**CORRELATES OF MATERNAL HEALTH SERVICE USE AND WOMEN’S EXPERIENCES USING ANTENATAL CARE IN GHANA: A MIXED METHODS STUDY**

**Abstract**

The pace of improvements in maternal mortality has been slow in Ghana. While Ghana’s maternal mortality ratio (MMR) decreased from 635 per 100,000 live births to 319 per 100,000 live births between 1990 and 2015, the country failed to meet the 75% reduction target set by Millennium Development Goal (MDG) goal 5A, to reduce maternal mortality ratio by 75% between 1990 and 2015. Antenatal care (ANC) is critical to improving maternal morbidity and mortality and child deaths. In 2003, Ghana introduced the National Health Insurance Scheme to ensure that all pregnant women have access to free maternal care, and in 2016, the WHO changed its recommendation from four or more to 8 or more ANC visits for developing regions. The objectives of this study were: 1) to identify correlates of pregnant mothers’ use of recommended health services, including the number of ANC visit and the initiation of ANC in the first trimester of pregnancy; and 2) develop an in-depth understanding of women’s experiences using ANC services in Ghana, nearly fifteen years after the introduction of the National Health Insurance Scheme in urban Ghana. The 2017 Ghana Maternal Health Survey was used for the quantitative part of this study. For the qualitative component, semi-structured in-depth interviews were conducted at the Korle Bu Teaching Hospital in Accra, Ghana.

Our results showed health insurance to be significantly correlated with the number of ANC visits, but not with the timing of first ANC visits. On average, older women, women with higher educational status, and women from wealthier households, women who were married, and those who had fewer than four children had greater numbers of ANC visits. Media exposure (radio) was significantly associated with ANC visits. There appeared to be decline over time in the likelihood of women seeking eight or more ANC visits and initiating ANC in their first trimester. Qualitative data suggest that social support, the health status of baby and mother, and confidence in doctors were reasons for women’s use of ANC services. Barriers to ANC included poor system and process structures, lack of friendliness of staff, high medical costs, negative relationships with providers, and geographical accessibility.

This study provided insight into factors associated with women’s ANC utilization and the timing of their first ANC visit, and reasons why women may seek or not seek recommended maternal health services. Findings may help inform public health policies aimed at improving maternal service use in the region.

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**List of Abbreviations**

ANC……………………………………………………….…………..........Antenatal Care

DHS……………………………………………………....Demographic and Health Survey

FANC……………………………………………………...…….....Four Visit ANC Model

GDHS…………………………………………... Ghana Demographic and Health Surveys

GhC…………………………………………………….…....……………...... Ghana Cedis

GMHS………………………………………………...…... Ghana Maternal Health Survey

HIC………………………………………………………....………. High Income Country

IRB………………………………………………………...….. Institutional Review Board

LMIC ..……………………………………………..... Low- and Middle-Income Countries

MDG……………………………………..……………...... Millennium Development Goal

MHS………………………………………………….....………... Maternal Health Survey

MMR…………………………………………………...………...Maternal Mortality Ratio

NHIS ………………………………………………...... National Health Insurance Scheme

OOP ……………………………………………………......……….............. Out of Pocket

SBA……………………………………………………..…...….... Skilled Birth Attendants

SDG …………………………………………………….…Sustainable Development Goal

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SSA…………………………………………………….……..........…. Sub-Saharan Africa

TBA……………………………………………………….…. Traditional Birth Attendants

UNICEF……………………………………………..……United Nations Children’s Fund

WHO ……………………………………………………........World Health Organization

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**Chapter 1: Introduction**

**1.1 Background**

There has been a significant global decline in maternal mortality since 1990,1 but rates of morbidity and mortality remain high. About 810 women die every day from pregnancy-related complications around the world.2 Estimates from the World Health Organization (WHO) indicate that each year, 300,000 women lose their lives during pregnancy or childbirth, with sub-Saharan African (SSA) countries accounting for two-thirds of maternal mortality.2,3 Complications in pregnancy and childbirth such as infections and severe bleeding is the chief cause of deaths in LMIC among adolescent girls.2

Reducing maternal mortality has been a long-standing international goal, reflected in Millennium Development Goal (MDG) 5A (to reduce maternal mortality ratio by 75% between 1990 and 2015)4 and Sustainable Development Goal (SDG) 3.1 (to reduce global maternal mortality by 70 per 100,000 live births by 2030).5 In 2010, the United Nations (UN) launched the Global Strategy for Women’s, Children’s, and Adolescents’ Health, which is in alignment with the SDGs to “ensure health and well-being for every woman, child, and adolescent.”6 The pace of improvements in maternal mortality has been slow in Ghana.7 While Ghana’s maternal mortality ratio (MMR) decreased from 635 per 100,000 live births to 319 per 100,000 live births between 1990 and 2015,8 the country failed to meet the 75% reduction target set by MDG goal 5A.

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Antenatal care (ANC) is critical to improving maternal morbidity and mortality and child deaths.9 ANC is a critical opportunity for health providers to deliver care and support, and provide information to pregnant women. ANC coverage is defined by the United Nations Children’s Fund (UNICEF) as “the percentage of women aged 15-49 with a live birth in a given period that received antenatal care provided by skilled health personnel at least once during pregnancy.”10 According to UNICEF, in 2016, 86% of pregnant women globally received any ANC care, and only 62% of these women received (the previously recommended) four or more ANC visits during their pregnancy.10 Sub-Saharan Africa and South Asia have the lowest ANC coverage, with 52% and 46% of pregnant women receiving four or more ANC visits respectively.10

In 2016, the WHO introduced a new ANC model recommending eight or more ANC contacts for pregnant women, particularly in developing countries.10–12 The International Federation of Gynecology and Obstetrics states that eight or more ANC contacts can decrease perinatal deaths by up to eight per 1,000 births in comparison to four or more ANC contacts.13 Since all pregnant women are at risk for pregnancy complications, it is imperative that many contacts with providers are established.14

Nearly 96% of Ghanaian women have received at least one ANC visit, with over 80% of women having received the four or more ANC visit previously recommended by the WHO,15,16 however, high maternal mortality persists within the country.7 Leading causes of maternal mortality in Ghana are hemorrhage, abortion, hypertensive disorder, sepsis and infection.17–19 With the high reportage of Ghanaian women receiving four or more ANC in 2014,10 a 2016 study by Afulani et al. observed that only 61% of mothers received better quality of ANC during pregnancy.20 Quality of ANC was defined as receipt

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of WHO recommended ANC services during pregnancy, including a mother being weighed, a blood sample taken, and told of pregnancy complications during visits. The gaps in care may be attributed to many mothers not receiving an adequate number of ANC visits.

The introduction of the National Health Insurance Scheme (NHIS) in 2003 was intended to increase health insurance coverage, particularly for vulnerable populations, thereby improving access to health care and reducing the financial burden for would-be beneficiaries.21,22 However, the intended beneficiaries of this policy do not fully take advantage of it in accessing health care.23 Research to understand what factors contribute to low rates of health insurance coverage is imperative. Thus, this research study aimed to assess the correlates of maternal health service use and health insurance coverage and to have an in-depth understanding of women’s experiences when seeking antenatal care.

**1.2 Specific Aims and Hypotheses**

The overall goal of this dissertation research was to identify correlates of maternal health services utilization among reproductive-aged women in Ghana after the introduction of the NHIS using a mixed methods approach. The specific aims and hypotheses are as follows:

**Specific Aim 1**: To characterize the distribution of ANC utilization and rates of recommended ANC use in Ghana between 2012 and 2017.

***Study Question 1a:*** What was the distribution of ANC visits among pregnant women in

Ghana?

***Study Question 1b***: What was the share of women receiving the recommended number of

ANC visits?

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***Study Question 1c***: What was the share of women initiating ANC in their first trimester of

pregnancy?

**Specific Aim 2**: To identify factors associated with ANC use, specifically with having fewer than four ANC visits and eight or more ANC visits in Ghana between 2012 and 2017.

***Study Question 2a:*** What differentiates women who had fewer than the minimum

number of four ANC visits in Ghana between 2012 and 2017?

***Hypothesis:*** We hypothesize that Ghanaian women who have health insurance coverage will be less likely to have fewer than four visits compared to women who had health insurance coverage.

***Study Question 2b:*** What differentiates women having the newly recommended eight or

more visits in Ghana between 2012 and 2017?

***Hypothesis:*** We hypothesize that Ghanaian women who have health insurance coverage will be more likely to have the newly recommended eight or more visits compared to women who did not have health insurance coverage.

***Study Question 2c:*** Which factors were associated with earlier ANC initiation during

pregnancy?

***Hypothesis:*** We hypothesize that Ghanaian women with health insurance coverage will have earlier initiation of ANC visit, within 0-3 months of pregnancy, than Ghanaian women without health insurance coverage

**Specific Aim 3:** To gain an in-depth understanding of women’s experiences using antenatal care services in Ghana, nearly fifteen years after the introduction of the NHIS in urban Ghana.

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***Study Question 1:*** What are women’s experiences with the NHIS, and how has it affected their utilization of maternal health services?

***Study Question 2:*** Why are women encouraged or discouraged from seeking maternal

health services?

***Study Question 3:*** What are innovative ways to increase the uptake of maternal services in

Accra, Ghana?

**1.3 Significance of Research**

This study is significant for the following reasons:

1. **Maternal mortality remains high in sub-Saharan Africa.**

Despite many interventions to help curb these incidences, including the maternal user fee abolition in Ghana through the introduction of the NHIS, maternal mortality remains high.

1. **This study identifies rates of, and barriers to, ANC use in Ghana**

Increased ANC use has been proposed as a means of improving maternal mortality. In the context of new recommendations, it is important to assess whether mothers in Ghana are meeting WHO recommendations. Several factors have been identified to contribute to the non-utilization of maternal health services, including age, family income, and transportation. Studies have also investigated the relationship between health insurance and utilization of ANC services.24–26 Our study identifies locally relevant correlates of maternal health service use and provides an in-depth understanding of women’s experiences when seeking antenatal care.

1. **Identifying barriers to ANC use can inform strategies to improve the utilization of maternal health services among pregnant women in Ghana.** This study contributes to existing evidence of characteristics associated with the patronage of maternal

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services in Ghana. The findings from this study may inform public health policies, interventions, and programs aimed at increasing maternal services use in the region. Identifying barriers that prohibit mothers from seeking care provides an important contribution in developing approaches to mitigate these barriers, thus, helping to reduce the maternal mortality in Ghana.

**1.4 Innovation**

The study is innovative because, to my knowledge, it is the first study to use the 2017 Ghana Demographic Health Survey Data to examine rates and correlates of maternal health services use, including both the number and timing of ANC visits. The mixed methods approach explored both the facilitators and barriers to the use of these services, nearly 15 years after the introduction of the NHIS. Study findings may provide a more comprehensive understanding of why women do not meet WHO recommendations.

As many countries, particularly those in sub-Saharan Africa, are still on the quest to reduce their maternal and childhood mortality rates, results from this study may inform future research aimed at these issues. Thus, beyond the Ghanaian context, this study adds to the broader literature on maternal health services use and reasons that encourages or discourages their use.

The remainder of this dissertation is categorized into four chapters. Chapter 2 focuses on the review of the literature on ANC, the NHIS in Ghana, factors associated with uptake of ANC, and barriers that contribute to maternal health use. Chapter 3 focuses on the research design of the study. Chapter 4 presents the findings of this study in two manuscripts. Chapter 5 focuses on the implications of study findings.

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**Chapter 2: Review of the literature**

This chapter presents a review of literature relevant to this study. The chapter covers the concept of Antenatal Care and the National Health Insurance Scheme of Ghana. The chapter examines any relationship between these two entities and the impact of the latter on the former within the context of WHO recommendations for standard antenatal care and the attainment of international goals pertaining to maternal and child health.

**2.1 Antenatal Care**

Antenatal Care (ANC) is the entire clinical workup (including care, support, and information) a woman receives from a health care professional during her pregnancy (up until delivery).27 ANC is arguably the most essential care given to women during their pregnancy. It grants the opportunity for women to be screened for possible risks during their pregnancy.28 Services also include preventive measures such as encouraging a healthy lifestyle, living tobacco-free, taking in good nutrition, being physically fit, getting counseling, and, most importantly, following through with screening visits and treatments. Frequent ANC provides more contact between the provider and the woman, to not only identify but address any challenges that may occur during pregnancy. The United Nations Children’s Fund (UNICEF) defines ANC coverage as “the percentage of women aged 15-49 with a live birth in a given period that received antenatal care provided by skilled health personnel at least once during pregnancy”.10 According to UNICEF, in 2016, 86% of pregnant women globally received any ANC, and only 62% of these women received (the

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previously recommended) 4 or more ANC visits during their pregnancy.10 Women, particularly in sub-Saharan Africa (SSA) and South Asian women are least likely to receive the healthcare they need throughout their pregnancy. This has resulted in SSA and South Asia having the lowest ANC coverage, with 52% and 46% pregnant women receiving four or more ANC visits, respectively.10 These two regions have the highest maternal mortality ratio.29

**2.2 WHO Antenatal Care Model**

The World Health Organization (WHO) has, for many decades, championed efforts to ensure better overall health and wellbeing for all. Although globally, pregnancy-related preventable morbidity and mortality has been improved, regions specifically in South Asia and Africa still have unacceptably high maternal morbidity and mortality.30 In 2002, efforts to improve the quality of ANC and increase patronage led to the WHO developing and recommending a more focused approach to ANC. This included four timed ANC visits. The visits were scheduled as follows; the first was between 8 and 12 weeks of pregnancy, the second between 24 and 26 weeks, the third at 32 weeks, and the final visit between 36 and 38 weeks.31 This FANC (Four-visit ANC or Focused Antenatal Care) model was designed to improve maternal and perinatal health outcomes. Evidence shows that women who had four or more ANC visits were more likely to have greater maternal satisfaction than those who had four or fewer, irrespective of the resource setting.31 However, compared to low-and middle-income countries (LMIC), high-income countries (HIC) had more than four ANC visits in their ANC models, thus, women in HICs had more ANC visits than those in LMIC – a factor to which better maternal and perinatal health outcomes in HICs could be attributed. There is also evidence that suggests that women who had more

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contacts with their providers during pregnancy were more likely to have positive pregnancy experiences and decreased perinatal mortality risk.31,32 Additionally, recent evidence has shown that the frequency of ANC visits by pregnant women is associated with reduced pregnancy complications.33

Following on from the above observations, the WHO increased the recommended number of ANC visits from four to eight for countries in developing regions,11,34–36 as countries in these regions accounted for a majority proportion of global maternal morbidity and mortality. Additional emphasis was placed on the need for adequate communication and connection between patrons of ANC services and care providers, as evidenced in the change in the lexicon from ANC “visit” to “contact.” In the 2016 WHO ANC model, nutritional interventions, maternal and fetal assessment, preventive measures, interventions for common physiological symptoms, and health systems interventions to improve utilization of quality antenatal care were standardized into the recommended eight-contact model. The aim was to improve the utilization and quality of ANC.10–12 In total, 49 recommendations were outlined in the new guidelines focusing on what care women should receive during the recommended eight contacts with their providers.33 The 2016 ANC model recommends one contact in the first trimester (gestational age up to 12 weeks), two contacts in the second trimester (at 20 weeks and 26 weeks) and five contacts in the third trimester (at 30 weeks, 34 weeks, 36 weeks, 38 weeks, and 40 weeks). Both the FANC and 2016 ANC models recommend a return for delivery at 41 weeks if one has not given birth by then. The goal of the 2016 model, was to provide the opportunity to save lives using ANC.28

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While at least one study concluded that the FANC model sees a higher rate of stillbirths compared to eight or more contacts,32 evidence from other researchers does not support this assertion.30 Villar et al. published findings of the WHO ANC randomized trial in Cuba, Argentina, Saudi Arabia, and Thailand that found that the FANC model and the new ANC model did not have different health outcomes for the mothers and newborns.37

**2.3 International Goals**

High mortality and morbidity, particularly in low-and middle-income countries (LMIC), contributed to the WHO setting out new health objectives for such countries, including reducing maternal mortality ratios and child mortality rates. These objectives were originally reflected in international goals such as the Millennium Development Goal (MDG) 5A (to reduce maternal mortality by 75% between 1990 and 2015)4 and MDG 4A (to reduce under-five mortality rate by two thirds and neonatal mortality to 12 per 1,000 live births between 1990 and 2015).38 Currently, the Sustainable Development Goal (SDG) 3.1 (to reduce global maternal mortality to 70 per 100,000 live births by 2030),39 and SDG

3.2 (to reduce under-5 mortality to at least 25 per 1,000 live births by 2030) reflect these objectives.39 Although worldwide, maternal mortality ratios have declined to almost half what they were in 1990,1 a review of current trends suggests South Asian and sub-Saharan countries will fail to meet the target of SDG 3.1.40 Further, sixty countries will miss the SDG 3.2.41 These countries account for about 80% of the global burden of maternal deaths and deaths of children before their fifth birthday.2,42 There is a substantial positive correlation between a higher number of antenatal care visits and positive maternal and child outcomes. A comprehensive antenatal care program is a critical opportunity to improve the delivery of care in the period leading up to the delivery of a baby, during the actual delivery

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of the baby, and thereafter. It presents an opportunity to reduce antepartum, perinatal, and postpartum complications and deaths. It has been proven that timely antenatal care can save lives.30 For LMIC to meet international goals, the recommended standards for the provision of quality ANC must be adhered to strictly.

**2.4 Ghana’s National Health Insurance Scheme**

Over the years, healthcare financing in Ghana has gone through many changes. Following independence in 1957, healthcare requirements of the public were met via a tax-funded system. By the dawn of the millennium, this system had given way to a user fee system, given the moniker “cash and carry” in reference to the need to pay upfront for health services before accessing said services. This set-up ultimately proved inadequate in providing healthcare to all as it left the most vulnerable, the poor, badly exposed.43,44 This led to a massive healthcare reform in the 2000s which saw the introduction of a social intervention program known as the National Health Insurance Scheme (NHIS) in 2003, under ACT 650.45 Its main aim was to increase health insurance coverage, particularly for vulnerable populations, thereby improving access to health care and reducing the financial burden for would-be beneficiaries.21,22 Under this act, all citizens of the country should have access to health insurance either through the NHIS or private health insurance; however, there are no penalties for citizens who do not get coverage through any insurance.21,46,47 Inasmuch as all citizens have access to health insurance, signing up to an insurance policy is the prerogative of an individual.43

The NHIS is funded through monthly Social Security and National Insurance Trust (SSNIT) contributions by formally employed citizens and returns from the National Health Insurance Investment Fund. Additionally, a special levy, the National Health Insurance

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Levy (NHIL), is placed on goods and services patronized by all citizens and the realized funds handed over to the National Health Insurance Authority (NHIA), which has oversight responsibility. Workers in the informal sector pay an annual premium, which also adds to the financing mechanism of the NHIS.48 Within the financing mechanism of the NHIS, certain groups are exempted from annual premiums. The exempt groups include, but are not limited to, formal employees who are contributing to the NHIS through monthly social security contributions, children under 18 years of age, adults above 70 years, and persons with mental health disorders. Women in the ante, peri- and post-natal periods were added to the exemptions at a later date.48,49 The exempt groups are excluded from out of pocket (OOP) premium payments to ensure that the poor and other vulnerable members of the population have access to care.50 This structure of the NHIS became fully functional in 2005.47

Long before the implementation of the NHIS, women in Ghana’s poorest regions could deliver at any public health facility without charge. ACT 650 expanded free delivery care to the entirety of the country. The initial implementation of the NHIS required that pregnant women not yet enrolled in the scheme pay out of pocket to access ANC services. Delivery services, however, remained free. Ghana’s Ministry of Health introduced a new Maternal Health Care Program in 2008, exempting pregnant women from paying out of pocket for maternal care (antenatal, delivery, and post-natal care) services as long as they enrolled in the NHIS.47,44 Thus, the Maternal Health Care Program became integrated into the NHIS.44,25 The reformed program in 2008 eliminated ANC charges. It introduced a complete package for pregnant women, theoretically ensuring access to the entire spectrum of maternal care (i.e. ante, peri – including delivery – and post-natal care). To benefit from

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the Maternal Health Care Program and receive free maternal care, women are required to complete an NHIS registration and submit proof of pregnancy to appropriate authorities.48,51 In Ghana it is possible to be registered for the NHIS and not have coverage.52 Not having coverage could be due to the fact that one has not paid their premium needed for renewal. Additionally, there is a one month waiting period for insurance cards expired for more than three months, or an individual is in the waiting period between completion and registration of paperwork and obtaining an insurance card. Pregnant women, however, are not subjected to the waiting period rule. Ghana’s universal health insurance, which is one of few in Africa, aims at not only improving the lives of the populace as a whole but also places a strong focus on the wellbeing and outcome of pregnant women.53 The NHIS is estimated to provide coverage for approximately 95% of the disease burden in Ghana. It also provides a wide variety of services including outpatient services, inpatient services, oral health, eye care services, emergencies, and maternity care.48 While in 2012, the NHIS was revised and amended under ACT 852,45 the amendments did not affect funding for the Maternal Care Program.

