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# Perceptions on abortion and long-acting contraceptive use among women of reproductive age in selected Nigerian States: a cross-sectional study

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## Research Article

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# Abstract

**Background:** It is estimated that over 210 million pregnancies occur each year, with almost half of these unplanned. The evidence further shows that about 76 million of these unplanned pregnancies occur in the developing world, with 19% ending in induced abortion and 11% of these abortions being unsafe. Abortion is greatly stigmatized in Nigeria, and the lack of a legal framework to support access to abortion services necessitates women seeking abortion services in unsafe places. This study, therefore, examines the perception of women on abortion (prevalence and stigma) on long-acting contraceptive (LARC) use in Nigeria.

**Methods:** We performed secondary data analysis on the round 5 of performance monitoring and accountability (PMA) data for seven states in Nigeria for women of reproductive age (n = 11,284), examining responses on use abortion incidence, perceptions on stigmatization and LARC use using  $\chi^2$  analysis and multivariate logistic regression models.

**Results:** Socio-demographic factors examined were found to be significantly associated with the perception that abortion was common among women who agreed that abortion was shameful. Women residents in rural areas were more likely (OR = 1.34; p-value = 0.000). Further, married women (OR = 15.18, p-value= 0.000) were 15 times more likely to use LARC.

**Conclusions:** Perceptions that abortion is common, and it is a shameful practice were found to be underlying contributors to LARC use in Nigeria. However, the most significant influence is the socio-demographic factors. Therefore, implementing agencies must ensure to tackle socio-demographic barriers to access and legislation of contraceptive uptake as this would reduce mortality from abortions

## Introduction

About 210 million births are expected to occur worldwide each year; about half of these births are unplanned and unwanted. With such a large proportion of unplanned and unwanted pregnancies, it is not surprising that 150,000 women globally experience induced abortions daily [1-3]. Estimates reveal that about 2.2 million pregnancies in sub-Saharan Africa are unplanned [4]. Unintended pregnancy is an important public health challenge across the world [5] as well as in Nigeria, and it has negative effects on the health of the mother and baby, leading to a sizeable and potentially avoidable cost burden [5].

Abortion or induced abortion is the termination of pregnancy before the age of viability (28 weeks of gestation) or the expulsion or extraction from its mother, a fetus, or an embryo weighing 500 grams or less deliberately [2]. Since the early 2000s, the global rate of induced abortions has remained stable at approximately 28 induced abortions per 1,000 women annually. Worldwide, an estimated one in five pregnancies, or 44 million, end in an induced abortion every year [6].

Unfortunately, for a variety of reasons, around 30 percent of these women seeking induced abortion end up in 'clinics' or the hands of illegal practitioners in a clandestine or otherwise unsafe abortion [7, 8]. In

sub-Saharan Africa, 25% of abortions occurring each year are unsafe [4], and unsafe abortion is a chronic but preventable, pandemic with significant repercussions for women's lives, reproductive health and career [1, 7]. The detrimental effect is not only limited to the individual but also affects the entire healthcare system, with the treatment of complications consuming a significant portion of resources (e.g., hospital beds, blood supply, drugs) [9]. Reliable data on the incidence of unsafe abortion generally lack [1], especially in countries like Nigeria, where access to abortion is legally restricted by law and highly stigmatized [2, 7, 10].

Kumar et al. defined abortion stigma as “a negative attribute ascribed to women who seek to terminate a pregnancy that marks them, internally or externally, as inferior to the ideals of womanhood.” According to this definition, women who have abortions challenge social norms regarding female sexuality and maternity, doing so elicits stigmatizing responses from their community [6], and this was also corroborated by Erving Goffman (1963) assertion on abortion stigma [11, 12]. However, it's pertinent to know that abortion stigma commonly permeates the experience of both those seeking the health service as well as those engaged in its provision [11]. Although abortion stigma has the potential to impair the well-being and mental health of many women, little attention has been paid to its study [6].

Additionally, socio-economic conditions and the stigma act is an additional barrier to access to quality abortion [13]. Either legal or illegal, induced abortion is commonly stigmatized by political, religious or other leaders and is often censored. Therefore, under-reporting is routine, even in countries where abortion is available legally on request. While there are legal, reliable and inexpensive ways to avoid unintended pregnancy, it is troubling that illegal abortion still leads to death or disability [1].

