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Implications of Birth Control Methods on Fertility and Wellbeing of Women: Evidence from Rural Households in Nigeria

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ABSTRACT

This study examined the effect of birth control use on the fertility and wellbeing of rural households in Nigeria. Secondary data from Nigeria Demographic and Health Survey for 2008 and 2013 were used in the study. The data was analyzed using descriptive statistics and the ordinary least squares (OLS) method. The results show that knowledge of birth control methods is high in rural areas (85%), however, contraceptive prevalence rate is still low (15%) and most women still do not intend to use birth control. The most common birth control method used is injections, pills, withdrawal and condoms. Majority of the women (62.1%) were found to have normal health and wellbeing as seen by their BMI. In addition, we found that wealth index, birth control use, region and occupation were all significantly related to fertility rate. The results further revealed that there has been a little decline in fertility rate over time, which could be attributed to use of birth control. The study further revealed that there has been an improvement in the level of wellbeing in rural Nigeria over time. This study concludes that increased use of birth control is key to curbing the issue of high fertility rates which goes further to improve the wellbeing of the woman.

KEY WORDS: Fertility, Birth Control, Wellbeing, Body Mass Index, and OLS

JEL CODE: J13, C21, I31

1 Introduction

1.1 Background of the study

Nigeria is the most populous country in Africa and ranks number 7 in the list of world countries by population with a current population of about 196 million, based on the latest United Nations estimate, which also accounts for about 2.57% of the entire world's population (World Population Review, 2018). The rural areas constitute about 51.40% of the population while the rest of the population is urban. The rural communities play a significant role in the development of the country. It has been noted that the major source of income for rural dwellers include primary economic activities such as agriculture which plays a major role in Nigeria's economic development Abah (2010). Agriculture accounts for one-third of the country's Gross Domestic product (GDP) and employs two-third of the labor force Bola (2007). The rural communities, of which about 90% are involved in agriculture, are a principal source of capital for the country, are major providers of raw materials for the country's industrial processes Nyagba (2009) and are the major providers of food in the country IFAD (2014). The country's population is constantly on the rise with a population growth rate of 2.61%. Nigeria is also estimated to have a population of over 230million by 2025 and to rank third most populous country in the world by 2050 (**United Nations Department of Economic and Social Affairs, Population Division, 2017**). This rising population growth puts the resources of the country under tremendous pressure. This rapid population growth is majorly accounted for by high total fertility rate National Population Commission and ICF International (2014). A survey carried out among the developing countries, revealed that total fertility rate was highest in the Sub– Saharan Africa at an average of 5.3 children per woman Olalekan et al. (2011) Also, statistics showed that Total Fertility Rate, TFR, or the average number of children per woman over the course of her lifetime, declined from 6.5 in 1990 to 5.7 in 2008 in Nigeria. Currently the TFR of an average Nigerian woman is 5.5 births per woman, the TFR of women in the rural areas is 6.3 while that of women in the urban areas is 4.8 National Population Commission (2013). This TFR implies that an average Nigerian woman, at the end of her childbearing age, would have given birth to about 6 children. Birth control, also known as contraception and fertility control, is a method or device used to prevent pregnancy. It is defined as "the use of various devices, drugs, agents, sexual practices, or surgical procedures to prevent conception or pregnancy" **(Nordqvist, 2009)**. Birth control has been used since ancient times, but effective and safe methods of birth control only became available in the 20th century Hanson and Burke (n.d.). Around the world, more women are using various birth control methods, but the figure is still low in developing countries, Mazumder et al. (2001) especially in Africa. In Nigeria specifically, just about 15% of the men and women who were reported to know about contraception methods actually use them. The low rate of contraceptive use in Nigeria results in high fertility rates, particularly in the rural areas. This high fertility rate accounts for Nigeria's high maternal, infant, and neonatal mortalities. There has

only been a slight increase in contraceptive prevalence and only a slight reduction in fertility rates in the country National Population Commission (2013). Hence, contraceptive practice remains low and fertility, population growth and unmet need for family planning are high.
The rate of population growth is also a cause for concern as population explosions poses major health and economic challenges to the nation. Households with many children are more likely, over time, to become poor and less likely to recover from poverty than families with only a few children (Ajakaiye and Adeyeye (2001); Orbeta (2005)). Unfortunately, there are very few studies that assess how the use of birth control methods affect household wellbeing in Nigeria. Against this background, this study sought to answer the following research questions: i. What is the fertility rate over time among rural households? ii. What is the wellbeing status of rural households? iii. How does the use of birth control methods affect the fertility? And, iv. How does fertility of rural households affect their wellbeing?

2 Literature Review

2.1 Theoretical Framework

Fertility theories seek to describe the major influences affecting fertility and no theory is capable of explaining fertility behavior in all societies throughout time. There are macrolevel theories and also microeconomic theories. The macrolevel theories include Malthus population theory and the microeconomic theories include Becker's theory and this study is based on these two theories.

2.1.1 Malthus Population Theory

Malthusian population theory was developed due to rapid population growth rate and low returns from agriculture. Malthus in his essay assumed that man's ability to reproduce was greater than his ability to produce Malthus (1826). Malthus analysis was based on the proposition that man's capacity to increase his means of subsistence was much less than his capacity to multiply. He stated in his essay "Population when unchecked, increases in a geometrical ratio. Subsistence increases only in arithmetical ratio" Malthus (1826). Furthermore, Malthus believed that if an increasing population growth was left unchecked, a time will come when population would exceed food availability. Malthus proposed two types of checks- the preventive check and the positive check. The main preventive check refers to moral restraints and postponement of marriage which are considered to reduce birth rate. He also proposed the use of birth control as part of the preventive checks. Malthus also believed that every individual must be conscious of the fact that his welfare lies in limiting the size of his family.

2.1.2 Economic Theory of Fertility

This theory was out forth by the American economist, Gary Becker in 1960. According to Becker, families lacking knowledge of birth control could exercise control over their births through abortion or abstinence in the form of delayed marriage and reduced frequency of coition during marriage. This gave very little room for decision making given the taboos against abortion, the strong social forces determining the age of marriage, and the relative inefficiency of reductions in the frequency of coition. Hence, births among families would be largely determined by chance. However, the growth in knowledge of birth control increases the chances of decision making by families.

In Becker's terms, children may be considered as both consumption goods, as they are a source of psychic income and satisfaction to their parents, as well as production goods, as they may sometimes provide money income. The benefits they yield are not fixed but vary in amount with the child's age, making children a durable consumption and production good. However, this classification does not imply that the satisfactions or costs associated with children are the same as those associated with other durables. According to Becker's analysis, a family must not only determine the number of children to have, but also determine the amount spent on them. In his work, he referred to more expensive children as "higher quality" children. Also, Becker assumed that an increase in income would lead to an increase in the amount spent on children, most of which would increase the quality of the children.

Conclusively, Malthus, on the other hand, concluded that an increase in income would lead to a large increase in family size due to 2 major reasons. First, according to Malthus, an increase in income would cause a decline in child mortality, enabling more children to survive childhood. Second, he argued that increase in income increases fertility by inducing people to marry earlier and 'abstain less while married. However, Becker's analysis generalized that of Malthus and concluded that quantity elasticity is probably positive but small in modern societies for 2 reasons. First, a decline in child mortality would induce a corresponding decline in births because parents are interested in the number of survivors and not in the number of births. Also, because births can now be controlled without abstinence, it is no longer guaranteed that an increase in income would result in a large increase in fertility.

