Journal of Biostatistics and Biometric Applications
Volume 7| Issue 1
ISSN: 2455-765X

Research Article Open Access

Demographic and Socioeconomic Influence on Antenatal Care Utilization Among Pregnant Women in Wa Municipality of The Upper West Region of Ghana

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Citation: Angko W (2022) Demographic and Socioeconomic Influence on Antenatal Care Utilization Among Pregnant Women in Wa Municipality of The Upper West Region of Ghana. J Biostat Biometric App 7(1): 103

Abstract

Introduction: It remains unclear if benefits of antenatal care can be attributed to the amount and content of care or to uncontrolled risk factors that might also affect its use. An understanding of the factors influencing antenatal care is still a challenge because the pathways through which the effects are obtained remain elusive.

Objective: The study examined the factor influencing antenatal care utilisation in the Wa Municipality.

Methodology and Data: The study employed a retrospective cohort design. The probability proportionate to size sampling was used to select the sub-district health catchment facilities, while the systematic random sampling was used to select respondents. Data was collected from 353 women based on the status of Antenatal care utilization.

Results: The results suggest that the educational status, maternal knowledge on adequacy of four or more antenatal care, score for general services received, number of tetanus toxoid doses received and anaemia status at Antenatal care registration were significant predictors to adequate antenatal care utilization.

Conclusion: The study further found that women who had anaemia at antenatal care registration, General quality of received women received at antenatal care, level of Tetanus doses as well as knowledge on the adequacy of antenatal care were significant factors that influence antenatal care usage among reproductive aged women in the Wa municipality. The implication is that, attention should be drawn by health management authorities to ensure an improvement in the coverage antenatal care in Wa Municipal while health staff are encouraged to enforce to the latter all due protocols in the discharge of their duties at antenatal care utilisation in Ghana

Keywords: Demography, Socioeconomic, Antenatal Care, Utilisation

List of abbreviations

ANC: Antenatal Care
WHO: World Health Organisation

JICA: Japan International Cooperation Agency
CHPS: Community Health Planning and Service
FANC: Focused Antenatal Care
LMICS: Low and Middle Income Countries
RHD: Regional Health Directorate
UWR: Upper West Region
BPCR: Birth Preparedness and Complication Readiness
DHS: Demographic and Health Survey
UK: United Kingdom
NHIS: National Health Insurance Scheme
AOR: Adjusted Odd Ratios
TT: Tetanus Toxoid
SP: Sulphadoxine Pyrimethamine
OPD: Out Patient Department

Introduction

The concept of reproductive health is based on the principle that every woman has the right to control her own sexuality and reproduction without discrimination regardless of age, marital status or income [56]. Ensuring the highest possible standards of reproductive health care for girls and women is fundamental to the exercise of their reproductive rights and freedoms, and to the exercise of the broad array of other human rights to which girls and women are entitled [23]. As a result, the International human rights law includes fundamental commitments of states to enable women and adolescent girls to survive pregnancy and childbirth as part of their enjoyment of sexual and reproductive health and rights and living a life of dignity [67]. The World Health Organization (WHO) envisages a world where "every pregnant woman and new-born receives quality care throughout the pregnancy, childbirth and the postnatal period" [62]. However, approximately 303,000 women and adolescent girls died as a result of pregnancy and childbirth-related complications in 2015 [28,44,65]. Approximately 2.6 million babies were stillborn in 2015 and these were mainly in low-resource based settings [16]. This phenomenon emphases the need for continuum of care during pregnancies to include antenatal care utilisation by all pregnant women. Antenatal care (henceforth, ANC) according to WHO, (2016) is the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both mother and the unborn child during pregnancy. Accessibility to good quality antenatal care is critical and may ensure favourable maternal and neonatal outcomes if the underlying factors influencing the provision and uptake of the antenatal services are well understood and tackled appropriately. Despite the number of interventions and policies implemented by Ghana Health Service and its partners to increase access to quality maternal and child care services over the years in the municipality, there are still some adverse maternal and neonatal outcomes that portray some doubts in terms of quality. More specifically, the Wa Municipal Health Directorate has been vigorously implementing the safe motherhood policy that include the issues of focused antenatal care and life saving skills over the years. Furthermore, the municipal has benefitted a lot from the JICA Phase I and II projects especially the massive expansion of CHPS compounds and capacity building of health staff aimed at increasing access to maternal and child health services since 2006. Notwithstanding all these interventions, some notable poor-quality indicators such as stillbirth, neonatal outcomes due to prematurity, Antenatal care of 4+ visits coverage, low birth weight among others are still subjects of concerns in the Municipality. These not only contribute to the burden of neonatal morbidity and mortality, but it also has profound effects such as the early origin of cardiovascular diseases in later life especially low birth weight.

Importance of Antenatal Care

The importance of Antenatal care utilisation cannot be over emphasized as it has profound effects on the health outcome of both the mother and unborn baby [64]. The major objective of antenatal care is to prevent and manage health problems, provide appropriate information and advice to improve pregnancy outcomes [29]. During antenatal care visits, screening for complications and advice on a range of issues, including birth preparedness, place of delivery, and referral of mothers with complications takes place. Information on antenatal care is of great value in identifying subgroups of women who do not use such services and is useful in planning improvements in these services [60]. It has been established that it is unlikely that one type of intervention is substantially better than another, but a combination of interventions may yield stronger effect [39]. Antenatal care provides an important opportunity to prevent and manage concurrent diseases through integrated service delivery. In low and middle-income countries (LMICs), antenatal acre utilization has increased since the introduction in 2002 of the WHO antenatal care model, known as Focused Antenatal Care (FANC) or basic antenatal care. This is a goal-orientated approach to delivering evidence-based interventions carried out at four critical times during pregnancy [64]. Despite the importance placed on antenatal care usage in Ghana, the Wa Municipal record of antenatal care is questionable in recent years. Adequate antenatal care of 4+ coverage has been below target of 80% for three consecutive years (77% in 2014, 74% in 2015 and 2016) whilst skilled delivery coverage continues to increase. In 2016, Wa Municipal recorded the highest in the region for skilled delivery coverage of 127.3% (RHD-UWR, 2016). In addition, the municipality recorded 64% first trimester registration at antenatal care far below the regional target of 80% in 2016. Anaemia is a particularly serious problem for pregnant women, which can lead to premature delivery and delivery of low birth weight babies (Ghana Statistical Service, 2014).

Antenatal care remains one of the Safe Motherhood interventions that if properly implemented in Ghana and has the potential to significantly reduce maternal and perinatal mortalities [48]. Antenatal care interventions have been found to enhance maternal and new-born health, which can also impact the survival and health of the mother and infant [17]. Antenatal period presents opportunities for reaching pregnant women with interventions to maximize maternal and neonatal health [55]. During Antenatal care, the chances for pregnant women to make appropriate and informed choices and decisions, contribute to optimum pregnancy outcome and improved care of the new-born [8]. In high-income countries, virtually all women have at least four antenatal care visits, are attended by a skilled health worker during childbirth and receive postpartum care. In 2015, only 40% of all pregnant women in low-income countries had the recommended antenatal care visits [66]. A study in Kenya indicated that 52.5% of women in rural areas and 49.2% in urban settings attended antenatal care once prior to delivery and the first Antenatal visit was after 28 weeks of pregnancy [22]. In Ghana, 85% attended at least one antenatal visit with a skilled provider before delivery. Seventy-three percent of pregnant women in urban areas and 55% in rural areas were more likely to attend 4 or more antenatal visits [49,51]. However, survey from the Ghana Statistical Service (2014) showed that 97% of women in Ghana receive antenatal care from a skilled provider with almost no mothers receiving antenatal care from a traditional birth attendant and only 3 percent of mothers receiving no antenatal care for their most recent birth in the five years before the survey (Ghana Statistical Service, 2014). This is in contrast to an earlier study report that indicated that, up to 40% of pregnant women in developing countries receive no antenatal care [2] and in Ghana 14% of women did not attend antenatal care at all [49]. More so, another study revealed the proportion of women who did not attend antenatal care to be lower (1.1%) [5]. The Ghana Statistical Service (2014) report again showed that a large proportion of pregnant women in Ghana (87 percent) had four or more antenatal care visits for the most recent live birth, an increase from 78 percent in 2008. The median duration of pregnancy for the first antenatal visit is 3.6 months (Ghana Statistical Service, 2014). Expectedly, the percentage of deliveries occurring in a health facility has also increased from 42 percent in 1988 to 73 percent in 2014, the percentage of births attended by a skilled provider has increased from 40 percent to 74 percent over the same period (Ghana Statistical Service, 2014). This reaffirms a study that showed that in some developing countries, far more women are seen by health workers during pregnancy than are delivered by a trained attendant. [18]. In light of evidence from a 2001 systematic review [18], the World Health Organization (WHO) began promoting a new model of antenatal care for low-income countries, moving away from the traditional model, developed largely in the West "the focused antenatal care".

