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Self-injected Depot–Medroxyprogesterone Acetate Subcutaneous (DMPA-SC) Uptake in Nigeria: A Paradigm Shift

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Abstract

Self-injection of DMPA-SC method is one of the Government of Nigeria's (GON) national family planning goals to address the unmet need for contraception. Some studies on DMPA-SC/SI have demonstrated its feasibility to improve modern contraceptive uptake. However, there is a gap in the predictors of method uptake and continuation across self-injecting and provider-administered in Nigeria. This study explored the uptake of self-injection DMPA-SC contraceptives among women in two geopolitical zones of Nigeria. The study employed 20 focused group discussions (FGDs) and 40 In-depth interviews (IDIs). Self-structured pretested questionnaire to elicit information from 844 women registered for Family Planning in selected health facilities. Descriptive statistics were calculated and multivariate logistic regression was used to model determinants of DMPA-SC/SI family planning uptake. Six months of Secondary Data from the Health Management Information system (HMIS) was used to triangulate the trends in uptake. About 97.6% reported ever heard DMPA-SC/SI family planning method; 78.4% reported its uptake; while 88.5% reported ever heard of self-injection as an option of family planning method. Data for each State showed a remarkable increase in uptake of DMPA-SC/SI. The motivations to use DMPA-SC/Self Injection were ease of accessibility, convenience, and self-administer/care. Factors that encourage the uptake of DMPA-SC/SI were; health benefits, the prevailing economic situation and its effectiveness. Findings from the study showed that interventions that deploy health education, awareness, social mobilization, advocacy, policy implementation, and public sensitization, making contraceptive services available for free, will increase the uptake of DMPA-SC/SI in the study areas.

Keywords: *Determinants, DMPA-SC/SI, Practice, Self-injection, Uptake.*

Introduction

In 2019, 1.1 billion of the 1.9 billion women of reproductive age (15–49 years) in the world have a need for family planning. 842 million people (44%) use natural method contraception, 80 million people use traditional contraception, and 190 million people use no contraception at all (10 percent) [1-2]. More than 208 million pregnancies occur each year worldwide, with 185 million occurring in developing countries alone. Almost one-fifth of all pregnant women in the world get an abortion or give birth to an unintended child [3]. Unintended pregnancies account for more than 40% of all pregnancies worldwide. In poor nations, an estimated 222 million women want to delay or stop having children but do not utilize contraception. In less-developed nations, an estimated 18 million unsafe abortions occur each year, resulting in high maternal deaths and injuries [4]. Unwanted birth also puts children's health and well-being

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in danger and contributes to rapid population expansion. One of the most important elements of safe parenthood and reproductive right is family planning [4].

In 2019, 75.7 percent of the global demand for family planning was addressed by contemporary technologies. According to Sustainable Development Goals (SDG) indicator 3.7.1, in Middle and Western Africa, less than half of the need was met [2]. The use of contraception advances the human right of people to determine the number and spacing of their children [1]. Variations in preference and pattern of usage of family planning strategies have been documented in some research. In Southeast Asia, the most prevalent contraceptive technique is the intrauterine device, which is used by 18.6% of women [1]. The pill and female condom are the most regularly used methods in Europe and Northern America (17.8% and 14.6 percent of women, respectively), whereas female sterilization and the pill are the most commonly used methods in Latin America and the Caribbean (16.0 and 14.9 percent, respectively) [1]. With a prevalence of 9.6% among women of reproductive age, Sub-Saharan Africa is the only region where injectables are the most common procedure [1].

In 2018, 17 percent of Nigerian women used all forms of contraception, and this was higher among sexually active single women (28 percent) than currently married women (12 percent). Despite the fact that married women now have more sexual exposure, all forms of contraceptive use have only increased modestly from 15% in 2013 to 17% in 2018, with the use of any modern method of contraception increased from 10% to 12% [5]. A three-year study of contraceptive use among women aged 15 to 52 in southwest Nigeria found that the majority (46.3%) chose the Jadelle implant, while Norplant (0.5%) was the least popular [6]. Married women were more likely to seek family planning methods in that study, with the motivating element being the increasing difficulty of raising children and the need to minimize family size [6]. Unintended pregnancy was found to be roughly 13 per 100 women during the first year after delivery, with well over three-quarters of these pregnancies occurring as a result of contraceptive product non-usage, inappropriate use, or failure. Delaying contraception until the first hospital visit or the sixth week after delivery increases the chances of unwanted pregnancy [7].

