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ORIGINAL RESEARCH

Knowledge of Ovulatory cycle and Contraceptive use and its association with Unwanted pregnancy among women in Ondo West Local Government Area, Nigeria

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Abstract

Background: It is estimated that poor sexual and reproductive health of women of reproductive age accounts for one-third of the global burden of disease and early deaths. This study assessed the knowledge of ovulatory cycle, contraceptive use and their association with unwanted pregnancy among reproductive-aged women in Ondo West Local Government Area, Ondo State, in Nigeria.

Methods: An analytical, cross-sectional household survey of 156 women of reproductive age selected through a multistage cluster sampling procedure. The prevalence, and interrelationship between knowledge of ovulation cycle, contraceptive use and unwanted pregnancy amongst the women were evaluated using bivariate and logistic regression modelling.

Results: The prevalence of unwanted pregnancy amongst the women was high (n= 156, 65.7%). This prevalence varied significantly with age and marital status of women at both bivariate and multivariate levels of analysis. Only 13.5% had correct knowledge of ovulatory cycle and 32.7% are currently using a method of contraception.

Conclusion: Reproductive-aged women in Ondo have very low knowledge of ovulation cycle and low incidence of contraceptive usage, and are likely to report high unwanted pregnancy. To reduce the burden of unwanted pregnancy, pragmatic efforts such as building community support for women to discuss and share experiences that empowers on fertility, ovulatory cycle, contraception and other sexuality issues is most essential.

Keywords: Contraceptive use, Ovulatory cycle knowledge, Reproductive age, Unwanted pregnancy, Women

Introduction

It is estimated that poor sexual and reproductive health of women of reproductive age accounts for one-third of the global burden of disease and early death. [1,2] Delayed recognition of pregnancy is associated with inadvertent continuation of risky behaviors that affect the health of the fetus and is also associated with delayed entry into prenatal care and increase in abortion rate. [3] In spite of the availability and wide range of modern contraceptive options that have been ascertained effective and beneficial to women, global statistics indicate low usage, with increasing unwanted pregnancies both in developed and developing countries.[4,5] Fundamental knowledge of reproductive physiology combined with informed contraception use contributes to successful practice or abstinence of coitus. This encourages a healthy sexual and reproductive behaviour and can help in the achievement of Sustainable Development Goals (SDG) 3 and 5 related to good health and wellbeing and gender equality respectively.[6,7] It also helps to monitor fertility [8] and recognize certain diseases,[9] and particularly reduce the risk of unwanted pregnancy.[10] Besides, inadequate knowledge of the ovulatory cycle and poor contraceptive use are linked to high fertility[11,12] and poor economic and social development outcomes. [13]

Knowledge of ovulatory cycle (KOC) is the basis of the natural family planning (NFP) methods. [14] It is a non-scientific method of identifying the physical signs and symptoms that change across a woman's menstrual cycle. Inadequate KOC in sexually active women is likely to lead to unwanted pregnancies in the absence of modern contraceptive use. [11,12,15,16] Therefore, correct KOC and contraceptive use are important for women of reproductive age, both for planning of conception or avoiding unwanted pregnancies and unsafe abortions.[15,17–19] It is a fertility awareness - based family planning method (FABM) involving observation a woman's bodily changes or monthly cycle to determine when it safe for a her to have sexual relations [9,20] to avoid pregnancy. This can help achieve the Family Planning 2030 (FP2030) agenda that supports the rights of additional 120 million women of reproductive age to freely decide for themselves whether, when, and how many children they want to have, using a combination of contraceptive methods.[7]

