

# Determinants of Quality Antenatal Care in a Peri-Urban Hospital, Ghana: An Application of the Content and Timing of Care in Pregnancy (CTP) Tool

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors JVB, MRA, TSL and AY designed the study, performed statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors FD managed the analyses of the study. Authors ANG and MKD managed the literature searches. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Aims:** To assess the quality of antenatal care and determine factors influencing access to quality care at the Holy Family Hospital, Nkawkaw in the Kwahu West Municipality of Ghana.

**Study Design:** A facility-based cross-sectional study.

**Place and Duration of Study:** Postnatal clinic of Holy Family Hospital, Nkawkaw, from July to September 2016.

**Methodology:** Four hundred postnatal clinic attendants age 15-49 years were selected consecutively for the study. Quality of antenatal care was classified according to the Content and Timing of care in Pregnancy (CTP) tool developed by Beekman et al (2011). Logistic regression was used to determine predictors of acceptable quality care. Results were presented as adjusted odds ratio at 95% confidence level.

**Results:** Approximately 66% of respondents received acceptable quality of care. Being a trader (AOR=4.1, 95%CI: 1.7-10.0); having had three or four births (AOR=2.0, 95%CI: 1.1-3.6) and having a partner with secondary education (AOR=4.6, 95%CI: 1.9-11.0) were significantly associated with receiving acceptable quality of care.

**Conclusion:** Although 66% of the respondents accessed acceptable quality of care, the hospital has the capacity to provide quality care to all women attending its antenatal clinic. Community-based Health Planning and Services; mobile phone text messaging to remind pregnant women of appointments; and domiciliary midwifery services could be part of effective strategies to address gaps in quality antenatal care.

**Keywords:** *Content and timing of care in pregnancy (CTP) tool; Holy Family Hospital; Kwahu West Municipal; Nkawkaw; quality antenatal care.*

## DEFINITION

- *CHPS – the lowest level of primary healthcare in Ghana with focus on disease prevention and health promotion through community participation.*

## ABBREVIATIONS

ANC	: Antenatal Care;
AOR	: Adjusted Odds Ratio;
BP	: Blood Pressure;
BS	: Blood Studies;
CHOs	: Community Health Officers;
CHPS	: Community-Based Health Planning and Services;
CI	: Confidence Interval;
CTP	: Content and Timing of care in Pregnancy;
G6PD	: Glucose-6-Phosphate-Dehydrogenase;
HIV	: Human Immunodeficiency Virus;
OR	: Odds Ratio;
PMTCT	: Prevention-of-Mother-to-Child-Transmission;
PNC	: Postnatal Care;
Q <sub>1</sub>	: First Quartile;
Q <sub>3</sub>	: Third Quartile;
SDG	: Sustainable Development Goal;
US	: Ultrasound;
WHO	: World Health Organisation;

## 1. INTRODUCTION

The World Health Organisation (WHO) envisions a world where every pregnant woman and newborn receives quality care throughout the pregnancy, childbirth and the postnatal period [1]. In 2015, an estimated 303 000 women died from pregnancy-related causes, 2.6 million babies were stillborn (half in the third trimester)

and 2.7 million newborns died in the first month of life [2,3]. Ninety-nine percent (99%) of maternal deaths occur in developing countries where women have one in 48 chance of dying from pregnancy associated causes compared to developed countries (1:1,800) [3,4,5]. In Ghana 380 women per 100,000 live births die from pregnancy related causes while at least 28,000 suffer disabilities each year [6].

Antenatal Care (ANC) is a Safe Motherhood Initiative instituted by the WHO to reduce maternal mortality particularly in developing countries as it incorporates socio-cultural factors, addresses health systems challenges and promote healthy policies [7]. However, there are disparities of access globally [8,9] ; while 86 per cent of pregnant women access antenatal care with skilled health personnel at least once, only three in five (62%) receive at least four antenatal visits. In regions with the highest rates of maternal mortality, such as sub-Saharan Africa and South Asia, even fewer women received at least four antenatal visits (52% and 46%, respectively) [9]. However, Ghana's ANC coverage has improved tremendously over the past 20 years. A survey conducted in 2014 indicated that 97% of women who gave birth in the preceding five years attended ANC at least once and 87% made at least four visits [10].

