Makasa M, Jacobs C, Musonda P, Michelo C (2016) Higher Educational Attainment Associated with Optimal Antenatal Care Visits among Childbearing Women in Zambia. *Front. Public Health* 4: 127. doi: 10.3389/fpubh.2016.00127
26. Tann CJ, Kizza M, Morison L, Mabey D, Muwanga M, et al. (2007) Use of antenatal services and delivery care in Entebbe, Uganda: a community survey. *BMC pregnancy and childbirth* 7: 23.
27. Adekanle DA, Isawumi AI (2008) Late antenatal care booking and its predictors among pregnant women in south western Nigeria. *Online Journal of Health and Allied Sciences* 7(1): 1-6.
28. Pallikadavath S, Foss M, Stones RW (2004) Antenatal care: provision and inequality in rural north India. *Social Science & Medicine* 59(6): 1147–1158.
29. Sharma B (2004) Utilization of antenatal care services in Nepal. *Nepal Population Journal* 11(10): 79–97.