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A Community-Based Distribution Intervention for Family Planning Among Women in Northern Nigeria

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MPH, University of Roehampton, 2015

MDS, Bayero University, 2012

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

In Northern Nigeria, inadequate information on family planning contributes to high mortality and morbidity rates in women of reproductive age due to multiple childbirths yearly. This study aimed to examine the relationship between the community-based distribution (CBD) strategy, religion, and attitudes toward family planning methods. Rosenstock's health belief model, which can be an instrumental anchor for health promotion programs, was the theoretical framework for the quantitative cross-sectional study design. The data source was survey questionnaires administered by the U.S. Agency for International Development to 809 reproductive-age Nigerian women after implementing a CBD intervention. A multinomial logistics regression analysis showed that CBD strategy and attitude (perception) influenced the practice of family planning methods in women of reproductive age ($p = .001$). The age group (20 to 29 years) exhibited higher odds of practicing various family planning methods ($p < 0.021$). In comparison, age groups 30 to 39 years and 40 to 49 years were associated with lower odds ($p < .001$ and $p < .003$), respectively. Quranic education and the occupation of a housewife were significant predictors, indicating higher odds of practice ($p < 0.016$ and $p < 0.014$), respectively. Additionally, the CBD strategy and attitude significantly predicted the practice of different family planning methods. The study findings support the development of targeted community-based educational programs and interventions for specific age groups, education levels, and occupations. Doing so may promote positive social change toward family planning and increase family planning uptake among women of reproductive age.

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Dedication

My capstone is dedicated to God and my mother, who encouraged and supported me. It is dedicated to the women of reproductive age in Northern Nigeria who need more information to take possession of their health.

Acknowledgments

I must acknowledge my children, Victor and Janet, for their support and patience during my doctoral journey. I want also to thank Betty Farrell for all her support and belief in me while I stayed with her in New York, USA. My thanks and appreciation also go out to my chair, Dr. Nancy Rea, who has been very supportive. I also want to thank my second committee member, Dr. Claire Robb, for her guidance and my university research reviewer, Dr. Tolulope Osoba.

Table of Contents

List of Tables

List of Figures

Section 1: Foundation of the Study and Literature Review

Worldwide, family planning has significantly reduced maternal deaths, birth complications, and pregnancy-related deaths and improved women's health. The World Health Organization (WHO, 2020) defined family planning as the ability of individuals and couples to anticipate and attain their desired number of children. Family planning methods include condoms, intrauterine devices (IUCDs), sterilization, birth control pills, patches, shots, vaginal rings, and emergency contraceptives. Adopting and using these contraceptive methods enables families to plan pregnancies, including determining the number of children they wish to have and allowing birth spacing and timing (WHO, 2020).

Several interventions and health programs have been targeted in Nigeria to improve family planning uptake by nongovernmental organizations from 2000 to 2015. As a result, family planning uptake increased from 10.3% to 66% in some geopolitical zones of the country (Akemike, 2020). However, family planning methods have low uptake in the North region. Researchers have attributed the low uptake to a poor health worker-to-population ratio, inaccessibility, low level of literacy, and traditional and religious belief systems (Akemike, 2020). The region has high preventable pregnancy-related deaths among women (Akemike, 2020). As a result, women of reproductive age living in the North suffer from unplanned pregnancies that have devastating consequences on their health despite some availability of these family planning methods in the communities.

Public health workers have used community-based distribution (CBD) practices to foster acceptance and increase the uptake of contraceptives and family methods among families in the North. The training and deployment of community health extension workers have proven effective because they are closer to families residing in the communities (Abdul-Hadi et al., 2017). Increased uptake and effective use of family planning methods have reduced maternal deaths by about 30% and early child deaths by 10% in Northern Nigeria (Frost & Frohwirth, 2018). However, barriers to family planning (e.g., myths and misconceptions that family planning methods could render these women infertile) continue to be an issue (Ochako et al., 2015). According to Nigeria Demographic and Health Survey (NDHS, 2016), safe motherhood indices in the north-western part of the country, where the contraceptive prevalence rate was as low as 4.3% in 2013. These indices include maternal mortality ratio (MMR), safe delivery practices, quality maternal health services, and referral care for emergency cases (Ajayi & Akpan, 2020). The MMR is defined as the number of maternal deaths during a given period per 100,000 live births during the same period (Ajayi & Akpan, 2020). High scores on safe motherhood reflect that most women receive the care they need to be safe and healthy throughout pregnancy and childbirth (WHO, 2020).

The CBD strategy has been found effective in increasing the uptake of family planning methods by changing perceptions and mitigating the challenges that hinder contraceptives among women in the North (Mihoko et al., 2017). As a result, CBD strategies have been adopted in Northern Nigeria to address the reproductive health need of women of reproductive age. These strategies can be deployed by community-based

distribution agents (CBDAs) trained and infused into the community system to deliver health services to women (Sheff et al., 2019). Public health specialist achieves the CBD strategy by expanding access across geographical zones and communities without transgressing sociocultural barriers such as male involvement, spousal support, social discrimination, women's right to contraceptive use, and addressing perceived risk to health (Sheff et al., 2019).

Background

Preventable maternal and neonatal deaths are an ongoing public health concern in Northern Nigeria. Northern Nigeria has a higher prevalence of preventable maternal and neonatal deaths (1,271 deaths per 100,000 live births) compared to Southern Nigeria due to unplanned pregnancies and low uptake of family planning methods (NDHS, 2016). The high prevalence rate of maternal and neonatal deaths in Northern Nigeria may be linked to the low acceptance rate of contraceptive usage due to several internal and external factors such as religion, marital status, level of education, and occupation in the affected communities. Studies on the uptake of family planning methods and the prevalence of modern contraceptive use in the region show that uptake levels of the use of family planning methods are still relatively low in many parts of the geopolitical zone (2.7% and 3.6% in the North-East and Northwest, respectively) compared to 15.5% in the southern parts of the country (Dambo et al., 2017). In another study, Wulifan et al. (2017) highlighted family planning methods' benefits, awareness, knowledge, and practice in the North. The authors noted that child spacing, child survival strategies, and improving

maternal health outcomes in pregnancy have been the primary focus of reproductive health interventions among women in these communities.

CBDAs are a crucial component of community-based strategies to inform the community and improve maternal and child health. CBDAs give doorstep information about family planning and administer short-term family planning methods such as pills, injectables, and condoms (Dambo et al., 2017). They also make referrals to health facilities with trained family planning providers for long-term family planning methods such as implants and IUCD (Wulifan et al., 2017). These strategies reduce preventable deaths from unplanned pregnancies, a common theme in northern communities. However, more CBDAs must be recruited to work closely with the target population (women aged 18–49) to foster their involvement and participation and avoid preventable deaths (Dambo et al., 2017).

Ochako et al. (2015) found that certain misconceptions were barriers and limited the uptake of family planning services in the North, especially among married women. For example, contraceptives are falsely linked to infertility, uterine fibroids, and breast and cervical cancer. These misconceptions are yet to be abolished, and the perception remains relatively unchanged given the influence of culture, religion, marital status, level of education, and occupation on women's health-seeking behaviors (Ochako et al., 2015). To fully understand and potentially reduce the hold of these misconceptions, evaluating the factors associated with the reduced use of family planning methods within northern communities is essential.

Additionally, the higher the educational and literacy level, the higher the practice and the likelihood of using modern family planning methods, such as contraceptives (National Population Commission, 2014). Women in the North, especially in rural areas, are less informed about how these reproductive health services can improve their health outcomes. The low level of awareness contributes to the discrepancies experienced within these communities, especially those deeply rooted in age-long traditions passed from generation to generation (National Population Commission, 2014). The fear of being infertile, amongst other perceived complications, has persisted because of a general lack of education. This fear has contributed to resistance to accepting modern contraceptives that, research shows, are more effective (Ochako et al., 2015). However, some researchers have explored barriers, challenges, and the effects of low uptake of family planning methods by reproductive women in Nigeria (Ochako et al., 2015). they have not thoroughly investigated these issues in the country's northern parts. To address this gap in the literature, I will examine CBDAs' implementation of CBD strategies to increase the uptake of family planning methods among women in northern communities. The aim was to identify ways to improve awareness of these methods and ultimately improve reproductive health metrics reported from the parts of the North through reduced maternal and child complications and deaths.

Problem Statement

One major problem in Northern Nigeria among women of reproductive age is the lack of adequate information on family planning. The lack of such information has grave consequences, leading to mortality and morbidity experienced by women due to multiple

childbirths every year (Bawah et al., 2019). Maternal morbidity and mortality may be due to education, religion, marital status, occupation, and inadequate information on family planning methods. Other factors include low awareness, inaccessibility, male involvement, and traditional societal and religious beliefs (National Population Commission, 2014). The uptake of family planning methods was as low as 2.7% and 3.6% in the North-East and North-Western regions, respectively, in 2013 (National Population Commission, 2014). These rates of 2.7% and 3.6% in Northern Nigeria pale compared to those for the Southwestern and Eastern parts of the country.

Research has shown that many women in Northern Nigeria wanting to space childbirth for two years or more are not using contraceptives (Bawah et al., 2019). Despite the family planning services available, women still have an unmet need for contraceptive use. The average woman in Nigeria has six children, with a contraceptive prevalence rate of 16% for any method and 11% for modern methods like IUCDs, pills, injectables, condoms, and implants (Ankomah et al., 2018; Eko et al., 2013). The North has the highest maternal mortality ratio (1,549 per 100,000 live births) among all the geopolitical zones within the country (Ankomah et al., 2018). Inadequate family planning services, concerns about the side effects, male opposition, culture, and religious hindrances have been identified as contributing factors to the low uptake of family planning methods accounting for 16.9% of the unmet need for family planning (Ankomah et al., 2018).

Research shows that these barriers accounted for 28% of unwanted pregnancies in 2009 among Nigerian women in the northern compared to the southern part of the

country. However, a more significant percentage of these women reside in rural areas (Amah, 2016; Omo-Aghoja et al., 2009). The lack of uptake of family planning has also encouraged unsafe abortion practices among these women. According to research, at least 1 in every five women residing in Northern Nigeria needs more knowledge to take up family planning to further their education or learn a trade to support their family (Amah, 2016). Therefore, there is a demonstrated need for the targeted and community-based delivery of information on family planning in Northern Nigeria.

Purpose of the Study

The purpose of this quantitative, cross-sectional study was to examine the relationship between CBD strategy, religion, and attitude (perception of family planning information) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) while controlling for age, level of education, marital status, and occupation among women of reproductive age in Northern Nigeria. The study findings may provide insight that health practitioners can use to improve reproductive health outcomes and help women of reproductive age understand the need to use family planning to space their children to reduce high rates of multiple births and maternal death and to have the number of children they can care for in the future. The lack of family planning among women of reproductive age in Northern Nigeria is a public health issue associated with increased maternal deaths in the region (Ochako et al., 2015).

I examined the CBD strategy of a nonclinical family planning service program that uses CBDAs and referral health facilities to promote safe and straightforward

contraceptive technologies. The approach has been used in many countries to increase

access to services for hard-to-reach communities (Ochako et al., 2015). Adopting the

CBD strategy through CBDAs may address the shortage of health workers, insufficient

health facilities, and limited family planning services. Where demand for family planning

is fragile and weak, as in northern Nigeria, the CBD strategy is attractive because it offers

services at fixed service points in convenient community locations and other outreach

activities (Ochako et al., 2015). The CBD strategy provides convenient access to family

planning supplies, fosters changes in beliefs and behaviors and encourages social change

by combining strategies for achieving comprehensive community involvement (Ochako

et al., 2015). The CBD strategy also provides commodities at the doorstep, and referrals

for women of reproductive age to health facilities where clients could provide services

and products not offered by the CBDAs, Ochako et al. (2015) noted. Because CBDAs are

in the communities, they may be able to encourage women to engage in family planning

services with the support of their husbands (see Ochako et al., 2015). I examined the

CBD strategy to understand the practice and uptake of family planning methods among

communities within Northern Nigeria.

The study design involved dependent, independent, mediating, and controlling

variables. The dependent variable was the practice of different types of family planning

methods (pills, injectables, condoms, implants, and IUCD). The independent variable was

the CBD strategy and religion. The mediator variable was the attitude (perception of

family planning methods) based on information received. Finally, the covariates

(controlling variables) were the age group of the women of reproductive age at the time of the study, level of education, marital status, and occupation.

