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Contraceptive Use Among Northern Nigerian Women Ages 15 to 49 Years

Hadiza Balarabe Usman
Walden University

Walden University

College of Health Professions

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Hadiza Balarabe Usman

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Abstract

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Hadiza Balarabe Usman

PGDIP, Green Eden Public Health College Abuja Nigeria, 2018

MPH, University of Birmingham United Kingdom, 2011

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Contraception remains the most effective modern way of controlling unwanted pregnancies among sexually active women. The purpose of this study was to investigate contraceptive use among northern Nigerian women ages 15 to 49 years. The study was anchored on social ecological model, which examined contraceptive use at the individual, interpersonal and community levels. Univariate, bivariate, Chi-square test of independence and logistics regression were conducted using secondary data from the Nigerian Demographic Health Survey 2018. 39,928 women, ages 15 to 49 years in the northwest region of Nigeria were sampled and only 6% used contraceptives. Results showed that a significant association existed between literacy level, educational level, location, wealth index; and husband's educational level and use of contraceptives ($p < .005$), while marital status and religion were associated with a decrease in contraceptive use. Similarly, women's education and literacy were significantly associated with use of contraceptives. Husband's level of education was significantly associated with use of contraceptives. The study recommended that enlightenment programs should be put in place to encourage more women to embrace use of contraceptives, as well as encouraging women to have informed knowledge about the importance of contraceptives, so that they can develop more interest in the use to avert health risks associated with nonuse. Implication for positive social change includes organizing more awareness programs in Northern Nigeria, using local health workers, traditional and religious leaders to promote contraceptive use to prevent unwanted pregnancies and improve quality of life.

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Dedication

This Doctoral study is dedicated to God Almighty who gave me the power and wisdom to take upon this opportunity to enable me contributes to my career and the society at large. This work is also dedicated to my entire family, colleagues, and friends who have supported me immensely through my success

Acknowledgments

I must thank Allah the almighty who created the opportunity and supplied the resources needed to complete my doctorate degree. He gave me life and kept me in good health all through the period of the study.

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Section 1: Foundation of the Study and Literature Review

Introduction

In this study, I examined contraceptive use among northern Nigerian women ages 15 to 49 years. This stems from the fact that the rate of pregnancies that are closely spaced among young women in the northern part of Nigeria contributes to high maternal mortality placed at 576/100,000 live births and high infant mortality of 69/1,000 live births (Izugbara, 2015). Meanwhile, a total fertility rate of 6.2 births per woman exists compared with 5.5 births per woman for the country and 11% of women aged 21 to 24 years having given birth seven times (Agida et al., 2016) shows that these closely spaced pregnancies are possibly due to the low contraceptive use reported at 15% among the region of women aged 15 to 49 years (Izugbara, 2015).

Moreover, the effect of low health literacy level among northern Nigerian women on family planning and child spacing has resulted in many health-related problems such as the rise in under five mortality rates (Adedini et al., 2015). This means need exists for intensified family planning programs to increase the knowledge on the issue and to promote use of contraceptives (Doctor et al., 2013), and involvement of men has a positive influence on women health care services (Izugbara, 2015). Similarly, reproductive health factors in the woman constitute significance to maternal mortality such as having too many pregnancies as well as unplanned pregnancies with little or inadequate gap in-between or when the woman is too old/young or too sick to be pregnant (Ajaero et al., 2016).

It is therefore important to note that contraceptive use is one of the most improved health services in the 21st century, which prevents unwanted births of children. Apart from the fact that these practices aid partners to avoid unplanned births, it also helps in regulating the time interval between births and pregnancies with respect to the age of the parents (Aliyu et al., 2015). Contraceptive use also helps to avert approximately 10% of childhood deaths and approximately 32% of maternal deaths as well as other benefits such as reduction in hunger and poverty. However, some sociocultural factors make a woman's decisions difficult without the consent of their husbands. In northern Nigeria, for instance, husbands make most of the decisions in their homes, and this includes contraceptive use (Izugbara, 2015). Against this background, this study was aimed at examining those factors contributing to low contraceptive use in northern Nigeria. The results will be helpful in proffering remedies to tackle the religious and sociocultural factors responsible for nonuse of contraceptives in northern Nigeria.

The Potential Positive Social Change Implications of the Study

The advocacy by the federal ministry of health on the use of contraceptive among sexually active women in Nigeria for the prevention of unwanted pregnancy and abortion is beginning to yield positive results as more women are recorded to be embracing the method in southern Nigeria (Oweseye, 2017). The National Bureau of Statistics (2015) reports on health have shown that contraceptive use among sexually active women of childbearing age increased by 7% compared to previous years, but this result is higher in southern than northern Nigeria (Owoseye, 2017). A cross section of women interviewed showed that most women believe in the efficacy of contraceptive method, either modern

or traditional, to prevent unwanted pregnancy and unsafe abortion. The implications for social change for this study include the possibility of organizing more awareness programs in northern Nigeria, using local health workers and traditional institutions to enlighten the general society in northern Nigeria on contraceptive use, which prevents unwanted pregnancies and improves quality of life. Also, this study will provide information on the role of husbands, especially in northern Nigeria, in promoting contraceptives use among women of childbearing ages. Izugbara (2015) believed that the involvement of husbands in the region could inform the development of policies and guidelines that can enhance contraceptives use in northern Nigeria. Other implications for social change may include the need to maintain a healthy living, reduce poverty, and reduce infant mortality rate, as well as improving the children's standard of living in the northern part of Nigeria.

Problem Statement

Contraceptive use has immense benefit in the control of unwanted and unplanned pregnancy, decrease in hunger and poverty, as well as in the control of childhood and maternal deaths (Adedini et al., 2015). In northern Nigeria, available information shows an awareness about contraceptives among women, as approximately 70% of the women know of at least one method of contraception (Aliyu et al., 2015). However, there is low percentage use of contraceptives, as only 25% of women aged 15 to 49 years are found to engage in the use of contraception (National Population Commission, 2015). This contributes to incidences of unwanted pregnancies and other social problems such as poverty, which is the inability to have enough to feed or clothe a family or a job to earn a

living. According to Ngbea and Achunike (2015), more than 50% of Nigerians live below the poverty line. In a similar study, it was deduced that the northwest has 77.7% of its population living in poverty. Also, the northeast has 76.3% and the north central states has 67.5% of its population living in poverty. In the same vein, there exists some level of gender inequality within this region, which can be evaluated based on the rate of literate women when compared with literate men. The literacy rate is between 38.0% and 62.0% for women and between 53.1% and 76.4% for men. There is also 63% likelihood of a man getting a job compared with a woman, which is less than 43% (National Bureau of Statistics, 2018). Similarly, significant affiliation exists within this region to cultural and religious norms, which are factors that define the ways of living of the northern Nigerian people (Agida et al., 2016). For instance, the Islamic religion predominantly practiced in the north allows a man to be entitled to four wives at a time (Wolf & Abubakar, 2015). This often leads to the women competing among themselves to have as many children as possible.

However, literacy level among some of the women is redefining their quest for having more children (Aliyu et al., 2015), and this enhances contraceptive use as means of birth control. Thus far, many studies in northern Nigeria have examined contraceptive use using other theories and the issue of use of contraceptives persists (Aliyu et al., 2015). The social ecological model (SEM) is a theory-based framework for understanding the multifaceted and interactive effects of personal and environmental factors, which determine behaviors, and for identifying behavioral and leverage points and intermediaries for health promotion within a society. Five hierarchical levels of the

SEM exist: individual, interpersonal, community, organizational, and policy/enabling environment (VPA, 2018), which my research was anchored upon.

However, most of the scholarly literatures available in this field of inquiry on the use of contraceptives in northern Nigeria are limited to prevalence and incidence rates related to use of contraceptive as methods, devices, or drugs used among sexually active people to reduce or prevent unwanted pregnancy and unsafe abortion (Ajayi et al., 2018; Arikawei et al., 2017; Iliyasu et al., 2018; Solanke, 2017). Other theories have been used and yet there is still lack of information on the social and ecological factors leading to low contraceptive use; hence, in the present study, I hoped to fill the gap by using the SEM model in northern Nigeria.

In this study, I considered the relationship between women's literacy level, women's educational level, husband's educational level, and contraceptive use in northern Nigeria among sexually active women ages 15 to 49 years, living in some selected communities in northern Nigeria, after adjusting for age, ethnicity, religion, SEM, marital status, and education. This relationship is important because literacy level to a large extent enhances use of contraceptives (Mobley et al., 2015).

Purpose of the Study

I examined the association between women's literacy level, women's educational level, husband's educational level, and contraceptive use among sexually active northern Nigerian women. Contraceptive use in this case is in line with the SEM, which is discussed in detail in 1.6; individual (women's literacy); interpersonal (husband's educational level); community and societal factors (women's educational level), as

adopted from the Centers for Disease Control and Prevention (CDC, 2018). There are three independent variables in this study. The first is *women's literacy*, defined in terms of women with higher than secondary schooling, women who cannot read at all, are able to read only parts of sentence, are able to read whole sentence, and are blind/visually impaired (Mobley et al., 2015).

I therefore limited the study to individual, interpersonal, and community levels of the SEM, which addressed the three research questions raised bordering on women's literacy (individual), women's educational level (community), and husband's educational level (interpersonal) in relation to use of contraceptives. For instance, at the level of the individual, a literate woman who reads about the importance of contraceptives could use it as means of controlling unwanted pregnancy. Also, at the level of the community, an educated woman is in a better position to interact more with other women in the community on the issue of unwanted pregnancy and how to control such using contraceptives. Husband's educational level relates to the interpersonal because studies have shown that husband's level of educational attainment enhances the interpersonal relationship he builds with other people (Krenn et al., 2015). This also includes the interpersonal relationship existing between him and his wife and based on this relationship, they could discuss use of contraceptive to control unwanted pregnancy, which is not often the case with the husband with little or no education in northern Nigeria (Mansor et al., 2015).

The second independent variable was *husband's education level*, which is defined by the number of target husbands that attained primary, secondary and tertiary education

level in northern Nigeria, because studies have found that they could influence spousal use of contraceptive (Wolf & Abubakar, 2015). The third independent variable in the study was *women's educational level*, which is defined by the number of target women that attained primary, secondary and tertiary education level. The dependent variable was contraceptive use. I that the findings of the study will aid individual women, husbands, and health workers in promoting contraceptive use in northern Nigeria.

Research Questions and Hypotheses

I examined contraceptive use among northern Nigerian women ages 15 to 49 years:

RQ1: What is the relationship between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index, and husband's educational level) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria?

*H*o$_1$**:** There is no significant association between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index; and husband's educational level) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

*H*1$_1$: There is a significant association between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index; and husband's educational level) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

RQ2: To what extend can women's literacy level, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria?

Ho$_2$: There is no significant association between selected factors (women's literacy level, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

*H*1$_2$: There is a significant association between selected factors (women's literacy level, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

RQ3: To what extend can women's level of education, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria?

Ho$_3$: There is no significant association between selected factors (women's level of education, age, marital status, religion, location, and wealth index), and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

*H*1$_3$: There is a significant association between selected factors (women's level of education, age, marital status, religion, location, and wealth index) and use of

contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

RQ4: To what extend can husband's level of education, women's age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria?

H_{0_4}: There is no significant association between selected factors (husband's level of education, women's age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

$H1_4$: There is a significant association between selected factors (husband's level of education, women's age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15 to 49 years, living in some selected communities in northern Nigeria.

Theoretical Foundation for the Study

This study was anchored on the SEM, which was developed for the purpose of understanding the relationship between environmental and personal factors. It was first conceptualized in 1970s and later in the 1980s, it was formalized by Bronfenbrenner (Kilanowski, 2017). The strengths of the SEM are that it allows analysis between factors within one level, and in-between levels. For example, in this study, RQ1 addressed combined factors at the individual, community and interpersonal levels of SEM (women's literacy, women's education, and husband's educational level), respectively, in

relation to the use of contraceptives. RQ2 examined the relationship between factors at the individual level of the SEM (women's literacy). RQ3 examined relationship at the community level of the SEM (women's educational level) in relation to use of contraceptives. Research question four focused on the relationship at the interpersonal level in relation to use of contraceptives after adjusting for age, ethnicity, religion, location, and wealth index (husband's level of education). Figure 1 explains these levels further.

Figure 1

The Social Ecological Model

Note. Centers for Disease Control and Prevention (CDC).

The SEM levels in figure 1 are explained in the following order:

1. Individual: This covers a person's behavior, attitude, gender and other demographic features.
2. Interpersonal: this feature covers informal and social systems determining human behavior.
3. Community: This covers inter organizational and institutional relations.
4. Organizational: These are rules covering social institutions.
5. Policy/Enabling Environment: This covers the state and national laws determining policy actions and environments.

Table 1 shows the SEM as applied to this study at each level.

