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Women's Perception of Preeclampsia and Antenatal Care Attendance in Northwestern Nigeria

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Abstract

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MPH, Usmanu Danfodiyo University Sokoto, Nigeria, 2012

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Dissertation Submitted in Partial Fulfillment

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Abstract

Researchers have demonstrated a significant relationship between antenatal care (ANC) attendance and pregnant women's sociodemographic characteristics. What has not been clearly studied is the relationship between ANC attendance and pregnant women's perceptions about conditions such as preeclampsia (PE) that could affect their pregnancies. ANC could facilitate the timely management of these conditions, ultimately improving the outcomes for PE affected women. In this study the relationship between pregnant women's perceptions about PE and their ANC attendance was examined. Guided by the health belief model (HBM), the research questions were used to explore the associations between four HBM constructs (perceived susceptibility, severity, benefits, and barriers) in relation to PE as the independent variables, and compliance with ANC visits among ANC attendees in Northwestern Nigeria as the dependent variable. Two hundred and twenty-one pregnant women were selected consecutively from three health centers in the zone. A researcher-validated questionnaire was used to collect data about the study variables which were tested using multivariate logistic regression. Women who booked for ANC at 16 – 21 weeks of gestation were 8.82 times (CI: 3.72 – 20.96) more likely to achieve compliance with their visits compared to women who booked after 28 weeks of gestation. However, the association between the independent variables and ANC attendance was not statistically significant. The results from this study could guide interventions to improve ANC attendance among pregnant women, which could make it possible to detect and manage PE early, leading to a positive social change through improved health outcomes for both the mother and the baby.

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Dedication

This work is dedicated to the memory of my late father who always believed in

my ability to surmount challenges and achieve victory in all my endeavors.

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Chapter 1: Introduction to the Study

Globally, the world records an average of 830 maternal deaths daily, with the majority of these deaths occurring in low and middle-income countries, including Nigeria (World Health Organization [WHO], 2018b). Maternal mortality figures in Nigeria are estimated to be about 800 deaths for every 100,000 live births, with the highest figures recorded in the northern regions of the country (WHO, 2017). Perinatal mortality figures are not any better; even though it is suggested in the literature that there are no accurate global figures for perinatal mortality rate due to poor surveillance and documentation of stillbirth rates, individual facility-based studies indicate that perinatal mortality is high, especially in low- and medium income countries (LMIC) (U.S. Agency for International Development [USAID], n.d). In a review of institutional data from 40 middle and low-income countries by Bailey et al. (2017), a stillbirth rate as high as 116.5 per 1,000 births and early neonatal death rate of 21 per 1,000 births were reported. An important contributor to these high figures is Preeclampsia (PE); this is a disease of pregnancy that affects the wellbeing of the mother and fetus (Bilano et al., 2014).

There is evidence to show that attention has been paid to the design and implementation of strategies that are aimed at reducing these figures for both maternal and perinatal deaths (Liu et al, 2016); however, in spite of this, the decline in the rates of these preventable deaths has not reached the desired level. The Millennium Development Goals [MDG] of reducing the maternal mortality ratio (MMR) by 75% by 2015 was not achieved in many of the low-income countries that are known to significantly contribute to the high global maternal mortality figures, Nigeria included (Alkema et al., 2016).

The new Sustainable Development Goals of reducing MMR figures to only 70 deaths per 100,000 live births by 2030 is a very ambitious goal for most of these countries based upon these historical trends. For sub-Saharan Africa where Nigeria is located, a reduction in maternal mortality rate of greater than 7.5% per annum is required to reach its projected 2030 regional Sustainable Development Goals of 143 deaths per 100,000 live births (Alkema et al., 2016). With the challenge posed by this goal, an urgent call for action has been declared (Alkema et al., 2016). Whether the Sustainable Development Goals for maternal mortality reduction is achieved or not could depend on the ability to successfully implement strategies that would make pregnancy and delivery safer for women in every part of the world, but more so for countries where the mortality figures have traditionally been known to be high (Askeer et al., 2015).

Perinatal death rates are equally alarming; not having been targeted by the MDGs, stillbirths have remained high, and rates have remained virtually unchanged (Askeer et al., 2015). This has contributed significantly to the failure to achieve the MDG 4 of reducing the under-5 mortality rate by two thirds by 2015 (Askeer et al., 2015). Globally, neonatal deaths account for 45% of all under-5 deaths, and of these, preterm deliveries and other intrapartum complications are responsible for more than half the cases (Liu et al., 2016). Preterm birth is a recognized complication of PE arising from the need to expedite delivery in early onset severe PE (Allshouse et. al., 2015). The need to provide acceptable obstetric care has since been recognized as a strategy in reducing preventable stillbirth rate and perinatal mortality rate (Liu et al, 2016).

Public health specialists have pointed out the need to have a continuum of care that includes pregnancy, delivery, postpartum, and neonatal care in order to reduce maternal and perinatal deaths, especially in low resource countries where perinatal mortality figures are high (Cooper, 2015). In addition, in its document on continuity and coordination of care, the WHO emphasized the need to empower people to control their own health (WHO, 2018a). This could be achieved by supporting them in self-management of illnesses and supporting them to develop a healthier illness behavior such as antenatal care [ANC] attendance (WHO, 2018a). By focusing on at least one aspect of the continuum of care (i.e., healthier illness behavior/ANC), this research is positioned to be relevant to ongoing public health interests in maternal and perinatal health. It could provide information on the perspective of pregnant women about PE that could be used to tailor programs to the needs of women who could be affected by PE in a manner that could improve outcome for both mother and child.

The chapter is divided into a Background section on women's perceptions about PE and its adverse effects, Problem Statement section on high PE-related maternal morbidity and mortality, Purpose of the Study section, and research questions and hypotheses. It also has sections on Theoretical Framework that provides an overview of the theory that guided the conduct of this study, Nature of the Study, Definition of Terms used, Assumptions around the study, and the Significance of the Study. It ends with a summary that highlights the main points of the chapter and transitions to Chapter 2.

Background

Maternal and perinatal morbidity and mortality rates are high among LMIC. The WHO reported an MMR of 239 deaths per 100,000 live births compared to just 12 per 100,000 live births in developed countries in 2015 (WHO, 2018b). PE is an important cause of maternal and perinatal morbidity and mortality, especially in LMIC, and a major contributor to the high morbidity and mortality figures among women and children (Bilano et al., 2014). A maternal mortality rate of 1.9% was reported among women admitted with PE in a recent study in Nigeria (Adamu et al., 2018). Early identification and timely institution of appropriate care could improve the clinical outcome for both the mother and baby (WHO, 2018b; Zanette et al., 2016). One way to ensure that PE is identified early and treatment is instituted in a timely manner is for pregnant women to attend ANC clinics (WHO, 2018b).

ANC is a preventive care strategy that has the potential to save the lives of women and their unborn children if practiced appropriately (WHO, 2019a). ANC attendance allows for early identification of complications in pregnancy generally through routine monitoring of pregnancies. It also makes it possible for health care providers to detect elevated blood pressure (BP) early through BP estimation, and it facilitates further evaluation for the diagnosis of PE (WHO, 2019a). The WHO recommendations on ANC emphasized the fact that the total package of care is necessary for a positive pregnancy experience (WHO, 2016b). A positive pregnancy experience includes, but is not limited to, risk, illness, and death prevention (WHO, 2016b). In relation to PE, ANC attendance could facilitate both monitoring of response to

antihypertensive use and early detection of deteriorating disease condition that could initiate relevant cascade of events to improve control (Chaiworapongsa et al., 2014). Once pregnancy has been booked for ANC, follow up ANC visits would facilitate continued care, early PE identification and treatment, and safe delivery (WHO, 2019a).

Generally, strategies to reduce maternal morbidity and mortality have focused on strengthening the health system and improving access to quality care (WHO, 2016a). Strategies to control PE have focused more on increasing the knowledge and skill-base of care providers and boosting the capacity of health facilities to provide appropriate PE care (Askeer et al., 2015). However, it may not only be the knowledge of care providers that needs to be improved upon. Previous studies suggest that lack of knowledge among pregnant women themselves regarding PE also needs further attention and research. Mosca et al. (2012) studied knowledge about PE in a heterogeneous online community of women aged 20–35 years. They found a low level of knowledge about PE among the study population and recommended focusing on women when disseminating information about PE in the community. In another study, there was also a low level of knowledge and lack of understanding of the disease among study respondents (Carter et al., 2017). This made women in this study skeptical about management modalities taken towards them (Carter et al., 2017), especially where they were subjected to elements of care in a situation where they did not perceive themselves as being ill (see Barlow et al., 2008).

Pregnant women sometimes did not accept the severe nature of PE even when they were affected by it (East et al., 2011). This negative perception was demonstrated in some community-based studies on PE. Abubakar et al. (2018) and Khowaja et al. (2016)

reported cultural practices and perceptions as causes of delay in seeking health care for obstetric complications, including hypertensive diseases in pregnancy in their separate community-based studies. PE was not perceived as a disease in the communities studied, and women would self-medicate for headaches because they did not relate such symptom to the disease occurrence (Khowaja et al., 2016). In another study conducted among women seeking ANC in a semi urban community in the Southwestern zone of Nigeria, the author demonstrated a significant relationship between perceptions about risk of PE and health seeking behavior among the study population (Ibiezugbe, 2017). Musinguzi et al. (2018) further provided insight on the relationship between perception about disease severity and compliance with treatment for hypertension.

Alatawi et al. (2016) looked at health behavior in a group of diabetics. They found a significant association between perceived susceptibility, perceived barriers, and self-efficacy and the outcome variable. They recommended that patients' beliefs and perceptions about a disease or condition should be considered in disease interventions (Alatawi et al., 2016).

The need to understand women's perspective of PE as recommended by previous researchers (Mosca et al., 2011) makes the quest for a more generalizable insight into women's perceptions about PE and its complications timely. The information could guide the design of health education programs and other public health interventions specific to the information needs of women at risk of PE. This makes the study necessary in an environment where PE is prevalent and PE-associated maternal and perinatal mortality rates are high.

Problem Statement

PE is a multisystem disorder of pregnancy characterized by BP elevation in the second half of pregnancy (Lim & Sternberg, 2018). It is associated with maternal, fetal, and neonatal complications that could contribute to the risk of death and/or long-term morbidity. PE is one of the five major causes of maternal and perinatal morbidity and mortality worldwide (American College of Obstetricians and Gynecologists [ACOG], 2013; Magee et al., 2016). Globally, up to 76,000 women die from the disease annually, and 99% of these deaths occur in developing countries where resources are limited (Preeclampsia Foundation, 2013; WHO, 2018b). In Nigeria, a PE-related maternal mortality rate of 1.9% has been reported (Adamu et al., 2018). These mortality figures could be reduced by early disease detection and appropriate management during the antenatal period, but poor ANC attendance makes this difficult to achieve (National Population Commission [NPC] and Inner City Fund [ICF] International, 2019; WHO, 2018b).

Women's behavior towards the uptake of preventive and treatment interventions for diseases is associated with their perceived susceptibility to that disease or condition (Champion & Skinner, 2008). This has been established for conditions such as smoking, HIV, and cancer (Champion & Skinner, 2008), and has been studied for cardiovascular diseases and diabetes (Alatawi et al., 2016; Sansbury et al., 2014). It is possible that such an association between women's perceptions of PE and its related adverse outcomes and their behavior towards PE control exists, yet available literature indicates that this has not been studied. This suggests a gap in research on PE and health behavior; I attempted to

study this relationship to fill this gap. I focused specifically on women's perceptions about PE and its complications and how these perceptions relate to their PE-related health behavior.

Purpose of the Study

The purpose of this quantitative study was to explore pregnant women's perceptions about PE and its adverse outcomes and their perceived susceptibility to and severity of the disease condition, and to evaluate the relationship between these perceptions and their health behavior as measured by their ANC attendance. The dependent variable was pregnant women's compliance with ANC visits. The independent variables were women's perceptions about their susceptibility to PE, perceptions about severity of the disease, perceptions about the benefits of ANC as a control measure for the disease, and perceptions about barriers to achieving compliance with ANC attendance. The study focused on perceptions about PE and its related adverse outcomes, an area that has not been very well researched, especially in low resource settings where poor community understanding of the disease has been shown to cause delay in seeking appropriate care (Khowaja et al., 2016).

Research Questions

The outcome variable of interest was women's compliance with ANC attendance. The research questions (RQs) were:

RQ1: Is there an association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0$1: There is no association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

H_a1: There is an association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

RQ2: Is there an association between pregnant women's perceived severity of the adverse health outcomes of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0$2: There is no association between pregnant women's perceived severity of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

H_a2: There is an association between pregnant women's perceived severity of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

RQ3: Is there an association between pregnant women's perceived benefit of ANC attendance in PE control and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0$3: There is no association between pregnant women's perceived benefit of ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

H_a3: There is an association between pregnant women's perceived benefit ANC

attendance and their compliance with ANC visits in Northwestern Nigeria

controlling for maternal sociodemographic and obstetric variables.

RQ4: Is there an association between pregnant women's perceived barriers to

ANC attendance and their compliance with ANC visits in Northwestern Nigeria

controlling for maternal sociodemographic and obstetric variables?

$H_0$4: There is no association between pregnant women's perceived barriers to

ANC attendance and their compliance with ANC visits in Northwestern Nigeria

controlling for maternal sociodemographic and obstetric variables.

H_a4: There is an association between pregnant women's perceived barriers to

ANC attendance and their compliance with ANC visits in Northwestern Nigeria

controlling for maternal sociodemographic and obstetric variables.

Theoretical Framework for the Study

Understanding women's perception about PE and its complications would be best

achieved via the framework of a relevant behavioral or psychological theory (Shah et al.,

2015). The health belief model (HBM) has been used to describe health related behaviors

and why people embark on them, as well as proffer a theoretical basis for public health

interventions (Champion & Skinner, 2008). The basic tenet of this theory is that people's

action towards disease prevention and control is a function of their belief about the threat

that condition poses to them and their belief that taking action to control it would yield

benefit that outweighs any perceived impediment to their action (Champion & Skinner,

2008). The action of pregnant woman towards disease control through ANC attendance

could be better understood through the application of the HBM constructs (perceived susceptibility, perceived severity, perceived benefits, and perceived barriers) to evaluate their beliefs about PE.

I proposed in this study that women would be more disposed to complying with proffered PE control measures where they perceived themselves as being susceptible to the disease and/or where they considered it to have severe consequences on their wellbeing or that of their unborn child. I further proposed that women's compliance with ANC visits is likely to be better where they believed that there were greater benefits than there were barriers to be derived from attending these clinics. The HBM has been applied to the design and implementation of breast cancer screening and HIV prevention programs in previous research (Champion & Skinner, 2008), and it was used to guide the design and conduct of this study. A detailed description of the theory is provided in Chapter 2.

Nature of the Study

The study was a quantitative study with a cross-sectional design. The choice of research design should ideally not be rigid, it should be dictated by the nature of the research questions or research hypotheses (Kartikeyan et al, 2016). This was taken into consideration in the selection of the study design for this research. Other factors that I considered were time and available funds for the research (Creswell, 2009).

The implementation was such that every consecutive pregnant woman who presented to the antenatal clinic for routine ANC and who was at 39 weeks' gestation and above in her index pregnancy was invited to participate in the study. I chose the cut-off of

39 weeks because it aligned with the gestational age (GA) at which the last ANC visit was expected to have occurred based upon the latest WHO ANC recommendations (WHO, 2016b). I then administered the questionnaire to those who gave consent to participate. The outcome variable that was explored was compliance with ANC attendance in the course of the index pregnancy. The independent variables that were included in the study were women's perception of PE, perception about severity of the disease, perception about the benefits of complying with the control measures, and perception about barriers to achieving compliance.

The number of respondents selected from each of the study sites was estimated based on the average number of ANC bookings at the selected center in the year preceding the planned commencement of data collection. Thereafter, for each participating center, recruitment continued consecutively until the estimated minimum sample size for that center was reached. Predesigned and tested questionnaires were administered to those women who were sampled. Using the questionnaire, I assessed women's number of ANC visits in the index pregnancy, and this figure was used to assess their level of compliance (the dependent variable) with the WHO recommended number of ANC visits. The independent variable was measured using the constructs of the HBM model (Champion & Skinner, 2008), which were perceived susceptibility of PE, perceived severity of PE, perceived benefits of ANC in the control of PE, and perceived barriers to ANC visits.

Other sociodemographic and obstetric variables such as age, marital status, parity, GA at recruitment, maternal level of education, maternal income level, and their PE

status were also included in the analysis as control variables. This approach aligned with the RQs because it allowed me to study the exposure (independent) variables and the outcome (dependent) variable at once, at the same time as permitting an assessment of the association between the two sets of variables (see Setia, 2016).

Definitions of Terms

Perceived susceptibility: This refers to the belief individuals have that they could get the disease or condition. This is otherwise defined as "the subjective risk of contracting a condition" (Rosenstock, 1974, p. 330). The susceptibility construct is significantly associated with performance of preventive health behavior in studies that have used the HBM to explain individual health behavior in disease prevention (Janz & Becker, 1984).

Perceived severity: This refers to how the person perceived the seriousness of a health condition and how it would affect their health (Rosenstock, 1974). It is a subjective feeling about the medical and social consequences of the disease condition under consideration, including the negative consequences to other people that are of significance to the person (Janz & Becker, 1984).

Perceived benefits: This is a person's perception about the gains to be derived from accepting the disease-related advice. It is the person's perception about how effective an action is, or will be, in reducing the risk or seriousness of a health condition (LaMorte, 2019).

Perceived barriers: This refers to the subjective feeling about the consequences of engaging in the health behavior under consideration even in the presence of perceived

threat. They are the perceived negative outcomes of engaging in an action that could reduce the threat of the disease condition to which the person feels susceptible. These barriers include things like perceptions about pain, cost, inconvenience, time to be spent, and danger (Janz & Becker, 1984; Rosenstock, 1974).

Antenatal care (ANC): This is the care provided to pregnant women by health care providers who are trained to provide such care with the aim of achieving an optimal healthy state for the mother and fetus (WHO, 2016b). It comprises identification of risk factors for adverse pregnancy outcomes; identification, prevention, and management of emergent pregnancy-related conditions or existing maternal diseases; health education; and health promotion (WHO, 2016b).