Research Questions and Hypotheses

The research questions (RQs) and hypotheses for this study were as follows:

RQ1: Is there a relationship between CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation?

$H_0$1: There is no relationship between the CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

H_A1: There is a relationship between the CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

RQ2: Is there a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as

mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation?

$H_0$2: There is no relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation.

H_A2: There is a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation.

Theoretical Framework

I used the health belief model (HBM) as the theoretical framework for this study. I drew from the model to conduct the literature review and develop the RQs. The U.S. public health services introduced the HBM in the 19th century. The model was developed by social scientists who mainly aimed to explain how individuals failed to engage in interventions and programs to prevent diseases (Rosenstock, 1974). Researchers and practitioners have used the HBM model to understand family planning issues among women (Akamike et al., 2020). The use of family planning methods constitutes a health-

seeking behavior whose premise is based mainly on specific perceptions, such as the

possibility of suffering the consequences of terminating an unwanted pregnancy, issues

that arise from poor child spacing, and potential risks for individuals who may face

challenges or complications from unsafe and illegal abortion (Akamike et al., 2020).

The HBM has six primary constructs: potential risks, perceived threat/severity,

perceived benefits, perceived barriers, perceived self-efficacy, and steps to initiate action

(Abraham & Sheeran, 2005; Jones et al., 2014; Rosenstock, 1974; Skinner et al., 2015).

Health care workers can apply the HBM model to determine an individual's willingness

or readiness to comply and practice preventive health care. Usually, this involves

assessing the potential threat to a patient and the accompanying actions that can be

implemented to address the health threat. Efforts to encourage people to adopt a healthy

behavior could also include discussing the benefits obtained and the obstacles

experienced (Conner & Norman, 2015; Coulson et al., 2016).

Researchers have also used the constructs associated with the HBM model to

assess individuals' health-seeking behavior regarding contraceptives in a much rather

diverse context. In one of the studies, findings showed that those who reported unmet

needs for family planning face constraining factors that hinder their preference for the

number of children they wished they had and the timing of pregnancies or births (Wulifan

et al., 2017). The HBM provides a framework to uncover the barriers to family planning

uptake and the cues to action in determining its effectiveness in preventing avoidable

complications and death. When women cannot access these methods, it becomes difficult

to avoid unwanted pregnancies, space children appropriately, and raise children under

safe and optimal conditions (Ochako et al., 2015). The HBM model, as applied to this study (see Figure 1), encompasses factors that could trigger a perceived threat to pregnancy and influence the decision to use contraception to resolve the potential danger.

Figure 1

Diagram of the Health Belief Model as Applied to This Study
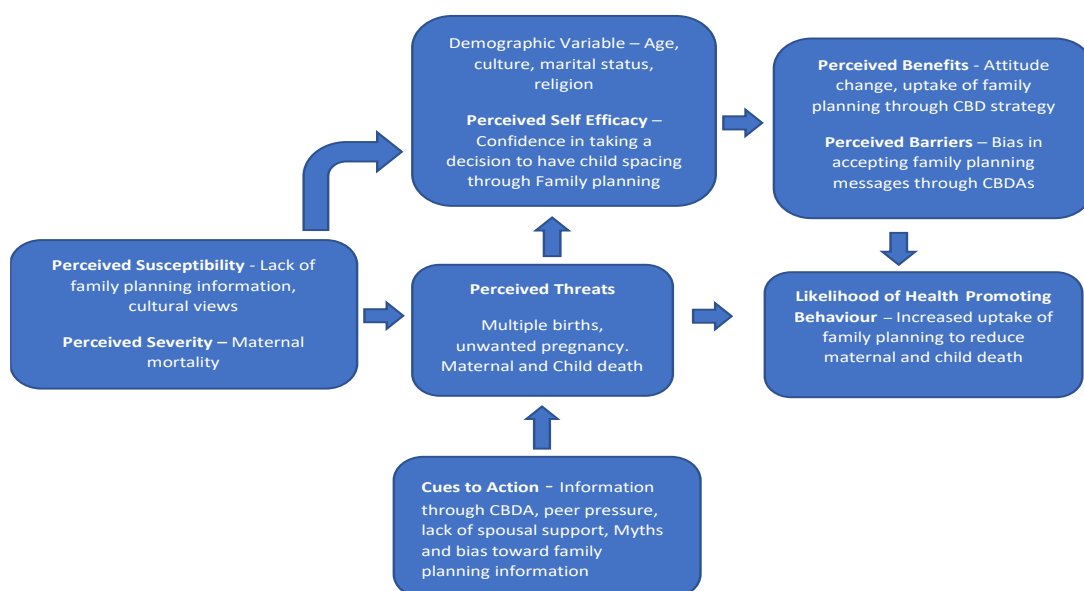
Note. The figure shows the health belief model theoretical framework applied to the uptake of family planning through the CBDA strategy. CBDA = community-based distribution agents. (3rd ed) by Hayden, J. (2019).

Nature of the Study

In this quantitative cross-sectional study, I examined the relationship between the CBD strategy, religion, and attitude (perception of family planning information), to

determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) while controlling for age, level of education, marital status, and occupation among women of reproductive age in Northern Nigeria data collected by USAID. The cross-sectional analysis allows for the use of secondary data in health studies (NDHS, 2016). I retrieved data from the U.S. Agency for International Development (USAID) data library to answer the RQs and understand how the CBD strategy increased the uptake of family planning methods. The association between the CBD strategy and the practice of different types of family planning methods was analyzed using a logistic regression model after ensuring that the assumptions of the logistic regression model were met. I test whether the CBD strategy influences the relationship between attitude and the uptake of family planning (pills, injectables, condoms, implants, and IUCD). The logistic regression highlighted whether women of reproductive age were more likely to take up family planning methods through the CBD strategy.

The study had three independent variables: CBD strategy, age, and religion. CBD strategy had a binary categorical/nominal level of measurement. The interview question was, "Have you ever been reached by family planning messages through a CBDA?" The response format was yes or no. For attitude, participants were asked how they felt about the CBD strategy ("Did the CBD strategy inform the uptake of family planning?"). The response format was yes or no. Regarding religion, participants answered a question about whether they practiced Islam, Christianity, or other religions.

The dependent variable was the practice of different types of family planning methods. This was a nominal, multicategorical variable (1 = pills, 2 = injectables, 3 = condoms, 4 = implants, and 5 = IUCDs). The attitude was used as a mediator. Participants were asked how they felt about the CBD strategy and did the CBD strategy inform their uptake of family planning. They answered yes or no. The controlling variables (covariates) were age, level of education, marital status, and occupation; these had categorical/ordinal levels of measurement.

Literature Search Strategy

I used Walden University Library databases, including PubMed and the search engine Google Scholar to find sources for the literature review. Keywords used to search for relevant literature included *family planning services*, *community-based distribution*, *contraceptive utilization*, *religion*, *marital status*, *occupation*, *level of education*, w*omen of reproductive age*, *knowledge and awareness of family planning services*, *maternal and child survival strategies*, and *health belief models*. The review includes a discussion of the importance of CBD in family planning uptake, the types of modern contraceptives, the CBD available, and the constructs of the HBM.

Literature Review Related to Key Variables

The study's literature review focuses on reproductive health, family planning services, and reproductive-age women using the HBM constructs. Family planning services include the use of barrier methods (i.e., condoms), hormonal methods (i.e., injectables, implants, and pills), IUCDs, and sterilization (NDHS, 2016). In Nigeria, reproductive health issues, especially in the northern states, are of increasing concern due

to maternal and child mortality, marital status, level of education, religion, occupation, and seemingly low planning services uptake amongst women of reproductive age (NDHS, 2016). Consequently, in the northern part of the country, several reproductive health interventions have been targeted at improving maternal and birth outcomes by private and public organizations at home and abroad (Amah, 2016). These family planning services aim to reduce maternal mortality; prevent unintended and high-risk pregnancies; and improve health indicators to better women, children, and the entire country (NDHS, 2016).

Global Prevalence of Family Family

Family planning remains one of the fundamental ways to ensure the progressive health safety of both women and children worldwide. Family planning entails birth spacing, child survival strategies, maternal and child health, and traditional and modern contraception. Given the ever-changing dynamics of society ranging due to literacy levels, marital status, occupation, evolving technologies, and societal demands on families, the use of modern contraceptives has emerged as one of the foremost interventions that help women plan their births, determine the number of children to have, and also ensure that these new-borns survive past the first few years of their lives and beyond (WHO, 2020). However, while public and private organizations continue to advocate using family planning methods to improve the birth outcomes for women and children, there are still impediments to ensuring it becomes universally prevalent in its uptake among countries (WHO, 2020). For example, family planning methods are available in Northern Nigeria. However, there is still a low uptake of these methods

across these communities, which results in high maternal mortality, poor birth outcomes, and the survival of these newborns, which are linked to complications of unplanned pregnancies (Adefalu et al., 2019). This might result from several factors, including knowledge, awareness, traditional barriers, acceptance, and means of distribution within the community. This study aims to explore CBD as an effective strategy for improving the knowledge, attitudes, and practice of family planning and child survival methods among women of reproductive age and increasing the use of modern contraceptives among women (18–49 years).

Research has shown that the use of family planning methods across the globe implies gaps in understanding the low utilization of these methods despite the availability and accessibility of these family planning services. According to WHO (2020), an estimated 225 million women of reproductive age in developing countries do not use family planning services to delay or stop childbearing. In Nigeria, the family planning policy has yielded low dividends in controlling the population explosion, as the population is projected to rise from 182 million to 397 million by 2050 (National Population Commission, 2013). Despite the rising population figures, the contraceptive prevalence rate remains at 10%, leading to a high burden of unmet family planning needs and other consequences of population growth, including high maternal and infant mortality (National Population Commission, 2013). In sub-Saharan Africa, the contraceptive prevalence rate ranged from 23.7–28.4% between 2008 and 2015, compared to other parts of Europe, which recorded at least 66.7% (WHO, 2020). This implies a low uptake of family planning services in the region, with many women

becoming pregnant without planning for the pregnancies. The northern communities selected as the study population had similar challenges addressed in this research study.

In Northern Nigeria, as detailed by Ahinkorah et al. (2020), religion and culture play a significant role in the socioeconomic status of women, i.e., the married woman is limited to being a housewife to take care of the children. The religion in Northern Nigeria, Islam, is considered the top means of determining if a woman can get western education other than the Quran (Ahinkorah et al., 2020). Cultural and religious peculiarities in Northern Nigeria limit a woman's ability to leave her home. This has increasingly encouraged the practice of CBD strategy, where these family planning services are taken to the door for easy acceptance (Ahinkorah et al., 2020). Some of these women cancan make extra money by producing home-made products neighbors purchase can make extra money by producing homemade products purchased by neighbors and family members within the comfort of their homes. Family planning services are not given to unmarried young adolescent girls because it is against the religion and culture within Northern Nigeria.

Despite the numerous family planning services available to women (18–49 years), there are still research findings that have reported a low uptake with growing cases of unplanned pregnancies and the practice of unsafe abortion (Wulifan et al., 2019). The uptake and use of family planning methods for unplanned pregnancies and unsafe abortions reduce infant mortality, prevent pregnancy-related health risks in women, prevent population explosion, and foster a healthy society (Wulifan et al., 2019). In addition, family planning services promote pregnancy delay and spacing, especially in

women at risk of birth complications due to health problems and mortality from early childbearing (Sinai et al., 2020; WHO, 2020). Findings have shown that more than 200 million women of reproductive age in many countries worldwide are not using contraception but would like to avoid pregnancy (WHO, 2020). Studies in Africa have shown that family planning services uptake is higher among women in urban areas than rural areas (Hoke et al., 2012).

Although the mode of distribution of these services in Nigeria features the use of intervention programs such as medical outreaches, community health agents or workers, primary health care centers, community health initiatives, or during antenatal visits to the hospital, educating aspiring and nursing mothers on the benefits of using family planning services would lead to a healthier life for themselves and their children (Hebert et al., 2013). A community-based intervention to promote planning services was introduced over 40 years ago to bring these services closer to those in need (Akamike et al., 2019). A study conducted among women of reproductive age (18–49 years) in Ebonyi State, Nigeria, showed that community-based interventions improved family planning services for married women (Akamike et al., 2019). Another study demonstrated how drug shops, also known as patent medicine vendors, can be instrumental in promoting family planning commodities, especially in rural areas (Malkin & Stanbach, 2015). In addition, the CBD strategy can be used in health promotion programs such as modern contraceptives, essential services for maternal and child health, and HIV prevention. Also, using pictorial representations to depict these services within the community raises knowledge and awareness about the benefits of these services since they are easy to

understand (Malkin & Stanbach, 2015). Therefore, it is essential to understand how community-based interventions can effectively foster the uptake of family planning methods in northern communities in Nigeria.