**2.5 Trends in Patronage of the National Health Insurance Scheme and Utilization of**

**Maternal Care Services**

Given that maternal care is now universally covered under the NHIS, it is vital to assess how many pregnant women are taking advantage of the universal health insurance to patronize services available to them. A primary aim of the NHIS is to remove financial barriers of access to healthcare.48 This ideal, however, is not achieved in practice. The poor enrolled in the scheme, and supposedly at an advantage regarding coverage, are yet to realize said advantage fully.23 A major challenge facing the NHIS is the difficulty in

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assessing the income level of would-be clients, particularly individuals in the informal sector. The significance of this is that, theoretically, the value of the premium required from an individual to be signed unto the scheme is supposed to be scaled to income. Set aside the exempt group, the rate for the “very poor” was about 7.2 GhC; for the “very rich” about 48 GhC per annum. Challenges with accurately categorizing prospective clients into various income strata means that, in practice, a flat fee is charged as premium per annum;54 the standard premium for all ranges between 8 to 10 GhC.55

Concurrently, increased utilization of health services by the insured has translated to an increased workload for providers. The increased workload coupled with delayed reimbursements by the NHIA has led to disruptions in operational flows directly impacting health service delivery.56 Delays in reimbursement from the Authority to service providers contributed to OOP payments for many women in rural Northern Ghana.57

Beneficiaries of the NHIS have reported experiencing longer queues at health facilities compared to individuals with private insurance or individuals paying out of pocket. They also reported being discriminated against compared to people who are uninsured but capable of paying out of pocket and the wealthy.5258 Duku et al. found that the perception of healthcare quality in Ghana was considerably more negative among individuals who were patrons of the NHIS versus individuals who were privately insured. This was the case regardless of the scale of measurement of satisfaction employed.59 Perceptions on non-technical quality of healthcare was measured on a 5-Likert scale based on seven quality indicators including but not limited to, satisfaction with service provision, waiting times, and filing complaints.59 Contrary findings were reflected in other research where actual experiences shaped the views of the patient based on their insurance status.58

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For example, a study in Burkina Faso (Ghana’s neighbor to the north), saw that individuals enrolled in community-based insurance (CBI) schemes although they received less comprehensive outpatient services than those not enrolled in the CBI, they perceived their quality of care to be better.60

**2.6 Demographic factors associated with National Health Insurance Scheme**

**Enrollment and Utilization in Ghana**

Since the inception of the NHIS in 2005, Ghana has scaled up coverage in all ten regions. Resultantly, a progressive increase in the number of patrons has been observed. In 2006, there were an estimated 2.5 million active users (11% of the population), in 2012, about 8.9 million and in 2017, approximately 10.7 million active users, accounting for roughly 37% of the population.55,61 Age, wealth, employment, residential status, marital status, and education have been associated with a greater likelihood of enrolling in the NHIS.49,50,62–6465 In 2014, about 47% of women in reproductive age in Ghana were registered under the NHIS. Over 50% of those were married, 47% were employed, and 50% were in the wealthier quintiles.62 Among women, NHIS enrollment was found to be higher in the more educated class and older women.5572 The likelihood of a mother enrolling in the scheme increases with age,72 and older adults who are enrolled in the NHIS have a higher probability of staying insured compared to their younger counterparts.49

Wealth status is a significant predictor of NHIS coverage amongst Ghanaians of reproductive age. Sarpong et al. found similar results in the Asante Akim North District, where higher socioeconomic status played a significant role in NHIS subscription.63 Also,

in the Central and Eastern regions of Ghana, patronage of NHIS was particularly low among the poor.64 The very foundation of the introduction of the NHIS is to ensure fair

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access and equity, particularly, for those of lower socioeconomic status. In reality,

however, NHIS coverage has been skewed towards the rich.62,63,66

Ameyaw et al. concluded that subscription to the NHIS was higher among the lower-income class than in the middle/higher income class. Using descriptive statistics, a supporting study also revealed that NHIS utilization was higher among insured individuals of lower socioeconomic status.43 These findings laid credence to the assertion that the NHIS scheme favors the poor, compared to other findings which state otherwise.67

Although a decrease in variations among NHIS enrollees over the years has been observed, wealth and residential status were still determining factors of NHIS patronage.64 Urban women were more likely to enroll in the NHIS than rural women.68 A study showed women in the Central Region, which is a more urbanized region, were more likely to utilize maternal health services compared to those in the Upper East Region, which is less urbanized. The observed increased likelihood of utilization of maternal health services reflects a higher average educational status.69 Ameyaw et al. also demonstrated similar findings where urban women had higher utilization of ANC services compared to rural women. The study explained that easier geographical access to health facilities might account for that observation.67

An increase in the delivery of health services has been observed following the implementation of NHIS. Outpatient utilization increased significantly after the introduction of the NHIS.23,70 Clinic visits and health care visits when ill was also higher among NHIS enrollees.55 Generally, NHIS enrollees have higher utilization rates for inpatient and outpatient services compared to the uninsured.23 Even when enrolled, however, the non-poor utilize services at a much higher frequency than the poor. This puts

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the poor at a disadvantage, demonstrating the impact of wealth status on NHIS utilization.23 Wealthier and more educated women were more likely to seek and utilize ANC services.71 The enrolled group also reports, on average, twice the prescriptions rate of the uninsured.55

**2.7 National Health Insurance Scheme and Maternal Care**

Under the NHIS, all maternal health visits before, during, and after birth should have full insurance coverage and, by extension, be free of charge. A study by Anafi et al. highlighted the challenges to the full realization of this policy. Women in this study asserted that although the government has indicated free maternal care for all, inadequate numbers of public healthcare facilities coupled with their chronically underfunded states create avenues for women to make out-of-pocket (OOP) payments for maternal services rendered to them.73 These women paid informal medical charges and several other fees, including ultrasound imaging fees, laboratory fees, and even fees for consultation with healthcare professionals. Thus, notwithstanding the Maternal Health Care Program guaranteeing pregnant women to be fully exempt from fees, in practice, women still encounter costs.44 The maternal fee exemption policy also unintentionally encourages the partners of pregnant women to be less financially supportive as the assumption is that there is no need for financial support when seeking maternal care.44 With limited financial independence, women opt to seek care from traditional birth attendants (TBAs), who are a cheaper alternative to skilled birth attendants (SBAs).74 Consequently, although the NHIS is designed to reduce the cost burden, the indirect costs associated with maternal care services mitigate the full utilization of these services.44 Dalinjong et al. found that, during childbirth, OOP payments amounted to an average of $17, which represents 5.6% of the

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average monthly income in the Kassena-Nankana Municipality of the Upper East region in Ghana.57

In this study, almost 70% of women believed that the free maternal care policy under the NHIS was not effective, as the mother bore the costs for drugs and other essentials such as toiletries. 19% of the women in this study testified to foregoing assets to fund bills accrued during childbirth. Women aged 20-24 had the highest report of OOP payments.57 Anafi et al. reported similar findings where women reported making OOP payments for drugs and occasionally for provider care, regardless of the fact that these were costs supposed to be fully absorbed by the NHIS.44 The study by Anafi et al. demonstrated that health facilities in rural Ghana were less likely to charge additional fees (in disregard of the free maternal care policy) as compared to facilities in urban centers. NHIS subscribers in health facilities in urban places like Accra were still made to make OOP payments, in some cases, as early as during the first antenatal visit.44 Notwithstanding these pertinent issues, Abrokwah et al. showed that OOP payments for antenatal visits were much lower among the insured versus the uninsured.75 The findings from this particular study are more in line with the intended consequences of the NHIS implementation.

A study by Abrokwah et al., using the Ghana Living Standards Survey (GLSS), discovered that between the years 2005 and 2006, only 60% of uninsured mothers had the minimum four or more ANC contacts (which was the recommendation at the time) compared to 81% of their insured counterparts.75According to the 2008 Ghana Demographic and Health Survey, NHIS subscribers have higher ANC utilization rates than non-subscribers suggesting that the free maternal health policy may have increased ANC enrollment.76,77 For example, Twum et al., concluded that mothers of children less than one

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year but greater than three months old who had NHIS were not only more likely to have six ANC visits, but were also more likely to have a facility-based delivery compared to the uninsured.78 Thus, women under NHIS had a better chance to access and patronize maternal health care services. Dixon et al. stressed the importance of the NHIS and its effect on maternal care patronage. In their study, higher ANC coverage was positively associated with NHIS enrollment, irrespective of socio-economic status, and other demographic factors in comparison to women who were not insured.25 These results were echoed in Bonfrer et al., where the percentage points of women insured under the NHIS who had received four or more ANC contacts were 7 points higher than those who were not NHIS insured, irrespective of the socio-economic status.43

Other research indicates that women who have access to NHIS, have a lower risk of birth complications and in totality, are improving the statistics of maternal health outcomes in the region as evidently supported by Mensah et al.79 Since the introduction of the NHIS, decreased infant mortality rates have been observed. In a study in the Northern Region of Ghana, following the switch from the “cash-and-carry system” to the NHIS, the childhood mortality dropped by 50%. 80 Using birth registry folders from the Tamale Teaching Hospital in the Northern Region, it was evident that 4% of infants delivered through the NHIS died, compared to 8% among non-NHIS enrollees. Singh et al. found that NHIS coverage was not associated with ANC attendance, but a greater use of facility delivery.47

**2.8 Antenatal Care and Maternal Health in Ghana**

While Ghana has made strides on the maternal and child outcome fronts by reforming her healthcare system through programs like the NHIS, the pace of

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improvements in maternal mortality has been slow.7 Ghana still has one of the worst maternal outcomes in the world.

Although Ghana’s maternal mortality ratio (MMR) decreased from 635 per 100,000 live births to 319 per 100,000 live births between 1990 and 2015,8 the country failed to meet the 75% reduction target set by MDG goal 5A. A huge factor accounting for this apparent failure is inadequate maternal health service utilization. Determinants of maternal health services utilization include level of education, region of residence, and occupation in rural Ghana.81 Poor utilization of antenatal and skilled maternal care are factors associated with both maternal mortality and neonatal mortality.74 A study in two rural districts of the Upper West Region in Ghana showed a staggering 58.7% of mothers had fewer than four ANC visits compared to the 41.3% who had the recommended four or more visits.83 Apanga et al. revealed that women who had fewer than four ANC visits had higher odds of having a cesarean section than those who had higher ANC. This is of significance considering that higher cesarean section rates correlate with higher maternal morbidity and mortality.

A study has shown that many mothers in Ghana do not attend the minimum required number of ANC contacts.14 This is of concern as receiving the recommended number of ANC contacts during pregnancy may reduce stillbirths and pregnancy complications.10 Another issue of note is the quality of delivery of recommended services. For example, while it was reported that 87.3% of pregnant women had four or more ANC contacts in 2014,10 a 2016 study by Afulani et al. observed that only 61% of mothers received high quality of care during pregnancy.20 In this study, high quality care was defined as receiving no fewer than eight of the nine essential ANC services recommended by the WHO during

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a pregnancy. Thus, only six out of ten pregnant women were beneficiaries of a minimum of eight out of the nine recommended ANC services, an example of which is blood pressure monitoring.20 Other research showed that mothers who utilized maternal health services in hospitals and health centers in Northern Ghana who were enrolled in the NHIS had higher quality of services.82 In that study, quality of services was assessed based on prospective mothers receiving all diagnostic and counseling procedures, including being attended to by a skilled birth attendant during delivery, routine urine examinations, and blood pressure monitoring.

This could translate to the high mortality rate in the region. The gaps in care may be attributed to women not receiving the WHO recommended number of ANC visits and services. Factors preventing pregnant women from attaining the recommended number of contacts may include long waiting times, poor attitudes of health workers, transportation and cultural beliefs, and the role played in ANC delivery.84 The slow pace of maternal mortality reduction in Ghana demonstrates the need to not only offer access to essential reproductive health services such as antenatal care but to ensure mothers receive the highest quality care possible by adhering to WHO ANC recommendations.

**2.9 Antenatal Care and Neonatal Morbidity and Mortality in Ghana**

The WHO estimates about 99% of all neonatal deaths occur in LMIC, with about 70% of these deaths occurring in Africa and South Asia .85 While there has been a significant decline in global infant mortality in the past two to three decades, sub-Saharan Africa has not mirrored these improvements.86,87 In Ghana, neonatal and under-5 mortality rates have been steadily declining.88 Neonatal mortality declined from 28 per 1,000 live births in 2013 to 24.2 per 1,000 live births in 2017 in Ghana.89 Under-5 mortality has also

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seen a significant decline, although the proportion of neonatal deaths accounting for under-5 mortality has increased. This is because the neonatal mortality rate is not falling as rapidly as the under-5 mortality.90 Neonatal deaths are estimated to account for almost half of under-5 mortality.88 In 2015, the Korle Bu Teaching Hospital (which is the highest tertiary hospital in Ghana) noted that 18% of all singleton childbirths were preterm deliveries. In that review of maternal and child health indices at the facility, advanced maternal age (> 35 years), hypertensive disorders, and poor antenatal care were recognized as grave contributors to such high preterm incidence.91 The Ghana Maternal Health Survey showed that nationally, about 80% of women had four or more ANC contacts, with the majority of care being received in government health-care facilities. These results showed that higher ANC reduced the odds of stillbirths among pregnant women in Ghana.73 Another study conducted by Kayode et al. supported these findings.92 In that research, it was found that adequate utilization of ANC services increased the likelihood of neonatal survival.92 A cross-sectional study carried out in 2014 by Saaka et al. observed that women who had a minimum of four ANC contacts, as was once recommended, were more likely to provide essential newborn care practices such as neonatal feeding. Such newborn care practices contribute directly to a decrease in neonatal deaths.93 The most significant impact of this finding is felt within the first 24 hours of a neonate’s life, as approximately 50% of neonatal deaths occur within the first 24 hours of birth.94 ANC contacts are a shielding mechanism against neonatal mortality in LMIC, as highlighted by Doku et al., who documented that the higher the ANC visits were per country, the lower the risk of neonatal deaths in those countries.28

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**2.11 Maternal Service Use and the Media**

Media exposure has been shown to impact the utilization of health services.95,96 For example, a study conducted in Nepal saw that 83% of mothers who were exposed to any media, including radio, print, and television that covered anything related to antenatal care services had four or more ANC contacts, compared to 52% of mothers who were not exposed.97 Similar findings were seen in Southern India where exposure to mass media, specifically television and radio, were significant determinants of maternal health service utilization in that region.98 Interestingly, in Ghana, women of low economic status listening to the radio and enrolled in NHIS were 10% more likely to have increased ANC contacts than those not enrolled.67

**2.12 Educational Status and Awareness of ANC**

Knowing the benefits of antenatal care is important in the utilization of maternal health services. Many studies have shown a higher educational level to be positively associated with receiving maternal health services.81,99–101 Women with higher education were more likely to seek and use ANC services at the recommended time.102,103 Umar et al. found that the higher the education level was of a woman, the better they were at receiving antenatal care.104 This is not a unique result, as education has also proven to be a determinant of the use of maternal health services both in rural and urban Ghana.71,81,105 Furthermore, Greenaway et al. observed that more educated women had higher health knowledge leading to them seeking more maternal health services compared to the less educated.106

Lack of knowledge of ANC also plays a role in patronage of maternal services. Research has shown that an appreciable proportion of expectant mothers were not in the

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know of the significance and medical relevance of ANC.107,108 A study in South Sudan, for example, showed that mothers did not fully understand the benefits of ANC as the concept of regular, structured medical follow-up during pregnancy was novel to them.109 A similar finding in Afghanistan showed some Afghan women did not fully appreciate the possible obstetric complications that could arise from reduced patronage of maternal services.100 Further, illiteracy reduced the extent to which expectant mothers appreciated the full importance of advice given at ANC.100 These observations apply to Ghanaian women as well. Better educated women were more likely to be satisfied with the care received, as they were more likely to have a better understanding of the delivery of maternal health services. The likelihood of women of lower educational status having negative experiences when receiving care indirectly plays a role in patronage of maternal health services.110

**2.13 Age and Maternity Care Utilization**

Increasing maternal age has been shown to correlate positively with increased utilization of maternal care services in Ghana.111 This observation particularly holds true in situations where women were fretful about pregnancy complications, have previous birth experiences, or have garnered knowledge of the benefits of ANC services due to increasing age.76,110,112 Numerous studies have supported these reports.110 For example, Uppadhaya et al. and Klemetti et al. both confirmed that the utilization of maternal care services was higher among older women compared to younger women. Sumankuuro et al. saw similar findings in Ghana. However, his results highlighted a significant factor accounting for this disparity. There is a tendency to hide pregnancies achieved out of wedlock from family heads for fear of the repercussions.115 By extension, younger expectant mothers may not freely disclose pregnancies and, by so doing, follow on to seek ANC.

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**2.14 Timing of ANC Initiation and Gestational Age**

An important factor in the scheduling of ANC contacts, besides their total number, is the timing of these contacts. This is key as the gestational age of a woman determines the specific services that will need to be offered. Consequently, the earlier the first ANC contacts, the higher the odds of intervention being set in place to ensure a safe delivery both for the mother and child.116,117 Women in Ghana have been noted to most commonly initiate their first ANC visit around the third or fourth month of their pregnancy, which is approximately the beginning of the second trimester.118 A study in Nigeria found that less than 1 in 3 women seek ANC services in the first trimester. Most women who seek maternal services, seek them during the late stages of the second trimester.102 Marginalized women had greater barriers to early initiation of ANC contacts because of financial barriers.119 In Northwest Tanzania, only 3.6% of women had their first ANC visit in the first trimester.120 Quality of care is a contributory factor in well-timed initiation of ANC services. A lack of necessary resources and input, including drugs and consumables, in healthcare facilities, may discourage expectant women from seeking care early.120 Educational level is also a significant factor in the initiation of ANC.121

**2.15 Parity and Its Influence on Maternal Service Use**

Women of higher parity were less likely to use an SBA even when they were enrolled in the NHIS scheme.122 This could be because they assume they have had ample experience from their previous births; thus, expectations from current pregnancy are routine. This result is not isolated. In Kenya women with high parity had lower antenatal and maternity service utilization.123 Parity, therefore, is a significant factor in the likelihood of a mother seeking maternal services.

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**2.16 Barriers to ANC Utilization**

The introduction of the NHIS was to help increase utilization rates of health services across the board.21,22 However, even with the maternal fee exemption policy under the NHIS, where cost is not an active barrier to seeking healthcare, other pertinent factors may mitigate the utilization of healthcare services. According to Ganle et al., despite the introduction of the maternal exemption policy, Ghanaian women still face barriers that contribute to the low utilization of maternal health services. These barriers include negative experiences with the provider or the service center, service availability, trust between the mothers and the nurses/doctors, maltreatment, poor quality care, intimidation, and lack of privacy, among others.124 These factors play a major role in patronage of health services. Again, under the NHIS, mothers still cite financial costs as a barrier to ANC services. For example, the costs incurred in purchasing prescribed medications not covered by the NHIS deter financially challenged women from follow up visits.115

Other studies have highlighted other barriers to ANC patronage, including inadequate human resources, poor interpersonal relation skills when dealing with mothers, poor staff knowledge and skills, and poor attitude of some caregivers .125–130 Long waiting times at the clinic also deter mothers from seeking ANC services during their pregnancy.125,127,131 A study in Malawi buttresses this point; women involved in the study asserted that prolonged service delivery times dissuaded them from subsequent ANC visits.

.131 Inconvenient timing of ANC sessions also adversely affected patronage as mothers miss out on economic activity to attend clinics.108,109,126 In some instances, inadequate stock of medications covered by insurance was linked to discontent with ANC services.123,132 Some of these systemic challenges may mitigate ANC patronage in Ghana.

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**2.17 Transportation**

Transportation is a determining factor in the utilization of health services. Among people of lower economic status, despite the free maternal health policy, lack of proper transport arrangements has been highlighted as a deterrent to patronizing ANC services.133 Notwithstanding the fact that ANC services are free, provided an individual is insured by the NHIS, allied costs such as for transportation, decrease ANC utilization.43 Transportation impacts the health-seeking behavior of Ghanaian women. This is made evident by a study that showed some women would save money that would have otherwise

been used to cover the cost of transportation for ANC visits to meet other obligations.120 A Nigerian study concluded that 44.1% of mothers who did not seek ANC services

cited the unavailability of transport as a major barrier. Furthermore, these women were not financially capable of making alternative transport arrangements. According to the study, elimination of transportation costs can increase the coverage of ANC in Nigeria by as much as 15%.134

**2.18 Geographic Accessibility**

In a study to assess factors accounting for poor ANC patronage in some parts of Ghana, approximately 33% of respondents cited long distances to the nearest ANC facility as the major barrier to them patronizing ANC services.83 Other studies also highlight proximity as a predictor of utilization, particularly in rural areas,135,136 with longer distances having negative effects on the patronage of maternal services access in Ghana.137–139 Women predominantly in rural areas in Ghana missed antenatal care services not only because of the distance between their homes and clinics but the distance between their homes and the bus stops as well. These bus stops were usually their nearest access to

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transport.115 In both South Sudan and rural Ghana, poor road conditions also contributed to less care at a health facility.138 Poor road conditions indirectly increase the cost of accessing ANC services as taxi and bus fares tend to be higher in such environments.138

In Cambodia, mothers who traveled less than 5.0 km for care were more likely to have the previously recommended number (four or more) of ANC contacts compared to those travelling farther.99 The longer the distance, the lower the odds of ANC attendance.99,123 Poorly located health facilities increase the barriers in accessing the services rendered at these facilities.109,123,127,140,141

**2.19 Cultural Factors and Norms that Influence Maternal Health Services Uptake**

Several studies have shown cultural factors and norms play a role in utilization of maternal health services. In South Sudan, prospective mothers and their partners discussed the role tradition plays during pregnancy and after birth. Certain nutritious foods that improve a prospective mother’s nutritional status were considered as taboo. In certain communities, some of these foods were considered to be pregnancy inducing or were said to increase the risk of obstetric complications.132

Cultural influences, such as non-disclosure of pregnancy until the baby is born, also contribute to delayed or reduced ANC patronage in Malawi.131 There, women believe that it is important to hide the baby for months from people to avoid being “cursed”.143 Similar beliefs can also be seen in rural parts of Ghana where community members believe it is important for mothers to seek medical care only after a baby is delivered, as this will prevent the public from discussing the pregnancy so the “gods” can protect the unborn child.115

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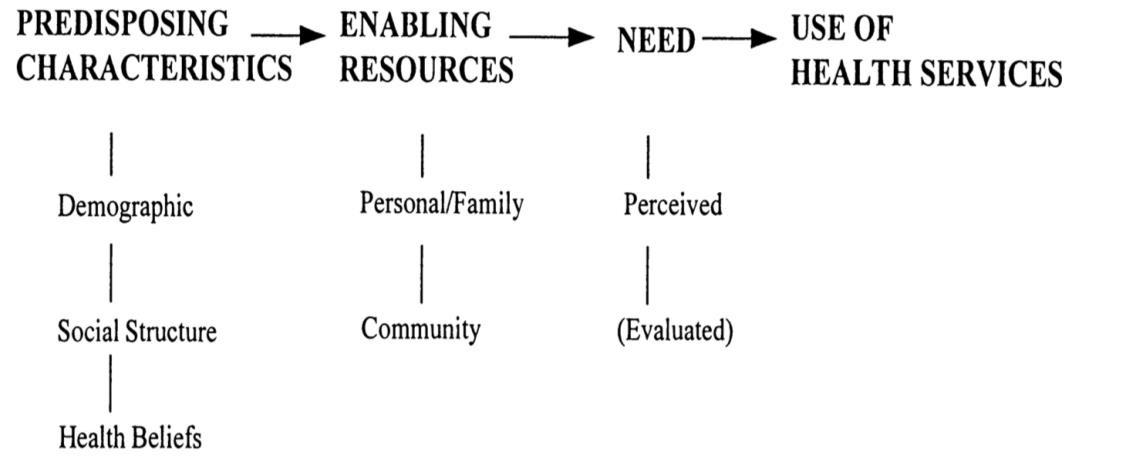
Several studies have shown that the a husband’s involvement in ANC is associated with ANC and SBA utilization.120,132,144 Some husbands, who are traditionally viewed as heads of households, discouraged ANC patronage based on historical norms.141 For instance, they perceived antenatal care not to be of importance as historically, female members of their respective clans did not seek these services but delivered healthy children regardless.109,142 Thus, they do not appreciate the need for their wives to visit the centers for care. Women also have delayed ANC utilization if their husbands are not supportive during their pregnancy.143 Women who did not have spouses during their pregnancy were also less likely to initiate ANC visits according to a study.143 Contrary to these findings, a study suggested mothers in Ghana take the sole initiative in seeking antenatal care. Another added that they do not see the lack of partner involvement as a mitigating factor.115 This is because they believed it was more important for the man to work and provide than to miss work in accompanying them. In certain traditional settings in Ghana, parents or in-laws make relevant decisions for expectant mothers regarding care.

**2.20 Theory – Andersen Health Behavioral Model**

The Andersen Health Behavioral Model, introduced in the 1960s, suggests that there are individual factors, societal factors, and health system factors that lead to the use of health services.145 These factors are posited under predisposing factors, enabling factors and need for care factors that encourage or hinder the utilization of health services.146 The predisposing factors are embedded in demographics, social structure, and health belief characteristics of an individual.147,148 Biological imperatives such as age and gender are considered demographic characteristics. These characteristics influence the likelihood that one needs health care services.149 The social structure consists of factors that determine

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one’s standing in a society, how one copes and deals with problems in the society based on the availability of resources at their disposal and the well-being of their physical surroundings; these include occupation, education, and ethnicity.149 In this model, the health belief factors are individuals’ values, attitudes and knowledge about the status of their health and health services. Enabling factors are the means and or resources accessible to individuals which increase or decrease their probability of health services use; these may include wealth and insurance type. Individuals’ perceived need of care is related to the knowledge one has about their current health status which pushes one to seek care or not.149 All these factors together, determine the use of health services. Figure 2.1depicts the initial behavioral model in the 1960s.149



**Figure 2.1. Initial Andersen’s Behavioral Model (1960)**149

The Andersen’s model since its inception, has evolved and has been used to rationalize health care use amongst individuals and populations across the world.149–154 The strength of this model is that it does not only take into account social factors that directly affect utilization but biological factors as well, both on an individual and a contextual level.155 An Ethiopian study conducted using the application of the Andersen model of

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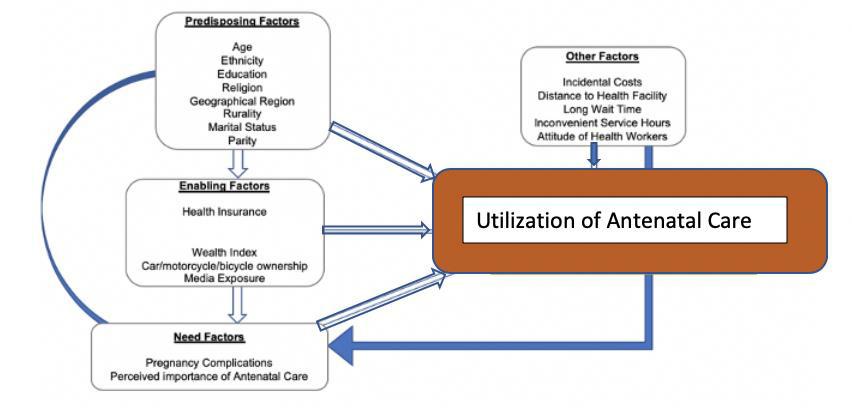
healthcare utilization to understand antenatal care use in Kersa District found that previous use of antenatal care and educational status were significant predisposing factors related to at least one ANC visit.150 Additionally, they found that wealth was a significant enabling factor. Pregnancy complication awareness and perceived importance of ANC were recognized as need factors within the study.150 A similar study in Kenya showed that the utilization of ANC services was more related to need factors such as perceived illness during pregnancy.156 In Arcury et al., preventive services were mostly influenced by predisposing and enabling characteristics as opposed to curative care. Here, need factors played a more significant role in health care utilization.157 For example, distance to facility was a factor for routine hospital checkups. When it came to chronic visits however, longer distance was not a factor; patients still commuted for these services.157 This same model was also used in six different countries to explain factors that influence the utilization of health services for childhood morbidity treatment in Africa. Li et al. found in China that need factor was a more dominant explanatory factor for the utilization of services amongst rural residents in China compared to the predisposing and enabling factors. These latter factors had minor impacts on whether one used health services or not.158

**Conceptual Model**

The conceptual model below describes the relationships in my Specific Aims 1, 2, and 3. Under this conceptual framework, the timing of the initiation of ANC and the number of ANC visits for the mother’s most recent pregnancy are used as a measures of utilization of health services. Mirroring Andersen’s model, and referencing other literature,158–164, predisposing factors include biological factors such as age, gender, and ethnicity. Religion, geographical region, rurality, marital status, and parity are also

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included in the predisposing factors. Health insurance status, type of facility used during most recent pregnancy, whether one has access to a skilled birth attendant, transportation means (own a car, motorcycle or bicycle), and media exposure are enabling factors. Need factors included pregnancy complications and the perceived importance of antenatal care. To fully try to explain reasons for the utilization of ANC services, other factors that may contribute to an increase or decrease in these services are also included. These other factors are incidental costs (such as out of pocket payment and transportation costs), distance to health facility, long wait times at the hospital, inconvenient service hours, and attitude of health workers. All these factors are assessed to understand the utilization of ANC in Ghana and the receipt of recommended ANC services within the region.