ANC visit: This refers to the visits that pregnant women embark on to a health facility that provides ANC. ANC is relevant to the control of PE and its adverse outcomes because it facilitates screening for and early detection of the disease by routine maternal BP measurement and urine protein estimation at every ANC encounter (WHO, 2016b).

Compliance with ANC visits: Compliance is simply acting according to an order, set of rules, or request (International Compliance Association, n.d.). ANC compliance could then be defined as the ability of pregnant women to keep to their ANC visit plan. Adherence is sometimes used in the place of compliance as they are seen by some to be synonymous (Cramer, 2008). Adherence means to be persistent in an act, to steadily observe or maintain an act (Aronson, 2007). Researchers have tended to use one or the other, and for the purpose of this research, studies that have used any of the two terminologies were deemed relevant and were included in the literature review.

Compliance with ANC visits in this research refers to when a pregnant woman has achieved at least five ANC visits in the index pregnancy.

Eclampsia: This is the occurrence of tonic-clonic convulsions in women with PE. It is one of the adverse effects of PE and is a major cause of maternal and perinatal death among women, especially in developing countries (Kirk & Chatterpadhy, 2014).

End-organ dysfunction: This is a sign of any maternal organ or utero-placental dysfunction such as:

- renal insufficiency (creatinine > 90 umol/L)

- liver involvement (elevated transaminases and/or severe right upper quadrant or epigastric pain)

- neurological complications (examples include eclampsia, altered mental status, blindness, stroke, or more commonly hyperreflexia when accompanied by clonus, severe headaches when accompanied by hyperreflexia, persistent visual scotomata)

- haematological complications (thrombocytopenia, Disseminated Intravascular Coagulopathy [DIC], haemolysis)

- uteroplacental dysfunction (fetal growth restriction; International Society for the Study of Hypertension in Pregnancy, 2014))

Preeclampsia: This is a multisystem disorder characterized by new onset of elevated BP in the second half of pregnancy (WHO, 2011). It is defined as the presence of a systolic blood pressure (SBP) greater than or equal to 140 mm Hg, or a diastolic blood pressure (DBP) greater than or equal to 90 mm Hg, on two occasions at least 4

hours apart in a previously normotensive patient (ACOG, 2013). It could also be defined

as an SBP greater than or equal to 160 mm Hg or a DBP greater than or equal to 110 mm

Hg or higher (ACOG, 2013). It is defined clinically as the presence of elevated BP and

proteinuria in the second half of pregnancy (Lim & Steinberg, 2018). In the absence of

proteinuria, PE is also diagnosed when there is BP elevation with any of platelet count

equal to or less than 100,000/micro liter, deranged liver enzymes, newly developed renal

insufficiency, pulmonary oedema, or new onset visual disturbance (ACOG, 2013). For

the purpose of this research, a respondent was deemed to have PE if she had been told so

by her care providers.

PE-related adverse outcome: These are life threatening maternal/fetal

morbidities/mortality that occur as a result of PE; they include eclampsia, pulmonary

edema, acute kidney injury, hepatic failure, preterm delivery, intrauterine growth

restriction, fetal death, and neonatal death (ACOG, 2013).

Preterm delivery: This is when babies are born alive before the pregnancy has

reached 37 completed weeks (WHO, 2018c).

Maternal death: This is the death of a woman while pregnant or within 42 days of

termination of pregnancy, irrespective of the duration and site of the pregnancy and from

any cause related to or aggravated by the pregnancy or its management, but not from

accidental or incidental causes (WHO, 2018b).

Proteinuria: This refers to the presence of 300mg (or more) of protein in a 24-

hour urine sample or protein-creatinine (both measured in mg/dl) ratio of 0.3 or more

(ACOG, 2013). Where these measurements cannot be done and a decision needs to be

taken, a spot urine dipstick protein assessment could be done and a value of 2+ would be deemed relevant (International Society for the Study of Hypertension in Pregnancy, 2014). PE may, however, be diagnosed in the absence of proteinuria, in which case the presence of end-organ dysfunction would be diagnostic.

Perinatal death: This is defined as stillbirths and death of babies that occur within 1 week of delivery.

Perinatal mortality rate: This refers to number of perinatal deaths (stillbirths and early neonatal deaths) per 1,000 total births (both stillbirth and live births).

Stillbirth: According to WHO, this is the death of a fetus who weighs at least 1,000g, or who is at least 28 weeks' GA where the weight is not available (WHO, 2019b)

Assumptions

One of the assumptions of this study was that data collection across all the study sites was conducted in a uniform manner. I assumed that the health behavior of pregnant women was similar across the selected study sites. Further, data collection about the outcome variable, number of ANC visits, was done by me at the time of questionnaire administration; the respondents were asked how many visits they have had since they registered for ANC in the index pregnancy, I assumed that they recalled the number of visits correctly and that they reported this number honestly.

I also assumed that the responses of women to the questions about benefits of ANC attendance were not influenced by their perceptions or experiences about the quality of ANC at their respective sites. Perceptions about quality of care could influence both preventive (such as ANC attendance) and curative health seeking behavior; this

study was not structured to assess perceptions about quality of ANC care because this is a complex entity on its own (Hanefeld et al., 2017) and not in the scope of this research. Those perceptions could however have been present in the minds of respondents as they assessed benefits of ANC attendance, and this could result in false positive high perception score for benefit if respondents' perceptions about quality of care were positive or a false negative low perception if their perceptions about quality of care were negative. I assumed that this was not the case in this study.

Scope and Delimitations

I focused on perceptions about PE and its adverse outcome among currently pregnant women who had booked for ANC. The scope of the study was defined by the HBM, which provided the theoretical foundation for the research. The HBM is characterized by six constructs, but only four out of these were applied to this study; I did not explore cue to action and self-efficacy. Cues are sometimes not consistent, they could be just fleeting moments or nonrecurring thoughts that come and go (Champion & Skinner, 2008) and so could be difficult to measure objectively across a group of individuals because of this unstable nature. The sixth construct, self-efficacy, is the newest addition to the HBM concepts (Champion & Skinner, 2008), and it is best applied to "…preventive health actions… that were not perceived to involve complex behavior" (Champion & Skinner, 2008, p. 49).

The delimitation of this study included the fact that only pregnant women in the sampled states of the Northwestern zone of Nigeria were studied. This excluded the perceptions of pregnant women about PE in other zones of the country where PE was

also prevalent (such as the Southwestern part of the country). It was not my intention to provide an explanation for women's general ANC behavior; I focused specifically on PE. While there are other illnesses that could be prevented by ANC attendance, it is possible that women may not perceive the relevance or severity of these conditions in the same way as they would consider PE. This suggests the need for caution in the application of the study's results, especially when applying it to the design and implementation of interventions to improve ANC uptake generally.

Limitations

The use of a cross-sectional design to study behavior or lifestyle may be flawed by the fact that people may change their behavior as a result of being affected by a disease or condition; it may not measure the "true" behavior of the individual towards the variable of interest (Kartikeyan et al., 2016). For this reason, it is possible that women's perception about PE and its association with ANC attendance may have been influenced by the fact that data were collected at the end of their pregnancy when they may not particularly feel susceptible to a disease that is pregnancy related. It is possible that the behavior of the recruited pregnant women (i.e., their perceptions) may have changed at different times during the course of the pregnancy, the cross-sectional nature of the study did not permit me to measure how perceptions about the disease varied through the course of the pregnancy, and I could not determine whether this variation (if any) could have affected the respondents' ANC attendance.

The respondents were pregnant women who had come for their routine ANC visit and who did not necessarily have PE in the index pregnancy. Although perceptions about

illnesses have been studied in the context of disease existence, illness perceptions could also influence health behavior even in the absence of a diagnosed health condition (Rau and Williams, 2013); in the case of this research it was not known whether the behavior of pregnant women (ANC attendance) or their perception of the disease and its complications would have been different if they had the disease. The number of women who reportedly had PE among the study population was very small to allow for any subgroup analyses as this could have provided the opportunity to explore any significant difference in the outcome variable between women with and women without PE in the course of the index pregnancy. Further research on the topic with a focus on women with PE could address this limitation.

Significance

This study provided information about the extent that women perceived themselves as being susceptible to PE and some of its adverse effects and how this related to their health behavior towards disease control. Pregnant women have the potential to contribute to favorable pregnancy outcomes through positive behavior change (Hjelm et al., 2018). A study about pregnant women's PE-related beliefs could provide information to guide the design and implementation of PE-specific public health interventions that could positively impact their behavior towards the disease. The risk of adverse outcome from PE could be reduced through the wider range of approaches to PE control such as increased number of ANC visits, which this study has the potential to provide. This could lead to better disease outcomes for women affected by PE, resulting

in a healthier population of mothers who would then be in a position to positively impact the lives of their children and family.

Summary

This chapter included an introduction to this study. PE is a major cause of maternal and perinatal morbidity and mortality, and previous efforts have focused on improving facility care delivery and updating provider knowledge and practice of PE prevention and treatment; there has been very little involvement of the women themselves. There is the need to concentrate on women's role in the prevention of this disease. In this study I assessed the perceptions of women about the disease severity and their perceived susceptibility to it and also investigated how these two relate to pregnant women's preventive behavior towards PE. Chapter 2 reviews the literature about PE, its prevention and treatment modalities, pathogenesis of the disease, and associated adverse health outcomes. The chapter provides an insight into what has been done so far in the field of research on pregnant women's health seeking behavior in general and in relation to PE in particular.

Chapter 2: Literature Review

PE is a condition of pregnancy that has maternal and fetal implications, and it is an important cause of maternal and perinatal morbidity and mortality (Townsend et al., 2016). If not properly managed it could lead to adverse maternal effects such as eclampsia, liver failure, stroke, and maternal death. It could also lead to perinatal effects such as intrauterine growth restriction, preterm delivery and prematurity, stillbirth, and early neonatal death (Zanette et al., 2016).

Controlling PE and its complications would require an early prenatal screening for the disease, appropriate diagnosis and treatment, and timely referral (WHO, 2019a). Public health attention has focused on providing life-saving drugs for PE care and improving care provider knowledge and practice about PE (Chowfla et al., 2018). Studies have been conducted and resources have been expended on developing guidelines for PE care, as well as for exploring care provider knowledge and practice of these guidelines in the management of PE (ACOG, 2013; Hoesing, 2016; WHO, 2011). Apart from this approach that is aimed at achieving control of symptoms, a preventive approach could also be instituted where women at risk of the disease or those with mild disease are identified early and care instituted in a timely manner during the antenatal period (Dowswell et al., 2015). This approach could effectively reduce the risk of PE-associated complications, and it could be achieved by pregnant women using ANC services (Kirk & Chattopadhyay, 2015).

ANC is the package of care that is given to pregnant women during pregnancy with the aim of ensuring optimal maternal and fetal outcome (NPC [Nigeria] and ICF

International, 2019). By its nature, ANC has the potential to facilitate early detection and timely treatment of PE, and to prevent the occurrence of PE-related adverse maternal and perinatal outcomes when implemented correctly (Kanyangarara et al., 2017). ANC attendance has been shown to be poor in most LMIC countries where PE is also prevalent. Maternal sociodemographic factors such as low educational level of mother and/or husband, multiparity, and rural residence are important predictors of these poor rates (NPC and ICF International, 2019; Tiruaynet & Muchie, 2019).

Previous studies have also shown that poor ANC utilization is associated with negative perception about its quality and the attitude of health providers at the sites of ANC provision (Chaurasiya et al., 2019). These studies did not examine ANC use and its association with other psychological factors such as perceptions about pregnancy related illnesses in the antenatal period (Chaurasiya et al., 2019; NPC and ICF International, 2019; Tiruaynet & Muchie, 2019). An individual's perception about their susceptibility to a disease or condition and its severity are closely associated with their personal health behavior towards the disease (Champion & Skinner, 2008). By extension, I questioned in this study whether women's perceptions about their susceptibility to the risk of PE and its adverse outcomes may be associated with their ANC attendance as an important preventive health behavior. For this reason, focusing on the women themselves, their perceptions, and their health behavior could serve as a potential avenue for reducing morbidity and mortality rates from PE. Similar to what has been demonstrated for other disease conditions, having the right perception about PE and its adverse effects among

pregnant women could move them towards positive action such as booking for and using

ANC in PE control (see Champion & Skinner, 2008).

Designing disease specific health education interventions tailored to the needs of

PE affected women could be more effective if it was based on knowledge of their beliefs

about the condition and how it could adversely affect their health. Although available

literature indicates that research has been conducted on disease perception and health

behavior in relation to HIV, cancer screening and prevention, TB control, hypertension,

and diabetes, among others (Alatawi et al., 2016), there is a paucity of data on women's

perceptions about PE as it relates to their ANC attendance. Also, previous studies on

women's perception of PE and its complications have been qualitative in nature (with

limited generalizability) and mainly conducted among a heterogeneous study population

(East et al., 2011; Mosca et al., 2012).

In the present study, I tried to fill the knowledge gap in the literature about

women's perception of PE by extending the horizon to include their perceptions about the

adverse outcomes that could result from it such as its perceived effect on their fetuses. I

also explored the relationship between these perceptions and women's behavior towards

ANC. Such information could guide the design and implementation of a woman- and PE-

specific public health intervention.

Interventions targeted at PE-affected women and those at risk should consider

women's values in their design and implementation, not only in relation to

antihypertensive medication but also in relation to other preventive services such as ANC

(Magee & von Dadelszen, 2018). This has the potential to address the high rate of PE-

related maternal and perinatal morbidity and mortality found amongst women affected by PE in a low-resource setting like Nigeria. The HBM was used to provide the theoretical foundation for this study and it guided the selection of study variables. This chapter provides insight into the literature search strategy, an overview of the chosen theory as it related to the study variables, and an overview of PE and the concepts applied to this research. I also reviewed the literature on ANC, its practice, and its relevance to maternal health generally and PE care in particular. At the end of the chapter I provide a summary of the discussion.

Literature Search Strategy

The databases I searched included Pub Med, CINAHL & MEDLINE Combined Search, Proquest, and MEDLINE with full text. The search words I used included *preeclampsia* and *antenatal care*. These were cross-referenced with *determinants, epidemiology, perceptions of, risk factors*, and *utilization*. The use of the search term *women's perceptions* in combination with *preeclampsia* did not yield results in at least two of the databases. The search was limited to publications between January, 2014, and December, 2019, initially, though I used literature extending to 2021 to support Chapter 5. Literature on the HBM, the guiding theory for this research, extended outside these periods.

The sources of literature were peer reviewed journals, government documents (such as WHO publications), and dissertations in the Walden Library that were within the 5-year frame. Occasionally I used abstracts where the full text to an article was not available, but these were used sparingly.

Theoretical Foundation

Theoretical framework in any proposed research provides not only the foundation for understanding the concepts used in that research, but also gives insight into how the dependent variable relates with the independent variables (Creswell, 2009; Frankfort-Nachmias & Nachmias, 2008). In addition, it provides a reference point for the interpretation of the findings from research (Glanz & Bishop, 2010). I used the HBM to guide this research.

The Health Belief Model

The HBM has been used extensively to explain health behavior change and to guide the implementation of health behavior related interventions (Champion & Skinner, 2008). The HBM is one of the oldest models of behavior change theories, and it has its origin in the 1950s in the United States where it was used to explain behavior towards prevention and disease detection interventions and peoples' response to symptoms, diagnosis, and treatment of disease conditions (Rosenstock, 1974). It started as a psychological theory but evolved gradually into the field of health in response to public health concerns (Glanz & Bishop, 2013). Today the HBM is considered one of the most widely recognized theories in the field of public health (Champion & Skinner, 2008).

Six constructs, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy, are included in this theory (Champion & Skinner, 2008). The first four constructs were originally the constructs in the model while the fifth and sixth were later additions (LaMorte, 2019). These six constructs

together explain people's behavior to health-related issues and why they would act to prevent, to screen, or to control illness conditions (Champion & Skinner, 2008).

Perceived Susceptibility

Perceived susceptibility refers to the belief individuals have that they could get the disease or condition. This is otherwise defined as "the subjective risk of contracting a condition" (Rosenstock, 1974, p. 330). For example, in relation to this study, this construct referred to the belief of pregnant women that they could develop PE. Because belief is subjective, individuals can have varying levels of perceptions about their susceptibility, with some completely denying the possibility of contracting a condition and others believing that they are in grave danger of contracting it (Rosenstock, 1974). The susceptibility construct is significantly associated with performance of preventive health behavior in studies that have used the HBM to explain individual health behavior in disease prevention (Janz & Becker, 1984).

Perceived Severity

Perceived severity refers to how the person perceived the seriousness of a health condition and how it would affect their health (Rosenstock, 1974). It is a subjective feeling about the consequences, both medical and social, of the disease condition under consideration, including the negative consequences to other people that are of significance to the person (Janz & Becker, 1984). Pregnant women may not only consider severity of PE as it relates to them specifically, but also how the disease could affect their unborn child. Perceived severity is significantly associated with preventive health behavior, although not as strongly so as perceived susceptibility (Janz & Becker, 1984).

Perceived Benefits

Perceived benefits is a person's perception about the gains to be derived from accepting the disease-related advice. It is the person's perception about how effective an action is or will be in reducing the risk or seriousness of a health condition (LaMorte, 2019). Where there is perceived susceptibility to, and severity about a disease, the action of an individual will depend on whether they perceived the health-related behavior change to be beneficial in reducing the undesired effect of that disease condition or not (Janz & Becker, 1984). What this implies is that health behavior change will not necessarily occur simply because a person perceived themselves as being at risk of a health condition, the person must also perceive the recommended behavior change to be effective in mitigating the perceived threat for them to act in the desired manner (Janz & Becker, 1984). Pregnant women may not necessarily comply with ANC appointments just because of their perceived susceptibility or severity of PE and its adverse outcome, they must believe that complying with their visits will reduce the perceived risk. Studies that have used the HBM to explain health behavior show that this construct is more significant in explaining sick role behavior than preventive health behavior (Janz & Becker, 1984).