The WHO recommends pregnant women start ANC within the first trimester and make at least eight visits before delivery in order to receive comprehensive package of care [1]. Content of ANC differ among countries [1]; hence, there are no standardized indicators to measure quality of ANC across geographical regions [11]. In a study involving ten low-income and middle-income countries, six components namely blood pressure measurement; urine test; blood test; tetanus injection; iron supplementation; and information on complications were used to assess content of care. In all ten countries, receipt of the six routine components varied widely; blood pressure measurement was the most commonly reported component, and urine test and information on complications the least. In another study, blood pressure measurements, abdominal palpation and fetal heart rate monitoring were provided to all participants [12.] In Ghana, ANC service package includes hemoglobin level estimation; urinalysis; blood grouping and rhesus factor test; ultrasound (US) scan; syphilis test; Prevention of Mother To Child Transmission (PMTCT) of HIV; micronutrient supplementation; tetanus immunization; monitoring of certain vital signs; obstetric and gynaecological examinations to aid in the early detection and management of complications that may arise; and education on the signs of pregnancy-related complications [10,13].

In 2015, the Kwahu West Municipality achieved ANC coverage of 106% with approximately 52% of the pregnant women making four visits (Municipal annual report, 2015; Unpublished

observation). The maternal mortality ratio was 201/100,000 live births with almost all the deceased being ANC attendants. It is speculated that although ANC coverage is high, it is not matched with equivalent quality of care. The aim of the study was to assess the quality of ANC and determine factors influencing access to quality care at the Holy Family Hospital, Nkawkaw in the Kwahu West Municipality of Ghana. The outcome of the study will generate action for improving quality towards achieving Sustainable Development Goal (SDG) target for maternal mortality (<70/100,000 live births) by 2030 [14].

## 2. MATERIALS AND METHODS

### 2.1 Study Site

Kwahu West Municipality is located in Eastern Region with Nkawkaw as its capital. It has a total population of 93,584 and the inhabitants are mostly farmers, craftsmen and traders. There are 32 Community-based Health Planning and Services (CHPS), ten health centers, three private hospitals and one mission hospital - Holy Family Hospital (Municipal annual report, 2015; Unpublished observation).

The Holy Family Hospital was selected as the study site due to its designation as the referral facility. Again, it attends to approximately 50% of all pregnant women accessing ANC in the municipality. It is a 227-bed capacity facility with specialized departments deserving of its status. There were 180 members of staff including five medical doctors and 100 nurses and midwives (Municipal annual report, 2015; Unpublished observation).

The ANC and postnatal care (PNC) clinics operate from Monday to Friday between 8:00 GMT to 17:00 GMT. Health service provision is in accordance with the National Health Insurance policy and the Ghana Health Service ANC and PNC guidelines. The average monthly delivery was approximately 290 and almost the same number is seen at the postnatal clinic (PNC) every month (Municipal annual report, 2015; Unpublished observation).

### 2.2 Study Design

This was a facility-based, descriptive cross-sectional study conducted at the Holy Family Hospital from July to September, 2016. The estimated proportion of pregnant women utilizing

ANC services at the facility was 50%. The desired precision and reliability coefficient were 0.050 and 1.96 respectively at 95% confidence level. Therefore, the estimated sample size adjusted for 10% dropout and non-compliance rate was 422. However, the response rate was 400 representing approximately 95%.

### 2.3 Data Collection

Four hundred postnatal clinic attendants age 15-49 years were consecutively selected for the study. Postpartum women who attended all ANC visits at the hospital were included and those who had delivered more than a month ago were excluded. Participants were interviewed with a semi-structured questionnaire. Individual written informed consent was obtained and privacy maintained for the interviews. Responses especially on care interventions were validated with information from the clients' ANC booklet and the facility's ANC register.

Socio-demographic characteristics (predictor variable) including age, marital status, religion, educational level, occupation, parity, health insurance status, partner's occupation, partner's educational level and ANC visit decision making power were collected from each respondent. The outcome variable (quality of ANC) was classified according to the Content and Timing of care in Pregnancy (CTP) tool developed by Beekman et al (2011) [15] which classifies care into a four-category ordinal scale; inadequate, intermediate, sufficient or appropriate.

The CTP tool aims to reflect if women received a minimum care package recommended in every pregnancy, regardless of parity or risk status. Classification was based on time of initiation; and number of blood pressure (BP) measurements, ultrasound (US) and blood studies (BS) received during the course of pregnancy. Components of BS included syphilis, human immuno-deficiency virus (HIV), haemoglobin, glucose-6-phosphate dehydrogenase (G6PD) deficiency, sickling, malaria (for suspected cases), blood grouping and hepatitis B tests.