Within the developing world, lack of access to family planning results within nearly 76 million unwanted pregnancies, 19 percent of which end in abortion [7, 8, 14], 11 percent of which are unsafe. Nigerian women get about 760,000 abortions per year, a rate of 25 abortions/1000 reproductive-age women [7, 15], which resulted in about 20,000 deaths [7, 8]. The poor practice of a safe and common medical procedure has been linked to these deaths, and the statistics are higher in countries where abortions are highly restricted by law [16], or where abortion is only allowed to save the life of the mother [15]. Unsafe abortion remains a leading cause of maternal mortality and morbidity in Africa, accounting for an estimated 14% of maternal deaths [17].

More than 200 million women in developing countries would like to delay their next pregnancy or even stop bearing children altogether, but many of them still rely on traditional and less effective methods of contraception or use no method at all [8]. It's worthy of note that unwanted or unintended pregnancy is the leading cause of abortion in Nigeria [16].

The use of modern contraceptive methods in sub-Saharan Africa has remained relatively low at 8-10% for over a decade. The low Contraceptive Prevalence Rate (CPR) of 6.8% reported in Nigeria in 1999 [18], and currently, 17% [19] is the direct cause of the high abortion rate [20]. Contraceptive empowers women and couples to make decisions about the timing and spacing of pregnancies [21], and it also can prevent one in every three maternal deaths by allowing women to space births, avoid unintended pregnancies and

abortions, and stop childbearing when they achieve their preferred family size [18, 20, 22] because it's their right to have access to modern contraceptive and maternal health care regardless of age, income, marital status, and parity [23]. The unfettered access and use of effective methods of contraception, especially the Long-Acting Reversible Contraceptives (LARC), will help to reduce this global burden of disease and mortality emanating from unsafe abortion [24].

Practically even though some Long-Acting Reversible Contraceptive methods are the world's most prevalent form of reversible contraception, the utilization is very low in sub-Saharan Africa [20], and Nigeria is one of the countries with low use of LARC [19, 25]. This low use of LARC is in part, as a result of reported side effects attributed to hormonal changes during and after use [26, 27] as well as misinformation and misconception [28].

There is no evidence of a delay in the return of fertility following removal or expulsion of these contraceptives [29]. The low use of LARC can also be attributed to the various power and gender-related factors linked to socio-demographic and economic characteristics including marital status, whether the pregnancy was as an outcome of rape [30], woman's economic dependence and educational level [30, 31], partner and parental support [31], societal factors including religion and social norms [32, 33], the healthcare systems, abortion laws and stigma on premarital and extra-marital sex [30, 34].

Implantable long-acting hormonal contraceptives, such as intrauterine devices (IUDs) and subcutaneous implants, will last for years as birth control methods that offer effective long-term contraception without the need for consumer intervention [18, 20, 21, 35]. They are safer, cost-effective and have lower failure rates because of their low reliance on user compliance for efficacy compared to short-acting contraceptives [20, 36-38]. Studies have found that LARC can contribute to reducing subsequent unintended conceptions and that women having an abortion may be highly motivated to secure contraception, particularly LARC [18, 38]; also, policies considering for heavy subsidization and upfront cost have been advocated [39] to ease the financial burden of the users. Although access to safe abortions and effective contraceptives has increased worldwide, accessibility is still a great barrier in many Low-and Middle-Income Countries (LMIC), including Nigeria. Also, the social stigma surrounding unintended pregnancies and abortion plays a critical role in the social, medical and legal marginalization of contraceptive services and abortion care [37], it is then surprising, given the demographic and programmatic significance of induced abortion that the research literature contains few probing investigations of the juxtaposition of contraception and abortion in the minds of those exposed to pregnancy risk [28] thus this research tends to examine the perception of women on abortion and its influence on Long-Acting Contraceptive (LARC) use among women of reproductive ages in selected Nigerian states employing a cross-sectional study approach

## **1.2 Aim of the study**

This research sought to examine if the use of Long-Acting Contraceptive (LARC) can be influenced by the perceived prevalence of abortion and expressed stigmatization towards abortion by women of reproductive age in Nigeria.