Modern family planning methods are a cost-effective strategy for minimizing high-risk pregnancies, unsafe abortions, and birth spacing and limitation [8-10]. In 2017, 214 million women had an unmet demand for modern family planning, despite advances in contraception technology and availability [11]. Progesterone-only contraceptives, such as injectable depot medroxy progesterone acetate (DMPA), are an extremely efficient means of contraception, particularly during the postpartum period. Each woman can choose her best option for preventing unwanted pregnancy by having access to a variety of contraceptive options. In Sub-Saharan Africa, injectable contraceptives, which provide three months of pregnancy protection, are a popular option. Self-injection of contraception is a new alternative that gives women more autonomy and control over when and if they want to have children while reducing the time and costs involved with quarterly clinic visits. Subcutaneous DMPA (DMPA-SC) is a new, simple-to-use injectable contraception that is especially suited for self-injection due to its design [12]. It is an intentional strategy of the Nigerian government's national family planning goals to address the unmet need for contraception, especially in hard-to-reach communities. It has the potential to be a game-changer in terms of increasing and scaling up DMPA-SC. DMPA-SC/SI has been demonstrated to improve contraceptive prevalence rates in studies. However, there is a gap in the predictors of method uptake and continuance across self-injecting and provider-

administered customers in Nigeria [13-15]. This study explored the uptake of self-injection DMPA-SC contraceptive among reproductive age women in Nigeria's South Western and North-Central geopolitical zones.

Materials and Methods

Study Settings

The study was conducted among women in two states each of Nigeria's South-West and North-Central geopolitical zones. There are six states (Niger, Kogi, Benue, Plateau, Nasarawa, and Kwara), including the Federal Capital Territory (FCT) in the North-Central geopolitical zone and in the southwest zone, there are equally six states, which are Ekiti, Ondo, Lagos, Osun, Ogun, and Oyo States. While the population of South West was put at 32.5 million people, that of North-Central is put at 45 million people. The study was conducted in two states from two geopolitical zones; North Central Niger and Plateau States and South-Western–Oyo and Lagos States [16].

Study Design

The study was a descriptive cross-sectional study conducted among 844 reproductive-aged (15 - 49 years) women residents in the four selected states. This study employed a mixed-method qualitative and quantitative design (Mixed-method approach; questionnaire-based, In-depth Interview, Focused Group Discussion). Data from the Health Management information system (HMIS) was used as Triangulation to substantiate the use of Self-injection.

Sample Size Calculation

Assuming a 50% DMPA-SC use in the study areas due to lack of reliable information, a z-score value of 1.96 for 95% confidence interval (CI), an error margin of 0.05, a non-response rate of 10% a, a minimum sample size of 844 was worked out using the Cochrane's [17] formula for a single proportion.

Sampling procedure

A multi-stage sampling procedure was used in selecting respondents for the study. In stage 1, we purposively selected two geopolitical zones, which are north-central and southwest. In stage 2, a simple random sampling technique was used to select two states in each of the geopolitical zones. In north-central, Niger and Plateau States were selected; while in the south west, Oyo and Lagos States were selected. In stage 3, the lists of all the LGAs in each of the selected States were obtained, out of which 50% of the LGAs were selected, ensuring an equitable percentage of half-drawn from urban and a half from rural. In stage 4, simple random sampling was used to select 10 Primary Healthcare Centres in each of the LGA. In the final stage, respondents were selected from the health facility register.

Inclusion/Exclusion Criteria

The eligibility criteria include women within the reproductive ages, 15-49 years, who were sexually active and mentally stable. We considered only women who were currently residing in the communities.

Research Instrument

Three research instruments were used for the study, and they are focused group discussion (FGDs); In-depth Interviews (IDIs), and structured questionnaires. The questionnaire was self-structured and was administered in the English language. The questionnaire elicited information on women's socio-economic characteristics; women's reproductive characteristics; awareness and practice of modern family planning, experience with self-injected DMPA-S, reasons for the use of self-injection, barriers to use of self-injection, negative influence to using DMPA-SC, what factors influence the use of DMPA-SC, what prompted women to take their last DMPA-SC, perception of quality of information given on DMPA-SC and description of the respondent experience of service delivery on DMPA-SC

attitude of healthcare workers to respondent. The questionnaire was pretested by administering it to 20 women in a health centre that was not included in the study. The questionnaire was administered through face-to-face interviews with respondents. However, where face-to-face contacts were not possible, mobile phones were used for data collection. The questionnaire was administered using an open data kit (ODK) in which the questionnaire called form was scripted into a computer and uploaded into a server. The completed forms were saved on the tablet and later uploaded into the server. The uploaded data were ready for error checking.