Perceived Barriers

Perceived barrier refers to the subjective feeling about the consequences of engaging in the health behavior under consideration even in the presence of perceived threat. They are the perceived negative outcomes of engaging in an action that could reduce the threat of the disease condition to which the person feels susceptible. These

barriers include things like perceptions about pain, cost, inconvenience, time to be spent,

and danger (Janz & Becker, 1984; Rosenstock, 1974). Where a pregnant woman believes

that by accepting to comply with her ANC appointments she might incur undesired

transport fare expenses she may choose not to comply even when she believed she could

be at risk of PE and its adverse outcomes.

Cues to Action

Cues to action is the fifth construct and it refers to the triggers for behavior

change; the factors that potentiate the occurrence of the behavior change. These include

environmental events or bodily events (Champion & Skinner, 2008). This construct is

considered to be rather inconsistent and sometimes nonrecurring; it is not consistently

measured in HBM-based research (Champion & Skinner, 2008).

Self-Efficacy

Badura (1997) defined this as "the conviction that one can successfully execute

the behavior required to produce the outcomes" (Badura, 1997 in Champion & Skinner,

2008, p. 49). It was a later addition to the HBM model and it is considered to be

necessary for health behaviors that are complex. Since most of the health-related actions

that the model was applied to were preventive behaviors that were considered to be

simple the concept did not feature in HBM model applications (Champion & Skinner,

2008).

Apart from the six constructs, there are other variables that are important to the

applicability of the HBM. It is believed that sociodemographic variables such as age,

marital status, and education could modulate a person's perceptions of a disease

condition and/or its severe outcome, the benefits of the desired behavior change versus the barriers to achieving this, and their ability to achieve the behavior change (Lee et al., 2015). These other sociodemographic factors are seen as indirect influencers of behavior change (Janz & Becker, 1984). Also, the knowledge of mothers about the adverse outcomes of PE could be relevant to the full understanding of the independent variables (IDV) in this study because the first two constructs, that is susceptibility and severity, are believed to be dependent on knowledge (Rosenstock, 1974).

Analysis of Health Belief Model Application in Previous Studies

The HBM has been applied widely to research on disease prevention/control and illness medication. HBM has been applied to the understanding of breast and cervical cancer screening (Pap smear) behaviors, and mammography (Daryani et al., 2016; Lee et al., 2015; Nahidi et al., 2017; W. Wang et al., 2014). It has even been applied to preventive behaviors against infections and treatment related behavior such as adherence to medication (Alatawi et al., 2016; Vadhariya & Sansgiri, 2015). These authors have reported significant associations though of varying strength between the performance of the desired health behavior and the different constructs of the model, with perceived susceptibility being the most consistent as a predictor of behavior compared to the other constructs (Alatawi et al., 2016; Nahidi et al., 2017; Vadhariya & Sansgiri, 2015).

In their study on breast cancer screening behavior among Korean women who had migrated to the United States, Lee et al. (2015) looked at the six constructs of HBM as explanatory variables to the respondents' behavior in relation to breast cancer screening. The researchers controlled for the influence of sociodemographic variables such as age,

marital status, level of education, immigration status, and health accessibility factors.

They used a 40-item HBM questionnaire and a one-on-one interview with respondents.

The researchers demonstrated the applicability of the HBM in explaining women's breast

cancer behavior. They further demonstrated a direct relationship between clinical breast

examination and respondents' perceived susceptibility to breast cancer, as well as

demonstrating an inverse relationship between the odds of having a mammogram and

perceived barriers to accessing the service (Lee et al, 2015).

As has been mentioned earlier, the application of HBM is not restricted to

providing explanations about peoples' health related behavior alone (Champion &

Skinner, 2008); it has been used to guide the design and implementation of interventions

as well. Nahidi et al. (2017) used the HBM to design training on breast self-examination

(BSE) among women in Iran. Their intervention focused on susceptibility, severity, and

barrier constructs of the HBM in the design of the intervention because these were the

constructs that were demonstrated to best explain breast cancer related behavior in a

previous study (Lee et al., 2015). They reported a significant association between

perceived susceptibility and improved performance of the preventive health behavior post

intervention (Nahidi et al., 2017).

Rationale for the Choice of Health Belief Model for this Research

The HBM was selected to give theoretical backing for this research because it is a

suitable model to use when one seeks to understand an individual's beliefs about a

disease or condition, especially where the preventive rather than the treatment aspect of

the condition is the point of interest (Rosenstock, 1974). The HBM has been applied by

researchers seeking to understand health behavior for conditions ranging from infections to more chronic health conditions (Alatawi e al., 2016; Lee et al., 2015; Vadhariya & Sansgiri, 2015). It has also been used to guide the design and implementation of interventions to change health behavior (Glanz, 2001; Nahidi et al., 2017; Shojaei et al., 2016). With its successful application in these contexts, it was hoped that the HBM would explain women's ANC attendance behavior as a preventive health behavior in relation to PE and its adverse effects. PE is an important contributor to maternal and perinatal morbidity/mortality and studies have suggested that ANC attendance has the potential to reduce the risk of occurrence of these adverse outcomes. Low ANC attendance in these PE prevalent areas makes ANC attendance behavior a useful target for interventions to bring about positive social change. Since knowledge of the important predictors of ANC behavior (apart from sociodemographic variables) could be beneficial to the design of these interventions, the HBM becomes suitable to the proposed research because it could explain ANC behavior among pregnant women especially in relation to PE.

Health Belief Model and the Study Research Questions

The HBM has been applied extensively to the understanding of people's behavior, and evidence supports its performance in explaining health behavior towards disease conditions (Champion & skinner, 2008). Each of the constructs has been shown to effectively predict health behavior. Perceived barrier has been shown across various studies to be the most powerful predictor of people's health behavior especially the sick role behavior, while perceived susceptibility is shown to be a better predictor of

preventive health behavior (LaMorte, 2019). In relation to this research, I used the HBM

constructs as the independent variables that explained the dependent variable (i.e.

compliance with ANC attendance). The theory is founded on two concepts, the desire for

an individual to avoid an illness or to get well when an illness already exists, and the

belief that taking the recommended action would lead to achieving these desired effects

of prevention or treatment (Janz & Becker, 1984).

ANC attendance has been shown to be significantly associated with pregnancy-

related health behavior and pregnancy outcome for women who access it (WHO, 2016b).

It has been studied in relation to anemia prevalence and prevention in pregnancy (Ikeanyi

& Ibrahim, 2015; Nonterah et al., 2019), as well as in relation to awareness of danger

signs in pregnancy (Liben et al., 2019). In relation to PE, ANC attendance is believed to

provide an opportunity for early identification of, and early institution of treatment for the

disease; both of these actions could prevent worsening of disease condition and the

occurrence of adverse outcome (Kirk & Chattopadhyay, 2015).

According to the HBM, a person's decision to embark on a health-related action

to prevent or treat a disease condition is determined by the person's perceived

susceptibility to the condition, and the belief that the consequence of contracting the

disease is severe. It also depends on their belief that the benefits to be derived from

engaging in the recommended behavior outweigh the barriers to its performance

(LaMorte, 2019). ANC attendance has been shown to be poor in low resource settings

even though studies have linked ANC with PE prevention. In this research I hypothesized

that compliance with ANC attendance was related to individual beliefs about

susceptibility and severity of PE as has been demonstrated for other health conditions. The HBM was used to explore ANC attendance as a health behavior in relation to PE. Each of the selected constructs (perceptions about susceptibility, severity, benefits, and barriers) were studied as predictors of the outcome variable (i.e. ANC attendance).

The constructs of the HBM formed the basis of the study's research questions and these constructs served as the explanatory variables. Similar to what other researchers had done in earlier where they used the HBM to explain health behavior or support the design of health interventions (Lee et al, 2015; McArthur et al., 2018; Nahidi et al., 2017), in this study I attempted to explain women's ANC attendance behavior in relation to PE. The outcome of the study could help to reduce the risk of occurrence of adverse outcomes from PE.

<p align="center">**Literature Review Related to Key Variables and Concepts**</p>

Preeclampsia: Overview

PE is defined as the occurrence of new onset BP elevation (i.e. hypertension) in a pregnant woman after the 20th week of gestation, with proteinuria or with the presence of features of organ involvement (Brown et al., 2018; Townsend et al., 2016). Specifically, PE is the existence of maternal BP of at least 140/90 mmHg measured on at least 2 occasions at least 4 hours apart (Lim & Steinberg, 2018).

PE is a disease of public health concern because it is responsible for maternal and perinatal deaths especially in areas that lack adequacy of resources to institute timely and effective treatment of the condition (Saleem et al., 2014). Globally 10 million women are

estimated to develop PE every year, and 76,000 pregnant women and 500,000 babies die from the disease annually (PE Foundation, 2013).

The cause of PE is not quite known (Townsend et al., 2016), but it has been shown to be associated with certain risk factors, the most consistent of which is nulliparity (Parker & Werler, 2014). Other risk factors are multiparity, extremes of maternal age, previous history of PE, change of spouse, and long inter-pregnancy interval (Parker & Werler, 2014).

Management of Preeclampsia

There is a universal agreement on the occurrence of high BP in the diagnosis of PE (Brown et al., 2018; Magee et al., 2014) but proteinuria is not universally believed to be necessary before a diagnosis is made (D'Souza & Kingdom, 2016). In addition, the absence of elevated BP itself may not exclude the diagnosis of PE as is seen in atypical cases of PE (Pettit & Brown, 2014). In diagnosing elevated BP, the diastolic BP is a more reliable estimate often because it is less sensitive to emotions and day to day stress of life (Ferreira et al., 2016). The use of BP and proteinuria to diagnose PE is sometimes considered to be too restrictive in clinical practice and for this reason the diagnosis has been expanded to include the presence of signs of end organ dysfunction (Churchill et al., 2018).

Once diagnosed, the management of PE involves BP control and institution of measures to prevent adverse maternal and fetal outcomes (Kirk & Chattopadhyay, 2015). These measures include the use of magnesium sulphate to prevent and treat fits, the use of antenatal corticosteroids to improve fetal lung maturity in the event of a preterm

delivery, and the practice of an early termination of pregnancy in severe PE for maternal

or fetal indications (Magee, et al., 2014). BP control is a necessary step in PE

management regardless of level of disease severity because it reduces the number of

cases of PE that can deteriorate to the severe form of the disease (Kirk & Chattopadhyay,

2015). Though some people believe that mild BP elevation in PE in the absence of other

signs of organ involvement does not warrant antihypertensive therapy, findings from the

control of hypertension in pregnancy study (CHIPS) suggest that this may not be entirely

so (Magee et al., 2015).

In the CHIPS study, tightly controlling BP by targeting a diastolic BP of 85mmHg

was associated with significant reduction in the incidence of severe HTN (SBP $\geqslant$

160/110 mmHg) (Magee et al., 2015). The study reported an incidence rate for severe

HTN of 40.6% among women in the less-tight-control group and 27.5% among women

in the tight-control group ($p < 0.001$) (Magee et al., 2015). Severe HTN could be

complicated by stroke, and the risk of occurrence of this complication could be

minimized by reducing the incidence of severe HTN (Kirsten et al., 2018), but PE could

also be complicated by stroke when the BP is severely elevated (ACOG, 2019). So,

although the CHIPS study focused on hypertensive diseases generally (and not PE

specifically), it would be reasonable to believe that tightly controlling the BP in PE could

be beneficial. The potential for this benefit could justify the use of antihypertensive

agents to control BP in PE even in women with the mild form of the disease (i.e. SBP $<$

160, DBP < 110 mmHg). Tight control has been shown not have any adverse effect on

the fetus or newborn (Solomon & Greene, 2015). With these findings some advocate

tight control in treating hypertension in pregnancy as this has been shown to reduce the risk of stroke from PE (Mol et al., 2016).

Elevated BP is a single factor that has been associated with the occurrence of stroke in women with hypertensive disease in pregnancy (ACOG, 2019) so once severe hypertension is detected in PE; the aim of care should be to lower the BP within hours of its detection (von Dadelszen & Magee, 2016). In severe PE intravenous drug use would seem to be the best approach for this job, but oral nifedipine has equally been shown to be effective (von Dadelszen & Magee, 2016). First line drugs in treating severe HTN in PE include intravenous hydrallazine and intravenous labetalol (ACOG, 2019). In-patient care is usually advocated in the management of severe PE in order to achieve adequate BP control (Mol et al., 2016).

The Role of Antenatal Care in Preeclampsia Care

ANC allow for early detection and effective monitoring of PE and its complication (Goldenberg et al., 2018). For this reason, ANC could be strategic to the control of PE and the prevention of adverse maternal and fetal outcomes associated with it (Brown & Garovic, 2014). Women who have had normal BP in early pregnancy could develop PE in later weeks of gestation (Townsend et al., 2016). Likewise, women who had been managed as cases of mild PE in the ANC clinic could experience a sudden rise in BP to the range of severe PE (Townsend et al., 2016). Keeping to scheduled visits for ANC is one way that both of these categories of women could be identified so that appropriate care is instituted in a timely manner (Kirk & Chattopadhyay, 2015).

The definitive treatment of PE is delivery of the placenta (Magee et al., 2014). Where a decision has been made to continue the pregnancy treatment should aim to maintain a BP level that is safe for mother and fetus (Townsend et al., 2016). In addition, the mother and fetus should be monitored for signs of disease deterioration such as maternal organ involvement and/or signs of placental dysfunction in the fetus (Townsend et al., 2016). The relevance of ANC in disease detection and the need to comply with scheduled visits for timely initiation of management cannot be overemphasized because embarking on this could prevent disease deterioration and the occurrence of adverse maternal and perinatal outcome (Goldenberg et al., 2018; Kirk & Chattopadhyay, 2015).

Maternal Outcome in Preeclampsia

PE is an obstetric condition that is associated with complications, the risk of which could be reduced significantly with proper management (Brown & Garovic, 2014). PE is a multisystem disorder that leads to damage to the endothelium with leakage of fluids to the extra vascular space; this results in reduced plasma volume and hypo perfusion of the maternal kidneys, liver, and brain, and a reduced placental function (Brown & Garovic, 2014). When appropriate care is not instituted on time, the outcome is usually unfavorable for both the mother and the baby (Zanette et al., 2016). Complications such as eclampsia, renal failure, liver failure, syndrome of haemolysis, elevated liver enzymes and low platelets, intrauterine growth restriction, low birth weight, preterm birth/prematurity, and perinatal death could occur (ACOG, 2013). Good outcome is associated with the ability to closely monitor women with PE (Brown & Garovic, 2014).

The aim of care in PE management is to improve outcome for the fetus, and minimize the risk of end organ failure and/or death for the mother (Magee et al., 2016). In the short term, simple patient information about the adverse outcome of PE on the mother has focused on four things which are convulsions or eclampsia, stroke, organ damage, and death, and to the fetus, prematurity and fetal death (PE Foundation, 2020). These six outcomes will inform the conceptualization of maternal and fetal PE-related adverse outcomes in the proposed research.

Management outcome for severe PE is usually tied to the facilities available for providing reliable inpatient monitoring of maternal and fetal condition, and post-delivery care for the baby (Brown & Garovic, 2014). Delayed diagnosis or late detection due to inadequate/nonexistent ANC service, and an inpatient care facility that could be several kilometers away, all add to the risk of poor outcome in the management of women with PE (Brown & Garovic, 2014). Outcome is usually better in high-income countries compared to LMIC, while the incidence of complication/adverse outcome is higher in LMIC countries (Goldenberg et al., 2018; Melese et al., 2019).

PE has also been shown to be a risk factor for cardiovascular disease in later life (Amaral et al., 2015). Women who have had PE have an increased risk of having systemic hypertension and diabetes (Seely et al., 2015). This suggests that preventing PE and controlling its effects is of long-term public health benefit. It also means that by presenting a platform for PE prevention and treatment, ANC has the potential to improve maternal health and reduce the risk of death from cardiovascular disease in the female population (Brown & Garovic, 2014).

Perinatal Outcome in Preeclampsia

PE contributes significantly to perinatal morbidity and mortality (Endeshaw & Berhan, 2015). PE is associated with prematurity arising from the need for early termination of pregnancy that is sometimes associated with severe disease at GA below term (Adams et al., 2014). Other adverse outcomes include small for GA babies, stillbirths, and early neonatal deaths, outcomes that have been associated with poor placental function (Brown & Garovic, 2014). Redenze et al. (2016) demonstrated a significant association between PE prevalence and the occurrence of these outcomes amongst pregnant women in their analysis of 4464 consecutive deliveries at a tertiary teaching hospital in Brazil.

Perinatal outcome in relation to PE is reported to be good where facilities for fetal monitoring and post-natal care for premature babies are adequate (Brown & Garovic, 2014). Challenges to achieving this include systemic and human resource related factors such as failure to comply with available guidelines for different reasons (Rawlins et al, 2018). To these could be added patient factor such as low perception about susceptibility and disease severity as these factors could influence positive patient behavior such as the use of ANC services (Brown & Garovic, 2014). These are issues that are commonly encountered in the care of PE affected woman in the low resource setting, and so they are issues of concern to public health practice.

Factors Associated With Poor Maternal and Perinatal Outcome in Preeclampsia Care

The role of ANC attendance in the prevention of PE and its adverse effect has been reviewed, key to achieving good coverage is not only the availability of the service but also the uptake of this service by pregnant women. Some barriers to the utilization of this service are system-, facility-, or health care provider-related (WHO, 2016b), while others are patient-related. Worldwide there is a low level of awareness about PE and an even lower perception about its severity (Brown & Garovic, 2014).

The low level of awareness about PE that is seen among women worldwide is not any different in Nigeria (Kirk & Chattopadhyay, 2015). Akeju et al. (2016) conducted a qualitative assessment of the perception of key members of the community in their study area, these included pregnant women, male decision makers, community leaders, and traditional birth attendants (TBAs). The focus of their study was perceptions about the etiology of preeclampsia/eclampsia (PE/E). They found that HTN in pregnancy was generally believed to result from stress and depressive thoughts (Akeju et al., 2016). The study revealed a low-level of knowledge and poor perception about PE and its consequences.

Women need to improve their awareness of, and responsiveness to the symptoms of PE (Brown & Garovic, 2014). Pregnant women need to have culturally relevant information about HTN in order to empower themselves to make appropriate decision about their health (Ouasmani et al., 2018). This could be achieved through improved

availability and utilization of ANC services in areas where the use of such service is poor
(Kirk & Chattopadhyay, 2015).