# Materials And Methods

## Data Source

The study used secondary data, which was extracted from the 2018 / Nigeria Round 5 dataset Performance Monitoring and Accountability (PMA). PMA 2018 used a two-stage cluster architecture within a sample of seven states in Nigeria between April and May 2018: Anambra, Kaduna, Kano, Lagos, Nasarawa, Rivers, and Taraba. The survey used indigenous enumerators who were familiar with the enumeration areas and had good local language order. A total of 302 enumeration areas (EAs) were drawn from the master sampling framework of the National Population Commission. Each EA was identified and mapped; out of each EA, 35 to 40 households were selected at random. All females of reproductive age (15–49 years) living within the selected household were contacted, and the enumerators interviewed those who consented to an interview using a female questionnaire. The information recorded on the questionnaires included the eligible women's socio-demographic information, use of family planning methods, abortion perception, fertility preference and reproductive health information, among others. A total of 11,284 women were interviewed.

## 2.2 Scope of study

This research was limited to secondary data collection Performance Monitoring and Accountability (PMA) using female datasets from the exercise PMA 2018 (Round 5). It is expected to provide more insight into how predominant socio-demographic distribution and perception abortion of respondents promotes long-acting contraceptive (LARC) use among reproductive-age women in Nigeria. The qualified respondents in the PMA 2018 round 5 survey conducted in Nigeria were a total of 11,215 and this reflects the sample size for this analysis.

## 2.3 Operational definitions and study variables

In this study, the primary outcome of concern at the time of the interview in Nigeria was to examine the influence of respondents socio-demographic variables and perception of abortion on the use of Long-Acting Reversible Contraceptive (LARC) of all women of reproductive age (15–49). The research primarily focused on all women potentially at risk of unintended pregnancy who are using any form of contraceptives.

The current use of a LARC method is defined as the use of the contraceptive implant or the intrauterine device (IUD) during the interview month.

Abortion prevalence was assessed by asking respondents "How common abortion is in community", their responses were broken into three categories namely; "Very common" for those with high prevalent, "Slightly common" for those with average prevalent and "Not common" for those with low prevalent.

Abortion stigmatization was assessed by using question asked on "A woman who removes a pregnancy brings shame to her family" responses were recoded into; "Agree" to capture those who stigmatized

against abortion, “Neither agree nor disagree” to capture those who are either in support of abortion or against it whilst “Disagree” was used to captured those who doesn’t stigmatized against abortion.

In order to assess if socio-demographic characteristics of women of reproductive age with high prevalent rate of abortion, highly stigmatized women’s likely to influence LARC use. The analyzes included selected demographic variables, potentially related to the use of LARC and the incidence of abortion. Those include education rates for women, index of household income, place of residence, age and marital status.

The frequency distribution of all the variables used in the analysis was first implemented to respond to the specified objectives. LARC usage trends were measured by identified demographic characteristics according to the proportion of all contraceptive consumers using LARC methods.

Abortion perceptions was cross tabulated using LARC use to demonstrate the association between the two variables and the chi-square test was used to demonstrate this association. Finally, multivariate logistic regression was used to estimate probability ratios accounting for respondents socio-demographic variables, abortion perception and LARC use.

## **2.4 Data processing and analysis**

For study, data was exported to Stata version 14. Descriptive statistics, including frequencies and proportions, have been used to sum up interest variables. Multivariate logistic regression was used to show the strengths of associations using Adjusted odds ratios (AOR) with an estimated confidence interval of 95 percent. Ultimately, in the multivariate logistic regression analysis, a p-value of less than 0.05 was used to identify variables significantly associated with socio-demographic characteristics of respondents, perception of abortion and use of Long-Acting Reversible Contraceptive (LARC).

## **2.5 Ethical consideration and Data availability**

The round 5 of the PMA data collection used in this analysis was secondary dataset that has been de-identified. Participants can no longer be marked, as all personal identifiable information has been deleted, as such no further approval of ethics was required. Nonetheless, permission to use the data was obtained from PMA website and permission to use the dataset can be obtained from PMA at <https://www.pma2020.org/request-access-to-datasets>.