Age and Practice of Family Planning Methods

Nigeria remains one of the only countries in the African region involved in promoting family planning services despite the hindrances encountered in the different areas, especially the Northern parts (Ochako et al., 2015). The northern part of Nigeria accounts for most maternal mortality annually from pregnancy-related causes, with the ratio of health workers to the northern population relatively low (Amah, 2016). Due to these poor statistics, availability and accessibility to family planning services are limited, especially in the areas (Amah, 2016). However, the uptake of these services remains low among women of reproductive age (Ochako et al., 2015; NDHS, 2016). I will examine whether a CBD strategy through CBDA will increase northerners' uptake of family planning services. Therefore, there is a need to adopt strategies that can be instrumental in delivering health services to those in need to prevent unfavorable outcomes in the reproductive health system. CBD programs can effectively increase some family planning services uptake among women living in rural areas of Northern Nigeria (Abdul-Hadi et al., 2017).

Researchers such as Sedgh et al. (2016) looked at the use of birth spacing and delaying pregnancies to ensure proper planning for women to promote better health and well-being for themselves and their children. Knowledge and awareness are critical to increasing the uptake of family planning services. Adefalu et al. (2019) expressed

concerns regarding the possible barriers to using child spacing, from misconceptions about contraceptive side-effects, spousal disapproval, marital status, level of education, occupation, social norms, religious, cultural and traditional beliefs that play a role in discouraging usage. Therefore, it is necessary to determine if CBDA effectively improves the knowledge of contraceptive use despite the availability of family planning services and counseling during antenatal and postnatal care.

The relatively low uptake of modern contraceptives and the health-seeking behavior of women of reproductive age have been highlighted in addressing reproductive health issues. For example, some of the barriers cited by women in research conducted by Sedgh et al. (2016) showed concerns about the side effects, the health risks posed, irregular changes in menstrual changes, and the possibility of infertility. This has affected their response, acceptance, and uptake of modern family planning services. Another study's findings showed that shared knowledge and awareness were also responsible for the low uptake of these services among reproductive-aged women (Wulifan et al., 2019). Other reasons include the myths and misconceptions surrounding contraceptives (Adongo et al., 2014). For example, a Ghanaian study revealed that contraceptives could predispose women to infertility, uterine fibroids, and risk of breast and cervical cancer (Adongo et al., 2014).

Religion and Practice of Family Planning Methods

The religion practiced is Islam which shapes and determines the behavioral partner of reproductive women in Northern Nigeria (Obasohan,2015). Islam greatly influences health-seeking behavior for married women of reproductive age in Northern

Nigeria because the man decides how the home is run (Obasohan,2015). The Islamic

practice allows a man to marry four wives and give birth to as many children as long as

Allah gives them (Obasohan,2015). Unfortunately, this has increased the number of

births, thereby reducing those who are adequately cared for and reducing access to

western education, which is substituted for Qur'anic education (National Population

Commission, 2014). Many of these women have no access to family planning which

increases the birth rate and maternal mortality in the case of multiple births. These

women are kept within enclosed houses and allowed out only with their husband's

permission in an Islamic setting known as the Purdah system (Obasohan,2015).

Education, Marital Status, Occupation, and Practice of Family Planning Methods

In Northern Nigeria, low uptake of family planning services is attributed to low

literacy levels, early marriages, and marital status (Haider and Sharma, 2013). The

implications of a lack of spacing births include miscarriages, increased child mortality

and morbidity, illegal and unsafe abortions, and maternal deaths (WHO, 2018). The

survival of children pre and post-pregnancy largely depends on the mothers' actions and

decisions. The consequences of unplanned pregnancies are most severe and detrimental

to children's health. In a study conducted by Haddrill et al. (2019) among women of

reproductive age, findings revealed that the women could not recognize early enough that

they were pregnant and delayed obtaining antenatal care while engaging in unhealthy,

unsafe, and unsafe lifestyles for mothers and fetus. In such situations, pregnancies often

result in unsafe abortions and abortion-induced deaths upon discovery. Moreover, early

pregnancy has adverse effects, including ostracization from social circles, shame, neglect,

fear, seclusion, depression, mental health issues, self-esteem problems, and discrimination (Chima Anyanwu et al., 2018). This research study by Chima Anyanwu et al. (2018) also seeks to identify similar potential threats that these target population groups might experience if effective interventions are not adopted to improve the uptake of family planning services.

In addition, women's occupations and education level are common denominators in using planning services (Chima Anyanwu et al., 2018). Awareness of contraception without knowing the benefits of the methods would only be counterproductive in allowing women to make informed decisions about their reproductive health before and during pregnancy (Wulifan et al., 2017). By propagating the use of family planning services for these women, the CBD interventions also create a simplified avenue to encourage easy access to contraceptives and offer counseling to improve the health of both mother and child through the CBDAs (Amah, 2016). The cues to action for women in this category are traced to the influence of health care providers within the communities and the information derived from their peers, CBDAs, parents, community members, and social media in making the right contraceptive choice. This study investigates how CBD interventions will help women in Northern Nigeria make better reproductive health choices through the uptake of family planning services despite the barriers. Women's contraceptive behavior can also be associated with their level of education and cultural values (National Population Commission, 2014). A study showed that about 60% of women of reproductive age have no formal education in Northern Nigeria (National Population Commission, 2014). Men in the North are considered

authority figures in their homes and wield power as household income earners compared to women (Sinai et al., 2019). Despite the low uptake of family planning services in Northern Nigeria, findings have shown that men desire a large family (NDHS, 2016). Hence, the women are at the mercy of the men because religion and culture demand that they fulfill their husbands' wishes (Sinai et al., 2018). There is also the general belief that women who use contraceptive methods are promiscuous, and men who permit such are considered weak by members of society (Ankomah et al., 2018). This has resulted in the low use of modern contraceptives in northern Nigeria (4.9% - North East and 7.2% North West, respectively) in the parts of the North of Nigeria (Nigeria Population Commission, 2019). Since CBDs have not been fully explored in improving knowledge and awareness of family planning services to promote uptake for this study, the key variable will be the uptake of family planning by a method as the dependent variable, which is categorized into the different types of family planning methods, and the independent variables, which are the CBD strategy and religion as binary categorical, nominal. The controlling variables will be age group, marital status, level of education, and occupation of reproductive women.

Perceived Susceptibility to Unwanted Pregnancy

The HBM and its constructs make certain deductions about individuals likely to develop health problems such as unplanned pregnancies (Tarkang & Zotor, 2015). Such individuals often tend to engage in health-seeking behaviors to find a solution to alleviate or prevent the problem. In the case of perceived susceptibility, a fundamental construct of the HBM, it focuses on the motive behind the actions taken to avoid health problems (Rosenstock, 1974). According to the model, motivation is primarily assumed to be a

conditional requirement for action (Tarkang & Zotor, 2015). It is commonplace for individuals to embark on a specific health-related intervention if they are convinced that their actions would prevent an adverse health risk or outcome (Nicholson, 2012; Tarkang & Zotor, 2015). Findings have also shown that a higher proportion of women perceive their chances of becoming pregnant are low or do not feel at risk of pregnancy even without family planning services (Nsugba, 2015; Winetrobe et al., 2013). On the other hand, some women do not think they are fertile enough for fear that they may experience difficulty getting pregnant (Lessard et al., 2012). In summary, perceived susceptibility implies the factors motivating a woman of reproductive age to use or not use any family planning service.

Family planning services remain one of the most potent means for sexually active women to prevent unwanted pregnancies and their consequences. In addition, it reduces maternal and infant deaths and morbidity (WHO, 2020). The Study by Apanga and Adam (2015) identified the factors responsible for family planning uptake and the barriers that could ensure the effectiveness of service delivery to women of the reproductive age group. The reproductive-aged women (18–49 years) represent the target population for this study. The study findings will help to facilitate an understanding of the relationship between CBD interventions to improve the uptake of family planning services in these communities.

Attitude (Perception of Family Planning Methods) and Use of Family Planning

Methods and Services

This is an essential construct of the model that addresses the obstacles faced by women in accessing family planning services. Many qualitative researchers have identified why women do not use these methods for the care and survival of their children. For example, a survey conducted among young women in sub-Saharan Africa showed that lack of access to family planning education and low awareness of how these services can be utilized served as significant barriers (Williamson, 2019). There were also concerns about the resulting side effects, possible risks attributed to disrupting menstrual cycles, and the fears of infertility. Besides, unmarried women were unwilling to risk the social stigma and discrimination associated with seeking such services in Northern Nigeria due to culture and religion (Williamson, 2019). These and more have been identified as significant barriers attributed to the low uptake of family planning services in Africa (Williamson, 2019).

Other research studies have further demonstrated how a lack of spousal support can affect the uptake of family planning services. According to WHO (2020), the low uptake of family planning services includes a lack of access to information and low levels of male involvement. Another study reported that women who were sexually active and were not looking to become pregnant, despite not using contraceptives, have an unmet reproductive health need (Sedgh & Hussain, 2014). The study findings also showed that women in sub-Saharan Africa fell under the barriers such as side effects, infertility, and poor sexual experiences (Sedgh & Hussain, 2014).

The study will examine whether the CBD through the CBDAs can increase knowledge to improve the uptake of family planning services. The attainability of the sustainable development goals before 2030 rests heavily on eliminating barriers to interventions that improve reproductive health for women and children. The use of family planning services can reduce the rate of maternal and child mortality and reduce the rate of unsafe abortions and unplanned pregnancies among women within the reproductive age range. Globally, barriers to the uptake of family planning services include (a) limited choice of methods, (b) fear of infertility, (c) cultural, traditional, and religious beliefs, (d) inaccessibility to these services, (e) bias against the women and the health provider, (f) marital status, (g) level of education and (h) occupation (WHO, 2020). The findings from this study will provide insight into how CBD interventions can effectively ensure that women have quick access to these family planning services from trusted service providers within the communities.

The underlying reasons for the high rates of unintended pregnancies are the non-use of family planning methods, less effective methods, and inaccurate and infrequent use. In addition, racial bias and ethnic differences in beliefs and traditions contribute to unintended pregnancies (Dehlendorf et al., 2014). However, despite the barriers and reasons for the low uptake of these services, health providers have the potential ability to influence the use of contraceptives when women visit health care facilities, mainly because individuals are more likely to accept use based on a medical prescription or a procedure (Dehlendorf et al., 2014). Therefore, in cases where CBD strategies are adopted within various locales, it becomes possible to provide more access to convince

these women and their partners to be more open to contraceptive utilization (Dehlendorf et al., 2014). One such way is to provide medical counseling to help women, regardless of race or ethnicity, improve their reproductive health by using suitable and effective family planning services in planning pregnancies.

The numerous barriers to family planning services among women of reproductive age are cut across several sub-Saharan countries (Ochako et al., 2015). The obstacles to utilization are similar and tend to take deep roots in these nations' cultural and traditional belief systems. Ochako et al. (2015) conducted a qualitative study on barriers to contraceptive utilization among women in Kenya. The findings revealed that the non-use of family planning services was due to social perceptions, myths, and misconceptions. These myths and misconceptions were centered around the fear of being infertile, possible congenital disabilities, and anomalies that may result after birth (Ochako et al., 2015). One crucial consideration is that the women in the study belonged to the low socioeconomic class in the country's urban and peri-urban regions. These imply that these may also be a reason for the low uptake of family planning services, hence the need to investigate the effectiveness of CBD interventions in providing solutions to these barriers.

Some research studies have been conducted to determine and identify the barriers women of reproductive age face in the uptake of family planning services. For example, a study conducted by Adongo et al., 2014 explains the reason for low contraceptive uptake showed the women being held back by their belief systems about contraception, changes in the menstrual cycle, hormonal imbalances coupled with insufficient knowledge of

reproductive health, and the mechanism of operation in the use of contraceptives

(Adongo et al., 2014).