Antenatal Care Practice

ANC is the package of care that is given to pregnant women during pregnancy
with the aim of ensuring optimal maternal and fetal outcome (NPC and ICF International,
2019). Especially when provided by a trained person, ANC provides a platform for (1)
timely identification and prompt treatment of complications in pregnancy, (2) disease
prevention through micronutrient supplementation and immunization, (3) provision of
health messages and counseling services for pregnant women in order to promote health
and prevent disease, and (4) birth preparedness and complication readiness (NPC and ICF
International, 2019).

The process of procuring this preventive service begins with a pregnant woman
registering for the service at designated centers at an early stage in pregnancy. The WHO
recommended GA for first visit is 14 weeks (WHO, 2016b). Thereafter, regular follow up
visits are maintained as advised by the protocol observed at the particular facility. Until
the publication of the WHO document on "Recommendations on Antenatal Care for a
Positive Pregnancy Experience" (WHO, 2016b), the pattern of visit has been by either the
traditional method (also referred to as the standard method) or the focused ANC pattern
(WHO, 2016b).

In the traditional method, a pregnant woman is advised to attend clinic every four
weeks until the GA of 28 weeks, every two weeks to the GA of 36 weeks, and thereafter
every week until delivery (Oshinyemi et al., 2018). This approach involved a total of 11-

14 visits (Dowswell et al., 2015). The focused ANC approach was introduced by WHO in

the 1990s after piloting it in some selected countries (WHO, 2016b). The aim was to

provide a more personalized care directed to the specific needs of the particular woman

through the provision of less frequent, but a better woman-targeted ANC experience

(WHO, 2018d). After several years of experience with this approach, the WHO

introduced another model where the visits were more frequent than the focused care

model (WHO, 2016b). This was in response to findings about increased perinatal

mortality with the focused ANC in countries where it was adopted (Dowswell et al.,

2015). The new model which had more visits compared to the focused ANC model is

now the recommended approach as it provides the possibility of more contacts with the

pregnant woman (WHO, 2016b).

Antenatal Care Practice in Low-Resource Settings

The rate of ANC attendance in low-resource countries is poor; a rate of 24% was

reported in Zimbabwe in a secondary analysis of data conducted in sub-Saharan Africa

(Kanyangarara et al., 2017). Though Nigeria was not included in this study, the figures in

the country are not very different from those reported in the latest National Demographic

and Health Survey (NDHS) for the country (NPC & ICF International, 2019). In Nigeria

overall, 61% of reproductive aged women received ANC from a skilled provider in the 5

years preceding the latest NDHS of 2018 (NPC & ICF International, 2019). The figures

were even lower at a rate of 41% for Northwestern Nigeria where the present study was

conducted. The rates reported in that publication were found to vary significantly with

some sociodemographic variables of the respondents such as maternal level of

educational attainment, parity, age, place of residence (rural/urban), and wealth quintile (NPC & ICF International, 2019).

WHO recommends that the first visit should be by the 14th week of gestation (WHO, 2016b). The first visit, also referred to as the booking ANC visit by some, is that first visit to the ANC facility at which time the pregnant woman is registered for subsequent ANC visits. The timing of this first visit is significant to the eventual ANC experience of the pregnant woman. Studies have shown a significant relationship between first-visit timing and whether or not a pregnant woman received the six WHO recommended ANC interventions, with women who book earlier being more likely to receive more of the interventions than those who book later (Agha & Tappis, 2016). At this visit a detailed history about any previous pregnancy performances and existing medical conditions among other things, is taken from the woman (WHO, 2016b).

The practice of ANC in most LMIC has been either by the traditional or "standard" methods which involve 11- 15 visits or by the focused ANC approach that involves four visits (WHO, 2016b). The visits in the "standard" method are advised at every 4 weeks from the first visit (assumed to be in the first trimester) until 28 weeks of gestation, every 2-weekly from 28 weeks to 36 weeks of gestation, and weekly thereafter until delivery (Oshinyemi et al., 2018). In the 1990s the focused ANC model was introduced with the goal of providing a kind of care that was individualized for the pregnant woman according to her needs (WHO, 2018d). It was considered to be an evidence-based, goal directed set of actions that were individual and family centered, and that were provided by a skilled provider with an emphasis on quality rather than quantity

of visits (WHO, 2018d). This model advocated four visits during the course of the pregnancy; the first visit was within 16 weeks of gestation, or when a woman first thinks she is pregnant, the second visit was at 20-24 weeks or at least once in second trimester, the third visit was at 28-32 weeks, and the fourth visit was at 36 weeks or later (WHO, 2016b).

The focused ANC was later abandoned when it was found to be associated with higher perinatal mortality rate (Kirk & Chatterpadhy, 2015), shorter and lower quality patient time, poor client satisfaction from the reduced number of visits, and poor provider compliance with the implementation of its components (WHO, 2016b). Women's satisfaction with the reduced number of visits compared to the standard model was also low (Dowswell et al., 2015). WHO now advocates the 8-visit model; it also recognizes the need to adapt the number and content of ANC visits to local context and the individual woman herself (WHO, 2016b). In this model, the eight visits or contacts are scheduled to occur first by 12 weeks of gestation, then eight weeks later at 20 weeks and six weeks later at 26 weeks. Subsequent visits are every 4 weeks at 30 and 34 weeks, and thereafter every 2 weeks until 40 weeks (36, 38, and 40weeks of gestation) (WHO, 2016b).

Determinants of Antenatal Care Use in Low-Resource Settings

As already mentioned, ANC attendance rates are persistently low in low resource settings even though that is where ANC services are needed the most in view of the high maternal morbidity and mortality figures (Ali et al., 2018). The low rates

have led to considerable research activities into the factors that might be responsible for this.

Ali et al. (2018) conducted a study in Bangladesh to explore the relationship between maternal sociodemographic variables and ANC attendance among women who had been pregnant in the preceding 3 years before the study period. In a bivariate analysis they found a significant association between women's education, mass media exposure, administrative divisions, and wealth quintiles, and ANC attendance for all the respondents regardless of age (Ali et al., 2018). The study also showed that husbands' level of education and number of children were significant determinants of ANC attendance for the adult respondents, while place of residence and the working status of pregnant women were significant for the adolescent respondents. In a multivariate logistic regression analysis with compliance with ANC attendance as the dependent variable however, the strongest association with ANC use was recorded with the respondents' level of education, and this was so regardless of their age (Ali et al., 2018). Though very informative, this research focused only on sociodemographic variables as predictors of ANC attendance.

In another study, Islam and Masud (2018) also found a significant association between certain socioeconomic variables and respondents' compliance with the WHO recommended number of visits, and this latter was, in turn, positively associated with receiving more ANC items at each visit (Islam & Masud, 2018). More importantly the study also found that the most commonly received item of care at any ANC visit was BP measurement as this was reported by 69% of the respondents. This study (Islam &

Masud, 2018) demonstrated a significant relationship between frequency of ANC visits and the attainment of closer BP monitoring in pregnancy; BP measurement is an important strategy in the prevention of PE (Kirk & Chattopadhyay, 2015).

Coming closer home in Nigeria, Aliyu and Dahiru (2017) looked at the predictors of delayed ANC visits in Nigeria. They did a secondary analysis of the 2013 Nigeria Demographic Health Survey (NDHS) with the study population being women aged 15 – 49 years and who had been pregnant within the preceding 5 years. Their outcome of interest was the timing of initiation of ANC visits; they found that maternal education, media exposure, geopolitical zone, and place of residence (urban or rural) were the strongest predictors of the outcome variable (Aliyu & Dahiru, 2017). Compared to my study, their study was limited to assessment of the timing of initiation of ANC visits. In addition, contrary to my study where the predictors were women's perceptions, the predictors of interest in their study were limited to sociodemographic variables.

Looking at predictors of ANC use from another perspective, Fagbamigbe and Idemudia (2015) looked at barriers to utilizing ANC services in Nigeria. They analyzed the records of 2,199 women who did not receive any ANC out of 6,299 participants who had had at least one pregnancy within the preceding five years of the 2012 National HIV/AIDS and Reproductive Health Survey (NARHS Plus II). The researchers focused on sociocultural, economic, individual, and family factors as well as factors related to the ANC service provider (Fagbamigbe & Idemudia, 2015). Their findings revealed that not having money to go the clinic, distance from the facility, and lack of transport to the clinic were the most frequent reasons given by these women for not attending ANC

clinic, these were followed by facility-related reasons (Fagbamigbe & Idemudia, 2015).

Further analysis of their data indicated that eliminating the first three reasons could

improve ANC attendance by about 15% while eliminating the facility related issues could

improve coverage by about 9% (Fagbamigbe & Idemudia, 2015).

Factors associated with underutilization of ANC services in Nigeria was also

studied by Agho et al. (2018). They did a secondary analysis of the NDHS data on 20,405

women of reproductive age who had had at least one pregnancy in the 5 years preceding

the survey; their outcome variables of interest were underutilization of ANC (defined as

frequency of ANC visits of less than four) and inadequate receipt of components of ANC

(Agho et al., 2018). They found a significant association between the outcome variables

and place of residence, household income, maternal education, home delivery, and short

inter-pregnancy interval; women who lived in rural areas, or who came from low-income

families, or had not completed secondary level education, or had had a home delivery in

their last pregnancy were at greater odds of not achieving the WHO-recommended

minimum of four ANC visits (Agho et al, 2018). Being a secondary analysis, the research

was limited by the primary variables captured in the original survey instruments, the

study focused mainly on socioeconomic and obstetric factors.

In summary, a review of available literature on determinants of ANC use revealed

that the subject has been studied extensively but previous research has focused mainly on

the sociodemographic and economic factors with a few looking specifically at barriers to

utilization. However, none of the articles I reviewed looked at disease perception as a

predictor of antenatal behavior, in this study I aim to fill that gap. In addition, all the

researchers in the studies reviewed studied not-currently pregnant women in the community whose report on the number of ANC visits achieved in the last pregnancy could have been affected by their ability to correctly recall and report these events. My study chose currently pregnant women at the ANC clinics with the intention of obtaining a more accurate report on the number of ANC visits achieved.

Antenatal Care and Preeclampsia Prevention and Treatment

ANC is an essential component of PE prevention (WHO, 2016b). The first ANC visit provides an opportunity to identify those women with risk factors for PE, and to apply necessary preventive measures (including mounting a closer surveillance) to minimize the risk of occurrence. As earlier defined, PE is the appearance of new onset BP elevation after the 20th week of pregnancy (Lim & Sternberg, 2018). By this definition, the first ANC visit could be crucial in screening for, and identifying the woman who is at risk of developing PE or who has gone into pregnancy with an elevated BP (Federation Internationale de Gynecologie et d'Obstetrique/International Federation of Gynecology and Obstetrics, 2019). It is also an opportunity to record a baseline BP level against which subsequent measurements would be compared, and deteriorating clinical state identified. Federation Internationale de Gynecologie et d'Obstetrique/International Federation of Gynecology and Obstetrics (2019) recommended that all women should be screened for PE at the GA of 11 to 13 weeks.

After the first visit, subsequent ANC visits would permit monitoring of maternal BP for further identification of women with PE or more importantly, for monitory BP pattern in those who had already been diagnosed with the disease (Townsend et al.,

2016). In this manner, disease deterioration would be detected early where BP control has not been achieved. Once detected, the appropriate management modality would be instituted thereby preventing further disease deterioration and the undesired adverse maternal and perinatal outcome (Kirk & Chattopadhyay, 2015). The relevance of ANC attendance in preventing adverse outcome from mother and baby in relation to PE cannot be overemphasized. The components of ANC that are specific to PE care and the case management of other hypertensive diseases in pregnancy include urine test for protein, BP measurement, and the administration of magnesium sulphate to pregnant women who have been detected to have severe PE at ANC (Kanyangarara et al., 2017).

ANC is strategic and key to PE care (Kirk & Chattopadhyay, 2015) and this has led to a call for increased number of visits close to term in order to facilitate timely PE detection and management (Brown & Garovic, 2014). It is believed that the greater the number of visits the woman has, the higher the likelihood for a timely prevention, detection, and/or treatment of a complication, and the better the satisfaction with care (Kanyangarara et al., 2017; WHO, 2016b).

The Study Variables

The primary outcome variable (i.e., ANC attendance) in this study was measured by the number of visits rather than the content or the quality of visits. In providing PE-related ANC, the purpose is to identify women at risk or women who already have the condition so that control measures could be instituted in a timely manner (Bilano et al., 2014). The overall goal of this approach is to reduce the risk of adverse perinatal and maternal outcomes that are known to be associated with PE (Bilano et al., 2014). In this

regard, both quality and quantity are important, and these have been subjects of research

(Rawlins et al., 2018). The focus on number of visits in my research was not to ignore the

relevance of quality, but to accept the constraints posed by the resources available to me

for this study (time, funds, and human resources). Quality of care assessment is

associated with numerous challenges (Hanefeld et al., 2017) that are beyond the scope of

this study. The independent variables for this study were "perceived severity", "perceived

susceptibility", "perceived benefits", and "perceived barriers". They were selected based

on the constructs of HBM. Several other studies that have used the HBM as the

theoretical basis for their research have also used these constructs to explain individual

health behavior (change) in relation to disease prevention, self-care, or disease treatment

(Bishop et al., 2015; Heid et al., 2016). These four constructs have been studied

extensively, and they have been shown to predict individual health behavior in relation to

disease prevention or sick role model (Janz & Becker, 1984). Of all the four, perceived

severity has been shown to be the weakest predictor of behavior in HBM (LaMorte,

2019).

ANC attendance rate has been shown to vary significantly with the

sociodemographic variables of women of reproductive age, so the covariates that were

explored in my study included respondents' age, parity, and highest educational level

attained (NPC &ICF International, 2019). Older studies have reported other

sociodemographic determinants like marital status, availability and cost of ANC services,

household income, women's employment, media exposure, having a history of obstetric

complications, and cultural beliefs (Simkhada et al., 2008). Of these, marital status,

having a history of obstetric complications, employment status, and maternal income were explored in my study in addition to the independent variables mentioned above.

Summary and Conclusion

To summarize what has been presented in this chapter, PE is an important cause of both maternal and perinatal morbidity and mortality. The risk of deterioration with its associated risk for poor maternal and fetal outcome, could be minimized by compliance with ANC visits, but ANC uptake is low.

The literature reviewed indicates availability of data on the selected theoretical model, that is the HBM, and how it has been used to study health behavior in aspects of disease prevention or to inform the design and implementation of strategies for disease prevention. There is also abundant information about ANC behavior, and about sociodemographic and/or economic determinants of ANC uptake especially in geographical areas where uptake is low. Perceptions about the cause of PE have also been reported. What has not been clearly reported in the literature is how these perceptions relate with women's ANC attendance behavior.

In the present study the aim was to assess and present information on how women's perceptions relate to the pattern of ANC attendance among the respondents. This is a research area that has not been explored before now, especially in low-resource settings where PE is also prevalent. The study is set to fill this gap in research, and further provide insight into women's beliefs about PE which latter is an important contributor to poor maternal and perinatal outcome. The insight gained from this research could be used to inform the design of interventions that are based on the beliefs of

women themselves, an approach that has been shown to yield better results in behavior

change interventions. The research methods, data collection and analyses will be

explained in Chapter 3.

Chapter 3: Research Methods

PE is a disease of pregnancy that is associated with the risk of adverse maternal and fetal outcomes, making it an important cause of maternal and perinatal morbidity and mortality (Townsend et al., 2016). Better outcomes could be achieved where there is early detection and timely institution of care because these measures reduce the risk of a worsening clinical state (Kirk & Chattopadhyay, 2015). ANC provides an opportunity to interact with the pregnant woman, assess her for the risk or presence of PE, and institute prevention or treatment measures in a timely manner (Kanyangarara et al., 2017). ANC attendance rate and compliance with the recommended number of visits has been shown to be generally poor, especially in areas where PE is also prevalent (NPC [Nigeria] and ICF International, 2019). Studies on individual health behaviours have shown that acceptance of a preventive or curative health measure depends on a person's belief about the risk of contracting a health condition, and their belief about the severity of the condition (Janz & Becker, 1984).

My study was a quantitative study with cross-sectional design where I studied women's perceptions about their susceptibility to PE and its adverse outcomes. I also assessed the relationship between ANC attendance and women's perceived severity about PE, their belief about the benefits of ANC in relation to PE prevention, and their perceived barriers to attending ANC. It was a cross-sectional analytic study with one outcome, and four main predictor variables.

This chapter comprises a methodology section and sections on instrumentation and operationalization of constructs, data analysis plan, threats to validity, and ethical procedures.

Research Design and Rationale

The study was quantitative in nature and the design was cross-sectional. The choice of a research design is usually informed by the time and funds available for its conduct (Creswell, 2009; Kartikeyan et al., 2016; Kudestam & Newton, 2015). The cross-sectional design is easy to conduct, and it allows the exposure (independent) variable(s) and outcome (dependent) variable(s) to be studied at once while permitting an assessment of the association between the two sets of variables at the same time (Setia, 2016). This approach saves both time and cost (Frankfort-Nachmias & Nachmias, 2008). My chosen design aligned well with the study's RQs because both pregnant women's perceptions (the independent variable) and their compliance with ANC visits (the dependent variable) were studied at one point in time.

The Study Variables

The dependent variable in this research was pregnant women's compliance with ANC visits and the independent variables were women's perception of PE, perceptions about severity of the disease, perceptions about the benefits of ANC, and perceptions about barriers to achieving compliance with ANC attendance. The covariates that were explored included age of respondent, marital status, parity, GA at booking, maternal educational attainment, and maternal income level. These variables are presented in Table 1.