Care trajectories were first assessed against the timing of initiation of care. Given the international consensus that care should start immediately a woman notices she is pregnant or within the first trimester [16-19]; women who received initial care after fourteen completed weeks of gestation are automatically assigned to the inadequate category. For the rest of the participants care was measured against the number of times they

received each intervention over the whole care trajectory. The frequency of each intervention (US, BP, BS) over the whole pregnancy was calculated. Women who had at least one intervention occurring less than the minimum recommended number of times and the number of the other interventions not exceeding the respective ranges (for example one for each intervention respectively) were also assigned to the inadequate category.

When at least one intervention occurred less than the minimum recommended number of times but another exceeded the respective ranges the women were assigned to the intermediate group (for example if she received eight US, one BP and one BS). For women that met the minimum recommended number of interventions (at least six BP and two BS and two US) throughout pregnancy, the timing of the interventions in pregnancy is considered. When the minimum number for each intervention occurred in the relevant trimesters, a woman was classified in the 'appropriate' category. However, those not meeting the time criterion were classified in the 'sufficient' group. Fig. 1 sets out the classification schematically.

### 2.4 Data Analysis

Data was entered onto Microsoft Excel 14.0 spreadsheet and exported into Stata statistical software (Stata Intercooled version 12; Stata Corp, College Station, TX, USA) for analysis. Descriptive statistics (mean, median, standard deviation, range, first and third quartiles) were calculated for age and parity. Frequency and percentage distribution of characteristics were computed with cross tabulations to compare respondents' experience of quality of care dichotomized as acceptable (appropriate or sufficient) and poor (intermediate or inadequate) quality. Logistic regression was used to determine the predictors of acceptable quality care. Results were presented as adjusted odds ratio at 95% confidence level.

## 3. RESULTS AND DISCUSSION

A total of 400 respondents participated in the study. Approximately 66% received acceptable quality of care with the remainder receiving poor quality. The mean age of respondents was 27.8 years with a standard deviation (SD) of 5.5 year. The youngest respondent was 16 years while the oldest was 42. Twenty-five per cent (first quartile,  $Q_1$ ) of respondents were aged 24 years or below. Half of the respondents (median) were below or

equal to 27 years. Seventy-five per cent (third quartile, Q<sub>3</sub>) were below or equal to 31 years. The mean number of births for respondents was 2.3 (SD=1.2; median=2.0; Q<sub>1</sub>=1.0; Q<sub>3</sub>=3.0; range=0-10).

Majority (81.3%) of respondents were aged 20-34 years. Eighty-four per cent had acquired at least secondary education and only about 60% had partners with this level of education. Nearly 19% were either unemployed or students and

majority (52.2%) of respondents had partners who were artisans (masons, plumbers, carpenters, etcetera). Approximately 93% were Christians. More than 70% had not had their relationships formalized with their partners but were living together (cohabiting). Only six per cent had had more than four births and almost all (97.5%) respondents had active national health insurance cards. Less than half (41.5%) had control over decisions concerning ANC attendance (Table 1).