Community-Based Distribution Intervention and Practice of Family Planning

The commitment to policy development and formulation of the CBD intervention

is observed in the region's health indicators for women of reproductive age (Bongaarts,

2016; Casterline & El-Zeini, 2014). The CBD strategy deploys community health

workers as CBDAs to the community level to increase awareness and knowledge of

various family planning methods (Dawson et al., 2013; Hoke et al., 2012). More public

health services have been recently introduced to community health workers, including

providing reproductive health services at the community level. These feature the

recruitment and training of more professional hands who extend family planning services

coverage in the community through the primary health care system (Scott et al., 2015).

Although the sustainable development goals aim to improve the utilization of

modern contraceptives, more than 225 million women in low- and middle-income

countries who wish to get pregnant are not using any form of modern contraceptives

(Osotimehin, 2015). According to global data reports, the worldwide utilization of

contraceptives is at 64% compared to the least developed countries, whose uptake is less

than 40% (United Nations Publications, 2017). It has been reported that community-

based integrated approaches effectively improve contraceptive uptake among women

(United Nations Publications, 2017). There is a commitment to increasing the

contraceptive prevalence rate from 35–55% and reducing its total fertility rate from 3.8

births per woman to 2.6 deliveries (FPS, 2012).

Across various parts of the world, many countries have designed and adopted different CBD strategies to address the reproductive health needs of women and children. For example, in Tanzania, community health agents were deployed to various regions of rural areas to expand access to women who require these family planning services (Sheff et al., 2019). However, the findings from the Study showed that community health agents had little or no impact on increasing the uptake of contraceptives among women in those selected areas (Sheff et al., 2019). The study also suggested expanding access across geographical zones and communities without breaking the socio-cultural barriers such as marital status, level of education, male involvement, spousal support, social discrimination, women's right to contraceptive use, and addressing perceived risk to health. The resulting side effects oppose contraceptive benefits to women (Sheff et al., 2019).

Definitions

The variables within the context of the study are defined as follows:

Age: This is the controlling variable defined as the length of time a person has lived (Westar, 2021). Age is measured in years.

Attitude: is a way of thinking or feeling about something (Westar, 2021). The variable is a mediator. This variable is measured by asking about the perception of the CBD strategy and a change in attitude towards accepting different types of family planning methods. The response format was binary (yes or no).

Community-based distribution (CBD) *strategy*: This is an independent variable. Participants were asked to answer yes or no: "Did you hear about the community-based

distribution strategy? The knowledge of the CBD strategy is information, and skills acquired through experience or education, theoretical or practical understanding of a subject, i.e., information on the CBD strategy that encourages the uptake of various family planning methods (Westar, 2021).

Family planning: limiting, timing, and spacing children through different means of preventing pregnancy (WHO, 2020). The study uses this term, but it is not a variable in this study.

Level of education: This controlling variable is the formal education level completed (Westar, 2021). The participant's level of education was categorized as never educated, Qur'anic, primary, secondary, and post-secondary.

Marital status: This is a controlling variable defined as being single, married, widowed, or divorced (Westar, 2021). In this instance, the representation was for only married or single, with the other option listed as other.

Maternal health: is women's health during pregnancy, childbirth, and postnatal (WHO, 2020). The paper uses this term, but it is not a variable in this study.

Occupation: This is a controlling variable defined as a job or profession; in this instance, the participants responded to either being a housewife, student, self-employed, unemployed, and in-employment.

Practice: This is a dependent variable. This variable is operationalized by asking which method the respondent has used. Family planning is a contraceptive method that protects users against unplanned pregnancies for a single use for a day and month or long-acting for 2 to 5 years, listed as the pill, injectables, condoms, implants, and IUCDs

(Bayer, 2022). Practice - is the application or use of an idea, belief, or method of Family

Planning (Westar, 2021). The variable is measured by the type of family planning method

used.

Religion: This is an independent variable defined as the belief and worship of

superior powers (Westar, 2021). This is represented as either Islam, Christianity, and

others.

<p style="text-align:center">Assumptions</p>

The study assumes that the CBD strategy used CBD agents to increase

information on the uptake of family planning methods. The assumption is that the CBD

strategy caused a change in attitude and uptake of family planning methods (pills,

injectables, condoms, implants, and IUCDs). It is assumed that women of reproductive

age in Northern Nigeria are more likely to take up family planning if given more

information. The assumption is that the study will require the age of the women to be

accurate to determine whether the right respondents participated (CDC, 2021). It is also

assumed that the women of reproductive age provided honest answers when the survey

was completed. It was believed that the women of reproductive age answered the survey

questions without assistance or coercion from peers or intentionally reported incorrect

information leading to biased answers (CDC, 2021).

These assumptions are important for the study's findings to be reliable and valid.

Regarding the age requirement, the assumption that people in that age category (18-49) is

critical because these ages are within the reproductive range. Therefore, the assumption

that the people who participated in this study fall within that range will help validate the

findings of this study. The assumption that the study questions were correctly answered without assistance is essential in knowing if the participants understand the CBD implementation.

Scope of Delimitations

The scope of the study is based on secondary data collected from women of reproductive age in Northern Nigeria by USAID in 2018. The delimitation of the study is the relationship between family planning services in value and meaning to other public health programs like the CBD strategy (Winetrobe et al., 2019). Since research findings have shown that at least 80% of unplanned pregnancies have been linked to the non-use or discontinued use of family planning services, there is a need for strategies among women in Northern Nigeria who do not wish to be pregnant (Sedgh et al., 2018). Another delimitation is that only women of reproductive age within the research communities participated in the data collection. In addition, only Nigerians within northern Nigeria were included in the study, reducing the ability to generalize the analysis to represent other communities. Other secondary factors include a lack of knowledge of family planning services, poor awareness, fear of side effects, and cultural, religious, and traditional beliefs and practices (Osotimehin, 2015). Based on the data collected and analyzed, exploring the effectiveness of CBDs could be pivotal in changing the narrative regarding the uptake of family planning services among women of reproductive age living in these communities.

Limitations

Limitations to the study include using secondary data and whether reliable data would be used to know if the CBD strategy increased the knowledge of family planning among women of reproductive age. In a study of this nature where secondary data is being used, it is preferable to use experimental and analytical design, which established claims, compared to the cross-sectional design, which is limited. Bias would be possible, where the study respondents have difficulty recalling the CBD strategy information, thus incorrectly completing the survey. During the data collection, some women of reproductive age would have turned down responding to the RQs, which had inclusion criteria. In some cases, women are entirely uninterested in contraceptives because they believe the methods control their fertility and may affect their ability to become pregnant (Kabagenyi et al., 2014).

Implications

Increased maternal mortality due to a lack of information on using various family planning methods is a significant public health concern in Northern Nigeria. Increased information through the CBD strategy for these women of reproductive age to take up family planning needs more encouragement because physiological changes occur in a woman's body during pregnancy due to hormonal changes (Wulifan et al., 2017). These triggers can cause a woman to perceive the need to protect her pregnancy and sponsor, making choices that favor remedying the situation if she perceives a threat (Wulifan et al., 2017). By propagating the use of family planning services for women, the CBD interventions and the influence of religion can create a simplified avenue to encourage

easy access to contraceptives and offer counseling to improve the health of both mother and child (Amah, 2016). The study can examine the effectiveness of CBD interventions in helping women make better reproductive health choices through the uptake of family planning services despite the barriers.

CBD promotes social change on a global scale. Modern contraception remains one of the most potent means of preventing unplanned pregnancies, permitting child spacing, and timing or delay before the subsequent pregnancy (Singh & Darroch,2017). According to findings from Singh and Darroch (2017), doubling efforts to tackle the unmet need for using modern family planning services would have prevented an estimated 54 million unplanned pregnancies, over 21 million unplanned births, and nothing short of 26 million abortions. This would have averted about 79,000 maternal deaths and more than one million infant deaths (Singh & Darroch, 2017). This implies that improving access to modern contraception is a vital means of protecting and preserving the lives of both women and children.

Despite the widely expressed need to address the issue of access to family planning services, there is still a shortage of resources to facilitate utilization, especially in low and middle-income countries, which have the highest maternal and newborn mortality figures (WHO, 2020). Therefore, the knowledge of mortality in the northern regions would be instrumental in comparing the effectiveness of CBD programs in these regions.

In Africa, CBD programs document outcomes that improve reproductive health. For example, in Tanzania, CBD programs were instrumental in expanding access to

condoms in the districts through community health agents, which are widely recognized and accepted in the communities (Sheff et al., 2019). However, the researcher did not align the use and distribution of condoms and contraceptive pills with the preferred family planning methods voted by women in the region. Instead of condoms and pills, the majority favored injectables (Sheff et al., 2019). In Southern Ghana, one of the community-based intervention strategies involved engaging males in facilitating the uptake of family planning services among women (Adongo et al., 2015).

Summary and Conclusions

The high maternal and child mortality rate has been attributed to the low uptake of family planning services (Frost & Frohwirth, 2018). However, using family planning methods through increased knowledge helps women rest between births to recuperate, avert unintended pregnancies, and provide ample time to cater to their children's health and well-being (Frost & Frohwirth, 2018). Research showed that without adequate information and advocacy, adopting effective family planning methods alone could not reduce maternal deaths by 40% and early child deaths by 10% (Frost & Frohwirth, 2018). CBD strategies through CBDAs could help lower the resistance against the acceptance of contraceptive utilization within these communities (Frost & Frohwirth, 2018). The barriers to contraceptive utilization include the level of education, marital status, occupation, religion, the fear of side effects, fear of social exclusion and discrimination, fear of being barren, spousal disapproval, and so many others that can be dislodged through health education and sensitizing communities with the correct information through awareness programs (Frost & Frohwirth, 2018).

Another opportunity with using CBDs is training women and health workers within the communities to sustain implemented interventions (NDHS, 2016). The more women are involved and participate in various intervention programs on reproductive health, the higher the chance of improving health outcomes (NDHS, 2016). Research showed that women given critical roles in the propagation of health services usually have a higher chance of success than those not involved (NDHS, 2016). Unfortunately, in northern Nigeria, increasing insecurities, religion, tribal and ethnic wars have hindered the uptake of contraceptives in these regions (Mihoko et al., 2017). In this study, I will examine how the CBD program influenced by religion will increase knowledge and the uptake of family planning services in Northern Nigeria.

Section 2: Research Design and Data Collection

Introduction

In this section, I outline the research methods used for the study. The purpose of this quantitative, cross-sectional study was to examine the relationship between the CBD strategy, religion, and attitude (perception of family planning information), to determine the practice of different types of family planning methods (pills, injectables, condoms, implants, and IUCD) while controlling for age, marital status, level of education, and occupation among women of reproductive age in Northern Nigeria. Consequently, the study findings may inform public health specialists, policy makers, key stakeholders, and donors about the need to improve reproductive health outcomes (maternal and child care, antenatal and postnatal care, prevention and treatment of sexually transmitted infections, quality service delivery, and postpartum care), behavioral change and effectiveness of the CBD program for women of reproductive age in Northern Nigeria. This section will discuss the research design, sampling procedures, validity, instrumentalization, operationalization of the study variables, ethical procedures, and study limitations.

Research Design and Rationale

In this cross-sectional study, I examined quantitative secondary data from the USAID data library. The purpose of this quantitative, cross-sectional study was to examine the relationship between the CBD strategy, religion, and attitude (perception of family planning information) to determine the practice of different types of family planning methods (pills, injectables, condoms, implants, and IUCD) while controlling for age, marital status, level of education, and occupation among women of reproductive age

in Northern Nigeria. Consequently, the study findings will inform public health specialists, policy makers, key stakeholders, and donors about the need to improve reproductive health outcomes (maternal and child care, antenatal and postnatal care, prevention and treatment of sexually transmitted infections, quality service delivery, and postpartum care), behavioral change and effectiveness of the CBD program for women of reproductive age in Northern Nigeria. The dependent variable was family planning uptake behavior, defined by the uptake of family planning (pills, injectables, condoms, implants, and IUCDs) methods. The independent variables were the CBD strategy and religion. The covariate (controlling) variables included the age group, marital status, level of education, and occupation of the reproductive women in the study. The mediator was the attitude toward family planning.

I analyzed quantitative data to measure the coverage and effect of the CBD intervention in the Jigawa, Katsina, Kebbi, and Zamfara States of Northern Nigeria. In addition, I compared the attitude, practices, and uptake of different types of family planning methods among those reached with the CBD strategy. The use of secondary data for analysis is more cost-effective. It gives access to a shorter time for analysis, additional insight, and findings from the initial intent of the data collected (Statistics How To, 2021).