Table 1

Variables and Research Questions Identified at each Social Ecological Model Level

Levels	Variables	Research question(s) using these variables
Individual, interpersonal and community	What is the relationship between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index, and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	RQ1
Individual	To what extend can women's literacy level, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	RQ2
Community	To what extend can women's level of education, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	RQ3
Interpersonal	To what extend can husband's level of education, women's age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	RQ4

Table 1 simply addresses the variables under each SEM level, as well as the research question that will address the question raised at each level.

Nature of the Study

I used a quantitative research methodology to investigate the association between individual, interpersonal, and community levels of control over the use of contraceptives among women in northern Nigeria. I used secondary data analysis to address the issues that I raised. The 2018 Nigerian Demographic and Health Survey (NDHS) was used in this context. This covered dataset for married and unmarried women of ages 15 to 49 years, living in some selected communities in northern Nigeria. The choice of ages 15 to 49 years was justified by the need to assist northern Nigerian women to control their fertilities to promote their healthy living and lower maternal mortality rate (Izugbara, 2015). The approach that I used was considered appropriate because it offered the possibility of analyzing data from the target population of 41,821 women and 13,311 men (ages 15 to 49 years) obtained from 2018 Nigerian Demographic and Health Survey (NDHS), so as to provide information of a possible existing association between independent (women's literacy level; women'seducation, and husband's level of education and dependent [contraceptives use] variables, after adjustment for age, location, religion and wealth index (control variables).

The NDHS contains data set on individual (women's literacy level) community (women's education level) and interpersonal (husband's educational level) as independent factors in relation to the dependent factor (contraceptive use). Contraceptive use as dependent variable was defined in terms of use and nonuse response by women to delay pregnancy. Other intervening variables were age, location, marital status, SES, (wealth index) and religion.

Literature Search Strategy

The list of databases and search engines that I used for the literature review were Science Digest, PubMed, MEDLINE, science articles, environmental and public health journals and CINAHL databases. Articles were also retrieved from Google Scholar and useful websites such as those of World Health Organization and National Bureau of Statistics. Databases were accessed through the Walden Library. The search terms used included *subject area, specialized area, general area,* and *types of contraceptives*. Specifically, the search terms used were *use of contraceptives in northern Nigeria, women's literacy in northern Nigeria, education in northern Nigeria and use of contraceptives, husband's educational level and contraceptive use in northern Nigeria, women in child bearing ages in northern Nigeria (15-49), socioeconomic status and contraceptive use in northern Nigeria location and contraceptive use in northern Nigeria, northern Nigeria's religion and use of contraceptives, Social Ecological Model and use of contraceptives, maternal health in northern Nigeria,* and *healthy lifestyle in northern Nigeria.*

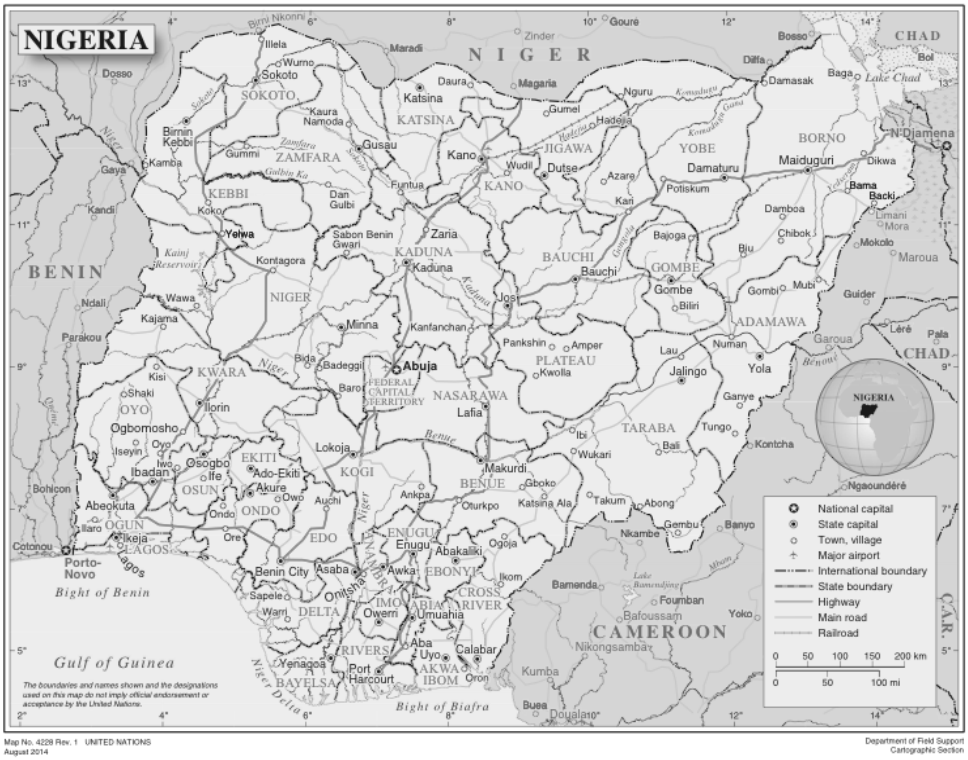
The scope of the literature included papers published from 2015 to 2019. Peer-reviewed and a few non-peer-reviewed literatures were included in the review of literature. However, there was limited current research on the subject area; hence, all literature available was derived from specialized area and general subject areas picked from peer and non-peer-reviewed journals. A total of 83 articles were searched for this study.

Population

According to World Population Prospects data (2018), the population of Nigeria as of December 2018 was estimated to be 198,227,337 people, and 50.7% of this population was male, whereas 49.3% was female. The region is made up of 19 states, as well as Federal Capital Territory (FCT), Abuja as shown in Figure 2.

Figure 2

Map of Nigeria



Note. Adapted from *https://www.un.org/Depts/Cartographic/map/profile/nigeria.pdf*

Demographic and Health Surveys (DHS, 2016) affirmed Nigeria's fertility rate to be 5.8%. Urban areas were 4.9%, whereas rural areas were 6.3%. northern Nigerian estimates in comparison with the south are shown in Table 2.

Table 2

Fertility Rate (Regional Estimates)

	Region	TFR (%)
	Northern Nigeria	
1.	North Central	5.3
2.	North East	6.4
3.	North West	7.3
	Southern Nigeria	
4.	South East	4.6
5.	South South	4.3
6.	South West	4.4

Note. From "World Population Data Sheet", by Population Reference Bureau, 2018, *Journal of Special focus on Changing Age Structure*, p. 9 (https://www.prb.org/wp-content/uploads/2018/08/2018_WPDS.pdf). Copyright 2018 by PRB publications.

Table 2 shows that fertility rate is higher in northern Nigeria than the south. This could be explained in terms of the fact that contraceptive use is higher in the South than in the north.

Use of Contraceptives in Northern Nigeria

One key development that was imperative in the protection of women's health, influencing fertility and maintaining healthy living is the use of contraceptives (Habyarimana & Ramroop, 2018). This has become necessary in view of population explosion with its attendant stretch on the livelihood of families and dwindling development of the economy, particularly in developing countries, such as Nigeria (Habyarimana & Ramroop, 2018). The use of contraceptive helps to avoid many challenges associated with unwanted pregnancies and promotes maternal health and healthy living, as well as reduction in 10% of childhood deaths and 32% of maternal deaths and nearly 10% of childhood deaths in Nigeria (Adedini et al., 2015). Ajayi et al.

2018) confirmed that the use of contraceptive has many benefits to health, such as child spacing, reduced child and maternal death, and preventing unwanted pregnancies generally (Singh et al., 2017).

NPPSD was conceived with the aim of reducing the national growth rate, reducing infant and maternal mortality rate, and reducing the total fertility, which the policy planners believe could be achieved through implementing widespread use of contraceptives (Dambo et al., 2017). This calls for an improved literacy and creating of awareness level for women to have a better education, especially in northern Nigeria (Adedini et al., 2015). These play a prominent role in defining maternal health, improving healthy lifestyle, and reducing infant mortality rates.

The implication of use of contraceptives is that when women use contraceptives, there will be a reduction in the incidences of unwanted pregnancies and maternal and infant mortality rates (Dambo, et al., 2017). The federal government's advocacy on the use of contraceptive among sexually active women in Nigeria for the prevention of unwanted pregnancy and abortion is beginning to yield positive results as more women are recorded to be embracing the use of pills. According to Owoseye (2017), the National Bureau of Statistics compiled data from the 2015 report, showing that contraceptive use among sexually active women of child bearing age increased by 7% compared with previous years across Nigeria. This includes the northern part of Nigeria, which is the focus of this study.

Although several factors may have been responsible for high fertility rate in the northern part of Nigeria, there is the religious factor that permits a Muslim man to marry

as many as four wives (Tigabu et al., 2018). However, the economic reality has forced several of the women to be engaged in use of family planning (Blackstone & Iwelunmor, 2017).

The use of contraceptive is low in northern Nigeria compared to the south (Dambo et al., 2017). This may have accounted for the challenging experience associated with frequent childbirth, leading to physical, mental and emotional strain that negatively impacts on the health of the women (Iliyasu et al., 2018). Although there are studies attesting to the awareness of the importance of contraceptives use in northern Nigeria, it is the actual use to control the negative incidences such as reduction in poverty, hunger, and maternal deaths that is low (Aliyu et al., 2015). However, the women engage in the use of one contraceptive. Some of them are female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, and diaphragms.

1. Use of female condoms: Condoms could either be worn by a male or a female. The male condom covers the penis for the purpose of collecting sperm, while the female condom is inserted into the vagina of a woman before intercourse to prevent sperm from entering the uterus (Koster, Bruinderink, & Janssens, 2015). Male or female condom remains a method of family planning (FP) that provides essential protection (Sharma & Nam, 2018). According to Koster et al. (2015), the female condom remains one female-initiated contraceptive that offers protection against unwanted pregnancy as well as protection against sexually transmitted infections (STIs). The reason for low use of this form of contraception is adduced

to its high price, unattractive appearance, and ability to insert it with ease (Koster et al., 2015). Some women still use it in the north for its positive side.

2. Injectable birth control: This involves giving a progestin injection (depot medroxy progesterone acetate, DMPA) in the arm or buttocks. It is expected that patients that use this method of contraceptive should eat a diet rich in calcium and vitamin D or take vitamin supplements while using this medication. The National Population Commission cited in Abdul-hadi et al. (2013) affirmed that contraceptive use may have increased modestly during the last 28 years. Most women in rural areas prefer oral contraceptive pills and injectable contraceptives mostly because of their effectiveness and ease of use. In Nigeria, injectable contraception is provided exclusively in mostly public sector hospitals (25.5%) and health centers (21.0%) (Abdul-hadi et al., 2013).
3. Birth control pills: Birth control pills contain a synthetic estrogen and a progestin, which functions to inhibit ovulation. A woman takes one pill daily, preferably at the same time each day. Many types of oral contraceptives are available, and a health care provider helps to determine which type best meets a woman's needs (Dumitru & Duane, 2016). There are also emergency pills taken when adults are involved in unprotected sexual intercourse. Chin-Quee et al. (2015) explained that after unprotected sexual intercourse, emergency contraceptive pills reduce the risk of pregnancy. The pills were designed for occasional use over indefinite periods of time and are less effective than other hormonal and long-acting methods. There is no consensus on the number of times the pills can be taken.

4. Use of implants: Implants are implantable rods or a nonsurgical contraceptive that blocks the fallopian tubes permanently (Petro, 2017). This requires a health care provider to thread a thin tube through the vagina into the uterus to place a soft, flexible insert into each fallopian tube, which requires no incisions. Within the next 3 months, scar tissue forms around the inserts to block the fallopian tubes to prevent the sperm from reach the egg. At the end of 3 months, a health care provider conducts tests to be sure that the scar tissue has fully blocked the fallopian tubes. Machiy et al. (2018) found that the positive features of this contraceptive method include its high effectiveness and long-acting nature. According to Teunissen et al. (2015), the implant is an efficacious, well tolerated, and safe method that does not require users' continuous action. The side effect of this method includes headache, weight gain, acne, breast tenderness, emotional instability, and abdominal pain. There is also irregular bleeding, as well as changes in the intensity and duration of menstrual bleeding also described as the most common side effects of the method (Teunissen et al., 2015).
5. Vaginal ring: The ring is a thin, flexible object inserted into the vagina, where it releases hormones continually for 3 weeks (Lopez-Picado et al., 2017). This is removed in the fourth week and a new one reinserted approximately 7 days later. Women with certain health conditions such as high blood pressure, heart disease, or certain types of cancer may not be allowed to use this method of contraceptive. The combined contraceptive vaginal ring (CCVR) is a hormonal method that releases 15 µg ethinylestradiol (EE) and 120 µg etonogestrel (ENG) daily and was

approved by the Food and Drug Administration (FDA) for use as a contraceptive since 2001. Kestelyn et al., (2018) stated that contraceptive vaginal rings (CVRs) have become popular in the countries where they are available. Two CVRs marketed in the United States and the United Kingdom are the etonogestrel ethinyl estradiol Nuvaring, and several studies tend to support the safety, tolerability and efficacy of CVRs, menstrual cycle control, ease of use, and being user-controlled (Kestelyn et al., 2018).