Table 1

Variables Used in the Study With Their Names, Type, and Measurement

Variable name	Variable type	Measurement
Compliance with ANC attendance (dependent variable)	Categorical	Poor compliance (0) Good compliance (1)
Perceived susceptibility	Categorical	Not perceived to be susceptible (0) perceived to be susceptible (1)
Perceived severity	Categorical	Not perceived-to be severe (0) Perceived to be severe (1)
Perceived benefits of complying with ANC visits	Categorical	Perceived benefits high (0) Perceived benefits low (1)
Perceived barriers to complying with ANC visits	Categorical	Perceived barriers low (0) Perceived barrier high (1)
Age (in years)	Categorical	<20yrs; 20-29yrs, 30-39yrs, ≥40yrs
Parity	Categorical	Primipara (1) Multipara (2) Grandmultipara
GA at booking	Discrete	<16wks, 16 – 21wks, 22-27wks, ≥28wks
Marital status	Categorical	Married Single Divorced/widowed
Level of maternal education	Categorical	No formal education (1) Completed primary education (2) Completed secondary level of education (3) Has HND/first degree and above
Maternal income	Categorical/ordinal	≤ [a]36,000 naira 37,000 - 72,000 naira 73,000 – 108,000 naira ≥109,000 naira
Had complication in previous pregnancies?	Categorical	Yes (1)/No (0)
Heard about preeclampsia?	Categorical	Yes (1)/No (0)
Know about PE?	Categorical	Yes (1)/No (0)

Note. ANC = Antenatal care; HND = Higher National Diploma

[a] Exchange rate: 360 naira to 1 US dollars

Methodology

Population

   The target population for this research was pregnant women who presented for ANC at the ANC clinics of the selected study sites (see below). The Northwestern zone of Nigeria is characterized by high maternal mortality figures, low ANC attendance rates, and high prevalence of PE and eclampsia (NPC and ICF International, 2019). The region is also characterized by low literacy level and poor contraceptive use giving rise to a high fertility rate (Adefalu et al., 2018). The total female population in the seven states put together was estimated to be about 23,981,727 in 2016 (National Bureau of Statistics, n.d) and that of women in the reproductive age (15-49 years) at 10,291,000 (NPC and ICF, 2019). The socioeconomic status of women is also generally poor in the region; 35% of the population in the area fall within the lowest wealth quintile (NPC [Nigeria] and ICF International, 2014).

Figure 1

The States of Nigeria and Their Maternal Mortality Ratio Categories

Note. Red (northeast and northwest), very high MMR; yellow (northcentral and south-south), high MMR; green (southeast and southwest), moderately high MMR. From "The midwives service scheme in Nigeria," by S. Abimbola, U., Okoli, O. Olubajo, M.J., Abdullahi, and Pate M.A., 2012, *PLoS Med 9*(5): e1001211 Copyright: © 2012 Abimbola et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Sampling and Sampling Procedures

The most valid sampling method is the random sampling technique as this gives every unit an equal chance of being selected (Creswell, 2009). Other types of probability sampling techniques include stratified, systematic, and cluster sampling for the

probability sampling methods, and convenience, quota, purposive, and snowballing for the nonprobability sampling methods (Health Knowledge, 2018). Usually a research design and/or method determines which of the techniques to use. The multistage sampling method was used in this research.

Each of the seven states in the region has at least one government-owned tertiary health facility where specialist ANC is rendered to pregnant women, including those with hypertensive disease in pregnancy. These seven states were originally three states comprising Sokoto, Kebbi and Zamfara (former Sokoto state), Jigawa and Kano (former Kano state), and Katsina and Kaduna (former Kaduna state). Site selection for this research was guided by the original division, and one state was selected from each of these three former divisions. In each selected state the tertiary health facility that had the likelihood of a higher ANC attendance rate was targeted for respondent recruitment. A total of three sites were used for this research, one each from former Sokoto State (i.e., Sokoto or Zamfara states; Kebbi State was not included in the sampling frame for reasons explained below), Kano State (i.e., Kano or Jigawa States), and Kaduna State (i.e., Kaduna or Katsina States). With this, the selected sites were Usmanu Danfodiyo University Teaching Hospital in Sokoto, Sokoto State; Turai Umaru Yar'Adua Maternity and Children Hospital Katsina in Katsina State; and Murtala Muhammad Specialist Hospital Kano in Kano state. The study population was drawn from the ANC clinic population of these selected facilities.

Respondents were pregnant women who presented to the ANC clinics of the selected health facilities for their routine ANC visit. Only women who were at 39 weeks

of gestation and above were recruited. Although I had an interest in women with PE, I did not specifically target only PE-affected women because with a PE incidence rate of 2%-3% generally (Abalos et al, 2014), limiting data collection to this category of women would require more time to achieve the intended sample size. Time constraint is an important factor to consider in study site and respondent selection (Frankfort-Nachmias & Nachmias, 2013). For this reason, all women who presented for routine ANC and who met the inclusion criteria regardless of BP status at the time of recruitment were surveyed.

The initial plan was to recruit women early in pregnancy and then administer the survey tool at delivery when they would have completed all the intended ANC visits; it was also the plan to retrieve actual number of ANC visits achieved by respondents from their ANC records. However, because of ethical issues surrounding access to respondents' sensitive health information, this approach had to be modified. So women were recruited and surveyed at 39 weeks' gestation. I assumed that at this GA most women had achieved their intended number of ANC visits and that this latter was reported to me. Finally, to overcome the ethical dilemma of having a patient as a study respondent and the associated possibility of having a biased response, respondents were not drawn from any health facility in Kebbi state where I resided.

Inclusion and Exclusion Criteria

Women who were pregnant at the time of the survey, were at 39 weeks' gestation or above, lived within the recruitment region, and consented to participate in the study were recruited. Women who did not consent, or who had any other underlying chronic

illness (particularly chronic hypertension, diabetes, sickle-cell disease, and asthma) or anemia in the index pregnancy were excluded. This was because this category of women was more likely to have visited the hospital more frequently by virtue of their conditions, including them could threaten the validity of our results by giving a false positive finding of good compliance with ANC visits. The external validity of the research finding could also be affected by including them for the same reason.

Sample Size Estimation

Sample size for this study was determined by the use of G*power with some assumptions in mind (Gunnarsson, 2019). These assumptions were:

1. That 50% of pregnant women in the population had a good perception about susceptibility to (i.e. perceived susceptibility was high), or severity of the adverse outcomes of PE

2. That there is a 50% probability of compliance with ANC when perception was positive (i.e. Pr $(Y = 1|X = 1)$ H1 = 0.5)

3. That there was a 30% probability of compliance with ANC when perception was poor (i.e. Pr $(Y = 1|X = 1)$ HO = 0.3)

4. That if there was a significant relationship between the independent variables and the dependent variable (ANC visit compliance) we would prove that at 0.05 significance level or *p* value of 0.05 (alpha level = 0.05), and that there was an 80% probability of achieving this *p* value (power = 0.8)

With these assumptions considered, the sample size was calculated using the

G*Power software (Faul et al., 2009) and a figure of 199 was arrived at as illustrated

below:

z tests: **-**	Logistic regression
Options:	Large sample z-Test, Demidenko (2007) with varcorr
Analysis:	A priori: Compute required sample size
Input:	Tail(s) = Two
Odds ratio	= 2.3333333
Pr(Y=1|X=1) H0	= 0.3
α err prob	= 0.05
Power (1-β err prob)	= 0.8
R^2 other X	= 0
X distribution	= Binomial
X parm π	= 0.6
Output:	Critical z = 1.9599640
Total sample size	= 199
Actual power	= 0.8002130

The estimated sample size was 199; 221 women were surveyed across the three study

sites.

Sampling Frame and Sample Size per Study Site:

Information about the number of new ANC registrations made in the preceding

year (i.e. 2020) was sought from each of the three sites. The figures were three thousand

three hundred and fifty (3,350), three thousand eight hundred and fifty (3,850), and

thirteen thousand five hundred and eight (13,508) in Katsina, Sokoto, and Kano

respectively. The sampling frame was 20,218; with a sample size of about 200, the

sampling fraction was calculated to be about 0.01. Using this latter as a guide, 43, 50, and

128 women were recruited in Katsina (Facility A), Sokoto (Facility B), and Kano

(Facility C) respectively giving a total of 221 respondents.

Procedures for Recruitment, Participation, and Data Collection

Women were surveyed at the ANC clinics of the respective study facilities. At

each of the clinics, official access to the ANC nursing staff was gained through the

respective nurses-in-charge during which time I introduced myself and the purpose of the

research. I also provided a brief overview of the data collection method and explained the

prepared announcement that was to be read to ANC attendees prior to questionnaire

administration. I emphasized to the nurses-in-charge that the content of the

announcement be kept as prepared since there was the need for uniformity across the

three study sites. A suitable room for the questionnaire administration was identified in

each of the facilities and this was assigned to me for the duration of the data collection

period.

At the beginning of each data collection session on an ANC day, the

announcement (prepared by me, Appendix A) was read out by one of the nurses under the

instruction of the most senior nurse on duty. This announcement was made at the

completion of the health talk administered to the pregnant women as was routinely done

at every ANC visit in all the sites surveyed. Women who were interested in participating

and who were at 39 weeks (announced as nine months' gestation for the sake of

simplicity and clarity) were shown to the room where I was waiting. As they entered one

at a time, I sought the consent of each intending respondent, explaining the purpose of the

study at the same time as emphasizing on confidentiality. They were informed that they could withdraw from the study at any time before completion if they wanted to, and that doing so would not in any way deny them the care they were supposed to receive. Respondent eligibility was also confirmed before each questionnaire administration. Once consent was provided and eligibility was confirmed, data was collected using the validated questionnaire. This was the procedure observed in all the study sites.

Instrumentation and Operationalization of Constructs

The Research Instrument

The instrument that was used for data collection was a structured questionnaire (see appendix B) that was developed from a comprehensive review of relevant literature and data collection tools used by other researchers in similar studies (see Smedley et al., 2014). It had three sections; the first two consisted of structured questions that assessed the demographic and clinical variables of the respondents (the covariates) including questions to ascertain the number of ANC visits achieved. The third section contained questions about the independent variables. Demographic and clinical variables included respondents' age, marital status, parity, level of education, and maternal income (i.e. the covariates).

Each of the independent variables (IDVs) was explored by a number of questions, with responses being agreement or disagreement with the statements made on a Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). The questionnaire focused on perceived susceptibility to PE and its adverse effects, perceived severity of PE and its adverse outcome, perceived benefits of attending ANC, and perceived barriers to

achieving the desired number of ANC visits (see McArthur et al., 2018). Deciding on the

number of items to form the composite scale for each perception construct was arrived at

on the consideration of a balance between having enough items to reasonably explore the

constructs at the same time as avoiding having too many items as this could overburden

the respondents (Fern et al., 2015).

The items in the questionnaire were derived from similar studies on PE or other

studies that had used the HBM model in their questionnaire construction (Abraham &

Sheeran, 2007; McArthur et al., 2018). The use of an already validated questionnaire

regarding the research topic would have been the ideal thing since such a tool would have

been more reliable (Kudestan & Newton, 2015), but literature search did not reveal any

such tool in the proposed research area or study population. Both the mother and fetus

were taken in to consideration in the design of the scale.

Validating the Questionnaire

This was done in five main steps which were (1) establishing face, content, and

construct validity, and consensual validation, (2) running a pilot test, (3) cleaning the data

collected, (4) checking for internal consistency using Cronbach's alpha, and (5) revising

the questionnaire (mTab, 2018).

The questionnaire was constructed in English and was sent to one Obstetrician,

one Obstetrician/Public health expert, and one Public health physician all of whom went

through it to provide a test of face and content validity (see Goforth, 2015). Issues of

content and structure were addressed; questions that did not seem relevant to the research

topic were removed, questions that appeared confusing were re-phrased, the sequence of

other questions was reviewed. They also raised observations on the content and number of Likert scale items; one item in the "benefit" scale (I believe that if I attended ANC regularly I will not develop PE) was removed on the advice of one of the reviewers because the statement was considered technically incorrect. The total number of items in the Likert scales for the four constructs were also reduced from a total of 35 items to 22. Further revision edited out ambiguous questions, words that appeared offensive, and questions that were merely duplication of others. Double barrelled questions or statements were rephrased; for example, the statement "most of the health workers are males and I do not want to be seen by a male health worker when I attend ANC" was edited to read "I do not want to be seen by a male health worker when I attend ANC"

Hausa language is the predominant language spoken by the majority of the women in the geographical area where the study was conducted, a linguist was engaged to translate the questionnaire to Hausa (see Lee et al., 2015 and Adefalu et al., 2018).

Piloting and Revising the Questionnaire

Once face and content validity were established, the questionnaire was piloted on a selection of 20 pregnant women who had met the inclusion criteria but were from a site that had not been selected for the study; they were not included in the final study (Lee et al., 2015). The aim was to test the appropriateness of the content, and the reliability of the data collection tool. The sequence of events leading to the actual questionnaire administration was also tested. Data were collected over a two-day period that coincided with the ANC clinic days of the facility that was used for the pilot. Questionnaire administration for each of the respondents was done over 15 minutes.

The data generated from this pilot study were used to test the reliability of the Likert scale using the Cronbach's alpha; a value of .7 and above was considered acceptable though some authors have accepted .6 (Nahidi et al., 2017). Report on the findings from the pilot survey is presented in Chapter 4. The questionnaire was then revised accordingly in preparation for the conduct of the actual study.

Operationalization of Study Constructs

When operationalizing HBM constructs it is recommended that multiple items be used to explore each construct (Abraham & Sheeran, 2007), so the variables in the study were operationalized by questionnaire items (Janz & Becker, 1984). Sociodemographic variables (the covariates) were measured by responses to the questions in the first section of the questionnaire. They were descriptive questions and they were measured as discrete (age, GA at booking), or categorical values (level of education, marital status, maternal income level).

Measuring the Dependent Variable

The dependent variable, "women's compliance with their ANC attendance" or how many times they visited the hospital for ANC, was measured on the basis of WHO's recommendation of eight visits (WHO, 2016b). It was measured by asking the respondents to report on the number of ANC visits they had in the course of the index pregnancy. It was projected that, depending on the GA at booking (i.e. the first visit at which they registered for ANC), pregnant women should be able to achieve at least five visits from the first visit to the time of delivery if they booked early for ANC.

Data were collected as discrete values (1, 2, 3, … and so on) that were then used

to create a code that had dichotomous responses for the dependent variable "compliance

with ANC visits".

In measuring ANC use, researchers elsewhere have used the earlier WHO

recommendation of four ANC visits to define adequacy of ANC visits and from this they

have referred to women with fewer than four visits as not having achieved the desired

number and were coded as '0', and women who had visited four or more times as having

achieved ANC and were coded as '1' (Chaurasiya et al., 2019). This approach was

applied to the conduct of my study with a little modification; women with 1 – 4 visits

were considered not to have achieved the recommended visits and were coded as "0"

while those with visits of 5 and above were deemed to have achieved it and were coded

as "1"; this choice was guided by the 2016 WHO document referred to above (WO,

2016b).

The Independent Variables

These were operationalized through questions that were used to assess

respondents' belief about the variable. Before administering these questions, respondents'

awareness and knowledge of PE was assessed and a brief explanation about PE, its mode

of presentation, and its common maternal and fetal adverse effects were provided to each

respondent. Then, in order to assess respondents' perceptions, they were requested to use

that information to respond to the questions in the survey (see McArthur et al., 2018). PE

was defined as the occurrence of elevated BP in a pregnant woman from the GA of 20

weeks and above; in my study, PE related adverse outcomes were defined as the

occurrence of fits, death of the mother during pregnancy or at the end of it, and/or death of the fetus in-utero or just after delivery

Previous studies that have used the HBM in either explaining a health behavior towards a disease condition, or in providing a foundation for the design of interventions to change behavior have measured the HBM constructs on the Likert scale (Lee et al., 2015; Nahidi et al., 2017). This may be because of the belief that the constructs of the HBM could differ among individuals; while some individuals may consider themselves as completely not susceptibility to a condition (and so strongly disagree with a suggestion about the disease), others may consider themselves in grave danger of contracting the disease (and may strongly agree) (Rosenstock, 1974). Based on this, and on the conduct of previous studies that have used the HBM, the IDVs in my study were measured on the Likert scale (Nahidi et al., 2017). Respondents' beliefs as evidenced by their responses to the questions asked were rated on a scale of 1 to 5 where 1 and 2 indicated weaker beliefs, a rating of 3 a neutral point, and 4 and 5 stronger beliefs (McArthur et al, 2018).

Covariates

Previous studies have demonstrated a significant relationship between the number of ANC visits achieved in an index pregnancy with some sociodemographic and clinical variables such as age at the time of index pregnancy, parity, GA at registration for ANC, marital status, maternal education, and place of residence (Yaya et al., 2017). These variables were included in this study. They were measured as discrete numbers (parity and GA at ANC registration), categories (level of education, marital status, maternal income, and PE status), or continuous variables (maternal age).

Data Analysis

After collection, the data were entered into the Statistical Package for Social Scientists (SPSS) (version 21). Data analysis was preceded by data cleaning; there were no missing values to be attended to because the survey was administered by me, and I ensured that all questions were asked.

Further data preparation included computation of variables that were necessary for the analysis but which could not be assessed directly from the questionnaire; the variable "parity" was computed from the questions on "how many times had you been pregnant before?" and "how many times had you delivered before?". From this, the proportion of women in the various categories of the variable "parity" was computed. Information about GA at first ANC visit was collected as discrete data and was then categorized into four categories as shown in Table 2.

Table 2

List of Variables Recoded

Covariate	Original code	Recoded
Maternal income	1 = ⩽ N36,000	1 = ⩽N36,000
	2 = N37000 - N72000	2 = >N36,000
	3 = N73000 - N108000	
	4 = ⩾ N109000	
GA at ANC registration	Discrete values	1 = < 16 weeks
		2 = 16 – 21 weeks
		3 = 22 – 27 weeks
		4 = > 28 weeks
ANC compliance	0 = Poor compliance	1 = Poor compliance
	1 = Good compliance	2 = Good compliance

Further analysis was guided by the research questions which were:

RQ1: Is there an association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

RQ2: Is there an association between pregnant women's perceived severity of the adverse health outcomes of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

RQ3: Is there an association between pregnant women's perceived benefit of ANC attendance in PE control and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

RQ4: Is there an association between pregnant women's perceived barriers to ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

Descriptive statistics were calculated in order to explore the distribution of each variable independently, as well as its distribution within the categories of the dependent variable. For both the independent variables and the covariates bivariate analysis using chi square test was performed to explore their association with the dependent variable. I proposed to use logistic regression analysis to explore associations between each of the IDVs and the DV, and to identify the strong associates of ANC attendance while controlling for the covariates. In using logistic regression analysis, it is assumed that the predictor variables are independent of each other; where significant correlation is demonstrated between any two predictor variables one of them would normally be

dropped in order not to violate the assumption (Field, 2013). So, in my study both the independent variables and the covariates were checked for multicollinearity using the SPSS software package, there was none, so this assumption was met. However, as would be seen in chapter 4, the findings from the bivariate analysis negated the need for further logistic regression analysis for all the independent variables and for most of the covariates. All test statistics were interpreted at the 0.05 significance level. The outcome of the test of reliability depicted by the Cronbach's alpha was also reported (Wen-Li et al. 2014).