Methodology

In this section, I describe the study population, sample size, and sample procedures I used in collecting secondary data from the USAID database. I examined the CBD strategy and religion with details on the operationalization of the variables used for the study and ethical procedures. I used the quantitative method to best inform public

health specialists, policy makers, and key stakeholders about the need to improve reproductive health outcomes, quality service delivery, behavioral change, and effectiveness of the CBD program for women of reproductive age in Northern Nigeria.

Population

For this study, I analyzed secondary data from the USAID data library. The library included data on women of reproductive age (18–49 years) residents in the targeted locations, namely Jigawa, Katsina, Kebbi, and Zamfara, when USAID carried out the CBD intervention strategy in 2018.

Sampling Procedures

Researchers with USAID (2018) used a two-stage cluster sample design. The cluster design is a probability sampling technique used for secondary data analysis that involves placing samples in a pattern by dividing the population around existing data points (Statistics How To, 2021). In the case of this research, the women of reproductive age who participated were from communities where the CBD intervention had been implemented (Statistics How To, 2021). Women had to be 18–49 years old to be included in the current study. The participants must have heard about family planning, child spacing, or the CBD intervention from CBDAs. For the current study, 809 women of reproductive age were selected.

Data Access, Reputability, and Quality

The database is saved on the USAID Data Library with access through registration with username and password. The data from USAID are highly credible through the DOC (Documentation Outreach Communication) as they have been family

planning donors in Nigeria. At the request of the final access to the data, the email address and student identification number from Walden University must be submitted to the USAID data library as part of verification (USAID, 2018).

The data set for the study from the USAID data library contains the study population and variables needed to answer my RQ with the location details of the CBD strategy through CBDAs with the representation of knowledge, attitude, and practice of women of reproductive age from Northern Nigeria. The evaluation was conducted in two randomly selected CBD implementation Local Government Areas (LGAs) in each of the selected Northern states in 2018 (a) a CBD implementation ward as the study group (b) and a non-CBD implementation ward as the control group. The CBD intervention group and non-CBD control groups were comparable for most background characteristics.

According to USAID, the data was collected through a data collection application, CSpro. The software for this secondary analysis was SPSS 28, after data cleaning and recoding where applicable. Data cleaning was based on the inclusion criteria of women of reproductive age who had received family planning services through the CBD strategy. The missing data was handled through listwise deletion and available case analysis. The listwise deletion dropped cases from the data set because it had missing values in at least one of the specified variables. When done, the analysis was only run on cases with a complete data set.

Sample Size and Power Analysis

According to Creswell & Creswell (2018), the best conclusions from a study are always determined by a large sample size, but this has financial and time constraints.

Therefore, a fraction of a bigger sample can be analyzed to draw inferences and

recommendations that will be needed. In this study, the power analysis examined the

relationship between the dependent and independent variables and determined the sample

size estimation. A multinomial logistic regression model was used for the study because

the dependent variable represented as (methods used) has five nominal categories:

method 1 - Pills, method 2 - Injectables, method 3 - Condoms, method 4 - Implants, and

method 5 - IUCDs. Method 1- Pills will be used as the reference category.

The sample size of respondents was calculated using the G* Power ($N = \beta/\alpha$;

both α and $1 - \beta$ are computed as functions of effect size, N Population size, and a

probability ratio) of the total data size, specifically by the population of women of

reproductive age in the sample communities selected states. Therefore, based on the

entire population randomly chosen for the study was 402 per site CBD site, and the non-

CBD site gave a total of 6,432 using a 95% confidence level and a 5% margin of error,

the sample size of 809 will represent the sample from the four states where data was

collected for analysis to determine the accuracy of the study results (Frankfort-Nachmias

et al., 2021).

Instrumentation and Operationalization

United States Agency for International Development (USAID), through its

implementing partner Association for Reproductive and Family Health (ARFH),

collected the data in 2018 in four states of Northern Nigeria. The instrumentation used to

collect the data was a quantitative survey to collect data among women of reproductive

age 18 -49 years where there was a CBD strategy compared to where there was no CBD

implementation as a control group. Some questions included women who had heard

family planning information from a CBDA to test a change in attitude that led to the

uptake of family planning (pills, injectables, condoms, implants, and IUCDs) methods.

The study results have been made public by USAID in the Development Data Library

(DDL) and stored internally within USAID to modify the other family planning activities

within USAID implementing partners.

Operationalization of Each Variable

The independent variable for the study was the CBD strategy, which refers to

disseminating family planning information through the CBDAs. This CBD strategy

involved providing information and contraceptive methods in the community while

considering the community's needs and resources. Participants responded to whether they

had heard of the family planning method from the CBDA. The CBD strategy variable

will be coded as 1 = Yes and 2 = No. Religion was also used in the study as an

independent variable coded into Islam = 1, Christianity = 2, and other = 3. Attitude

(perception of different family planning methods was used as an independent and

mediator variable. Participants were asked whether CBDA would influence their

perception of the family planning method. The variable was coded 1 = Yes, 2 = No. The

dependent variable was the practice (different types of family planning methods). The

methods used several categories of 1 = Pills, 2= injectable, 3= condoms, 4= implants, and

5 = IUCD. The practice variable is re-coded so that the final variable will have five

categories representing five family planning methods.

Age was the control variable in this study. The age categories were 1 = 15 – 19 years, 2 = 20 – 29 years, 3 = 30 – 39 years, and 4 = 40 – 49 years. Marital status is code 1=married, 2= single, and 3= other. The level of Education was coded as 1 = never educated, 2 = Qur'anic, 4 = primary, 4 = secondary, and 5 = post-secondary. The occupation was coded as 1 = housewife, 2 = student, 3 = self-employed, 4 = unemployed and 5 = in-employment. The mediator variable was the attitude (perception toward family planning methods). Participants were asked whether CBD would influence their perception of the family planning method. The variable was coded 1 = Yes, 2 = No. Table 1 shows the type and level of measurement of each variable.

Table 1

Overview of Study Variables

Variable name	Type of variable	Level of measurement
CBD strategy	Independent	Categorical/nominal
Religion	Independent	Categorical/nominal
Attitude (perception of family planning methods)	Independent or mediator	Categorical/nominal
Age	Covariate (Controlling)	Categorical/ordinal
Marital status	Covariate (Controlling)	Categorical/nominal
Level of education	Covariate (Controlling)	Categorical/nominal
Occupation	Covariate (Controlling)	Categorical/nominal
Practice (type of family planning uptake method)	Dependent	Categorical/nominal

Note. CBD = community-based distribution.

Data Analysis Plan

Secondary data was used for the quantitative data collected from reproductive women aged 18 – 49 years in Northern Nigeria by USAID. The data for the study was downloaded from the USAID data library using a certified username and password exported to SPSS 28. Formal permission was sought to access the data. All ethical procedures were followed to avoid violating privacy and confidentiality. I obtained permission from Walden University's Institutional Review Board, with approval number 04-24-0986209, to use secondary data. In addition, the data set is reputable in terms of representation of the population of the study, which is women in Northern Nigeria.

The data was analyzed using Statistical Package for the Social Sciences via the USAID development data library with access through username and password creation. The data selected from the USAID data library are credible and vetted before being available for public use and analysis. The data analysis is the identification of data sets, interpretation, and representation of findings in tables and charts with explanations in line with the RQs.

The data was examined for screening which checks for data errors. The missing data was handled through listwise deletion and available case analysis. The listwise deletion dropped cases from the data set because it has a missing value in at least one of the specified variables. When done, the analysis will only run on cases with a complete data set. The multinomial logistic regression model will be used to analyze the dependent variable; family planning methods have five categories: method 1 - Pills, method 2 - Injectables, method 3 - Condoms, method 4 - Implants, and method 5 - IUCDs. In order

to validate that the findings of the study are valid, linearity, outliers, independence, and multicollinearity will be examined.

Research Questions and Hypotheses

RQ1: Is there a relationship between CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation?

$H_0$1: There is no relationship between the CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

H_A1: There is a relationship between the CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

RQ2: Is there a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as

mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation?

$H_0$2: There is no relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation.

H_A2: There is a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation.

Detailed Analysis

The study used descriptive analysis, and results were represented as tables and frequencies for all the variables where applicable. In addition, a bivariate analysis was conducted to assess the existence of a relationship using the chi-square test between independent variables CBD strategy, religion, attitude (perception of family planning methods), and dependant variable practice of different types of family planning methods (pill, injectables, condoms, implants, and IUCD) while controlling for age, marital status, level of education and occupation for RQ1 (Wagner, 2020).

The relationship between the independent variable, CBD strategy, religion, and the dependent variable of the practice of different types of family planning methods (pill, injectables, condoms, implants, and IUCD) with the mediator variable, attitude (perception of family planning methods) through a Sobel test while controlling for age, marital status, level of education and occupation using chi-square to report the p-value used to assess statistical significance for RQ2 (Wagner, 2020).

Also, multinomial logistic regression was used to determine the relationship between independent variables CBD strategy, and religion, with mediator variable attitude (perception of family planning methods) on the practice of different types of family planning methods (pill, injectables, condoms, implants, and IUCD while controlling for age, marital status, level of education and occupation. The use of multinomial logistic regression for RQ2 generated odds ratios (OR) and the associated 95% Confidence interval (CI) (Wagner, 2020).

Several assumptions are examined as a part of the analysis (see Appendix). First, an assumption tested if autocorrelation for residual values was independent, reducing the accuracy and narrowing the confidence interval to 95% (Wagner, 2020). In testing the autocorrelation using the Durbin-Watson statistic, the residual versus the time plot can clearly show correlated patterns of residual values (Hahn & Meeker, 2021). The second assumption (see Appendix) tested for the presence of multicollinearity to reduce incorrect conclusions about the relationship between the dependent and independent variables (Hahn & Meeker, 2021). It is essential to understand that when predictors are correlated, the estimated regression coefficient depends on which other predictors are available in

the model. A third assumption (see Appendix) examined whether non-constant variance in the error terms results in heteroskedasticity to test for the distribution of residuals by checking the probability plot (Hahn & Meeker, 2021). This tested the variance amount of error. A fourth assumption is that there were no extreme outliers. Logistic regression is sensitive to outliers using Mahalanobis and Cook's Distance values (Wagner, 2020). Table 2 shows the RQs, the variable, the measure level, and the test type used to analyze each RQ.

Table 2

Overview of Study Variables and Statistical Tests

Research question	Variable (type)	Level of measurement	Test
RQ1: Is there a relationship between CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation?	CBD strategy (independent)	Categorical	Frequencies, multinomial logistic regression
	Religion (Independent)	Categorical	
	Attitude (perception of family planning methods; independent)	Categorical	
	Practice (type of family planning methods; dependent)	Categorical	
	Age group (covariate or controlling)	Categorical/ordinal	
	Marital status (covariate or controlling)	Categorical	
	Level of education (covariate or controlling)	Categorical	
	Occupation (covariate or controlling)	Categorical	
RQ2: Is there a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation?	CBD strategy (independent)	Categorical	Frequencies, multinomial logistic regression
	Religion (independent)	Categorical	
	Type of family planning methods (pills, injectables, condoms,	Categorical	

implants, and IUCDs; dependent)	
Attitude (perception of family planning methods; mediator)	Categorical
Age group (covariate)	Categorical/Ordinal
Marital status	Categorical
Level of education	Categorical
Occupation	Categorical

Note. CBD = community-based distribution; IUCD = intrauterine devices.

Threats to Validity

External threat to validity was the limitation of the study to women of reproductive age in Northern Nigeria, which reduces the potential for the study to be generalized. Internal threat to validity was using secondary data. Using different research approaches to examine the same issue is essential in improving the credibility of the findings. Other threats to the validity of this study included the selection of subjects from the two sites within four states of Northern Nigeria. The research design and the selected plan focused on objectively dealing with participants and eliminating bias. Therefore, measures taken to address potential threats to the validity of the proposed study's findings included using random sampling to prevent selection bias in including participants. In addition, triangulation was used to enhance the study findings' validity and credibility.