6. Diaphragms: This is a shallow, flexible cup that is made of latex or soft rubber (Kyamwanga, Turyakira, Kilbourne-Brook & Coffey, 2015). It is inserted into the vagina before intercourse with the sole aim of preventing sperm from reaching the uterus. A diaphragm should be used with spermicidal cream or jelly. The diaphragm should remain in the woman up to 6 to 8 hours after intercourse so as to prevent pregnancy, but removed within 24 hours. According to Kyamwanga et al. (2015), the diaphragm is a barrier contraceptive method that can be especially appropriate for women wishing to space her children but cannot or do not want hormonal contraception or intrauterine devices (IUDs).Complications arising from pregnancy and childbirth have been identified as the leading cause of death among women in developing countries, but the use of diaphragm as a form of modern contraceptives has been found to contribute to the reduction of the negative effects of unwanted pregnancy (Ngome & Odimegwu, 2015).

The contraceptive methods reviewed above constitute the different methods women often use to prevent unwanted pregnancy, which some women in northern

Nigeria use also. However, the use of such contraceptives to a large extent depends on a number of factors. One of the factors is women literacy, which is reviewed next.

Women's Literacy in northern Nigeria

Women's literacy in northern Nigeria is low compared to the South (Sinai, Anyanti, Khan, Daroda, & Oguntunde, 2017). This probably is due to factors such as ethnic and religion that favour the male more than the female child (Sinai et al., 2017). In northern Nigeria, there is a general knowledge of family planning, but it is the use of contraceptives that is low as many women's contraceptive knowledge and practice are influenced by male dominance and low social status. According to Aliyu et al. (2015), this makes it a herculean task for the women to make decisions of their own regarding their health in the absence of their husbands.

Health literacy as conceptualized by experts refers to a participant's knowledge, skill, and access to health care, and the ability to manage health related information and use such information to prevent unwanted pregnancy and other health related issues. Progression in women health literacy indicates women' increasing health information in such a way that their health outcomes were closer to those of higher income, better educated, and low-risk women's health outcomes (Braveman, 2015**).** Mobley, Thomas, Sutherland, Hudgins, Ange and Johnson (2015) stated that health literacy has do with an individual's knowledge, skill, and ability to understand and apply health related information and to access health care services. According to Thomas, Mobley, Hudgins, Sutherland, Inglett and Ange (2018), the Enterprise Community Healthy Start (ECHS) program promoted maternal health literacy through health education and health

counseling, referrals to community and medical resources, and support through a consistent long-term relationship between a participant and a Nurse in advanced societies.

In northern Nigeria, particularly in government hospitals in urban centers and community health centers, health care providers have enlightened women on the importance of child spacing through a number of literacy and enlightenment programmes and also from stories that circulate in the community and their observations of how others around them behave (Goldberg, 2015). Such women have been encouraged to use any contraceptive methods that they are comfortable with after a careful examination by a medical expert. For example, in 2013, the total fertility rate for north-west Nigeria was 6.7, which was a slight margin from 2008 that was 7.3 in comparison with the national figures of 5.7 and 5.5 for 2008 and 2013 respectively. National Population Commission (NPC), Nigeria and ICF International survey on Nigeria Demographic and Health Survey as cited in Sinai et. al. (2017) reported that only 3% of women in the North-east region of the country use one form of contraceptive or the other in 2013, and the figure is by far low in rural areas. This transcends to mean more births.

Kilfoyle, Vitko, O'Conor and Bailey (2016) confirmed that there is a relationship between health literacy and health outcomes. Unfortunately, this literacy that could enhance the knowledge about contraception, safe sexual practices, healthy pregnancy and postpartum behaviors, and preventive care, which are important to keep women healthy and leading productive lives, is not being explored and utilized positively. For instance, American Institute of Medicine posited that due to low, or inadequate health literacy, about 90 million Americans have difficulty understanding and acting upon health

information, which often affects their health and well-being (Kilfoyle et al., 2016). This could also be the case of northern Nigeria with adequate knowledge of importance of contraceptives, but the use by the women is relatively low (Aliyu et al. 2015). The problem is more cultural since the women have the awareness about the importance of contraceptives as agreed by Aliyu and fellow researchers.

Similarly, Sinai et al. (2017) discussed some of the cultural factors in northern Nigeria that tends to prohibits women from taking personal decisions. For instance, a woman can only leave their home after permission from her husband and the husband would have to agree before she can leave (Sinai et al., 2017). This explains the difficulty for most women in the region to make vital decisions concerning their health, including taking contraceptives without the consent of their husbands.

Women Education in northern Nigeria

There are many benefits that are attributed to acquiring education. One of them is health awareness prospect. Kalejaiye, Sokefun and Adewusi (2015) explained that in Nigeria, especially in the North, the educational opportunity available to male and female children are unfortunately not equal because of the perception that western education is more beneficial to the male than the female children. World Bank (2015) reported that education of girls is reduced in proportion in Nigeria in comparison with the education of their male counterparts. The World Health Organization (2016) explains that maternal health covers health of women during pregnancy, childbirth and after birth period. In other words, education enables the woman to know how to take care of herself after birth to avoid becoming pregnant again so that issues associated with infection, high blood

pressure and the need for abortion will not arise (WHO, 2016). Table 3 shows maternal education level and use of contraceptives.

Table 3

Level of Education and Use of Contraceptives by Women

Level of education	Never used	Have used	Total
No education	91.54	8.46	100
Primary	68.51	31.49	100
Secondary	61.45	38.55	100
Higher	37.51	62.49	100

Note. Gender in Nigeria Report, Cited in Ugochukwu, 2016.

Table 3 shows the level of use of contraceptives by some women surveyed in Nigeria. This table shows that women with no form of education who have accepted that they have never used any form of contraceptives or the other were about 91.54%, while those with higher education who accepted that they have never used were 37.51%, while 62.49% accepted that they have used. The implication of this is that women level of education plays a vital role in determining their use of contraceptives in controlling unwanted pregnancy (Arikawei et al., 2017). This explains why educated women in northern Nigeria enjoy a better healthy living than the uneducated women. Another factor that plays a prominent role in use of contraceptives is husband's level of education, which is reviewed next.

Husband's Level of Education in northern Nigeria

There are several studies linking husband's level of education, awareness and consent to the use of contraceptives by women to prevent unwanted pregnancy (Mansor et al., 2015; Irani, Speizer, & Fotso, 2015; Tilahun, Coene, Temmerman, & Degomme, 2015). An estimated 225 million women tend to have an unmet need for modern

contraception in developing countries (Singh, Darroch & Ashford, 2015). According to National Population Commission, Nigeria (NPC, 2015), demography of health surveys in Nigeria shows that the proportions of women of reproductive age who use modern contraceptive method is 10%. A common reason proposed for this non-use of modern contraceptives is male partner's disinterest in use of contraceptives (Aransiola, Akinyemi, & Fatusi, 2015). This is because the desire for more children on the part of the male partners no doubt affects the use of contraceptives, especially in northern Nigeria.

However, the situation in Ghana, as compared to Nigeria is that the level of education among married men in Northern Ghana has been found to encourage the use of contraceptives, as they discuss the issue in their social network and thereby discussing same issue with their wives compared to those who are not involved in such discussions (Krenn et al., 2015). This is lacking in northern Nigeria because of the unwillingness of even the educated men to discuss contraception with their wives (Mansor et al., 2015).

In a relative development in Ethiopia, Tilahun et al. (2015) affirmed that 42.9% of couples used contraceptives, because they were influenced by husbands that want smaller family size. This is to say couples who do not wish to have more children will use contraceptive to prevent unwanted pregnancy (Irani et al., 2015). Tilahun et al. (2015) also stated that a husband's favourable attitude towards use of contraceptives determined a couple's use of contraception. This to a large extent is often influenced by the level of education of the men, which enhances their awareness and enlightenment levels, which is lacking in northern Nigeria (NPC, 2015). It is also imperative to note the importance of the couples' decision making on contraceptive use; as it helps to determine the best

method that could suit a woman's body. The implication is that couple's decision and agreement in the first place will lead to getting proper support for using female contraceptive method (Mansor et al., 2015). In northern Nigeria, men's role in the decision making of contraceptive use by their wives is highly essential. This is gaining grounds in northern Nigeria. The percentage may have been low, but there is an increased awareness on the use of contraceptives. This takes us to review of women in child bearing ages in northern Nigeria.

Women in Childbearing Ages in northern Nigeria (15-49 Years)

Several factors are responsible for early child bearing in northern Nigeria. This is basically due to the fact that girl-child education hardly takes precedence in northern Nigeria. The ages of first marriage is placed at 13 years and 21 years of age for girls and men. This can result in child bearing as early as 15 years, which can negatively affect both maternal and child health (Wolf & Abubakar, 2015). The cultural norm in northern Nigeria places women's reproduction at the mercies of their husbands. She is expected to always consult with her husband in decision making, and must be submissive in matters of sexual intercourse (Wolf & Abubakar, 2015).

Wolf and Abubakar (2015) found that little effort has been put into creating awareness to reduce incidences of early marriages. Most times early marriages give rise to incidences of unintended pregnancies, which are linked to elevated health problems that often result in high number of maternal and neonatal deaths (Sedgh, Singh & Husain, 2015). World Health Organization (2015) expressed that maternal deaths can be reduced by 7–35% as the number of children per woman decreased. This is to say delayed

marriage and child bearing, as well as adequate spacing of children through use of modern contraceptive method can correct the incidences of maternal deaths that are rampant in northern Nigeria. According to Owolabi, Goon and Seekoe (2017), promotion of use of contraceptives by the women of child bearing ages helps to prevent 32% maternal deaths, 10% childhood deaths and 2.7 million infant deaths as well as to reduction in poverty, especially in places like the Northern part of Nigeria.

Maternal Health in northern Nigeria

There are several studies linking the use of contraceptives and maternal health (Ajayi et al., 2018; Abegunde, Orobaton, Shoretire, Ibrahim, Mohammed, bdulazeez, Gwamzhi, & Ganiyu, 2015; Olaleye et al., 2015). According to Srivastava, Avan, Rajbangshi, and Bhattacharyya (2015), every year about 287,000 women die of causes associated with childbirth, of which a sizeable number of these deaths are in developing countries. Health care providers therefore, pointed out that understanding women's perception of care and satisfaction with services is important as service utilization and positive maternal and neonatal awareness creates a positive women health. Women health is therefore viewed as a multidimensional concept, influenced by a variety of factors bordering on positive evaluation of factors associated with childbirth and child spacing through the use of contraceptives (Ajayi et al., 2018).

Kana et al. (2015) explained that poor women and child health indicators have been a recurring public and maternal health challenge in Nigeria since the documentation of National Maternal, Newborn, and Child Health (MNCH) statistics began. Several interventions have been instituted aimed at 10% reduction in child and maternal mortality

in Nigeria in the five years leading to 2015 (Kana et al., 2015). Despite these efforts, maternal and child health indicators in northern Nigeria continue to be among the poorest in the world. For example, only 2.7% of married women of reproductive age in the North-East region were reported to be using modern contraceptive methods (National Population Commission and ICF International, 2015). These figures are disturbing despite the increased presence of women and child health services and improved service delivery that are documented in National Maternal, Newborn, and Child Health (MNCH) statistics (Kana et al., 2015).

Thomas et al. (2018) viewed the issue of the mother's health from the point of functional health literacy, which has to do with the knowledge, skill, and ability to understand and apply health related information and to access health care services. Women's health should stem from available information on health care services, which women should make full use of in order to enjoy adequate health during childbearing ages (15-49 years). Progress in women's health literacy indicates increasing health awareness, so that women's health outcomes could be positive, irrespective of income level, education, and other socioeconomic indicators (Braveman, 2015). Efforts were initiated by government in promoting women health through health education and health counseling, referrals to community and medical resources, and support through a consistent long-term relationship between a participant and a Registered Nurse Case Manager (RNCM) program. A study confirmed that more than 90% of the women that participated in the program made positive health literacy progress and have undertaken it upon themselves to promote women's health (Thomas et al., 2018).

Maternal health is yet to attain the expected level in northern Nigeria due to factors earlier mentioned, such as women's literacy level, husband's level of education, ethnicity, and religious practices in northern Nigeria, but efforts are still being made by NGOs and governments in northern states of Nigeria to try to reduce poverty level through promotion of child spacing via use of contraceptives.

Socioeconomic Status (Wealth Index) and Contraceptive use in Northern Nigeria

There are several studies that have explored the relationship between socioeconomic factors and contraceptive use (Lamidi, 2015; Lemessa, 2018; Metcalfe et al., 2016). Metcalfe et al. (2016) explained that instead of terminating unwanted pregnancy due to socioeconomic factors, such unwanted pregnancy is simply prevented from occurring in the first place using contraceptives. In northern Nigeria, the decision to have more children could also be attributed to socioeconomic factors, which Bakibinga et al. (2016) affirmed to have a relationship with reproductive health behavior. Many studies have linked contraception usage and socioeconomic variables amongst women who seek measures to prevent unwanted pregnancies. Such measures could be expensive and from a health policy perspective, it is not all public health care insurance that covers the cost of contraception or all forms of contraceptives (Marchildon, 2013). This means women wishing to assess contraception most times must pay for it. The implication is that while women in high socioeconomic status could easily afford this, women in middle or low socioeconomic may find it difficult to afford cost of contraception if not supported by the government (Lemessa, 2018).