Unwanted pregnancy predisposes women to several risks such as unsafe abortion, maternal death, malnutrition, mental illness and vertical transmission of Human Immuno-deficiency Virus (HIV) to children.[21,22] It increases stress levels, impacts negatively on women's quality of life, and threatens economic status of families.[23,24] High fertility has been considered one of the key factors responsible for high infant mortality (72.2 per 1,000 live birth) and maternal mortality ratio (236 per 100,000) in Nigeria.[25,26] The current gap in unwanted pregnancy among countries in Africa is 10–54%.[27] Unsafe abortion, a risk often associated with unwanted pregnancy, has a rate of 36 per 1000 among Nigerian women aged 15–49 years. This is higher than the sub-Saharan African's average of 28 per 1000.[28,29] Globally, Nigeria currently has the highest number of maternal deaths per year[30] and

the fourth highest maternal mortality ratio. [31] Meanwhile, the failure rate of natural family planning (NFP) methods is low when used correctly, less than 5 per 100 women per year[32] and empirical data supports the notion that the adoption of reliable contraceptive methods can effectively diminish the likelihood of unwanted pregnancy, and unsafe abortion.[27] Prior studies have also indicated that possessing knowledge about fertility awareness has the potential to mitigate the occurrence of unwanted pregnancy in women and modify sexual behavior.[33] Given the paucity of information on mindfulness and correct knowledge of ovulatory cycle, it is necessary to assess the knowledge of ovulation cycle, contraceptive use and their association with unwanted pregnancy.

Methodology

Study setting: This study was conducted in Ondo West Local Government Area (OWLGA) of Ondo State, which is located in the south-western geopolitical zone of Nigeria. OWLGA is one of the most densely populated areas in Ondo State with a total population of 443,800 inhabitants.[34] Agriculture forms the backbone of the local economy, other economic activities include trading, crafts like weaving, woodcarving, and blacksmithing, as well as small-scale industries such as sawmilling and palm oil processing.

Study design and participants: The study employed a cross-sectional design and conducted among women of reproductive age (15-49 years). Using the difference between total wanted fertility rates and total fertility rates for the 3 years preceding the Nigeria DHS 2018 survey in the Southwest region of 10% prevalence in Ondo State, the Cochran's sample size formula was used to derive a sample size of 138. Adding a 10% attrition rate, we had a total of 152 sample size.

Inclusion and exclusion criteria: The study included women of reproductive age 15-49 years who reside in the selected wards who consent to participate voluntarily in the study, while women who were either below or above the stipulated age range and those who refused to give voluntary consent were ineligible to participate in the study.

Sampling techniques: A multi-stage cluster sampling technique was implemented to select 152 women of reproductive age (15–49 years). At the first stage, 3 electoral wards were purposively selected from the 12 wards in the LGA to cover urban, rural, and peri-urban localities. This approach was adopted to ensure diversity and capture variation in socio-demographic characteristics and access to health services across settlement types. At the second stage, 5 Census Enumeration Areas (EAs) were selected from each of the three wards using simple random sampling by balloting, such that each EA had an equal chance of being selected regardless of its population size. At the third stage, a household listing exercise was conducted in each selected EA to build a sampling frame of all eligible women aged 15–49 years who were permanent residents. From each sampling frame, eligible women were selected systematically using a fixed

sampling interval calculated by dividing the total number of eligible women in the EA by the required sample size for that EA. Given the total sample size and number of EAs (15), an average of 10 eligible women was expectedly drawn from each EA. In households with more than one eligible woman, one was selected using a simple random method (balloting) to avoid intra-household clustering.

Data collection methods: Computer-assisted personal interviews instrument was designed in English language and administered by trained research assistants who equally understand the dominant Yoruba language in the study area, to enable them explain the questionnaire without altering the meaning to participants. Interviewer training occurred one week to data collection and it reviewed the study objectives, protocol and instruments, fieldwork procedures and ethical considerations. The questionnaire was designed by the researcher after reviewing literature and in consultation with some independent expert analysts. Experts' ratings were statistically analyzed to determine content validity. A pre-test of the study instrument was conducted with 18 reproductive-aged women randomly selected from a different ward in the local government area to correct items that were found to be ambiguous. The instrument was used to collect data on the socio-demographic characteristics of study participants, pregnancy experience, knowledge of ovulation cycle and contraceptives. Data quality was ensured through onsite supervision, and back-checks of collated data on the computer.