2.2 Conceptual Clarifications: Birth Control, Fertility and Wellbeing

2.2.1 Birth Control Methods

Birth control, also known as contraception and fertility control, is a method or device used to prevent pregnancy. More specifically, it is defined as "the use of various devices, drugs, agents, sexual practices, or surgical procedures to prevent conception or pregnancy" **(Nordqvist, 2009)**. Several methods have been used to control birth since ancient times, but effective and safe methods

of birth control only became available in the 20th century Hanson and Burke (n.d.). Planning, making available, and using birth control is referred to as family planning. More specifically, family planning services refers to activities that enable individuals to determine the number and spacing of their children. It involves the use of contraception and other techniques to control the timing of reproduction. The term is sometimes used to refer to access to and use of contraception. Both terms are sometimes used interchangeably in several literature. In Nigeria, just as around the world, several practiced were used to control conception. These practices can generally be referred to as traditional methods of birth control. These traditional methods are basically fertility awareness-based methods. Here, a woman is expected to understand her menstrual cycle, to know the periods where she is safe and when she's unsafe, i.e, ovulation or fertile periods, and avoid sexual intercourse during unsafe periods. These methods include:

1. **Rhythm Method**

This method predicts when ovulation will occur based on when it occurred in past cycles. It is practicable in women with relatively regular menstrual cycles. In this method, women avoid sexual intercourse 3 days to her estimated ovulation date, which is usually 14 days to her expected period date, up to 3 days after, making a total of 7 days.

2. **Cervical Secretions**

This method involves watching changes in the cervical mucus. Normal vaginal discharge changes at the time of ovulation. At this time, there is more mucus, it feels wet and slippery, looks like egg white and can be stretched between the fingers. After ovulation, there is less mucus and it is sticky or even dry, blocking sperm from entering the uterus. This signifies a safe period.

3. **Basal Body Temperature Method**

This involves taking daily temperature readings to detect when ovulation is occurring. It is based on the principle that during ovulation, progesterone increases your body temperature by 0.2 - 0.5°C. Sex is avoided on days when the temperature in increased and can be resumed when the temperature goes back to the baseline and remains so for 3 days.

4. **Sympto-thermal Methods**

This method involves the combination of various methods that indicate ovulation periods. It involves a combination of at least 2 of the above methods and other symptoms such as breast tenderness, slight lower abdominal pain, abdominal heaviness and slight bleeding/spotting. This method is more effective than using only one of the above-mentioned methods.

5. **Withdrawal Method**

This is the oldest method known and is also referred to as "coitus interruptus". Coitus unterruptus refers to the withdrawal of the penis from the vagina before the release of ejaculate. This means that ejaculation must take place outside of the vagina. No other protection methods are usually used with the withdrawal method. This method is associated with high failure rates because it requires a strong degree of motivation on the part of the male. Also, the pre-ejaculatory secretions can contain millions of spermatozoa that can cause pregnancy. Nonetheless, the method is the most commonly used birth control method among Nigerian males.

6. **Lactational Amenorrhea Method (LAM)**

This is a temporary birth control method that depends on exclusive breastfeeding from birth up to 6 months after birth. This method is based on the physiological concept that breast feeding women have amenorrhea and are therefore not ovulating. However, for the method to be successful, the baby must fully be on breast milk and periods should not have started. It can only be regarded as a temporary form of contraception as chances of periods starting increase after 6 months, hence the failure rate is very low in the first 6 months.

The modern birth controls methods available are profiled below.

1. **Physical Barrier Methods**

Barrier contraceptives are those that prevent pregnancy by physically preventing sperm from entering into the uterus Lawrence (2008). They include, male condoms, female condoms, cervical caps, diaphragms and contraceptive sponges. Globally, condoms are the most common birth control methods Chaudhuri (2007) According to the 2003 Demographic and Health Survey (DHS), the condom is reported to be the main contraceptive method known of and used by Nigerian women of reproductive age.

2. **Hormonal Contraception**

These are contraceptives that use hormones to prevent pregnancy. Hormonal contraception is available in different forms which include oral pills, implants and injections and they are currently available only for women.

There are 2 types of oral birth control pills, the combined oral contraceptive pills (which contain both estrogen and a progestin) and the progestogen-only pills, sometimes called minipills Ammer (2009). Both types of birth control pills prevent fertilization mainly by inhibiting ovulation and thickening cervical mucus. They may also change the lining of the uterus and thus decrease implantation Hoffman (2011). The pills are 92% effective. The Depo Provera injection is another form of hormonal contraceptive. Commonly referred to as the injection, it is a contraceptive injection containing progestogen. It prevents pregnancy by stopping the ovaries releasing an egg each month

and there are also changes to the lining of the womb. The levonorgestrel subdermal implant (Norplant) is the most commonly available long-acting progestin-only subdermal implant in Nigeria. It has been found to be highly effective and safe and generally acceptable to Nigerian women.

3. **Intrauterine Devices**

The current intrauterine devices (IUD) are small devices, often 'T'-shaped, containing either copper or levonorgestrel, which are inserted into the uterus. The hormones or the Cooper stops the sperm from reaching the egg. Even when sperm does reach the egg, the IUD stops the egg from attaching to the wall of the uterus. They are one form of long-acting reversible contraception which are the most effective types of reversible birth control Winner et al. (2012), they are 99% effective. The IUD is very popular and widely used in Nigeria, particularly by older married women.

4. **Sterilization**

Sterilization, is also known as permanent contraception. It prevents all future pregnancies and is very difficult and impossible to reverse. Surgical sterilization is available in the form of tubal ligation for women and vasectomy for men. Tubal ligation is a procedure to cut or clip a woman's fallopian tubes so that sperm cannot get an egg to fertilize. Although this method is commonly used worldwide, especially in developed countries and in some developing countries in Asia and South America, it is not a common or acceptable contraceptive choice in Nigeria. This may be due to high cost of the procedure, scarcity of skilled providers (especially in rural areas), and fear of surgical complications (G. 2007).

Vasectomy refers to permanent male sterilization. The male tubes are cut and tied to prevent sperm from mixing with the semen and hence prevent fertilization. Although the procedure is simple, safe, and effective, it is not readily accepted as a method of fertility control in Nigeria (Akinwuntan and Shittu 2008).

5. **Emergency Contraception**

Emergency contraceptive methods are medications or devices used after unprotected sexual intercourse with the hopes of preventing pregnancy. They work by delaying the female body from releasing an egg or by preventing the sperm from fertilizing an egg. However, it does not work once an egg has been fertilized. A number of options exist, including high dose birth control pills, levonorgestrel, mifepristone and IUDs. These methods are very effective.

2.2.2 Birth Control and Fertility

Fertility refers to natural capability to produce offspring. It can also be said to be the actual production of offspring rather than the physical ability to produce offspring, which is termed "fecundity".