Ethical Procedures

In research involving human participants, such as the proposed study, there are concerns about the anonymity and security of data sets. The research, in this case, involved the participant's medical information, which is sensitive information. There

were protection measures in place by USAID that ensured the anonymity of the data and to protect the confidentiality of the participants. Any unauthorized parties did not have access to the data in the study. The data was stored securely and protected by passwords. The study did not reveal the identity of any selected women from the study community. I followed the strict process set forth by Walden University's Institutional Review Board for the use of secondary data.

Summary

The study's methodology is discussed in section two through a descriptive cross-sectional design of the quantitative data set. The USAID data of 2018 is used to answer and analyze the relationship between the CBD strategy, religion, attitude (perception of family planning methods), and the type of family planning methods (pills, injectables, condom, implants, and IUCD) while controlling for age, marital status, level of education and occupation. The details in section two include the study population, sampling procedure, definition of variables, instrumentation, operationalization of the variables, a threat to validity, and ethical procedures. Since secondary data will be used in this study, investigating the knowledge gap that must have been present through CBDs is essential to examine the relationship between the perception and utilization of contraceptive methods among women of reproductive age. The results and statistics of the analyzed data will be detailed in section three.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative cross–sectional study was to examine the

relationship between CBD strategy, religion, and attitude (perception of family planning

information) to determine the practice of different types of family planning methods

(pills, injection, condoms, implants, and IUCD) while controlling for age, level of

education, marital status, and occupation among women of reproductive age in Northern

Nigeria. The study findings may provide insight that researchers and health practitioners

can use to improve reproductive health outcomes and help women of reproductive age

understand the need to use family planning to space their children to reduce multiple

births leading to maternal death and have the number of children they can care for in the

future.

The RQs and hypotheses for this study were as follows:

RQ1: Is there a relationship between CBD strategy, religion, and attitude

(perception of family planning methods) to determine the practice of different types of

family planning methods (pills, injection, condoms, implants, and IUCD) in women of

reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital

status, level of education and occupation?

$H_0$1: There is no relationship between the CBD strategy, religion, and attitude

(perception of family planning methods) to determine the practice of different

types of family planning methods (pills, injection, condoms, implants, and IUCD)

in women of reproductive age (18–49 years) in Northern Nigeria while

controlling for age, marital status, level of education and occupation.

*H*_A1: There is a relationship between the CBD strategy, religion, and attitude

(perception of family planning methods) to determine the practice of different

types of family planning methods (pills, injection, condoms, implants, and IUCD)

in women of reproductive age (18–49 years) in Northern Nigeria while

controlling for age, marital status, level of education and occupation.

RQ2: Is there a relationship between the CBD strategy and religion to determine

the practice of different types of family planning methods (pills, injection, condoms,

implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as

mediated by attitude (perception of family planning methods)while controlling for age,

marital status, level of education and occupation?

*H*₀2: There is no relationship between the CBD strategy and religion to determine

the practice of different types of family planning methods (pills, injection,

condoms, implants, and IUCD) in women of reproductive age (18–49 years) in

Northern Nigeria as mediated by attitude (perception of family planning

methods)while controlling for age, marital status, level of education and

occupation.

*H*_A2: There is a relationship between the CBD strategy and religion to determine

the practice of different types of family planning methods (pills, injection,

condoms, implants, and IUCD) in women of reproductive age (18–49 years) in

Northern Nigeria as mediated by attitude (perception of family planning methods)

while controlling for age, marital status, level of education and occupation.

In Section 3, I discuss the data set I used and present the results of the secondary

data analysis. In the Accessing the Data Set for Secondary Data Analysis subsection, I

detail the time frame during which I obtained the data set. I provide descriptive and

demographic characteristics of the reproductive-age women in the sample. The Results

subsection includes a description of the data analysis and findings, statistical analyses

using a multinomial logistic regression model, and a discussion of the results of the RQs.

After presenting the results, I summarize the section's key points and provide a transition

to Section 4.

Assessing the Data Set for Secondary Data Analysis

I obtained the data set for the secondary data analysis from a database available in

the USAID Data Library with access through registration with username and password.

In the primary study, USAID researchers used a cross-sectional quantitative study to

assess the CBD intervention's effects on women of reproductive age through simple

random sampling in Jigawa, Katsina, Kebbi, and Zamfara States of Northern Nigeria. The

data from USAID were collected in 2018, are highly credible, and accessible through the

Documentation Outreach Communication (DOC) as family planning donors in Nigeria.

To obtain access to the data, I submitted my email address and student identification

number from Walden University to the USAID data library as part of verification

(USAID, 2018).

The sample size of 809 from the data set for the study from the USAID data library contained the study population and variables needed to answer the RQs with details of the CBD strategy of women of reproductive age. The response rate for participants from Northern Nigeria was 21% for 15–19 years, 71% for 20–29 years, 56% for 30–39 years, and 36% for 40–49 years. USAID collected the data through a data collection application, CSpro, and analyzed it with data analysis software, SPSS 28, after data cleaning and recoding where applicable (USAID, 2018). Data cleaning was based on the inclusion criteria of women of reproductive age who had received family planning services through the CBD strategy. There was no change in the study data collection plan presented in Section 2; therefore, no discrepancies are reported.

Sample Characteristics

The controlling variables included respondent demographic characteristics represented as frequencies and percentages in Table 3. All the participants were women of reproductive age, giving 100% of the sample. The participants' ages were categorized into four groups: 15–19 years, 20–29 years, 30–39 years, and 40–49 years. The largest age group was 20–29 years, with 337 individuals or 41.7% of the sample. The next largest age group is 30–39 years, with 266 individuals or 32.9% of the sample. The 15–19 and 40–49 age groups were the smallest, with 53 and 153 individuals, or 6.6% and 18.9% of the sample. The majority of the study sample, 773 (95.6%), were married; only 22 (2.7%) were single, while 14 respondents (1.7%) were categorized as others. Most 268 (66.9%) respondents answered "yes," indicating they had attended school. On the other hand, 268 respondents, or 33.1% of the total respondents, answered "no."

Table 3 shows that only 285 respondents, or 35.2%, attended Quranic school.

One-hundred forty-five respondents, or 17.9% of the total respondents, attended primary

school. Eighty-three respondents, or 10.3% of the total respondents, attended secondary

school. Twenty-eight respondents, or 3.5% of the total respondents, attended

postsecondary education, whereas 268, or 33.1%, had no education. The respondents'

occupation shows that most were housewives (40.2%) or self-employed (47.3%), while

1.2% were students, 2.2% were unemployed, and 9.9% were employed.

Table 3

Study Sample Characteristics: Controlling Variables

Confounding variable	f	%
Age group		
15–19 years	53	6.6
20–29 years	337	41.7
30–39 years	266	32.9
40–49 years	153	18.8
Marital status		
Married	773	95.
Single	22	2.7
Other	14	1.7
Level of education		
No education	268	33.1
Quranic	285	35.2
Primary	145	17.9
Secondary	83	10.3
Postsecondary	28	3.5
Occupation		
Housewife	325	40.2
Students	10	1.2
Self-employed	383	47.3
Unemployed	18	2.2
In-employment	73	9.0

Note. N = 809.

For the independent variable, CBD strategy, I measured responses to ever heard about CBD or seen CBD agents, either Yes or No. Table 5 indicated that 579 respondents, or 71.6% of the total respondents, answered "Yes," indicating that they have seen CBDAs or heard of CBD. On the other hand, 230 respondents, or 28.4%, said No. For religion, 805 respondents, or 99.5% of the total respondents, practiced Islam, while three respondents, or 0.4%, identified as practicing Christianity. In contrast, one respondent, or 0.1% of the total respondents, identified as having another religion, as shown in Table 5. In Table 5, attitude (perception of family planning methods) shows that 582 respondents, or 79.1% of the total respondents, answered "Yes," indicating that they believe the CBD strategy provided information, education, and communication that influenced the uptake of family planning methods.

On the other hand, 20 respondents, or 2.5% of the total respondents, answered "No," indicating that they do not believe the CBD strategy provides information, education, and communication leading to the uptake of family planning. In comparison, 34 respondents, or 4.2% of the total respondents, answered "Not Sure," indicating they were unsure whether the CBD strategy provided such information, education, and communication. The valid percent column shows the percentage of respondents within each valid category, while the cumulative percent column shows the cumulative percentage of respondents. Table 4 also shows that 227 respondents provided a valid response to the question, while 582 respondents did not provide a valid answer or did not respond to the question.

The attitude (perception of family planning methods) was also a mediator variable in RQ2. Participants were asked whether CBD would influence their perception of the family planning method. The variable is coded 1 = Yes, 2 = No, 3 = Not Sure, with 582, or 79.1%, accepting a change in perception by the CBD strategy and 20 respondents, or 2.3%, saying No to the influence of CBD on their perception of family planning methods.

Table 4

Study Sample Characteristics: Independent Variables

Independent Variables	*f*	%
CBD Strategy		
Yes	579	71.6%
No	230	28.4%
Religion		
Islam	805	99.5%
Christianity	3	0.4%
Others	1	0.1%
Attitude (Perception)		
Yes	582	71.9%
No	20	2.5%
Not Sure	34	4.2%
Missing system	173	21.4%

Note. N = 809

The frequencies and percentages of the dependent variable, the practice of the different types of family planning methods, showed pills at 30.4%, injectables at 27.8%, condoms at 19.1%, implants at 7.9%, and IUCD 1.1%, are represented in Table 5.

Table 5

Study Sample Characteristics: Dependent Variable

Dependent Variable	Frequency	Percentage
Practice (Types of Method)		
Pill	246	30.4%
Injectable	154	27.8%
Condoms	225	19.1%
Implants	64	7.9%
IUCD	9	1.1%
Missing System	111	13.7%

Note. $N = 809$

Table 6

Coding: Family Planning Methods (Independent Variable Recode)

Range	Original Code	New Code
Daily Pills	1	1
After Sex Pills	2	1
Male Condoms	3	2
Female Condoms	4	2
Injectable	5	3
Implants	6	4
IUCDs	7	5

USAID used a simple random sampling technique to collect data in this study.

Therefore, using a sample size of 809 adequately represents the women of reproductive

age as my target population to answer the RQs.

Univariate Analysis

The univariate analysis table, Table 7, highlights the mean results for family

planning methods as an index variable based on the average of five items comprising the

number of pills, injectables, condoms, implants, and IUCD. The mean finding was 2.11,

with an SD of 1.40. The family planning methods was the dependent variable though a

continuous variable because the count of the method uptake in numbers but measured as

a categorical variable. The result shows that 86.3% of the sample's responses took family

planning methods, 66.9% had a level of education, and 96.6% had other occupations. The

responses from the study had 95.6% of married women separated into different age

categories of 6.6% for 15-19 years, 41.7% for 20-29years, 32.9% for 30-39yeqrs, and

18.8% for 40-49years, respectively.

Table 7

Univariate Analysis

Characteristics	*N*	%	Mean	*SD*
Family Planning Methods	698	86.3	2.11	1.40
Level of Education	541	66.9		
Marital status	773	95.6		
Occupation	781	96.6		
Age group	809	100		

a. R Squared = .036 (Adjusted R Squared = .009) *Note* - Dependent Variable Family Planning methods had five categories – Pills, injectables, condoms, implants, and IUCD.

Results

In this section, the USAID data set analyzed contains all the variables. Before the statistical test, I will discuss the results of the two RQs I tested.

Research Question 1 Results

RQ1: Is there a relationship between CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation?

$H_0$1: There is no relationship between the CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

H_A1: There is a relationship between the CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

For RQ 1, I conducted a bivariate analysis of the independent variable CBD strategy, religion, and attitude (perception) and dependent variable practice of different types of Family Planning Methods (Pills, Injectables, Condoms, Implants, and IUCD) to get chi-square tests. As a result, the chi-square test for the total sample had a value of 6.210, with 2 degrees of freedom, and the asymptotic significance (2-sided) was .014. This means that the relationship between the two variables in the total sample is statistically significant because the p-value is greater than 0.05, as seen in Table 8. The indication of 0.014 as a p-value shows a relationship between the categorical variables: the DV and IV are statistically significant. As such, I will reject the null hypothesis stating no relationship between the CBD strategy and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation.

Table 8

Chi-Square Test Results for CBD Strategy, Religion, and Attitude Against Practice

	Value	Df	Asymptotic significance (2-sided)
Pearson Chi-Square	6.210[a]	4	.014
Likelihood Ratio	6.263	4	.180
Linear-by-Linear Association	4.202	1	.004
N of Valid Cases	689		

a. 0 cells (20.0%) have an expected count of less than 5. The minimum expected count is

.34.