Socioeconomic factors related to reproductive decision-making in most rural areas of sub-Saharan countries are a barrier to contraceptive use and a factor that determines family size (Lemessa, 2018). It is important to note that decision-making autonomy of women is based on their level of education, employment and household wealth, which are indicators of their levels of socioeconomic and political influences (Lamidi, 2015). Also, at the individual level, studies have shown significant associations between modern contraceptive use and measures of social status (Dias & Oliveira, 2015). Furthermore, Lamidi (2015) also revealed that, above and beyond individual-level of socioeconomic status, spatial socioeconomic characteristics are important predictors of modern contraceptive use among women. Analysis of spatial distribution of poverty in Nigeria equally shows greater concentration of women living in poor households, especially in the Northeastern and Northwestern states than in other states in Nigeria (NPC, 2014). However, women living in wealthy households, tend to have more health care decision-making power, including contraceptive use (Lamidi, 2015)

According to Kana et al. (2016), Nigeria accounts for 15% of global burden of maternal mortality with the extremely poor in Northeastern region having an estimated maternal mortality ratio (MMR) of 1549 deaths per 100,000 live births, which is more than 5 times the global average. This could be attributed to non-use of contraceptives, which is globally acclaimed to reduce maternal death. The World Health Organization recognizes the importance of use of contraceptives as one of the six essential health interventions needed to achieve safe motherhood, irrespective of socioeconomic status (Kana et al., 2016).

Bakibinga et al. (2016) argued that knowledge and use of contraceptive can contribute to a decline in the maternal and infant mortality ratios, improve maternal health by reducing the incidence of unwanted pregnancies and bring about improvement in healthy living. The implication is that the ability of the women to control their fertility will simply mean that women are able to have a better awareness and then have the number of children they can comfortably provide for in terms of food, clothing and shelter so as to eradicate poverty, as well as reduce child mortality (Olaleye et al., 2015). Unfortunately, there are barriers to access and effective use of contraceptives (Kana et al., 2016). Thus, Ajayi et al. (2018) believed that focusing interventions programmes on improving the socioeconomic statuses of women would increase the use of modern contraceptives among women in sub-Saharan Africa, including northern Nigeria, which is the focus of this research. Just like socioeconomic status or wealth index, another factor that could influence use and non-use of contraceptives is location, which is reviewed next.

Location and Contraceptive use in Northern Nigeria

Low contraceptive use has been documented to lead to high maternal mortality ratio in sub-Saharan Africa (Izugbara, 2015), and this is due to a variety of factors. One of the factors identified to affect contraceptive use among women of child bearing age, especially in northern Nigeria is location (Izugbara, 2015), and so it is important to understand the role location (urban or rural setting) plays in use of contraceptives (Solanke, 2017). Several studies have reported higher contraceptives use in the urban and southern parts of Nigeria compared to uptake by women in the rural and northern parts of

Nigeria (Adebowale, Adedini, Ibisomi & Palamuleni, 2014). It is also important to note that access to safe voluntary family planning, whether in an urban or rural location is not only a human right but it is central in reducing poverty (UNFPA, 2016).

According to United Nations (2014), reproductive decision-making in most rural areas of sub-Saharan countries, including Nigeria is a barrier to contraceptive use and a factor that brings about large family size. This implies that the relationship between Nigeria's high fertility rate and its low contraceptive use is apparent, and this creates a wide disparity in contraceptive prevalent rate between urban and rural communities. Tunau, Awosan, Adamu, Muhammad, Hassan, Nasir, Raji, Oche, Nwobodo and Baba (2016) posited that to make socioeconomic development feasible in Nigeria, and to improve overall maternal health, there is a need to explore means of promoting contraceptive use among the urban and rural populace, as this would provide an insight into controlling unwanted pregnancy, not just in northern Nigeria alone, but across Nigeria at large.

Mohammad (2016) expressed that education increase the acceptability of new technologies, including knowledge and use of contraception. This is seen to be higher among the highly empowered and upper-class women compared to the poorly empowered and lower-class women, and so strategies to improve contraceptive use should be focus more on the latter group of women (Ofonime, 2017). This is corroborated by the fact that majority of educated women are resident in urban areas and desire fewer children than their less educated counterparts who are majorly resident in rural areas (UNFPA, 2016). This does not mean that among the rural dwellers, there are those who

do not desire birth spacing of children because it has become a feature of reproductive dynamics (Towriss & Timæus, 2018). Moreover, Tunau, Awosan, Adamu, Mohammad, Hassan, Nasir, Raji, Oche, Nwobodo and Baba (2016) believed that societal challenges have increased the need to have fewer children based on socioeconomic factors, irrespective of urban or rural setting.

Tunau et al. (2016) buttress furthermore that several socio demographic factors which may be prevalent in urban or rural locations could possibly explain the differences in contraceptive use. This use could improve the quality of life and raise the standard of living by decreasing the number of dependents requiring intensive personal care, education, food, shelter, and clothing, among others (Doctor et al., 2013). This underscore the importance of contraceptive use in both urban and rural locations for improved quality of life. The next review is on religion in northern Nigeria.

Religion in Northern Nigeria

Religion is one very influential factor that controls the actions and inaction of a number of individuals. Pinter, Hakim, Seidman, Kubba, Kishen and DiCarlo (2016) also believed that one of the many factors contributing to preventing women's access and use of contraceptives is religion. This probably is because it (religion) permeates the innermost part of the individual and tries to explain the relationship with God based on certain principles that man must adhere to, which includes matters bordering on sexual relationship and procreation. Religious groups therefore exercise enormous influence on issues of reproduction, and promoting same actively across cultural divide (Wolf & Abubakar, 2015). In northern Nigeria, the predominant religion is Islam and the belief is

that children are seen as a blessing and a gift from Almighty Allah (God) and as such, sexual acts in a marriage should be for the purpose or possibility of conceiving a child (Obasohan, 2015). Thus, it becomes quite difficult for a health care provider in the north to strike a balance between a couple's use of contraceptives and religious attitudes towards reproductive health (Pinter et al., 2016).

Religious beliefs are also subject to the influence of the local customs, which may affect people's stance on many issues, including use of contraceptives (Wolf & Abubakar, 2015). These religions also have denominations with different viewpoints (Prettner & Strulik, 2017). This is why it is a herculean task to define a single viewpoint representing any given religion (Pinter et al, 2016). This is strengthened by the fact that many individuals tend to define their religious posture based on their level of education, enlightenment, cultural belief, personal inclination and interpretation of religious doctrine that may not strictly follow the general viewpoint of their religious affiliation (Pinter, 2016). However, religious views on use of contraceptives in Christianity, Judaism, Islam and Hinduism have different backgrounds and perspectives. Prettner and Strulik (2017) posited that Christians are found to be more engaged in the use of contraceptives compared to Muslim women who are found to be less engaged in the use of contraceptives. This led to the conclusion that the interpretation given by religious leaders, who are well respected and held in high esteem, rather than actual religious doctrines control use or non-use of contraceptives (Prettner & Strulik, 2017).

Religion defines the attitude of a people, which may be the case of northern Nigeria, where the Hausa-Fulani natives refuse the use of contraceptives (Pinter et al.,

2016). This is based on the belief that the use of modern contraceptives is a way of trying to reduce their population through the control of fertility naturally given by God, instead of focusing on the aspect of reduction in both maternal and infant mortality rates (Olaleye et al., 2015). According to Atta and Zacharias (2016), Pew Research Centre stated that 48.3% of Nigeria's population practice Christianity religion, while about 48.9% practice Islam. In the Northern part of Nigeria, Islam is predominant. The Christian women in northern Nigeria use contraceptives more to control unwanted pregnancy than the Muslim women. The reason is that the Christian women are open to interacting more with other women from the Southern part of Nigeria who have embraced child spacing and birth control measures, which they (Christian women) see as a means of ensuring a better healthy living (Bicchieri, 2015). The high rate of fertility in the North could therefore be attributed to Islamic religion, which permits a devout Muslim to be entitled to four wives, which implies that there is likely to be competition among the women to have equal number of children, regardless of the economic situation or any other negative factors (Wolf & Abubakar, 2015). Some people in northern Nigeria still practice traditional African religion in which high fertility is associated with approval from the ancestors, while low fertility is seen as a curse from the gods (Lipka, 2015). This is an impression that the government and some NGOs are still battling hard to change.

Lipka (2015) stated that in a recent study by the Pew Research Center, African countries are still most morally opposed to use of contraceptives. For example, Nigeria and Ghana are countries whose population still regards the use of contraceptive as morally unacceptable. According to the ICF International (2015), the Sub-Saharan Africa

is the only region where low levels of contraceptive use and high fertility still persists in the world. This is because in places like northern Nigeria, contraceptive use is still very low due to the factor of religion discussed here (Prettner & Strulik, 2017). This is where husbands have great role to play in promoting the essence and importance of use of contraceptives to control unwanted pregnancies.

Empirical Studies Associated with Use of Contraceptives

Ajayi et al. (2018) reviewed the use of contraceptives for birth control purposes. However, maternal health care visit was seen as a predictor of contraceptive use, which is not the case of the present study. This is because the present study's attempt is to look at contraceptive use holistically in northern Nigeria. The study by Iliyasu et al. (2018) have similar objectives of use of contraceptives to control of unwanted pregnancies.

Solanke (2017) concluded that socio-demographic characteristics exert more influence on non-use than modern contraceptive use. The present study also has similar scope, as well as similar methodology. The difference lies in the fact that the coverage of the reviewed study was between 2008 to 2013, as well as looking at women of advanced reproductive age while the present study has an objective intent of covering beyond 2013, as well as looking at younger women of ages as low as 15 years.

The implication of this study is that education and religion play prominent roles in the use of contraceptives, and such pose some similarities with the present study that also looks education and religion as factors that could improve contraceptive use in northern Nigeria. The role of men as a focus is similar to one of the variables the present study is looking at in relation to contraceptives use among women in northern Nigeria. Most

empirical studies reviewed here addressed the use of contraceptives in general terms, but there remained a gap in knowledge with regards to types of contraceptives in particular, as well as giving consideration to the northern Nigeria cultural norm, which places women's reproductive decision at the mercies of their husbands (Wolf & Abubakar, 2015). Therefore, a gap in knowledge was filled with regards to husband's level of education and use of contraceptives in order to control unwanted pregnancy, after due consideration of the religious and cultural peculiarity of northern Nigeria.

Operational Definition of Terms

Contraceptives use was the dependent variable examined in this study, and this was defined as a means of preventing women of child bearing ages from getting pregnant until they are physically, mentally and emotionally prepared so as not to affect their health and before their resumption of sexual activities (Iliyasu et al., 2018). This means that women need time to resume child bearing, and protection becomes imperative so that even if they are engaged in sex, pregnancy will be avoided. The issue is that there is awareness about contraceptives among women in northern Nigeria as means of controlling unwanted pregnancies, but there is low percentage use, which implies that despite the awareness, fewer women are engaged in the use of this modern means of controlling unwanted pregnancies (Aliyu et al., 2015). In this study, unwanted pregnancy was defined as pregnancy which a woman is not physically, mentally, or emotionally prepared for.

The main independent variables for this study include women's literacy, women's highest education level and husband's level of education. Women literacy in this study

was defined in line with NDHS 2018 definition, which sees women literacy in the light of women who have attained higher than secondary schooling, women who cannot read at all, able to read only parts of sentence, able to read whole sentence and blind/visually impaired. women's education is defined in terms of number of women with no education, primary, secondary, and higher (tertiary) education and use of contraceptives. This also means access to health care service and child spacing information, which enhances their physically, emotionally, and mentally preparation for the next pregnancy (Abegunde et al., 2015).

The level of educational attainment, that is number of women and husbands with no education, primary, secondary, and higher (tertiary) education, as well as contraceptive awareness of the husbands in Northern is of great importance to the use of contraceptives in the control of unwanted pregnancies. The study also took note number of healthy women during pregnancy, childbirth, and after childbirth, and then consider types of contraceptives such as use of female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, and diaphragms.

Assumptions

I assume that all data received from the secondary source, NDHS, which is a periodical survey on populations and households by the Nigerian government and supported by USAID, contain the accurate and complete information of the participating women. I also assume that those in charge of releasing the data were objective and that the information collected from them were accurate and complete information of the surveys of the NDHS data in Nigeria in 2018. I also assumed that the information

provided represent the actual information on women literacy in northern Nigeria, women's level of education, as well as their husband's level of education. I also assumed that the information provided relating to SEM and bordering on intrapersonal, interpersonal and community were accurate. These assumptions in relation to contraceptive use shaped the direction of inferences made in the study (Abegunde et al., 2015). These were general assumptions on the subject matter, and the recorded missing data which could have affect the results and inferences made were minimize to the barest minimum, and so they constitute no noticeable interference in the course of the analysis.