Fertility rate as a measure of fertility, refers to the number of offspring produced per individual or population. It is the relative frequency with which births actually occur in a given population Ushie (2009). In demographic contexts, fertility is measured in a variety of ways generally classified as period measures or cohort measures. Period measures refer to a cross-section of the population in one year while cohort measures follow the same people over a period of decades. Both period and cohort measures are widely used Demeny and McNicoll (2003). The period measures include crude birth rate (CBR), General fertility rate (GFR) and Child-woman ratio (CWR) while the cohort measures include total fertility rate (TFR), gross reproduction rate (GRR) and net reproduction rate (NRR). According to Ushie (2009), fertility is a function of two basic variables which are biological and individual choices. The biological function is influenced by genetics while the individual choices are influenced by sociocultural and economic conditions Demeny and McNicoll (2003) . The main measure of fertility used by this study is the total children ever born. The total fertility rate, TFR, refers to the average number of children a woman would have at the end of her reproductive age, or over the course of her lifetime. Total Fertility Rates (TFR) are higher in Sub-Saharan African countries than in other major regions of the world. The TFR of sub-Saharan Africa was 5.1 births per woman, as at 2010, which is double the rate in other regions - 2.3 births per woman in Asia and Latin America ("United Nations," n.d.).

2.2.3 Birth Control and Wellbeing

As earlier stated, wellbeing may be described as the quality of life of an individual. Several studies have also described wellbeing as the set of human activities that describe the conditions of life that an individual experience (Adeoti and Akinwande (2013); Rojas (2004)). Also, wellbeing has been recognized to include issues of health, education, security, freedom, social relations and others and not just income and consumption Oladokun, Adenegan, and Alawode (2017). It represents various aspects of personal and family satisfaction in life such as the feelings of being prosperous or happy; health and nutrition; material wealth; and education. Wellbeing status of rural households is also said to be lower than that of the urban population due to several factors such as inadequate social amenities, agriculture as the main occupation and generally low standards of living, among others. Previous studies have found that use of birth control methods does not only affect fertility, but it also affects wellbeing in general. Low levels of wellbeing have been attributed to high rates of population growth which limits the amount of resources available to an individual, resulting from the high fertility rate which is also due to low levels of birth control use (see; Canning and Schultz (2012), Cleland et al. (2012)).

2.3 REVIEW OF EMPIRICAL STUDIES

It is believed that a fertility decline as a result of birth control use is associated with reduced mortality, hence enhancing human capital formation. It has been previously established in this study that the rate of maternal mortality was high in Nigeria World Health Organization (2014) resulting from high fertility, therefore a reduction in fertility would mean a reduction in mortality (Schultz, 2007). This corresponds to the findings of other studies which also concluded that use of birth control helped to reduce the number of pregnancies and improve birth spacing which reduced maternal mortality (Cleland et al. (2012); Rutstein (2005); Conde-Agudelo and Belizan (2000); **Osemwhenka, 2004**). It was also discovered that women who never used birth control were about 3 times more likely to be undernourished than their counterparts Adebowale, Fagbamigbe, and Bamgboye (2011) . Body Mass Index (BMI) was considered a key variable in the research between nutrition and fertility and it is assumed to have an inverse relationship with fertility (**Hosseini-Chavoshi et al., 2008**). The study found that a significant difference existed between the mean BMI for those who used and those who never used birth control. Other studies have shown that a woman with higher BMI is likely to return to fertility sooner than her counterpart with lower BMI (Popkin et al. (1994); Adebowale, Fagbamigbe, and Bamgboye (2011)). Furthermore, it was discovered that apart from improvements in health, use of birth control improved the wellbeing of families in other areas. Canning and Schultz (2012) proposed that the use of birth control had certain economic repercussions for the family. For instance, fewer or adequately spaced pregnancies gave women the opportunity to acquire more skills and trainings that would increase their earning capacities, parents would also be able to acquire more physical assets (Becker and Lewis (1974); T. Paul Schultz (2008)). This is consistent with the findings of Bailey (2006), who also found that early access to birth control in the US increased women's investment in their careers, hence increasing their wages. A study carried out in Matlab, Bangladesh discovered that women who used birth control methods were reported to have more physical assets in their households than those who did not use any methods. These assets moved away from livestock and tended towards housing and financial assets, consumer durables and jewelry T. Paul Schultz (2009). Women in these households were also found to earn about 40% higher income than their counterparts. However, a similar study in Madagascar found no significant relationship between birth control use and household income Hajason, Piña, and Raveloharimisy (2013). It was also found that as a result of reducing their fertility, parents can then increase their transfers to each child in form of gifts as well as human capital (**Becker, 1981**; **Quisumbing and Maluccio, 2003**). As a result, parents can invest more in each child in terms of nutrition, health and education. A similar study however, found a weak relationship between birth control use and child's schooling Hajason, Piña, and Raveloharimisy (2013). **Kraudal (2000)**, suggested that fertility rates will reduce with an increase in women's education. He also opined that the net effect of community education outweighs that of individual education. Hence the more the proportion of better educated women in a society, the

lower the fertility rates in that society. Studies have shown a strong positive relationship between wealth status and use of birth control to reduce fertility (**Kishor & Lekha, 2008; Elfstrom & Stephenson, 2012**). Few studies in Nigeria have found a direct relationship between birth control use and wealth index (Adebowale, Fagbamigbe, and Bamgboye (2011); Odusina, Ugai, and Olaposi (2012)). They found that women in the richer wealth index or higher socioeconomic status were more likely to use birth control than their counterparts. This finding is similar to the findings of an earlier study which took place in Bangladesh which found that women who belonged to groups that received microfinance support were more empowered and more prone to contraceptive use than their counterparts who did not receive that support (**Schuler & Hashemi, 1994**). Whereas, quantitative measures of a similar study in Ghana found that receiving microfinance support did not influence women's use of birth control (**Norwood, 2005)**. Adeyemo and Oni (2012) discovered that large household size increased wellbeing of rural households. They implied that this may be due to the fact that rural households depend on family labor for their agrarian activities, hence large family size leads to increased productivity thereby leading to increased income and wellbeing. The study also found that increased educational levels and being in formal occupations significantly increased wellbeing status.

2.4 Conceptual Framework

The conceptual framework for this study shows the relationship between the use of birth control, fertility and wellbeing. The framework starts by showing socio-economic factors that influence the use of birth control methods. The use of birth control then directly affects fertility shown by the TFR, birth rates and number of living children. Use of birth control also directly affects the wellbeing status of households through its direct influence on their health, economic status, and so on, and indirectly affects wellbeing through its effects on fertility.

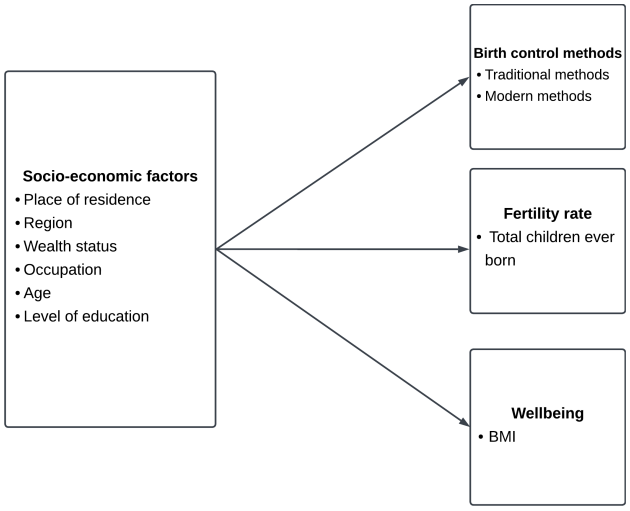

Figure 1. Conceptual Framework

3 Research Methodology

3.1 Scope of the study

This study focused on the rural population of Nigeria. Nigeria is one of the Sub-Saharan nations located in the western part of Africa. Nigeria is widely recognized as the most populous country in Africa and the country has 36 states plus the Federal Capital Territory. The rural areas refer to those areas in the country characterized by fewer homes or buildings and lower population density compared to the urban areas, or by certain socioeconomic features. The rural population constitutes about 51.40% of the entire country's population, which means that more than half of the population of Nigeria resides in the rural areas. Rural Nigeria is characterized by agrarian livelihood as well as certain other primary production activities.