# **Data Analysis And Results**

## **3.2 Univariate Analysis**

### **3.2.1 Socio-demographic characteristics**

Participants in the study were selected from 7 states of Nigeria with about a quarter of the study respondents from Kaduna state while other states had respondents contributing between 10-15 percent

each and only Taraba state contributed less with 7% of the respondents. Analysis of place respondents' place of residence showed a slightly equal distribution as 49 percent of the respondents reported living in urban areas with others being resident in rural communities. The mean age of respondents in the study was 29 years. With a five-year age grouping, about 17% of respondents were between 40-49 years, which accounted for the lowest age group while respondents between ages 20-29 years (35%) accounted for the highest percent of age group in the study. Slightly below half of the respondents reported to have completed secondary education, 21 percent never attended any schools while an equal proportion (17%) completed primary and higher education, respectively. About two-thirds of the respondents were married, 30 percent never married and a combined percent of less than 5 percent either widowed, divorced, or separated. Approximately, half of the respondents were in the low wealth quintile group, with about one-third in the high quintile group while others were classified as being in the middle of the wealth quintile grouping as shown in table 1.

**Table 1: Socio-Demographic of Respondents**



<b>Variable</b>	<b>N=11476</b>	<b>%</b>
<b>State</b>		
Kaduna	2807	24.5
Lagos	1707	14.9
Taraba	848	7.4
Kano	1791	15.6
Rivers	1302	11.4
Nasarawa	1563	13.6
Anambra	1458	12.7
<b>Place of residence</b>		
Urban	5641	49.1
Rural	5835	50.9
<b>Age group</b>		
15-19	2334	20.4
20-29	4031	35.1
30-39	3191	27.8
40-49	1914	16.7
<b>Mean age: 29 years</b>		
<b>Completed Level of education</b>		
Never	2375	21.1
Primary	1920	17.1
Secondary	5001	44.5
Higher	1938	17.3
<b>Marital status</b>		
Never married	3265	29.0
Married	7448	66.3
Divorced or separated	266	2.4
Widow	255	2.3
<b>Wealth index</b>		

Low	5784	50.4
Middle	1996	17.4
High	3686	32.2

### 3.2.2: Outcome variable

Table 2 below show the perception of research participants on abortion and reported use of contraceptives. About 70 percent of respondents stated that abortion was not common in their states and place of residence. Almost two-thirds of people perceived abortion as being shameful while a quarter thought otherwise. Amongst the respondents, approximately 22% reported using family planning, with 84% of these using modern contraceptive and only 4% were using Long Acting Reversible Contraceptives (LARC).

**Table 2: Perception on abortion and use of contraception**

Variable	N=11476	%
<b>How Common is Abortion</b>		
Not Common	7749	69.0
Common	3485	31.0
<b>Abortion Perceived as Shameful</b>		
Neutral	1197	10.7
Yes	7108	63.3
No	2929	26.0
<b>Current Use of any Family Planning Method</b>		
No	8716	78.5
Yes	2390	21.5
<b>Current Use of a Modern Family Planning Method</b>		
No	9306	83.8
Yes	1800	16.2
<b>Use of Long Acting of Reversible Contraceptive Method</b>		
No	10752	95.9
Yes	463	4.1

### 3.3 Bivariate Analysis

Amongst respondents that reported abortion being common in their communities, the tables reveals that associated factors include state of residence, age group, and marital status while place of residence, level of education and wealth index were not associated with the perception or response that abortion were common in the communities of residence as shown in table 3 below.