A total of 20 FGDs (5 per State) were held among women of reproductive age in the four states. Each of the FGDs lasted between 45 minutes and an hour, and an end was put to each of the discussions when no further issue was raised. Each of the discussions featured between 10 and 12 participants who share similar socio-economic characteristics. The numbers of participants were small enough to allow cordial conversation but large enough to allow divergent views [18]. The FGDs were held in Pidgin English and were recorded after permission was sought from participants.

Also, a total of 40 IDIs (10 per State) were conducted among family planning providers. IDIs lasted between 45 minutes and an hour. They were one-on-one interviews conducted with identified stakeholders and persons relevant to the focus of the research. Well-detailed FGDs and IDIs guides were used in conducting the interviews. The guides were structured to promote uniformity in the discussions. Some of the issues discussed in the FGDs and IDIs were the perception of women on DMPA-SC, the perception of the community on DMPA-SC, place of the utilization of DMPA-SC, motivation to use DMPA-SC, factors that encourage the use of DMPA-SC; internal and external triggers to use DMPA-SC and factors that influence the ability to demand for DMPA-SC and availability of the products in the health facilities. Both FGDs and IDIs were audiotaped using NVIVO 12.0. In addition to the recording; a research assistant took notes using a template.

Data Collection Procedure

Trained field research assistants were used in collecting the data five research assistants, which comprised 3 community resource persons and 2 other persons with B.Sc. Degrees in health-related disciplines were recruited for data collection. Research assistants were given training on the following areas: overview of family planning, explanation of the study goals and objectives, study locations-urban and rural LGAs, study data collection, and ethics in the field survey. Six months records Secondary data analysis of HMIS was used to determine the trends in self-injection.

Dependent Variable

The outcome indicator used in this study is the use of DMPA-SC. The outcome indicator is binary; hence women who reported uptake of DMPA-SC were coded 1, while those who reported otherwise were coded 0.

Independent Variables

For the dependent variable, we assessed the predictive value of several independent variables (covariate), which include maternal age, marital status, maternal education, occupation, place of residence, parity (number of children), number of children alive, desire for more children and geopolitical zones of residence were examined. Maternal age examined the current age of the respondents, and we considered the following age groups: <19; 20-29; 30-39 and ≥ 40 years. Marital status is considered the marital status of the respondents. We considered five marital categories which were married, single, separate, divorced, and widowed. Maternal education was considered the highest educational attainment of the respondents, and we considered the following groups: non-formal education, primary, secondary and tertiary

education. For occupation, the following categories were examined: housewife, artisan, farming, civil servant, trading, and student. Place of residence categorized the women into rural and urban. Parity examined the number of children which the woman had given birth to ever, and the following categories were considered: none, 1-3, 4-6, and ≥ 7. The number of children alive is considered the actual number of children alive out of the number of children to which the woman has given birth to. We considered the following categories: none, 1-3, 4-6, and ≥ 7. A desire for more children considered whether the woman desires more children or not. Those who desire more children were coded one while otherwise coded 0. The geopolitical zone categorized the women into South West and North Central. These variables were used by past studies that examined the determinants of family planning in Nigeria and elsewhere [19-25].

Statistical Analysis

Descriptive statistics were used to analyze the categorical and continuous variables of the socio-economic characteristics of women of reproductive age. Cross-tabulation analysis was conducted to establish the association between dependent variables and selected independent variables. The Chi-square test was used to set variables that were statistically significant at 5%. The binary logistic regression was used to examine determinants of DMPA-SC/SI uptake among the women. Audio-taped voices were transcribed verbatim. Important themes related to the discussion were highlighted. Recorded voices were reported using translated quotations, which were denoted using brackets. The literal translation gave credibility to the reports. The In-depth Interview (IDIs) and Focus Group discussions were subjected to descriptive and inferential statistics using NVIVO version 12. Quantitative data collected was analyzed using IBM Statistical Package for Service Solution (SPSS) Version 26.

Ethical Clearance and Approval

Approval to conduct the study was obtained from the Nigerian Health Research Ethics Committee in line with the established guidelines of the Federal Ministry of Health. Approval was sought from the health facilities where the study was conducted. Informed consent was obtained from individual participants, having provided detailed information about the survey to them.