Scope and Delimitations

The researcher employed a quantitative approach in course of this research. The perspectives of the participants on use of contraceptives in controlling unwanted pregnancy and unsafe abortion were considered. In particular, the investigation was focused on the the relationship between women's literacy and use of contraceptives among women in child bearing ages 15-49, the relationship between women's highest education level and use of contraceptives among women in child bearing ages 15-49, and the relationship between husband's level of education and use of contraceptives among women in child bearing ages 15-49.

The study also considered the target women who use female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, diaphragms considering age, based on location, religion and SES. The study equally considered husband's level of education in relation to use of contraceptives among women in child bearing ages 15-49, after adjusting for age, location, religion and SES. Data used in this study was the 2018

NDHS. The choice 15 to 49 years old was justified by the fact that women in northern Nigeria marry early due to religious and cultural factors, and the fact that birth rate is higher in the North than any other part of Nigeria. The study was delimited to North Western Nigeria, comprising of Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara States. This choice was based on the fact that the region has the highest fertility rate of 7.3% and therefore higher than every other region in Nigeria.

Significance, Summary and Conclusions

This research investigated contraceptive use among northern Nigerian women of ages 15-49, and as such contributed in filling a gap in literature in this field of study, especially with regards to women's literacy, women's education level, and husband's level of education. In other words, it is the hope of the researcher that the research will help to reduce the high incidence of maternal related health challenges that are more prominent in the region (Solanke, 2017). It is hoped that the findings will improve the promotion and use of contraceptives in northern Nigeria, where hitherto little or no attention is paid to use of modern contraceptives, so as to improve the reproductive health of young women who are about to start reproduction. These efforts would assist in reducing infant and maternal mortalities related issues (Federal Government of Nigeria, 2015).

It is hoped that individual families at the community levels may find the result of this study useful, as it will serve to improve healthy living and reduce the circle of (Ajaero et al., 2016). The essence of this is to bring about positive social change through the promotion of women's literacy, women'shealth, as well as engendering societal

understanding of the plight of the northern Nigerian woman. Most of the empirical evidences reviewed in this study based on quantitative methodology did not give details on type of contraceptives methods, but discussed contraceptives as devices that control unwanted pregnancies, as well as considering religious factors that influence use of contraceptives (Iliyasu et al.,2018; Solanke, 2017; Bakibinga et al., 2016).

The findings of most of the previous studies also showed that there is much awareness about the importance of contraceptives in control of unwanted pregnancies (Aliyu et al., 2015; Okigbo et al., 2015; Igbodekwe et al., 2015), but utilization has remained low among the women. The quality of these studies, which did not reveal the role of individual, interpersonal and community levels in the use of contraceptives necessitated the current research. Therefore, an investigation of the relationship between women's literacy, women's highest education level and husband's level of education and contraceptives use became necessary because of the nature of northern Nigeria, where the women have been caged by religious and cultural factors (Bakibinga et al., 2016). Many of such studies adopted primary means of data collection (Aliyu et al., 2015), but this current study adopted secondary means of data collection in the course of carrying out the research to determine the association between the independent and dependent variables.

Section 2: Research Design and Data Collection

Introduction

In this study, I examined contraceptive use among northern Nigerian women ages 15 to 49 years. This was necessitated by the fact that the birthrate in northern Nigeria has remained high compared with other parts of Nigeria, thereby bringing the increasing challenges of maternal and infant mortality rates. This trend has become a burden to both the states in the north and to the federal government (Solanke, 2017).

Research Design and Rationale

This research that I used was a quantitative research methodology in investigating contraceptive use among northern Nigerian women 15 to 49 years old. Although many other studies have used the qualitative and the quantitative approaches to investigate contraceptive use among sexually active individuals (Ajayi et al., 2018; Iliyasu st al., 2018; Arikawei et al., 2017; Awonuga et al., 2015), I used the cross-sectional quantitative approach to examine the association between women's literacy (higher than secondary schooling and women who cannot read at all, are able to read only parts of sentence, are able to read whole sentence and blind/visually impaired), women's highest education level (number of target women with no education, primary, secondary and tertiary education), husband's level of education (number of target husbands with no education, primary, secondary, and tertiary education), and contraceptive use among women of reproductive age between 15 and 49 years in northern Nigeria. The dependent variable in this study was *contraceptive use*, which was defined in terms of contraceptive use and non-use response. This defined whether women used any methods of contraception or not

to control unwanted pregnancy. The independent variables were in terms of women with higher than secondary schooling and women who cannot read at all, are able to read only parts of sentence, are able to read whole sentence, and are blind/visually impaired, the number of target women with no education, attained primary, secondary, tertiary levels of education, number of target husbands with no education, attained primary, secondary, tertiary levels of education, age, marital status, location, religion, SES, and education. Age was measured in 5-year groups: 15 to 19 years, 20 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years, 40 to 44 years, and 45 to 49 years. Marital status was categorized in terms of never married, married, living together, widow, divorced, or separated. The categorization of location was urban and rural areas. Religion was categorized as Catholic, other Christians, Islam, Traditional religion, and others. SES, which is taken as wealth index was measured as poorest, poorer, middle, richer, and richesg. Husband's involvement in decision regarding contraception depends on their level of educational attainment and it was measured in terms of contraceptive use or nonuse. According to Thelle and Laake (2015), a cross-sectional study collects data at a given point in time and then allows the researcher to assess the prevalence or occurrences of an issue of interest, thereby providing information on the prevalence of an outcome.The scope of this study did not address issues outside the focus of the study as defined in the independent and dependent variables. Because NDHS data are taken as concrete data derived from the field supported by the Nigerian government through the National Bureau of Statistics, an agency responsible for data collection on Nigeria's development, as well as supported by United States Agency for International

Development (USAID), there was no further need of subjecting the data for any validation in the field for correctness and completeness. I assumed that the data represent accurate information that have been verified, validated, complete, and correct for use in any research purpose.

Methodology

The secondary data provided by NDHS 2018 was analyzed statistically based on the available information on contraceptive use in northern Nigeria. NDHS is a national survey that is periodically collected on populations and households by the Nigerian government and supported by USAID. Analysis of the secondary data of the target population of women ages 15 to 49 years was carried out. NDHS is a large sample size conducted in the six geopolitical zones of Nigeria and is a national representative survey, which is easily accessible from National Bureau of Statistics, as well as on the internet for use, and secondary data allows researchers to address new research questions (Wee & Steinman, 2011). The data was analyzed using SPSS software.

Population

The study population consisted of a dataset for married and unmarried women of ages 15 to 19 years, and men living in some selected communities in northwestern Nigeria. The choice of the age group was justified by the fact that the high fertility rate of women in that age group in northern Nigerian must be controlled to promote healthy living and lower the maternal mortality rate (Izugbara, 2015). The approach that I used for this study was considered appropriate because it offered the possibility of analyzing data from the target population of 127,545 women, which yielded a response rate of 99%

for women (ages 15-49 years). This target population represents the population provided by the NDHS (2018), with the support of USAID.

Sampling and Sampling Procedures

I used a sampling frame from the NDHS (2018), which provided the required secondary dataset, containing information of sexually active married and unmarried women between ages 15 and 49 years. The data was extracted in such a way that gave the required representative sample used in the study. The sampling frame included all married and unmarried women between ages 15 and 49 years who are sexually active and have given birth. The secondary data that I used for the study represents data collected on women's literacy, women's educational level, and husband's level of education, with regard the intervening variables such as number of target women with higher than secondary schooling, women who cannot read at all, are able to read only parts of sentence, are able to read whole sentence and blind/visually impaired, women's highest education level, and in relation to use of female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, diaphragms.

Sample Size Calculation

The required sample size that determined the empirical validity for the study was based on the population of 39,928 interviewed in 2018 NDHS. The size chosen for the study predicted the relationship between the independent and the dependent variables and this was consistent with the sample size applied in reliable literatures reviewed earlier using NDHS dataset (Igbodekwe et al., 2015; Solanke, 2017). The power of the study was calculated using the approach defined by the G*Power 3.1.9.4 to calculate a

sufficient sample size using an alpha of 0.05, power of 0.8, using a two-tailed test (Hayes, 2019). The required sample size computed for determining the empirical validity for logistics regression with more than five predictor variables was 39,928 women, ages 15 to 49 years, in the northwest region of Nigeria, representing 31% respectively of the population of women and men sampled in 2018. The minimal power level, alpha and effect size chosen for this study was used to test the association between the independent and the dependent variables (Iliyasu et al., 2018).

Instrumentation and Operationalization of Constructs

In this study, I used secondary data. The data represents original data that have been collected using data collection tools by NDHS. Because no instrument was involved in the data collection process, review of reliability and validity of instrumentation were not necessary.

Operationalization

As earlier stated, the dependent variable was contraceptive use. The strain of birth necessitated the use of contraceptive for birth control, based on the fact that women need to recuperate before resuming childbearing. Awareness about contraceptives was not the only focus of this study, but the use among women in northern Nigeria as a means of controlling unwanted pregnancies was the focus of the study. It is disturbing that despite the awareness, few women use contraceptives as means of controlling unwanted pregnancies (Aliyu et al., 2015). The means of contraceptives include female condoms, birth control pills, injectable birth control, implants, vaginal ring, and diaphragms. The essence is to ensure that women in northern Nigeria have control over the number of

children they can readily take care of to address the recurring circle of poverty ravaging the region (Wolf & Abubakar, 2015). Tables 4 and 5 show the coding and study variables respectively.

Table 4

Showing the Name of Variables in the 2018 Data set for Women in North West Nigeria

Research Questions	Variable Name
Research Question One: What is the relationship between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index, and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	Current contraceptive use Women's Literacy Women's Level of Education Husband's Level of Education
Research Question Two: To what extend can women's literacy level, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	Women's Literacy: Women's literacy: Cannot Read at all Able to read part of a sentence Able to read whole sentence No card with required Language
Research Question Three: To what extend can women's level of education, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria	Women's Education No Education Primary Secondary Higher
Research Question Four: To what extend can husband's level of education, women's age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?	Husband's Level of Education: No Education Primary Secondary Higher Don't Know

Table 5

Study variables: Name, Label, and Values (NGBR7AFL.SAV) for Women in North West Nigeria

S/No.	Variable name	Variable label	Variable value
1.	V312	Contraceptive use method	0= Not Using; 1-20 (Use of any Method)
2.	V155	Literacy	0=Cannot Read at all; 1= Able to read part of a sentence; 2= Able to read whole sentence 3= No card with required Language
3.	V701	Husband/partner's education level	0= No education; 1= Primary; 2= Secondary; 3= Higher; 4= Do not know; Missing = 5
4	V013	Age in 5-year groups	1=15-19; 2= 20-24; 3= 25-29; 4= 30-34; 5= 35-39; 6= 40-44; 7= 45-49
5	V106	Highest education level	0= No education; 1= Primary; 2= Secondary; 3= Higher
6	V130	Religion	1= Catholic; 2= Other Christian; 3= Islam; 4= Traditional Religion
7	V025	Types of place of residence	1= Urban; 2= Rural
8	V190	Wealth index combined	1= Poorest; 2= Poorer; 3= Middle; 4= Richer; 5= Richest
9	V501	Current marital status	0= Never in union; 1= Married; 2= Living with Partner; 3= Widowed; 4= Divorced; 5= No longer living together/separated

Tables 4 and 5 provide a better understanding of the variables being investigated, taking into consideration the independent, dependent, and control variables. Table 6 shows how the various variables were measured.

Table 6

Measurement of the Dependent and Independent Variables from 2018 NDHS Data set for Women in North West Nigeria.

Variable Name	Variable	Category	Values/Measurement
Contraceptive use	Dependent	Categorical-Nominal	IF any (Female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, diaphragms) "YES", then USE IF all (Female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, diaphragms) "NO", then NON-USE
Age	Independent	Categorical-Ordinal	15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49 years
Current Marital status	Independent	Categorical-Nominal	Never in union; Married; Living with Partner; Widowed; Divorced; No longer living together/separated
Wealth Index	Independent	Categorical-Nominal	Poorest, poorer, middle, richer, richest

Table 6 shows how the variables were measured.

Data Analysis Plan

The SPSS version 21.0, 2012 for windows was the software used for data analysis in the study. All necessary data elements were available, and data cleaning was carried out after the reorganization of data for unfinished, unreliable, inaccurate or non-relevant parts of the data. Data dictionary was developed in line with the provision of SPSS software, which defined all the variables, as well as providing appropriate labeling and recoding for the purpose of ease of analysis. Data coding was done before data analysis.

Age group in the NDHS was picked based on original coding in ages between 15 to 49 years. Women's literacy was based on higher than secondary schooling, women who cannot read at all, able to read only parts of sentence, able to read whole sentence and blind/visually impaired. Women's highest education level was in terms no education, primary, secondary, and tertiary level attained. Husband's level of education was also based on no education, primary, secondary, and tertiary level attained. Contraceptives use was based on yes, when a woman use any of these: female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, and diaphragms and no, when she failed to use any means of contraception. The outcome of dependent variable was classified in terms of use and non-use. For easy process of interpretation of the results of the analysis, all variables were coded accordingly. Ordinal scale was used, which involved ranking of items.