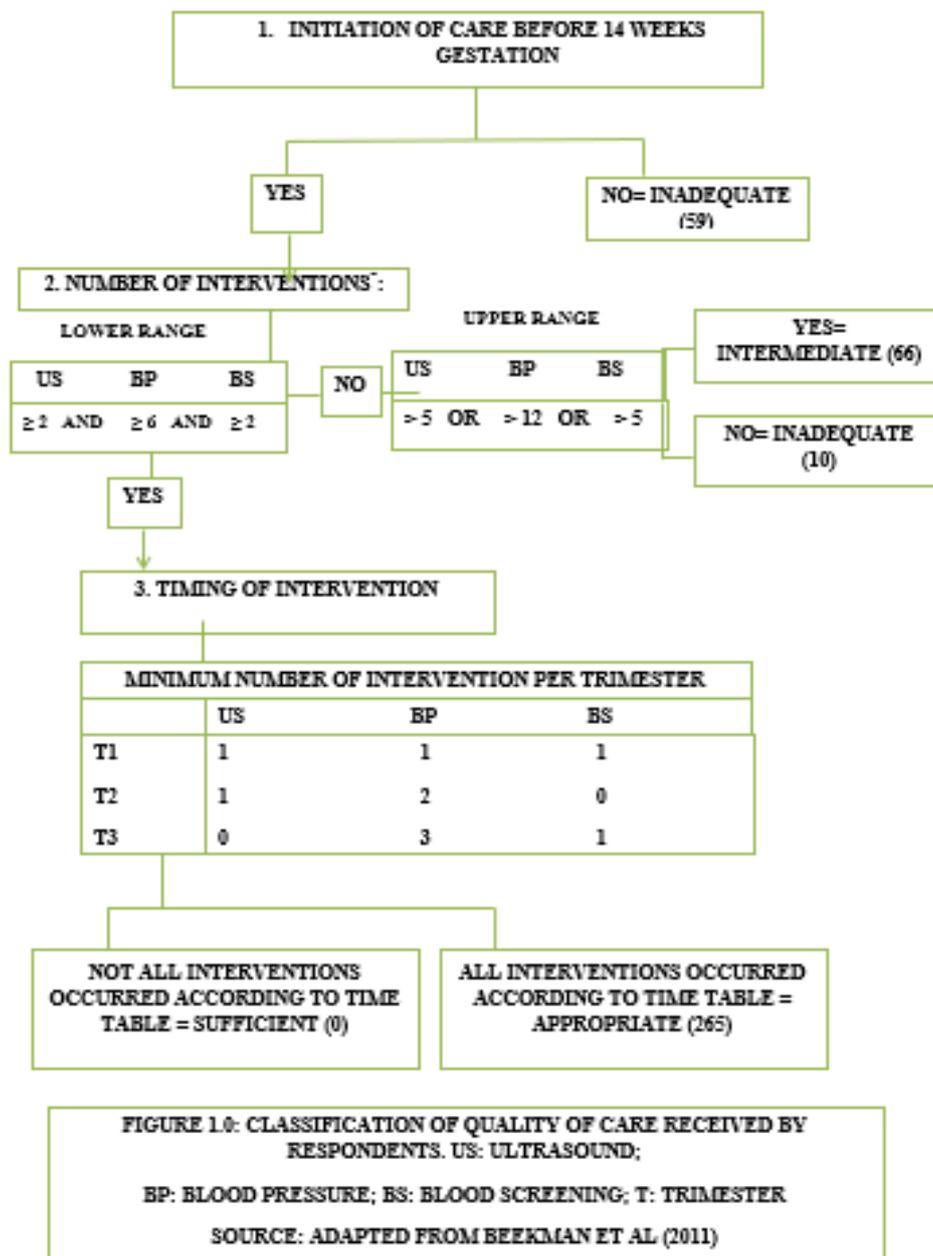


Fig.1. Classification of quality of care received by respondents, Holy Family Hospital, Nkwakaw, Ghana; 2016

**Table 1. Sociodemographic characteristics of respondents, Holy Family Hospital, Nkawkaw, Ghana; 2016**

<b>Characteristic</b>	<b>Acceptable quality, n (%)</b>	<b>Poor quality, n (%)</b>	<b>Total, N (%)</b>	<b>p-value</b>
<b>Age</b>				
15-19	17 (65.3)	9 (34.7)	26 (6.5)	0.730
20-24	56 (65.9)	29 (34.1)	85 (21.3)	
25-29	101 (68.2)	47 (31.8)	148 (37.0)	
30-34	56 (60.9)	36 (39.1)	92 (23.0)	
>34	35 (71.4)	14 (28.6)	49 (12.2)	
<b>Educational level</b>				
Illiterate	19 (52.8)	17 (47.2)	36 (9.0)	0.010
Primary	21 (75)	7 (25)	28 (7.0)	
Secondary	184 (64.1)	103 (35.9)	287 (71.7)	
Tertiary	41 (83.7)	8 (16.3)	49 (12.3)	
<b>Occupation</b>				
Unemployed	29 (49.2)	30 (50.8)	59 (14.7)	<0.001
Student	12 (80.0)	3 (20.0)	15 (3.7)	
Artisan	70 (63.6)	40 (36.4)	110 (27.5)	
Farmer	38 (60.3)	25 (39.7)	63 (15.8)	
Trader	88 (83.8)	17 (16.2)	105 (26.3)	
Civil servant	28 (58.3)	20 (41.7)	48 (12.0)	
<b>Marital status</b>				
Single	37 (66.1)	19 (33.9)	56 (14.0)	0.990
Married	32 (65.3)	17 (34.7)	49 (12.3)	
Cohabiting	196 (66.4)	99 (33.6)	295 (73.7)	
<b>Religion</b>				
Traditional	6 (85.7)	1 (14.3)	7 (1.8)	0.150
Christianity	244 (65.1)	131 (24.9)	375 (93.7)	
Islam	15 (83.3)	3 (16.7)	18 (4.5)	
<b>Parity</b>				
1-2	161 (62.4)	97 (37.6)	258 (64.5)	0.040
3-4	89 (75.4)	29 (24.6)	118 (29.5)	
>4	15 (62.5)	9 (37.5)	24 (6.0)	
<b>Health insurance</b>				
Yes	263 (65.8)	127 (34.2)	390 (97.5)	<0.001
No	2 (20)	8 (80.0)	10 (2.5)	
<b>Partner's educational level</b>				
Illiterate	4 (1.5)	0 (0.0)	4 (1.0)	<0.001
Primary	105 (39.6)	52 (38.5)	157 (39.2)	
Secondary	140 (52.8)	46 (34.1)	186 (46.5)	
Tertiary	16 (6.1)	14 (27.4)	53 (13.3)	
<b>Partner's occupation</b>				
Unemployed	4 (20.0)	16 (80.0)	20 (5.0)	<0.001
Student	5 (71.4)	2(28.9)	7(1.8)	
Artisan	146 (69.9)	63 (30.1)	209 (52.2)	
Farmer	64 (66.0)	33 (24.0)	97 (24.2)	
Trader	17 (94.4)	1 (5.6)	18 (4.5)	
Civil servant	29 (59.2)	20 (40.8)	49 (12.3)	
<b>Decision making</b>				
Self	109 (65.7)	57 (34.3)	166 (41.5)	0.840
Partner	25 (64.1)	14 (35.9)	39 (9.2)	
Self/Partner	116 (68.2)	54 (31.8)	170(42.5)	
Parent	15 (60.0)	10 (40.0)	25 (6.3)	