Results

The respondents comprise of women between the ages of nineteen and forty-nine years. However, the majority of them, 689 (81.6%) were women of age 20 – 39 years. Most of the respondents, 718 (85.1%), were married women, about three quarter 73.9% of them had at least secondary level of education, 355 (42.2%) were traders, while 385 (45.6%) were rural dwellers. More so, 456 (54.0%) were from the southwestern part of Nigeria, while 388 (46.0%) were from the northcentral part. About half 418 (49.5%) of the women had 1 -3 children, while about the same number of women still desire more children (Table 1a, Table 1b).

Table 1a. Socio-demographic Characteristics of the Respondents

Variables	Frequency (n = 844)	Percent
Age (years)		
≤19	18	2.1
20-29	341	40.4
30-39	348	41.3
≥40	137	16.2
Marital status		

Married	718	85.1
Single	80	9.5
Separated	22	2.6
Divorced	11	1.3
Widowed	13	1.5
Highest educational level		
None	81	9.6
Primary	139	16.5
Secondary	400	47.4
Tertiary	224	26.5
Occupation		
Housewife	93	11.0
Artisan	108	12.8
Farmer	76	9.0
Civil Servant	133	15.7
Trading	355	42.1
Student	79	9.4
Type of residence		
Rural	385	45.6
Urban	459	54.4
State of residence		
Lagos	252	29.8
Oyo	204	24.2
Niger	185	21.9
Plateau	203	24.1

Table 1b. Socio-demographic Characteristics Continued

Variables	**Frequency (n = 844)**	**Percent**
Geopolitical zone of residence		
Southwestern	456	54.0
Northcentral	388	46.0
LGA of residence		
Epe	118	14.0
Ifako Ijaiye	134	15.9
IBNE	126	14.9
Ido	78	9.2
Bassa	83	9.8
Jos South	119	14.1
Bosso	101	12.0
Tafa	85	10.1
Parity (number of children)		
None	63	7.5
1-3.	418	49.5
4-6.	314	37.2
≥7	49	5.8

Number of children alive		
None	63	7.5
1-3.	455	53.9
4-6.	301	35.7
≥7	25	3
Desire for more children		
No	425	50.4
Yes	419	49.6

An overwhelming majority, 824 (97.6%) of the respondents, have heard the term Depot Medroxyl Progesterone Acetate Subcutaneous (DMPA-SC). Seven hundred and forty-seven (88.5%) of the respondents have heard about self-injection as an option of family planning methods. Six hundred and sixty-two (78.4%) are using DMPA-SC/SI. Over a half (53.5%) of the respondents have never self-injected DMPA-SC/SI, with fear of self-injecting 31.7%, fear of needle/injection 21.2% and no knowledge of how to self-inject 14.4%, dominating the reasons these women have never administered the DMPA-SC/SI family planning method themselves. A vast majority, 462 (74.5%) of the respondents, have been using the DMPA-SC/SI method of family planning for the past 12 months. Those who have not been using DMPA-SC/SI for over three months cited the unavailability of the products (38.8%) and desire for pregnancy and childbirth (24.1%) as the major reasons they have not been using the product (Table 2).

Table 2. Awareness and Uptake of DMPA-SC among Respondents

Variables	**Frequency**	**Percent**
Ever heard of DMPA-SC (n = 844)		
Yes	824	97.6
No	20	2.4
Ever heard of self-injection (SI) as option of FP (n = 844)		
Yes	747	88.5
No	97	11.5
Uptake of DMPA-SC (n = 844)		
Yes	662	78.4
No	182	21.6
Ever Self-Injected DMPA-SC (n = 662)		
Yes	308	46.5
No	354	53.5
Reasons for never self-injected* (n = 354)		
Fear of self-injecting	112	31.7
Fear of needle/injection	75	21.2
I do not know how to do it	51	14.4
I do not know I can self-inject	43	12.1
Fear of not doing it right	43	12.1
It is safer for someone to inject me	30	8.5
Duration of using DMPA-SC/SI (n = 662)		
<6 months	273	41.2
6-11 months	231	34.9

≥12 months	158	23.9
Non-use of DMPA-SC/SI for more than 3 months (n = 662)		
Yes	546	82.5
No	116	17.5
Reasons for non-use for more than 3 months (n = 116)		
Unavailability of DMPA-SC/SI at health facility	45	38.8
Desire for pregnancy and to have more children	28	24.1
No reason for non-use	17	14.7
I changed method	15	12.9
Husband is not available	11	9.5