Focused Antenatal Care

Focused antenatal care (FANC) which offers a range of services to a pregnant woman such as health promotion and education on different topics on reproductive health including importance of Focused antenatal care danger signs in pregnancy, nutrition in pregnancy, breastfeeding, family planning and birth preparedness among others (WHO, 2006). Reports have shown that women who starts antenatal care early and make at least 4 antenatal care visits are more than three times on average more likely to deliver in a health facility under the supervision of a qualified personnel than those who visits antenatal care less frequently (WHO, 2006). However, [39] Mbuagbaw et al., (2015) revealed that almost half of pregnant women worldwide and especially in developing countries do not receive this amount of antenatal care. Timely and adequate visits for antenatal care, therefore, avoids adverse pregnancy outcomes if pregnant women are provided with quality care during antenatal period. The WHO recommends a minimum of four antenatal care visits (FANC) with the first visit before 16 weeks, second visit between 24-28 weeks, third visit at 32 weeks and the last visit at 36 weeks [14]. Hence, the World Health Organisation standards for provision of effective antenatal care stipulates that a pregnant woman receive at least four skilled assessments through focused antenatal care involving interventions outlined in WHO antenatal care model (WHO, 2007). Although a more recent systematic review has raised questions about the efficacy of focused ANC (Dowswell et al., 2010) and revised evidence-based guidelines are being compiled, focused antenatal care remains the WHO recommendation for low-income countries (WHO, 2011d).

Literature Review

Despite decades of implementation of maternity healthcare programmes, including a focus on increasing the use of antenatal care (ANC) and concomitant birth preparedness and complication readiness (BPCR), the uptake of antenatal care continues to be below

expectations in many developing countries. This has attendant implications for maternal and infant morbidity and mortality rates [59]. An analysis of Demographic and Health Surveys (DHS) from 45 developing countries showed that women in sub-Saharan Africa particularly adolescent pregnant women start antenatal care considerably later than women from other regions. Therefore, they do not fully benefit from its preventive and curative services as compared to their adult counterparts [26] (Magadi, et al., 2007, WHO, 2003). Identifying non-geographic and modifiable barriers to antenatal care is important for policy formulation [5]. Various studies across the world have shown that many factors can be associated with late antenatal care booking [3,4,20,26]. These include social-demographic factors, social-economic factors and biological factors. Other factors may be barriers faced by women in accessing health care and these barriers may influence their decisions to attend antenatal care early. Evidence from studies done in the UK and Tanzania show that social-demographic factors such as not being married or not living with the husband, being of ethnic groups with a low social standing, are associated with late antenatal care booking [20,26,27]. Hagey et al., (2014) explored the social and behavioural factors that affect timely initiation of antenatal care from the perspective of health care providers in Kigali city. They found that women's knowledge gaps, having previous births, limited involvement of male partners, problems with health insurance, and antenatal care culture were the main barriers to first antenatal care initiation.

Additionally, Quantitative studies on timing of antenatal care attendance from developing countries have been able to shed light on the influence of socio-demographic factors. Late booking of antenatal care has repeatedly been associated with young age , premarital status [40] (Magadi et al., 2000), unwanted pregnancies [35,40] (Magadi et al., 2000), high parity [37,40](Magadi et al., 2000, 2007), lack of formal education [37,40] (Magadi et al., 2007), low socio-economic status [40] (Magadi et al., 2000) and ethnicity [37] (Magadi et al., 2000). Less is known about the influence of demographic and socioeconomic factors influencing antenatal care utilisation among pregnant women in Ghana.

Factor Influencing Antenatal Care Utilisation

Results from a study conducted in two rural districts of the Upper West Region, Ghana on the use of antenatal care revealed that the overall use of antenatal care during pregnancy was shaped by cultural factors related to perceptions of pregnancy, gender-based roles and responsibilities and concerns that antenatal care would result in an overweighed baby and culturally inappropriate delivery at a health care facility. The average number of antenatal care visits were 3.34±1.292, and the majority of expectant mothers (71.3%) enrolled for antenatal care at the 8th week or later, with the longest delay recorded at the 6th month of gestation. Traditional norms significantly influenced this delay [59]. Another study showed that, in the Upper East Region of Ghana, family heads consulted soothsayers before deciding on whether to allow the expectant mother to honour the antenatal care appointment [1]. Aside that, there are other cultural factors which according to [59] Sumankuuro et al study in 2017, portrayed some mothers preferring TBA care because they felt their cultural needs could not be met at the health facility setting, particularly if they could be sure that placenta could be buried appropriately. Other culturally premised barriers to prenatal care also included stigmatisation of pregnant women by community members, the need for pregnancy rites for prime mothers and concerns over women who "belong to a dangerous belief system" also attending the health facility, in such cases, there seemed little point in receiving antenatal care. [59]. Qualitative as well as quantitative studies have stressed the influence of social support from family members [7,63].

A study from Nepal for example reported the important role of mothers-in-law in deciding about antenatal care use of their pregnant daughters-in-law [54]. Studies from Uganda showed that adolescents were more likely to experience violence from parents, to be rejected by their partner, expelled from school, and to be stigmatized [7,38], and therefore to hide their pregnancy [38]. Late recognition of and uncertainty about the pregnancy [30,32,47], as well as cultural beliefs and practices around pregnancy [19,36], have been reported to influence women's timing of antenatal care attendance. Ethnographic studies from Mozambique and southern Tanzania illustrated for example that women at an early stage of pregnancy delayed antenatal care initiation purposely in order to protect the unborn from witchcraft and sorcery attacks of jealous neighbours and kin [19]. Hence, greater understanding of the sociocultural barriers to antenatal care is essential if proposed changes in community-specific health education programs are to facilitate early commencement and increased use of antenatal care [59]. Studies have also shown that social-economic factors such

as the educational level of the woman, wealth level, employment status, exposure to media, lack of knowledge about importance of early antenatal care are associated with late antenatal care booking [3,4,55]. Biological factors like nulliparity, previous foetal loss and HIV status may be associated with late antenatal care booking as seen in studies done in Nigeria, Tanzania, Kenya, Zambia [9,53]. Women may experience barriers in accessing health such as long travel distances to health facilities, staff availability at the health facilities, staff attitudes at health facilities, problems getting money for treatment, having to take transport to the health facility and concerns about clinic booking procedures (Enabudoso et al, 2012, Ifenne and Utoo, 2012, Nwosu et al, 2012, Solarin and Black, 2013). Different factors influence the healthcare seeking behaviour of pregnant women (Nielsen et al, 2001). These factors could be organizational, such as the availability of services, or socio-demographics [50] (Magadi et al., 2000). Socio-demographic characteristics, such as education, occupation and number of children, were related to the use of antenatal care services in Vietnam (Graner et al, 2010, Trinh, Dibley, and Byles, 2007). In Punjab, Pakistan, family finances and the woman's level of education were important determinants of antenatal care use (Mumtaz and Salway, 2007). In Nigeria, perceived quality of care was one of the factors responsible for the low utilization rate of antenatal care services in tertiary institutions in the Southwest part of the country [48]. A population-based study from the 2007 Zambia demographic and health survey showed that more than 50% of Zambian pregnant women book for antenatal care late with a high proportion associated with presence of unplanned or unwanted pregnancies in women younger than 20 years of age. The concentration of this problem in lower or no education groups may be an illustration of existing inequalities, which might further explain limitations in health promotion messages meant to mitigate this challenge. There is thus urgent need to re-pack health promotion message to specifically target this and related poor groups (Nyambe et al, 2016). It looks reasonable that unplanned pregnancies may not receive much attention regarding early antenatal care booking as shown in the above Zambian study. Various barriers to early antenatal care booking may surround unplanned pregnancy and may include shame due to conception at old age, poor family spacing or delayed diagnosis of pregnancy. (Nyambe et al, 2016). Results similar to the findings in this study done in the Copperbelt province of Zambia and Tanzania showed that women with unplanned pregnancy were 4.4 times and two times respectively more likely to book for antenatal care late compared to those with planned pregnancies [9] (Exavery et al., 2013). It is therefore recommended that access to family planning methods as well as benefits to early antenatal care booking and attendance be made as a right.