**Figure 2.2 Conceptual Model Describing Relationships in Specific Aim 1, 2, and 3 using Andersen’s Behavioral Model of Health Service Use**165

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**2.21 Summary of the literature and gaps in knowledge**

There is a continued need to improve maternal health outcomes in Ghana. With evidence of strong associations between high quality ANC and maternal health outcomes, it is critical to evaluate the extent to which mothers in Ghana utilize maternal health services as recommended by the WHO. To my knowledge, no study has looked at the characteristics associated with Ghanaian mothers who received eight or more visits even prior to the change in WHO recommendation from a four ANC visit model to an eight-visit model. A study conducted in Bangladesh used the 2014 DHS data sets to assess the level of compliance with the WHO recommended number of ANC services during pregnancy. In this study, it was found that only 6% of mothers received eight or more ANC visits. However, they looked at eight or more ANC visits before the introduction of the new ANC recommendation in 2016.166

Few studies in Ghana have looked at the association of health insurance coverage and maternal services utilization. The most recent such study used over a decade old data derived from 2008 GDHS.25 Further, the use of mixed method to get a comprehensive view of health insurance coverage and maternal service usage has been limited. Mixed methods have rarely been used to examine the association between health insurance and maternal services use while taking into account patients’ perspectives on the NHIS and how that may or may not contribute to their maternal healthcare-seeking behavior. Most of the studies that attempted to do mixed methods or qualitative analyses focused on rural and peri-urban areas. This dissertation aims to fill these gaps by using recent data and a mixed-method approach, with qualitative work centered in an urban area.

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**Chapter 3: Methodology**

**3.1 Research Aims**

The overall goal of the dissertation research was to identify correlates of maternal health services utilization among reproductive-aged women in Ghana after the introduction of the NHIS and to understand reasons why women may or may not seek ANC visits using mixed methods. The specific aims and hypotheses addressed are as follows:

**Specific Aim 1**: To characterize the distribution of ANC utilization and rates of recommended ANC use in Ghana between 2012 and 2017.

***Study Question 1a:*** What was the distribution of ANC visits among pregnant women in

Ghana?

***Study Question 1b***: What was the share of women receiving the recommended number of

ANC visits?

***Study Question 1c***: What was the share of women initiating ANC in their first trimester of

pregnancy?

**Specific Aim 2**: To identify factors associated with ANC use, specifically with having fewer than four ANC visits and eight or more ANC visits in Ghana between 2012 and 2017.

***Study Question 2a:*** What differentiates women who had fewer than the minimum number of four ANC visits in Ghana between 2012 and 2017?

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***Hypothesis:*** We hypothesize that Ghanaian women who have health insurance coverage will be less likely to have fewer than four visits compared to women who had health insurance coverage.

***Study Question 2b:*** What differentiates women having the newly recommended eight or more visits in Ghana between 2012 and 2017?

***Hypothesis:*** We hypothesize that Ghanaian women who have health insurance coverage will be more likely to have the newly recommended eight or more visits compared to women who did not have health insurance coverage.

***Study Question 2c:*** Which factors were associated with earlier ANC initiation during

pregnancy?

***Hypothesis:*** We hypothesize that Ghanaian women with health insurance coverage will have earlier initiation of ANC visits, within 0-3 months of pregnancy, than Ghanaian women without health insurance coverage

**Specific Aim 3:** To gain an in-depth understanding of women’s experiences using antenatal care services in Ghana, nearly fifteen years after the introduction of the NHIS in urban Ghana.

***Study Question 1:*** What are women’s experiences with the NHIS, and how has it affected their utilization of maternal health services?

***Study Question 2:*** Why are women encouraged or discouraged from seeking maternal

health services?

***Study Question 3:*** What are innovative ways to increase the uptake of maternal services in

Accra, Ghana?

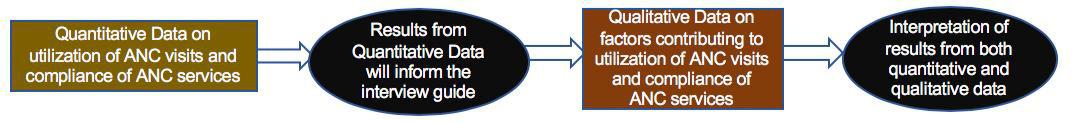
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**3.2 Protection of Human Subjects**

Ethical clearance was obtained from the University of South Carolina Institutional Review Board (Pro0089196) and Korle Bu Teaching Hospital’s Scientific and Technical Committee and Institutional Review Board (KBTH-IRB 00095/2019). Verbal consent was obtained from all participants. This study did not involve the collection of participant’s identifiable information to maintain anonymity.

**3.3 Mixed Methods Design**

To gain a complete understanding of maternal health services patronage and maternal experiences when seeking ANC, our study employed explanatory sequential mixed methods. Explanatory sequential mixed methods involve the collection of both quantitative (close-ended) and qualitative (open-ended) data. It was considered sequential because the results generated from the quantitative part of this project helped inform the qualitative part. Access to a nationally representative data set was obtained, which was used for the quantitative part. The qualitative questionnaire was informed by the quantitative results. Figure 3.1 depicts a detailed process of this design.



**Figure 3.1 Explanatory Sequential Design of the study**

**3.4 Quantitative Method: Data Source**

This study used data from a nationally representative cross-sectional sample of pregnant women. The data were downloaded from the Demographic and Health Surveys (DHS) program website.167 The DHS program, since 1984, has assisted with more than 400

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surveys in over 90 countries through data collection and dissemination of nationally representative data including nutrition, malaria, fertility, family planning, gender, and maternal and child health.168 Ghana is one of the countries that have benefited from this program since 1988. DHS has two main survey types, the standard DHS surveys (usually conducted every 5 years) and the interim DHS surveys (conducted in between standard DHS rounds and focused on specific topics). For our study, an interim DHS survey was used, the Ghana Maternal Health Survey (GMHS). GMHS data contain information on ANC services, including the number of antenatal care visits and timing of the first visit, and problems in accessing health care use and many more.167

**3.4.1 Sampling Procedure**

The sampling frame for the GMHS was the 2010 Population and Housing Census, the most recent census data collected in Ghana. This sampling frame provided clusters (enumeration areas, EAs), which were stratified into homogenous subgroups (e.g., rural versus urban). A probability proportional to size selection was used during the first stage of sampling to select 900 EAs, including 466 EAs in rural areas and 434 enumeration areas in urban areas. Households in the selected clusters were then listed, which provided a complete list of occupied residential households for household selection in the second stage. During the second stage, 30 households per cluster were randomly selected to be interviewed.

**3.4.2 Data Collection**

The 2017 GMHS used three questionnaires to collect the data: a household questionnaire, a woman’s questionnaire, and a verbal autopsy questionnaire. For our research, the household and women questionnaires were used. These questionnaires were

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in English, Ga, Akan, and Ewe. Before the questionnaires were administered, pretesting took place in Winneba, Ghana, for about a month. Based on feedback from the pretest fieldwork, the actual survey was modified to reflect the actuality of what was ongoing on grounds.

Staff were trained for approximately four weeks with a focus on interviewing techniques, questionnaire content, and instruction on administering the questionnaires. The household questionnaire focused on personal and environmental (living conditions) characteristics of each individual, such as housing (e.g., type of wall, roof, and floor material types), source of drinking water, and ownership of livestock. A focus on individuals in the household enabled the researchers to identify women who were eligible for an interview. The women’s questionnaire included, but was not limited to, background characteristics such as age and educational attainment, pregnancy history, health care access, and insurance. GMHS data collection took place over four months between 15 June 2017 and 12 October 2017. The sample included 26,324 households, with 25,062 women ages 15 to 49, and 71,271 total births. There was a 99% response rate for women and households. The analytic sample was restricted to the most recent live birth within the past five years (N=11,890). UNICEF defines ANC coverage as "the percentage of women aged 15-49 with a live birth in a given period that received antenatal care provided by skilled health personnel at least once during pregnancy."10 Women who reported "don't know" when asked how many times, in total, they had received antenatal care during their pregnancy (N=25) and women who had missing values when asked this question (N=XX) were excluded from analysis, resulting in a final analysis sample (N=11,818). Further, sixty women who reported "don't know" for the timing of their first antenatal care visit were also

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excluded from the analysis of the timing of first antenatal care variable, resulting in a final analysis sample of 11,805.

**3.4.3 Measurement of Key Constructs and Definition of Variables**

**Outcome Variables**

The outcome variables for this study were the number of antenatal care visits, and the timing of the first ANC visit.

*Outcome Variable One: Number of antenatal care visits*

Women were asked how many times, in total, they had received antenatal care during their pregnancy. Responses ranged from zero to twenty visits. In this study, the number of ANC visits was treated as either a continuous count variable or as a categorical variable. The continuous variable was used to evaluate which factors were correlated with a larger number of ANC visits. The categorical definition included three categories: zero to three visits, between four and seven visits, or eight or more visits, reflecting the previous and current WHO recommendations.

*Outcome Variable Two: Timing of antenatal care visits*

To assess the timing of the first antenatal care visit, women were asked how many months they were pregnant before their first ANC visit for their most recent pregnancy. Answers ranged from zero to ten. For our research, the variable was dichotomized, with 1 indicating that the first visit occurred during the first trimester (between zero and three months) and 0 after the first trimester (greater than three months).

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24,71,104,114,169–172

**Primary independent variable**

*Health insurance coverage*

In Ghana, it is possible to register for health insurance without having coverage. Many conditions need to be met for a registered user to have access to coverage, such as payments of premiums on time and not allowing coverage to expire. Women were asked whether they were registered and/or covered by any insurance at the time of the interview. The health insurance variable was dichotomized as being covered, or not.

**Covariates**

Based on an extensive literature review (see Chapter X), potential confounders were identified that might influence a mother’s decision in seeking health insurance

coverage and the use of maternal health services.

*Mothers’ Age*

To measure mother’s age, respondents were asked how old they were at their last birthday at the point of the survey. For consistency, interviewers compared the answer women gave to a previous question, asking about the month and year the mother was born. This was done to rectify discrepancies between the two answers and to ensure consistency. Mothers aged fifteen to forty-nine were surveyed. For our analysis, age was defined as <25; 25-35; and >35.

*Mothers’ Educational Status*

Mothers’ educational status refers to whether a mother has ever attended school, and if yes, what were the highest level of education attained. The data record women who have attended primary, middle, junior high school/junior secondary school, secondary/senior secondary school/ tech/ vocational school, and higher. For our study, four

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categories were defined: no education was coded as “0”, primary was coded as “1”, middle, junior high school, and junior secondary school, as “2”, and secondary, senior secondary school, and vocation school, and higher as “3.”

*Mothers’ Marital Status*

To assess mothers’ marital status, mothers were asked whether they were married, not married, or currently living with a partner. For this research, the variable was dichotomized. Women who recorded that they were not married were coded as “0”, and women married or currently living with a partner were coded as “1”.

*Household Wealth*

The wealth index measured by the GMHS is a multifactorial measure of the cumulative living standard of household respondents. The wealth index combines a wide variety of household characteristic and households’ ownership of bicycles and televisions, selected assets; sanitation facilities and types of water access; and housing materials used for building.173 It was categorized into five quintiles. For our study, the quintiles were coded as poorest=0; poorer=1; middle=2; richer=3; richest=4.

*Mothers’ Region*

Ghana’s ten regions were divided into four ecoregions (Coastline as “0”, South Central as “1”, South West as “2”, and Northern as “3.”)

*Mothers’ Religion*

The questionnaire asked mothers about six different denominations of Christianity, including Catholic, Anglican, Methodist, Presbyterian, Pentecostal, and other Christian. It also asked mothers to choose whether they were Islam, traditionalists, not affiliated with any religion at all, or others not described on the questionnaire. The variable was

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dichotomized where “0” was coded as not Christian, and “1” as Christian (all mothers who said that they identify with some Christianity).

*Urbanicity*

Urbanicity was related to the area a mother currently lives. Urbanicity was measured as a dichotomous variable. Mothers who lived in rural areas were coded as “0”, and those in urban areas as “1”.

*Ethnicity*

There are various ethnicities in Ghana. Women were asked at the time of the interview whether they identified as Akan, Ga/Dangme, Ewe, Guan, Mole-dagbani, Grusi, Gurma, Mande, or other. For the purpose of this research, ethnicity variable was categorized based on locality/similarities and number in cells. Akan were coded as “0”. Ga/Dangme were combined with Ewe due to cell sizes and locality of these people and were coded as “1”. Mole-dagbani was coded as “2” and Guan, Grusi, Gurma, Mande, and others were coded as “3.”

*Parity*

To measure parity, mothers were asked about the total number of births, irrespective of whether the baby was alive or a stillbirth. For our research purposes, mothers who had a live birth between 2012 and 2017 were included in our study. The number of children birthed ranged from one to fourteen. Parity was defined as one; two; three; and four or more births.

*Distance to Facility*

Women were asked whether distance to facility was a big problem or not, when they were sick and wanted to get medical advice or treatment. Women who said distance

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to facility was a big problem were coded as “0”, and those who said distance to facility was not a big problem were coded as “1.”

*Not Wanting to go Alone for Treatment/Advice*

Women were asked when they were sick and wanted to get medical advice or treatment, was not wanting to go alone for treatment a big problem to them or not. Women who said it was a big problem were coded as “0”, and those who it was not a big problem were coded as “1.”

*Money Needed for Treatment*

Women were asked whether getting money for treatment was a big problem or not, when they were sick and wanted to get medical advice or treatment. Women who said distance to facility was a big problem were coded as “0”, and those who said distance to facility was not a big problem were coded as “1.”

*Permission to go to the Doctor*

Women were asked whether getting permission to go to the was a big problem or not, when they were sick and wanted to get medical advice or treatment. Women who said getting permission to go to the doctor was a big problem were coded as “0”, and those who it was not a big problem were coded as “1.”

*Watches Television*

Women were asked how often they watched tv. Women who did not watch tv at all were coded as “0”, those who watched less than once a week were coded as “1”, and

those who watched at least once a week were coded as “2”

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*Listens to Radio*

Women were asked how often they listened to the radio. Women who did not listen to the radio at all were coded as “0”, those who listened less than once a week were coded as “1” and those who listened at least once a week as “2.”

*Year of birth of child*

Year of children’s birth was categorized individually from 2012 to 2017. 2012=”0”; 2013=”1”; 2014=”2”; 2015=”3”; 2016=”4”; 2017=”5.”

**3.7 Statistical Methods**

The data were analyzed using univariate, bivariate, and multivariable methods. First, descriptive statistical analysis was used to estimate the means for continuous socio-demographic characteristics and percentages for categorical characteristics.

Second, the significance of bivariate associations between the outcome variables (ANC visits and timing of the first ANC visit) and selected explanatory variables was assessed using the Pearson’s chi-squared test statistic. Statistical significance was defined using a p-value cutoff of 0.05.

Third, multivariate analyses assessed the independent associations between health insurance and other covariates and ANC utilization. A Poisson regression model was estimated for the count data (number of ANC visits); estimates are presented as incidence rate ratios (IRR) with 95% confidence intervals (CIs). A multinomial logistic regression model was used to assess correlates of the number of ANC visits, categorized as either fewer than four visits, four to seven visits, or eight or more visits. Estimates are presented as relative risk ratios (RRR) with 95% CIs. Multivariable logistic regression was used to

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characterize the relationship between the explanatory variables and the timing of the first ANC.

An additional multivariable logistic regression model was estimated to explore the relationship between sociodemographic characteristics and health insurance coverage; the goal was to understand why, despite the national availability of health insurance, wealth differentials remained in the utilization of maternal health services. Results from the multivariable logistic regression analysis were presented as odds ratios (OR), with 95% CIs.

The Ghana Maternal Health Survey used multistage cluster sampling methods to select respondents for the surveys. To account for the complex survey design, the Stata command suite for survey data analysis (*svy*) was used in all analyses; survey weights allow for the estimation of population means. Data were analyzed using STATA version 15.1.

The following equations describe the logistic, Poisson, and multinomial logistic regression models estimated for this analysis:

**Logistic regression:**

**Equation 1:** ln (P*i* /(1− ))= i +

where,

: the probability of an event happening to individual *i*

/(1− ): the odds of the event happening (the probability that an event happens divided by the probability that the event does not happen)

i : vector of covariates describing the characteristics of individual i, and the corresponding coefficients

: individual-specific random error term

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**Poisson regression**

**Equation 2:** Y*i* = e i + u*i*

where Yi is the number of events observed for individual *i*

**Multinomial logistic regression**

**Equation 3:** Ln (Pr(Y11= 1)/ Pr(Y2= 1)) = i +

Ln (Pr(Y3= 1)/ Pr(Y2= 1)) = i +

**3.5 Qualitative Methods: Site Selection**

Ghana is a country in West Africa, with a population of about 29 million people.174 It consists of ten administrative regions with the densest population being in Accra, the capital of Ghana, with an estimated population of 2.27 million.175 Accra is home to Korle-Bu Teaching Hospital (KBTH), the only public tertiary hospital in the southern part of Ghana, and the third-largest hospital in Africa.176 There are about 11,000 deliveries yearly and an estimated 1,000 new antenatal attendances every month at KBTH,177,178 thus, making KBTH an ideal place for the qualitative part of this study.

**3.5.1 Recruitment and Sampling**

Recruitment took place at the KBTH. Stratified purposeful sampling was used to recruit thirty pregnant women for the study. Age, language, number of ANC visits, and stage of pregnancy were known before sampling began. To be eligible for this study, women had to be in their last scheduled ANC visit during their third trimester (ninth month) of pregnancy. They also had to be between ages 18 and 49 years and speak English, Ga, or Twi (which are the most predominant languages in the area). After the nurses had briefed the women on the ongoing research, nurses on duty assisted with recruitment efforts by

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referencing women’s files and referring eligible women to the team. Only women who agreed to participate were referred to the researchers. At the health facility, there was a waiting period before one saw the doctor. This area was where women were recruited. In total, 16 women had eight or more ANC visits and 14 women had fewer than eight ANC visits. This sampling strategy helped obtain a comprehensive sample to understand women’s experiences when utilizing ANC services in a healthcare setting. To minimize recall bias of the number of ANC visits, researchers referred to the women’s ANC health cards to verify how many ANC visits were recorded prior to their current visit. Recruitment ceased when the target sample size (N=30) was reached.

**Sample size determination**

To ensure saturation, a point where no new information can be derived from additional in-depth interviews, thirty pregnant women were recruited for the study. Data saturation depends on the richness of the data being retained from the interviewees being used for a study and can be reached by interviewing as few as twelve individuals.179,180

**3.5.2 Reflexivity – Research Relationship**

As a researcher, especially one who has been away from Ghana for so long, there could be this understated “ego” that one might have, or a participant might perceive the researcher has. This could be a challenge when trying to establish a trusting relationship between the researcher and the participant. But I believed this could have been to my advantage. Most times, Ghanaians have a way of showing too much respect to foreigners. This is particularly true through their hospitable nature. Having a Ghanaian background

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was beneficial as it allowed the participant to view me as their equal. Having the ability to relate to them in their dialect was also valuable.

Nevertheless, the power hierarchy was still observed, being that I am not only American but also a doctoral student. A participant may feel the need to withhold information because they do not know what I may do with that information. Consequently, they may feel obliged to talk to me even if they do not want to, because they may feel compelled due to my status. To circumvent this, I learned to take all my “titles” off going in. I also went into this study as a Ghanaian adult and not an American doctoral student. This helped my participants to see me more as an ally and enabled them to be more open than they would have been.

As an American, I also feared that participants may expect me to have all the answers. This was something that I had been thinking about going into this research. This worried me a bit as I knew they might seek information outside of the research parameters that I could not be provided. To calm my nerves, I made it a priority to continuously remind them of the overall goal of the study, which was to understand the experiences of Ghanaian women’s utilization of ANC.

Additionally, I made sure to let participants know the benefits of their story and how they were adding to the plethora of research around maternal care. I reiterated the confidentiality of the shared information. Knowing that what you are telling an individual was kept confidential encouraged more honesty, which created a relationship between the researcher and the participant that yielded more honest answers from participants.

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**3.5.4 Data Collection**

Thirty individual in-depth interviews with pregnant women were conducted between July 9, 2019 and July 23, 2019, at KBTH. Face-to-face interviews were conducted in English, Ga, and Twi. The semi-structured interview guide had questions related to women’s engagement with maternal health services in Accra such as their knowledge of ANC, health center experiences, and patient provider relationships. Interview guides were translated to Ga and Twi and extensively piloted. The piloting was done to ensure the final interview guide had clarity. Two trained researchers were charged with data collection, one serving as the research assistant at the KBTH Obstetrics department and a doctoral student in Public Health who is also conversant with the local sociocultural context and language.

Interviews were conducted at a secure part of the waiting room, or a private area by the doctor’s office if that was preferable for the participant. The researchers further explained to the participant their rights, reasons for participation in the study, and the contributions they are making to the field of maternal and child health. Verbal informed consent was obtained from women prior to interviews. Interviews were audio-recorded to guarantee that accurate information was retrieved from the participant and transcribed verbatim for analysis. A paper-based questionnaire was also used, primarily to screen eligible women and to record demographic information from women. Interviews were, on average, between 25 and 40 minutes. All data were stored in a locked locker at a designated place in the researcher’s home or password secured on researcher’s computer. Women who agreed to take part in the study were gifted 50 GHS (10 USD equivalent), which represented gratitude for their time and effort.

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**3.5.3 Analysis**

Interviews were audio recorded, translated, and transcribed verbatim by a professional transcriptionist from Ghana. A professional translator was hired (2nd researcher) to ensure that the words translated had not lost its meaning. Transcribed interviews and field notes were analyzed thematically using NVivo 12 software. Two researchers used a line-by-line coding approach for the preliminary codebook development employing an inductive approach. An initial codebook was developed using previous literature. Four transcripts were independently coded by two researchers using the line-by-line coding approach. This was done to increase validity. A preliminary set of codes was then discussed to ensure intercoder agreement. Differences in themes were reconciled for consistency. Upon reaching an agreement, the PI re-coded the initial transcripts plus the remaining using the established codebook. New codes that emerged during analysis were categorized under similar themes. Stata version 15 software was used to calculate descriptive statistics of the socio-demographic characteristics of participants.

Upon completion of the analysis, all data will be stored for three years. Data are kept for additional time to allow the researcher to go back to it if necessary. It is also a requirement of the Office of Research and Compliance at the University of South Carolina.

**3.5.4 Funding Disclosure**

This research was supported by the University of South Carolina’s SPARC Graduate Research Grant and the Ceny Walker Graduate Fellowship, also awarded by University of South Carolina.

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**Chapter 4: Manuscript 1**

**Correlates of Antenatal Care Use and Timing of the first Antenatal Care Visit among Women of Reproductive Age in Ghana: A Cross-Sectional Study**1

1 Cofie, A., Ostermann, J., Frongillo, E., Hardin, J. and Horner, R. To be submitted to *BMC Health Services Research*.

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**Abstract**

**Background:** Antenatal care (ANC) is the care a woman receives during pregnancy. In 2016, the World Health Organization (WHO) increased the recommended number of ANC visits for pregnant women in low and middle income countries from four to eight. This study characterizes correlates of maternal health service use, including the number and timing of ANC visits and the role of health insurance coverage, in Ghana around the time of the change in recommendations.