**Table 3: Socio demographic characteristics, abortion being common and LARC use**

Variable	LARC use			χ <sup>2</sup> , p-value
	No n=3314	Yes n=169	Total N=3483	
<b>State</b>				
Kaduna	18.8	30.2	19.4	
Lagos	17.5	11.2	17.2	
Taraba	6.2	5.3	6.2	
Kano	10.7	8.9	10.6	
Rivers	16.9	18.3	16.9	
Nasarawa	16.9	19.5	17.1	
Anambra	13.0	6.5	12.7	21.16,0.002**
<b>Place of residence</b>				
Urban	57.8	58.0	57.8	
Rural	42.2	42.0	42.2	0.00,0.958
<b>Age group</b>				
15-19	18.2	1.2	17.4	
20-29	37.2	33.1	37.0	
30-39	28.3	41.4	28.9	
40-409	16.3	24.3	16.7	43.29,0.000**
<b>Level of education</b>				
Never	10.1	11.8	10.2	
Primary	15.8	16.6	15.9	
Secondary	52.0	47.9	51.8	
Higher	22.1	23.7	22.1	1.23,0.745
<b>Marital status</b>				
Never married	34.6	3.0	33.0	
Married	60.3	92.3	61.9	
Divorced or separated	2.7	3.0	2.7	
Widow	2.4	1.7	2.4	75.59, 0.000*

Wealth index				
Low	40.6	41.4	40.6	
Middle	18.6	16.6	18.5	
High	40.8	42.0	40.9	0.45,0.798

The table below reveals association between socio-demographic characteristics of respondents and their perception of abortion being shameful. Amongst women who opined that abortion is a shameful act, state of residence, age, level of education, marital status and wealth index were associated with LARC use, however, place of residence within the states (rural or urban) was not associated with the LARC use.

Specifically, Kaduna, Lagos and Nasarawa states contributed a larger percentage of women using LARC amongst the respondents who reported that abortion was shameful, with 32.2%, 11.4% and 21% using LARC in the states, respectively. Overall, state of residence ( $\chi^2 = 53.01$  and  $p\text{-value} = 0.000$ ) was found to be associated with LARC use. Women's place of residence (rural or urban) was not associated with LARC use although percentage of women using LARC by place of was equally distributed (50%). Most LARC users were within ages 20 to 49, with age group 30-39 accounting for 41% of LARC users, while age groups 20-29 and 40-49 accounted for 30% and 28% of LARC users respectively among women who said that abortion is shameful. There was an increasing number of LARC users by educational qualifications till the secondary education level with 47% of women with secondary education who perceived abortion as being shameful reportedly using LARC while a quarter (25%) of the women who perceived abortion as being shameful were using LARC. Overall, level of education ( $\chi^2 = 28.75$  and  $p\text{-value} = 0.000$ ) was associated with LARC use.

Marital status was associated with LARC use, however, among the users, 95% of the women were married while a combined 5% were either never married, divorced/separated or widowed. Almost half (47%) of the women who reported using LARC belong to the low wealth quintile, 30% were classified as being in the high wealth quintile while others were in the middle. Wealth quintile ( $\chi^2 = 8.01$  and  $p\text{-value} = 0.018$ ) was found to be an associated factor for LARC use among women who saw abortion as being shameful.

**Table 4: Socio-demographic characteristics, perception on abortion being shameful and use of LARC**

Variable	LARC use			χ <sup>2</sup> , p-value
	No n=6813	Yes n=290	Total N=7103	
<b>State</b>				
Kaduna	22.6	36.2	23.2	
Lagos	10.2	11.4	10.3	
Taraba	7.7	3.8	7.5	
Kano	17.9	8.6	17.5	
Rivers	10.8	9.7	10.8	
Nasarawa	15.8	21.0	16.0	
Anambra	15.0	9.3	14.8	53.01,0.000**
<b>Place of residence</b>				
Urban	46.1	50.0	46.3	
Rural	53.9	50.0	53.7	1.69,0.194
<b>Age group</b>				
15-19	22.7	0.7	21.8	
20-29	35.2	30.0	35.0	
30-39	25.9	41.4	26.5	
40-49	16.2	27.9	16.7	111.91, 0.000**
<b>Level of education</b>				
Never	21.2	13.1	20.9	
Primary	16.4	19.6	16.5	
Secondary	47.5	42.8	47.4	
Higher	14.9	24.5	15.2	28.75,0.000**
<b>Marital status</b>				
Never married	31.1	1.3	29.9	
Married	64.0	95.2	65.3	
Divorced or separated	2.4	1.4	2.3	