To support this, the health promotion packages that encourage pregnant women to book for antenatal care early must thus be repackaged to suit differential background characteristics that account for their differences in education status, age and parity (Nyambe et al, 2016). The reasons why some women in sub-Saharan countries including Ghana do not seek or get adequate antenatal care are not obvious. In order to improve the planning and provision of antenatal care services, it is important to understand perceived or apparent barriers to antenatal care services. This will enable the formulation and implementation of interventions that will sustain antenatal care utilization [48] (Magadi et al., 2000). In a prior study in Ghana, cost incurred while accessing antenatal care services was partly due to consultation fees and drugs [49]. Cost was an influencing factor for 49% of the pregnant women in their antenatal attendance to public hospitals and private traditional birth attendants in a study conducted in Kumasi and was associated with increased likelihood of a woman experiencing an adverse outcome including distance and parity. Aside that, lack of insurance, being unaware of pregnancy, and not being sick were reasons that statistically influenced antenatal care attendance. These limited the number of antenatal care visits attended and consequently the services obtained [5]. Cost may be related to travel and unofficial fees [63]. Cost could also be due to feeding expenses for the pregnant woman and more so if she was accompanied by a family member. Buying drugs and supplies that were not provided or not covered by the National Health Insurance Scheme (NHIS) could also constitute cost. Cost was also cited as an obstacle to enrolling women in the NHIS [41,42,43]. To avoid the long wait time in public facilities, some of these women may have ended up in private or maternal home facilities. The fees charged could be high and may determine how many times a woman attends antenatal care [5]. Cost as a determinant is re-enforced by the fact that 49.2% of pregnant women according to a study had a primary level or no formal education and were of low-income level. The level of education of the pregnant woman [52,61] and that of her husband has been shown to be a barrier in accessing antenatal care even in developed countries. A higher level of education would increase the woman's knowledge, awareness and effectiveness of antenatal services and the consequences. This knowledge could influence her healthcare decision-making. Lack of knowledge of obstetric complications was associated with underutilization of antenatal services in Indonesia [61]. Similar studies involving Planned Parenthood and other healthcare services in Metro Cebus, Philippines and Haiti observed that maternal education was

the most consistent and important determinant of antenatal care use [12,13]. Recent studies have suggested that women who knew about risk factors were more likely to utilize health facilities for delivery than those without knowledge [45,57]. For example, in Tigray Zone, Ethiopia, many expectant mothers had no knowledge of the benefits they would derive from utilising skilled maternity care, this lack of health literacy, combined with mockery, shame and stigmatisation from the family and community if they sought antenatal care, resulted in the absence of antenatal care uptake [10,58]. To address some of these barriers associated with accessing antenatal care services, the government of Ghana established the National Health Insurance Scheme in 2003 to replace the previous "cash-and-carry" system. The goal was to provide essential health services without out-of-pocket payment at the point of service with some category of people exempt from paying insurance premiums. Thus, insured pregnant women were mandated to get free antenatal services [15,41,42].

It has been reported that women insured by the present insurance scheme were more likely to use prenatal care and less likely to experience birth complications, while the uninsured were more likely to delay seeking antenatal care and develop obstetric complications [41,42].However, not all private health providers accept the government insurance. A policy that could facilitate acceptance of this insurance by all providers will offer pregnant women the choice of either using a private or public facility taking distance into consideration. This choice could likely minimize the aspect of cost and distance thereby increasing access to antenatal care, which may lower the prevalence of adverse outcomes [5]. Educational level was a strong determinant of enrolment in the National Health Insurance Scheme and those with less education were less likely to enrol [41,42]. Designing health education programs that take into consideration those with no formal or basic education would likely increase antenatal care utilization and likely reduce adverse birth outcomes. Educating women on the dangers of inadequate antenatal care utilization may be the best way to encourage antenatal care use [31]. Exposure to mass media was seen to increase the odds of women seeking antenatal care in India [50], while less exposure to mass media was associated with underutilization of antenatal care services in Indonesia [61]. One study observed that eliminating travel distance to antenatal care increased demand for sufficient care [49]. The distance travelled by some of the women to the hospital or health centre for antenatal care could be substantial. Distances longer than 3–5km are deterrents to seeking antenatal care (Magadi et al, 2000). A study in the Upper West Region of Ghana, found that expectant mothers utilised care only on the community market days due to transport difficulty, although some husbands owned motorbikes [6]. Even when distance was cited as a barrier to antenatal care use in Kenya, 18% of women still did not visit the nearest antenatal care facility [63]. The women in this Kenyan study could be considering the quality of care that is offered at their preferred point of service. Studies show that clients' perception of the quality of antenatal care does not only ensure compliance but also re-enforces continuous utilization of the health facilities such as delivery and postnatal care services [21]. Sumankuuro et al, in a study in 2017 [59] found that, poor midwife/nurse-expectant mothers' relationship was a key barrier to antenatal care utilisation, with many mothers reporting they were 'castigated' by nurses during antenatal care follow-ups and shown grave disrespect during emergencies in ways that are contrary to professional codes of conduct and contradict the principles of maternal engagement theory [21,59]. Women who were maltreated during antenatal care were less likely to practice the messages communicated to them and less likely to return for follow-up appointments. Whereas, the poor attitude of nurses influenced the willingness of pregnant women to utilise health facility care in Tanzania [46], abusive language, violation of the mothers' privacy and unconsented involvement of other non-professionals during caregiving discouraged adult women elsewhere in Ghana from seeking advice from younger nurses [24]. Thus, poor engagement and ownership of the antenatal care process within the health care setting itself suggest a failure on the part of antenatal care services to follow the principles of maternal engagement theory [25] and exhibits inadequate attention to cultural sensitivity [59].Hence, a woman's satisfaction with antenatal care services may have immediate and long-term effects on her health and subsequent utilization of the reproductive health services (Yohannes et al., 2013).

A study in rural north India and Indonesia found an association between parity with reduced antenatal care use. Women who have experienced a previous pregnancy without complications may feel little need to seek care. Also, practical issues of attending a health facility when caring for children may influence antenatal care attendance [61]. In India, it was found that women with many children were less likely to use antenatal care services [50]. In some communities of the Upper West Region (UWR) of Ghana, the expectant mother had to gain approval from the husband (and in some locations, permission from the community) before seeking antenatal care at a health facility [24,25] and a man accompanying their wife to antenatal care was seen as a violation of cultural norms [25].

In these locations, expectant mothers could register for antenatal care but fail to follow-up or implement therapeutic [58], and preference for home birth took precedence over antenatal care [11]. As a strategy for linking women to antenatal care early in their pregnancies, health promotion campaigns in communities with an emphasis on maternal health would additionally ensure that most women gain access to basic reproductive health information. Formal or ad hoc trainings and workshops should be implemented in communities to explain basic knowledge about reproductive health and the importance of antenatal service utilization [34]. In another region of rural Ghana, it was observed that women who patronised antenatal care services were more likely to have the support of their husbands, and were more likely to be prepared and ready for birth and emergencies [58]. Even where antenatal care is utilised, it may not necessarily provide adequate information regarding obstetric danger signs [1], indicating that the quality of antenatal care education is also a factor shaping maternal health outcomes. In northern Ghana, for example, only 65% of women attending antenatal care reported receiving education on obstetric danger signs [1]. Overall, government efforts to significantly increase uptake of antenatal care continue to be problematic in rural Ghana [58].

Methodology

A retrospective cohort design was adopted and purely a quantitative study. The study used quantitative methods of data collection on the subject in the Wa Municipality of the Upper West Region. The Wa Municipality has been subdivided into six (6) Sub-Municipals with a total of 26 government health facilities including Community-based Health Planning and Services (CHPS) and 4 private facilities. However, there were 22 active government and 4 private health facilities that offered Antenatal Care (ANC) services. The study population consisted of all women who had attended ANC in the Municipality and delivered within the past 12 months in a health facility preceding the study. The sample size was calculated using a two Sample Situations formula as follows:

$$\mathbf{n = D\left[(Z\alpha + Z\beta)^2 * \left(P_1(1 - P_1) + P_2(1 - P_2) / (P_1 - P_2)^2\right]\right.}$$

Where,

D = design effect which is normally 2 as a default value

$\mathbf{P_{1=}}$ the estimated level of an indicator measured as a proportion at the time of the first survey or for the control area, which is current anaemia prevalence of 42% = 0.42

$\mathbf{P_{2=}}$ the expected level of the indicator either at some future date is 21% = 0.21

Zα = the Z-score corresponding to the degree of confidence with which it is desired to be able to conclude that an observed change of size (P1 – P2) would not have occurred by chance (**α** - the level of statistical significance)**.**

Zβ = the z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (P2 - PI) if one actually occurred (statistical power).

This implies that,

D= 2, **Zα**= 1.960 at 95% confidence level, **Zβ**= 1.645 at 0.95 statistical power, $\mathbf{P_1}$= 0.42 and $\mathbf{P_2}$= 0.21

$$\mathbf{n = 2\left[(1.96 + 1.645)^2 * \left(0.42\ (1 - 0.42) + 0.21(1 - 0.21) / (0.42 - 0.21)^2\right]\right.}$$

$$\mathbf{n = 2\left[12.996 * 0.244 + 0.166 / 0.0441\right] = 2\left[75.669\right] = 151.338 \approx 152.}$$

Hence,

Probable loss to follow up of 10% of sample = 16

Hence the sample size per one category = **152+16 = 168**

This gave a minimum sample size of **336.** However, maximum sample size of 353 women were interviewed where 176 attained adequate ANC and 177 attained inadequate ANC.

Inclusion Criteria

• All women who had attended antenatal care in Wa Municipality and delivered within 12 months preceding the study in a health facility were qualified to be included in the study
• Women were also included in the study if they had a maternal health booklet/record for the index pregnancy with any of these health facilities in the Wa Municipality.
• Women were chosen based on their use of Antenatal care within the study heath facility and their willingness to participate in the study.