Threats to Validity

Threats to External Validity

A study is said to be valid when it is unbiased; it is a study whose design, methods, and procedures are appropriate enough to produce results that are close to the truth, and it is a study that has measured what it has set out to measure (Frankfort-Nachmias & Nachmias, 2008). The validity of a study could be threatened by various forms of bias such as misclassification that could arise from information bias, and selection bias (Szklo & Nieto, 2014).

Disparities in the definitions of PE across the study sites may result in misclassifying respondents as having PE or not. Also, failure of the care providers to pass on the information about PE status to the respondent may result in her inability to know her PE status and this may add to misclassification bias when a respondent is labeled as having PE when indeed she does not or vice versa. For example, identification of women with PE in the study was based on their response to the question on whether or not they

were told that they had high BP in the index pregnancy. For the 11 respondents who responded positively, it cannot be ascertained that it was actually PE they had or it was simply pregnancy induced hypertension since the respondents did not differentiate between the two. It is also not known whether there could have been more women with PE than the number recorded since it is possible that the care providers may not have given the information about PE status to the respondents, in which case some of the latter may even have had high BP without knowing that they did.

Misclassification is an important threat to validity because it could significantly distort the strength of the relationship between predictor and outcome variable (Szklo & Nieto, 2014). This is a limitation that should be considered in the interpretation of the results of this study.

The tendency for selection bias in this study was considered as the likelihood of erroneously oversampling a category of women with different risks for PE or different antenatal behavior. In one of the study sites, appointments for ANC visits across the days of the week were scheduled based on the parity of the attendees; all primigravidae and primiparae attended on Tuesdays, all multipara attended on Wednesday, and all grand multipara attended on Thursdays. It is possible to have oversampled a particular group based on how many women were surveyed on each of these days.

ANC attendance behavior may be different between women attending private tertiary facilities compared to public tertiary facility since the former would involve higher cost and the tendency to exclude women of low socioeconomic status. To avoid

the potential for this form of selection bias, women were sampled from government owned tertiary health facilities and no private facility was included.

Threats to Internal Validity

The outcome variable (compliance with ANC attendance) was measured by the number of ANC visits the respondent reportedly had at the time of recruitment. This information was obtained from the respondent as part of the survey questions at the time of questionnaire administration, it was therefore associated with the risk of recall bias, though the risk would have been more likely if the survey had been done after delivery or even outside the pregnancy period. The likelihood for researcher bias was minimized by developing structured data collection procedures to which I strictly adhered. Also, I conducted the data collection; this ensured a uniform questionnaire application process and a reduced risk of interviewer bias and threat to validity.

Ethical Procedures

Applications for permission to conduct the study were sent to the review committee of each of the hospitals that were selected for the study. Institutional Review Board (IRB) approval of Walden University (approval number 12-23-20-0417876) was also obtained before the pilot and main studies were conducted. At the ANC clinics of the study sites, the most senior nurse announced the purpose of the survey and the intended study population (i.e. pregnant women who were at least 39 weeks pregnant) at the end of the routine ANC health talk. I approached women who indicated interest to participate and then administered the consent form in the privacy of the room allocated for data collection. As part of the consent-seeking process, the purpose of the study was explained

to each respondent, the names of the respondents were neither requested for nor recorded, but each respondent's questionnaire was labeled by a research number purely for research purpose. Intending respondents were also informed that they could decline to respond to any question they didn't want to respond to, or even withdraw from the study even after they had consented, however none of these happened. Conflict of interest was avoided by not engaging women from the health facility where I was employed or from other facilities from within Kebbi State where I worked.

Summary

The study was cross-sectional and analytical in design. I explored the association between the respondents' perceptions about PE and related adverse feto-maternal outcomes and their ANC attendance behavior. The dependent variable was "compliance with ANC attendance" measured by the number of ANC visits achieved by the respondent in the index pregnancy. Guided by the HBM, the independent variables were participants' perceived susceptibility to and severity of PE, and perceived benefits and barriers to compliance with recommended ANC visit. Statistical analyses involved the use of chi-square test to assess the relationship between the DV and each IDV or covariate. Chi square test, and simple logistic regression analysis where applicable were used to test the research hypotheses. The outcome of the data collection and analyses is presented in the next chapter, Chapter 4.

Chapter 4: Results

This research was a quantitative cross-sectional analytic study. The main purpose was to assess the association between pregnant women's perceptions about PE and their ANC attendance in Northwestern Nigeria. The research questions for the study were:

RQ1: Is there an association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0 1$: There is no association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

$H_a 2$: There is an association between pregnant women's perceived susceptibility to PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

RQ2: Is there an association between pregnant women's perceived severity of the adverse health outcomes of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0 2$: There is no association between pregnant women's perceived severity of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

$H_a 2$: There is an association between pregnant women's perceived severity of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

RQ3: Is there an association between pregnant women's perceived benefit of ANC attendance in PE control and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0$3: There is no association between pregnant women's perceived benefit of ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

H_a3: There is an association between pregnant women's perceived benefit ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

RQ4: Is there an association between pregnant women's perceived barriers to ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

$H_0$4: There is no association between pregnant women's perceived barriers to ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

H_a4: There is an association between pregnant women's perceived barriers to ANC attendance and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables.

In this chapter the results of the data collection and analyses are presented with reference to the research questions. At the end of the chapter a summary of the research findings is provided.

The Pilot Study

Twenty women who met the inclusion criteria but were not from the intended study sites were recruited for the pilot study. The questionnaire was piloted on these women taking note of the time spent to complete the survey per person. The data generated were used to test the reliability of the Likert scale using Cronbach's alpha in the SPSS software. The reliability analysis showed that dropping the statement "I believe I would convulse if I had PE" would improve the reliability of the severity scale as the Cronbach's alpha value improved from .62 to .73, so the statement was dropped. At the conclusion of the pilot study the Cronbach's alpha values for the four scales were .97, .73, .94, and .62 for susceptibility, severity, benefits, and barriers scales respectively. The final questionnaire contained three items in each scale for the measurement of women's perceived susceptibility, severity, benefits, and barriers. The number of items retained per IDV scale also reduced the survey time per person by 3 minutes, from an average of 15 minutes to an average of 12 minutes. Considering the survey population was women in advanced pregnancy, this was considered an advantage.

Data Collection

Data collection was done using a structured questionnaire over a period of 4 weeks as permitted by the ANC schedules of the study facilities. In all three facilities, every consecutive pregnant woman who met the inclusion criteria was invited to participate. Two hundred and twenty-seven women who were at least 39 weeks pregnant consented to participate in the study but only 221 were surveyed. Six participants were excluded because two of them had Type II diabetes mellitus, two had asthma, one had

chronic hypertension, and one had just registered at the clinic as a referral from another facility. The number of respondents surveyed in each of the three facilities was proportionate to their annual ANC clinic registration; 43 were recruited from facility A, 50 recruited from facility B, and 128 women recruited from facility C. The approximate ANC registration in the preceding year were 3,350, 3,850, and 13,508 in each of facilities A, B, and C respectively.

The data collection process went according to plan; 221 women were surveyed. Fortunately, even though the respondents had been informed that they could decline to respond to any of the questions they didn't want to answer, none of the respondents declined responding to any questionnaire item so the response rate was 100%. There were no missing data, but 11 women were told they had high BP in the index pregnancy. Although the PE status of these 11 women could not be verified, they were not included in the bivariate analysis for the RQ on "perceived susceptibility to PE" ($N = 210$). Two of the respondents had been pregnant once but their pregnancies ended in miscarriage so they were included in the category of "primigravidae" for the purpose of this research. Some other variables were recoded; all respondents were married except for two who were divorced, so "marital status" was revised to read two options only which were "married" and "divorced."

Respondents were mainly young married women with high parity, low level of educational attainment, and no- or low-income status. Sixty-eight percent of them were below 30 years of age, 83.3% had delivered before, 28% had no formal education or had just primary level of education, 99% were married at the time of data collection.

This study sample can be considered an appropriate representation of the population of women who attend ANC clinic in Northwestern Nigeria because all the states in the region were considered in the process of facility selection for this study. In addition, every woman who met the study criteria in the three selected facilities was given the opportunity to participate in the study. Descriptive statistics of women in the NDHS provides helpful information to assess the representativeness of my sample (see NPC [Nigeria] and ICF International, 2019). In this latter document, data on maternal age and maternal level of education was reported to be similar to those in the present study, but the values presented in the former were not segregated by region. There were no figures for Northwestern Nigeria against which I could compare the characteristic of my study population.

Results

Descriptive Characteristics of Respondents

The demographic variables used in this study were age, marital status, educational level, and maternal income. The obstetric variables included respondents' parity including number of miscarriages, and complications in their previous pregnancies. Descriptive analysis was used to estimate the frequencies of these variables. A total of 221 women who met the eligibility criteria were surveyed and all (100%) had complete data. Sixty-two percent of the 221 respondents were in the age group of 20-29 years, 5.5% were less than 20 years, and 3.6% were more than 40 years of age. Close to 50% of respondents had completed secondary level education and 99.1% were currently married at the time of data collection; two respondents were divorced. Nearly 17% of the

respondents were pregnant for the first time ($N = 37$, 16.7%) and the rest ($N = 184$,

83.3%) had had one or more deliveries. Of those who had delivered previously, 39

(21.2%) had had one or more miscarriage(s) before. About one third (35.7%) of the 221

respondents had no source of personal income. Of those who did report personal income,

90.1% earned the equivalent to 100 U.S. dollars or less as monthly income. The

prevalence of PE according to respondents' report was low; 5% reported being told they

had high BP. Awareness of and knowledge about PE were recorded in 37.6% and 11.3%

of the respondents respectively. Table 3 provides a more detailed description of these.

Table 3

Descriptive Statistics of Demographic and Obstetric Variables (Covariates) of Study

Respondents

Variable	Number	Percentage
Age group (years) ($N = 221$)		
< 20	12	5.4
$20 - 30$	136	61.5
$31 - 40$	65	29.5
> 40	8	3.6
Educational level ($N = 221$)		
Non-formal	32	14.5
Primary level	30	13.6
Secondary level	109	49.3
Tertiary level	50	22.6
Marital status ($N = 221$)		
Divorced	2	0.9
Married	219	99.1
Parity ($N = 221$)		
Primigravida	37	16.7
Multipara	119	53.9
Grandmultipara	65	29.4
Women who have had a miscarriage before ($N = 184$)		
Yes	39	21.2
No	145	78.8

Variable	Number	Percentage
Number of previous miscarriages ($N = 39$)		
Once	26	66.7
Twice	9	23.0
3 or more times	4	10.3
Maternal income status ($N = 221$)		
Had income	142	64.3
Had no income	79	35.7
Maternal income level ($N = 142$)		
⩽36,000	130	90.1
> 36,000	12	9.9
Source of income ($N = 142$)		
Civil service	13	9.2
Hair dressing	7	4.9
Food processing	35	24.7
Tailoring	34	23.9
Trading	53	37.3
GA at booking (weeks) ($N = 221$)		
< 16	10	4.5
16 – 21	95	43.0
22 – 27	68	30.8
⩾28	48	21.7
Had complications in previous pregnancies? ($N = 221$)		
Yes	129	58.4
No	92	41.6
Nature of complications in previous pregnancies[a]		
High Blood Pressure	38	17.2
Eclampsia (convulsions in pregnancy)	8	3.6
High sugar level (Diabetes)	1	0.5
Anemia (low iron levels)	26	11.8
Preterm delivery	15	6.8
Stillbirth (baby not born alive)	20	9.0
Miscarriage	25	11.3
Others	91	41.2
Respondent has heard of PE? (awareness) ($N = 221$)		
Yes	83	37.6
No	138	62.4
Respondent knows what is PE? (knowledge) ($N = 221$)		
Yes	25	11.3
No	196	88.7

Note. [a]Multiple responses allowed.

Antenatal Care Attendance

There was an almost equal proportion of respondents who had "good compliance" (52%) as there were with "poor compliance" (48%) with ANC attendance. When asked if they had missed a scheduled visit since they registered for ANC, 19% (N = 42) of the respondents had missed at least one visit before (see Table 4).

Table 4

Descriptive Statistics of Antenatal Care Attendance of Respondents

Variable	Number	Percentage
ANC compliance ($N = 221$)		
Poor (< 5 visits)	106	48.0
Good ($\geqslant 5$ visits)	115	52.0
Missed a scheduled visit ($N = 221$)		
Yes	42	19.0
No	179	81.0
Number of scheduled visits missed ($N = 42$)		
1 visit	35	83.3
2 visits	7	17.7

Respondents Perceptions About Preeclampsia

The perception variable (independent variable) was explored under four constructs (the IDVs) which also made up the four research questions. Respondents were asked questions that were set to measure their perceived susceptibility to PE ($N = 210$), perceived severity of PE ($N = 221$), perceived benefits of ANC in relation to PE control ($N = 221$), and perceived barriers to attending ANC ($N = 221$). Their responses were measured on a Likert scale. Composite scores were also computed for each of the IDVs by calculating the mean scores for each respondent for the items measuring the IDV. The

descriptive statistics of the IDV scale items and those of the composite scores of each

IDV are presented in Tables 5 to 8.

Perceived Susceptibility to PE

For perceived susceptibility, 11 women (4.9%) were told they had elevated BP in

the current pregnancy and so were excluded from responding to questions on this domain.

The rest of the women ($N = 210$, 95.1%) responded to the statements "I believe I can

develop PE", "being pregnant makes it more likely that I will develop PE" and "I worry a

lot about getting PE". A total of 73.3% of the respondents strongly agreed (17.1%) or

agreed (56.2%) with the first statement; 70.5% either strongly agreed (21.9%) or agreed

(48.6%) with the second statement. For the third statement, 72.9% strongly agreed

(16.3%) or agreed (56.6%) that they would worry a lot about getting PE. See Table 5. A

subgroup analysis was done for the women who had high BP in the previous pregnancy;

30 (13.6%) of them responded to questions in this domain. Out of these, 76.7% of the

respondents either strongly agreed (20%) or agreed (56.7%) with the first statement about

perceived susceptibility; 66.7% strongly agreed (26.7%), or agreed (60%) with the

second statement, and 76.3% of the respondents either strongly agreed (13.3%) or agreed

(63.3%) with the third statement. The distribution of responses for the rest three IDVs for

this subgroup is reported in Table 6.

Perceived Severity of PE

For the severity variable, all 221 respondents responded to the statements "I

believe if I had PE it will be a burden on my family financially", "my life would be

danger if I developed PE" and "the life of my unborn baby would be in danger if I

developed PE". None of the respondents strongly disagreed with any of the three statements but 10% of them disagreed with the statements "I believe if I had PE it will be a burden on my family financially", 9% disagreed with "my life would be danger if I developed PE" and 7.2% disagreed with "the life of my unborn baby would be in danger if I developed PE" respectively.

Perceived Benefits of ANC Attendance

For the IDV that explored the "perceived benefits" of ANC, women responded to the statements "I believe that PE could be detected early if I attend ANC regularly", "I believe that attending ANC regularly could protect me from the complications of PE" and "I believe that attending ANC regularly could protect my unborn baby from the complications of PE". All the respondents either strongly agreed or agreed with each of the statements except one respondent (0.5%) who was undecided about the item "I believe that PE could be detected early if I attended ANC regularly" (See Table 5).

Perceived Barriers to Antenatal Care Attendance

For the IDV that explored "perceived barriers" to attending ANC, women responded to the statements "attending ANC regularly is time consuming", "my husband does not permit me to attend ANC regularly" and, "if my home is far from the health facility I will not attend ANC". While 38% of the respondents agreed with the statement that "attending ANC regularly is time consuming" only 1.4% agreed with the statement that "my husband does not permit me to attend ANC regularly" and 5.3% agreed with the statement that "if my home is far from the health facility I will not attend ANC". Husbands were not perceived as barriers to ANC attendance for 97.6% of the

respondents, and distance of their homes from the health facility was also not perceived

as a barrier for 94.8% of the respondents. See Table 5.