Widow	2.5	2.1	2.5	125.06,0.000**
<b>Wealth index</b>				
Low	52.3	46.9	52.1	
Middle	18.2	15.9	18.1	
High	29.5	37.2	29.8	8.01,0.018**

### 3.4 Multivariate Analysis

The multivariate analysis examined the extent of relationship between associated factors in the bivariate analysis as shown in table 5. Findings reveal that marital status of women and wealth index of households had no significant relationship with perceptions of abortion being shameful. However, other socio-demographic factors were significantly associated by varying degrees. Specifically, among women who agreed that abortion was shameful, place of residence was a significant factor and women resident in rural areas were more likely (OR = 1.34; p-value = 0.000) to report abortion being shameful. Further, age group of respondents and level of education were significantly associated with agreement on abortion being shameful, respondents who completed secondary education had more likelihood (OR = 1.38; p-value = 0.000) of perceiving abortion as being shameful.

**Table 5: Socio-demographic characteristics, perception of abortion being shameful and LARC use**

<b>Variable</b>	<b>Odds ratio</b>	<b>p-value</b>	<b>95% CI</b>
<b>Place of residence</b>	<b>RC=Urban</b>		
Rural	1.34	0.000**	1.2117 – 1.4833
<b>Age</b>	<b>RC=15-19</b>		
20-29	0.88	0.047**	0.7778 – 0.9984
30-39	0.82	0.006**	0.7114 – 0.9445
40-49	0.96	0.596	0.8166 – 1.1233
<b>Level of education</b>	<b>RC=Never</b>		
Primary	0.98	0.701	0.8603 – 1.1065
Secondary	1.38	0.000**	1.2232 – 1.5652
Higher	0.98	0.800	0.8388 – 1.1452
<b>Marital status</b>	<b>RC=never married</b>		
Married	0.98	0.682	0.8698 – 1.0956
Divorced or separated	0.99	0.990	0.7604 – 1.3106
Widow	1.26	0.132	0.9338 – 1.6871
<b>Wealth index</b>	<b>RC=Poor</b>		
Middle	1.09	0.163	0.9639 – 1.2440
High	0.91	0.160	0.8043 – 1.0365
<b>Constant</b>	<b>1.49</b>	<b>0.000</b>	<b>1.2713 – 1.7359</b>

Table 6 below indicates that five socio-demographic factors (place of residence, age, level of education, marital status, and wealth index) were examined to determine how these factors influence women’s perception that abortion is common in the communities. All factors examined were found to be significantly associated with the perception that abortion was common, however, women who were educated to any level were twice more like to report abortion being common in their communities. Also, wealthier women were more likely to report abortion being common while other socio-demographic factor had influence but were not the most significant in comparison to education and age.

**Table 6: Socio-demographic characteristics, Perception of abortion being common and LARC use**



<b>Variable</b>	<b>Odds ratio</b>	<b>p-value</b>	<b>95% CI</b>
<b>Place of residence</b>	<b>RC=Urban</b>		
Rural	0.87	0.010**	0.7838 – 0.9674
<b>Age</b>	<b>RC=15-19</b>		
20-29	1.67	0.000**	1.4611 – 1.9089
30-39	1.81	0.000**	1.5524 – 2.1147
40-49	1.87	0.000**	1.5759 – 2.2306
<b>Level of education</b>	<b>RC=Never</b>		
Primary	2.27	0.000**	1.9492 – 2.6430
Secondary	2.97	0.000**	2.5645 – 3.4294
Higher	2.77	0.000**	2.3274 – 3.3019
<b>Marital status</b>	<b>RC=never married</b>		
Married	0.77	0.000**	0.6817 – 0.8652
Divorced or separated	0.92	0.557	0.6949 – 1.2165
Widow	0.85	0.277	0.6283 – 1.1424
<b>Wealth index</b>	<b>RC=Poor</b>		
Middle	0.97	0.662	0.8525 – 1.1067
High	1.19	0.007**	1.0494 – 1.3576
<b>Constant</b>	<b>0.15</b>	<b>0.000</b>	<b>0.1242 – 0.1775</b>

Table 7 below shows the socio-demographic factors with significant influence on the use of Long Acting Reversible Contraceptive (LARC) among women in the study states were age, level of education and marital status. Wealth index had no significant influence on LARC use. Specifically, increasing age, and educational qualification led to increasing probability to use LARC among women, respectively. Further, married women (OR = 15.18, p-value= 0.000) were 15 times more likely to use LARC followed by widowed women and then divorced or separated women.