Exclusion Criteria

• The study excluded women you attended their antennal care service another facility in a different district other that the study district but was referred from those districts to deliver in the Wa Municipality or
• Women who attended ANC elsewhere for the most part of their pregnancy outside of the study districts were also excluded from the study
• Pregnant women who never attended ANC at all but were referred to deliver within the study health facility were also excluded from the study
• Women who also had no maternal health records or booklet of their index pregnancy with the studied health facilities were excluded from the study
• Women who also attended antenatal care within the catchment health facilities who were not willing to participate in the study were excluded from the study

Sampling Procedure

The entire Municipality's six (6) sub-districts made comprising Bamahu, Busa, Charia, Charingu, Kambali and Wa central. The corresponding sub-district health catchment facilities were selected using probability proportionate to size sampling technique based on the total ANC registrants gotten from the current twelve-monthly aggregate from the DHIMS 2 database. This was to determine the individual facility catchments from which the respondents would be chosen in the sub-district. In all, 14 of the municipality's 45 facilities were selected to have provided ANC services from across government and non-governmental health institutions within the period under study. The justification for the selection of the 14 health facilities were that, most of the facilities were homogenous and provided similar primary health to limited heterogeneous groups within the municipality. Systematic random sampling was then used to draw respondents from the facilities ANC register based on the status of ANC utilization until the estimated sample size of 353 was achieved. Selected participants were then linked-up and followed to their households at the community level for the interview. The selected health facilities for the study included woman who attended Bamahu health centre (13), Sing CHPS (18), Busa Health centre (18), Dobile North CHPS (26), Islamic Hospital (20), Charingu Health Centre (10), Kambali Health Centre (35), Kpongu CHPS (18), Sombo CHPS (20), Dondoli CHPS (17), Kunbiehi CHPS (17), UW Regional Hospital (48), Wa Market Clinic (20), Wa Urban Health Centre (73). This distribution of the selected participants drawn from the respective sub-districts and catchment facility communities in the Wa Municipality**.** This selection was based on the number of women who qualified to be included in the study who were willing to participate in the study.

Training of Data Collectors

A two-day training was organised for the data collection team who were mainly students on leave with working experience on maternal and child health. They comprised four research assistants and one supervisor. The training involved the following:-

- General overview of the study including explanation of the study objectives.
- Acquiring samples of maternal antenatal care records booklets and going through the questionnaire systematically for in-depth understanding of the study variables.
- Performance of role-plays simulating the data collection process in the local language.

Quality Control

The following quality control measures were employed to ensure validity and reliability of data.

- A three-day intensive training was organized for the data collectors.
- The researcher supervised and monitored activities of the research assistants to make sure that data were collected as planned.
- Filled questionnaires were scrutinized on the field and checked by the supervisor and researcher for completeness and accuracy on daily basis.
- Data were cleaned to eliminate any irregularities.

Ethical Considerations

Before the study was carried out, the following ethical issues were considered as outlined below:

- A written permission was obtained from the Regional Health Directorate and District Director for Health Services of Wa Municipal.
- Informed consent was obtained from the study participants prior to data collection. Before taking consent, the research team explained to study participants what the study was all about, the processes involved during data collection and the associated benefits of participating in the study. In addition, participants were offered the opportunity to ask questions before consent was obtained or otherwise.
- Confidentiality and anonymity of the study participants was also maintained by using identity numbers on the questionnaires other than participant's names.
- Data were analysed at aggregate level and no participant's name would be linked with the results. The completed forms were kept under lock and key, and were only accessible to the team involved in the data management process.

Data collection Tools and Procedure

The tools used to collect the data were a pre-coded structured and semi-structured questionnaire and an observation checklist. The questionnaire had 59 items captioned under seven sub-titles, Status of antenatal care services utilization, Personal information/ demographic characteristics, Records review of maternal antenatal care booklet or card, Anthropometric and biochemical assessment, Content and quality of antenatal care services, Maternal behaviours and health status during last pregnancy, Socioeconomic status of household wealth index of respondent. The Data was collected through face-to-face interviews with respondents using a pre-coded structured and semi-structured questionnaire, after getting consent. Information on the seven sub-titles on the questionnaire that needed to be answered by the respondents were duly captured whereas those that were needed from the maternal antenatal care booklet/card were also reviewed accordingly and captured. Observational information was further probed to ensure consistency of findings before recording. Pre-testing of the questionnaire was done by randomly selecting women from the antenatal care register of a few health facilities in the Wa Municipality and tracing them to their households for the interview. The main purpose of the pre-test was to ensure readability and comprehension of the questions and the feedback was used to correctly revise the questionnaire to

provide the desired answers. This guaranteed the validity of the tool which was used for the data collection in the study. The trained research assistants thus gained the competency and administered the questionnaires the right way and this guaranteed reliability of the research tool.

Data Processing and Analysis

The quantitative data were manually entered using the Statistical Package for Social Science (SPSS) version 21. Data were cleaned by running preliminary frequencies of all the variables to check for entry inaccuracies. All incorrectly coded data were double-checked with the questionnaire after which all wrong entries were corrected. Descriptive statistics are performed and results tables. Chi-square tests were used to measure associations between the dependent and independent variables and logistic regressions were also used to determine the actual predictors of the independent variables to the dependent variables of interest. The logistic regression adjusted odds ratio (AOR) and 95% confidence intervals were used to assess the strength of association for all the statistically significant associations with a p-value <0.05. The study also presented quantitative findings in the results section of the analysis. The study also presented quantitative findings in the results section of the analysis, reinforcing determinants to adequate and inadequate ANC services utilization in the study area as a compliment to the determinants.

Variables Definition

The main dependent variable is the status of antenatal care services utilization which is categorised as binary, adequate (ANC of at least 4 or more attendance) or inadequate(less than 4 antenatal care attendance). The independent variables are socio-demographic and socio-economic characteristics, components of received antenatal care including general score of services received, maternal reproductive health and obstetric profile, maternal knowledge and behavioural risk factors. The independent variables included, maternal age at antenatal care registration, educational status, religion, marital status, occupational status and wealth index. Components of received antenatal care involved weight checking, height measurement, blood pressure taken, blood and urine sample examination, received education on possible danger signs/complications of pregnancy, received Tetanus Toxoid (TT) injection, Sulphadoxine Pyrimethamine (SP) and monthly iron supplementation, fundal height measurement and palpation. Others include receiving information assistance on childhood diseases, maternal and child nutrition, breastfeeding, antenatal and delivery care, vaccinations and immunizations, and family planning as well as the number of TT and SP doses received. The overall Score for services received and Score for received information was categorised as when the weighted score is less than the median score or otherwise high if score is equal or above the weighted mean score. Tetanus toxoid (TT) received and Sulphadoxine Pyrimethamine (SP) received were each categorised as adequate or inadequate if the woman had less than two (2) doses or two (2)/more doses respectively. Maternal reproductive health and obstetric profile included high or low risk gravidity, high or low risk parity, adequate or inadequate birth spacing, late or early gestational age at registration and number of antenatal care Attendance. On maternal knowledge and behavioural risk factors, characteristics such as knowledge on making 4+ antenatal care visits including antenatal care Services importance, smoking exposure, alcohol intake, episodes of malaria infection, dietary diversity score. The classification as low or high or otherwise, inadequate or adequate based on the comparison of the weighted mean with each individual score. If the individual was less than the weighted mean then the variable is classified as low or inadequate. On the other hand, if the individual score was equal or more than the weighted score, then the variable was classified as high or adequate.

Results

Socio-demographic and Socio-economic Characteristics of Respondents

Of the three hundred and fifty-three (353) total study respondents in the survey, it was observed that an overwhelming majority (85.0%) were Waalas/Dagaabas and the remaining 15.0% constituted the minor ethnic groups. However, in descending substantial order among the minor groups, Sissalas followed by Dagbani/Mamprusis, and Ashanti/Fantis were quite notable tribes in the Wa municipality. The remaining very few however, are a mix of other Ghanaian and foreign tribes such as upper easterners (Frafra and

Kasena/Builsas), Gonjas, Bimoba, Konkonbas, Burkinabes, Niger, etc. The municipality is predominantly a Muslim community with Islam (84.4%) being the major religion among the respondents with the remaining being Christians according to the results. In terms of marital status, almost all the respondents (91.2%) were duly married whereas the remaining few were not married. The results also indicate that about one third of the study participants (36.3%) never had any formal education. A sizeable proportion (39.9%) of the respondents had attained at most first cycle education (primary and junior high) but very few respondents (23.8%) were able to attain at least a second cycle education (senior high and tertiary levels). It was also observed that about 38.0% of the respondents were unemployed with many as housewives and few on apprenticeship in various works as hairdressing, dressmaking or weaving and very few as students. Aside 8.2% that were engaged as government/private employees, 53.8% were into self-occupation either as a farmer or as a trader in cooking/brewing and selling, buying and selling of commodities. Concerning birth spacing, it was realised that 48.2% and 26.9% conceived after the youngest child had attained at least three years of age and less than three years respectively whilst about one-fourth of the respondents were primipara who had never delivered. On the household wealth index classification, most of the respondents were above the median wealth index while 43.9% were below the median.