3.2 Data Source and Type

The type of data that was used in this study was secondary data. The study used cross-sectional dataset collected from the National Demographic and Health Survey (NDHS) for the years 2008 and 2013. The NDHS is a survey that is designed to provide data to monitor the population and health situation in Nigeria. The surveys gathered information on demographics, as well as fertility levels, fertility preferences, marriage, awareness and use of family planning methods, nutritional status of women and children, mortality, and so on. In addition to presenting national estimates, the reports provided estimates of key indicators for both the rural and urban areas in Nigeria. The target groups were women aged 15-49 in randomly selected households across Nigeria.

3.3 Analytical techniques

For the purpose of this study, the techniques used to analyse the data include descriptive statistics and ordinary least squares (OLS) method.

- Descriptive statistics was used to profile the birth control methods that are accessible and used by the rural households, to estimate the fertility rate of rural households and their wellbeing status. Descriptive analyses of mean, standard deviation, minimum, maximum value and frequency table was used to describe the socio-economic characteristics of the respondents, includes: their age, sex, household size, marital status, region of residence, occupation, religion, wealth index and educational level. The fertility rate was measured using the total number of children ever born as the main variable while wellbeing was measured by the womens' BMI.

- Ordinary least squares method was used to determine the effect of the use of birth control on the fertility rate of rural households and the effect of fertility on their wellbeing. Ordinary least squares (OLS) is a type of linear least squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables by the principle of least squares: (minimizing the sum of the squares of the differences between the observed dependent variable (values of the variable being predicted) in the given dataset and those predicted by the linear function. The implicit form of the regression model used to assess how birth control use affects fertility is as follows:

$$Y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \mu_i \quad (1)$$

Where Y_i = Fertility rate (Total children ever born), X_1 = age of woman, X_2 = age of household head, $X3$ = marital status, X_4 = use of birth control methods, X_5 = educational level of woman X_6 = occupation of woman X_7 = wealth index X_8 = region of resident X_9 = time and μ = error term. β_0 and β_1 are coefficients of the model.

The form of the regression model used to assess the effect of fertility on the wellbeing of the rural women is as follows:

$$Y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \mu_i \quad (2)$$

where

Y_i = Wellbeing of woman (BMI), X_1 = age of woman, X_2 = age of household head, X_3 = marital status, X_4 = house size, X_5 = educational level of woman, X_6 = occupation of women, X_7 = wealth index, X_8 = fertility rate (total children ever born), X_9 = use of birth control methods, X_{10} = region of residence, and μ_i = error term. β_0 and β_1 are coefficient of the model.

4 RESULTS AND DISCUSSIONS

4.1 Socio-Economic and demographic characteristics of the respondents

This section describes the socioeconomic and demographic characteristics of the rural women considered. These characteristics include age, educational level, household size, region, occupation and marital status.

4.1.1 Sex of Household Head

Table 1 revealed that in 2008, 88.6 percent of household heads in rural Nigeria are male while in 2013, 86.6 percent of household heads are male. Although there is a slight increase in the percentage of female household heads over the years, majority of the household heads in rural Nigeria are of the male sex.

Table 1. Distribution of household heads by sex

	2008		2013	
Sex	Frequency	Percentage	Frequency	Percentage
Male	15280	88.6	24213	86.6
Female	1959	11.4	3732	13.4
Total	17239	100	27945	100

Source: Author's computation, 2019

4.1.2 Age of Respondents

Table 2 revealed that 20.7 percent in 2008 and 20.6 percent in 2013 of the women in rural Nigeria are within the age range 25-29. This means women within the age range 25-29 are the most common in rural Nigeria. The mean age of women in 2008 is 31 with a standard deviation of 9.1 while the mean age in 2013 is 32 with a standard deviation of 8.95. The distribution also reveals that the population of young women (less than 30) reduced over the years from 46 percent in 2008 to 42.5 percent in 2013 while that of older women (30 and above) increased from 54.1% in 2008 to 57.6 percent in 2013. This distribution supports the issue of rural-urban migration with most of the young population migrating to the urban areas in search of a better life.

Table 2. Age distribution of rural women

	2008		2013	
Age (5-year groups)	Frequency	Percentage	Frequency	Percentage
15-19	1622	9.4	1973	7.1
20-24	2740	15.9	4134	14.8
25-29	3569	20.7	5747	20.6

Table 2. Age distribution of rural women

	2008		2013	
30-34	2839	16.5	4805	17.2
35-39	2511	14.6	4409	15.8
40-44	1999	11.6	3473	12.4
45-49	1959	11.4	3404	12.2
Total	17239	100	27945	100

Source: Author's computation, 2019

4.1.3 Age of Household Head

Table 3 revealed that 29.7 percent and 30.9 percent of the household heads in rural Nigeria are within the age range 31-40 in 2008 and 2013 respectively, while only 9.1 percent in 2008 and 9.2 percent in 2013, are aged above 60. The average age of household heads is 42 with a standard deviation of 12.92 in 2008 while in 2013, the average age of the household heads is 43 with a standard deviation of 12.88. The distribution indicates that majority of the household heads, 69.3 percent in 2008 and 72.6 percent in 2013 were in their active and productive age, within the age range 31-60.

Table 3. Age distribution of rural women

	2008		2013	
Age category in years	Frequency	Percentage	Frequency	Percentage
0-30	3735	21.7	5102	18.3
31-40	5114	29.7	8625	30.9
41-50	4466	25.9	7256	26
51-60	2354	13.7	4391	15.7
60 & above	1570	9.1	2571	9.2
Total	17239	100	27945	100

Table 3. Age distribution of rural women

	2008	2013
Source: Author's computation, 2019		

4.1.4 Marital Status

Table 4 above shows that a large majority of rural women in Nigeria are married with a percentage of 93.1 and 90.7 in 2008 and 2013 respectively. Married people are more likely to know about and use birth control methods in order to control fertility.

Table 4. Distribution of rural women by marital status

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
Married	16045	93.1	25339	90.7
Living together	294	1.7	841	3
Widowed	505	2.9	954	3.4
Divorced	183	1.1	410	1.5
Not living together	212	1.2	401	1.4
Total	17239	100	27945	100
Source: Author's computation, 2019				

4.1.5 Household Size

Table 5 shows that most of the households in rural Nigeria have within 4-6 members with a percentage of 39.1 and 40.5 percent in the year 2008 and 2013 respectively. The minimum number of household members is 1 while the maximum number is 34. The average household size in 2008 is about 7 members with a standard deviation of 3.62 while the average household size in 2013 is 6 members with a standard deviation of 3.6. This shows a slight reduction in the household size in rural Nigeria over the years, hence most of rural households are medium sized.