**Methods:** The study used a nationally representative cross-sectional sample of pregnant women from the 2017 Ghana Maternal Health Survey. The analysis sample included 11,818 women ages 15-49 years with a live birth during 2012 to 2017. Bivariate associations between outcome variables (number of ANC visits; timing of the first ANC visit) and a broad range of explanatory variables were assessed using Pearson’s chi-squared test. Multivariable associations were assessed using Poisson regression and logistic regression models. Statistical significance was defined as p-value <.05.

**Results:** Among 11,818 women sampled, 10% had between 0-3 ANC visits; 50% had 4-7 visits; only 40% had eight or more visits. 67% of women had their first ANC visit in their first trimester. Half of the women were covered by health insurance. Factors associated with larger numbers of ANC visits included health insurance coverage, having primary or higher education, being married, being from wealthier households, being older than 25 years, having fewer children, and media exposure. Significant regional variation was observed. There was no association between health insurance coverage and the timing of women’s first ANC visit. The strongest positive associations were with household wealth,

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and with being older, married, and Christian. We observed trends toward lower rates of ANC visits and timeliness between 2012 and 2017.

**Conclusions:** A better understanding of the correlates of maternal health service use may inform policy options aimed at reducing maternal mortality. These may include increasing insurance reimbursements to hospitals to minimize out-of-pocket costs to pregnant women, maintaining the Free Secondary High School introduced in 2017, and equitably distributing resources across regions. Recent trends toward lower rates of ANC visits and timeliness highlight the urgency of these efforts.

**Background**

Reducing maternal mortality has been a long-standing international goal, reflected in Millennium Development Goal (MDG) 5A (to reduce maternal mortality ratio by 75% between 1990 and 2015)1 and Sustainable Development Goal (SDG) 3.1 (to reduce global maternal mortality by 70 per 100,000 live births by 2030).2 Although Ghana has made strides to reduce maternal mortality over the years, maternal mortality remains high.3 Antenatal care is a critical opportunity for health providers to deliver care and support, and provide salient information to pregnant women. According to UNICEF, in 2016, 86% of pregnant women globally received at least some ANC care. However, only 62% of these women received (the previously recommended) four or more ANC visits during their pregnancy.4 Sub-Saharan Africa and South Asia have the lowest rates of ANC coverage, with 52% and 46% pregnant women receiving four or more ANC visits respectively.4

In 2002, efforts to increase ANC patronage led to the World Health Organization developing and recommending a focused approach to ANC coverage, especially in low and middle income countries (LMICs).5 Evidence suggested that women who had more

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contacts with their providers during pregnancy were more likely to have positive pregnancy experiences and decreased perinatal mortality risk.5,6 Following on from these observations, the WHO, in 2016, increased the recommended number of ANC visits from four to eight for countries in developing regions,7–10 as countries in these regions had the highest rates of maternal morbidity and mortality.

In an aim to improve access to health care and reduce the financial burden, particularly for vulnerable populations, Ghana, in 2003, introduced the National Health Insurance Scheme (NHIS).11,12 Under this act, all citizens of the country should have access to health insurance either through the NHIS or private insurance; however, there are no penalties for citizens who do not get coverage through any insurance.11,13,14 Women in the ante, peri- and post-natal periods are exempted from premium payments under the NHIS.15,16 Women who have access to NHIS have a lower risk of birth complications and, in totality, better maternal health outcomes.17

In multiple studies, NHIS coverage has been shown to be associated with increased use of ANC services. In a study using 2008 Ghana Demographic and Health Survey data, NHIS enrollment was positively associated with higher ANC coverage, controlling for socio-economic status and demographic characteristics.18 In another study, women insured under the NHIS were 7 percentage points more likely to have received four or more ANC contacts than those who were not NHIS insured, irrespective of their socio-economic status.19 Using the 2005/06 Ghana Living Standards Survey (GLSS), only 60% of uninsured mothers had the four or more ANC contacts recommended at the time, compared to 81% of their insured counterparts.20 There was significant geographic variation: in two

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rural districts of the Upper West Region in Ghana, only 41.3% had the recommended four or more visits.21

In addition to the number of ANC contacts, the timing of the first ANC visit is considered a key performance metric of health systems in LMIC, because the gestational age of a woman determines the specific services that will need to be offered. Women in Ghana most commonly initiated their first ANC visit around the third or fourth month of their pregnancy, which is approximately the end of the first or beginning of the second trimester.22 In a study using the 2008, 2010 and 2012 Demographic Health Survey data, Wang et al. did not find a significant association between health insurance and the timing of the first ANC use.23

The extent to which changes in WHO recommendation have been incorporated into the standard of care, the number of women potentially affected by this change, and the role of health insurance as a means of mitigating barriers to ANC use, have not yet been evaluated in Ghana. We used data from the 2017 GMHS to examine factors associated with ANC use in Ghana to inform policies aimed at increasing ANC use and reducing maternal mortality.

**Methods**

**Data source**

Our study used the 2017 Ghana Maternal Health Survey (GMHS), an interim Demographic Health Survey (DHS) of a nationally representative cross-sectional sample of pregnant women. Data were downloaded from the DHS program website.24

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**Sampling procedure**

The sampling frame for the GMHS was the 2010 Population and Housing Census, the most recent census data collected in Ghana. This sampling frame provided clusters (enumeration areas, EAs), which were stratified into homogenous subgroups (e.g., rural versus urban). A probability proportional to size selection was used during the first stage of sampling to select 900 EAs, including 466 EAs in rural areas and 434 enumeration areas in urban areas. Households in the selected clusters were then listed, which provided a complete list of occupied residential households for household selection in the second stage. During the second stage, 30 households per cluster were randomly selected to be interviewed.

**Sample size**

GMHS data collection took place over four months between 15 June 2017 and 12 October 2017. The sample included 26,324 households, with 25,062 women ages 15 to 49, and 71,271 total births. There was a 99% response rate for women and households. The analytic sample was restricted to the most recent live birth within the past five years (N=11,890). UNICEF defines ANC coverage as "the percentage of women aged 15-49 with a live birth in a given period that received antenatal care provided by skilled health personnel at least once during pregnancy."4 Women who reported "don't know" when asked how many times, in total, they had received antenatal care during their pregnancy (N=25) and women who had missing values when asked this question (N=? 47 ?) were excluded from analysis, resulting in a final analysis sample (N=11,818). Sixty women who reported "don't know" for the timing of their first antenatal care visits were excluded from

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the analysis, resulting in a final analysis sample of 11,805 for the timing of first antenatal care variable.

**Description of variables**

**Outcome variables**

Outcome variables included two measures of ANC use, the number of antenatal care visits and the timing of the first antenatal care visit.

*Number of ANC visits*: Women were asked how many times, in total, they had received antenatal care during their pregnancy. Responses ranged from zero to twenty visits. In this study, the number of ANC visits was treated as either a continuous count variable or as a categorical variable. The continuous variable was used to evaluate which factors were correlated with a larger number of ANC visits. The categorical definition included three categories: zero to three visits, between four and seven visits, or eight or more visits, reflecting the previous and current WHO recommendations.

*Timing of first ANC visit:* Women were asked how many months they were pregnant before seeking their first ANC visit for their most recent pregnancy. The variable was dichotomized, with 1 indicating that the first visit occurred during the first trimester (between zero and three months) and 0 after the first trimester (greater than three months).

**Explanatory variables**

The following variables were included in the models as potential correlates of ANC use and the timing of the first ANC visit. Variables were selected based on the existing literature and data availability.25–32

*Health insurance*: In Ghana, it is possible to register for health insurance without having coverage. Many conditions need to be met for a registered user to have access to

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coverage, such as payments of premiums on time and not allowing coverage to expire. Women were asked whether they were registered and/or covered by any insurance at the time of the interview. The health insurance variable was dichotomized as being covered, or not. Health insurance was the primary independent variable of interest.

*Demographic and obstetric factors*: Woman’s age, education, marital status, parity, ethnicity, religion, and urban vs. rural residence, were included as potential sociodemographic correlates of ANC use. Woman’s age was defined as <25; 25-35; and >35. Educational status was captured as no education; primary; middle, junior high school/junior secondary school; and secondary/senior secondary school/ tech/ vocational school, and higher. Marital status was categorized as married or not married. Parity was defined as one; two; three; and four or more children. Women’s religion was captured as Christian vs. all others. Urbanicity was categorized as rural vs. urban. Woman’s ethnicity was captured as Akan; Ga/Dangme and Ewe; Mole-Dagbani; and Guan, Grusi, Gurma, Mande or other.

*Economic wellbeing*: In the DHS, the household wealth index, a composite indicator of economic wellbeing, was categorized into five quintiles, the poorest, poorer, middle, richer, and richest. Wealth index quintiles were included as a categorical variable. The wealth index has been shown to be associated with increased maternal health service use.33–35

*Barriers and facilitators*: Many factors can prevent a woman from getting treatment or medical advice for themselves. Distance to facility, not wanting to go alone for treatment/advice, money needed for treatment, and getting permission to go to the doctor when sick or to get medical advice were potential barriers captured in the DHS and

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included our analyses. These factors were included as binary variables (0= big problem; 1= not a big problem)

The extent of media exposure has been shown to impact the utilization of health services.36 Women were asked how often they watched television. Women who did not watch television at all were coded as “0”, those who watched less than once a week were coded as “1”, and those who watched at least once a week were coded as “2.” Exposure to the radio was coded similarly to television exposure.

*Other variables*: Year of birth was included to account for potential changes in ANC use over time. Year of children’s birth was categorized individually between 2012 and 2017. Region of residence was included to account for possible regional variation in ANC use. For this study, Ghana’s ten regions were combined into the four ecoregions: Coastline, South-West, South-Central, and Northern.

**Data analysis**

The data were analyzed using univariate, bivariate, and multivariable methods. First, descriptive statistical analysis was used to estimate the means for continuous socio-demographic characteristics and frequencies and percentages for categorical characteristics.

Second, the significance of bivariate associations between the outcome variables (ANC visits and timing of the first ANC visit) and selected explanatory variables were assessed using the Pearson’s chi-squared test statistic. Statistical significance was defined using a p-value cutoff of 0.05.

Third, multivariate analyses assessed the independent associations between health insurance and other covariates and ANC utilization. A Poisson regression model was

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estimated for the count data (number of ANC visits); estimates are presented as incidence rate ratios (IRR) with 95% confidence intervals (CIs). A multinomial logistic regression model was used to assess correlates of the number of ANC visits, categorized as either fewer than four visits, four to seven visits, or eight or more visits. Estimates are presented as relative risk ratios (RRR) with 95% CIs. Multivariable logistic regression was used to characterize the relationship between the explanatory variables and the timing of the first ANC.

An additional multivariable logistic regression model was estimated to explore the relationship between sociodemographic characteristics and health insurance coverage; the goal was to understand why, despite the national availability of health insurance, wealth differentials remained in the utilization of maternal health services. Results from the multivariable logistic regression analysis were presented as odds ratios (OR), with 95% CIs.

The Ghana Maternal Health Survey used multistage cluster sampling methods to select respondents for the surveys. To account for the complex survey design, the Stata command suite for survey data analysis (*svy*) was used in all analyses; survey weights allow for the estimation of population means. Data were analyzed using STATA version 15.1.

**Ethics Approval**

The Ghana Maternal Health Survey 2016 was approved by the Ghana Health Service Ethical Review Committee and the ICF’s Institutional Review Board. This study was exempt from ethical review as it used a publicly available data set with no personally identifiable information. Permission to use the data was granted in February 2019 from MEASURE DHS.

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**Results**

***Number of ANC visits***

Figure 4.1 shows the distribution of the number of ANC visits among Ghanaian women aged 15-49 with a live birth between 2012 and 2017. The plurality of women had between six and eight ANC visits; 44% of women had the newly recommended eight or more ANC visits.



|  |
| --- |
| **% of women** |

16%

14%

12%

10%

8%

6%

4%

2%

0%

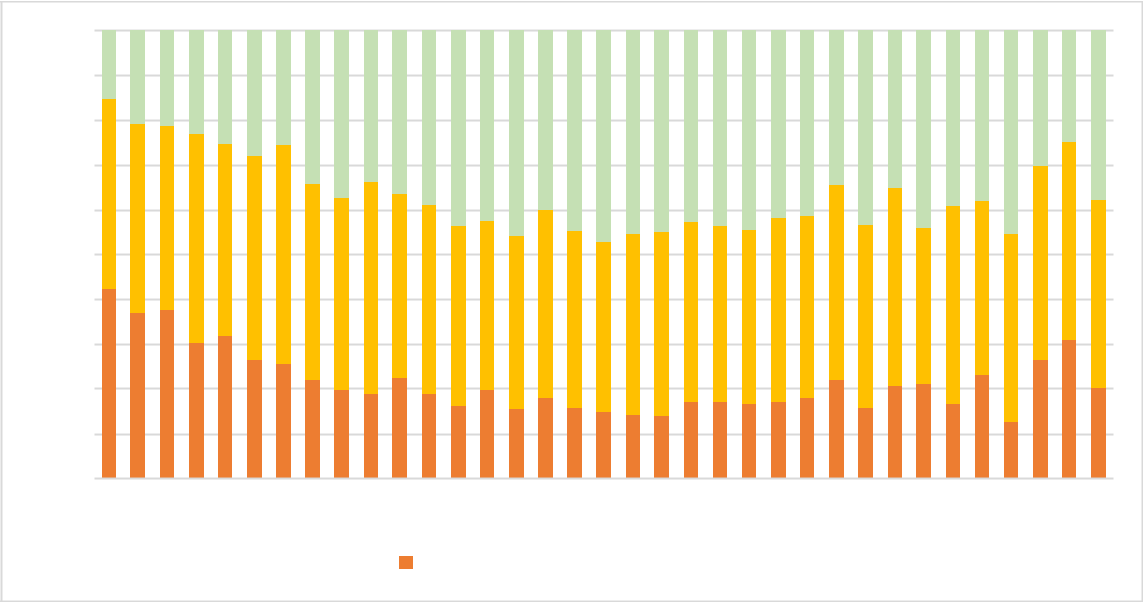
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|  |  |  |  |  | 12% |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | 10% |  |  |  |
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|  |  |  |  |  |  |  |  |  |  | 7% |  | 7% |
|  |  |  | 5% |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | 4% |  |
| 2% |  | 2% |  |  |  |  |  |  |  |  |  |  |
|  | 1% |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+ |
|  |  | # of antenatal care visits during the most recent pregnancy | | | | | | | | |  |  |

**Figure 4.1 Distribution of Antenatal Care Visits among women aged 15-49 in Ghana (Ghana Maternal Health Survey; weighted; n=11,818)**

***Age of women***

Figure 4.2 shows the distribution of the number of ANC visits by age. Women ages 25 and above were most likely to have 8 or more visits, and least likely to have fewer than 4 visits. Women younger than 20 years of age were most likely to have fewer than 4 visits and least likely to have 8 or more visits.

61



100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0-4 visits |  | 5-7 visits |  | 8+ visits |  |
|  |  |  |
|  |  |  |

**Figure 4.2 Distribution of the Number of Antenatal Care Visits by Age (Ghana Maternal Health Survey; weighted; n=11,818)**

**Table 4.1** compares the sociodemographic characteristics of women who had zero to three ANC visits, between four and seven ANC visits, and eight or more ANC visits. The results of the bivariate analysis indicated that all sociodemographic characteristics were significantly associated with the number of ANC visits (p<0.001 for all associations). Compared to women who had 8 or more visits, those who had zero to three ANC visits were disproportionately likely to not have health insurance coverage (66% vs. 45%), be under age 25 (32% vs. 16%), have no education (36% vs. 16%), be not married (23% vs. 14%); and have 4 or more children (45% vs. 32%). Rural residence was strongly associated with lower numbers of ANC visits: 71% of women with 0-3 visits resided in rural areas, compared to 41% of women with 8 or more visits. Women with fewer ANC visits were also poorer, more likely to report barrier when seeking care (see Figure 4.3 and Figure 4.4 for details) and had lower rates of media exposure. Significant regional variation was observed, with women in the Coastline region most likely to have 8 or more visits.

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**Table 4.1** Sociodemographic characteristics of recent mothers ages 15-49, in aggregate and by number of ANC visits received during the most recent pregnancy (2017 Ghana Maternal Health Survey; n=11,818)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **# of ANC visits in the most recent pregnancy** | | | |
|  | **Total** | **0-3** | **4-7** | **8 or more** | |
| **Variables** | **(100%)** | **(10%)** | **(46%)** | **(44%)** | |
|  |  | Percent (%) | | P value | |
| ***Sociodemographic and obstetric factors*** | |  |  |  | |
| **Health Insurance** |  |  |  | < .001 | |
| Not Covered | 50 | 66 | 50 | 45 | |
| Covered | 50 | 34 | 50 | 55 | |
| **Mother’s Age** |  |  |  | < .001 | |
| <25 | 22 | 32 | 26 | 16 | |
| 25-35 | 48 | 43 | 43 | 50 | |
| > 35 | 30 | 25 | 31 | 14 | |
| **Mother’s Education** |  |  |  | < .001 | |
| No Education | 24 | 36 | 27 | 16 | |
| Primary | 17 | 25 | 19 | 15 | |
| Middle/JSS/JHS | 40 | 32 | 39 | 42 | |
| Secondary or higher | 19 | 7 | 15 | 27 | |
| **Marital Status** |  |  |  | < .001 | |
| Not Married | 16 | 23 | 17 | 14 | |
| Married | 84 | 77 | 83 | 86 | |
| **Parity** |  |  |  | < .001 | |
| 1 | 24 | 22 | 23 | 25 | |
| 2 | 21 | 17 | 17 | 25 | |
| 3 | 18 | 16 | 15 | 18 | |
| 4 or more | 37 | 45 | 39 | 32 | |
| **Ethnicity** |  |  |  | < .001 | |
| Akan | 48 | 39 | 47 | 52 | |
| Ga & Ewe | 20 | 26 | 17 | 23 | |
| Mole-Dagbani | 18 | 18 | 19 | 16 | |
| Other | 14 | 17 | 17 | 9 | |
| **Religion** |  |  |  | < .001 | |
| Not Christian | 22 | 23 | 23 | 18 | |
| Christian | 78 | 77 | 77 | 72 | |

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***Continued:* Table 4.1** Sociodemographic characteristics of recent mothers ages 15-49, in aggregate and by number of ANC visits received during the most recent pregnancy (2017 Ghana Maternal Health Survey; n=11,818)

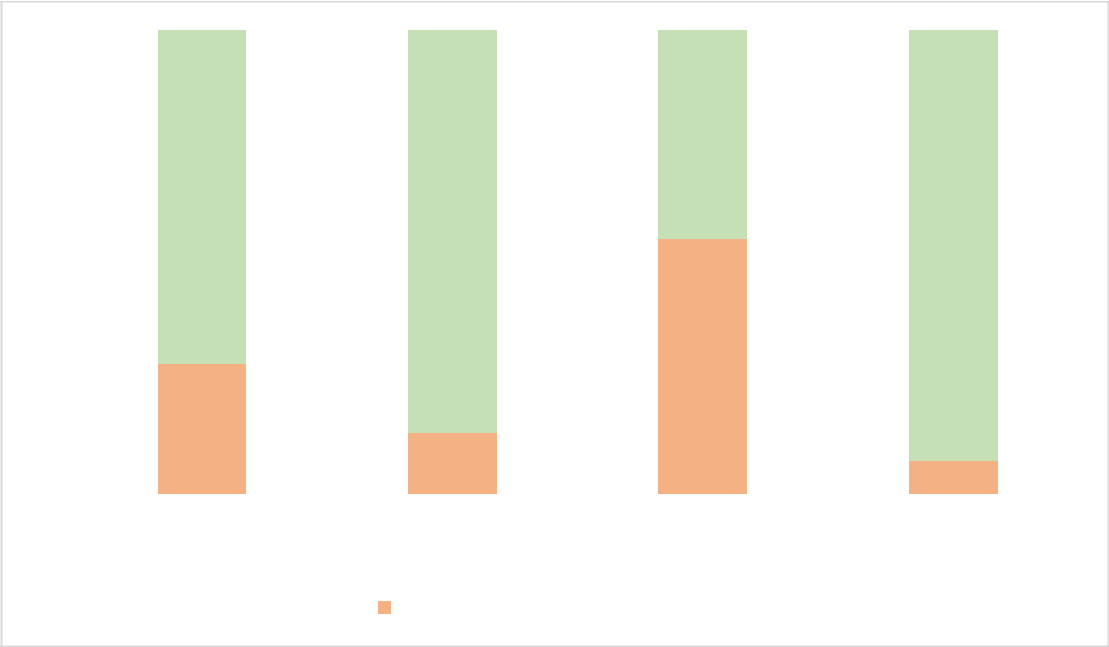
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **# of ANC visits in the most recent pregnancy** | | | |
|  | **Total** | **0-3** | **4-7** | **8 or more** | |
| **Variables** | **(100%)** | **(10%)** | **(46%)** | **(44%)** | |
|  |  | Percent (%) | | P value | |
| **Urbanicity** |  |  |  | < .001 | |
| Rural | 51 | 71 | 56 | 41 | |
| Urban | 49 | 29 | 44 | 49 | |
| ***Economic wellbeing*** |  |  |  |  | |
| **Wealth Index** |  |  |  | < .001 | |
| Poorest | 21 | 40 | 26 | 12 | |
| Poorer | 21 | 28 | 26 | 17 | |
| Middle | 20 | 21 | 20 | 19 | |
| Richer | 20 | 9 | 17 | 24 | |
| Richest | 18 | 2 | 11 | 28 | |
| ***Barriers and facilitators*** |  |  |  |  | |
| **Distance to Facility** |  |  |  | < .001 | |
| Big problem | 26 | 36 | 28 | 20 | |
| Not a big problem | 74 | 64 | 72 | 80 | |
| **Not wanting to go alone** |  |  |  | < .001 | |
| Big problem | 12 | 15 | 11 | 12 | |
| Not a big problem | 88 | 86 | 89 | 88 | |
| **Getting money for** |  |  |  | < .001 | |
| **treatment** |  |  |  |  | |
| Big problem | 50 | 65 | 52 | 44 | |
| Not a big problem | 50 | 35 | 48 | 56 | |
| **Getting permission to** |  |  |  | < .001 | |
| **go to the doctor** |  |  |  |  | |
| Big problem | 6 | 10 | 7 | 5 | |
| Not a big problem | 94 | 90 | 93 | 95 | |
| ***Media Exposure*** |  |  |  |  | |
| **Watches television** |  |  |  | < .001 | |
| Not at all | 25 | 40 | 30 | 18 | |
| Less than once a week | 18 | 21 | 17 | 18 | |
| At least once a week | 57 | 39 | 63 | 64 | |

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***Continued:* Table 4.1** Sociodemographic characteristics of recent mothers ages 15-49, in aggregate and by number of ANC visits received during the most recent pregnancy (2017 Ghana Maternal Health Survey; n=11,818)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **# of ANC visits in the most recent pregnancy** | | | |
|  |  | **Total** | **0-3** | **4-7** | **8 or more** | |
|  | **Variables** | **(100%)** | **(10%)** | **(46%)** | **(44%)** | |
|  |  |  | Percent (%) | | P value | |
|  | **Listens to radio** |  |  |  | < .001 | |
|  | Not at all | 25 | 35 | 28 | 20 | |
|  | Less than once a week | 25 | 25 | 26 | 25 | |
|  | At least once a week | 50 | 40 | 46 | 55 | |
|  | ***Other variables*** |  |  |  |  | |
|  | **Region** |  |  |  | < .001 | |
|  | Coastline | 37 | 34 | 28 | 45 | |
|  | South Central | 18 | 27 | 20 | 17 | |
|  | South West | 29 | 24 | 30 | 26 | |
|  | Northern | 16 | 15 | 22 | 12 | |
|  | **Year of birth of child** |  |  |  | < .001 | |
|  | 2012 | 9 | 6 | 8 | 10 | |
|  | 2013 | 12 | 11 | 11 | 11 | |
|  | 2014 | 16 | 14 | 16 | 16 | |
|  | 2015 | 20 | 20 | 20 | 20 | |
|  | 2016 | 25 | 27 | 25 | 25 | |
|  | 2017 | 18 | 22 | 20 | 18 | |

65



100

80

60

40

**55**

20

**28**

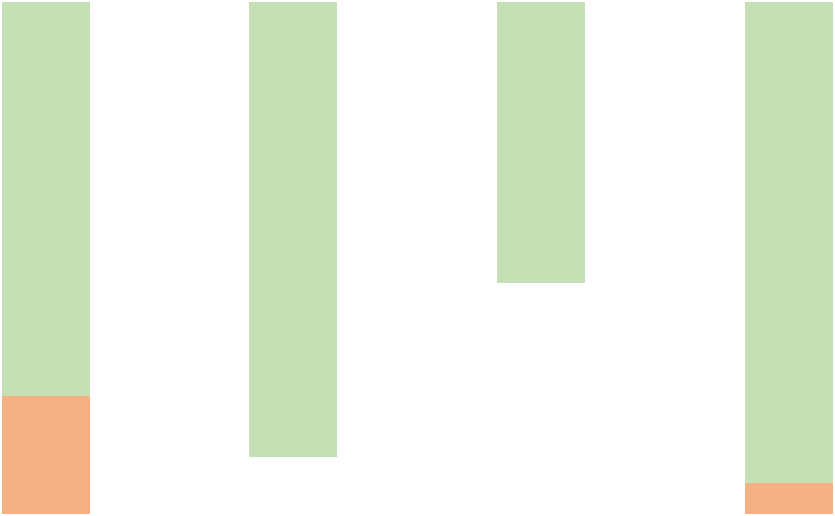
|  |  |  |  |
| --- | --- | --- | --- |
|  | **13** | **7** |  |
| 0 |  |  |
|  |  |  |

Distance to health facility Not wanting to go alone Money for treatment Getting permission to see

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | doctor |  |
| Big problem |  | Not a big problem |  |
|  |  |
|  |  |

**Figure 4.3 Percentage of women aged 15-49 with <8 ANC visits who reported existing barriers to receiving health care (Ghana Maternal Health Survey; weighted; n=11,805)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 100 |  |  |  |  |  |  |  |  |  |  |  |  |
| 80 |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |  |  |
| 40 |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 20 |  |  |  |  |  |  |  | **45** |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| **23** | |  |  |  |  |  |  |  |  |  |  |  |
| **11** |  |  |  |  |  | **6** |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 0 |  |  |  |  |  |  |  |  |  |  |  |
| Distance to health facility Not wanting to go alone Money for treatment | | | | | | | | | Getting permission to |  |  |
|  |  |  |
|  |  |  |  |  |  |  |  |  |  | see doctor |  |  |
|  |  |  | Big problem | | |  | Not a big problem | | |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |



**Figure 4.4 Percentage of women aged 15-49 with 8+ ANC visits who reported existing barriers to receiving health care (Ghana Maternal Health Survey; weighted; n=11,805)**

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***Timing of the first ANC visit***

67% of women sought ANC in their first trimester of pregnancy, while 33%

initiated ANC after the first trimester (Figure 4.5).