Table 5

Descriptive Statistics of Responses to Questionnaire Scale Items on the Independent

Variables

	Women's Responses				
Independent variable	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
Perceived susceptibility to PE (N = 210)					
1. I believe I can develop Preeclampsia	36 (17.1)	118 (56.2)	11 (5.2)	44 (21.0)	1 (0.5)
2. Being pregnant makes it more likely that I will get preeclampsia	46 (21.9)	102 (48.6)	13 (6.2)	49 (23.3)	0
3. I worry a lot about getting preeclampsia	36 (17.1)	124 (59.0)	4 (1.9)	46 (21.3)	0 (0)
Perceived severity of PE					
4. I believe that if I had PE It will be a burden on my family financially	73 (33.0)	120 (54.3)	6 (2.7)	22 (10.0)	0
5. My life would be in danger if I develop PE	81 (36.7)	115 (52.0)	5 (2.3)	20 (9.0)	0
6. The life of my unborn baby would be in danger if I develop PE	88 (39.8)	110 (49.9)	7 (3.2)	16 (7.2)	0
Perceived benefits of ANC on PE control					
7. I believe that PE could be detected early if I attend ANC regularly	97 (43.9)	122 (55.2)	1 (0.5)	1 (0.5)	0
8. I believe that attending ANC regularly could protect me from the complications of PE	82 (37.1)	139 (62.9)	0	0	0
9. I believe that attending ANC regularly could protect my unborn baby from the complications of PE	91 (41.2)	130 (58.8)	0	0	0
Perceived barriers to attending ANC					
10. Attending ANC regularly is time consuming	5 (2.4)	80 (38.1)	2 (1.0)	117 (55.7)	6 (2.9)
11. My husband does not allow me to attend ANC regularly	0	3 (1.4)	2 (1.0)	179 (85.2)	26 (12.4)
12. If my home is far from the health facility I will not attend ANC	2 (1.0)	9 (4.3)	0	197 (93.8)	2 (1.0)

Table 6

Descriptive Statistics of Responses to Questionnaire Scale Items on the Independent

Variables for Respondents who had High Blood Pressure in the Previous Pregnancy

Independent variable	Women's Responses				
	Strongly agree *N* (%)	Agree *N* (%)	Neutral *N* (%)	Disagree *N* (%)	Strongly disagree *N* (%)
Perceived susceptibility to PE (*N* = 30)					
1. I believe I can develop Preeclampsia	6 (20)	17 (56.7)	1 (3.3)	6 (20.0)	0
2. Being pregnant makes it more likely that I will get preeclampsia	8 (26.7)	12 (40.0)	2 (6.7)	8 (26.7)	0
3. I worry a lot about getting preeclampsia	4 (13.3)	19 (63.3)	1 (3.3)	6 (20.0)	0
Perceived severity of PE (*N* = 30)					
4. I believe that if I had PE It will be a burden on my family financially	11 (36.7)	18 (60)	0	1 (3.3)	0
5. My life would be in danger if I develop PE	12 (40.0)	18 (60.0)	0	0	0
6. The life of my unborn baby would be in danger if I develop PE	15 (50.0)	15 (50.0)	0	0	0
Perceived benefits of ANC on PE control (*N* = 30)					
7. I believe that PE could be detected early if I attend ANC regularly	16 (53.3)	14 (46.7)	0	0	0
8. I believe that attending ANC regularly could protect me from the complications of PE	12 (40.0)	18 (60.0)	0	0	0
9. I believe that attending ANC regularly could protect my unborn baby from the complications of PE	13 (43.3)	17 (56.4)	0	0	0
Perceived barriers to attending ANC (*N* = 30)					
10. Attending ANC regularly is time consuming	0	15 (50)	0	14 (46.7)	1 (3.3)
11. My husband does not allow me to attend ANC regularly	0	0	0	28 (93.3	2 (6.7)
12. If my home is far from the health facility I will not attend ANC	1 (3.3)	3 (10)	0	25 (83.3)	1 (3.3)

A composite score was calculated for each respondent in order to obtain the

perception of the respondent on that variable. These scores represented the overall

response (or the composite score) for the respondent on that scale (i.e. the overall

perception about that IDV). Table 7 shows the descriptive statistics of these scores where

17.1% of the respondents strongly agreed and 48.3% agreed that they perceived

themselves as being susceptible to PE while 21.8% were undecided. For the "perceived

severity" variable 35.3% strongly agreed and 50.2% agreed that PE was a severe disease

while 9.5% were undecided. Almost all the respondents (99. 5%) perceived ANC to be

beneficial in controlling PE. For the barrier scale, 59.5% of the respondents disagreed

(57.6%) or strongly disagreed (1.9%) that they had perceived barriers to ANC attendance.

Table 7

Descriptive Statistics of Respondents' Perceptions About the IDVs

Independent variable	Women's responses on the IDVs				
	Strongly agree N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)	Strongly disagree N (%)
Perceived susceptibility ($N = 210$)	36 (17.1)	102 (48.3)	46 (21.8)	27 (12.8)	0
Perceived Severity ($N = 221$)	78 (35.3)	111 (50.2)	21 (9.5)	11 (5)	0
Perceived benefits ($N = 221$)	87 (39.3)	133 (60.2)	1 (0.5)	0	0
Perceived barriers ($N = 221$)	0	1 (0.5)	89 (40.2)	126 (57)	5 (2.3)

The descriptive statistics of respondents' responses to the IDVs reported in Table

6 shows that some response categories for some of the IDVs had a small number of, or no

respondents at all (i.e. "strongly disagree" and "strongly agree" categories). With this

distribution, logistic regression analysis would yield an invalid result since many cells

may be empty or have small proportion (Field, 2013). Although it is best to use as wide a

scale as possible at the time of data collection (5-point, 7-point, or higher), data generated

in a study could be condensed to fewer categories at the level of analysis (Allen &

Seaman, 2007). Dichotomizing the responses at this stage simplifies analysis, makes

computation less complex, and saves time (Jeong & Lee, 2016). In addition, when

running comparisons and tests of associations, the contingency tables could have fewer

combinations of item responses that have zero entries thereby producing more reliable

results (Jeong & Lee, 2016). More importantly, dichotomizing multiple-point Likert scale

responses has been shown not to affect the quality of result that is generated at data

analysis; results from the 5-point scale correlated well with result from the dichotomized

scale when the two scales were applied to the same data set (Jeong & Lee, 2016). So, to

improve the quality of my result, the responses were dichotomized into two. These were

"perceived to be susceptible" "YES" for scores of 4 and 5, and "NO" for scores of 3, 2,

or 1; "perceived to be severe" "YES" for scores of 4 and 5, and "NO" for scores of 3, 2,

or 1. The others were "perceived to be beneficial" "YES" for scores of 4 and 5, and "NO"

for scores of 3, 2, or 1; and "perceived to have barriers" "YES" for scores of 4 and 5, and

"NO" for scores or 3, 2, or 1. The descriptive statistics of these dichotomized responses

for the four independent variables are reported in Table 8.

Table 8

Descriptive Statistics of Respondents' Dichotomized Responses About the IDVs

Independent variable	Yes		No	
	Number	Percentage	Number	Percentage
Perceived to be susceptible	137	65.2	73	34.8
Perceived to be severe	189	85.5	32	14.5
Perceived to be beneficial	220	99.5	1	0.5
Perceived to have barriers	90	40.7	131	59.3

The distribution of the dichotomized responses respondents who experienced high BP in their previous pregnancies is presented in Table 9.

Table 9

Descriptive Statistics of Respondents' Dichotomized Responses About the IDVs for Respondents Who Had High BP in the Previous Pregnancy

Independent variable	Yes		No	
	Number	Percentage	Number	Percentage
Perceived to be susceptible	18	60.0	12	40.3
Perceived to be severe	30	100	0	0
Perceived to be beneficial	30	100	0	0
Perceived to have barriers	15	50.0	50	50.0

Next, a chi-square analysis was performed to assess the association between each of the covariates and the outcome variable, compliance with ANC. Chi-square tests were conducted and the test values, for each variable are reported in Table 10. For the variables "marital status", "educational level" and "perceived benefits" Fischer exact test was performed because some of the cells had values that were less than 5. The analyses revealed no significant relationship between each of the covariates and the dependent variable "compliance with ANC" except GA at first ANC visit. GA at booking was significantly associated with the DV. The result is reported in Table 10 for the main study group, and in Table 11 for the subgroup analysis on the independent variables for respondents who experienced high BP in their previous pregnancies.

Table 10

Descriptive statistics of all Predictive Variables by Antenatal Care Compliance

	Compliance with ANC				
Predictive variables	Poor, N = 106 (%)	Good, N = 115, (%)	X^2	Cramer's V	p-value
Age-range (in years)					
<20	6 (5.7)	6 (5.2)			
20 – 30	61 (57.5)	75 (65.2)	1.72	.09	.65
31 – 40	34 (32.1)	31 (27)			
>40	5 (4.7)	3 (2.6)			
Parity					
Primigravida	14 (13.2)	23 (20)			
Multipara	55 (51. 9)	64 (55.6)	3.76	.13	.15
Grandmultipara	37 (34. 9)	28 (24.4)			
Marital status					
Divorced	0	2 (1.7)	2.19	.10	.23
Married	106 (100)	113 (98.3)			
Educational level					
No formal	19 (17. 9)	13 (11.3)			
Primary	17 (16)	13 (11.3)	5.45	.16	.14
Secondary	52 (49.1)	57 (49.6)			
Tertiary	18 (17)	32 (27.8)			
Income status					
Has source of income	71 (67)	71 (61.7)	.66	.06	.42
Has no source of income	35 (33)	44 (38.3)			
Income Level[a]					
≤36,000	66 (93)	64 (90.1)	.36	.05	.55
>36,000	5 (7)	7 (9. 9)			
GA at booking					
< 16	6 (5.7)	4 (3.5)			
16 – 21	30 (28.3)	65 (56.5)	29.55	.37	.00***
22 – 27	32 (30.2)	36 (31.3)			
≥28	38 (35.8)	10 (8.6)			
Awareness about PE					
Yes	39 (36.8)	44 (38.2)	.05	.02	.82
No	67 (63.2)	71 (61.8)			
Perceived susceptibility					
Low	31 (30.7)	44 (39.3)	1.31	.78	.25
High	70 (69.3)	68 (60.7)			
Perceived severity					
Low	13 (12.3)	19 (16.5)	.81	.6	.37
High	93 (87.7)	96 (83.5)			
Perceived benefits					
Low	0	1 (0.9)	.93	.67	.34
High	106 (100)	114 (99.1)			
Perceived barriers					
Low	60 (56.6)	71 (61.7)	.60	.05	.44
High	46 (43.4)	44 (38.3)			

Note. [a] N = 142

*$p < .05$. **$p < .001$. ***$p < .0001$

Table 11

Descriptive Statistics of all Independent Variables by Antenatal Care Compliance for Respondents with High Blood Pressure in Previous Pregnancy

Respondent's characteristics	Compliance with ANC		X^2	Cramer's V	p-value
	Poor, N = 16 (%)	Good, N = 14, (%)			
	Covariates				
Perceived susceptibility					
Low	5 (31.3)	7 (50.0)	1.09	.19	.46
High	11 (68.8)	7 (50.0)			
Perceived severity					
Low	0	0	-	-	-
High	16 (100)	14 (100)			
Perceived benefits					
Low	0	0	-	-	-
High	16 (100)	14 (100)			
Perceived barriers					
Low	8 (50)	7 (50)	.00	.00	1.00
High	8 (50)	7 (50)			

Note. n = 30.

Testing the Research Hypotheses

The first binary logistic regression analysis was performed to check the association between each of the covariates and the outcome variable, compliance with ANC (Table 12). Then a binary logistic analysis was performed to assess the association between each of the IDVs (except perceived benefit that did not vary between respondents) and the DV (Table 13). Multiple logistic regression analysis was not performed as earlier planned because none of the associations between each of the IDVs and the DV was significant (see Field, 2013).

Simple Binary Logistic Regression Analyses

For the covariates, this analysis showed that, apart from GA at booking, none of the covariates were significantly associated with the DV. Women who booked for ANC at less than 16 weeks were not significantly more likely to achieve compliance with ANC

visits compared to women who booked at 28 weeks or more (OR = 1.99, p = .38).

Compared to women who booked at 28 weeks or more, women who booked at 16 – 21 weeks of gestation were 8.82 times more likely (OR = 8.82, 95% CI = 3.72 – 20.92) to achieve compliance with ANC (*p* < 0.001). Also, compared to women who booked at 28 weeks' gestation or more, those who booked at 22 – 27 weeks were 4.0 times more likely (OR = 4.4, 95% CI = 1.77 – 10.97) to achieve compliance with ANC visits (*p* = 0.002).

Table 12

Simple Logistic Regression Analysis of Each of The Covariates by Compliance with Antenatal Care

Characteristics	Poor compliance v. Good compliance
	Unadjusted OR (95% CI)
Age-range (in years)	
<20	1.18 (.12 - 11.45)
20 – 30	2.68 (.45 - 15.93)
31 – 40	2.15 (.38 - 11.08)
>40	1.00[a]
Parity	
Primigravida	1.2 (.34 - 4.26)
Multipara	1.1 (.43 - 2.67)
Grandmultipara	1.00[a]
Marital status[b]	---
Divorced	---
Married	---
Educational level	
No formal	.59 (.18 - 1.87)
Primary	.42 (.14 - 1.24)
Secondary	.53 (.24 - 1.2)
Tertiary	1.00[a]
Income status	
Has source of income	.69 (.21 - 2.3)
Has no source of income	1.00[a]
Income Level	
⩽36,000	.79 (.46 - 1.38)
>36,000	1.00[a]
GA at booking	
< 16	1.99 (.43 - 9.15)
16 – 21	8.82 (3.72 - 20.92)[***]
22 – 27	3.97 (1.65 - 9.5)[**]
⩾28	1.00[a]
Had complications in previous pregnancies	
Yes	1.12 (.5 - 2.15)
No	1.00[a]
Awareness about PE	
Yes	.95 (.49 - 1.84)
No	1.00[a]

Note. 1.00[a] = reference category; [b]All respondents (except 2) were married so the variable "marital status" did not meet one of the requirements for logistic regression analysis and was therefore not subjected to this test.

[*]$p < .05$. [**]$p < .001$. [***]$p < .0001$.

Exploring the individual association between the IDVs, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, none of the variables were significantly associated with the dependent variable. Details of the statistical analyses is reported in Table 13. The perceived benefits variable was not subjected to logistic regression analysis because 99.5% of respondents perceived ANC to be beneficial, leaving only 0.5% of the respondents (N = 1) with the perception that ANC was not beneficial. With almost no variability in the distribution of respondents for this variable, the requirement of having no cell with "0" value for logistic analysis was not met and the test was not performed on this variable (Field, 2013).

Table 13

Simple Logistic Regression Analyses of Each of the Independent (Perception)Variables by Compliance with Antenatal Care

Variable	Poor compliance v. Good compliance	
	Unadjusted OR (95% CI)	*p*-value
Perceived susceptibility		
Low	1.4 (.79 - 2.47)	
High	1.00[a]	.23
Perceived severity		
Low	1.42 (.66 - 3.03)	
High	1.00[a]	.37
Perceived benefits[b]		
Low	---	
High	---	
Perceived barriers		
Low	1.24 (.72 - 2.12)	
High	1.00[a]	.44

Note. 1.00[a] = reference category, [b]All respondents (except 1) perceived ANC to be beneficial so the variable "perceived benefit" did not meet one of the requirements for logistic regression analysis and was therefore not subjected to this test.

RQ1: Is there an association between pregnant women's perceived susceptibility to the adverse health outcomes of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

In the results of the simple regression analysis (Table 13), "perceived susceptibility to PE" was not significantly associated with ANC attendance ($p = .23$) so the null hypothesis for this RQ could not be rejected and no further analysis was performed.

RQ2: Is there an association between pregnant women's perceived severity of the adverse health outcomes of PE and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

A simple logistic regression was performed between "perceived severity" (perceived severity "NO" = 0 and "YES" = 1) and the dependent variable (Poor compliance = 0, Good compliance = 1), this association was not significant, $p = .37$ (Table 13). For this research question the null hypothesis could not be rejected and no further analysis was performed.

RQ3: Is there an association between pregnant women's perceived benefit of ANC in PE control and their compliance with ANC visits in Northwestern Nigeria controlling for maternal sociodemographic and obstetric variables?

To explore the applicability of logistic analysis to testing the null hypothesis in this research question, a cross-tabulation was performed between this IDV (perceived benefits) and the DV. This analysis reported no significant association between the two variables ($p = .34$). The analysis also reported some cells with zero counts, the

requirement for logistic regression was therefore not met (Field, 2013) and the test was

not performed. The null hypothesis could not be rejected based on the outcome of the chi-

square (Fischer exact) analysis.

RQ4: Is there an association between pregnant women's perceived barriers to

ANC attendance and their compliance with ANC visits in Northwestern Nigeria

controlling for maternal sociodemographic and obstetric variables?

The null hypothesis for this RQ was tested by performing a simple regression

analysis between "perceived barriers" (perceived barriers "NO" = 0 and "YES" = 1) and

the dependent variable (poor compliance = 0, good compliance = 1). The association was

not significant *(p = .44)* (Table 13). For this research question the null hypothesis could

not be rejected and no further analysis was performed.

In evaluating the four RQs, I explored the association between women's

perception of PE and their compliance with ANC attendance controlling for the

sociodemographic and obstetric variables. The dependent variable "compliance with

ANC attendance" was not significantly associated with any of the four perception

constructs that I studied (perceived susceptibility, perceived severity, perceived benefits,

and perceived barriers to ANC attendance), this was so even for the category of

respondents who experienced high BP in their previous pregnancies.

Summary

Overall, in this study, I found that none of the four perception constructs were

significantly associated with ANC attendance. Further, the only covariate that

significantly predicted compliance with ANC attendance was GA at first ANC visit

where women who booked at the GA of 16 to 21 weeks were more likely to achieve

compliance compared to those who booked later than 28 weeks. Also, booking for ANC

earlier than 16 weeks did not significantly affect respondents' compliance with ANC

visits compared to women who booked later than 28 weeks. The results and implications

of this study will be further discussed in the next chapter, along with an exploration of the

limitations, potential for social change, and recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

This study was conducted to explore the relationship between perception of PE and its association with compliance with ANC attendance among pregnant women in Northwestern Nigeria. I analyzed the data in a quantitative manner to describe the study population and to look at the distribution of the variables among the respondents. I performed chi square test and logistic regression analysis to test the nature, direction and magnitude of the relationship between the independent/covariates and the dependent variables.

In this study, there were four RQs that were guided by the HBM. I wrote the RQs to examine the association between pregnant women's perceived susceptibility to PE, their perceived severity of PE, their perceived benefits of ANC, and their perceived barriers to ANC, and their compliance with ANC attendance. There was no significant association between the independent variables and the dependent variable. Other findings were those of low level of awareness about PE, and the significant association between GA at booking and compliance with ANC attendance.

Interpretation of Findings

Awareness of Preeclampsia

The proportion of women who were aware of PE in this research was low (37.6%) even though up to 52% of the respondents visited the ANC clinic at least five times. While this finding may not be significantly different from what has been reported in other places where PE is also prevalent (Akeju et al., 2016; Brown & Garovic, 2014; Hutchinson, 2016; Kirk & Chattopadhyay, 2015), it could be an indication that the

information provided to women during their ANC visits may not include information about PE. This questions the quality of the care provided in terms of information sharing during ANC visits. Hutchinson (2016) reported that women in their study were poorly educated about PE in the ANC period, and they considered this to be an important contributor to the delays encountered by women with PE in the course of seeking care for their condition. It is possible that the respondents in my study forgot the information provided to them during the antenatal period, especially if they didn't feel it was important (see Kessels, 2003), but the significance of PE as an important contributor to maternal and perinatal morbidity and mortality makes this finding of poor awareness relevant to public health professionals who are concerned with making pregnancy outcomes better for women.