**Table 7: Logistic regression of LARC use and respondent's socio-demographics**

<b>Variable</b>	<b>Odds ratio</b>	<b>p-value</b>	<b>95% CI</b>
<b>Age</b>	<b>RC=15-19</b>		
20-29	9.82	0.000**	3.0877- 31.2658
30-39	14.42	0.000**	4.5244 – 45.9664
40-49	15.32	0.000**	4.7719 – 49.2026
<b>Level of education</b>	<b>RC=Never</b>		
Primary	1.91	0.000**	1.3839 – 2.6476
Secondary	2.60	0.000**	1.9029 – 3.5700
Higher	3.52	0.000**	2.4209 – 5.1150
<b>Marital status</b>	<b>RC=never married</b>		
Married	15.18	0.000**	7.4027 – 31.1081
Divorced or separated	3.94	0.018**	1.2639 – 12.3278
Widow	7.35	0.000**	2.7375 – 19.7254
<b>Wealth index</b>	<b>RC=Poor</b>		
Middle	0.87	0.366	0.6331 – 1.1834
High	0.84	0.281	0.6165 – 1.1508
<b>Constant</b>	<b>0.00</b>	<b>0.000</b>	<b>0.0000 – 0.0006</b>

## Discussion

The study examined the perceptions of women on abortion and how this influences the use of Long-Acting Reversible Contraceptives (LARC) in states involved in the Performance Monitoring and Accountability (PMA) project in Nigeria. It found that LARC use was more prevalent among women residents in urban areas. The use of LARC increased with age and educational attainment. Studies also found the influence of higher educational attainment on LARC use in Nepal and Uganda [18, 40], while other studies in Ethiopia and Iran [41, 42] did not support this finding. While this study and that of Rajan et al., (2019) found a significant influence of age on LARC use [18], this was contradicted by findings of Nejim, Muhammed & P Surender (2017), in Ethiopia and other developing countries [43-45]. This study provides evidence that, in Nigeria, women's age and educational attainment are contributing factors of LARC use irrespective of their perception of how common or shameful abortion is perceived.

LARC use progressively decreased with increasing wealth quintile. The women who belonged to households in the highest wealth quintile were less likely to use LARC compared to women who belonged to the lowest wealth quintile. The study contradicts findings in Nepal, Ethiopia, Iran and Nigeria [18, 42, 46, 47], as these studies found a positive association between LARC use with higher wealth quintile.

## Conclusion

The study concludes that women's perception on abortion being common in their communities and abortion being a shameful practice influenced LARC use. However, the significant factors that influenced LARC use were women's sociodemographic characteristics. It found that residence (urban), educational level (increasing attainment), age (increasing age) and marital status were positive factors influencing LARC use. Therefore, in as much as future interventions strive to reduce stigma on abortion through education and legislation, women's socio-demographic characteristics should be considered in the planning of interventions in order to increase education on LARC, improve the use of LARC and reduce abortion-related mortality.

## Declarations

**Funding:** The authors declare that they have not received any funding for this study

**Ethical approval and Consent to participate:** The dataset used in the study was a secondary dataset from performance monitoring accountability (PMA) and it's available on PMA website for public use. No separate ethical permission is required for data use and publication as

**Competing interests:** The authors declare that they have no competing interests

**Contributions:** OAB, initiated the study, acquired the data, reviewed the literature and wrote the manuscript; VC, wrote the discussion and conclusion section and verified the analyses, statistical and writing advice at all stages of the manuscript writing including discussion and conclusion; OSO, Conceptualized data analysis, present it in the table and review overall manuscript. All authors read and approved the final draft.

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## Abbreviations

LARC – long-acting contraceptive

CPR – contraceptive prevalence rate

RC – recode

IUD - intrauterine devices

EA – enumeration area

PMA – performance monitoring accountability

AOR – adjusted odds ratio

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