Table 9

Symmetric Measures for CBD Strategy, Religion, and Attitude Against Practice

		Value	Approximate Significance
Nominal by Nominal	Phi	.342	.014
	Cramer's V	.342	.014
N of Valid Cases	689		

Looking at the dependent and independent variables for RQ1, the independent

variable, CBD strategy and religion, are dichotomous and have no outliers. The

dependent variable of the practice of different types of family planning methods is

recorded from seven to five categories (see Table 6). The independent and dependent

variables are categorical and independent of observation, which meets the assumption of

the nominal measurement scale.

The reference for the dependent, independent, controlling, and mediator variable

categories must be explained in discussing the multinomial logistic regression results. For

the age group, women of reproductive were used in the reference category, which is

between 20 to 29 years, and marital status, married was the reference category. For the

level of education controlling variable, Qur'anic education is the reference category,

while for occupation, the reference category is the housewife. The reference category is

yes for the independent variables, CBD strategy and attitude, which was also a mediator

variable, while religion is Islam. Finally, the reference category was pills for the

dependent variable practice (uptake of family planning methods). The reference

categories are used to compare the other categories for the dependent, independent,

controlling, and mediator variables.

The multinomial logistic regression model analysis found the model statistically

significant ($p = .001$). The R^2 of the model was between 0.399 (Cox and Snell) and 0.344

(Nagelkerke), meaning that this specific model explained the variance in predicting the

CBD strategy. Examining individual variables in the model, I found that the variables

that significantly predicted the practice of different types of family planning methods

(pills, injectables, condoms, implants, and IUCD) were age group (20 to 49 years), level

of education (Quranic), and occupation (housewife) except age group (15 to 19 years),

marital status (the majority were married) and religion (all Muslims) which all showed

no value because one category was dominant and excluded from further analysis with the

significance of .0. Age group (20 to 29 years) led to 1.13 higher odds of the practice of

different types of family planning methods ($p < 0.021$). Age (30 to 39 years) led to .699

times higher odds of the practice of different types of family planning methods ($p = $

$<.001$), and 40 to 49 years led to .781 times higher odds of practice (uptake of different

family planning methods ($p = < .003$). Level of education (Quranic) led to .858 higher

odds of the practice of different types of family planning methods than individuals with

less than a high school education ($p < 0.016$). Occupation (housewife) led to .682 higher

odds of the practice of different types of family planning methods ($p < 0.014$), the CBD

strategy, and attitude (perception). The odd ratio shows the strength of the association

between the dependent and independent variables. In this case, the age group between 30

-49 years, Qur'anic education, the occupation had a strong association because they were

less than one and the probability of influencing the practice and uptake of different family

planning methods. The variables predictive of practice of different family planning

methods were age group (20 to 49 years), educational level, occupation, CBD strategy,

and attitude. See Table 10 for all statistics associated with RQ1.

Table 10

Logistic Regression Predicting CBD Strategy, Religion, Attitude, and Practice
Controlling for Age Group, Marital Status, Level of Education, and Occupation

	B	S. E	Wald.	*df*	*p*	Odds Ratio	95% C.I. for Odds Ratio Lower	Upper
Age 15-19			3.937	1				
Age 20-29	-.435	.145	8.945	1	<.001	.647	.487	.861
Age 30-39	-.125	.146	.735	1	.003	.882	.662	1.175
Age 40-49	-.125	.146	.735	1	.003	.882	.662	1.175
Marital status	.0[b]	.0		1	.0	.	.	.
Level of Educational	-.106	.044	5.791	1	.016	.858	.825	.981
Occupation	-.076	.116	.425	1	.014	.682	.859	1.092
CBD strategy	-.052	.058	.805	1	.001	.953	.940	.980
Religion	.0[b]	.	.	1	.0	.	.	.
Attitude	-.061	.124	.387	1	<.001	.631	.445	.765
Practice (Types of Methods)								
Pills	-.061	.124	.387	1	.534	.931	.745	1.165
Injectables	.022	.134	.096	1	.782	1.042	.801	1.357
Condom	-.009	.109	.003	1	.958	.884	.803	1.231
Implants	-.007	.115	.001	1	.886	.684	.785	1.233
IUCD	.109	.921	.042	1	.920	1.233		
Constant	.233	.642	.812	1	.003	1.610		

Research Question 2 Results

RQ2: Is there a relationship between the CBD strategy and religion to determine

the practice of different types of family planning methods (pills, injection, condoms,

implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation?

$H_0$2: There is no relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation.

H_A2: There is a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods) while controlling for age, marital status, level of education and occupation.

Looking at the dependent, independent, and mediator variables for RQ2, the independent variable, CBD strategy and religion were dichotomous and had no outliers. The dependent variable was recoded from seven to five categories (see Table 11). The independent variable, CBD strategy, and the mediator, attitude, influenced the practice (different family planning methods). The independent and dependent variables are categorical and independent of observation, which meets the assumption of the nominal measurement scale. The mediator variable, attitude (perception of family

planning methods), is used to understand if the CBD strategy increased the practice of different family planning methods.

Analysis through the multinomial logistic regression model, variables were statistically significantly correlated ($p = .003$). The R^2 of the model was between 0.091 (Cox and Snell) and .104 (Nagelkerke). The analysis for the variables showed that CBD strategy ($p = .001$), age group 20 - 29 years ($p = <.001$), 30 – 39 years ($p = .003$), educational level ($p = .016$) occupation ($p = .014$) significantly predict practice of different types of family planning methods. From the analysis from RQ1, I excluded marital status and religion for RQ2.

Table 11

Logistic Regression Predicting CBD Strategy, Religion, Practice Mediating With Attitude and Controlling for Age, Marital Status, Level of Education, and Occupation

	B	S. E	Wald.	*df*	*p*	Odds Ratio	95% C.I. for Odds Ratio Lower	Upper
Age 15-19			3.937	1				
Age 20-29	-.435	.145	8.945	1	<.001	.647	.487	.861
Age 30-39	-.125	.146	.735	1	.003	.882	.662	1.175
Age 40-49	-.125	.146	.735	1	.003	.882	.662	1.175
Level of Educational	-.106	.044	5.791	1	.016	.858	.825	.981
Occupation	-.076	.116	.425	1	.014	.682	.859	1.092
CBD strategy	.052	.058	.805	1	.001	.953	.940	.980
Attitude	.061	.124	.387	1	<.001	.631	.445	.765
Practice (Types of Methods)								
Pills	-.061	.124	.387	1	.534	.931	.745	1.165
Injectables	.022	.134	.096	1	.782	1.042	.801	1.357
Condom	-.009	.109	.003	1	.958	.884	.803	1.231
Implants	-.007	.115	.001	1	.886	.684	.785	1.233
IUCD	.109	.921	.042	1	.920	1.233		
Constant	.233	.642	.812	1	.003	1.610		

Summary

In the analysis of my study, I found that the variables, age, level of education, occupation, CBD strategy, and attitude all significantly predicted the practice of different types of family planning methods (pills, injections, condoms. Implants, and IUCD). Marital status and religion do not significantly predict the practice of different family planning methods. This is because the multicollinearity among the predictors is low, indicating that they are independent and contribute unique information to the model. In addition, the age 20 to 49 years, being married, with qur'anic education, hearing about the CBD strategy and attitude (perception of family planning methods) are predictors of the practice of different types of family planning methods (pills, injections, condoms. Implants and IUCD).

In Section 4, I consider how the study results may inform professional practice and potentially lead to positive social change. I also interpret the findings about the theoretical framework. Section 4 also includes a discussion of the study's limitations, recommendations to increase the CBD strategy as an intervention in more communities, and a conclusion to the study.

Section 4: Professional Practice Application and Social Change Implications

Introduction

Study findings demonstrate that family planning based on the CBD strategy effectively solves unwanted pregnancies and reduces maternal mortality in Northern Nigeria. The purpose of this quantitative cross–sectional study was to examine the relationship between CBD strategy, religion, and attitude (perception of family planning information) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) while controlling for age, level of education, marital status, and occupation among women of reproductive age in Northern Nigeria. I sought to determine the association between the variables under study to provide knowledge of public health interventions in the target region. Using the study findings, public health specialists may be able to incorporate more activity-based interventions for community-based programming to reach more women of reproductive age with family planning methods and information in Northern Nigeria. Analysis of the 2016 data from NDHS shows that the maternal mortality ratio in Nigeria was due to poor safe motherhood indices in the northern part of the country, where the contraceptive prevalence rate was as low as 4.3%. The results of this study show that the independent variables of CBD strategy, religion, and attitude (perception of family planning methods) can significantly influence the practice of different types of family planning methods (pills, injectables, condoms, implants, and IUCD) to prevent unwanted pregnancies and maternal and child deaths.

The findings from the study revealed that CBD strategy and attitude (perception of family planning methods) impact the practice of different family planning methods (pills, injectables, condoms, implants, and IUCD) among women of reproductive age in Northern Nigeria. The data analysis revealed that the CBD strategy directly affects attitude (perception of family planning methods), leading to the practice of different family planning methods (pills, injectables, condoms, implants, and IUCD). A direct association existed between the variables under study, directly affecting the practice of different family planning methods (pill, injectables, condoms, implants, and IUCD) by CBD strategy and religion. An increase in information through education can increase awareness and change in attitude (perception of family planning methods). In Section 4, I will discuss the interpretation of findings, limitations of the study, implications to positive and social change, recommendations to increase the CBD strategy as an intervention to more communities, and a conclusion to the study.

Interpretation of the Findings

I used secondary data for the study's quantitative descriptive cross-sectional design. I examined the relationship between CBD strategy, religion, and attitude (perception of family planning information) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) while controlling for age, level of education, marital status, and occupation among women of reproductive age in Northern Nigeria. The independent variables were CBD strategy, religion, and attitude. The dependent variable was the practice of family planning methods (pills, injectables, condoms, implants, and IUCD). The controlling variables

were age, marital status, level of education, and occupation, while attitude was the mediator.

A review of the literature shows that northern Nigeria has been introduced to several reproductive health interventions targeted at improving maternal and birth outcomes by private and public organizations (Amah, 2016). However, the uptake of family planning services remains low among women of reproductive age, even with various activities (Ochako et al., 2015; NDHS, 2016). Despite all the health systems introduced, the need to adopt strategies instrumental in delivering health services is essential to those needing family planning services with the CBD intervention. A WHO (2020) literature review shows an estimated 225 million women of reproductive age in developing countries as of 2019 do not use family planning services to delay or stop childbearing. This has also extended to Nigeria, where the family planning policy has yielded low dividends in controlling the population explosion, as the population is projected to rise from 182 million to 397 million by 2050 (National Population Commission, 2013)

I used data collected by USAID in 2018 for this cross-sectional study. I found a relationship and association between the CBD strategy, attitude (perception), and the uptake of different family planning methods. This implies that the intervention was effective and improved the contraceptive prevalence rate within Northern Nigeria, where the CBD strategy was practiced. The findings also showed that attitude (perception) increased knowledge to accept family planning.

I sought to answer the two RQs:

RQ1: Is there a relationship between CBD strategy, religion, and attitude (perception of family planning methods) to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria while controlling for age, marital status, level of education and occupation?

RQ2: Is there a relationship between the CBD strategy and religion to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) in women of reproductive age (18–49 years) in Northern Nigeria as mediated by attitude (perception of family planning methods)while controlling for age, marital status, level of education and occupation?

Akamike et al. (2019) detailed the effectiveness of intervention programs such as medical outreach, community health agents or workers, and community health initiatives as the mode of distribution for family planning services in Nigeria. The researchers found these community outreach efforts more effective in reaching more women of reproductive age. This literature confirms that community-based interventions can increase information and reduce bias toward the uptake of family planning methods supported by the current study.

In the current study, the analysis for RQ1 showed that the CBD strategy, religion and attitude (perception of family planning methods), age, marital status, level of education, and occupation were predictors of the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) predict ($p = .523$). For RQ2, the CBD strategy, religion, age, marital status, level of education, and occupation

were predictors of the practice of different family planning methods (pills, injections, condoms, implants, and IUCD). statistically significantly correlated ($p = .003$). The R^2 of the model was between 0.091 (Cox and Snell) and .104 (Nagelkerke). The analysis for the variables showed that CBD strategy ($p = .001$), age group 20 - 29 years ($p = <.001$), 30 – 39 years ($p = .003$), educational level ($p = .016$) occupation ($p = .016$) significantly predict practice of different types of family planning methods.