**First Antenatal Care Visit**

**33%**

**67%**

 1st Trimester  2nd & 3rd Trimester

**Figure 4.5 Timing of the first ANC visit among recent mothers ages 15-49 (Ghana Maternal Health Survey; weighted; n=11,805)**

**Table 4.2** summarizes the sociodemographic characteristics of women and their bivariate associations with the timing of their first ANC visit during pregnancy. Health insurance coverage, maternal education, marital status, household wealth, were significantly associated with the timing of the first antenatal care visit during pregnancy. Maternal age, religion, urbanity, and parity, distance to facility, getting money for treatment, exposure to mass media (tv and radio), also showed a significant association with the timing of the first antenatal care visit during pregnancy. Compared to women who received their first ANC visit in the first trimester, those who received the first visit later were more likely to be not covered by health insurance, <25 years old, have no education, be not married and have 4 or more children. They were also more likely to reside in poorer households, have lower media exposure, and cite distance to the facility and money for

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treatment as barriers. There were differences between rural and urban areas and by region,

albeit smaller than for the number of ANC visits.

**Table 4.2** Bivariate associations between sociodemographic characteristics and the timing of the first ANC visit among recent mothers ages 15-49 (Ghana Maternal Health Survey; weighted; n=11,805)

**Variables**

**Total** **1st Trimester** **2nd & 3rd**

**(100%)** **(67%)** **Trimesters (33%)**

Percent (%) P value

|  |  |  |  |
| --- | --- | --- | --- |
| ***Sociodemographic and obstetric*** | | ***factors*** |  |
| **Health Insurance** |  |  | .019 |
| Not covered | 50 | 48 | 52 |
| Covered | 50 | 52 | 48 |
| **Mother’s Age** |  |  | <.001 |
| <25 | 22 | 20 | 27 |
| 25-35 | 48 | 49 | 43 |
| > 35 | 30 | 31 | 30 |
| **Mother’s Education** |  |  | < .001 |
| No Education | 24 | 23 | 27 |
| Primary | 17 | 16 | 20 |
| Middle/JSS/JHS | 40 | 40 | 39 |
| Secondary or higher | 19 | 21 | 14 |
| **Marital Status** |  |  | <.001 |
| Not Married | 16 | 15 | 18 |
| Married | 84 | 85 | 82 |
| **Parity** |  |  | <.001 |
| 1 | 24 | 25 | 25 |
| 2 | 21 | 23 | 18 |
| 3 | 18 | 18 | 16 |
| 4 or more | 37 | 34 | 41 |
| **Ethnicity** |  |  | .135 |
| Akan | 48 | 49 | 46 |
| Ga & Ewe | 20 | 20 | 20 |
| Mole-Dagbani | 18 | 18 | 18 |
| Other | 14 | 13 | 15 |
| **Religion** |  |  | <.001 |
| Christian | 22 | 79 | 76 |
| Not Christian | 78 | 21 | 24 |
|  |  | 68 |  |

***Continued:* Table 4.2** Bivariate associations between sociodemographic characteristics and the timing of the first ANC visit among recent mothers ages 15-49 (Ghana Maternal Health Survey; weighted; n=11,805)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Variables** | **Total** | **1st Trimester** | **2nd & 3rd** |  |
|  |  | **(100%)** | **(67%)** | **Trimesters (33%)** |  |
|  |  |  |  | Percent (%) | P value |
|  | **Urbanicity** |  |  |  | .036 |
|  | Rural | 51 | 50 | 54 |  |
|  | Urban | 49 | 50 | 46 |  |
|  | ***Economic wellbeing*** |  |  |  |  |
|  | **Wealth Index** |  |  |  | <.001 |
|  | Poorest | 21 | 19 | 24 |  |
|  | Poorer | 21 | 20 | 24 |  |
|  | Middle | 20 | 19 | 21 |  |
|  | Richer | 20 | 20 | 19 |  |
|  | Richest | 18 | 22 | 12 |  |
|  | ***Barriers and*** |  |  |  |  |
|  | ***facilitators*** |  |  |  |  |
|  | **Distance to Facility** |  |  |  | .031 |
|  | Big problem | 26 | 25 | 28 |  |
|  | Not a big problem | 74 | 75 | 72 |  |
|  | **Not wanting to go** |  |  |  | .263 |
|  | **alone** |  |  |  |  |
|  | Big problem | 12 | 11 | 12 |  |
|  | Not a big problem | 88 | 89 | 88 |  |
|  | **Getting money for** |  |  |  | <.001 |
|  | **treatment** |  |  |  |  |
|  | Big problem | 50 | 47 | 54 |  |
|  | Not a big problem | 50 | 53 | 46 |  |
|  | **Getting permission** |  |  |  | .104 |
|  | **to go to the doctor** |  |  |  |  |
|  | Big problem | 6 | 6 | 7 |  |
|  | Not a big problem | 94 | 94 | 93 |  |
|  | ***Media exposure*** |  |  |  |  |
|  | **Watches television** |  |  |  | <.001 |
|  | Not at all | 25 | 24 | 30 |  |
|  | Less than once a week | 18 | 18 | 18 |  |
|  | At least once a week | 57 | 58 | 52 |  |
|  |  |  |  |  |  |
|  |  |  | 69 |  |  |

***Continued:* Table 4.2** Bivariate associations between sociodemographic characteristics and the timing of the first ANC visit among recent mothers ages 15-49 (Ghana Maternal Health Survey; weighted; n=11,805)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Variables** | **Total** | **1st Trimester** | **2nd & 3rd** |  |
|  |  | **(100%)** | **(67%)** | **Trimesters (33%)** |  |
|  |  |  |  | Percent (%) | P value |
|  | **Listens to radio** |  |  |  | <.001 |
|  | Not at all | 25 | 22 | 28 |  |
|  | Less than once a week | 25 | 25 | 26 |  |
|  | At least once a week | 50 | 53 | 46 |  |
|  | ***Other variables*** |  |  |  |  |
|  | **Region** |  |  |  |  |
|  | Coastline | 37 | 37 | 38 | .062 |
|  | South Central | 18 | 19 | 17 |  |
|  | South West | 29 | 29 | 28 |  |
|  | Northern | 16 | 15 | 17 |  |
|  | **Year of birth of child** |  |  |  | <.001 |
|  | 2012 | 9 | 10 | 8 |  |
|  | 2013 | 12 | 12 | 11 |  |
|  | 2014 | 16 | 17 | 14 |  |
|  | 2015 | 20 | 20 | 20 |  |
|  | 2016 | 25 | 25 | 27 |  |
|  | 2017 | 18 | 16 | 20 |  |

***Multivariate associations with the number of ANC visits***

In the Poisson regression analysis, women with health insurance, on average, had more ANC visits relative to women who did not have health insurance (IRR=1.06, P-value: <.001), controlling for other characteristics (**Table 4.3**). Women ages 25 years or older were more likely to seek more ANC visits compared to women who were less than 25 years (IRR=1.10 to 1.15, P-value: <.001). Women who had a middle school education or higher education were significantly more likely to have higher rates of ANC visits compared to those how had no education (IRR=1.07 to 1.09, P-value: <.001). Married women were significantly more likely to have larger numbers of ANC visits than women who were not married (IRR=1.06, P-value: <.001). Women in higher wealth index quintiles were all more

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likely to have higher rates of ANC visits compared to women from the poorest households. Women from the South Central, South West and Northern regions of Ghana were significantly less likely to have higher rates of ANC visits than women from the Coastline regions. Women with four or more children had lower rates of ANC visits compared to women who had three or fewer children (IRR=0.92, P-value: <.001). Lower rates of ANC visits were observed in 2017 compared to 2012.

**Table 4.3** Results of the Poisson regression analysis of socio and demographic characteristics correlated with the number of antenatal care visit during pregnancy, from the 2017 Ghana Maternal Health Survey (n=11,818)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** |  | **Frequency of antenatal care visits** | | | |
|  |  |  | **95% CI of IRR** | |  | |
|  |  | IRR | Lower | Upper | P value | |
| ***Sociodemographic and obstetric*** | ***factors*** |  |  |  |  | |
| **Health Insurance** |  |  |  |  |  | |
| Not covered | (Ref) |  |  |  |  | |
| Covered |  | 1.06 | 1.04 | 1.08 | <.001 | |
| **Mother’s Age** |  |  |  |  |  | |
| <25 | (Ref) |  |  |  |  | |
| 25-35 |  | 1.10 | 1.07 | 1.13 | <.001 | |
| > 35 |  | 1.15 | 1.11 | 1.20 | <.001 | |
| **Mother’s Education** |  |  |  |  |  | |
| No Education. | (Ref) |  |  |  |  | |
| Primary |  | 1.01 | 0.98 | 1.05 | .278 | |
| Middle/JSS/JHS |  | 1.07 | 1.03 | 1.10 | <.001 | |
| Secondary or higher |  | 1.09 | 1.05 | 1.13 | <.001 | |
| **Marital Status** |  |  |  |  |  | |
| Not Married | (Ref) |  |  |  |  | |
| Married |  | 1.06 | 1.03 | 1.09 | <.001 | |
| **Parity** |  |  |  |  |  | |
| 1 | (Ref) |  |  |  |  | |
| 2 |  | 0.99 | 0.96 | 1.01 | .574 | |
| 3 |  | 0.96 | 0.93 | 1.00 | .056 | |
| 4 or more | 0.92 | | 0.89 | 0.96 | <.001 | |

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***Continued:* Table 4.3** Results of the Poisson regression analysis of socio and demographic characteristics correlated with frequency of antenatal care visit during pregnancy, from the 2017 Ghana Maternal Health Survey (n=11,818)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variables** |  | **Frequency of antenatal care visits** | | | |
|  |  |  | **95% CI of IRR** | |  | |
|  |  | IRR | Lower | Upper | P value | |
| **Ethnicity** |  |  |  |  |  | |
| Akan | (Ref) |  |  |  |  | |
| Ga & Ewe |  | 0.98 | 0.95 | 1.02 | .474 | |
| Mole-Dagbani |  | 1.03 | 0.99 | 1.07 | .097 | |
| Other |  | 0.97 | 0.92 | 1.01 | .165 | |
| **Religion** |  |  |  |  |  | |
| Not Christian | (Ref) |  |  |  |  | |
| Christian |  | 1.01 | 0.98 | 1.04 | .627 | |
| **Urbanicity** |  |  |  |  |  | |
| Rural | (Ref) |  |  |  |  | |
| Urban |  | 1.00 | 0.97 | 1.03 | .470 | |
| ***Economic wellbeing*** |  |  |  |  |  | |
| **Wealth Index** |  |  |  |  |  | |
| Poorest | (Ref) |  |  |  |  | |
| Poorer |  | 1.07 | 1.02 | 1.11 | .002 | |
| Middle |  | 1.13 | 1.07 | 1.18 | <.001 | |
| Richer |  | 1.21 | 1.15 | 1.27 | <.001 | |
| Richest |  | 1.29 | 1.22 | 1.37 | <.001 | |
| ***Barriers and facilitators*** |  |  |  |  |  | |
| **Distance to Facility** |  |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 1.01 | 0.99 | 1.04 | .206 | |
| **Not wanting to go alone** |  |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 0.95 | 0.92 | 0.99 | .016 | |
| **Getting money for treatment** |  |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 1.01 | 0.99 | 1.03 | .290 | |
| **Getting permission to go to the doctor** | |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 1.03 | 0.97 | 1.09 | .274 | |
|  | 72 | |  |  |  | |

***Continued:* Table 4.3** Results of the Poisson regression analysis of socio and demographic characteristics correlated with frequency of antenatal care visit during pregnancy, from the 2017 Ghana Maternal Health Survey (n=11,818)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Variables** |  | **Frequency of antenatal care visits** | | | |
|  |  |  |  | **95% CI of IRR** | |  | |
|  |  |  | IRR | Lower | Upper | P value | |
|  | ***Media exposure*** |  |  |  |  |  | |
|  | **Watches television** |  |  |  |  |  | |
|  | Not at all | (Ref) |  |  |  |  | |
|  | Less than once a week |  | 1.01 | 0.97 | 1.04 | .688 | |
|  | At least once a week |  | 1.02 | 0.98 | 1.05 | .345 | |
|  | **Listens to radio** |  |  |  |  |  | |
|  | Not at all | (Ref) |  |  |  |  | |
|  | Less than once a week |  | 1.01 | 0.98 | 1.04 | .392 | |
|  | At least once a week |  | 1.04 | 1.01 | 1.06 | .001 | |
|  | **Region** |  |  |  |  |  | |
|  | Coastline | (Ref) |  |  |  |  | |
|  | South Central |  | 0.89 | 0.86 | 0.92 | <.001 | |
|  | South West |  | 0.91 | 0.88 | 0.93 | <.001 | |
|  | Northern |  | 0.93 | 0.89 | 0.97 | .004 | |
|  | **Year of birth of child** |  |  |  |  |  | |
|  | 2012 | (Ref) |  |  |  |  | |
|  | 2013 |  | 0.97 | 0.93 | 1.01 | .247 | |
|  | 2014 |  | 0.98 | 0.94 | 1.01 | .229 | |
|  | 2015 |  | 0.96 | 0.93 | 1.00 | .049 | |
|  | 2016 |  | 0.95 | 0.92 | 0.99 | .005 | |
|  | 2017 |  | 0.90 | 0.86 | 0.94 | <.001 | |

**Table 4.4** summarizes the results of the multinomial logistic regression analyses of

factors associated with the use of zero to three visits, four to seven visits, or eight or more

visits. Women with health insurance, women ages 25 and older, married and more educated

women, women with lower parity, and women from households in higher wealth index

quintiles were relatively less likely to have zero to three ANC visits (relative risk ratio

(RRR), ranging from 0.25 to 0.87) and more likely to have eight or more ANC visits (RRR

ranging from 1.04 to 2.46). Region was significantly associated with receipt of eight or

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more ANC visits. Women from the South Central regions, South West regions, and Northern regions were relatively less likely to have eight or more ANC visits compared to women from the Coastline regions. Rates of ANC visits decreased over time, with women who gave birth in 2017 being much more likely to have only 0-3 visits (RRR 1.65) and less likely to have 8 or more visits (RRR 0.67) compared to women who gave birth in 2012.

The estimated relative risk ratios suggest that women who were not covered by health insurance and those who reported that gaining permission to go to the doctor was a big problem were about 60% more likely to have only zero to three ANC visits compared to women who were covered. Women who were not educated were about 53% more likely to have fewer than four ANC visits than women with secondary or higher education. Women from the poorest households were four times more likely to have fewer than four ANC visits relative to women from the richest households.

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**Table 4.4** Results of the multinomial logistic regression analysis of antenatal care visits, from the 2017 Ghana Maternal Health Survey (n=11,818)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** |  |  | **0-3 antenatal care visits** | | | |  | **Eight or more antenatal care visits** | | | |
|  |  |  |  | **95% CI of RRR** | |  |  |  | **95% CI of RRR** | |  | |
|  |  | RRR |  | Lower | Upper |  | P value | RRR | Lower | Upper | P value | |
| ***Sociodemographic and obstetric factors*** | | | | |  |  |  |  |  |  |  | |
| **Health Insurance** |  |  |  |  |  |  |  |  |  |  |  | |
| Not covered | (Ref) |  |  |  |  |  |  |  |  |  |  | |
| Covered |  | 0.62 | 0.65 | | 0.86 |  | <.001 | 1.18 | 1.06 | 1.31 | .002 | |
| **Mother’s Age** |  |  |  |  |  |  |  |  |  |  |  | |
| <25 | (Ref) |  |  |  |  |  |  |  |  |  |  | |
| 25-35 |  | 0.67 | 0.59 | | 0.85 |  | .002 | 1.61 | 1.37 | 1.87 | <.001 | |
| > 35 |  | 0.49 | 0.46 | | 0.78 |  | <.001 | 1.88 | 1.53 | 2.30 | <.001 | |
| **Mother’s Education** |  |  |  |  |  |  |  |  |  |  |  | |
| No Education. | (Ref) |  |  |  |  |  |  |  |  |  |  | |
| Primary |  | 0.87 | 0.74 | | 1.11 |  | .277 | 1.04 | 0.88 | 1.23 | .620 | |
| Middle/JSS/JHS |  | 0.61 | 0.56 | | 0.82 |  | <.001 | 1.18 | 1.01 | 1.39 | .037 | |
| Secondary or higher |  | 0.65 | 0.46 | | 0.85 |  | .045 | 1.37 | 1.12 | 1.68 | .002 | |
| **Marital Status** |  |  |  |  |  |  |  |  |  |  |  | |
| Not Married | (Ref) |  |  |  |  |  |  |  |  |  |  | |
| Married |  | 0.71 | 0.64 | | 0.95 |  | .016 | 1.34 | 1.14 | 1.57 | .001 | |
| **Parity** |  |  |  |  |  |  |  |  |  |  |  | |
| 1 | (Ref) |  |  |  |  |  |  |  |  |  |  | |
| 2 |  | 1.33 | 0.84 | | 1.29 |  | .707 | 1.09 | 0.92 | 1.29 | .313 | |
| 3 |  | 1.54 | 0.95 | | 1.56 |  | .103 | 0.90 | 0.75 | 1.08 | .272 | |
| 4 ore more |  | 1.71 | 1.02 | | 1.73 |  | .030 | 0.75 | 0.62 | 0.90 | .002 | |

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***Continued:* Table 4.4** Results of the multinomial logistic regression analysis of antenatal care visits, from the 2017 Ghana Maternal Health Survey (n=11,818)

**Variables**

**Ethnicity**

Akan (Ref)

Ga & Ewe

Mole-Dagbani

Other

**Religion**

Not Christian (Ref) Christian

**Urbanicity**

Rural (Ref) Urban

***Economic wellbeing* Wealth Index**

Poorest (Ref)

Poorer

Middle

Richer

Richest

***Barriers and facilitators* Distance to Facility**

Big problem (Ref) Not a big problem

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **0-3 antenatal care visits** | | | |  | **Eight or more antenatal care visits** | | | |
|  |  | **95% CI of RRR** | |  |  |  | **95% CI of RRR** | |  | |
| RRR |  | Lower | Upper |  | P value | RRR | Lower | Upper | P value | |
| 1.34 | 1.06 | | 1.81 |  | .015 | 1.12 | 0.98 | 1.41 | .077 | |
| 0.89 | 0.74 | | 1.22 |  | .704 | 1.15 | 0.95 | 1.40 | .142 | |
| 0.93 | 0.72 | | 1.32 |  | .906 | 0.85 | 0.76 | 1.08 | .202 | |
| 0.83 | 0.67 | | 0.93 |  | .005 | 1.01 | 0.87 | 1.17 | .865 | |
| 0.80 | 0.68 | | 1.06 |  | .168 | 0.94 | 0.79 | 1.11 | .471 | |
| 0.69 | 0.53 | | 0.89 |  | .006 | 1.05 | .87 | 1.27 | .595 | |
| 0.73 | 0.52 | | 1.03 |  | .075 | 1.45 | 1.14 | 1.85 | .002 | |
| 0.41 | 0.27 | | 0.64 |  | <.001 | 1.77 | 1.38 | 2.27 | <.001 | |
| 0.25 | 0.13 | | 0.45 |  | <.001 | 2.46 | 1.88 | 3.50 | <.001 | |
| 1.03 | 0.82 | | 1.29 |  | .753 | 1.12 | 0.97 | 1.29 | .103 | |

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***Continued:* Table 4.4** Results of the multinomial logistic regression analysis of antenatal care visits, from the 2017 Ghana Maternal Health Survey (n=11,818)

**Variables**

**Not wanting to go alone**

Big problem (Ref) Not a big problem

**Getting money for treatment**

Big problem (Ref) Not a big problem

**Getting permission to go to the doctor**

Big problem (Ref)

Not a big problem

***Media exposure* Watches television**

Not at all (Ref) Less than once a week

At least once a week

**Listens to radio**

Not at all (Ref) Less than once a week

At least once a week

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **0-3 antenatal care visits** | | | |  | **Eight or more antenatal care visits** | | | |
|  |  | **95% CI of RRR** | |  |  |  | **95% CI of RRR** | |  | |
| RRR |  | Lower | Upper |  | P value | RRR | Lower | Upper | P value | |
| 0.91 | 0.73 | | 1.15 |  | .467 | 0.78 | 0.65 | 0.92 | .005 | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0.82 | 0.68 | 1.00 | .058 | 0.97 | 0.86 | 1.09 | .628 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0.61 | 0.45 | 0.83 | .002 | 1.16 | 0.90 | 1.50 | .226 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1.09 | 0.85 | 1.40 | .466 | 1.08 | 0.90 | 1.30 | .373 |
| 0.91 | 0.73 | 1.14 | .449 | 1.07 | 0.89 | 1.28 | .438 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0.89 | 0.70 | 1.11 | .320 | 1.06 | 0.90 | 1.24 | .474 |
| 0.84 | 0.69 | 1.01 | .076 | 1.15 | 1.00 | 1.32 | .045 |

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***Continued:* Table 4.4** Results of the multinomial logistic regression analysis of antenatal care visits, from the 2017 Ghana Maternal Health Survey (n=11,818)

**Variables**

***Other variables***

**Region**

Coastline (Ref)

South Central

South West

Northern

**Year of birth of child**

2012 (Ref)

2013

2014

2015

2016

2017

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **0-3 antenatal care visits** | | | **Eight or more antenatal care visits** | | |
|  |  | **95% CI of RRR** |  |  | **95% CI of RRR** |  | |
| RRR |  | LowerUpper | P value | RRR | LowerUpper | P value | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0.90 | 0.69 | 1.17 | .433 | 0.58 | 0.47 | 0.73 | <.001 |
| 0.74 | 0.54 | 0.99 | .050 | 0.58 | 0.50 | 0.70 | <.001 |
| 0.40 | 0.28 | 0.58 | <.001 | 0.47 | 0.39 | 0.64 | <.001 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1.33 | 0.87 | 2.04 | .179 | 0.93 | 0.75 | 1.16 | .576 |
| 1.17 | 0.80 | 1.71 | .398 | 0.93 | 0.76 | 1.14 | .525 |
| 1.31 | 0.87 | 1.96 | .182 | 0.91 | 0.74 | 1.12 | .394 |
| 1.40 | 0.95 | 2.04 | .082 | 0.86 | 0.70 | 1.05 | .146 |
| 1.65 | 1.10 | 2.49 | .015 | 0.67 | 0.53 | 0.84 | .001 |

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***Multivariate associations with the timing of the first ANC visit***

Table 4.5 presents the findings from our multivariable logistic regression analysis of factors associated with the timing of women's first antenatal care visit during pregnancy. Health insurance was not significantly associate with ANC initiation in the first trimester. The strongest associations were with older age, being married, having four or more children being Christian, and being in a higher wealth index quintile.