Descriptive Statistics on Content of Antenatal Care Services Received

About three in every ten women (30.3%) received enough and adequate basic essential services with the majority receiving inadequacy of these services. The content of ANC services received during ANC includes, weight checking at least twice, Height checking, Blood pressure, Urine examination, Blood sample examination, health and nutrition talks, Tetanus injections, receiving iron supplements among others. Out of the total of 353 women studied, it was revealed that over 99% of the women had their weights checked at least two during their ANC period, 94% had heights during ANC while 93 % had their blood pressure checked at least three times during ANC visits. It studies further showed that over 93% of women who attended ANC had their Urine and Blood examined during the period. Additionally, over 91% of the women received at least one Tetanus injection and iron supplementation. Moreover, Majority (70%) had low average service score indicating an individual mean of less the average mean score. In term of information on healthcare, the results showed that majority had enough information, information on nutrition (77.6%), breastfeeding (76.8%), Delivery (83.9%), vaccination and immunization (85.6%), family planning (67.1%). Besides these, the about 73% of the woman had less that Tenatus Toxiod doses (Inadequate TT) while 82% had more than two doses of sulphadoxine pyrimethamine (SP) that is 2+ doses. In terms of general score of information and assistance given at ANC, majority (60.3%) had adequate requisite information. This means, about four in every ten women received low information on the outlined services at the ANC visits. In addition, most of the women (73.1%) received less than two doses of tetanus toxoid (TT) for their most recent pregnancy. In terms of sulphadoxine pyrimethamine (SP) intake, a vast majority of the women (82.4%) had received at least two doses as stipulated by WHO for the minimum protection prophylaxis against malaria with only 8.2% receiving as much as five plus doses for maximum protection whereas 7.9% did not receive at all. **(See table 1)**

Variable		Frequency	Percent
Weight checked at least two times			
	No	3	.8
	Yes	350	99.2
	Total	353	100.0
Height taken on first visit			
	No	19	5.4
	Yes	334	94.6
	Total	353	100.0
Blood pressure taken at least three times			
	No	25	7.1
	Yes	328	92.9
	Total	353	100.0
Urine examination performed at least once			
	No	24	6.8
	Yes	329	93.2
	Total	353	100.0
Blood sample examination performed at least once			
	No	9	2.5
	Yes	344	97.5
	Total	353	100.0
Received health and nutrition talk at least four times on possible danger signs/complications of pregnancy			
	No	223	63.2
	Yes	130	36.8
	Total	353	100.0
Received TT injection at least once			
	No	30	8.5
	Yes	323	91.5
	Total	353	100.0
Received iron supplementation monthly			
	No	14	4.0
	Yes	339	96.0
	Total	353	100.0
Measurement of fundal height against the age of gestation, foetal heart beat and foetal movement count monthly			
	No	5	1.4
	Yes	348	98.6
	Total	353	100.0
Score for average services received			
	Low	246	69.7
	High	107	30.3
	Total	353	100.0
Information on Childhood diseases			
	No	192	54.4
	Yes	161	45.6
	Total	353	100.0

Information on nutrition of mothers and children			
	No	79	22.4
	Yes	274	77.6
	Total	353	100.0
Information on breastfeeding			
	No	82	23.2
	Yes	271	76.8
	Total	353	100.0
Information on antenatal and delivery care			
	No	57	16.1
	Yes	296	83.9
	Total	353	100.0
Information on vaccinations and immunizations			
	No	51	14.4
	Yes	302	85.6
	Total	353	100.0
Information on family planning			
	No	116	32.9
	Yes	237	67.1
	Total	353	100.0
Score for information			
	Low	140	39.7
	High	213	60.3
	Total	353	100.0
Number of TT received			
	Less than TT2	258	73.1
	TT2+ intake	95	26.9
	Total	353	100.0
Number of SP doses received			
	One	34	9.6
	Two	81	22.9
	Three	124	35.1
	Four	57	16.1
	5+	29	8.2
	Zero	28	7.9
	Total	353	100.0
Score for SP intake			
	Inadequate (<2+ doses)	62	17.6
	Adequate (2+ doses)	291	82.4
	Total	353	100.0

Table 1: Content of ANC services received during antenatal period

Factors Associated with Receiving Adequate ANC Services

The results indicated that of the socio-demographic and socio-demographic characteristics, only religion, education, occupation and wealth index were statistically significant in association with the status of ANC utilization (Table 4). With religion (χ^2 (1, N = 353) = 6.339, p = 0.012) Christian pregnant women were more likely to achieve adequate ANC utilization (65.5%) than their Muslim counterparts were. For education (χ^2 (2, N = 353) = 14.620, p = 0.001) women with at least second cycle education (67.9%) and those without education at all (46.1%) were far more likely to attain adequate ANC services utilization than women with first cycle education. Likewise for occupation (χ^2 (2, N = 353) = 12.098, p = 0.002) Government/private employees and unemployed women were far more (79.3%) and (50.7%) respectively likely to utilize ANC services adequately than women that are self-engaged. Similarly with wealth index (χ^2 (1, N = 353) = 9.383, p = 0.002) women from households with a higher wealth index (57.1%) were more likely to have adequate ANC services utilization than those with lower wealth index (40.6%). However, there was a weaker association between ethnicity (χ^2 (1, N = 353) = 3.584, p = 0.058) and ANC services utilization. Regarding maternal obstetric, antenatal records and behavioural/lifestyle patterns, the results showed that maternal knowledge on ANC importance and 4+ ANC visits, maternal age and gestational age at ANC registration and number of ANC attendance were found to also be statistically significant in association with the status of ANC services utilization (Table 4). Concerning score for maternal knowledge on ANC importance (χ^2 (1, N = 353) = 12.183, p < 0.001) women with a high knowledge (64.9%) on ANC importance were more likely to utilize ANC services adequately than those with low knowledge (44.1%). With knowledge on the need to make at least four ANC visits (χ^2 (1, N = 353) = 10.345, p = 0.001) women with knowledge were more (55.5%) likely to attain adequacy of the services than those without knowledge (36.8). For maternal age at ANC registration (χ^2 (2, N = 353) = 6.375, p = 0.041) women aged 20-34 years were more likely (53.5%) to adequately utilize ANC services than older ones (38.5%) and younger ones (35.7%). Similarly for gestational age at ANC registration (χ^2 (1, N = 353) = 333.552, p < 0.001) women who register at ANC in their first trimester are far more likely (97.2%) to achieve adequacy of ANC services than women who register in their second and third trimesters (0.0%). Also, regarding total ANC attendance/visits (χ^2 (1, N = 353) = 83.749, p < 0.001) women who attended a minimum of four visits (61.8%) were by far, more likely to adequately utilize the services than those with less than four visits (0.0%). However, there was weaker association between parity (χ^2 (1, N = 353) = 3.818, p = 0.051) and ANC services utilization. On the generality of ANC services, score for general services received (χ^2 (1, N = 343) = 14.874, p < 0.001) and number of tetanus toxoid (TT) doses received (χ^2 (1, N = 343) = 15.941, p < 0.001) were the only statistically significant in association with the status of ANC utilization (Table 6). Women with a high score of received general basic essential services (65.4%) were more likely to have adequate ANC services utilization than those with low scores (43.1%). Also, women who received at least two doses of tetanus toxoid immunization (67.4%) were more likely to attain adequate ANC services utilization than those with less than two doses (43.4%). However, there was weaker association between score for received information (χ^2 (1, N = 353) = 3.668, p = 0.055) and ANC services utilization. (**See Table 2)**

Variable	**ANC services utilization, n (%)**	**n = 353**			
			Test statistic		
	Adequacy	**Inadequacy**	**df**	**χ^2**	**p-value**
Ethnicity					
Major	163 (51.6)	153 (48.4)	1	3.584	0.058
Minor	13 (35.1)	24 (64.9)			
Religion					
Muslim	140 (47.0)	158 (53.0)	1	6.339	0.012
Christian	36 (65.5)	19 (34.5)			
Education					
No education	59 (46.1)	69 (53.9)	2	14.620	0.001
Low education	60 (42.6)	81 (57.4)			
High education	57 (67.9)	27 (32.1)			