*Multiple Responses

The most mentioned factors the influence the use of DMPA-SC was the health benefits 45.0%, and financial implications were other factors that positively influenced respondents to using DMPA-SC. A majority (69.6%) of respondents were reminded to take their last DMPA-SC/SI by their appointment cards, 14.0% were reminded by phone calls from a health worker, while 2.7% took their last jab of DMPA-SC/SI through the help of text message from the health facility. Easy-to-use, effective and free family planning products were the most mentioned motivating factors to women's use of DMPA-SC/SI family planning method 207 (31.1%). Child spacing 15.5% and enlightenment 11.8% were other factors that motivated the respondents to use DMPA-SC/SI family planning. The majority of study participants believed that health education, awareness creation and social mobilization (46.5%), and advocacy, policy implementation, and public sensitization (33.4%), can help to encourage women to continue using a DMPA-SC/SI family planning method. Spousal/partners' encouragement (50.0%) was the most mentioned factor that made it easy for the respondent to initiate DMPA-SC/SI uptake. Other factors mentioned were ability to self-administer (19.0%), cost and availability of DMPA-SC/SI (13.3%), proximity to health facility (11.5%), and self-interest (6.2%) (Table 3).

Table 3. Factors Influencing DMPA-SC/SI Uptake among Respondents

Factors	**Frequency (n = 662)**	**Percent**
Influence to DMPA-SC /SI use		
The health benefits	298	45.0
The Financial implications	153	23.1
Encouragement from family and friends	118	17.9
The effectiveness, safety and availability of the products	73	11.0
Proximity of community Providers	20	3.0
Benefits associated with Self-injection		
It is easy to use and self-administered	278	42.0
It is safe and dependable	135	20.4
It helps in child spacing an d prevention of unwanted pregnancy	116	17.5
It is available, accessible and affordable	75	11.3
It is provided free of charge	58	8.8
Reminder to take DMPA-SC/SI		
Appointment card	461	69.6
Phone calls from health worker	93	14.0

Phone reminder (alarm)	54	8.2
Spousal encouragement/reminder	36	5.4
Text message from health facility	18	2.7
The motivators to use DMPA-SC/SI FP methods		
The product is free, easy to use and effective	207	31.1
Child spacing	173	26.1
Availability of the product	105	15.5
Enlightenment	78	11.8
Economic situation of the country	47	7.1
Spousal encouragement	35	5.3
Attitude of health workers	17	2.6
What can be done to encourage women to continue using DMPA-SC/SI		
Health education, awareness creation and social mobilization	308	46.5
Advocacy, policy implementation and public sensitization	221	33.4
Making products available and accessible	83	12.5
Provision of the products free for women	50	7.6
Why it easy for respondent initiating the use of DMPA-SC/SI method		
Spousal/partner encouragement	331	50.0
Ability to self-administer	126	19.0
Cost of method	88	13.3
Proximity to health facility	76	11.5
Self interest	41	6.2

From the Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs) on the influence, benefits, and motivators of DMPA-SC/SI family planning uptake, the following information was gathered from the participants.

Influencers to DMPA-SC/SI Uptake

From the FGDs and IDIs, it was gathered that there are some factors that serve influence on respondents who reported they use of self-injectable DMPA-SC contraceptive. Prominent among the factors were health benefits, the country's economic situation, financial implications involved in raising children, and the effectiveness, safety, and availability of the products whenever they need it. Some of the participants in the IDIs and FGDs has these to say:

"Mostly what motivates our women here is suffering. They are suffering a lot, the men are not taking good care of them, so if a woman just gives birth to one child and she sees the condition she is facing in that house, she will decide and contact her husband for family planning, and at times, all of them agree, and they would come to the clinic together, and sometimes the woman will come, and she will say that they have agreed with her husband because of their condition, they want to rest first" **IDI Plateau.**

"We see that there is need for children to have good food, to have a good education and then to have good health care, so that is why we encourage them so that they will use the family planning, in order for them to be able to take good care of their children" **IDI Plateau.**

"One has to do family planning because, one should not have children intermittently, and they will start looking like twins. If you are taking one derica of rice before when children are too much, how will one get food to eat. So, one has to plan. Not even this period that everywhere is dry" **FGD Lagos.**

"It is effective, no complain of bleeding, and it reduce the number of visit of clients" **IDI Oyo.**