The statistical process involved descriptive and inferential statistics. Simple descriptive statistics of the demographic and socioeconomic variables were conducted by the researcher. The variables were coded and modified to answer the research questions. Descriptive univariate analyses were performed to examine the frequency distributions of the variables. Also, Bivariate analysis was used to determine the relationships between the independent variables and contraceptive use. Chi-square test of independence was performed for categorical variables. Statistical significant differences were determined through the use of chi-square at $p < 0.05$. However, the independent variables that were found to have statistical significant association with contraceptive use in the bivariate analysis were included in the multiple logistic regression model. The decision rule was

that a null hypothesis was rejected if p was greater than 0.05 and not rejected when p was less than 0.05. Odds ratio were calculated for the bivariate analysis using a confidence level of 95%. The strength of the association was determined using the value of the odds ratio. At the multivariate level of analysis, the model included all the predictor variables adjusted for age, location, religion, SES, and education. Conditions of linearity and multicollinearity were tested to determine the appropriateness of the logistics regression. These were explained in details below:

RQ1: What is the relationship between selected factors (women's age, marital status, religion, literacy level, educational level, location and wealth index; and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_1: There is no significant association between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index; and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_1$: There is a significant association between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index; and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

RQ1: included categorical independent variables, ordinal independent variables and categorical dependent variable. Bivariate analysis was used to assess the relationship between the selected factors (women's age, marital status, religion,

literacy level, educational level, location and wealth index; and husband's educational level) and use of contraceptives among women in child bearing ages 15-49.

RQ2: To what extend can women's literacy level, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_2: There is no significant association between selected factors (women's literacy level, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_2$: There is a significant association between selected factors (women's literacy level, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

RQ2: Also included categorical independent variables, ordinal independent variables and categorical dependent variable. Multiple logistic regression, including OR and 95% CI, was used to assess the association between women's literacy and contraceptive use, after adjusting for age, marital status, location, religion and wealth index.

RQ3: To what extend can women's level of education, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_3: There is no significant association between selected factors (women's level of education, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_3$: There is a significant association between selected factors (women's level of education, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

RQ3: included categorical independent variables, ordinal independent variables and categorical dependent variable. Multiple logistic regression, including OR and 95% CI, was used to assess the women's level of education, age, marital status, religion, location, and wealth index.

RQ4: To what extend can husband's level of education, women's age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_4: There is no significant association between selected factors (husband's level of education, women's age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_4$: There is a significant association between selected factors (husband's level of education, women's age, marital status, religion, location, and wealth index) and use of

contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

RQ4: Included categorical independent variables, ordinal independent variables and categorical dependent variable. Multiple logistic regression, including OR and 95% CI, was used to assess husband's level of education, women's age, marital status, religion, location, and wealth index.

Past literature reviews and the application of SEM model by the CDC for the prevention of violence in the United States, attests to the fact that the predicting variables for contraceptive use have been replicated to follow the social-ecological model. In this study, age of the women and level of educational attainment by the women are potential variables or extraneous factors that correlate directly or indirectly with the dependent and independent variable in the statistical model, which are seen as confounders (Ilola, 2018). Moreover, in multiple logistic regression model, covariates include both the independent and confounding variables and therefore the association between dependent and independent variables after controlling for the confounding variable could be reported to the point of accuracy. Logistic regression model is useful for estimating odds ratios, and therefore suffice in cross-sectional studies (Ulrik, 2018). The advantage is that it does not require the researcher to begin to define which is explanatory variable or which are confounders.

Inferential Statistics

The determination of the significance of the logistic regression was by examining the classification table, the display of the incorrect and correct classifications of the

outcome variable. Chi- square goodness of fit test was used to test the appropriateness of model. To determine the significance of each of the independent variables, the Wald statistic was used. Logistics regression analysis calculated the effect of each explanatory or dependent variables on the odds ratio of the observed event of interest which in this case was use of contraceptives. The model summary provided the -2 Log Likelihood statistics which measured how poorly the model predicts the decisions. The Snell R^2, Cox and Nagelkerke R^2 were used to determine the percentage of variance in the dependent variable that was explained by the predictor or independent variable.

Threats to Validity

The sampling procedure did not include random sampling process, and as such did not involve bias selection as a result of the convenient sampling procedure. This could have affected the internal validity of the results, but was taken care of by ensuring that samples selected were diverse and cut across the North West States of Nigeria that participated in the study. The use of secondary data for the process of analysis always come with some limitation, but these were addressed by ensuring that the key variables of the SEM theory applied in this study were well tailored to suit the variables under consideration. This was based on the fact that construct validity defined the usefulness of a theoretical framework to the nature of a study (Creswell, 2012). Since secondary data was utilized in this study, measurement errors associated with the use of primary instrument did not arise to affect the validity and reliability of the results.

Ethical Procedures

Permission was sought and obtained from National Bureau of Statistics to use the NDHS secondary dataset for the purpose of analysis. Management of the dataset was treated with utmost discretion and stored securely from access to unauthorized people. Names, location, and identity of the representative samples were kept as secret as possible so as not to divulge or give the hint of these vulnerable population. Other requirements of Walden University were also appropriately met.

Summary

This section described the research design and methodology employed by the researcher in the study. As explained earlier, the quantitative method was applied. The population of the study was drawn from NDHS dataset 2018. The study design was cross-sectional in nature. The independent variables investigated include women's literacy, women's educational level and husband's level of education while the dependent variable was contraceptive use (female condoms, injectable birth control, birth control pills, use of implants, vaginal ring, diaphragms). SPSS version 21 was the statistical software utilized in carrying out the analysis. Analysis utilize descriptive statistics to establish relationship between the independent (women's literacy, women's education and husband's education) and dependent variables (contraceptive use) after adjusting for age, marital status, location, religion and wealth index. The next section described the results of data analysis.

Section 3: Presentation of the Results and Findings

Introduction

I examined contraceptive use among northern Nigerian women 15 to 49 years old. Four research questions were addressed in this study:

RQ1: What is the relationship between selected factors (women's age, marital status, religion, literacy level, educational level, location, wealth index, and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

RQ2: To what extend can women's literacy level, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

RQ3: To what extend can women's level of education, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

RQ4: To what extend can husband's level of education, women's age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

The hypotheses were designed to test the association between women's literacy, women's level of education, husband's level of education, and contraceptive use in northern Nigeria. The social-ecological model was used as a framework for this study. The result of secondary analysis of the 2018 NDHS are here. Data validation was performed using SPSS Version 21. Multiple data entrance was performed to address

missing data. There was recoding of variables, categorization, and manipulation to address the variables in the research questions. The analysis was by means of descriptive statistics. Thereafter, univariate, bivariate, and logistic regression analyses were performed on the independent variables to establish the significant predictors of contraceptive use in northern Nigeria.

Data Collection of Secondary Data Set

The 2018 NDHS was implemented by the National Population Commission (NPC) in collaboration with the National Malaria Elimination Programme (NMEP) of the Federal Ministry of Health, Nigeria. The funding was provided by USAID, Global Fund, Bill and Melinda Gates Foundation (BMGF), the United Nations Population Fund (UNFPA), and World Health Organisation (WHO). The population of target women was 127,545 (NDHS, 2018) from which 39,928 women ages 15 to 49 years in northwestern Nigeria were taken as a sample size to determine the empirical validity for logistics regression with more than five predictor variables. This served in testing the association between the independent and the dependent variables.

Discrepancies

There were some missing values associated with contraceptive use and nonuse among the target women. According to Jacobson et al. (2017), dealing with missing values in large dataset could be cumbersome. Because the target group was mainly women, with 3% missing value, this proportion was considered negligible in the decision on contraceptive use among the women in northwest Nigeria (Madley-Dowd & Heron, 2019). In northwestern Nigeria, the target women in the 2018 data set were 39,928, and

being secondary data set, the entire sample (N = 39,928) was used in the simple logistic regression model. This was based on the dichotomous nature of the dependent variable coded as use and nonuse.

Univariate Analysis

Descriptive Characteristics of the Sample Population

A sample of 39,928 women of ages 15 to 49 years were analyzed. This considered variables such as age, current marital status, location, wealth index, religion, women's literacy, women's education, husband's level of education in relation to contraceptive use. The analysis of the sample size (39,928) shows that 3504 (6%) of the women use one form of contraceptive or the other to prevent unwanted pregnancy, while 94% do no use any form of contraceptive. Table 7 shows the use and nonuse of any form of contraceptive, whereas Tables 8 and 9 show the demographic characteristics and the independent variables of the study sample size, respectively.

Table 7

Use of Contraceptives

Contraceptives	F	%
Yes, if any of: Female condom, injectable birth control, pills, use of implants, vaginal ring, diaphragms, abstinence, withdrawal, traditional, others.	2504	6
No, if none of the contraceptives	37,424	94
Total	39,928	100

Table 8

Demographic Characteristics of the Sample Size

Variables	F	%
Age Distribution:		
15-19	567	1.4
20-24	3098	7.8
25-29	6185	15.5
30-34	7592	19
35-39	7746	19.4
40-44	7368	18.5
45-49	7372	18.5
Total	39,928	100
Marital Status:		
Never in union	104	0.3
Married	38,382	96.1
Living Together	72	0.2
Widowed	799	2
Divorced	545	1.4
Separated	26	0.1
Wealth Index:	39,928	100

Table 9

Independent Variables of the Study

Women's literacy	F	%
Cannot read at all	34,034	85.2
Able to read only parts of sentence	2524	6.4
Able to read whole sentence	3368	8.4
Missing values	2	.0
Total	39,928	100.0
Women's Education		
No Education	31,443	78.7
Primary	4465	11.2
Secondary	3125	7.8
Tertiary	895	2.2
Total	39,928	100.0
Husband's Level of Education		
No education	23, 898	59.9
Primary	4191	10.5
Secondary	5538	13.9
Tertiary	4137	10.4
Don't know	690	1.7
Total	38, 454	96.3
Missing values	1474	3.7
Total	39, 928	100.0

Bivariate Analysis

A bivariate analysis was used to evaluate research question one, which is the association between the demographic variables: age, marital status, place of residence (location), wealth index and religion, as well as women's literacy, women's education and husbands' level of education and contraceptive use in preventing pregnancy in North

Western Nigeria. To achieve this, Chi-square test was conducted. One out of the eight independent variables showed no significant relationship with contraceptive use. This was age group, $\chi 2$ (6, N = 2504) = 3143.21, $p > .005$. Other variables show relationship. These were literacy, $\chi 2$ (3, N = 2504) = 3143.21, $p < .005$, wealth index, $\chi 2$ (4, N = 2504) = 3203.64, $p < .005$; and type of place of residence $\chi 2$ (1, N = 2504) = 1065.27, $p < .005$.

Religion, women's education, current marital status and husband's level of education were also significantly related with contraceptive use in North Western Nigeria. The results were, religion, $\chi 2$ (3, N = 2504) = 3354.98, $p < .005$; women's education, $\chi 2$ (2, N = 2504) = 3846.87, $p < .005$; current marital status, $\chi 2$ (5, N = 2504) = 309.87, $p < .005$; and husband's education, $\chi 2$ (3, N = 2483) =2709.79, $p < .005$. However, looking at the margin of the relationship, i.e. 2504 (6%) to 37424 (94%), the extent of relationship is very low. The analysis therefore proved that there is a significant association between selected factors (marital status, religion, literacy level, educational level, location, wealth index; and husband's educational level) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria. Only women's age showed contrary relationship. The results of the bivariate analyses were shown in tables 10, 11 and 12 depicting the variable that was not significantly associated with contraceptive use and the ones that were significantly associated with contraceptive use respectively.