Antenatal Care Attendance

The aim of my study was to explore the association between women's perception of PE, if any, and their ANC attendance. PE is one of the major causes of maternal and perinatal mortality (PE Foundation, 2013), and any intervention that would reduce its negative impact on pregnancy outcome should be encouraged. The relevance of sociodemographic and economic factors as determinants of ANC attendance has been demonstrated in existing literature (Bwalya et al., 2018; Yaya et al., 2017). What has not been demonstrated is whether ANC attendance was affected by how women perceived themselves as being susceptible to diseases, and whether this perception had significant association with ANC attendance. ANC is a preventive health service for pregnant women; it provides the opportunity to screen women for existing health problems and

identify pregnancy related problems such as PE early enough so that further appropriate control measures could be instituted. I did not find any significant association between women's perceptions of PE and their compliance with ANC attendance. This is contrary to what was observed with other preventive health behaviors such as cancer screening services (Nahidi et al., 2017). The results from my research did not corroborate other findings about disease perception and preventive health behavior.

From my study, 52% of the respondents complied with their ANC attendance (i.e., received five or more visits). This finding is slightly higher than what was reported by the latest National Demographic and Health Survey for Nigeria (NPC & ICF International, 2019) and by Chaurasiya et al. (2019) in Nepal, where 42% of the respondents received four or more visits in their last pregnancy. Kanyangarara et al. (2017) reported a figure of 24% in Zimbabwe; this proportion was much lower than what I found in my research. Several factors could explain this finding. First, in all the study sites ANC was provided through either the traditional approach of four weekly visits until 28 weeks, two weekly visits until 36 weeks, and weekly visits until delivery, or the new WHO approach of eight visits; first visit by 12 weeks of pregnancy, then at 20 weeks, 26 weeks, 30 weeks, 34 weeks, 36 weeks, 38 weeks, and at 40 weeks (WHO, 2016b). None of the three study sites used the four-visit focused ANC approach and this may have made it easier for most respondents to achieve compliance (defined as five or more ANC visits in the index pregnancy) from the time they booked until 39 weeks of gestation when they were surveyed. Furthermore, the study population for these other studies was drawn from the community while my study population was drawn from the ANC clinic

where the women recruited were women who could be assumed to be women had already decided to attend.

The finding of good compliance in a higher proportion of women compared to the national figures for the zone could also be explained by the timing of the first visit. Overall, 43% of the respondents had their first visits between the GAs of 16 and 21 weeks, and these women were 8.3 times more likely to achieve compliance ($p < .0001$) compared to those who booked after the 28th week of gestation. It would have been expected that women who started their ANC in the first and early second trimester (that is at less than 16 weeks) would have achieved significantly more visits compared to others, but this was not found to be so, perhaps because only a small number of respondents out of the total study population ($N = 10$, 4.5%) registered for ANC that early. A larger sample may reveal a different relationship.

The lower proportion of women reported in the NDHS could also have arisen from a difference in the study population; while I focused on pregnant women at ANC clinics in my study, the NDHS focused on all women of reproductive age who had been pregnant in the preceding 5 years in the selected communities (NPC & ICF International, 2019). In addition, though both surveys suffered from the possibility of recall bias, the possibility of this happening would be higher with the NDHS where the recall of information was for an event that happened up to 5 years earlier compared to my study where women were expected to recall the number of visits in an ongoing pregnancy.

I found that women who booked their pregnancies after the 20th week of pregnancy were significantly more likely to achieve compliance compared to women

who booked after the 28th week, that is, in the third trimester. This relationship remained

statistically significant even after all other relevant sociodemographic factors such as

maternal age, maternal education, and parity were controlled for. I also found in this

research that only a small proportion of women missed their scheduled visits, and even

amongst these, only 16% missed more than one visit. This shows that pregnant women

could adhere to their scheduled visits and that once they register for ANC early, the

likelihood of achieving compliance was high. So early booking for ANC is associated

with the potential for increasing the total number of visits achieved thereby increasing the

potential for PE to be detected early at any time the woman developed it. Agha and

Tappis (2016) reported that women were more likely to have had their BP checked the

earlier they had their first ANC visit in that pregnancy. They also reported that booking

the pregnancy at an earlier GA was associated with the likelihood of achieving more

visits (Agha and Tappis, 2016) and the possibility of detecting PE earlier should it

develop; early PE detection is associated with a higher likelihood for proper PE control

and a better pregnancy outcome (Brown & Garovic, 2014; Goldenberg et al., 2018).

     In the WHO recommended schedule of eight visits in the course of the pregnancy,

the first visit is recommended to be at about 12 weeks while the remaining seven are from

the 20th week of gestation. In this study I found that women who booked for ANC at 16

– 21 weeks of gestation were significantly more likely to achieve compliance with their

visits compared to women who booked after 28 weeks of gestation; this finding is in line

with the WHO recommended practice (WHO, 2016). So, women should be encouraged

to book for ANC at a GA of not later than 20 weeks because this is associated with the greater odds of achieving the recommended number of ANC visits.

Perceptions about Preeclampsia and Compliance with Antenatal Care Attendance

I tested the relationship between women's perceptions of PE and their ANC attendance. Their perceptions were measured by their perceived susceptibility to PE, perceived severity of PE, perceived benefits of attending ANC, and perceived barriers to attending ANC. I found no significant association between women's perception of PE and their ANC attendance.

Overall, the findings from my research did not corroborate previous research findings that studied the association between perceived susceptibility and severity about a health condition and the use of preventive health services for those conditions. Also, contrary to earlier reports (Simkhada et al., 2007), women in this study did not perceive distance, husband's permission, or time spent during the ANC clinic session to be important barriers to ANC attendance in relation to PE. Overall, most of the respondents did not perceive themselves to have barriers against ANC attendance. However, I found that all the respondents who had experienced high BP in their previous pregnancies perceived PE to be a severe disease, and because there was no variability in their perception, further bivariate analysis by chi-square test did not yield any meaningful result.

<div align="center">

Limitations of the Study

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In this study I surveyed women almost at the end of the pregnancy period in a cross-sectional manner. The timing and the design of the study may have posed a

limitation to the validity of the result since it is possible that the respondents may not have felt particularly at risk of a condition that was pregnancy related when they were already almost at the end of the pregnancy period. This may have influenced some of their responses.

The cross-sectional nature of the study design also could have affected the measurement of the "true" perception of the women towards PE. Kartikeyan et al. (2016) observed that people may change their behavior or lifestyle when they are affected by a disease, and in a cross-sectional approach the varying changes in behavior may not be captured by a study. It is possible that the women may have had changes in their perception at different times during the course of the pregnancy. The findings in this research should not be generalized to women at GAs other than at term.

The sample only included women who were available on the day of the survey. There may have been a proportion of women who registered but were not consistent with their visits, and because of this, missed being selected for this study. This could have led to selection bias within the study sample. The result of this study should be interpreted with care because it could be reporting only on women who had some degree of consistency and pre-existing interest with ANC visits. A potential way to reduce this bias in future research could be to recruit women from the community rather than in clinics. This could provide a more accurate sample.

Almost all the respondents did not have PE so their perception about severity should not be generalized to women with PE. It is difficult to say from the findings of my research, whether both antenatal behavior and the nature of its association with perceived

susceptibility and severity would have been different if the respondents were women with PE. A sub-group analysis would have provided an insight into these, but it was also a limitation that the actual number of women who were thought to have PE were few (i.e., $N = 11$) and that the diagnosis of PE could not be verified with certainty because I had no access to the respondents' medical records or information. For this reason, it is difficult to conclude that the findings in this research were a true reflection of women's perceived severity of PE.

When the Likert scale is used for measurement, four or more items are used to make up the scale (Boone & Boone, 2011). The fewer the items, the lower the value of the Cronbach alpha, which is a measure of the scale's reliability (Tavakol & Dennick, 2011). The nature of my study population (pregnant women who were apparently healthy and may not welcome any unnecessary prolongation of clinic time) however made it such that fewer questions were asked in order to shorten the duration of the survey. This may have constituted a limitation to this study which provides an opportunity for future studies about pregnancy related conditions and for the development of a stronger survey tool (see Adanri, 2017).

Recommendations

Based on the findings from this study I recommend that women be encouraged to book their pregnancies from the 16th week and not later than the 20th week of gestation as this is likely to afford them the opportunity to meet the recommended number of visits in a pregnancy. The findings thus support the WHO recommendation of eight visits, where all the visits except the first, are at 20 weeks of gestation or more (WHO, 2018d).

The proportion of women who were aware of PE was low. I recommend that care providers that are responsible for health talks at ANC clinics include PE and its complications in their talks in order to improve pregnant women's awareness of PE. Considering the nature of the study area and the low literacy level, media talk shows (radio and television) could also be used to educate women about PE and its complications. The provision of health messages and counseling services for pregnant women is one of the key functions of ANC in order to promote health and prevent disease (NPC & ICF International, 2019), so information sharing about PE among pregnant women should be promoted.

What I found in my research did not conform with what is known about the relationship between disease perception and health behavior because no significant association was demonstrated between perceptions of PE and compliance with ANC attendance. I recommend further research to explore the nature of the relationship between these two variables, perhaps with a larger sample size because PE is an important cause of maternal morbidity and mortality, and ANC is a recognized preventive service that facilitates screening and early intervention for the control of PE and its complications. Knowledge about the true nature of the relationship could inform the design of evidence-based interventions to improve ANC attendance for PE prevention. The findings also do no support the validity of the HBM model in explaining health behavior in this population of women. I would recommend that a different model that focuses on health care utilization be used to explore antenatal care utilization in future research. Although it may not explain women's perception of PE, a sociological

model like Anderson's Socio-Behavioral Model (Anderson, 1995 as cited in Lo & Fulda, 2008) may provide a more appropriate theoretical basis for explaining women's compliance with ANC attendance.

Implications of the Study

Positive Social Change

PE is a major contributor to maternal and perinatal morbidity and mortality and is therefore, a disease that is of interest to public health professionals whose goal it is to reduce morbidity and mortality among pregnant women. Creating awareness among pregnant women about PE and its complications could drive ANC attendance, potentially leading to an opportunity for early PE identification and control. Positive pregnancy outcome in relation to PE begins with early identification of the condition and this could be facilitated by timely and adequate ANC visits. Through this research I discovered a lack of awareness about PE among pregnant women and this provides an opportunity to create and implement interventions that would change the finding. A woman who is aware of and knowledgeable about a disease is more likely to seek care services that would prevent or control that disease (Celik & Hotchkiss, 2000) thereby increasing the chances for a better pregnancy outcome with a healthy mother and baby. The lack of PE awareness amongst most of the respondents brings up the need for public health campaigns to change this, a measure that could lead to positive social change among pregnant women in the study area.

Methodological and Theoretical Implications

In the present research, pregnant women were surveyed almost at the conclusion of their pregnancy. It is possible that many of the respondents may not have perceived themselves as particularly susceptible to the condition because they had almost completed the pregnancy period. Methodologically it would seem that, in exploring a pregnancy related condition, it would be more appropriate to recruit women early in the course of their pregnancy. Future research could explore this methodological approach. What I found in this study did not corroborate previous research findings about the value of disease perception in predicting health behavior towards a preventive or curative health care service.

I used the HBM to provide the theoretical foundation for this study. Theoretically, the HBM posits that peoples' behavior towards disease prevention would be positively influenced by their perceptions of that disease condition as measured by perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Glanz et al., 2008; Janz & Becker, 1984). However, I did not find this in my study; the variables were not significantly related. Further research perhaps using a different model, may be needed to explore women's ANC behavior especially regarding the control of a time-bound disease condition such as PE.

Recommendations for Practice

ANC attendance should be seen as an opportunity to improve pregnant women's awareness about pregnancy related health issues including PE. Care providers should aim to create awareness and improve women's knowledge about PE by providing information

about the disease during ANC health talks. Other means of getting the information to pregnant women could also be used; awareness raising campaigns could be mounted through the media (i.e., radio and television). In addition, public health campaigns should be directed at getting pregnant women to register for ANC visits no later than the 20th week of gestation.

The absence of a significant relationship between respondents' perceptions about PE and ANC attendance, which is a preventive health service, suggests the need for further research to explore the applicability of sociological (rather than psychological) model in understanding health behavior for disease conditions that are naturally time bound such as PE.

Conclusion

In this research, women's perceptions about PE were not significantly associated with ANC attendance. There is a need for further research to investigate other potential risk factors that could be associated with ANC attendance in relation to PE. GA at first ANC visit was significantly associated with ANC compliance after controlling for maternal age, parity, and educational level. Public health interventions to improve the proportion of women who achieve the adequate number of ANC visits should focus on getting women to register no later than the 20th week of gestation. In addition, women should be provided with information about PE during the ANC health talks so as to improve the number of women who are aware of and know about the disease.

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Appendix A: Announcement to be Made by the Nurses Before Antenatal Health Talks at the Antenatal Clinics

This announcement will be made at the end of the routine activities that occur during the antenatal care (ANC) health talks. When the nurses are done, and they have taken questions or request for clarifications from the pregnant women, they will then announce as follows:

Finally, before we end this health talk today, I have an announcement to make. We have a student-visitor among us today. She is scholar with a University in the USA called Walden University. She is enrolled in a higher degree (PhD) program and, as part of the program, she will be conducting a research that will involve asking you a few questions about high blood pressure in pregnancy. She will approach you individually later while you are waiting to have your obstetric examination or while waiting to see the physician so that she may seek your permission to participate in the study. You don't have to participate if you don't want to. She is not involved in providing ANC to you in any way so your failure to participate will not in any way affect the way you are treated at the clinic now or in subsequent antenatal visits.

Hausa Version

Daga karshe, kafin mu kammala tattaunawan mu yau ina son in shaida muku chewa muna da bakuwa a cikin mu yau. Ita dai wannan bakuwar babban daliba ce a wata jamia da ake kira Walden University a kasar Amurka inda take neman digirin ta na ukku watau PhD. A saboda da haka take bukatar ta yi muke wasu tambayoyi game da hawan jini na masu juna biyu. Zata same ku daya bayan daya a lokacin da kuke jira a yi muku

awo ko kuma sanda kuke jiran ku ga likita don ta nemi yardan ku game da amsa mata

wadannan tambayoyin. Ba dole ne ku yarda ku amsa mata bai dan baku ga daman yin

haka din ba. Ita dai babu hannun ta a cikin ba yar da kulawa a gareku don hake rashin

yarda ku shiga wannan bincike ba zai cutar da ku ba ta ko wane hanya a yanzu ko a wani

lokacin in kun dawo awo.

Appendix B: Questionnaire "Women's Perception of Preeclampsia and Antenatal Care

Attendance in Northwestern Nigeria"

Section I. Sociodemographic and clinical variables

1. How old are you? _____

2. What is your level of education?
    a.   Non-formal
    b.   Primary level
    c.   Secondary level
    d.   Postsecondary level (certificate)
    e.   Tertiary level (NCE, Diploma, Degree)

3. What is your marital status?
    a.   Single
    b.   Divorced
    c.   Widowed
    d.   Married

4. Do you have a source of income?
    a.   Yes
    b.   No

5. If yes, what is it?
    a.   Public service
    b.   Hair dressing
    c.   Food processing
    d.   Tailoring
    e.   Trading
    f.   Others (please specify)

6. *How much (in naira) do you earn from that source monthly?
    a.   36,000 naira and below
    b.   37,000 - 72,000 naira
    c.   73,000 – 108,000 naira
    d.   109,000 naira and above

7. Is this your first pregnancy?   A. Yes.......... (skip to Q10)   b. No................

8. If not, how many times have you been pregnant before? ....

9. How many times have you delivered before?......................

10. Is this your first visit to the hospital since you became pregnant?
    a.   Yes.......(Skip to Q13)
    b.   No

11. If not, how many times have you visited since you registered for antenatal care in this pregnancy?.........

12. At what gestational age (in weeks) did you have your first antenatal visit in this pregnancy?

13. Did you miss any scheduled visit since you registered for ANC?

    a.   Yes…
    b.   No.......(Skip to Q15)

14. If yes, how many visits did you miss?......

15. Did you have any of the following problems in your previous pregnancies (you can tick more than one option; skip this question if you have never been pregnant before)
    a.   High Blood Pressure
    b.   Eclampsia (convulsions in pregnancy)
    c.   High sugar level (Diabetes)
    d.   Anemia (low iron levels)
    e.   Preterm delivery
    f.   Stillbirth (baby not born alive)
    g.   miscarriage
    h.   Others (please specify) ....
    i.   None

16. Were you ever told you have high blood pressure in this pregnancy?
    a.   Yes
    b.   No

17. Have you heard of preeclampsia?
   a.   Yes
   b.   No
   c.   I don't know / I'm not sure

18. Do you know what is preeclampsia?
   a.   Yes
   b.   No
   c.   I don't know / I'm not sure

Preeclampsia is a condition that affects women only when they are pregnant and it starts from the 5th month of pregnancy. Their blood pressure will be high; they may have headaches and they could fit. If it is not managed well it could lead to complications that could affect the pregnant woman, her unborn child, or both. It could be detected early and managed appropriately if a pregnant woman presents for antenatal care.

Section B.

Now I am going to ask you some questions about preeclampsia and its adverse effects; you may wish to respond to each of the questions based on how well you agree or disagree with the statements that I make

HBM Constructs (Independent variables)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Perception about susceptibility to preeclampsia (**3 items**)					
1. I believe I can develop Preeclampsia					
2. Being pregnant makes it more likely that I will get preeclampsia					
3. I worry a lot about getting preeclampsia					
Perceptions about severity of Preeclampsia (**3** items)					
4. I believe that if I had PE It will be a burden on my family financially					
5. My life would be in danger if I develop PE					
6. The life of my unborn baby would be in danger if I develop PE					
Perceptions about benefits of complying with ANC visits in relation to Preeclampsia (3 items)					
7. I believe that PE could be detected early if I attend ANC regularly					
8. I believe that attending ANC regularly could protect me from the complications of PE					
9. I believe that attending ANC regularly could protect my unborn baby from the complications of PE					
Perceived barriers to complying with ANC visits (3 items)					
10. Attending ANC regularly is time consuming					
11. My husband does not allow me to attend ANC regularly					
12. If my home is far from the health facility I will not attend ANC					

Thank you for your time

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