Having tertiary education (OR=4.6, 95%CI: 1.7-12.5); being a student or trader (OR=4.1, 95%CI: 1.1-16.2 and OR=5.4, 95%CI: 2.6-11.1 respectively); having had three or four births (OR=1.8, 95%CI: 1.1-3.0); having active national health insurance card (OR=8.3, 95%CI: 1.7-39.6); having a partner with primary or secondary (OR=4.7, 95%CI: 2.4-9.2 and OR=7.0, 95%CI: 3.6-13.8 respectively); and having an employed partner were significantly associated with receiving acceptable quality of ANC (Table 2).

The goal of universal health coverage is to ensure all persons have access to quality health care. In sub-Sahara Africa where majority of maternal deaths occur, sociodemographic,

cultural and economic factors are important barriers to access. A considerable proportion of respondents did not receive the expected quality of care and it is of particular concern because quality ANC is one of the main strategies of reducing maternal mortality [7]. The fact that majority of the women accessed acceptable quality of care brings into focus the capacity of the hospital to provide quality care to all pregnant women if pragmatic steps are taken to improve access. This finding ties in well with the study of Duysburgh et al (2013) who observed that quality of antenatal care in most sub-Sahara African countries can be improved with the existing human resource without major investments [20].

**Table 2. Estimated odds ratio of receiving quality ANC, Holy Family Hospital, Nkawkaw, Ghana; 2016**

Characteristic	OR	95% CI	p-value	AOR	95% CI	p-value
<b>Educational level</b>						
Illiterate(ref)	1.0			1.0		
Primary	2.7	0.9-7.9	0.070	1.5	0.4-6.2	0.560
Secondary	1.6	0.8-3.2	0.190	1.0	0.3-3.2	0.960
Tertiary	4.6	1.7-12.5	<0.001	9.7	1.9-49.4	<0.001
<b>Occupation</b>						
Unemployed(ref)	1.0			1.0		
Student	4.1	1.1-16.2	0.040	13.8	2.1-89.8	0.000
Artisan	1.9	1.0-3.5	0.060	1.0	0.4-2.3	0.950
Farmer	1.6	0.8-3.2	0.220	1.4	0.5-4.5	0.530
Trader	5.4	2.6-11.1	<0.001	3.7	1.5-9.1	<0.001
Civil servant	1.4	0.6-3.0	0.410	0.4	0.1-1.5	0.190
<b>Parity</b>						
1-2(ref)	1.0			1.0		
3-4	1.8	1.1-3.0	0.010	2.1	1.1-3.8	0.020
>4	1.0	0.4-2.4	0.990	0.7	0.3-2.1	0.560
<b>Health insurance</b>						
No(ref)	1.0			1.0		
Yes	8.3	1.7-39.6	0.010	0.9	0.1-12.2	0.992
<b>Partner's educational level</b>						
Illiterate(ref)	1.0			1.0		
Primary	4.7	2.4-9.2	<0.001	4.0	1.6-10.0	<0.001
Secondary	7.0	3.6-13.8	<0.001	5.6	2.2-14.0	<0.001
Tertiary <sup>a</sup>	1.0	-	-	-	-	-
<b>Partner's occupation</b>						
Unemployed(ref)	1.0			1.0		
Student	10.0	1.4-71.9	0.020	3.5	0.4-34.3	0.290
Artisan	9.3	3.0-28.8	<0.001	6.8	1.6-29.4	0.010
Farmer	7.8	2.4-25.1	<0.001	3.0	0.6-14.0	0.170
Trader	68.0	6.9-675.0	<0.001	27.4	2.2-334	0.010
Civil servant	5.8	1.7-20.0	0.010	2.0	0.4-11.0	0.430