Marital status					
Married	164 (50.9)	158 (49.1)	1	1.690	0.194
Not Married	12 (38.7)	19 (61.3)			
Occupation					
No occupation	68 (50.7)	66 (49.3)	2	12.098	0.002
Self employed	85 (44.7)	105 (55.3)			
Gov't/Private employee	23 (79.3)	6 (20.7)			
Wealth index					
Low	63 (40.6)	92 (59.4)	1	9.383	0.002
High	113 (57.1)	85 (42.9)			
Score for Maternal knowledge on ANC importance					
Low	113 (44.1)	143 (55.9)	1	12.183	0.000
High	63 (64.9)	34 (35.1)			
Knowledge on 4+ ANC visits					
Yes	137 (55.5)	110 (44.5)	1	10.345	0.001
No	39 (36.8)	67 (63.2)			
Care from same health provider					
Yes	158 (49.2)	163 (50.8)	1	0.575	0.448
No	18 (56.3)	14 (43.8)			
Level of satisfaction					
Dissatisfied	15 (50.0)	15 (50.0)	1	0.000	0.987
Satisfied	161 (49.8)	162 (50.2)			
Malaria episodes					
Yes	73 (48.7)	77 (51.3)	1	0.148	0.700
No	103 (50.7)	100 (49.3)			
Score for Malaria Episodes					
Single episode	47 (43.1)	62 (56.9)	2	5.057	0.080
Multiple episodes	26 (63.4)	15 (36.6)			
No malaria	103 (50.7)	100 (49.3)			
Practiced Self medication					
Yes	7 (38.9)	11 (61.1)	1	0.913	0.339
No	169 (50.4)	166 (49.6)			
Alcohol intake					
Yes	11 (45.8)	13 (54.2)	1	0.167	0.683
No	165 (50.2)	164 (49.8)			
Smoking exposure					
Yes	11 (34.4)	21 (65.6)	1	3.375	0.66
No	165 (51.4)	156 (48.6)			
Classification of 7-day DDS					
Low (< median score)	82 (49.7)	83 (50.3)	1	0.003	0.955
High (At least median score)	94 (50.0)	94 (50.0)			
Birth Spacing					
Inadequate	40 (42.1)	55 (57.9)	1	3.125	0.077

Adequate	136 (52.7)	122 (47.3)			
Age of mother at registration					
Under 20 years	10 (35.7)	18 (64.3)	2	6.375	0.041
20-34 years	146 (53.5)	127 (46.5)			
At least 35 years	20 (38.5)	32 (61.5)			
Gestational age at registration					
Early registration	176 (97.2)	5 (2.8)	1	333.552	0.000
Late registration	0 (0.0)	172 (100)			Fishers=0.000
Gravidity Score					
Low risk	156 (50.6)	152 (49.4)	1	0.605	0.437
High risk	20 (44.4)	25 (55.6)			
Parity Score					
Low risk	167 (51.4)	158 (48.6)	1	3.818	0.051
High risk	9 (32.1)	19 (67.9)			
No. of ANC visits					
<4 visits	0 (0.0)	68 (100.0)	1	83.749	0.000
4+ visits	176 (61.8)	109 (38.2)			Fishers=0.000
Score for received information					
Low	61 (43.6)	79 (56.4)	1	3.668	0.055
High	115 (54.0)	98 (46.0)			
Score for general services received					
Low	106 (43.1)	140 (56.9)	1	14.874	0.000
High	70 (65.4)	37 (34.6)			
Satisfaction Level Score					
Dissatisfied	15 (50.0)	15 (50.0)	1	0.000	0.987
Satisfied	161 (49.8)	162 (50.2)			
Number of TT received					
Less than TT2	112 (43.4)	146 (56.6)	1	15.941	0.000
TT2+ intake	64 (67.4)	31 (32.6)			
Score for SP intake					
Inadequate	26 (41.9)	36 (58.1)	1	1.888	0.169
Adequate	150 (51.5)	141 (48.5)			

Source: Author's Computation

Table 2: Factors associated with receiving adequate ANC services

Empirical Model

The results further indicate that women with no education and low education were respectively about 50.6% and 55.6% less likely to be protected from having adequate ANC services utilization than those with high or at least second cycle education. Also, women with anaemia at registration were about 63.7% less likely to attain adequate ANC utilization than those not being anaemic at registration. Women with a lower general score of received services were 55.5% more likely not to adequately utilize ANC services compared to those with higher scores. Women with less than two doses of TT intake were 59.7% more likely not to adequately utilize ANC services compared to those with TT2+ intake. Women without knowledge on adequacy of ANC visits were 54.9% more likely not to adequately utilize ANC services compared to those with knowledge. **(See Table 3)**

Independent Variables	Coeff.	Wald	Sig.	Exp (B)	95% C.I.for EXP(B)	
					Lower	Upper
1. Education (High)						
No Education	-0.704	4.598	.032	0.494	0.260	0.941
Low Education	-0.811	6.500	.011	0.444	0.238	0.829
2. Anaemia at Registration (Normal)						
Anaemia at registration	-1.013	17.401	.000	0.363	0.226	0.584
3. **General services received (High)**						
Low general services received	-0.809	9.207	.002	0.445	0.264	0.751
4. TT2+ intake (Adequate)						
Less than TT2 (Inadequate)	-0.908	9.926	.002	0.403	0.229	0.710
Knowledge on adequate ANC (Yes)						
No Knowledge	-0.796	8.825	.003	0.451	0.267	0.763
Constant	2.505	39.482	.000	12.246		

*Cox and Snell R square=0.171, *Nagelkerke R square=0.228, odel Chi-square=64.339,*Hosmer and Lemoshow test = 0.931

Sources: Author's computation

Table 3: Multinomial logistics regression of the predictors to adequate ANC utilization

Maternal knowledge on ANC Importance, Behaviours and Malaria Occurrence

It was realised that seven out of every ten pregnant women had knowledge on the need to make at least 4+ ANC visits. On importance for seeking ANC services, varied responses were given as indicated in Table 2 below. However, three most important reasons were identified as to the prevention/and or identification of potential problems during childbirth, to protect the health of the child and the health of the mother **(see table 4).**

Variable		Frequency	Percent
Knowledge on making 4+ ANC visits			
	Yes	247	70.0
	No	106	30.0
	Total	353	100.0
Importance for seeking ANC Services			
	Prevent/identify potential problems during child birth	97	27.5
	Protect the health of the child	92	26.1
	Protect Health of the mother	87	24.6
	Screen for the lying position of the foetus/ baby and whether alive or dead	31	8.8
	Hb screening, Lab/medical investigation	25	7.1
	Availability of medicine	15	4.2
	Early screening and transmission prevention of diseases to baby	6	1.7
	Total	353	100.0

Source: Author's Computation

Table 4: Maternal Knowledge on ANC importance

Maternal behaviours and malaria occurrence during pregnancy

As more of the mothers were observed to come from households with a high wealth index, similarly, most of the women (53.3%) had a high dietary diversity score (DDS) as informed from a seven-day dietary intake at the time of their pregnancy with the remaining on a low DDS. Generally, 91.5% and 8.5% were satisfied and dissatisfied respectively regarding the level of satisfaction of care received at the ANC services. Expectedly, about nine out of every ten women received ANC from the same health care facility provider throughout their pregnancy with the rest receiving care from multiple facilities. It was noted that not almost all the mothers when they were pregnant were into self-medication as very few (5.1%) took drugs without medical authorization from a physician. In terms of smoking exposure, only very few (9.1%) were exposed with majority (90.9%) not exposed during the tenure of pregnancy. Likewise, most (93.2%) did not take alcohol when they were pregnant. Of those that consumed it, 41.7% of them were taking it once a week and 58.3% taking it twice a week or other times in a month. Even though most of the mothers did not get malaria, a considerable number (42.5%) of them whilst pregnant had malarial infection with 11.6% of them having multiple episodes of malaria. **(See Table 5)**

Variable		Frequency	Percent
Classification of 7-day DDS			
	Low (< median score)	165	46.7
	High (At least median score)	188	53.3
	Total	353	100.0
Level of satisfaction with ANC Received			
	Dissatisfied	30	8.5
	Satisfied	323	91.5
	Total	353	100.0
Care from same health care provider during ANC			
	Yes	321	90.9
	No	32	9.1
	Total	353	100.0
Practiced Self medication			
	Yes	18	5.1
	No	335	94.9
	Total	353	100.0
Exposure to smoking			
	Yes	32	9.1
	No	321	90.9
	Total	353	100.0
Intake of alcohol			
	Yes	24	6.8
	No	329	93.2
	Total	353	100.0
No. of times of alcohol intake			
	Once a week	10	2.8
	Twice a week	7	2.0
	Other	7	2.0
	N/A	329	93.2
	Total	353	100.0

Malaria episodes			
	Yes	150	42.5
	No	203	57.5
	Total	353	100.0
No. of Times of malaria			
	1	109	30.9
	2	23	6.5
	3	16	4.5
	4+	2	.6
	N/A	203	57.5
	Total	353	100.0

Table 5: Maternal behaviours and malaria occurrence during pregnancy

Reasons for Adequate ANC Services Utilization

Among the many factors or reasons accounting for the attainment of adequate ANC services utilization by virtue of timely registration coupled with at least three subsequent visits in order of dominance among the 176 pregnant women in the Wa municipality, the following observations were made. Slightly more than one-sixth were curious to find out the development of the foetus and lying position of the baby as well as general well-being of the pregnancy. This was closely followed by those who were prompted by their knowledge on ANC importance. Whilst some others were due to education from health staff/personnel, others initiated and sustained the visits due to pregnancy detection at the outpatient department (OPD) by health staff. In addition, some were because of the provision/prescription of routine pregnancy medications and lab investigations amongst many other reasons elicited in the adjoining Table 4 below with the very least being fear of caesarean section, needing ANC card to get or renew National Health