Study variables: Outcome variables: The primary reproductive health outcome measured in this study was the prevalence of unwanted pregnancies based on the questions on fertility intention. There were two responses to the question regarding if last pregnancy or current pregnancy was wanted: ''Yes,'' or ''No.'' Responses indicating ''wanted then or now'' in the question were coded as ''1 = Yes,'' while responses having the response of ''wanted later'' or ''not wanted'' was coded as ''0 = No.''

Independent variables: The primary explanatory variable of interest was knowledge of the ovulatory phase. Question on knowledge of ovulation phase was elicited from participants and has seven-level responses (1 = During her period, 2 = After the period ended, 3 = Middle of the cycle, 4 = Before period begins, 5 = at any time, 99 = others, 9 = Don't know). We recoded responses ''1, 2, 4, 5, 99, and 9'' to ''0'' which indicates incorrect knowledge and ''3'' to ''1'' as the correct knowledge. Women who are currently doing anything or using any method of contraceptive to delay or avoid pregnancy, were coded as users (1), and those who reported not using any method were coded as nonusers (0). Other explanatory variables include women's age, marital status, educational attainment, partner's educational attainment, religion, ethnicity and locality.

Statistical Analysis: All statistical analyses were conducted using Stata version 16 (StataCorp, College Station, TX, USA). The data were analyzed at descriptive,

bivariable, and multivariable levels. At the descriptive level, frequencies and percentages were used to summarize categorical variables, while measures of central tendency and dispersion (mean and standard deviation) were applied to continuous variables such as age.

At the bivariate level, Pearson's Chi-square test was employed to determine the association between the binary outcome variable (unwanted pregnancy) and categorical explanatory variables. Where necessary, Fisher's exact test was used when Chi-square assumptions were not met. Statistical significance was assessed at the $p < 0.05$ threshold (95% confidence level). At the multivariable level, binary logistic regression models were employed to examine the independent and combined influence of explanatory variables on unwanted pregnancy. Three models were fitted: Models 1 and 2 presented unadjusted odds ratios for the study's key explanatory variables, while Model 3 provided adjusted odds ratios after controlling for socio-demographic and other explanatory variables. All regression results were reported with odds ratios (OR), 95% confidence intervals (CI), and p-values. Model diagnostics, including checks for multicollinearity and overall model fit were performed to validate the finding.

Ethical Consideration

Ethical clearance for the study was obtained from the University of Medical Sciences Ethical Review Board to guarantee that the protocols adhere to Health and Human Services requirements for the protection of human subjects.

Results

Descriptive Results

The frequency and percentage distribution of socioeconomic and demographic variables are represented in Table 1. Twenty-four percent of the women fall within the age group of 25-29 years, 70% are currently married while 60% obtained a secondary education qualification. About 38% of the women reside in an urban locality, 60.3% of whom have obtained secondary education qualification. A graphic representation of the prevalence of unwanted pregnancy, knowledge of ovulatory cycle and contraceptive use is presented in Figure 1. . The prevalence of unwanted pregnancy among women of reproductive age (15-49 years) was high (65.7%), 13.5% of the women had correct knowledge of ovulatory cycle while 32.7% are currently using a method of contraception.

Bivariate Results

Table II summarizes unwanted pregnancy among women in relation to their socio-demographic characteristics and the dependent variables. Age and marital status were found to have significant relationship with the outcome of interest ($X^2 = 13.7892$, $p = 0.032$ and $X^2 = 20.6439$, $p = 0.000$). The prevalence of unwanted pregnancy was high among those who have never spoken with their partners about use or non-use of contraceptive methods (52.9%). The few people who had correct knowledge of ovulation cycle and those who use any form of contraceptives were less likely to have unwanted pregnancy (14.1% and 29.2%).