<sup>a</sup> Omitted from logistic regression model

The study suggests that the quality of ANC is demand-side driven; thus, the pregnant woman must start in the first trimester and following through religiously till delivery in order to receive acceptable quality of care. [21,22] These conditionalities are influenced by sociodemographic, economic and cultural factors. Some studies have demonstrated that women older than 19 years are more likely to utilize ANC services compared with those below this age. [23,24] However, this study found no significant association between age and utilization and is consistent with others carried out in Africa. [21,25] The explanation may lie in the peri-urban nature of the municipality coupled with the not-so-high educational achievements of most of the women (less than 15% of respondents had attained tertiary education) influencing young women to start childbearing at an earlier age (more than one-third of respondents were below 20 years). This might have contributed to a societal acceptance of teenage pregnancy and destigmatization. Consequently, young women were able to access ANC services without being shy.

There were differing findings on the relationship between parity and quality of ANC: while some studies [21,25] found no association; Manzi et al (2014) observed that women who have had four or more births are likely to delay initiation of care compared to those with lesser births. [26] On the contrary, this study suggests that women with three to four births often start ANC in the first trimester and are more likely to receive quality care compared to those with lesser births. A possible explanation to the observation is that women who have had more births may have interfaced with the facility on more occasions and experienced satisfactory care hence are likely to initiate ANC on time and follow up with high number of visits to receive expected care.

Respondents who were traders had better chances of receiving quality care compared with others. According to Thaddeus and Main's (1994) "delay" model of factors influencing maternal mortality, delays in deciding to seek care (delay 1) is mainly due to lack of 'economic power' on the part women. [27] Studies have shown that women who earn income are likely to utilize ANC service compared with those who do not. [21,28] According to Yang et al (2010) access to transportation influences utilization of ANC services. [28] The local economy of the study site (Nkawkaw) is commerce-based. Women who engage in 'buying and selling'

activities often have readily available funds for transportation [29] and other care related costs. The location of the hospital and main transport terminal in the commercial area gives options to pregnant women to either commute by foot or vehicle to the facility thereby removing transportation barriers.

One of the limitations of the study was misclassification bias potentially associated with the CTP tool due to its focus on only three interventions to adjudge quality. Again, the convenience sampling technique might have introduced selection bias.

#### **4. CONCLUSION**

Although nearly two-thirds of respondents accessed acceptable quality of care, the hospital has the capacity to provide quality care to all women attending its ANC clinic.

Current efforts to improve universal health coverage through Community-based Health Planning and Services (CHPS) programme is an important strategy for enrolling women early into care. Improving the synergy in service delivery between Community Health Officers (CHOs) at the CHPS zones and midwives will enhance early booking and quality antenatal care; CHOs should link up all pregnant women to health facilities. Adoption of mobile phone text messaging to remind pregnant women of their appointments should be a key consideration by the Municipal Health Directorate and the Hospital Management. Demand generation activities through community-based health promotion campaigns using multiple communication channels is worth considering by the Municipal Health Directorate. In the medium-to-long term and in the quest for Universal Health Coverage, the Ghana Health Service need to engage the National Health Insurance Scheme to accredit domiciliary midwifery services.

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#### **CONSENT AND ETHICAL APPROVAL**

Ethical approval was provided by the Committee on Human Research Publications and Ethics at the Kwame Nkrumah University of Science and

Technology (Approval number: CHRPE/AP/493/16). Administrative permission was sought from the Kwahu West Municipal Health Directorate and Holy Family Hospital. Written informed consent, confidentiality and anonymity were observed throughout the study.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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