Women who were between 25-35 years had 38% greater odds of having their first ANC visit in their first trimester of pregnancy compared to those who were less than 25 years of age. Women who were older than 35 years were 38% more likely to have their first ANC visit in their first trimester in comparison to women who were younger than 25 years. Married women were 22% more likely to seek ANC visit in their first trimester compared to those who were not married. Women in the richest households were more than twice as likely to have ANC visit in their first trimester than those from poorest households. Women who identified as Christians were 21% more likely to have their first ANC visit in their first trimester relative to non-Christians. Women in urban areas were 0.82 times as likely to have their first ANC in their first trimester compared to women in rural areas. Women with four or more children were 0.73 times as likely to seek ANC in their first trimester of pregnancy relative to women with three or fewer children. There appeared to be substantial declines over time in the likelihood of women initiating ANC in their first trimester – women who had births in 2016 and 2017 were 0.70 and 0.63 times less likely to seek ANC in their first trimester of pregnancy compared to those who had births in 2012.

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**Table 4.5** Results of the multivariable logistic regression analysis of socioeconomic and demographic characteristics associated with timing of first antenatal care visit during pregnancy, from the 2017 Ghana Maternal Health Survey (n=11,805)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Timing of antenatal care visits** | | | |
|  | **Variables** |  |  | **95% CI of OR** | |  | |
|  |  |  | OR | Lower | Upper | P value | |
|  | ***Sociodemographic and obstetric*** | ***factors*** |  |  |  |  | |
|  | **Health Insurance** |  |  |  |  |  | |
|  | Not covered | (Ref) |  |  |  |  | |
|  | Covered |  | 1.04 | 0.94 | 1.16 | .461 | |
|  | **Mother’s Age** |  |  |  |  |  | |
|  | <25 | (Ref) |  |  |  |  | |
|  | 25-35 |  | 1.38 | 1.18 | 1.61 | <.001 | |
|  | > 35 |  | 1.38 | 1.10 | 1.73 | .005 | |
|  | **Mother’s Education** |  |  |  |  |  | |
|  | No Education. | (Ref) |  |  |  |  | |
|  | Primary |  | 0.96 | 0.84 | 1.13 | .638 | |
|  | Middle/JSS/JHS |  | 1.03 | 0.89 | 1.20 | .667 | |
|  | Secondary or higher |  | 1.14 | 0.95 | 1.45 | .200 | |
|  | **Marital Status** |  |  |  |  |  | |
|  | Not Married | (Ref) |  |  |  |  | |
|  | Married |  | 1.22 | 1.05 | 1.43 | .011 | |
|  | **Parity** |  |  |  |  |  | |
|  | 1 | (Ref) |  |  |  |  | |
|  | 2 |  | 1.13 | 0.96 | 1.32 | .120 | |
|  | 3 |  | 0.89 | 0.75 | 1.07 | .241 | |
|  | 4 or more |  | 0.73 | 0.61 | 0.88 | .001 | |
|  | **Ethnicity** |  |  |  |  |  | |
|  | Akan | (Ref) |  |  |  |  | |
|  | Ga & Ewe |  | 0.90 | 0.76 | 1.07 | .242 | |
|  | Mole-Dagbani |  | 1.16 | 0.97 | 1.38 | .091 | |
|  | Other |  | 1.01 | 0.85 | 1.18 | .944 | |
|  | **Religion** |  |  |  |  |  | |
|  | Not Christian | (Ref) |  |  |  |  | |
|  | Christian |  | 1.21 | 1.06 | 1.37 | .003 | |
|  | **Urbanicity** |  |  |  |  |  | |
|  | Rural | (Ref) |  |  |  |  | |
|  | Urban |  | 0.82 | 0.71 | 0.95 | .011 | |
|  |  | 80 | |  |  |  | |

***Continued:* Table 4.5** Results of the multivariable logistic regression analysis of socioeconomic and demographic characteristics associated with timing of first antenatal care visit during pregnancy, from the 2017 Ghana Maternal Health Survey (n=11,805)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Timing of antenatal care visits** | | | |
| **Variables** |  |  | **95% CI of OR** | |  | |
|  |  | OR | Lower | Upper | P value | |
| ***Economic wellbeing*** |  |  |  |  |  | |
| **Wealth Index** |  |  |  |  |  | |
| Poorest | (Ref) |  |  |  |  | |
| Poorer |  | 1.02 | 0.87 | 1.20 | .767 | |
| Middle |  | 1.18 | 0.98 | 1.42 | .075 | |
| Richer |  | 1.31 | 1.04 | 1.64 | .017 | |
| Richest |  | 2.18 | 1.68 | 2.82 | <.001 | |
| ***Barriers and facilitators*** |  |  |  |  |  | |
| **Distance to Facility** |  |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 1.01 | 0.87 | 1.16 | .886 | |
| **Not wanting to go alone** |  |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 0.97 | 0.83 | 1.13 | .722 | |
| **Getting money for treatment** |  |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 1.04 | 0.93 | 1.16 | .470 | |
| **Getting permission to go to the doctor** | |  |  |  |  | |
| Big problem | (Ref) |  |  |  |  | |
| Not a big problem |  | 1.11 | 0.90 | 1.36 | .297 | |
| ***Media exposure*** |  |  |  |  |  | |
| **Watches television** |  |  |  |  |  | |
| Not at all | (Ref) |  |  |  |  | |
| Less than once a week |  | 1.04 | 0.89 | 1.23 | .574 | |
| At least once a week |  | 1.05 | 0.89 | 1.22 | .624 | |
| **Listens to radio** |  |  |  |  |  | |
| Not at all | (Ref) |  |  |  |  | |
| Less than once a week |  | 1.07 | 0.91 | 1.23 | .411 | |
| At least once a week |  | 1.06 | 0.93 | 1.20 | .358 | |

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***Continued:* Table 4.5** Results of the multivariable logistic regression analysis of socioeconomic and demographic characteristics associated with timing of first antenatal care visit during pregnancy, from the 2017 Ghana Maternal Health Survey (n=11,805)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Timing of antenatal care visits** | | | |
|  | **Variables** |  |  | **95% CI of OR** | |  | |
|  |  |  | OR | Lower | Upper | P value | |
|  | ***Other variables*** |  |  |  |  |  | |
|  | **Region** |  |  |  |  |  | |
|  | Coastline | (Ref) |  |  |  |  | |
|  | South Central |  | 1.40 | 1.16 | 1.70 | <.001 | |
|  | South West |  | 1.04 | 0.89 | 1.21 | .606 | |
|  | Northern |  | 1.13 | 0.92 | 1.40 | .232 | |
|  | **Year of birth of child** |  |  |  |  |  | |
|  | 2012 | (Ref) |  |  |  |  | |
|  | 2013 |  | 0.89 | 0.71 | 1.15 | .361 | |
|  | 2014 |  | 0.93 | 0.74 | 1.16 | .549 | |
|  | 2015 |  | 0.84 | 0.68 | 1.08 | .184 | |
|  | 2016 |  | 0.70 | 0.58 | 0.89 | .003 | |
|  | 2017 |  | 0.63 | 0.51 | 0.85 | <.000 | |

***Multivariate associations with health insurance coverage***

**Table 4.6** presents findings on characteristics associated with health insurance. The strongest associations with maternal health insurance coverage were women being older, having a secondary school or higher education, being married, and being from wealthier households. Being from Northern, South-West, and South-Central regions was also significantly associated with health insurance coverage. Older (>35 years) women were 28% more likely to have insurance coverage compared to women who were younger than 25 years (p <.001). Married women were 39% more likely to have insurance coverage than women not married (p <.001). Women with secondary school or higher were 77% more likely to have health insurance coverage in comparison to women without an education (p <.001). Women from the richest households were more than twice as likely to have health insurance coverage relative to women from the poorest households (OR 2.28; p <.001).

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Women who gave birth in 2017 were four times more likely to have health insurance

coverage compared to those who had births in 2012.

**Table 4.6** Results of the multivariable logistic regression analysis of demographic characteristics associated with health insurance coverage, from the 2017 Ghana Maternal Health Survey (n=11,805)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Health Insurance Coverage** | | | |
| **Variables** |  |  |  | **95% CI of OR** | |  | |
|  |  | OR |  | Lower | Upper | P value | |
| **Mother’s Age** |  |  |  |  |  |  | |
| <25 | (Ref) |  |  |  |  |  | |
| 25-35 |  | 1.24 | 1.06 | | 1.45 | .007 | |
| > 35 |  | 1.28 | 1.05 | | 1.57 | .015 | |
| **Mother’s Education** |  |  |  |  |  |  | |
| No Education. | (Ref) |  |  |  |  |  | |
| Primary |  | 0.81 | 0.69 | | 0.95 | .012 | |
| Middle/JSS/JHS |  | 1.00 | 0.87 | | 1.16 | .904 | |
| Secondary or higher |  | 1.61 | 1.34 | | 1.94 | <.001 | |
| **Marital Status** |  |  |  |  |  |  | |
| Not Married | (Ref) |  |  |  |  |  | |
| Married |  | 1.39 | 1.21 | | 1.59 | <.001 | |
| **Wealth Index** |  |  |  |  |  |  | |
| Poorest | (Ref) |  |  |  |  |  | |
| Poorer |  | 1.48 | 1.25 | | 1.75 | <.001 | |
| Middle |  | 1.74 | 1.42 | | 2.14 | <.001 | |
| Richer |  | 2.10 | 1.66 | | 2.66 | <.001 | |
| Richest |  | 2.50 | 1.93 | | 3.24 | <.001 | |
| **Urbanicity** |  |  |  |  |  |  | |
| Rural | (Ref) |  |  |  |  |  | |
| Urban |  | 0.87 | 0.75 | | 1.01 | .080 | |
| **Region** |  |  |  |  |  |  | |
| Coastline | (Ref) |  |  |  |  |  | |
| South Central |  | 1.41 | 1.17 | | 1.71 | <.001 | |
| South West |  | 1.26 | 1.08 | | 1.48 | .003 | |
| Northern |  | 2.69 | 2.22 | | 3.26 | <.001 | |

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***Continued:* Table 4.6** Results of the multivariable logistic regression analysis of demographic characteristics associated with health insurance coverage, from the 2017 Ghana Maternal Health Survey (n=11,805)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **Health Insurance Coverage** | | | |
|  | **Variables** |  |  |  | **95% CI of OR** | |  | |
|  |  |  | OR |  | Lower | Upper | P value | |
|  | **Parity** | (Ref) |  |  |  |  |  | |
|  | 1 |  |  |  |  |  |  | |
|  | 2 |  | 0.97 | 0.82 | | 1.14 | .739 | |
|  | 3 |  | 0.90 | 0.75 | | 1.08 | .302 | |
|  | 4 or more |  | 0.71 | 0.58 | | 0.86 | .001 | |
|  | **Year of birth of child** |  |  |  |  |  |  | |
|  | 2012 | (Ref) |  |  |  |  |  | |
|  | 2013 |  | 1.06 | 0.85 | | 1.32 | .571 | |
|  | 2014 |  | 1.15 | 0.94 | | 1.40 | .157 | |
|  | 2015 |  | 1.09 | 0.89 | | 1.33 | .387 | |
|  | 2016 |  | 1.21 | 0.99 | | 1.47 | .052 | |
|  | 2017 |  | 4.59 | 3.6 | | 5.77 | <.001 | |

**Discussion**

Over the years, healthcare financing in Ghana has gone through many changes. Following independence in 1957, healthcare requirements of the public were met via a tax-funded system. By the dawn of the millennium, this system had given way to a user fee system, given the moniker “cash and carry” in reference to the need to pay upfront for health services before accessing said services. This set-up ultimately proved inadequate in providing healthcare to all as it left the most vulnerable, the poor, badly exposed.19,37 This led to a massive healthcare reform in the 2000s, which saw the introduction of a social insurance program known as the National Health Insurance Scheme (NHIS) in 2003, under ACT 650.38 Its main aim was to increase health insurance coverage, particularly for vulnerable populations, thereby improving access to health care and reducing the financial burden for would-be beneficiaries.11,12 Under this act, all citizens of the country should have access to health insurance either through the NHIS or private health insurance;

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however, there are no penalties for citizens who do not get coverage through any insurance.11,13,14 Inasmuch as all citizens have access to health insurance, signing up to an insurance policy is the prerogative of an individual.19

Our study showed that 90% of women who gave birth between 2012 and 2017 had the previously recommended four or more ANC visits; however, less than half of the women had the updated WHO recommended eight or more visits (44%). Approximately one third of women did not initiate their care in the first trimester. Our estimates are similar to those reported by UNICEF, which showed that 85% of women received at least four ANC visits in Ghana in 2017.39 While Ghana served as the leading country in Africa with four or more ANC visits in 2017, our data suggest that Ghana has substantial room for improvements in ensuring that every woman has at least eight ANC contacts.

Our analyses of the correlates of ANC use have several policy implications. First, the results suggest that health insurance coverage plays a significant role in ensuring that women receive the recommended number of ANC visits. These findings are in line with previous studies where health insurance was significant in increased uptake of maternal health services.18,40 We did not find a significant association between health insurance coverage and the timing of ANC visits. Previous studies also did not find an association between health insurance and the timing of the first ANC.18

Second, knowing the benefits of antenatal care is vital in the utilization of maternal health services. A woman’s education was significantly associated with increased ANC visits. In this study, women with secondary or higher education were 37% more likely to have at least eight ANC visits compared to those without an education. This is supported by prior studies that showed that education was positively associated with frequency of

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ANC visits.30,31 Greenaway et al. observed that more educated women had higher health knowledge leading to them seeking more maternal health services compared to the less educated.42

Third, household wealth was a significant correlate of larger numbers of ANC visits and the timely initiation of ANC. Women who were from the richest households were 2.46 times as likely to seek at least eight ANC visits, and 2.28 times as likely to initiate ANC in the first trimester, relative to those from the poorest households. The very foundation of the introduction of the NHIS is to ensure fair access and equity, particularly for those of lower socioeconomic status. However, in reality, NHIS coverage has been skewed towards the rich.23,43,44 This is evident in our results where wealthier households were more likely to have maternal health insurance coverage compared to those from poorer households and increased antenatal care use. Thus, a focus on a more robust NHIS system, which ensures that intended policies are enforced, may help fully eliminate the disparities present among the poor and wealthy with regards to maternal service use.

Fourth, this study revealed significant regional variation in the rates and timeliness of ANC visits. Women from the Northern, South West, and South Central were less likely to have eight or more visits in comparison to women from the Coastline regions of the country. Regional variations may exist due to the distribution of health facilities, necessary infrastructure, and human capital.33 The Coastline regions have many hospitals and clinics due to the presence of the capital, compared to other regions in the country. Thus, resources are more centered along the Coastal regions than their counterparts. Therefore, women in these regions (Coastline) are more likely to have geographical access to hospitals, thus,

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increased maternal service use. Poorly located health facilities increase the barriers in accessing the services rendered at these facilities.45–49

Fifth, there are indications of temporal trends that should be of concern to policymakers. While a cross-sectional study does not typically allow for the identification of changes over time, variation in the year of birth within the sample allowed us to identify such effects. There were indications that both the number of ANC visits and the timeliness of the initiation of ANC decreased significantly between 2012 and 2017. A Tanzania study observed similar findings where ANC visit rates declined over time. It was noted that unintended consequences from existing programs introduced may explain the trend toward lower rates of ANC visits.50

We observed several other associations with potential policy relevance. Women who had four or more children were less likely to seek at least eight ANC visits compared to women who had fewer than four children. This could be because they assume, they have had ample experience from their previous births; thus, expectations from current pregnancy are routine. This result is not isolated. Observed similarities in Kenya were recorded where women with high parity had reduced antenatal and maternity service utilization.45 Finally, The extent of media exposure has been shown to impact the utilization of health services.51,52 For example, a study conducted in Nepal saw that 83% of women who were exposed to any media, including radio, print, and television that covered anything related to antenatal care services had a higher likelihood of four or more ANC contacts than the 52% of the mothers who did not have similar exposure.53 Similar findings were seen in Southern India where exposure to mass media, specifically television and radio, were significant correlates of maternal health service utilization in that region.54 Results from

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this study echo these findings. In Ghana, radio is a widespread medium used to educate the populace. Women who listened to radio at least once a week were 15% more likely to have eight or more ANC visits.

**Limitations**

These analyses were based on data from a cross-sectional survey; hence, only statistical associations were inferred and not causality. The time gap between the child’s birth and the DHS survey represents a significant limitation. Women were surveyed on children born within the past five years before the interview. Recall bias may result in information that may not be accurate as women may find it difficult to remember. Further, insurance coverage was asked at the time of the interview. This measure of insurance coverage at the time of the interview may not be reflective of insurance coverage at the time of their ANC visit. Additionally, our outcome variables only reflect how many times the women received care but not the timing or services received. Women are supposed to have specific ANC visits in each month of their pregnancy; however, that level of specificity was not available in our data.56 Nonetheless, this study adds to the literature on health insurance and antenatal care use. It is among the first studies to look at maternal health utilization in Ghana around the time of the new 2016 WHO ANC recommendations using a nationally representative dataset.

**Conclusion**

This study demonstrated systematic variation in ANC use in Ghana with sociodemographic and economic characteristics, by region of residence, and over time. It is recommended that, for increased antenatal care use to broaden in Ghana, several public health interventions need to take place. The NHIS was an initiative set forth by the

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Ghanaian government to ensure every woman has the necessary care from pregnancy up until birth and remove financial barriers to healthcare access. Despite increases in insurance coverage, low numbers of ANC visits and late initiation of ANC were observed for large numbers of women, suggesting that other interventions need to be coupled with the NHIS. With the new Free Secondary High School introduced in 2017, for secondary educational fees to be absorbed by the government, we hope to see an increase in the percentage of women with at least a secondary school degree. ANC awareness should be aimed at younger women and women with greater parity, as they were less likely to have the recommended number of ANC visits. Every pregnant woman, regardless of age or parity, should be well-informed about the importance of receiving comprehensive ANC for each pregnancy. A focus on an equitable distribution of human capital, health facilities, and roads across regions may mitigate geographic variation in access. Recent trends toward lower rates of ANC visits and timeliness highlight the urgency of these efforts.

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**Chapter 5: Manuscript 2**

**Women’s Experiences Using Antenatal Care in Accra, Ghana**2

2 Cofie, A., Ostermann, J., Frongillo, E., Hardin, J. and Horner, R. To be submitted to

*PLOS ONE*.

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**Abstract**

**Background:** The pace of improvement in maternal mortality has been insufficient in Ghana. While Ghana’s maternal mortality ratio decreased from 635 per 100,000 live births to 319 per 100,000 live births between 1990 and 2015, the country failed to meet the 75% reduction target set by Millennium Development Goal (MDG) 5A, to reduce maternal mortality ratio by 75%. Antenatal care (ANC) is critical to improving maternal morbidity and mortality and child deaths. The objective of this study was to investigate women’s experiences when utilizing ANC services in Accra, Ghana.

**Methods:** Thirty pregnant women, ages 18-49 and in their late third trimester of pregnancy, were enrolled using purposive sampling from Korle Bu Teaching Hospital in Accra, Ghana. Semi-structured in-depth interviews assessed women’s experiences when using antenatal care. Data were transcribed verbatim, and grounded theory was used to identify themes emerging from the data. NVivo 12 software was used for analyses.

**Results:** Women’s ages ranged from 24 to 42 years. Half of the mothers (53%) had eight or more ANC visits. 97.7% had some form of education, with over half having a secondary school or higher degree (55%). Social support, the health of baby and mother, and confidence in doctors were reasons women used ANC services. Barriers included poor system and process structures, lack of friendliness of staff, high medical costs, negative relationships with providers, and geographical accessibility.

**Conclusion:** The importance of ANC was well-understood. Despite women’s knowledge and understanding of the importance of ANC, some women did not meet ANC visits recommendations. Reasons included lack of friendliness of the staff and high medical

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costs. This study highlights opportunities that may help inform policies aiming to increase maternal service use in urban Ghana.

**Background**

Globally, there has been a significant decline in maternal mortality since 1990, but rates of morbidity and mortality remain high.1 Estimates from the World Health Organization (WHO) indicate that each year, 300,000 women lose their lives during pregnancy or childbirth, with sub-Saharan African (SSA) countries accounting for two-thirds of maternal mortality.2,3 Complications in pregnancy and childbirth such as infections and severe bleeding are the chief cause of deaths in low-and middle-income countries (LMIC) among adolescent girls.2 In 2017, the WHO estimated about 5.4 million child deaths, with SSA accounting for over half of these deaths.4 The majority of childhood deaths are preventable, and the leading causes of these deaths include birth complications, pneumonia, and intrapartum-related events.4 Antenatal Care (ANC) is critical to reducing maternal morbidity and mortality and child deaths.5 ANC is arguably the most essential care given to women during their pregnancy. ANC is the entire clinical workup (including care, support, and information) a woman receives from health care professionals during her pregnancy (up until delivery).6 It grants the opportunity for women to be screened for possible risks during their pregnancy.7 These opportunities include preventive measures such as encouraging a healthy lifestyle, living tobacco-free, taking in good nutrition, being physically fit, getting counseling, and, most importantly, following through with screening visits and treatments.

Women who had more contacts with their providers during pregnancy were more likely to have positive pregnancy experiences and decreased perinatal mortality risk.8,9,10

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Based on this evidence, the WHO increased in 2016 the recommended number of ANC visits from four to eight for countries in developing regions,11–14 as countries in these regions accounted for most global maternal morbidity and mortality. Before this recommendation, Ghana had been working actively to reduce their maternal mortality. Between 1990 and 2015, Ghana’s maternal mortality ratio decreased from 635 per 100,000 live births to 319 per 100,000 live births.15 This could partly be attributed to the National Health Insurance Scheme (NHIS) introduced in 2005.16 NHIS exempts women in the ante, peri- and post-natal periods17,18 from out-of-pocket premium payments to ensure that the poor and other vulnerable members of the population have access to care.19 This change came to be when Ghana’s Ministry of Health introduced a new Maternal Health Care Program in 2008. The reformed program eliminated ANC charges as long as women enrolled in the NHIS.16,44

Achieving full and effective realization of this policy is challenging. After NHIS implementation, out-of-pocket payments for antenatal visits were much lower among the insured versus the uninsured.20 However, although, in theory, there is free maternal care for all, women complained of having to make out-of-pocket payments due to inadequate numbers of public healthcare facilities coupled with chronically underfunded facilities.21 These women paid informal medical charges and other fees, including ultrasound imaging fees, laboratory fees, and even fees for consultation with healthcare professionals.22 The maternal fee exemption policy also unintentionally encourages the partners of pregnant women to be less financially supportive as the assumption is that there is no need for financial support when seeking maternal care. Consequently, although the NHIS is

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designed to reduce the cost burden, the indirect costs associated with maternal care services reduce the full use of these services.22

The total number of ANC visits, and timing of these contacts are important metrics of ANC use. The earlier the first ANC contact, the higher the odds of interventions being in place to ensure a safe delivery both for the mother and child.23,24 Women in Ghana most commonly initiate ANC around the third or fourth month of their pregnancy, which is approximately the second trimester.25 In Nigeria, fewer than 1 in 3 women seek ANC services in the first trimester.26 A lack of necessary resources in healthcare facilities, including drugs and consumables, discourages expectant women from seeking care early.27 Better educated women tend to initiate ANC services earlier compared to the less educated.

Although several studies have examined women’s experiences when seeking ANC services in Ghana, most focused on rural areas. Further, most used quantitative methods to correlate health services use and key determinants of health. Our study aims to close this gap by investigating women’s experiences when utilizing ANC services in an urban setting, nearly fifteen years after the introduction of the NHIS in Ghana. Study findings may provide a more comprehensive understanding of women’s reasons for seeking, or not seeking, ANC services in urban Ghana.