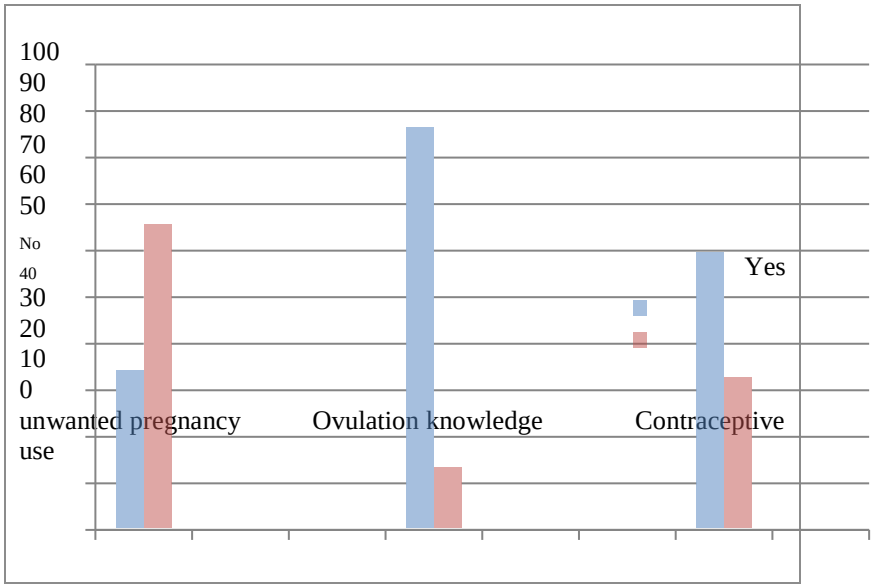


Figure1: Unwanted pregnancy, ovulation cycle and contraceptive use

Multivariate logistic regression

Table III, models 1 and 2 are the unadjusted models showing the association between unwanted pregnancy and the independent variables; knowledge of ovulation and contraceptive use. Model 3 is adjusted and controlled for all other variables, the association between unwanted pregnancy and each of the socio-demographic variables is presented. The model predicts that women 30 years and above have higher odds of unwanted pregnancy compared to women in the reference age group (29 years and below) (OR = 2.22, 95% CI = 1.087-4.514, p = 0.028). And married women compared to the other category of marital status also have higher odds of unwanted pregnancy (OR =4.51, 95% CI = 1.087-4.514, p = 0.003).

Table I: Frequency distribution of the demographic characteristics of women

Variable	Frequency	Percentage
Age in 5-year Groups:		
15-19	9	5.8
20-24	26	16.7
25-29	38	24.4
30-34	25	16
35-39	28	17.9
40-44	13	8.3
45-49	17	10.9
Marital Status: Single	26	16.7
Married	120	76.9
Divorced/Separated	10	6.4
Knowledge of Ovulatory Cycle:		
During her period	0	0
Right after her period	69	44.2
Halfway between two periods	21	13.5
Just before her period begins	1	6
At any time	37	23.7
Other	4	2.6
Don't know	24	15.4
Religion: Christianity	120.0	76.9
Islam	36.0	23.1
Ethnic Group:		
Yoruba	129.0	82.7
Others	27.0	17.3
Educational Qualification:		
Primary	45	28.8
Secondary	94	60.3
Tertiary	10	6.4
No Formal education	7	4.5
Partner's Educational Qualification:		
Primary	13	8.3
Secondary	78	50
Tertiary	21	13.5
None	8	5.1
NA	36	23.1
Locality Type:		
Urban	59	37.8
Peri-urban	52	33.3
Rural	45	28.8
Total	156	100

Table II: Chi-square distribution of variables by unwanted pregnancy among women

Variable	Yes	No	Total	X^2 (p-value)
Age				
15-29	34.8	54.2	41.4	
30+	65.2	45.8	58.6	0.027
Marital status				
Single/Divorced/Separated	7.6	27.1	14.3	
Married	92.4	72.9	85.7	0.002
Religion				
Christianity	75.0	72.9	74.3	
Islam	25.0	27.1	25.7	0.789
Ethnicity				
Yoruba	85.9	79.2	83.6	
Others	14.1	20.8	16.4	0.310
Educational qualification				
Primary/None	31.5	37.5	33.6	0.477
Secondary/Tertiary	68.5	62.5	66.4	
Partner's educational qualification				
Primary/None	14.1	25.7	17.5	
Secondary/Tertiary	85.9	74.3	82.5	0.129
Locality				
Urban	39.1	27.1	35.0	
Rural	27.2	29.2	27.9	
Peri-urban	33.7	43.8	37.1	0.331
Ever spoken to partner about contraceptive use or non-use before				
Yes	47.1	54.3	49.2	0.472
No	52.9	45.7	50.8	
Total	100	100	100	