Table 5. Distribution of household size

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
1-3	3252	18.9	5526	19.8
4-6	6733	39.1	11329	40.5
7-9	4265	24.7	6544	23.4
10 & above	2989	17.3	4546	16.3
Total	17239	100	27945	100

Source: Author's computation, 2019

4.1.6 Educational Level of Respondents

The distribution in Table 6 shows that most rural women in Nigeria have no education with 58.4 percent in 2008 and 44.6 percent in 2013. This is closely followed by women with primary education 2008 with 22.4 percent while it is followed by women with secondary education in 2013 with 26.4 percent. There is a significant increase in the number if women with secondary education from 2008 to 2013 which means that there is a significant improvement in the level of education of women. However, the percentage of women with higher education is very low in both years. This could imply low knowledge and use of birth control in rural Nigeria.

Table 6. Distribution of respondents by educational level

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
No education	10068	58.4	12458	44.6
Primary	3860	22.4	5929	21.2
Secondary	2783	16.1	7374	26.4
Higher	528	3.1	2184	7.8
Total	17239	100	27945	100

Table 6. Distribution of respondents by educational level

	2008	2013
Source: Author's computation, 2019		

4.1.7 Educational Level of Husband/Partner

Table 7 revealed that 49 percent of rural women's husbands in 2008 and 36.8 percent in 2013, had no education. This is followed by 21.6 percent of husbands having primary and secondary education in 2008 while it is followed by 28.9 percent having secondary education in 2013. There is also an increase in the percentage of husbands with secondary education over the years and this is similar to the case of the rural women, hence there is a significant improvement in the educational level in rural Nigeria. Furthermore, it is noticed fewer men have no formal education, hence, that the rural husbands are more educated than rural women.

Table 7. Distribution by educational level of husband/partner

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
No education	8446	49	10295	36.8
Primary	3723	21.6	5425	19.4
Secondary	3721	21.6	8082	28.9
Higher	1349	7.8	4143	14.8
Total	17239	100	27945	100
Source: Author's computation, 2019				

4.1.8 Occupation of Respondent

Table 8 revealed that about 31 percent of women were not working in 2008 as compared to 26.8 percent in 2013. Furthermore, 29.6 percent engaged in sales activities in 2008 and increased to 38.9 percent in 2013. Also, 26.5 percent were engaged in agricultural activities in 2008 which reduced to 13.2 percent in 2013. This distribution implies that rural women in Nigeria are mostly unemployed,

engaged in sales/trading and agricultural activities. The distribution also supports the general low level of employment in the rural areas.

Table 8. Distribution of rural women by occupation

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
Not working	5279	30.6	7499	26.8
Professional/technical/managerial	371	2.2	1438	5.1
Clerical	51	0.3	118	0.4
Sales	5102	29.6	10857	38.9
Agricultural-self employed	—	—	271	1
Agric-employee	4573	26.5	3421	12.2
Household and domestic	—	—	48	0.2
Services	371	2.2	1317	4.7
Skilled manual	1466	8.5	2959	10.6
Unskilled manual	26	0.2	17	0.1
Total	17239	100	27945	100

Source: Author's computation, 2019

4.1.9 Wealth Index

The wealth index is a composite measure of a household's cumulative standard of living. This index places households on a continuous scale of relative wealth. Wealth is a household characteristic that often has a large effect on health. The index is calculated from data on ownership of some assets such as bicycles and televisions, materials used for housing construction, access to water and sanitation facilities.

Table 9 shows the wealth index of rural women. The distribution revealed that majority of rural women are poor with 62.6 percent in 2008 and 42.2 percent in 2013 while only 17.3 percent are rich in 2008 and this increases to 38 percent in 2013. This study supports that the standards of living in rural areas is generally quite low, although improving (Adebo and Modupe 2010).

Table 9. Distribution of women by wealth index

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
Poor	10792	62.6	11781	42.2
Middle	3466	20.1	5543	19.8
Rich	2981	17.3	10621	38
Total	17239	100	27945	100

Source: Author's computation, 2019

4.1.10 Region

Table 10 shows the distribution of the respondents by region. This distribution revealed that all the regions in the country was covered in the analysis but most of the respondents were from the northern region in both years.

Table 10. Distribution of rural women by occupation

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
North Central	3290	19.1	4297	15.4
North East	3936	22.8	5278	18.9
North West	5200	30.2	8245	29.5
South East	1294	7.5	2581	9.2
South South	2043	11.9	3574	12.8
South West	1476	8.6	3970	14.2
Total	17239	100	27945	100

Source: Author's computation, 2019

4.2 Profiling the Use of Birth Control Methods in Rural Areas

The section provides information on the level of knowledge and usage of birth control methods by these rural women in Nigeria. The section also explains the willingness to use birth control methods at a future time.

4.2.1 Knowledge of Any Method

Table 11 revealed that about 59 percent had the knowledge of birth control methods in 2008 while 41 percent had no knowledge of birth control. Furthermore, the percentage of women who had knowledge of birth control significantly increased to 85.6 percent in 2013 while the percentage of women without knowledge of birth control decreased to 14.4 percent in 2013. This shows that over the years, the knowledge of birth control methods among rural women in Nigeria has greatly increased.

Table 11. Distribution by knowledge of birth control methods

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
Knows no method	7074	41	4013	14.4
Knows only folkloric	237	1.4	230	0.8
Knows only trad. Mth	73	0.4	160	0.6
Knows modern method	9855	57.2	23542	84.2
Total	17239	100	27945	100

Source: Author's computation, 2019

4.2.2 Current Use Or Non-Use of Birth Control

Table 12 revealed that 91.4 percent and 85 percent of rural women in Nigeria do not use any birth control methods in 2008 and 2013 respectively. The distribution also showed that very few rural women in Nigeria use any method of birth control, although use of birth control methods increased over time from 8.6 percent in 2008 to 15 percent in 2013. This agrees with previous studies which revealed that the contraceptive prevalence rate in Nigeria is very low although the knowledge of birth control is quite high (Okunade et al. 2016).

Table 12. Distribution by use or non-use of birth control methods

	2008		2013	
Category	Frequency	Percent	Frequency	Percent
non-use	15759	91.4	23758	85
Use	1480	8.6	4187	15
Total	17239	100	27945	100
Source: Author's computation, 2019				

4.2.3 Distribution by use or non-use of birth control methods

Table 13 shows the different birth control methods, both traditional and modern that are available and used by rural Nigerian women. The distribution shows that the most common birth control method used by rural women in 2008 is injections (2 percent), condoms (1.3 percent), periodic abstinence (1.2 percent), lactational amenorrhea method (1.1 percent), use of pills (0.9 percent) and then withdrawal method (0.8 percent). In 2013, a few more methods were added to the survey. They include the use of diaphragm, male sterilization and female condoms although use of these methods is still very low. In 2013, the most common birth control method used by rural women was also injections (3 percent) but unlike 2008, this is followed by withdrawal method (2.3 percent), then condoms (2.1 percent), periodic abstinence and use of pills (2 percent each). The use of lactational amenorrhea method reduced from 1.1 percent in 2008 to 0.4 percent in 2013 while the use of IUDs increased from 0.4 percent in 2008 to 1 percent in 2013. This indicates a gradual move from traditional to modern methods in rural Nigeria.