Table 10

Cross tabulation of Predictors Variables Significantly Associated with Contraceptive Use in North West Nigeria (n = 39, 928)

Predictor Variables	Use	Non-Use	Chi-Square ($\chi 2$)	df	Test (2-sided)
Literacy: Cannot read at all	1312	32722	3143.21		.000
Able to read only parts of sentence	404	2120			
Able to read whole sentence	788	2580			
No card with required language	0	2			
Total	2504	37424			
Age Groups: 14-19	12	555	682.27	1	.081
20-24	135	2963			
25-29	472	5713			
30-34	504	7088			
35-39	595	7151			
40-44	453	6915			
45-49	333	7039			
Total	2504	37424			

Table 11

Cross tabulation of Predictors Variables Significantly Associated with Contraceptive Use in North West Nigeria (n = 39, 928)

Predictor Variables	Use	Non-Use	Chi-Square ($\chi 2$)	df	Test (2-sided)
Wealth Index: Poorest	260	14185	3203.64	1	.000
Poorer	487	11523			
Middle	658	6312			
Richer	513	3628			
Richest	586	1776			
Total	2504	37424			
Current Marital Status: Never in union	1	103	309.87	1	.000
Married	2476	35906			
Living with partner	7	65			
Widowed	8	791			
Divorced	12	533			
No longer living together/separated	0	26			
Total	2504	37424			
Type of place of Residence: Urban	1246	9079	1065.27	1	.000
Rural	1258	28345			
Total	2504	37424			

Table 12

Cross tabulation of Predictors Variables Significantly Associated with Contraceptive Use in North West Nigeria (n = 39, 928)

Predictor Variables	Use	Non-Use	Chi-Square ($\chi 2$)	df	Test (2-sided)
Religion: Catholic	160	211	3354.98	1	.000
Other Christian	336	877			
Islam	2008	36025			
Traditionalist	0	311			
Total	2504	37424			
Women Highest Edu: No education	1057	30386	3846.87		
Primary	470	3995		1	.000
Secondary	693	2432			
Higher	284	611			
Total	2504	37424			
Husband's Education: No education	684	23214	2709.79		
Primary	236	3955			
Secondary	728	4810			
Higher	810	3327		1	.000
Don't know	25	665			
Total	2483	35971			
Missing		1453			
Total	2483	37424			

Logistic Regression Analysis

Also performed were logistic regression analyses using all the independent variables. Analyses of each of the predictor variables in relation to each research question were hereby presented. The essence is to determine if the women at one point or the other tried to use contraceptives to prevent unwanted pregnancy. The predictor variables were age, current marital status, type of place of residence, wealth index, religion, women's literacy, women's education, and husband's level of education.

The Results

Analyses of binomial logistic regression were conducted to test for association between the independent and dependent variables using the research questions. The components of the regression model (women's literacy, women's education, and husband's level of education) correspond to research questions 2-4.

Research Question Two: To what extend can women's literacy level, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_2: There is no significant association between selected factors (women's literacy level, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_2$: There is a significant association between selected factors (women's literacy level, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

Logistic regression analysis was used to investigate the association between the predictor and the dependent variables in North Western Nigeria. The sample size analyzed was 39, 928. All the independent variables, i.e. women's literacy, age, current marital status, type of place of residence (location), religion, and wealth index predicted contraceptive use, $\chi 2$ (4, N=2504) = 3143.21, $p < 0.05$. The model explained 6% of the

variance in contraceptive use. Table 11 gives the coefficients, the Wald statistic and probability values for each of the predictor variables. This shows that age, wealth index, women' literacy predicts contraceptive use in North Western Nigeria. Furthermore, while women who cannot read at all were associated with decrease in percentage of contraceptive use (85.5%), the coefficients explained that an increase women's literacy was significantly associated with the odds of using contraception by a factor of 1.46 (95% CI [1.37, 1.56]). An increase in the age group was also associated with contraceptive use by a factor of .949 (95% CI [.929, .976]). Current marital status (married status 89.9% not using contraceptive) was not associated with contraceptive use as seen in a factor of .518 (95% CI [.446, .600]). Type of place of residence, religion and wealth index were associated with contraceptive use by an increases factor of .788 (95% CI [.706, .878]), .258 (95% CI [.233, .284]) and 1.66 (95% CI [1.58, 1.73]) respectively. The null hypothesis was rejected while the alternative hypothesis was accepted. Therefore, there is a significant association between women's literacy and use of contraceptives among women in child bearing ages 15-49, living in some selected communities in North Western Nigeria after adjusting for age, marital status, location, religion and wealth index.

Table 13

Logistic Regression Model for Women's literacy in North West Nigeria

							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Women's literacy	.380	.032	141.124	1	.000	1.462	1.373	1.556
Age in 5-year Groups	-.052	.014	13.577	1	.000	.949	.924	.976
Current Marital Status	-.658	.076	75.615	1	.000	.518	.446	.600
Type of Place of Res.	-.239	.056	18.481	1	.000	.788	.706	.878
Religion	-1.357	.050	734.405	1	.000	.258	.233	.284
Wealth Index	.505	.023	482.384	1	.000	1.658	1.584	1.734
Constant	1.036	.235	19.478	1	.000	2.819		

Research Question Three: To what extend can women's level of education, age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_3: There is no significant association between selected factors (women's level of education, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_3$: There is a significant association between selected factors (women's level of education, age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

A logistic regression analysis was used to investigate the association between the predictor and the dependent variables in North Western Nigeria. The sample size analyzed was 39, 928. All the independent variables, i.e. women's highest education, age, current marital status, type of place of residence, religion, and wealth predicted contraceptive use, $\chi 2$ (4, N=2504) = 3143.21, $p < 0.05$. The model explained 6% of the variance in contraceptive use. Table 12 gives the coefficients, the Wald statistic and probability values for each of the predictor variables. This shows that age, wealth index, women' highest education predicts contraceptive use in North Western Nigeria. The coefficients explained that women's education attainment was significantly associated with the odds of using contraception by a factor of 1.70 (95% CI [1.66, 1.73]). An increase in the age group was associated with contraceptive use by a factor of 1.01 (95% CI [.999, 1.02]). Current marital status (married status 89.9% not using contraceptive) was not associated with contraceptive use as seen in a factor of .818 (95% CI [.798, .838]). Type of place of residence (location), religion and wealth index were associated with contraceptive use by an increases factor of .813 (95% CI [.784, .843]), .973 (95% CI [.968, .979]) and 1.28 (95% CI [1.26, 1.30]) respectively. The null hypothesis was rejected while the alternative hypothesis was accepted. Therefore, there is a significant association between women's education and use of contraceptives among women in child bearing ages 15-49, living in some selected communities in North Western Nigeria after adjusting for age, marital status, location, religion and wealth index.

Table 14

Logistic Regression Model for Women's Education in North West Nigeria

							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Women's Education	.528	.010	2895.021	1	.000	1.696	1.664	1.729
Age in 5-year Groups	.009	.005	3.033	1	.082	1.009	.999	1.020
Current Marital Status	-.201	.012	263.841	1	.000	.818	.798	.838
Type of Place of Res.	-.207	.018	125.100	1	.000	.813	.784	.843
Religion	-.027	.003	81.437	1	.000	.973	.968	.979
Wealth Index	.244	.008	891.104	1	.000	1.277	1.256	1.297
Constant	-2.408	.054	2024.068	1	.000	.090		

Research Question Four: To what extend can husband's level of education, women's age, marital status, religion, location, and wealth index predict use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria?

Ho_4: There is no significant association between selected factors (husband's level of education, women's age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

$H1_4$: There is a significant association between selected factors (husband's level of education, women's age, marital status, religion, location, and wealth index) and use of contraceptives among women in childbearing ages 15-49, living in some selected communities in northern Nigeria.

Logistic regression analysis was used to investigate the association between the predictor and the dependent variables in North Western Nigeria. The sample size analyzed was 39, 928. All the independent variables, i.e. husband's education level, age, current marital status, type of place of residence, religion, and wealth index predicted contraceptive use, $\chi 2$ (4, N=2504) = 3143.21, $p < 0.05$. The model explained 6% of the variance in contraceptive use. Table 13 gives the coefficients, the Wald statistic and probability values for each of the predictor variables. This shows that age, wealth index, husband's level of education predicts contraceptive use in North Western Nigeria. Furthermore, the coefficients explained that an increase husband's level of education was significantly associated with the odds of using contraception by a factor of 1.17 (95% CI [1.16, 1.83]). An increase in the age group was also associated with contraceptive use by a factor of 1.00 (95% CI [.990, 1.10]). Current marital status (married status 89.9% not using contraceptive) was not associated with contraceptive use as seen in a factor of 1.50 (95% CI [1.37, 1.63]). Type of place of residence, religion and SES were associated with contraceptive use by an increases factor of .752 (95% CI [.724, .780]), .943 (95% CI [.925, .961]) and 1.51 (95% CI [1.49, 1.54]) respectively. The null hypothesis was rejected while the alternative hypothesis was accepted. Therefore, there is a significant association between husband's level of education and use of contraceptives among women in child bearing ages 15-49, living in some selected communities in North Western Nigeria after adjusting for age, marital status, location, religion and wealth index.

Table 15

Logistic Regression Model for Husband's Level of Education

							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Husband's Education	.156	.006	620.594	1	.000	1.169	1.155	1.183
Age in 5-year Groups	.000	.005	.000	1	.991	1.000	.990	1.011
Current Marital Status	.403	.044	85.601	1	.000	1.497	1.374	1.630
Type of Place of Res.	-.285	.019	227.820	1	.000	.752	.724	.780
Religion	-.059	.010	36.347	1	.000	.943	.925	.961
Wealth Index	.413	.008	2852.749	1	.000	1.512	1.489	1.535
Constant	-2.929	.077	1442.344	1	.000	.053		

Summary

The results of the Nigeria's Health Demographic Survey 2018 in relation to use of contraception and the predictor variables of women of child bearing aged 15 to 49 years in northern Nigeria were presented and analysed. The bivariate and logistic regression analyses models were used to evaluate the association between women's literacy, women's education and husband's level of education. In the course of the bivariate analysis, the independent variables that revealed a significant association with contraceptive use were age groups (25-29, 30-34, 35-39), women's literacy, location (urban), women's educational level (attainment of tertiary level) and husband's educational level (attainment of tertiary level). The variables that were not significantly associated with contraceptive use were religion, not able to read at all, and no education. In the course of logistic regression analysis, the control variables, except religion were associated with contraceptive use. The independent variables associated with

contraceptive use were women literacy, women's education and husband's attainment of tertiary education. Section 4 addressed the research findings, potential professional practice application, and the findings' implications for social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The issue of contraceptive use, which has the potential of controlling unwanted pregnancies and reducing maternal and infant mortalities, is not given the due attention in northern Nigeria. This is due to several factors such as low literacy level, gender inequality, religious and cultural factors, and others. To enhance the use of contraceptives to bring about improved family planning, the association between some demographic variables and contraceptive use among women aged 15 to 49 years in northern Nigeria were determined. This study was anchored on the socioecological theory, which took into cognizance the association of the individual, interpersonal and community levels and contraceptive use, depicting the influence the various levels have on contraceptive use. Quantitative analysis of secondary data sourced from the 2018 NDHS dataset was carried out. The process involved the univariate, bivariate, and multivariate analyses of the data through the aid of SPSS Version 21 software.

Interpretations of the Findings

The Age

The significance of age having an association with contraceptive use agrees with Solanke (2017), who examined factors influencing contraceptive use and nonuse among women of advanced reproductive age in Nigeria and found women's age as a factor that increase use of contraceptive. Secondary data were pooled and extracted from the 2008 and 2013 NDHS. This study showed that age is a factor in the use of contraceptives. This was proved by a factor of .949 (95% CI [.929, .976]). The analysis confirmed that young

women aged 25 to 29 years, 30 to 34 years, and 35 to 39 years use more contraceptive as seen in 15.5%, 19% and 19.4%, respectively, whereas women ages 40 to 49 years use less contraceptive, probably because of other factors not considered in this study such as menopause and other extraneous factors. There is, therefore, a need for an advocacy to target the increase of use contraceptives amongst the women in other groups.

Current Married Status

There was association between current marital status (younger women) and contraceptive use in northern Nigeria. This was proved by a factor of .518 (95% CI [.446, .600]) and ($p < .05$). This confirmed the finding of Igbodekwe et al. (2014), who studied the use of modern contraceptive among women of childbearing age in resource constraint setting. The emphasis from the point of view of Igbodekwe et al. was that younger women, especially in northern Nigeria, use contraceptives to delay pregnancy, whereas married women hardly use. This is therefore seen in the number of children they give birth to in a short interval, which often affect their children, especially infants, whom they hardly wean before the next pregnancy. However, those who were never married, widows, the divorced, or those separated from their spouses, but were involved in a sexual relationship, use contraceptives to prevent unwanted pregnancies.

Wealth Index

This study simply showed that wealth index was a factor in the use of contraceptives. This was proved by a factor of 1.66 (95% CI [1.58, 1.73]). This means that because the use of contraceptives is expensive, only those who can afford it will use it more, which confirmed the finding of Metcalfe et al. (2016), who posited that instead

of terminating unwanted pregnancy due to socioeconomic factors, such unwanted pregnancy, is prevented from occurring in the first place using contraceptives. Studies have linked contraception usage and socioeconomic variables among women who seek measures to prevent unwanted pregnancies (Marchildon, 2013). Also, husbands and wives could reach the decision to use contraceptives to avoid unwanted pregnancies, and this could be related to reproductive decision making in line with the socioeconomic reality (Lemessa, 2018).

Women's Education Attainment

This study shows that women's education attainment is a factor in the use of contraceptives. This was proved by a factor of 1.70 (95% CI [1.66, 1.73]). The analysis confirmed that women with higher level of educational attainment use contraceptives more to control unwanted pregnancies. This confirmed the study of Arikawei et al. (2017), who explains that educated women in northern Nigeria, who have increased knowledge about contraceptives, use contraceptives more than the uneducated women in preventing unwanted pregnancies.