Table IIIA: Predictors of unwanted pregnancy among women of Reproductive age

Key independent & Other variables	Model 1 (Unadjusted)			Model 2(Unadjusted)			Model 3 (Adjusted)			Model 4 (Crude)		
	OR	p-v	95% CI	OR	p-v	95% CI	OR	p-v	95% CI	OR	p-v	95% CI
Ovulation Knowledge												
Incorrect knowledge[R]	1.795	0.002	1.241-2.595							1		
Correct knowledge	1.810	0.324	0.556-5.889							7.926	0.064	0.885-70.943
Currently using Contraceptives with partner												
No[R]				1.558	0.043	1.013-2.397				1		
Yes				1.649	0.192	0.777-3.501				1.826	0.303	0.580-5.745
Age group												
15-29[R]							1.230	0.432	0.733-2.064	1		
30+							2.215	0.028	1.087-4.514	1.907	0.169	0.760-4.784
Marital status												
Single/Divorced/Separated[R]							0.538	0.187	0.214-1.349	1		
Married							4.510	0.003	1.659-12.255	0.594	0.368	0.191-1.847
Religion												
Christianity[R]							1.971	0.001	1.312-2.960	1		
Islam							0.897	0.789	0.406 1.982	1.006	0.991	0.332-3.045

Table IIIB: Other Predictors of unwanted pregnancy among women of Reproductive age

Key independent & Other variables	Model 1 (Unadjusted)			Model 2(Unadjusted)			Model 3 (Adjusted)			Model 4 (Crude)		
Educational attainment of respondent												
None/primary[R]							1.611	0.112	0.894 - 2.900	1		
Secondary/Higher							1.303	0.478	0.627 - 2.708	1.937	0.177	0.741- 5.063
Educational attainment of respondent's partner												
None/primary[R]							1.333	0.514	0.561 - 3.164	1		
Secondary/Higher							2.105	0.134	0.795 - 5.573	1.819	0.301	0.5855 - 5.652
Ethnicity												
Yoruba[R]							2.078	0.000	1.411 - 3.061	1		
Others							0.625	0.312	0.251 - 1.554	0.594	0.368	0.191- 1.847
Locality												
Peri-urban[R]							1.476	0.168	0.848 - 2.568	1		
Urban							1.875	0.143	0.808 - 4.354	0.874	0.863	0.264- 2.893
Rural							1.209	0663	0.513 - 2.850	1.104	0.826	0.357 3.412
Ever spoken to partner about contraceptive use or non-use before												
No[R]							2.812	0.000	1.589 - 4.975	1		
Yes							0.339	0.472	0.339 - 1.648	0.379	0.096	0.121- 1.187

Discussion

The study aimed to determine the knowledge of ovulation cycle and contraceptive use and their relationships with unwanted pregnancy among reproductive-aged women. The result shows

there is a low knowledge of ovulatory cycle, low use of contraceptive and high rate of unwanted pregnancy. Prevalence of unwanted pregnancy was found among two third of the respondents and this is higher than those reported in 29 African countries by Ameyaw et al.[27] Also, less than a third of the respondents had correct knowledge of ovulation which falls within the bracket of the Sub-Saharan Africa study by Iyanda AE.[12] In the same vein, just about one third of the respondents reported contraceptive use. This is evidence that contraceptive use for prevention of unwanted pregnancy in Nigeria is still a problem; the consequences reflect in persistent high fertility and accelerated population growth which the country is currently experiencing. High fertility has been considered one of the key factors responsible for high infant mortality (72.2 per 1,000 live birth) and maternal mortality ratio (236 per 100,000) in Nigeria.[25,26]