Table 13. Distribution by current birth control method

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
Not using	15759	91.4	23758	85
Pill	153	0.9	562	2
IUD	68	0.4	291	1
Injections	352	2	934	3.3

Table 13. Distribution by current birth control method

	2008		2013	
Diaphragm	—	—	6	0
Condom	219	1.3	586	2.1
Female Sterilization	67	0.4	94	0.3
Male sterilization	—	—	1	0
Periodic Abstinence	199	1.2	572	2
Withdrawal	135	0.8	655	2.3
Other	91	0.5	183	0.7
Norplant	4	0	95	0.3
Lactational amenorrhea	190	1.1	119	0.4
Female condom	—	—	2	0
Foam or jelly	2	0	87	0.3
Total	17239	100	27945	100

Source: Author's computation, 2019

4.2.4 Birth Control Use and Intention

Table 14 shows the intention of rural women in Nigeria to use birth control. The distribution shows that 15.9 percent of rural women intend to use birth control methods but do not use currently in 2008 while this increases to 20.9 percent in 2013, the percentage of women who intend to use birth control can still be said to be low. On the other hand, 75.6 percent of rural women did not to use birth control in 2008 but this reduces to 64.2 percent in 2013.

Table 14. Distribution by intention to use birth control

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
Using modern method	1055	6.1	2777	9.9

Table 14. Distribution by intention to use birth control

	2008		2013	
Using traditional method	425	2.5	1410	5
Non-user intends to use later	2734	15.9	5828	20.9
Does not intend to use	13025	75.6	17930	64.2
Total	17239	100	27945	100

Source: Author's computation, 2019

4.3 Assessing the Fertility Rate of Rural Households in Nigeria

This section shows the fertility rate of rural households in Nigeria. The main variable used to estimate fertility rate here is "total children ever born" which shows the number of children born by a woman in rural Nigeria. This provides one measure of population fertility.

Total Children Ever Born

Table 15 shows us the distribution of the total children ever born to rural women in Nigeria in 2008 and in 2013. The distribution reveals that 34.9 percent of rural Nigerian women in 2008 and 36.5 percent in 2013, had between 3 and 5 children as at the time the data was collected. The table also revealed that 68.6 percent of the women had 5 children or less in 2008 which increased to 71.2 percent in 2013. The minimum number of a children to a woman is 0 and the maximum number is 18 children. In 2008, the average number of children to a rural Nigerian woman is 4.25 with a standard deviation of 3.01 and this decreases only slightly to 4.07 in 2013 with a standard deviation of 2.87. This slight reduction in the average number of children born to a Nigerian woman in the rural areas may be attributed to the slight increase in the use of birth control. Hence, use of birth control is effective in curbing high fertility rates.

Table 15. Distribution of women by total children born

	2008		2013	
Category	Frequency	Percentage	Frequency	Percentage
0-2	5809	33.7	9683	34.7
3-5	6014	34.9	10206	36.5

Table 15. Distribution of women by total children born

	2008		2013	
6-8	3690	21.4	5746	20.6
9-11	1452	8.4	1957	7
11 & above	274	1.6	353	1.3
Total	17239	100	27945	100

Source: Author's computation, 2019

4.4 Wellbeing of rural women by BMI

This section assesses the wellbeing of rural women and the major indicators of wellbeing used were the body mass index (BMI). BMI is a relative weight measure and has been observed to have correlations with health, income, employment and promotion (Hubler, 2019).

Wellbeing of rural women by BMI

This study used body mass index (BMI) as the main indicator for the health and wellbeing of rural women. Table 16 shows that most of the rural women in Nigeria have normal weight, with a percentage of 67.9 and 62.1 percent in 2008 and 2013 respectively. This shows that a lot of rural women have normal health and wellbeing. The table also shows an increase in the percentage of women that are overweight, from 14.6 percent in 2008 to 20.5 percent in 2013 as well as increasing obesity from 4.2 percent in 2008 to 9.1 percent in 2013. Previous studies have already shown that Sub-Saharan Africa is an experiencing an increase in overweight and obesity, even though the region is still dealing with under-nutrition Black et al. (2008), which is influenced by physical inactivity and dietary patterns. Studies have found that higher BMI is related to lower wellbeing (Linna et al. 2013).

Table 16. Distribution of women by BMI

	2008		2013	
Category	Frequency	Percent	Frequency	Percent
Underweight	2294	13.3	2327	8.3
normal weight	11712	67.9	17348	62.1

Table 16. Distribution of women by BMI

	2008		2013	
Overweight	2514	14.6	5725	20.5
Obese	719	4.2	2545	9.1
Total	17239	100	27945	100

Source: Author's computation, 2019

4.5 Assessing the Effect of Birth Control on Fertility

This section attempts to explain the effect of the use of birth control methods on fertility of rural women in Nigeria. The result of the linear regression is shown in table 17 and it identifies demographic factors that could affect fertility such as age, region, level of education, wealth index, marital status and occupation of the women, as well as the use of birth control method. The analysis found the north east, north west and south south regions, involvement in sales, agriculture, and manual labour as factors that positively affect fertility. That is, they increase fertility. Other factors that were found to negatively affect fertility include secondary and higher education, wealth index, south west region and use of birth control methods. The results also showed that fertility reduced with time in 2013.

Age of Respondent

Table 17 showed the age of women to be a significant factor which may affect fertility. The positive coefficient implies that fertility of women increases with increasing age.

Marital Status

Table 17 showed that a woman's marital status was significantly related to her fertility level. The negative coefficients imply that a woman who is divorced, widowed or separated is expected to have lower fertility levels when compared to her married counterparts. This is in line with the result of other related studies which found that women who were currently legally married were more likely to have higher fertility than women who were not in any union (Alene and Worku (2008); Fagbamigbe et al. (2014)) or women who were only living together with their partner Akpa and Ikpotokin (2012). Couples who are legally married and are living together should have higher coital frequency, hence increasing fertility levels.

Use of Birth Control Methods

The result of the analysis in table 17 showed that the use of birth control significantly affects fertility levels. The use of birth control was found to be negatively related to fertility level, that is, fertility or number of children born reduces with the use of birth control methods. It has been previously established that the use of birth control is a means of curbing high fertility and this is consistent with the findings of other studies which revealed that couples use one or more birth control methods to limit or space their children (Ijaiya et al. (2009); Adebowale, Fagbamigbe, and Bamgboye (2011)). This is in a bid to curb the current population explosion and for several other reasons which could be economic, social or medical.

Educational Level

The result in table 17 found secondary and higher education to be significantly related to fertility and the regression coefficients were negative, implying a negative relationship between level of education and fertility. This implies that fertility reduces as level of education increases. This finding corroborates with previous studies which also found a significant negative effect of education on fertility (Osili and Long (2008) ; Fagbamigbe et al. (2014); Mberu and Reed (2014)). These studies indicate that women with no formal education or primary education had higher fertility (about 1.5 children per woman higher) than those with secondary or higher education. Barber et al. (2002) explained that fertility reduces with higher educational levels because the women would have spent longer period of childbearing years in school when compared to their counterparts. Carr, Pan, and Bilsborrow (2006) also explained that higher levels of education may improve a woman's knowledge of information regarding fertility options. Education also gives women opportunities to participate in the labor force.