Variable		Frequency	Percent
	Health staff education	23	6.5
	Knowledge on ANC importance	24	6.8
	Previous history of lost pregnancy	4	1.1
	Scheduled ANC visits by health staff following missed period	18	5.1
	Early initiation due to detection of pregnancy at the OPD and subsequent initiation	22	6.2
	Desire to give birth to a healthy and strong baby	7	2.0
	Curious to find out development and lying position of the foetus/baby and general wellbeing of the pregnancy	28	7.9
	To detect any pregnancy complications and seek early appropriate health care	20	5.7
	Provision/prescription of routine pregnancy medication and lab investigation by health facility	21	5.9
	Needed ANC card to get NHIS	3	.8
	Fear of C/S and other pregnancy complications	3	.8
	Others	3	.8
	N/A	177	50.1
	Total	353	100.0

Table 6: Reasons for adequate ANC services utilization

Reasons for Inadequate ANC Utilization

Of the 177 women who had inadequate ANC services utilization, the following accounted for the late registration or failure to make at least four contact visits as outlined in order of magnitude in Table 5 below. Among the topmost three were those who did not know either they were pregnant or were not sure of it (15.3%), those who did not have insurance (14.7%) and those who simply had no time to attend (10.7%).However it was interesting to note that attribution of previous miscarriages to early ANC attendance, thought of foetus being still blood in first trimester, wrong pregnancy test results by health staff and cultural beliefs delaying early registration, were among the stunning reasons for inadequacy of ANC visits even though it was 0.6% each. **(See table 7)**

Variables	Frequency	Percentage
I did not know I was pregnant / Wasn't sure of being pregnant	27	7.6
Lack of insurance	26	7.4
No time to attend	19	5.4
Refusal to initiate ANC visits without any reason	18	5.1
Because the pregnancy wasn't troubling her	17	4.8
Travel out and wanted to come home to initiate/continue	15	4.2
Shy / Fear of ridicule and criticism from community / family members / health staff in initiating timely ANC Visits	13	3.7
I was sick	9	2.5
I did not know I had to attend early	7	2.0
Wanted the stomach to be big before starting ANC	4	1.1
I do not like the attitude of the hospital staff / Fear of intimidation from Health staff	4	1.1
I could not afford it / Fear of being asked to buy things or spend money	4	1.1
Attributed previous miscarriages to early ANC visits	1	.3
Because I thought the foetus would still be blood in first trimester	1	.3
Cultural beliefs	1	.3
I have had other children without any problems	1	.3
Hospital too far from where I live / No health facility around	1	.3
Wrong UPT test results by Health staff	1	.3
Now spends more money buying ANC card, drugs, etc at the facilities	1	.3
Others	7	2.0
N/A	176	49.9
Total	353	100.0

Author's Computation form field survey

Table 7: Reasons for inadequate ANC utilization

Discussion

Where as women appears to have embraced the concept of care during pregnancy with enthusiasm when such services are available, the care they are offered often falls short of the ideal by a long way, in terms of content and probably also quality (Abou-Zahr et al., 2003). Most women in Ghana go for antenatal care at least once during pregnancy, but many are not (or at least do not remember) receiving the full components of antenatal care (Afulani P., 2015). Health education, iron supplementation, blood pressure measurement and tetanus toxoid were the more commonly received components of antenatal care (Joshi et al, 2014). In other jurisdictions, receipt of components of care is defined as receiving a blood pressure measurement, urine test, blood test, and information on pregnancy complications (Owolabi et al., 2017). Reports from other centres have shown that, even when women attend antenatal care, they do not receive the full care as prescribed in national reproductive and child health programme guidelines: 37% never had their blood pressure checked, 41% never had their blood tested, 45% never had their urine tested, 25% never had their abdomen examined (Jose Villar & Bergsjg, 1997). The service most frequently received by all women across all countries was blood pressure measurement (96%), whereas the least frequently received was information on complications (68%) (Owolabi et al., 2017). It was noted in this study that about one-third (36.8%) of the respondents received health and nutrition education at least four times on possible danger signs/complications of pregnancy at antenatal care which is consistent with findings from Jose Villar & Bergsjg where only 37.0% were informed of danger signs (Jose Villar & Bergsjg, 1997). Meanwhile, another study on a national scale indicated that two–thirds of women who utilised antenatal care received information about the danger signs of pregnancy complications in Ghana (Wang et al., 2011). A more recent and evidenced based study on antenatal care quality in twenty-eight African countries including Ghana showed that 61% of expectant mothers received information about pregnancy complications during their visit with a skilled provider in antenatal care (Chukwuma et al., 2017). Another study by Adanu on the proportion of Ghanaian antenatal attendants benefiting from different aspects of antenatal care, 1999- 2003 showed that 95.8% had their blood pressures checked, 84.2% received anti-tetanus injection, 83.4% and 80.9% had their blood and urine samples taken respectively, 77.1% were given iron supplements, 59.0% told about pregnancy complications and 55.3% received malaria prophylaxis (Adanu, 2010). Meanwhile Chukwuma et al also found that 87% of clients reported having their blood pressure checked at least once during ANC for the index pregnancy, 84% received at least one tetanus injection and 79% and 70% had blood and urine tests respectively conducted during ANC, (Chukwuma et al., 2017). However, according to the findings of this study, 92.9% had their blood pressure taken at least thrice and whereas 91.5% received at least an injection of tetanus toxoid (TT) vaccine, only 26.9% received at least two doses of TT for minimum protection during their most recent pregnancy. The results further showed that 97.5% and 93.2 of the women had their blood and urine samples examined at least once respectively. Also from this study, 96.0% received monthly iron supplementation tablets with only 36.8% receiving education at least four times on danger signs/complications of pregnancy. Again, the findings indicated that whereas most of the women (92.1%) received at least a dose of sulphadoxine pyrimethamine (SP), 82.4% of them received at least two doses of the SP for the minimum protection against malaria infection.

This study is further in conformity with the GDHS 2014 findings on each of the above mentioned ANC components in the Upper West region to be over 90.0% except likewise receiving education on danger signs/complications of pregnancy (53.5%) (GDHS, 2014). Advocacies by health stakeholders and client-centred rights empowerment activists could be an attributable factor in the seeming variance of improvement in these services between these studies based on the rising awareness in education across boards between duty bearers and care seekers on standard enforcement of protocols in the study area. Also, this difference could be due to the call for improvement over time in the quality of antenatal services provided in Ghana that ensures that all women have the aforementioned services rendered them (Adanu, 2010). However, in totality or as an aggregate, findings from this study revealed that about three in every ten women (30.3%) receives enough and adequacy of these basic essential services with the majority (69.7%) receiving inadequacy of these services. In contrast to the general basic essential services offered, majority (60.3%) of the women at ANC received on average a high score of adequate requisite information assistance regarding the following: childhood diseases, nutrition of mothers and children, breastfeeding, antenatal and delivery care, vaccinations, birth control and contraceptives. Villar et al noted that focused antenatal care (FANC) was introduced as the standard of care in sub-Saharan Africa (José Villar et al., 2001, Jose Villar & Bergsjg, 1997) to offer high quality, intensive, and woman centered ANC visits between expectant mothers and their

healthcare providers [62] (WHO, 2001). However, acute health worker shortages and underfunding prevent FANC from being implemented as intended (Gerein et al., 2006, Manongi et al., 2006). For instance, an observational study in Tanzania documented that the average first contact lasted 12 minutes and follow-up contacts lasted only 7 minutes (von Both et al., 2006) which is contrary to when a properly conducted FANC should take 45 minutes for the first contact and 35 for follow-up contacts. Hence, health workers did not provide all recommended services (Conrad et al., 2011) and were often disrespectful (Conrad et al., 2012, Mason et al., 2015, Roberts et al., 2015) and this perhaps rendered many women not to complete the recommended number of contacts reflecting the poor quality of services. These may possibly to an extent account for the variance in average score of these antenatal care services offered in the Wa Municipality.