**Methods**

**Study setting**

Ghana is a country in West Africa with about 29 million people.29 Ghana has sixteen administrative regions with the densest population being in Accra, the capital. Accra has an estimated population of 1.9 million.29 It is home to Korle-Bu Teaching Hospital (KBTH), the only public tertiary hospital in the southern part of Ghana, and the third-

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largest hospital in Africa.30 There are about 11,000 deliveries yearly, and an estimated 1,000 new antenatal attendances every month at KBTH.31,32 Women from both rural and urban areas are represented at KBTH, making KBTH an ideal place for this study.

**Sampling and fieldwork**

Recruitment took place at the KBTH maternity ward. Purposive sampling was used to recruit thirty pregnant women for the study. Age, language, number of ANC visits, and stage of pregnancy were known before sampling began. To be eligible for this study, women had to be in their last scheduled ANC visit during their third trimester (ninth month) of pregnancy. They also had to be between ages 18 and 49 years and to speak English, Ga, or Twi (which are the most predominant languages in the area). After the nurses had briefed the women on the ongoing research, nurses on duty assisted with recruitment efforts by referencing women’s files and referring eligible women to the team. Only women who agreed to participate were referred to the researchers. At the health facility, there was a waiting period before one saw the doctor. This area was where women were recruited. In total, 16 women had eight or more ANC visits and 14 women had fewer than eight ANC visits. This sampling strategy helped obtain a comprehensive sample to understand women’s experiences when utilizing ANC services. To minimize recall bias of the number of ANC visits, researchers referred to the women’s ANC health cards to verify how many ANC visits were recorded prior to their current visit. Recruitment ceased when the target sample size (N=30) was reached.

**Data Collection**

Thirty individual in-depth interviews with pregnant women were conducted between July 9, 2019 and July 23, 2019, at KBTH. Face-to-face interviews were conducted

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in English, Ga, and Twi. The semi-structured interview guide had questions related to women’s engagement with maternal health services in Accra such as their knowledge of ANC, health center experiences, and patient provider relationships. Interview guides were translated to Ga and Twi and extensively piloted. The piloting was done to ensure the final interview guide had clarity. Two trained researchers were charged with data collection, including the author (who is also conversant with the local sociocultural context and language) and a research assistant at the KBTH Obstetrics department.

Interviews were conducted at a secure part of the waiting room, or a private area by the doctor’s office if that was preferable for the participant. The researchers further explained to the participant their rights, reasons for participation in the study, and the contributions they are making to the field of maternal and child health. Verbal informed consent was obtained from women prior to interviews. Interviews were audio-recorded to guarantee that accurate information was retrieved from the participant and transcribed verbatim for analysis. A paper-based questionnaire was also used, primarily to screen eligible women and to record demographic information from women. Interviews were, on average, between 25 and 40 minutes. All data were stored in a locked locker at a designated place in the researcher’s home or password secured on researcher’s computer. Women who agreed to take part in the study were gifted 50 GHS (10 USD equivalent), which represented gratitude for their time and effort.

**Sample size determination**

To ensure saturation, a point where no new information can be derived from additional in-depth interviews, thirty pregnant women were recruited for the study. Data

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saturation depends on the richness of the data being retained from the interviewees being used for a study and can be reached by as little as interviewing twelve members or less.33,34

**Reflexivity**

The PI, a Ghanaian-American, may have created a disconnect between the researcher and women, where women might not relate to the researcher enough to share their experiences. The researcher acknowledged this. The PI and research assistant, however, both had ties to Accra, Ghana, which proved to be a benefit to the study. Having a Ghanaian background allowed the women to view the PI as their peer. They were more relaxed and willing to participate in the study due to the PI’s understanding of the local dialects. Reiterating the confidentiality of information shared also helped build trust between the PI and women to yield honest answers from women.

**Ethical consideration**

Ethical clearance was obtained from the University of South Carolina’s Office of Research and Compliance (Pro0089196) and Korle Bu Teaching Hospital’s Scientific and Technical Committee and Institutional Review Board (KBTH-IRB 00095/2019). Verbal consent was obtained from all women. This study did not involve the collection of participant’s identifiable information to maintain anonymity.

**Data Analysis**

Interviews were audio recorded, translated, and transcribed verbatim by a professional transcriptionist from Ghana. A professional translator was hired (2nd researcher) to ensure that the words translated had not lost its meaning. Transcribed interviews and field notes were analyzed thematically using NVivo 12 software. Two

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researchers used a line-by-line coding approach for the preliminary codebook development employing an inductive approach. An initial codebook was developed using previous literature. Four transcripts were independently coded by two researchers using the line-by-line coding approach. This was done to increase validity. A preliminary set of codes was then discussed to ensure intercoder agreement. Differences in themes were reconciled for consistency. Upon reaching an agreement, the PI re-coded the initial transcripts plus the remaining using the established codebook. New codes that emerged during analysis were categorized under similar themes. Stata version 15 software was used to calculate descriptive statistics of the socio-demographic characteristics of participants.

Upon completion of the analysis, all data will be stored for three years. Data are kept for additional time to allow the researcher to go back to it if necessary. It is also a requirement of the Office of Research and Compliance at the University of South Carolina.

**Results**

**Demographic characteristics of Women**

Women’s ages ranged between 24 and 42 years; 43% were native Ga speakers, 40% English speakers, and 17% native Twi speakers (Table 1). Mothers who had eight or more ANC visits accounted for 53% of our sample, and those who had less than eight ANC, 47%. Those who had eight or more ANC visits had an average of ten visits, and those who had less than eight visits had an average of six visits. Most women were born in Ghana and from the Greater Accra region. 76.7% of the women were married. Many women had some formal education. Few of the women worked in a formal sector and had either a personal or a household mode of transportation. Women sampled had between 1 and 5 children. All women used the NHIS for ANC visits. Women who had eight or more ANC services had

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a higher percentage of advanced educational level attained compared to those who had fewer than eight ANC visits. Monthly salaries were higher for women who had eight or more ANC compared to those who had fewer than eight ANC visits. 70% of women did have a mode of transportation.

**Table 5.1** Sociodemographic characteristics of women participating in in-depth interviews at Korle-Bu Teaching Hospital, Accra, Ghana

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Antenatal Visits** | **< 8 Antenatal** | **8 Antenatal** | | |
|  |  | **Visits** | **Visits** | | |
|  | **(N=30)** | **(N=14)** | **(N=16)** | | |
|  |  |  |  |  |  | |
|  | **(Mean (SE),** | **(Mean (SE),** | **(Mean (SE),** | | |
|  | **range, or %)** | **range, or %)** | **range, or %)** | | |
| **Age, range (years)** | 24-42 | 24–39 | 25-42 |  |  | |
| **Age, mean (years)** | 32 | 30 | 33 |  |  | |
| **Born in Ghana** |  |  |  |  |  | |
| Yes | 96.7 | 100 | 93.7 |  |  | |
| No | 3.3 | 0.0 | 6.3 |  |  | |
| **Region** |  |  |  |  |  | |
| Greater Accra | 55.2 | 57.1 | 40.0 |  |  | |
| Volta | 10.3 | 0.0 | 20.0 |  |  | |
| Eastern | 13.8 | 14.3 | 20.0 |  |  | |
| Northern | 17.2 | 28.6 | 13.0 |  |  | |
| Central | 3.5 | 0.0 | 7.0 |  |  | |
| **Married** |  |  |  |  |  | |
| Yes | 76.7 | 64.3 | 87.5 |  |  | |
| No | 23.3 | 35.7 | 12.5 |  |  | |
| **Attended school** |  |  |  |  |  | |
| Yes | 97.7 | 93.0 | 100 |  |  | |
| No | 3.3 | 7.0 | 0.0 |  |  | |
| **Highest level** |  |  |  |  |  | |
| **attended** |  |  |  |  |  | |
| Primary | 45.0 | 64.4 | 31.2 |  |  | |
| Secondary | 27.5 | 28.5 | 18.8 |  |  | |
| Vocational1 | 24.1 | 7.1 | 43.8 |  |  | |
| 4 year and above | 3.4 | 0 | 6.2 |  |  | |

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***Continued:* Table 5.1** Sociodemographic characteristics of women participating in in-depth interviews at Korle-Bu Teaching Hospital, Accra, Ghana

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Antenatal Visits** | **< 8 Antenatal** | **8 Antenatal** | | |
|  |  | **Visits** | **Visits** | | |
|  | **(N=30)** | **(N=14)** | **(N=16)** | | |
|  |  |  |  |  |  | |
|  | **(Mean (SE),** | **(Mean (SE),** | **(Mean (SE),** | | |
|  | **range, or %)** | **range, or %)** | **range, or %)** | | |
| **Employed** |  |  |  |  |  | |
| Yes | 93.3 | 100 | 93.7 |  |  | |
| No | 6.7 | 0.0 | 6.3 |  |  | |
| **Employment status** |  |  |  |  |  | |
| Full time | 55.3 | 21.5 | 86.0 |  |  | |
| Self employed | 41.3 | 78.5 | 7.0 |  |  | |
| Other2 | 3.4 | 0.0 | 7.0 |  |  | |
| **Work in the formal** |  |  |  |  |  | |
| **sector** |  |  |  |  |  | |
| Yes | 17.2 | 14.3 | 20.0 |  |  | |
| No | 82.8 | 85.7 | 80.0 |  |  | |
| **Monthly salary** |  |  |  |  |  | |
| < 5003 | 41.3 | 50.0 | 33.3 |  |  | |
| 501 – 1000 | 51.8 | 50.0 | 53.4 |  |  | |
| > 1000 | 6.9 | 0.0 | 13.3 |  |  | |
| **Method of ANC4** |  |  |  |  |  | |
| **payment** |  |  |  |  |  | |
| NHIS5 | 100.0 | 100 | 100 |  |  | |
| Other | 0.0 | 0.0 | 0.0 |  |  | |
| **Number of children,** | 0 – 5 | 0-5 | 0-5 |  |  | |
| **range** |  |  |  |  |  | |
| **Number of children,** | 1.7 | 1.6 | 1.7 |  |  | |
| **mean** |  |  |  |  |  | |
| **Own Transportation6** |  |  |  |  |  | |
| Yes, personal | 6.7 | 0.0 | 6.2 |  |  | |
| Yes, household | 23.3 | 21.4 | 25.0 |  |  | |
| No | 70 | 78.6 | 68.8 |  |  | |

1 = tertiary, polytechnical, two-year programs; 2 = part time, contracts; 3 = cedi currency;

4 = antenatal care; 5 = National Health Insurance Scheme; 6 = car or motorcycle

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**Themes emerging from the analysis**

Knowledge about ANC and its benefits, health center experiences, patient-provider relationship, women’s experiences with the NHIS, challenges in accessing ANC, and cues for action were themes from our analysis.

**Knowledge about Antenatal Care and its Benefits**

All women understood the importance and value of ANC and the need to use ANC services. Many identified that increased ANC visits reduce maternal morbidity and mortality and protect the child and help identify complications. Below are responses from women regarding their understanding of ANC and its importance:

*“ANC is where pregnant women go to be cared for and check the baby’s welfare and to prevent complications. If you don’t go, there is no way you will know something is affecting you or your baby. So, I see that every pregnant woman should go for ANC because if you don’t, something bad can happen.” (Participant 26, 2nd pregnancy)*

*“It is important because you wouldn’t know your condition and what might affect the baby. The antenatal clinic examines, detects, and takes care of the complications for everything to be okay. And that’s very good. It is great for you to come to the hospital when you are pregnant.” (Participant 25, 1st pregnancy)*

Emphasis on learning while at ANC visits were also apparent among the interviewed women.

*“The antenatal care has helped in many ways, and it educated me on many issues: It has helped prevent illnesses, prompts me when I need blood, and checks the posture of the babies in the womb for me to see. As the doctor often asks me to take*

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*tests to ensure the babies and I are well and in good shape. This has helped me a lot because thanks to the antenatal clinic, the doctor notices any problem and prescribes the medication to prevent it.” (Participant 5, 3rd pregnancy)*

These mothers expressed zeal to honor appointments, which may explain why most sought eight or more visits. Also, women honored appointments in part to avoid nurse’s criticism.

*“Well, I believe since I have been scheduled to come for ANC, I have to do just that. I have no option. That way, if there’s anything wrong with me, the doctors can identify that and treat it, so even if I don’t have an appointment with the doctor and I have an issue, I come to see the doctor to treat it.” (Participant 23, 2nd pregnancy) “You have to honor all your appointments and not miss any. Because they will ask you why you missed an appointment and you don’t know why the doctor appointed that date. And that’s one of the reasons why they get annoyed with you.” (Participant 7, 6th pregnancy)*

**Experiences of Pregnant Women in Healthcare**

KBTH is rated as one of the best hospitals in Ghana. Many of the women came to KBTH because of the world-class care they believed they would receive due to better outcomes recorded by the hospital compared to the other teaching hospitals in the country. Some of the mothers shared their experiences about KBTH and the comfort they felt, knowing they were in the right hands.

*“… Korle-bu is the best in Ghana, so if you don’t go to Korle-Bu, where else would you go? That’s why we come. Regardless of what you do, you will come.” (Participant 6, 4th pregnancy)*

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Some mothers also discussed lower charges for services as a reason for receiving care at KBTH.

*“KBTH has been of great help because I used to visit a private hospital which charges double the price of KBTH. The service delivery is different from KBTH, but you gain some experience at KBTH that private hospitals don’t give. Charges are also lower at KBTH.” (Participant 1, 4th pregnancy)*

Although some women talked about how great KBTH was, a few talked about challenges that existed within the hospital Most women addressed the lack of friendliness of some staff members and the stressful environment mothers encountered when seeking care.

*“Some of them are very good and treat you politely like your own sister, but some are very rude and will be shouting on you here and there, so some are good, and others are not, but the majority are good.” (Participant 13, 2nd pregnancy)*

*“It’s very stressful. Very stressful. You would have to come and wait, join a queue, and the nurses do whatever they have to do, talking to you anyhow. They will be talking on the phone, chatting and putting on makeup before looking after us.” (Participant 8, 3rd pregnancy)*

A handful of mothers talked about a mandatory family blood donation imposed on them as part of the process of receiving ANC at KBTH. Due to this, some women missed care. Those who decided to come without family blood donations waited much longer for care.

*“I missed out on ANC the other time due to the blood I hadn’t donated” (Participant 29, 2nd pregnancy)*

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*“We were asked to donate blood, and I don’t think that’s compulsory, and not all of us will get someone to donate for us... I didn’t get someone to donate blood for me, and they wasted over three hours of my time.” (Participant 16, 1st pregnancy) “...Before your vitals are checked, they check whether you have donated blood and check the receipt. If you haven’t your book will be put aside even if you are in the queue or even came at 5 am, the one who came at 10 am would be attended to because of the blood donated. (Participant 15, 1st pregnancy)*

**Relationship of Women with Healthcare Providers**

Our sample underscored the relationships women have with doctors at KBTH and how that encourages or discourages their ANC visits. Many mothers were generally pleased with their doctors.

*“I feel he/she has time and patience for me... and I’m grateful to God. In all my visits, they have been good to me, and it makes me happy.” (Participant 29, 2nd pregnancy)*

*“What encourages me to seek ANC is the fact that I get to live healthy as well as the baby after the doctor has attended to me. Also, if I am not well, I am assured that the doctors will take good care of me.” (Participant 10, 6th pregnancy)*

Some women voiced their disdain with certain doctors.

*“Sometimes, when you are complaining to them, they aren’t attentive, you make eye contact, that should explain a lot, but it doesn’t, so I just stop talking. I didn’t like it. If I’m talking to you and you are texting, talking on the phone, that’s not good. I hate it.” (Participant 6, 4th pregnancy)*

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Staff members seeking ANC at KBTH were guaranteed the best of treatment. They did not have to go through the normal procedures set forth for the other women. They also did not pay the minimum fee required at KBTH to seek ANC services.

*“I think because I’m a health worker so my experience can’t be generalized, I’m given VIP treatment thus I don’t really join queue, so basically I’m given the best of care and can’t really say so for others.” (Participant 2, 3rd pregnancy, Staff)*

KBTH has a structure in place in which doctors are divided into teams. Therefore, a pregnant woman can see multiple doctors even though assigned the same team. Some women liked this structure and others not.

*“My experiences with the doctors have been wonderful. Since they’re working as a team, they consult each other when there’s an issue that beats their minds, and they have their superiors around to consult as well.” (Participant 2, 3rd pregnancy)*

*“I’m not happy about having different doctors, especially today. I wish to have met the first doctor who was good to me, but I’ll not be seeing him, and that’s my worry now. Because he/she asked me to go do scan knowing exactly what to do with it, but this doctor has no idea what the scan is for.” (Participant 28, 4th pregnancy)*

Most women were content with their doctors. Most negative experiences came from their interactions with the nurses. Most women believed that the nurses were usually too harsh, unhelpful, and unpleasant, which was a deterrent in seeking ANC care.

*“... It’s the nurses that are our colleagues, and we can approach them, but they are the harsh ones. They don’t have patience with us at all. Like before, here wasn’t like this. Things have developed here. I don’t know where the insurance people are. If you are asking them questions regarding that, they will start talking and saying,*

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*“haven’t you gone to school before”? I don’t work at Korle Bu, so I wouldn’t know where things are located unless I ask. It disturbs me a lot.” (Participant 6, 4th pregnancy)*

Some women addressed the improvements of nurses over the years.

*“With nurses and doctors, I think it’s better now comparing it to 4 years ago; the nurses were a bit harsh. But they’re doing their best now, which is way better than they were.” (Participant 3, 3rd pregnancy)*

*“Pregnant women should be treated well because ill-treatment doesn’t encourage us to come.” (Participant 11, 2nd pregnancy)*

**Costs and Women’s Experiences with the National Health Insurance Scheme**

The NHIS was introduced to improve access, particularly for vulnerable populations, and to reduce the financial burden for beneficiaries. Pregnant women are to be fully covered when seeking care. Our results showed that all women, except staff members, had to pay a small fee of 5 GHS (1 USD) before care was rendered. Some saw the fee as a barrier in seeking care.

*“I don’t pay because I am a staff member… it’s a privilege I enjoy.” (Participant 12, 1st pregnancy,, Staff)*

*“It used to be free, but now we pay for everything. So, they should help us with that. Because some of us do not have the money to pay for the tests and scans. The insurance cover should be increased to cover the scans and tests.” (Participant 20, 4th pregnancy)*

Women using the NHIS talked about the high copays for scans and laboratory tests associated with seeking ANC visits.

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*“No, I paid for the scan and laboratory test. The scan was fifteen cedis, and the laboratory test was twenty cedis, but now the scan is thirty-five cedis, and the laboratory test is forty cedis. That’s high.” (Participant 19, 2nd pregnancy)*

Additionally, some women did not see the benefit of the NHIS during their pregnancy, mainly because of the out-of-pocket costs. One woman explained her experience below.

*“So far, [NHIS] hasn’t benefitted me. It reduces the consultation fee, but the rest I pay. I paid for everything, including my medication. I pay for every single thing here.” (Participant 6, 4th pregnancy)*

On the contrary, some women saw value in the NHIS and how it has helped reduce ANC costs.

*“I think it has been beneficial to me because it covers a bigger part of the cost I incur at the hospital, so it’s been helpful. Every small thing counts. So, whatever you get, you just take it like that.” (Participant 23, 2nd pregnancy)*

*“It has really helped by reducing prices. I paid more when I didn’t have the NHIS. Now that I have the card, I don’t pay so much anymore.” (Participant 26, 2nd pregnancy)*

**Barriers to ANC Use**

Women reported many challenges in seeking ANC visits. Distance to facility, waiting times, and direct and indirect costs were the most recurrent.

*“Yes, it’s too far. When will I get a vehicle from Kasoa to Kaneshie, then Kaneshie, to this place? It’s too far.” (Participant 19, 2nd pregnancy)*

Women cited too many mothers and poor process structures contributing to long queues as reasons for long wait times at the hospital. These wait times played a role in unavoidable

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costs as mothers had to spend money on other things such as food and drinks during their wait.

*“I think it’s because of the process involved. You have to pay, then get a card, then get a number, then you go elsewhere before they give you something to show the nurses and there’s a lot of us here too, creating a long queue, so I think that’s the reason.” (Participant 10, 6th pregnancy)*

*Because to be frank, you always have to have money on you. Even due to the long wait times, you also spend lots of money when you are here, like for food and other things. (Participant 29, 2nd pregnancy)*

Another commonly cited reason for not utilizing ANC services was unawareness of pregnancy and lack of observed complications during pregnancy. These contribute to late initiation of ANC and having fewer ANC visits before birth than recommended.

*“For me, when I was pregnant, I did not know. I still used to have my menses when I was pregnant. I realized that every time I eat, I throw up. And so, I went to check and realized that I was pregnant. So, for me, I realized I was pregnant at five months. That is when I started to come for care.” (Participant 25, 1st pregnancy)*

*I usually don’t experience complications or any issue whatsoever when pregnant, so I don’t start ANC early... I say to myself that well, I’m not experiencing any complications, so why not work to make money in the meantime, when I get to 6 months then I start ANC.” (Participant 22, 3rd pregnancy)*

Costs for ANC services such as labs, scans, and other tests were also frequently mentioned. Some women made decisions on seeking ANC based on their perceived health status and lack of money.

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*“Sometimes, I have an appointment, and I know of the tests to take after the appointment, but there is no money, so I miss the appointment.” (Participant 20, 4th pregnancy)*

*“I feel there’s nothing wrong with me so why waste money to the hospital for ANC and sometimes I don’t have money for lab tests and scans I can just say I’m fine I won’t come for ANC.” (Participant 3, 3rd pregnancy)*

Although many women were concerned with the 5 GHS charge, they were okay with it because they believed it was a small fee for quality care. Anticipated charges at the hospital, however, made some women concerned about the 5 GHS fee as they saw it as another layer of cost.

*“For me, since I want to be taken very good care of, I don’t think it discourages me from coming. Plus, my husband also gives me money to visit the hospital.” (Participant 4, 2nd pregnancy)*

*“With the 5 GHS I usually pay, it worries me a lot because all the tests I did this morning alone amounts to 15 GHS, and I’m yet to meet the doctor. Definitely, he/she will ask me to run another test and its money involved. This and other costs make me sometimes decide to reschedule appointments by the doctor.” (Participant 27, 3rd pregnancy)*

Many women did not see transportation cost as inhibiting access to ANC services as many lived close to the hospital and had financial support from their partners.

*“Actually, I’m living inside Korle Bu, so I just walk in here, it’s not too far so transportation doesn’t bother me.” (Participant 15, 1st pregnancy)*

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*“Transportation hasn’t been a problem for seeking ANC, so even if I don’t have, my husband supports me in that regard. (Participant 10, 6th pregnancy)*

*“He makes sure I have what I need before coming, and that makes me happy... he gives me everything I need for antenatal such as money for food, transportation, and other things. So that also encourages me to come for ANC.” (Participant 24, 2nd pregnancy)*

First-time mothers were likely to seek ANC services. Their excitement and curiosity drove them for ANC visits.

*“I don’t know if it’s because this is my first pregnancy, so I enjoy going for ANC, I’m anxious and always want to know if my baby is in good shape and if I’m also good.” (Participant 15, 1st pregnancy)*

**Cues for Action**

For mothers to seek the recommended eight or more visits outlined by the WHO, participants discussed ideas on improving ANC use. Some said a better coverage of the NHIS would help women tremendously as it will help reduce women’s cost, thus, encouraging use of ANC.

*“I think the NHIS should be made more effective than it is now because there’re pregnant women that can’t afford the cost incurred when they visit the hospital. This will make them not come due to the cost. Many largely depend on the NHIS to cover their bills, but it’s not that effective. If the NHIS is effective, we’ll all benefit because we were told it'd work effectively. But here we are, it is not working.” (Participant 27, 3rd pregnancy)*

Some advocated for the need of increased training for nurses.

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*“Well, if the NHIS is not working or helpful, even if the nurses come, there are things that they should be able to appreciate. If they tell you to run scans and labs and you don’t do it, they will not treat you well. They will treat you so inhumanely. So, if they can help us in that area by better training the nurses, it will really help us.” (Participant 27, 3rd pregnancy)*

More media awareness on ANC, education, and individual accountability were also included in the ideas from women in increasing the use of ANC visits.