Occupation

The result in table 17 revealed that some groups of occupation were statistically significant in relation to fertility level. These include women in the professional/technical/managerial field, women involved in sales, agriculture, services and skilled manual labor. While being involved in a professional field was negatively related to fertility levels, all other occupational groups showed a positive relationship to fertility. This corroborates the findings of other studies which found that increased participation of a woman in labor force reduces her fertility levels El-Ghannam (2005). A woman in the professional field is more educated than the average rural woman, hence she is likely to have lower fertility levels than others. On the other hand, a woman's involvement in agriculture, increases the likelihood of having more children because it is believed that more children translate to more help with the farming activities.

Wealth index

The wealth index of the women was also found to be statistically significant to fertility with negative coefficients, implying that fertility reduces with increasing wealth status. Women in the middle and rich categories are more likely to use birth control methods, hence lowering their fertility.

This result supports the findings of previous studies which also revealed that poorer women were more likely to have higher fertility levels than their counterparts (Adebowale, Fagbamigbe, and Bamgboye (2011); Fagbamigbe et al. (2014); Akpa and Ikpotokin (2012)).

Region

Table 17 revealed that the all the regions, except the south east region, were significantly related to fertility. The north east, north west and south south regions were shown to positively affect fertility. This implies that the women in these regions were more likely to have more children than women than in the south west region. This study supports the findings of previous studies which found that the north east and north west zones (predominantly populated by Muslims and Hausa, Fulani and Kanuri ethnic groups) have the higher fertility rates in the compared with other regions Mberu and Reed (2014) with TFR of 6.3 and 6.7 respectively which is 2 children higher than that of women in the southern zones (National Population Commission and ICF Macro (2009) ; National Population Commission and ICF International (2014)). Another study implemented in the northern zones found that fertility is a key socio-political, cultural and economic resource in the region. The study identified several factors that contribute to high fertility levels in the region, such as the Koranic inheritance doctrine that promotes childbearing and polygamy and the depiction of contraceptives as against Islamic doctrine Izugabara et al. (2009) . General lack of comprehensive information of birth control and unavailability of birth control in the region have also been found to cause high fertility in the region (Smith (2004) ; McNicoll (2011)). This study also found the regression coefficient for the south west region was negative and significant. This supports the finding of previous study that found that the south west region has the lowest fertility levels (Mberu and Reed 2014).

Table 17. Effect of birth control use on fertility

Variables	Coefficient	Standard.Error	t..value
Age of respondent	0.2268***	0.0014000	165.67
Age of household head	-0.0015	0.0009000	-1.61
Marital status			
Living with partner	-0.2403***	0.0630000	-3.81
Widowed	-0.8839***	0.0555000	-15.92
Divorced	-1.2841***	0.0842000	-15.26
No longer living together/separated	-1.0468***	0.0829000	-12.63

Table 17. Effect of birth control use on fertility

Variables	Coefficient	Standard.Error	t..value
Use of Birth Control Methods	-0.0507*	0.0306880	-1.65
Educational level			
Primary	-0.0005	0.0281000	-0.02
Secondary	-0.5975***	0.0319000	-18.71
Higher	-0.5028***	0.0553000	-27.17
Occupation			
Professional/technical/managerial	-0.1697***	0.0611000	-2.78
Clerical	0.0926	0.1580000	0.59
Sales	0.3478***	0.0255000	13.62
Agricultural self-employed	0.3939***	0.1255000	3.14
Agricultural - employee	0.2483***	0.0320000	7.76
Household and domestic	-0.3956	0.2913000	-1.36
Services	0.0941*	0.0540000	1.74
Skilled manual	0.1857***	0.0360000	5.16
Unskilled manual	0.5173	0.3227000	1.60
Wealth index			
middle	-0.0901***	0.0274000	-3.29
rich	-0.4498***	0.0306000	-14.68
Region			
North East	0.5974***	0.0333412	17.92
North West	0.6554***	0.0328365	19.96
South East	-0.0005	0.0410943	-0.01
South South	0.0903**	0.0376007	2.40

Table 17. Effect of birth control use on fertility

Variables	Coefficient	Standard.Error	t..value
South west	-0.4273***	0.0377885	-11.31
Time			
2013	-0.0728***	0.0207164	-3.51
Constant	-2.932	-2.9321000	-58.69

Author's computation, 2019

4.6 Assessing the Effect of Fertility on Wellbeing

This section aims to assess the effect of fertility on wellbeing of rural women. The result of the regression analysis carried out is presented in table 18. This result identifies factors that could influence wellbeing which include region of residence, occupation, household size, educational level, wealth index, marital status, total number of children ever born, occupation and use of birth control methods. The result shows that factors such as region, educational level, wealth index, total children ever born, some groups of occupation and marital status were found to be significantly related to wellbeing while others such as household size, age of household head and use of birth control methods were not significantly related to wellbeing. Age, educational level, wealth index and use of birth control were found to be positively related to wellbeing while the other factors showed a negative relationship. It was also found that wellbeing of the women in rural Nigeria has improved over time.

Age

Table 18 revealed that women's age was significantly related to their wellbeing levels. The coefficient of age indicated a positive relationship between age and wellbeing. This implies that women's wellbeing increases as they grow older. This means that as women become older, they have better understanding and experience in issues regarding health and wellbeing and can manage these issues better than younger women with little experience. This finding is consistent with that of previous studies (Adeyemo and Oni (2012) ; Udensi, Ifenkwe, and Ashiegbu (2015)).

Marital status

The result in table 18 shows that some stars groups were statistically significant in explaining wellbeing while the others were not. Being divorced or separated are not significantly related to wellbeing, although negative. On the other hand, living with partner and widowed are significantly

related but their coefficients are also negative. This means that women in these groups are likely to have reduced wellbeing levels. For widowed women, it may be due to the unexpected loss of the breadwinner of the family. This result also showed that level of wellbeing reduces with being in an informal union. This finding supports that of previous studies (Adeyemo and Oni 2012).

Household size

The result in table 18 from the analysis showed that the household size was not significant to the level of wellbeing of the woman, however, it showed a negative coefficient. This implies that as household size increases, wellbeing level reduces. That is, the larger the number of household members, the more difficult it is to manage the affairs of the household and the more stress is exerted on the woman. Although insignificant, the negative result supports the findings of other studies (Ukoha, Mejeha, and Ite (2007); Udensi, Ifenkwe, and Ashiegbu (2015)).

Educational level

The educational level of the woman was found to be significantly related to her wellbeing. Table 18 revealed that primary, secondary and higher education were all significant at 1%. The coefficients show a positive relationship between education and wellbeing. This implies that the more educated a woman is, the better her wellbeing. That is, the level of wellbeing increases with increase in educational level. Education exposes the women to better ways of managing resources and generally improves their decision-making abilities regarding nutrition, health and wellbeing in general. This finding is consistent with the result of previous studies which also found education to be positively related to wellbeing (Uwaegbute and Oke (2004) ; Udensi, Ifenkwe, and Ashiegbu (2015)).