The prevalence of unwanted pregnancy was significantly associated with age and marital status at the bivariate level and this further supports finding from other studies that the problem of unwanted pregnancy pervades all ages and marital status.[35–37] Incorrect knowledge of ovulation and low contraceptive use were significantly associated with unwanted pregnancy among women in Ondo and this is consistent with previous study by Iyanda AE.[12] An important factor contributing to high levels of unwanted pregnancy in Nigeria is the persistently low level of contraceptive use and incorrect knowledge of the ovulation cycle. These findings also suggest that inadequate understanding of women's reproductive health has implications for risky health behaviors like unprotected sex often leading to unwanted pregnancies and sexually transmitted diseases.[11,12]

In both stratified and non-stratified models of the multivariate analysis, we found that the KOC and use of contraception increases the likelihood of unwanted pregnancy. These counterintuitive t and unexpected associations have also been reported in recent studies.[12,35] A systematic review and meta-analysis study reported that the pooled prevalence of unintended pregnancy among contraceptive users in low- and middle-income countries was close to average.[38] Another study conducted in 12 low and middle-income countries reported a pooled prevalence of eighty seven percent for unintended pregnancies.[39] The discrepancy in the rate of unwanted pregnancy and knowledge of ovulation cycle and contraceptive use is likely due to a combination of individual preferences, poor spousal communication and contextual factors of service access in rural areas and of cultural and personal relationships. Besides, the political context within which unintended pregnancies are situated cannot be glossed over. According to Ameyaw et al.,[27] the lack of political commitment is a significant factor in many African countries where government attention has moved away from developmental challenges due to poor governance. Consequently, these variations may have adverse implications for the sexual and reproductive health outcomes of women in Nigeria.

Our findings show that women in higher age categories were more likely to experience

unwanted pregnancy, compared to women aged 29 years and below. This finding is in line with a study by Hubacher et al.,[40] who investigated the magnitude of unintended pregnancies in sub-Saharan Africa and the potential role of contraceptive implants to alleviate it, and found that women aged 25–29 and 30–34 years have the highest proportion of unintended pregnancies, compared to those aged 24 years and below. A study in Tanzania also indicated that the risk of unplanned pregnancies increases with age.[41] This pattern of relationship may arise likely because most women at older ages are done with child bearing and any pregnancy occurring at these ages may be regarded as unwanted or unintended.

Recommendations: The findings of this study have strong implications for policies, programmes and interventions aiming at reducing unwanted/unintended pregnancies amongst women in the area. To reduce the burden of unwanted pregnancy, social interventions focusing on women empowerment, community health education, support and increased autonomy should be prioritized in Ondo West Local Government Area of Nigeria. To increase KOC and contraceptive use among women aged 15-49 years in the area, a synergy of efforts by stakeholders at the Ministries of Women Affairs, and Health and Social Welfare, hospital administrators and the Heads of Nursing and/or public health education is required to develop policies that advocate for women's socio-economic empowerment and reproductive health rights. Also, the integration of post-partum family planning education and services into routine antenatal and immunization clinics is critical. In addition, this study indicates the need for additional integrated qualitative and quantitative studies to analyze factors affecting the pattern of relationship between unwanted pregnancy, knowledge of ovulation cycle and contraceptive use in the area.

Conclusion

This study focused on knowledge of ovulatory cycle and its linkages unwanted pregnancies amongst women of reproductive age in Ondo West LGA of Nigeria. It found a high level of unwanted pregnancies amongst the women alongside low levels of knowledge of the ovulation cycle and contraceptive use. The relationships between these three variables were significant at all levels of analysis. The study also found higher levels of unwanted pregnancies in women at the older stages of their reproductive lives. Although unexpected, this finding of higher levels of unwanted pregnancy at later stages of women's reproductive life has been collaborated by other studies in Africa pointing to a complex interplay of factors in the relationships between women's age, reproductive experience, knowledge of ovulatory cycle and use of contraceptives in general. This has strong implications for policies, programmes and interventions aiming at reducing unwanted/unintended pregnancies amongst women in the area.

Authors' contributions; AOY conceptualized, designed the study method, analysed data, and wrote the initial draft of the manuscript. OOA contributed to data analysis. MNI and BOE contributed to methodology selection and implementation. FAT helped edit the manuscript and facilitated technical and administrative oversight.

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