*“It must be advertised on television expressing the importance of ANC for you and your baby. Others who are pregnant and at home turn to lose their babies or their lives because they don’t come for ANC. So, it must be advertised in different languages for people to know the importance of it.” (Participant 15, 1st pregnancy) “We have to start advising ourselves and not wait to be told to do the right thing for ourselves and our babies.” (Participant 24, 2nd pregnancy)*

**Discussion**

This study sought to explore women’s experiences at a teaching hospital in Ghana when seeking maternal health services during pregnancy. All women understood the benefits of antenatal care. Some reasons why some women did not fully use ANC services were lack of friendliness of staff, negative relationships with nurses, and high medical costs, even with the presence of the NHIS. Other reasons were long wait times, transportation cost, unawareness of pregnancy, and lack of observed complications during pregnancy. Social support and health status of baby and mother encouraged high antenatal care use among the women.

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Women fully comprehended the risks involved when one refused to seek maternal health services, such as infections, high blood pressure, and preterm labor.2 This comprehension could be explained by the mean age of our sample (thirty-two years) and the number of children born to them. Increasing maternal age has been shown to be associated with increased use of maternal care services in Ghana.35–37 This association particularly holds true in situations where women have previous birth experiences and/or have garnered knowledge of the benefits of ANC services due to increasing age.38–40 Women in South Sudan, in contrast, did not fully understand the benefits of ANC, as the concept of regular, structured medical follow-up during pregnancy was novel to them.41 Similarly, in Afghanistan, women did not fully appreciate the possible obstetric complications that could arise from reduced patronage of maternal services.42 Further, illiteracy reduced the extent to which the full import of advice given at ANC could be appreciated by expectant mothers.42

Lack of friendliness, poor interpersonal relationship skills, and poor attitude of nurses discouraged ANC visits by the women in our study. In another study, maltreatment and intimidations by nurses were barriers that contributed to the low use of maternal health services.43 Poor system and process structures were also reasons for the low use of ANC visits in our study. Women in our study addressed the cumbersome process at the hospital and the lack of help they sometimes received from nurses, which led to longer wait times. Women who used the NHIS as their form of payments also noticed longer queues at the health facility, compared to individuals with private insurance or fully paying out of pocket.45 Similarly, women in Malawi asserted that prolonged service delivery times dissuaded them from subsequent ANC visits.44 Other studies found inadequate human

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resources, poor staff knowledge and poor attitudes from some of the caregivers as barriers to ANC patronage.46–51

NHIS was introduced to help increase utilization rates of health services across the board. Even with the maternal fee exemption policy under the NHIS, however, where cost is not an active barrier to seeking healthcare, other pertinent factors mitigated the use of healthcare services among women. Women in this study addressed how copays associated with the NHIS and informal medical charges delayed their ANC uptake. Thus, notwithstanding the Maternal Health Care Program guaranteeing pregnant women to be fully exempt from fees, in practice, women still encountered additional costs.22,52 The additional costs observed in our study could be explained by delayed reimbursements by the National Health Insurance Authority, which has led to disruptions in operational flows directly impacting health service delivery.53 Delay in reimbursement from the Authority to service providers contributes to out-of-pocket payments for many women, as the hospital had to find novel ways to maintain daily operations.54

Geographic location played a role in accessing care. In our study, women who lived far were more concerned about seeking services than those who lived nearby. Proximity was a predictor of utilization, with longer distances being said to have adverse effects on the accessibility of maternal services in Ghana.55–59 In addition, many studies have shown how transportation impacts the health-seeking behavior of Ghanaian women.59–61 This is made evident by a study that indicated that some women would save money that would have otherwise been used to cover the cost of transportation for ANC visits to meet other obligations.27 These sentiments were echoed among our women. Many did not have a

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problem with the transportation cost itself if no additional costs were incurred at the hospital.

Some women had significant challenges to early initiation of ANC contacts due to unawareness of pregnancy. Another reason for late initiation was lack of observed complications during pregnancy. Women who did not have pressing issues during their pregnancy did not see the need to seek care. They felt it was more prudent to work and save money for the imminent charges they will face during the birthing process.62

Social support, specifically spousal support, played a significant role in encouraging mothers to seek care. Many women discussed the financial and emotional support their spouses rendered to them, which made them happy and emboldened them to get care. This finding is contrary to a study that suggested that the maternal fee exemption policy unintentionally encouraged the partners of pregnant women to be less financially supportive as the assumption is that there is no need for financial support when seeking maternal care.22

Additional reasons why mothers sought care were the health status of both baby and mother, and confidence in doctors at the hospital. The confidence of the mothers in their doctors encouraged them to seek ANC as they believed doing so would lead to a better health outcome for both mother and baby. These findings are observed in a another study where women outlined confirmation of health, prevention of monitory medical complications, and a trusting relationship with the healthcare provider as a meaningful part of ANC.63

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**Limitations**

The research provides a contextualized, and rich understanding of women’s experiences with the NHIS and how that plays a role in their seeking of ANC services in Accra, Ghana. Women’s experiences with seeking ANC services may be different in other populations not sampled, and our results may not be generalizable to the country at large. Translation in research can affect results generated from a study. Since women who were Ga and Twi speakers were included in our study, transcripts from them were converted to English for analysis. To ensure that words translated had not lost meaning, a professional transcriptionist from Ghana translated and transcribed the interviews. After translation, the author ensured that all translations were accurate as she is well versed in both local dialects. The women sampled attended one large facility in an urban area with a diverse patient population; the experiences of women in other facilities were not captured. Women who did not seek care at all were not included in our study, and women with more ANC visits were more likely to be approached for this study. Therefore, other relevant experiences that exist when seeking ANC services may be missed. For this reason, further studies are recommended in those areas to help better inform maternal health policies in Ghana.

**Conclusion**

Social support and well-being of mother and child motivated women to make ANC visits. Nevertheless, based on women’s experiences, a single-focused intervention such as the NHIS would not suffice to increase maternal use of ANC. Despite women’s knowledge and understanding of the importance of ANC, some women did not meet the necessary ANC visits for several reasons including lack of friendliness of the staff and high costs.

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Although Ghana has made many strides in reducing both maternal mortality and child mortality over the years through policies like the NHIS, Ghana failed to meet the 75% reduction target set by MDG goal 5A (to reduce maternal mortality ratio by 75% between 1990 and 2015).64 Therefore, further implementation of public health interventions aimed at increasing use of maternal services is needed. These interventions could include improved nurse trainings to strengthen the interpersonal relationship between nurses and women. Another intervention may be improved reimbursements from the National Health Insurance Authority to hospitals to eliminate the unintended copays women endure at the hospital, leading to a financial burden, and thus, decreased ANC visits. The processes at the hospital need to be streamlined to reduce the long waits women encounter when seeking ANC services. These interventions could help to reduce maternal and childhood mortality in Ghana.

**Acknowledgements**

The authors are grateful to Korle Bu Teaching Hospital for authoring the study to take place. A special thanks to Theophilus Brocke for his dedication to the project during recruitment and data collection. Thanks to Dr. Marian Botchway for her assistance during the coding process. A huge thanks to Dr. Bernard Okoe-Boye who was supportive of this project and Dr. Franklin Acheampong who helped ensure that the project was successful.

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**Chapter 6: Conclusion and Implication**

According to the World Health Organization, 94% of all maternal mortality occurs in low and lower-middle-income countries. Over the years, although Ghana has made many strides in reducing the maternal and perinatal deaths within the region, they failed to meet the then Millennium Development Goal 5A which was to reduce maternal mortality by 75% between 1990 and 2015.4 In Ghana, the leading cause of maternal mortality are hemorrhage, abortion, hypertensive disorder, sepsis and infection.17–19 Many of these deaths are preventable. ANC is arguably the most essential care given to women during their pregnancy. It grants the opportunity for women to be screened for possible risks during their pregnancy.28 Evidence has shown that women who had more frequent ANC visits were more likely to have positive pregnancy experiences and decreased pregnancy complications and perinatal mortality risk.31,32 These observations led the WHO to increase the number of recommend ANC visits from four or more to eight or more, especially for low and middle-income countries.

The introduction of the NHIS was a gateway to ensure citizens of Ghana had reduced out of pocket payments, and in that, eliminated all costs associated with pregnancy and childbirth for any Ghanaian woman enrolled. Elimination of fees was realized during the introduction of the Maternal Health Care Program in 2008. With these changes and updated recommendations set forth by the WHO, it was imperative to assess the association between health insurance and maternal health service use, and other determinants that may

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contribute to increased care. In determining the factors that affect increased ANC visits, it is also of importance to understand women’s experiences when seeking ANC. Understanding the barriers and or facilitators to ANC use is critical in enhancing ANC visits within the region, thus, potentially decreasing maternal and perinatal deaths.

This study demonstrated several factors are correlated with ANC use in Ghana. Age, wealth, education, marital status, health insurance, and other factors were found to be associated with greater antenatal care use in Ghana. Geographical variations of ANC uptake were also present. Media exposure, specifically radio, was associated with increased ANC visits. It is recommended that, for increased antenatal care use to broaden in Ghana, several public health interventions need to take place.

Younger women were less likely to seek the WHO recommended number of ANC visits. Creating a safe space for all mothers, irrespective of age, or marital status, may be one of the many steps in improving ANC uptake. Women with higher educational status were also more likely to have increased ANC uptake. With the new Free Secondary High School introduced in 2017 in Ghana, secondary educational fees are absorbed by the government; this eliminates financial disparities. Initiatives like these need to be expanded to cover university as well.

The introduction of the NHIS was also a great initiative. Women who had health insurance were more likely to have increased ANC visits. The NHIS ensures every woman has the necessary care from pregnancy up until birth and removes financial barriers to healthcare. The poor enrolled in the NHIS, and supposedly at an advantage regarding coverage, are yet to realize said advantage fully. This may be due to the indirect costs incurred at the hospital. Women in our study discussed the copays they face when present

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at the hospital. These copays deter some of them from seeking ANC. Thus, there is a need to guarantee that the National Health Insurance Authority reimburses hospitals on time, so hospitals are not inclined to charge fees that would otherwise have been covered by the National Health Insurance Scheme. Others addressed the money they spent due to long wait times at the hospital. These monies go to food and beverages. Bettering flows at the hospital may decrease long wait times. A more robust focus on training and recruiting medical doctors and nurses to the public sector may reduce the mother-to-provider ratio at the hospital, therefore, expediting patient visits. An interesting finding was that health insurance was not significant in the timing of ANC. This may be attributed to the unawareness of pregnancy during the first trimester. Some women in our study acknowledged that they mostly find out about their pregnancy during the second trimester. Information about pregnancy signs should be broadened, so all women are aware of the possibility of pregnancy when it does occur. Media exposure, specifically radio, was a predictor in increased ANC visits. Using that medium and others for maternal health educational purposes may not only help improve the number of visits but also the timing of the first ANC visit. The well-being of mother and child was a significant motivator when in seeking ANC. These may be emphasized when educating women about the consequence of ANC.

When focusing on education, policies should specifically target women with greater parity. Our results showed that the more children a woman had, the less likely they were to receive the recommended number of ANC visits. The notion of familiarity may explain this. Women who had children before may think they know how to handle subsequent pregnancies due to their earlier experiences. Exit interviews for all pregnant

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women, regardless of previous pregnancies, could advise women on the importance of ANC for all future pregnancies. Social support was also a motivator in seeking care. Nurse/midwives should encourage mothers to bring their partners to ANC when applicable.

Furthermore, geographical variations in uptake of ANC may be due to a lack of access, funding, and infrastructure. Hospitals in the coastal regions of the country may be more resourced than their counterparts as the capital is located in one of the coastal regions. A focus on equitable distributions of human capital, health facilities, and improved roads across regions by the government should be fundamental.

Women’s experiences and trends toward lower rates of women completing the recommended number of ANC visits despite the increase of health insurance coverage, suggest that a single-focused intervention such as the NHIS may not suffice to increase maternal use of ANC. Despite women’s knowledge and understanding of the importance of ANC, women may not meet the necessary ANC visits for several reasons, including the lack of friendliness of the staff and nurses. Customer service training, especially for nurses, should be paramount. Women voiced out concerns with some nurses at the hospital. Many did not appreciate the harshness of nurses, which contributed to delayed ANC uptake. A focus on strengthened nursing training may help with improved ANC use.

This study contributes to the literature in maternal and child in Ghana. These findings may help in strengthening and creating new interventions, which may encourage ANC use, helping reduce maternal and childhood deaths in Ghana. Further research in other hospitals, especially in other regions, may build upon these findings to implement a more comprehensive approach for better maternal health services in the country.

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**Appendix A: Information Letter and Consent Form**

**Protocol Title:** Reasons for non-compliance with WHO antenatal care service

recommendations in Ghana: a qualitative study.

**Principal Investigator:** Anna Cofie, MPH, Arnold School of Public Health, University of South Carolina, 054-172-7788, acofie@email.sc.edu

**INTRODUCTION**

Hello, my name is Anna Cofie. I am currently working on a qualitative study looking at reasons for non-compliance with WHO antenatal care (ANC) recommendations in Ghana. This study is being done to assess the mother’s attitudes, knowledge, and perceived barriers with regards to adhering to the recommended ANC contacts by the WHO. This study is a minimal risk study to you, the participant, and it is purely voluntary. At any given point throughout the study, you have the right to skip questions you would not want to answer, and your withdrawal from the study is completely up to you. It is important to highlight that your identity would be strictly confidential throughout the process, as pseudonyms are used to de-identify you. Insights gained from this study is aimed to help the Ministry of Health in Ghana devise better plans to ensure that all mothers in Ghana have access to adequate ANC services. Results from this study will also be presented at national and international academic conferences and published in reputable journals. If you agree to be in this study, I will ask you to do:

1. A face to face interview which would last between 25-40 minutes, preferably at the hospital where you just received antenatal care. In this case, at Korle Bu Teaching Hospital (KBTH).

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Upon completion of all parts of the study, you would be compensated 50 GhC for your time and effort.

As stated above, you can decide to skip questions and or halt your participation in this research. A copy of this form would be given to you for your records.

***Permission to audio record interview:***

*Please sign below if you are willing to have these interviews audio recorded.*



Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

**Contacts and Further Questions:**

This research was developed and conducted by a student at the University of South

Carolina in partial fulfillment of her doctoral degree. If you have any additional concerns or questions regarding this research, please contact Anna Cofie at [acofie@email.sc.edu.](mailto:acofie@email.sc.edu) If you have additional concerns or questions related to your rights as a participant in this study, please contact the University of South Carolina’s Office of Research Compliance at [lisaj@mailbox.sc.edu](mailto:lisaj@mailbox.sc.edu) or 803-777-6670.

Consent form approved by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on \_\_\_\_\_\_\_\_\_\_

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**Appendix B: Interview Guide**

**Protocol Title**: Women’s Experiences Using Antenatal Care in Accra, Ghana

***SCREENING FOR STUDY PARTICIPATION***

1. Are you at least 18 years of age?

*YesNo*

1. Do you speak Ga or English?

*YesNo*

1. Are you in your third trimester (nine months of pregnancy)?

*YesNo*

1. This one on one interview will last approximately 25-40 mins. Are you willing to talk with me further?

*YesNo*

*SCORING: The participant must answer “Yes” to all questions above before the researcher can proceed with the interview. If a participant answers “No” to any, the researcher will thank the participant for her time as she does not fit the inclusion criteria set by the researcher.*

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**The Study Survey**

**Introduction**

Hello, (insert participant name). My name is (name of the researcher), and I am a 3rd year Ph.D. student in the Health Services Policy and Management (HSPM) department at the University of South Carolina, located in South Carolina, US. Let’s speak a little about why we are here today. After a brief overview, I will confirm your verbal and written consent to participate in this study and interview. May I begin?

**A. Title/Purpose:**

I am conducting a study to learn about the experiences of women in Ghana during their pregnancy. We would like to know in particular about your experiences with antenatal care. When concluded, I would like this research to inform maternal health policy in Accra, Ghana, and beyond to help new mothers in the future.

**B. Course of the interview:**

As a participant in this interview, we will discuss your insights on the experiences of your current pregnancy. This interview is audio-recorded, but your responses are confidential and will only be used for this research purpose. The interview should last between 25-40 minutes. I am audio recording to ensure that I accurately document responses for the written part of my report. Additionally, I will take notes during the interview so that I can refer to it.

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**C. Permission to audio record:**

**[Researcher]:** Now that I’ve given an overview of the study and the course of the interview, do I have permission to audio-record this session?

1. (Yes) Thank you! You will also receive 50 GhC ($10) for your participation in this study.
2. (No) Okay, to participate in this study, I will have to audio record the session. If that is not an option for you, I will not proceed with the study. Thank you for your time.

**[PRESS BUTTON HERE]**

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***Part I: Woman’s Experience during Pregnancy-*** Thank you for this information.

I will like to ask you some questions about your current pregnancy.

1. What have your experiences been like with your pregnancy?

Context: To develop a rapport with the participant by asking questions centered around her pregnancy.

* Follow up questions

1. Is this your first pregnancy?
   * If not--- how different is this experience compared to your previous pregnancy experience/s?
2. Can you tell me who you are living with? What is their relationship to you?
3. Do you currently work?
   * If yes, where? How do you like your current position?
   * If no, how have you been financially supported throughout your pregnancy?
4. Since you found out about your pregnancy, have you changed how you take care of yourself?
   * *Probe* – Do you exercise more? How has your food intake changed?
     + If smoker, did you quit?
5. During your pregnancy, have you faced any medical complications?

* *Probe – did you have any record of infection, anemia, and the likes?*

1. How has your antenatal care visits helped you in any way?

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***Part II: Knowledge about Antenatal Care and its’ Benefits-*** Thank you for providing that information. Now I would like to talk about what you know about antenatal care.

1. When you hear the word antenatal care, what does it mean to you?

Context: We want to know whether the participants have any knowledge of antenatal care and how that knowledge probably affects their utilization of these services.

* Follow up questions

1. How important is antenatal care during your pregnancy?
2. From what you know, how often must a woman see her doctor during pregnancy?
   * *Probe – how many times must a pregnant woman seek care? Can you explain why this number?*

\*\*\*\*\*\*\*\*If mothers said they faced any complications during their pregnancy, we will follow up with this question\*\*\*\*\*\*\*\*

1. Do you think attending ANC visits addressed these complications?
   * \*\*If participants did not attend any ANC visits\*\* (Do you think if you attended ANC visits, some of these complications would have been reduced?)

***Part III: Health Center Experience*** – Thus far, we’ve discussed your knowledge about antenatal care, let’s talk about how you feel when you receive care.

1. Tell me about your last experience at KBTH during your recent ANC visit? What happened during your visit to KBTH?

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Context: We want to know how individuals feel towards receiving care within a health-care setting.

* Follow up questions

1. What do you think about the clerks and receptionists at the hospital?
   * *Probe - Are they as helpful as you would like them to be?*
2. In your most recent visit to the hospital, how long did it take you to see a doctor/nurse (waiting time)?
   * *Probe – Can you explain why you think it took you this long to see your doctor?*
3. Have you ever been turned away because the doctor did not show up?
4. *Probe - If yes, what were the reasons given, and how did that make you feel?*
5. *During your pregnancy, have you always got an appointment for your next ANC care?*
6. Have you had the same doctor throughout your pregnancy?
7. *Probe – If not, did having different doctors affect your care in any way? Can you explain it?*
8. *What was the reason you had to change doctors?*

***Part IV: Patient-Provider Relationship*** – Ok, so far, we’ve talked about your knowledge and your feelings about antenatal care and your healthcare experiences, now let’s speak about your relationship with your provider during your most recent pregnancy.

1. Please tell me about your experiences with your doctor.
   * *Probe - Have you had any good or bad experiences?*

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Context: We want to know the dynamic between the patients and the providers and how that affects the utilization of ANC services.

* Follow up questions

1. During your ANC visits, did your provider counsel you about healthy eating, keeping physically fit, and your overall being?
2. Did your provider talk to you about using alcohol, tobacco, and the like?
3. Were you told about the importance of ANC by your provider?
   * *Probe – Did your provider explain the need for your visit?*
4. How will you describe your time spent in the doctor’s office?
   * *Probe – During your visit, was he willing to listen to what you had to say about your pregnancy experience?*
   * *Probe – Do you feel enough time was spent with you?*
5. After your visit with the doctor, how clear were the things s/he discussed with you?
   * *Probe – Did you understand all that s/he shared with you? Explain why you felt that way?*
   * *Probe – Did you leave his/her office with doubts? Tell me about that?*

**Part V: Seeking ANC–** Thank you for all the information you have provided thus far. I would like to move into talking about the things that encourage or discourage you from seeking care

1. Tell me about any experiences that you feel encouraged or discouraged you from seeking ANC.

Context: We want to know factors that have encouraged or discouraged participants toward using ANC services.

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* Follow up questions

1. What role did your partner play when you were seeking ANC services?
2. Do you use private insurance, NHIS, or cash?
   * If you use the NHIS, how has it benefitted you or not during your pregnancy? (*Ask similar questions for private insurance and cash)*
3. Have copays or any associated costs and fees impacted your decision to seek care during your pregnancy?
   * If so, please provide examples or provide thoughts on why you believe this to be so?
4. Has transportation impacted your health services use?
   * *Probe – please give me some examples of how transportation has impacted you getting healthcare.*
5. Have you ever been turned away because a service you needed during your pregnancy could not be provided?
   * *Probe – can you share that experience with me?*
6. Describe any cultural practices that might deter you from seeking ANC services.
   * *Probe – culturally, are there beliefs that encourages one not to seek care in a hospital setting?*
     + *As in, will you prefer a pastor or Imam as your point of contact during your pregnancy?*

***Part VI: Ideas on improving ANC uptake*** – We are now moving into the final part of the interview. As we finish up, I would like to discuss how the uptake of antenatal care can be encouraged in this region.

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1. What do think will need to be implemented to ensure that mothers seek the full 8 recommended ANC services?

Context: We want to know how we can encourage mothers to seek antenatal care.

* Follow up questions

1. Do you know about any of the recommended best practices by pregnant women?
   * *Probe – Do you think it is a lack of knowledge on the patient side, or must the government do more?*

***Part VII: Basic Demographics*** – As we begin, I will ask you a few demographic questions

* 1. How old were you on your last birthday?

1. What is your current relationship status?
   * + 1. Single
       2. Married
       3. Separated

d.Divorced

1. Widowed
2. In Domestic Partnership
3. Living with a Significant Other
4. Were you born in Ghana? a. \_\_\_Yes

b. \_\_ No

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If participant answered “Yes,” which of the 10 regions in Ghana were you born?

*Region \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*If participant answered “No,” please indicate the country in which you were born. Country:*

1. Have you ever attended school?
   1. \_\_\_Yes
   2. \_\_\_No

\*\* If participant answered no, skip next question. [#5]

5. What is the highest level of school you’ve attend?

a. \_\_\_ Primary

b. \_\_\_ Secondary

c. \_\_\_ Vocational School

1. \_\_\_ 4-year University
2. \_\_\_ Higher
3. Are you currently employed? a. \_\_\_Yes

b. \_\_\_No

If participant answers “No”, skip the next (3) questions [#7, #8 and #9]

1. What is your employment status? a. \_\_\_ Full Time

b. \_\_\_ Part Time c. \_\_\_ Contract

1. Do you work in the formal sector (banking, office, corporate, etc.)?

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1. \_\_\_Yes
2. \_\_\_No

9. What is your monthly salary? (In Cedis)

a. \_\_\_ < 500

b. \_\_\_ 501 – 1000

c. \_\_\_ 1001 – 2000

d. \_\_\_ 2001 – 3000

e. \_\_\_ 3001 – 4000

f. \_\_\_ > 4000

1. For your most recent birth, what method of payment did you use?

a. \_\_\_NHIS

b. \_\_\_Private Insurance c.\_\_\_ Cash

1. How many children do you have?

a. \_\_\_ 1

b. \_\_\_ 2

c. \_\_\_ 3

d. \_\_\_ 4

e. \_\_\_ >5

1. Do you own a car? a. \_\_\_Yes

b. \_\_\_No

1. Do you own a motorcycle? a. \_\_\_Yes

b. \_\_\_No

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* 1. Do you own a mobile phone?

1. \_\_\_Yes
2. \_\_\_No
3. Do you have a bank account? a. \_\_\_Yes

b. \_\_\_No

**Conclusion**

Now that we have concluded the interview, I would like to ask if there are any additional questions you have for me regarding this topic? Are there questions you were expecting that we did not cover today? Lastly, what other experiences and perspectives surrounding this topic would you like to share?

Thank you for your time today. Your honesty and transparency are appreciated, and we will be in touch regarding the results.

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