Occupation

The result showed that most of the occupation groups were significantly related to wellbeing with the exception of services and household and domestic. While some of these groups showed a positive relationship to wellbeing, the others showed a negative relationship. Agriculture as occupation showed a negative relationship to wellbeing. This implies that women whose primary occupation is agriculture are likely to have reduced wellbeing than their counterparts while those in formal occupation have increased wellbeing. This result supports that of previous studies (Adeyemo and Oni 2012).

Fertility (Total children born)

The level of fertility, measured by the total number of children born, was found to be significantly related to wellbeing. The negative coefficient of fertility implies that the more children a woman has, the lower her wellbeing.

Table 18. Effect of fertility on wellbeing

Body.mass.index	Coefficient	Standard.Error	t.value
Age of respondent	0.0963***	0.00360	26.60
HHhead Age	0.0015	0.00190	0.75
Marital status			
Living with partner	-0.2981**	0.12830	-2.32
Widowed	-0.2233**	0.11340	-1.97
Divorced	0.148	0.17170	0.86
Separated	-0.1876	0.16890	-1.11
Household size	-0.0066	0.00640	-1.04
Educational level			
Primary	0.6391***	0.05720	11.17
Secondary	1.1377***	0.06530	17.42
Higher	2.5235***	0.11350	22.23
Occupation grouped			
Professional/technical/managerial	0.3404***	0.12440	2.74
Clerical	0.9448***	0.32150	2.94
Sales	0.4893***	0.05210	9.39
Agricultural - self employed	0.6304**	0.25520	2.47
Agricultural - employee	-0.2438***	0.06510	-3.74
Household and domestic	-0.5726	0.59260	-0.97
Services	0.1705	0.10990	1.55
Skilled manual	-0.1189	0.07330	-1.62
Unskilled manual	1.5589**	0.65650	2.37

Table 18. Effect of fertility on wellbeing

Body.mass.index	Coefficient	Standard.Error	t.value
Wealth index			
Middle	0.6295***	0.05580	11.27
rich	1.8405***	0.06270	29.36
Fertility (Total children born)	-0.0277***	0.01020	-2.71
Use of birth control	0.0182	0.06240	0.29
Region			
North East	-0.7005***	0.06812	-10.28
North West	-0.8499***	0.06710	-12.66
South East	-0.4702***	0.08420	-5.59
South South	-0.0601	0.07690	-0.78
South West	-0.6000***	0.07750	-7.74
Time			
2013	0.5159	0.04220	12.24
Constant	18.9698	0.10790	175.79

*** significant at 10% ** significant at 5%Prob > F: 0.0000

Author's computation, 2019

5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

The rural population are an essential part of the population of this country as they contain majority of the population, and are major contributors to the agricultural workforce and to the general needs of the nation, therefore the wellbeing of the rural people is very important. The need for population

control informs the use of various birth control methods. This study attempted to identify the effect of the use of these methods on fertility and on wellbeing of the rural women in Nigeria.

5.1 Summary

The socio-economic characteristics, fertility and wellbeing levels, use of birth control methods, effect of birth control on fertility and wellbeing of rural women were measured and analysed. Based on these, this study found the following:

- Among the rural women considered in the dataset, very few fell within the age range 15-19 while majority of the women in rural Nigeria are within the age range 25-29. The average age of a rural Nigerian woman is 31. On the other hand, majority of the household heads are within the age range 31-40 and the average age of the household heads is 43. Also, the highest percentage of women sampled belong to households containing 4-6 members and 7-9 members. Majority of the women sampled have no education or only primary education. The case was also similar for the womens' husbands, however, a higher percentage of the husbands has secondary education unlike the women who had primary education. A large percentage of rural women were found to be unemployed; the major occupational activities were found to be sales and agricultural activities and a large majority of the rural population was found to be poor. Most of the women samples were from the northern regions.
- Majority of the women had knowledge of birth control methods while few had no knowledge. However, the use of birth control was found to be low, that is, contraceptive prevalence rate is low, as very few women currently used while a large majority did not use any birth control methods. The most common birth control methods used by these women include injections, withdrawal method, condoms, periodic abstinence and use of pills. While a few women intend to use birth control methods in future, majority of the women still did not intend to use birth control methods.
- The number of children born to most women was within 3-5 children per woman, 0-2 children and 6-8 children.
- The wellbeing of most women, assessed by their BMI was found to be normal while others had relatively low levels of wellbeing.
- In assessing the effect of birth control methods on fertility, a regression model was fitted with eight explanatory variables. The results of the regression analysis showed that age, region, educational level, wealth index, occupation, marital status and use of birth control methods were found to significantly affect the level of fertility of rural Nigerian women.

- The regression model used to assess the effect of fertility of wellbeing of rural women was fitted with nine explanatory variables. The results showed that age, region of residence, educational level, marital status, occupation, household size, marital status and total number of children ever born were all significantly related to wellbeing levels of rural women.

5.2 Conclusion

Based on the empirical evidences obtained from the study, the following conclusions were drawn:

- The level of education, employment and wealth status are low in rural Nigeria. Although, there seems to be a little improvement in the quality of lives of the rural population, the standard of living is still quite low in these areas.
- It can also be concluded that although the knowledge of birth control methods is high, the contraceptive prevalence rate in rural Nigeria is low as seen in the percentage of women who use birth control. It can be further concluded that the CPR is not likely to increase much as a lot of women still do not intend to use birth control from the study. We can also conclude that most birth control methods used in rural Nigeria are traditional methods and few modern methods. However, the study shows a gradual move to modern methods.
- The fertility rate in rural Nigeria is gradually reducing as seen in the total number of children born to the women, as more women are having fewer children.
- The fertility rate was reduced with time from 2008 to 2013 and this could be as a result of the little increase in the use of birth control methods. We can therefore conclude that birth control methods are effective in controlling fertility.
- There was an increase in the wellbeing of the rural women over time, a positive relationship between birth control use and wellbeing, as well as a negative relationship between fertility rate and wellbeing. Hence, it can be concluded that the use of birth control is effective in controlling fertility and therefore in increasing wellbeing levels.

5.3 Recommendations

Based on the results obtained from this study, the following recommendations are made in a bid to ensure improved use of birth control methods, effective fertility control and improved wellbeing:

- In order to bridge the knowledge/practice gap in the use of birth control methods, government/health practitioners/policy makers should take active steps in increasing awareness campaigns, especially in rural areas, on the importance of birth control, choices available and

its benefits. Increased use of birth control should be encouraged since it was identified that birth control use will curb high fertility rates.

- Level of education was found to be negatively related to fertility, therefore, post-primary education for women in rural Nigeria should be promoted, especially in the northern region. This would enable women have increased participation in the labour force, increase their age at marriage and provide better information about their reproductive lives. Better education would also help improve the wellbeing of rural households; hence, policies should be directed at promoting female education in Nigeria.
- There should be more commitment to social programs to improve the socio-economic status of the rural Nigerian women, as uneducated, unemployed women and women in the poor category are less likely to use birth control. Hence, an improvement in socio-economic status of these women would most likely increase the contraceptive prevalence rate in the country. Programs should also be directed at improving the wellbeing of the rural population by improving their access to safe drinking water and better housing materials. Therefore, government and non-governmental organizations should pay more attention to improving the welfare of rural Nigerian women.

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