The findings from the study can be used to develop targeted educational programs or community-based interventions to increase family planning uptake among women of reproductive age by promoting positive attitudes towards family planning and focusing on targeted interventions for specific age groups, education levels, and occupations to improve the practice of family planning methods.

The study findings related to the theoretical framework of the HBM where perceived threat/severity, perceived benefits, perceived barriers, perceived self-efficacy, and steps to initiate action towards unwanted pregnancy through the practice of different types of family planning methods (pill, injectable, condom, implants, and IUCD). The model is a health behavior theory associated with family planning issues among women (Akamike et al., 2020). The variables CBD strategy, religion influenced by age, marital status, level of education, and occupation can initiate action, which is a change in attitude (perception of family planning methods) leading to the perceived benefit of the practice of different types of family planning method (pill, injectable, condom, implants, and IUCD). Applying the HBM model in the current explains an individual's willingness or readiness to comply and practice preventive health care through an increased

understanding of the CBD strategy messages leading to a change in attitude (perception) and practice of different types of family planning methods to prevent unwanted pregnancies (Coulson et al., 2016). Therefore, the HBM is appropriate for the current study.

Limitations of the Study

This cross-sectional study intended to utilize the USAID 2018 data to examine the relationship between CBD strategy, religion, and attitude (perception of family planning information), to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) among women of reproductive age in Northern Nigeria while controlling for age, level of education, marital status, and occupation. One of the limitations of this study is related to the use of a secondary data set and its reliability in answering my specific RQs without determining the accuracy of the anthropometric data. The study data was collected from a population of reproductive women in four Northern states but used to represent and generalize Northern Nigeria. The study can be extended to other parts of Nigeria to compare the context to understand the acceptance of the CBD strategy and how best to modify activities for each location in Nigeria.

Some limitations include the sampling bias that limited data collection to only married women, reducing the comparison of the views of unmarried women who may have had access to family planning methods. The missing values and incomplete responses observed in some questions were possibly due to literacy level or lack of proper understanding of the questions asked during the study. It could also be that some

missing values were due to a long time between when USAID implemented the CBD intervention and when the survey was conducted, who may have forgotten some details from the CBD activities. The missing values affected the analysis and overall validity of the findings.

The current study included the age of women of reproductive age from 18, while the original research was 15 years old. Starting with the age of 15 means there needs to be written consent from the parents which could not be determined because age 15 is considered a minor (Coulson et al., 2016). In addition, the peer-reviewed journals for the literature gave a better connection between the CBD strategy and the practice (uptake of different types of family planning methods (pills, injection, condoms, implants, and IUCD) compared to the anthropometric data used for analysis.

The data set presented some limitations since I was not the originator of the questions. This led to recoding more variables than expected, like family planning methods, age category, marital status, marital status, and religion. The family planning methods were recoded, particularly the male and female condoms, because female condoms are not very popular in Northern Nigeria and had very few entries (i.e., eight entries for female condoms). Men were not included in the study, which is a limitation in getting spousal support in family planning. In Northern Nigeria, the men have most of the say in family decisions which would have been influential in understanding their perception of the practice of family planning methods. Lastly, Northern Nigeria has its peculiarity with a high level of illiteracy which is seen in the responses as it appeared during analysis that some of the answers were incomplete. In addition, some response

category frequency was lower than expected, with so many missing values due to the long duration from when the CBD intervention was implemented and when the actual study was conducted.

Recommendations

This cross-sectional study intended to utilize the USAID 2018 data to examine the relationship between CBD strategy, religion, and attitude (perception of family planning information), to determine the practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) among women of reproductive age in Northern Nigeria while controlling for age, level of education, marital status, and occupation. Public health implementers should extend the CBD intervention to other parts of Nigeria to compare details through a need assessment on the realization that Nigeria may not be able to provide conventional health services but has improved intervention activities through the CBD strategy to reach more women.

The findings from the study suggest that developing targeted educational programs or community-based interventions to increase family planning uptake among women of reproductive age by promoting positive attitudes towards family planning and focusing on targeted interventions for specific age groups, education levels, and occupations can improve the practice of family planning methods. The theory that the CBD strategy influences the change of attitude (perception of family planning method) leading to the practice of different types of family planning methods (pills, injections, condoms, implants, and IUCD) is supported in this study.

Furthermore, the HBM theory posits that perceived benefits play a significant role in the experiences of women of reproductive age to have a change in behavior to live healthy without multiple pregnancies (Centers for Disease Control and Prevention [CDC], 2022). Therefore, CBD strategy incorporated with other activities like healthy living for their children with a focus on prevention strategies can increase the practice of family planning among reproductive women in Northern Nigeria (CDC, 2022).

Male involvement sessions can be organized to educate the men in supporting the reproductive woman in Northern Nigeria to change the attitude and practice of family planning. The men act as gatekeepers in the home. Their opinion will go a long way in creating support for reproductive women in Northern Nigeria through informative, educative, and communicative materials. Future researchers could collect data specifically focused on the acceptable age from 18 years and other significant variables such as socioeconomic status and culture, which could have sizeable social change implications. Another recommendation on the results of this study is that more time should be spent on getting views from unmarried women to compare their perspectives on the practice of different types of family planning methods.

The current study could have included additional covariates to enhance the study's internal validity while controlling other extraneous variables (Burkholder et al., 2020). The CBD strategy can influence attitude (perception), leading to the practice of different types of family planning methods through more research, recognition, improved strategy, linkages to health facilities, and community ownership of some processes and activities that will be simplified and accepted by a more prominent target population and more

communities. The ownership by the community will increase community participation in the intervention such that there is continuity of the CBD strategy even after the donor funding ends.

Implications for Professional Practice and Social Change

Professional Practice

The current study highlights the importance of the relationship between the CBD strategy and practice and the uptake of family planning methods. The present study finds that the CBD strategy and religion directly affect attitude (perception) and the practice of different types of family planning methods. This finding is important because it will build program development of educational strategies and collaboration between public health specialists to modify the CBD strategy to effectively change women of reproductive age's bias regarding the uptake of family planning (Akamike et al., 2020).

The modified strategies will include community gatekeepers whose views of various activities will be incorporated to increase community ownership. In addition, these CBD program modifications will consist of policies supporting the no-cost approach of family planning services and include other innovative activities that will increase donor funding. An increased coverage can employ more CBDAs that can respond to a real existing problem of the inability of the public sector to meet the demand for family planning need among reproductive women in Northern Nigeria. Increased coverage will require funding and modified strategies to extend services to hard-to-reach areas.

Another professional practice implication is to include a policy that specifically meets the need of women of reproductive age and supports family planning processes. Policies can be documented for more health workers to be trained with increased referral sites to support family planning services. This policy will better guide public health specialists in advocacy to promote support services to better, healthier lives which can make a substantial positive social change. The policies will allow public health specialists to diversify in training to gain more knowledge from other nations and cultures to meet specific reproductive needs and reduce mortality and morbidity rates among women in Nigeria. The policy will give room for incremental funding in Nigeria to support an increased distribution of family planning products, consumables, and health care workers' training in referral facilities.

Positive Social Change

There are implications for positive social change from the results of this study on CBD strategy on family planning methods among women in Northern Nigeria. The reviewed literature highlights the effect of CBD strategy enhancing a change in attitude (perception) towards the practice (uptake of family planning), which includes child spacing to allow the woman to develop skills to improve her health and behavioral pattern. Another positive social change is that if a woman has control over her body, the HBM perceives the benefits of the uptake of family planning. Using policies to firm up access to family planning services will encourage more women to practice different types of family planning methods if the correct information is shared. Establishing other communication channels, such as IEC material, will include pictures at strategic locations

within communities, radio, and T.V. messages to reduce the myths and bias around family planning, which can guide toward better acceptance. Educating spouses or men through male involvement sessions and mothers-in-law can increase the acceptance of family planning services by women of reproductive age in Northern Nigeria.

While the CBD strategy is relevant, the knowledge of some family planning products is limited to locations with limited access to product sources. The distribution of the family planning products such as pills, injectables, and condoms can be extended to proprietary patent medicine vendors (PPMV)s around the community since any community extension worker can explain these methods. This may lead to increased practice of different family planning methods.

Conclusion

The study validates that CBD strategy can increase positive perception towards the practice of different types of family planning methods. The current study examined the relationship between the CBD strategy, religion, and attitude (perception of family planning methods) of women of reproductive age in Northern Nigeria. In the extensive literature reviewed, I could not find a CBD intervention strategy that stood alone specific to family planning without the inclusion of other health services in Northern Nigeria. However, the study findings showed significance in introducing CBD strategy and attitude towards practicing different family planning methods in Northern Nigeria.

An improved CBD strategy with policies and collaborations should be created to overcome the fundamental problem of maternal mortality and the limited availability of health facilities, personnel, and service, leading to evident barriers to family planning

services in Northern Nigeria. Addressing the low uptake of family planning methods can

be looked into from the findings of the study to develop targeted community-based

educational programs and interventions to increase family planning uptake among

women of reproductive age by promoting positive attitudes towards family planning and

focusing on targeted interventions for specific age groups, education levels, and

occupations to improve the practice of family planning methods.

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Appendix

The narration of Variance Inflation Factor for Research Question

RQ1 - Relationship between CBD strategy, religion, attitude (perception of family

planning methods), the practice of different types of family planning methods (pills,

injection, condoms, implants, and IUCD), age group, marital status, level of education,

and occupation.

The multicollinearity assumption is assessed and measured by VIF (variance

inflation factor). The reported VIFs are below 2, the highest VIF of 1.199 representing

occupation and the lowest being .813 for CBD strategy. This shows a low

multicollinearity which indicates a low correlation between the CBD strategy, which is

independent of the other predictors, which were the controlling variables, and the

mediating variable, attitude. The findings suggest that the predictors were not highly

correlated because the residuals evaluated for independence, determined by the Durbin-

Watson statistic 2.123 in Table A1, indicated no autocorrelation (Hahn & Meeker, 2021).

The Durbin-Watson statistics of 2.123 shows observations for the study are independent,

and the data is not autocorrelated. The data is not autocorrelated because the values for

observation are not similar to those that could have been observed within a given time.

Logistic regression was sensitive to outliers by examining Cook's Distance, which had a

minimum value of .000 and a maximum value of .041. The difference in Cook's distance

examines the logistic regression to outliers which means the difference in the predicted

value for the observations and observable changes made. The small value between .000

and 0.041 indicates a significant value on the observations made to determine the logistic

regression to outliers. The values were below one; therefore, all residuals were well predicted (Wagner, 2020).

Table A1

VIF for Research Question 1

Variable	Tolerance	VIF
Age group	.925	1.081
Marital status	.867	1.153
Level of Education	.895	1.118
Occupation	.834	1.199
CBD Strategy	.813	1.134
Religion	.871	1.148
Attitude (Perception)	.856	1.392
Practice (Types of methods)	.876	1.141

RQ2 - Relationship between the CBD strategy and religion and practice of different types of family planning methods (pills, injection, condoms, implants, and IUCD) mediated by attitude, age, marital status, level of education, and occupation.

The multicollinearity assumption was assessed by VIF. All reported VIFs are below 2, with the highest VIF of 1.199 representing occupation and the lowest 1.081 for the age group. The findings suggested that the predictors were not highly correlated because the residuals evaluated for independence, determined by the Durbin-Watson statistic 2.123 in Table A2, indicated no autocorrelation (Hahn & Meeker, 2021). This shows a low multicollinearity which indicates a low correlation between the CBD strategy, which is independent of the other predictors, which were the controlling variables, and the mediating variable, attitude. Logistic regression was sensitive to outliers by examining Cook's Distance, which had a minimum value of .000 and a

maximum value of .041. The small value of between .000 and 0.041 indicates a

significant value on the observations made to determine the logistic regression to outliers.

The values are below one; therefore, all residuals were well predicted (Wagner, 2020).

Table A2

VIF for Research Question 2

Variable	Tolerance	VIF
Age group	.925	1.081
Marital status	.867	1.153
Level of Education	.895	1.118
Occupation	.834	1.199
CBD Strategy	.813	1.134
Religion	.871	1.148
Practice (Types of Family Planning)	.876	1.141
Attitude (Perception)	.856	1.392