Religion

Religion is significantly associated with contraceptive use in northern Nigeria. This was seen in an increase odds of contraception use by a factor of .258 (95% CI [.233, .284]). This study, therefore, is not in agreement with Bakibinga et al. (2016), who found no significant influence of religion and ethnicity on family planning approval among women in rural western Kenya. It was discovered that only Christian women use contraceptive more than those who practice Islam and traditional religion in northern

Nigeria and thereby not corroborating Bakibinga et al. (2016). A research using primary instrument (questionnaire) could give a better understanding of why Christianity tends to embrace use of contraceptives more than other religion in northern Nigeria.

Location

Location or place of residence was significantly associated with contraceptive use in northern Nigeria. This was seen in an increase odds of contraception use by a factor of .788 (95% CI [.706, .878]). This study agrees with Adebowale et al. (2014) who have reported higher contraceptive use in the urban and southern parts of Nigeria compared with women in the rural and northern parts of Nigeria. The implication of this is that women in urban centers tend to use more contraceptives as means of controlling unwanted pregnancies as against rural women who may not be able to afford the cost of contraceptives. The finding of Ofonime (2017) affirmed that there is higher use of contraceptive among the highly empowered and upper-class women in the urban areas compared with the poorly empowered and lower-class women in rural areas.

Husband's Educational Attainment

The analysis of the study found that husband's attainment of primary school was significantly associated with contraceptive use in northern Nigeria. This was seen in an increase odds of contraception use by a factor of 1.17 (95% CI [1.16, 1.83]). According to Awonuga et al. (2014), the role of male involvement in family planning among civil servants in Ibadan, South Western Nigeria, cannot just be undermined. This has to do with a certain level of education attained by such men. This study, therefore, suggests

that such role should be sought among the men in northern Nigeria so that contraceptives use will be based on mutual agreement between husbands and wives.

Similarly, husband's attainment of secondary school was significantly associated with contraceptive use in northern Nigeria. The implication is that exposure to contraceptive use is subject to certain basic level of education attained by the men. The study also found that husband's attainment of tertiary education was significantly associated with contraceptive use in northern Nigeria. This corroborates the findings of Awonuga et al. (2014) and Okigbo et al. (2015) regarding the importance of the role of men in the decision regarding the use of contraceptive by women. This implies that attainment of tertiary education has a greater likelihood of the men allowing their wives to use contraceptives so that they can control unwanted pregnancies. These findings suggest that men who attained primary, secondary or tertiary levels of education were more likely to encourage their wives to use contraceptives than men who never had any form of education (Arikawei et al., 2017).

Socioecological Model

In the application of the socioecological model to this study, it has been found that individual factors bordering on women's literacy (able to read only parts of sentence, able to read whole sentence), after adjusting for age, marital status, location, and wealth index; community factors bordering on women's education (primary, secondary, and higher), after adjusting for age, marital status, location and wealth index and religion and interpersonal factor bordering on husband's educational level (primary, secondary, and higher), after adjusting for age, marital status, location and wealth index are predictive of

contraceptive use, whereas religion, not able to read at all, and no education were not predictive. According to the concept of the socioecological model, preventive behavior of an individual are being influenced at the individual, interpersonal and community levels of influence, as adopted for this study at these three levels (individual, interpersonal and community levels). This means effective use of the model could enhance the use of contraceptive at the age groups, marital status, as well as among educated women or women with certain level of literacy, women who are desirous of good health and educated men will also influence the use of contraceptives.

Adequate planning of the socioecological model to reflect the individual, interpersonal, and communities with special consideration for age, marital status, and education of the men enhance the use of contraceptive in northern Nigeria and by so doing, the measure could help to address the issue of unwanted pregnancies and assist in improving maternal and children's health.

Contraceptives

In this study, the various contraceptives contained in the NDHS 2018 dataset such as female condom, injectable birth control, birth control pills, implants, vaginal ring, diaphragms, and withdrawal were the ones analysed in terms of use and non-use. The result showed that the women, 2504 or 6% use one form of contraceptives or the other. However, the researcher did not delve comprehensively into traditional means of birth control, but the modern means of contraception.

Limitations of the Study

Secondary data constitute the dataset used in this study. Despite being part of the 2018 Nigerian Demographic and Health Surveys (NDHS), there are certain limitations, involving manipulation of the 2018 dataset to suit the focus of this study, which is the North West Nigeria. There were issues of quality check to ensure that the dataset represents data that could actually address the research questions. In the process of the analyses, there were certain phenomenon not considered in this study. For instance, there were those people without any form of religion that were not considered in this study. The focus of the study was on women in North West Nigeria in age bracket of 15-49. The consideration was because of their history of early marriages, high birth rate and poverty level. These factors were limitations, but the effects were fairly managed through careful data imputation and data interpretation.

The missing value in husband's level of education was 1474 or 3.7%. This did not affect the study's outcome in any way. Moreover, contraceptive use was more associated with those that completed primary, secondary and tertiary schools. Therefore, the entire sample size of 39, 928 was large enough and thus providing room for better decision making as against a small size whose result would not have been valid and reliable for generalization to the North West region used.

Other limitations included the use of chi-square test and logistic regression for the variables selected based on the fact that the data were derived from an existing secondary data set. More also, the validity and reliability of the result would have been affected if the researcher were to rely on the initial analysis that considered a part of the population,

instead of the entire sample that was eventually used. Therefore, changes were adequately managed in order to avoid incidence of undue biases. The NDHS 2018 also have some limitation in reporting in terms of availability and frequency of use of health care services, health delivery system, and nature of health services that are available and accessibility by end users at the primary, secondary and tertiary health care services. Most times too, it requires mathematical and technical skills in order to understand the kind of data reported by the NDHS. Another major limitation was the fact that only some of the independent variables studied in this research (current marital status, age, location, women's education and wealth index) were reported in respect of contraceptive use and non-use in the NDHS 2018 data set. Other independent variables (religion, women's education, women's literacy and husband's level of educational attainment were not reported). I had to directly cross tabulate contraceptive use with the variables in SPSS before arriving at my result.

Recommendations

The use of secondary data analysis of Nigerian Demographic Health Surveys 2018 dataset has some limitations because of absence of control of variables on the part of the researcher. The use of primary instrument and quantitative analysis of responses will suffice to deal with issues associated with use of secondary instruments, such as multiple imputations. There is need for further research to examine the role of the various levels of socioecological predictors in contraceptive use, especially in northern Nigeria. The use of primary data could provide more detailed information on the roles of the various levels that could effectively enhance the use of contraceptive in northern Nigeria.

There is strong need for an advocacy to target the increase of contraceptive use amongst the women in other groups. This study therefore found low level of contraceptive use among married women in northern Nigeria. A research using primary instrument (questionnaire) could give a better understanding of the role of religion in contraceptive use not just in Northern alone, but across entire Nigeria. The finding of this study thus suggests the need for further researchers that could enhance women's skill in use of any of the different contraceptives mentioned in this study. The highpoint is to increase the number of women in northern Nigeria that will embrace the use of contractive. This means as the women have increased knowledge about the importance of contraceptive, they will tend to develop more interest in the use so as to avert health risks associated with non-use (Arikawei et al., 2017).

This therefore means that there is need to put more programmes in place, such as television and radio jingles, short drama and sponsoring of movies to sensitize the general society in northern Nigeria on the importance of contraceptives so that more women can embrace its use. There is also need to have a further research in the future for the purpose of determining the extent of the relationship between the various independent and the dependent variables that were used in this research. The finding of this study also suggests the need for further research to address and balance women's over-submissiveness to their husbands in issues pertaining to their decisions on use of contraceptives in northern Nigeria since husbands have influence on them in that regard. The advocacy group needs to also promote higher educational attainment in northern Nigeria since once of the findings simply suggest that men who attained primary,

secondary or tertiary levels of education were more likely to encourage their wives to use contraceptives than men who never had any form of education.

Professional Practice

There is no doubt this research has proven that the use of secondary data is not only cost effective, but also saves time in sourcing useful and reliable data needed to arrive at a worthy conclusion and generalization. This was demonstrated with data collected from the Nigeria Demographic and Health Surveys (NDHS). The data collected could be useful to federal ministry of health, professional health workers and counsellors to counsel men, especially in northern Nigeria to promote use of contraceptives among their wives. This is because the involvement of husbands in the region could assist policy makers in the development of policies and guidelines that can enhance contraceptives use in northern Nigeria (Izugbara, 2015). For instance, the analysis with regards to contraceptive use based on age group has significant implications for public health professionals to plan effective family planning program intervention to embrace all ages who are active sexually among the different age groups 15 to 49 years in northern Nigeria. The implication of an increase in age group associated with an increase in the odds of contraception use by a factor of .949 (95% CI [.929, .976]) is an indication that the findings from this study could serve as insights to aid researchers on family planning to fashion ways of targeting the different age groups to increase contraceptive use with the aim of helping to avert the risks factors involved in non-use of contraceptives.

An increase in the highest educational level of husbands as associated with an increase in the odds of contraception use by a factor of 1.17 (95% CI [1.16, 1.83]) is an

indication that advocacy should also be targeted at improving school attendance for both the girl-child and the boy-child in northern Nigeria so that in the long run, the prospect of using contraceptive can increase contraceptive use. Furthermore, current marital status was also associated with a decrease in the odds of contraception use by a factor of .518 (95% CI [.446, .600]), which is an indication of the need for some interventions from professionals in order to increase contraceptive use among married women. This should be incorporated into the health and counselling services sessions. The finding will also assist health professionals to effectively evaluate and design the form of contraceptives that that could suit different women desiring family planning so as to help in improving maternal and child health in northern Nigeria. Additionally, the analysed data sets can serve as means of further information to promote advocacy on the use of contraceptive among sexually active women in Nigeria, and for the prevention of unwanted pregnancy and abortion. Other researchers could draw from this data as a means of improving on their work in order to further extend the frontier of knowledge and also as a means of improving maternal health and quality of life.

Positive Social Change

The implications for social change for this study include the possibility of organizing more awareness programmes in northern Nigeria, using local health workers and traditional institutions to enlighten the focus group on contraceptive use, as this could change the narrative, which hitherto proved that sorthern Nigerian women use of contraceptives is higher than that of their counterparts in northern Nigeria (Owoseye, 2017). This means as more women use contraceptives to prevent unwanted pregnancies,

there will be improvement in their quality of life. Other implications for social change as a result of the finding of this research is that there could be the possibility of having more cross section of women to embrace the modern contraceptive method to prevent unwanted pregnancy and unsafe abortion. This could serve as a means to promote healthy living, reduce poverty, and reduce infant mortality rate, as well as improving the children's standard of living in the region. Findings of the study could be effective in addressing the disparities in contraceptive use among the different religious and ethnic groups in northern Nigeria, as this could help to bring about increased and improved family planning programmes that will aid the reduction in the incidences of unwanted pregnancy, maternal and child mortality, poverty and reduction in high birthrate in northern Nigeria.

Improving women's health and reduction in both maternal and child mortalities is one of the benefits of use of contraceptives. This means that the finding of this study could provide timely information for policymakers, public health planners, health professionals and researchers that will serve as springboard to formulate and implement family planning programs that will bring about effective and time bound positive social change on contraceptive use. Further social change implication is that absence of family planning could constitute a great deal to the risk of maternal mortality as a result of too many pregnancies as well as unplanned pregnancies with little or inadequate gap in-between or when the woman is too old/young or too sick to get pregnant (Ajaero et al., 2016). However, family planning helps to avert about 32% and 10% of maternal and

childhood deaths respectively, and also having other benefits such as reduction in hunger and poverty, which is prevalent in northern Nigeria.

Conclusion

This study used the 2018 Nigerian Demographic Health Survey to evaluate contraceptive use in northern Nigeria. The study investigated some factors (independent variables) associated with contraceptive use among women aged 15 to 49 years. In the bivariate analysis, the independent variables revealed a significant association with contraceptive use. These were age, marital status, women's literacy, maternal's health and husband's educational level. Variables that were not significantly associated with contraceptive use was religion. In the logistic regression analysis, factors such as age, location, wealth index, women's literacy, women's education and husband's level of education predicted contraception use among women aged 15 to 49 years, while independent variable factors such as current married status in North West Nigeria was not significantly associated with use of contraceptives. There is therefore no doubt that one of the 21st century's health reform is use of contraception to control unwanted pregnancy, as well as to improve and maintain healthy lifestyle among sexually active women. This has not been fully embraced in North West Nigeria hence, the usefulness of this research to fill the knowledge gaps in the use of socioecological model to predict use of contraceptive in the region. In southern Nigeria, just like the advanced societies, the use of contraceptive to control unwanted pregnancy has been found to be more effective and stress free but its use is still low in northern Nigeria. This study will therefore serve as a means of enhancing the use of contraceptives among the women, as findings of the study

could be used to enhance the design of effective family planning programmes so as to improve contraceptive use, reduce unwanted pregnancy, reduce maternal and child mortality rates, as well as improve the quality of life of the local women in North West Nigeria. It is equally hoped that findings of the study could contribute in bringing about positive social change by improving the health of the women, reducing death rates, improving quality of life for both the individuals and the northern Nigerian society in general through increased use of contraceptive among sexually active women.

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