Knowledge of Antenatal Care Utilisation

It is vital to update current knowledge regarding antenatal care attendance and its determinants, as it has important implications for policy developed to ensure ANC attendance by all pregnant women and reduce maternal morbidity and mortality (Sakeah et al., 2017). Therefore further research on how to improve the level of utilization of obstetric services (Adanu, 2010) is always necessary. The findings from this study indicated that of the socio-demographic and socio-demographic characteristics religion, education, occupation and wealth index were statistically significant in association with the status of antenatal care utilization. However, only education was a significant predictor to adequate antenatal care utilization. A study by Babalola et al also showed that education is the only individual-level variable that is consistently a significant predictor of antenatal care services utilization (Babalola et al., 2009). Similar studies involving Planned Parenthood and other healthcare services in Metro Cebus, Philippines and Haiti observed that maternal education was the most consistent and important determinant of antenatal care use [12,13] (King-Schultz et al., 2008). Babalola et al showed that the odds of reporting use of antenatal care services increase steadily with education such that women with post-secondary education are five times as likely to report service use as their counterparts with no formal education (Babalola et al., 2009). Similarly a national scale study in Ghana by Afulani showed an observed significant association between quality of received antenatal care services and education such that on average, women with some education (any level) receive higher quality antenatal care than those with no education (Afulani, 2015). Secondary or tertiary education enables women to approach health staff on relatively equal terms, to pose questions and, potentially, to seek care with lesser concern about any possible reprimands (Were et al., 2013). As posited above, this study's finding is in consonance with other conducted studies. Women with no education [(AOR, 0.494, 95% CI (0.260 – 0.941), p=0.032] and low education, [(AOR, 0.444, 95% CI (0.238 – 0.829), p=0.011] were respectively about 50.6% and 55.6% less likely to be protected from having adequate antenatal care services utilization than those with high or at least second cycle education. According to Ikeanyi & Ibrahim, in some of the settings mothers for multifaceted reasons ranging from education, ignorance, over confidence, etc. fail to access the facilities for prenatal care and even the few that try to avail this, poorly comply with the prenatal interventional measures in place (Ikeanyi & Ibrahim, 2015). Improved women education, health education, empowerment and home visiting those women defaulting antenatal clinic attendance are recommended to improve on their utilization of prenatal interventions. This is expected to make them appreciate better the need for early commencement and compliance with prenatal care. Also, involvement of the husbands in prenatal care to help in ensuring compliance and adherent to interventions is suggested (Ikeanyi & Ibrahim, 2015). Regarding maternal obstetric and antenatal records profile including behavioural characteristics, the results of this study showed that maternal knowledge on antenatal care importance and 4+ antenatal care visits, maternal age and gestational age at antenatal care registration and number of antenatal care attendance were the only found to also be statistically significant in association with the status of antenatal care services utilization. However, of all the associated factors only maternal knowledge on adequacy of 4+ antenatal care visits were a significant predictor to the status of antenatal care services utilization. The study showed that women without knowledge on adequacy of antenatal care visits were 54.9% more likely not to adequately utilize antenatal care services compared to those with knowledge. Consistent with another study, women who did not receive advise on when to start antenatal care (AOR = 3, CI: 1.48, 6.24), had higher odds of late antenatal care attendance compared with their counterparts (Gebremeskel et al., 2015). Similarly, women who haven't got health information on time of ANC attendance were four times less likely to attend antenatal care timely than those women have got health information on time of antenatal care attendance at AOR= 4.25, 95% CI: 1.93, 10.73 (Gudissa Damme, 2015). Also, women lacking comprehensive knowledge of anemia (OR = 0. 75

(95% CI: 0.57-0.97)) and those who weren't informed about the importance of iron supplementation during the pregnancy (OR = 0. 05 (95% CI: 0.04-0.07)) had significantly lower utilization of ANC services (Gebremedhin et al, 2014) in another study.

A study by Chemir et al., 2014 among pregnant women attending focused antenatal care at health centers in Jimma town, South West Ethiopia showed that 75.6% of the clients had 'good knowledge' regarding importance and objectives of focused antenatal care (Chemir et al., 2014). In another study, more than half (57.5%) of the expectant mothers equally had good knowledge on antenatal care benefits [59]. Conversely, this study revealed 72.5% of the respondents to have low knowledge on importance and objectives of antenatal care however, women with a high knowledge on antenatal care importance were more likely (64.9%) to utilize antenatal care services adequately than those with low knowledge. Titaley et al in a study also confirmed that lack of knowledge about the importance of maternal and child health hinders women from attending antenatal services [61]. Again, the findings from this study indicates that on the generality of received antenatal care services, score for general services received (χ^2 (1, N = 343) = 14.874, p < 0.001) and number of TT doses received (χ^2 (1, N = 343) = 15.941, p < 0.001) were the only statistically significant in association with and predictors to the status of ANC utilization (Tables 6 & 7). Women with a lower general score [(AOR, 0.445, 95% CI (0.264 – 0.751), p=0.002] of received services were 55.5% more likely not to adequately utilize antenatal care services compared to those with higher scores. Also, women with less than two doses of Tetanus intake [(AOR, 0.403, 95% CI (0.229 – 0.710), p=0.002] were 59.7% more likely not to adequately utilize antenatal care compared to those with TT2+ intake. These observations were in conformity to a study by Chukuma et al. (2017) on antenatal care quality observed that the odds of retention in skilled birth attendance were higher among antenatal care clients that had received at least one tetanus injection (OR= 1.12, 95% CI = 1.06–1.19) (Chukwuma et al., 2017). However, a study in Tanzania which indicated that factors positively associated with utilization of four or more antenatal care visits included higher quality of care services received and also receiving two or more doses of SP/Fansidar for preventing malaria (Gupta et al., 2014). It was noted again from this study that women with anaemia at registration were about 63.7% less likely to attain adequate antenatal care utilization than those not being anaemic at registration. Meanwhile, Titaley et al. (2010) [61] showed that women reporting not having any pregnancy complications had an increased odds of underutilizing antenatal care services perhaps because they felt well during pregnancy and therefore did not perceive the need to attend any services [61]. The contrary finding of this study to Titaley et al. (2010) [61] could be attributable to perceived alternative pathways to getting their anaemia solved other than through reliance on antenatal care services by the women at registration. A study in Northern Ghana noted if quality of provided care is poor, the population will lose its trust in the health system and, despite the efforts to enhance access, the utilisation rate of health services will decrease (Duysburgh et al., 2014). One study by Chemir et al. (2014) found that overall, more than half (60.4%) of the pregnant women were satisfied with the services that they received (Chemir et al., 2014). Equally, from this study more than half but rather 91.5% of the respondents were satisfied with the general services received. As satisfaction often goes alongside the adequate utilization and receipt of quality services (Thaddeus and Maine, 1994), Afulani observed a significant association between quality of received antenatal care services and the following, that on average, women with some education (any level) receive higher quality antenatal care than those with no education. In addition, women in the higher wealth quintiles receive significantly higher quality antenatal care than those in the lowest wealth quintile. Moslems received higher quality antenatal care than all the other religious groups. Moreover, on average, women who had four or more antenatal care visits scored 0.60 more points on antenatal care quality than those who had less than four visits with also women who went for the first antenatal care visit in the first trimester receiving a significantly higher quality antenatal care than those who went later (Afulani P., 2015). However, in this study the following unfolded, even though educational status was significantly associated (χ^2 (2, N = 353) = 14.620, p = 0.001) with antenatal care utilization, women with at least second cycle education (67.9%) and those without education at all (46.1%) were far more likely to attain adequate antenatal care services utilization than women with first cycle education. Equally with the association of wealth (χ^2 (1, N = 353) = 9.383, p = 0.002) to antenatal care services utilization, women from households with a higher wealth index (57.1%) were more likely to have adequate antenatal care services utilization than those with lower wealth index (40.6%). For the association of religion (χ^2 (1, N = 353) = 6.339, p = 0.012) in this study to antenatal care services utilization, Christian pregnant women on the contrary were more likely to achieve adequate antenatal care utilization (65.5%) than their Muslim counterparts. As an associated factor women who attended a minimum of four antenatal care visits (χ^2 (1, N = 353) = 83.749, p < 0.001) were by far, more likely (61.8%) to adequately utilize the services than those with less than four visits. Similarly for gestational age at antenatal care registration (χ^2 (1, N = 353) = 333.552, p < 0.001) women who register at antenatal care in their first trimester are far more

likely (97.2%) to achieve adequacy of antenatal care services than women who register in their second and third trimesters. Despite the perceived benefits of antenatal care, the reasons for not completing a minimum of four antenatal care visits or the inability to commence antenatal care early as shown do differ much different from Sumankuuro et al, 2017 [59]. They discovered distance to antenatal care venue, transport difficulties, cultural influence and social reasons and not far into pregnancy as some of the factors inhibiting adequate utilization of antenatal care [59]. In some cases, women might not feel the need to seek professional care when there is nothing wrong with their pregnancy [7,19,46] (Ndyomugyenyi et al., 1998).

Conclusion

The aimed at exploring the factors influencing antenatal care utilisation among reproductive aged women in the Wa municipality. Results showed an abysmally low especially TT2+ (26.9%) and education on danger signs/complications of pregnancy (36.8%). Educational status, maternal knowledge on adequacy of 4+ antenatal care, score for general services received, number of TT doses received and anaemia status at antenatal care registration were the factors statistically significant in association with and predictors of adequate antenatal care utilization in the study area. Even though religion, occupation, wealth index, maternal knowledge on antenatal care importance, number of antenatal care attendance, maternal age and gestational age at antenatal care registration were also observed to be statistically significant in association with the status of antenatal care utilization in Wa Municipal, they were not predictors to status of antenatal care utilization. The study further found that women who had anaemia at antenatal care registration, General quality of received women received at antenatal care, level of Tetanus doses as well as knowledge on the adequacy of antenatal care were significant factors that influence antenatal care usage among reproductive aged women in the Wa municipality. Based on this finding, the study recommends policies that focuses on improving services of antenatal received my expectant mothers. Attention should be drawn by health management authorities to ensure an improvement in the coverage of antenatal care in Wa Municipal while health staff are encouraged to enforce to the latter all due protocols in the discharge of their duties at antenatal care.

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