"When I was using the implant, access to the commodity was a problem because you have to go to and queue and wait you have to also pay, but this DMPA SC is easy because it does not take time and it does not waste time" **FGD Plateau.**

"It is easy, and its complication are less, women complain about it less unlike the pills that you can forget, the loop you will bleed other are headache and what have you, in the ratio of women in the community of women using family planning method is the least women complain about its complications" **FGD Plateau.**

"I think the only thing that makes them use it is that by the time they plan their family, they will be at rest, there will not be issue of unwanted pregnancy, they will enjoy their husband, and they will enjoy their wife. I think that is one of the things that make them to turn out" **IDI Oyo.**

"My husband encourages me" **IDI Oyo.**

"The cost…it is cost-effective; it is free, so, there's no money attached to it. Then the proximity too is one of it. but probably because of the self-injection" **IDI Lagos.**

"My ideal family planning method will be implant. Although, it's okay with all other methods, but because I can just take a method and disappear for five years except, I have complaints, it makes it easy for me. And for Sayana press or DMPA-SC, if I'm educated on self-injection, and I'm given two, three unijects to take home, it also encourages me to stay on that method because I can take three and for the next nine months, I won't have to leave my job to go to any facility to go and take" **IDI Lagos.**

"Firstly, family planning protects life. It prolongs a woman's life. Because this maternal and child health problem that we used to face during childbirth, it affects our lives, we die on time because we do not plan well, but if we plan well, unwanted pregnancy would not occur, and at times when we are taking it, it makes us strong and healthy to prepare ourself for another baby that is coming" **IDI Plateau.**

"FP has a lot of benefits. If we leave a gap between one child and the other, you know we will have time to plan for the unborn child to save enough to plan ahead and the one on the ground we would have time to properly take care of him/her" **IDI Oyo.**

"My husband is very pleased with this one because I was on another family planning method, but I was not enjoying it at all, but this one (DMPA-SC) is very okay for me. I'm enjoying it; even my husband likes it" **FGD Plateau.**

"It is even the husband that said the wife should go and collect it that food stuffs is now expensive, school fees is now expensive" **FGD Oyo.**

My husband consented because I using Noristerate, but I was bleeding, so I stopped so when i was ready my husband said we should go together so that we will hear and we will be given lectures, so they agree and we went together" **FGD Plateau.**

Analysis

The bivariate analysis of women uptake of DMPA-SC/SI, in association with socio-demographic and some reproductive health characteristics, shows that respondents' age, marital status, the highest level of education, occupation, type of residence, and State of residence were statistically significantly associated with uptake of DMPA-SC/SI, among the studied population. The age of respondents shows that an increase in age has a corresponding increase in the use of DMPA-SC/SI, especially from the age of 20 upwards. The majority of respondents (92.3%) who were widows were users of DMPA-SC/SI much more than those who are single (57.5%). Though education was found to be statistically significant (< 0.001) in association with DMPA-SC/SI uptake, there were no much difference between those who had tertiary level of education and those who had primary level. A higher proportion of respondents from the urban areas (93.9%) and those from the north-

central zone (Plateau, 100.0% and Niger, (82.7%) respectively had higher uptake of DMPA-SC/SI than their counterparts from the rural areas and southwestern zone of Nigeria. The association between type of residence and State of residence was statistically significant (<0.001) (Table 4a).

Table 4a. Socio-demographic Characteristics of the Respondents and Uptake of DMPA-SC/SI

	Uptake of DMPA-SC/SI		
Variables	**Uptake (n = 662)**	**Not Uptake (n = 182)**	**p-value/χ2**
Age (years)			
≤19	13 (72.2)	5 (27.8)	< **0.001**
20-29	242 (71.0)	99 (29.0)	22.461
30-39	286 (82.2)	62 (17.8)	
≥40	121 (88.3)	16 (11.7)	
Marital status			
Married	580 (80.8)	138 (19.2)	< **0.001**
Single	46 (57.5)	34 (42.5)	25.179
Separated	16 (72.7)	6 (27.3)	
Divorced	8 (72.7)	3 (27.3)	
Widowed	12 (92.3)	1 (7.7)	
Highest educational level			
None	57 (70.4)	24 (29.6)	**0.002**
Primary	118 (84.9)	21 (15.1)	14.876
Secondary	298 (74.5)	102 (25.5)	
Tertiary	189 (84.4)	35 (15.6)	
Occupation			
Housewife	74 (79.6)	19 (20.4)	< **0.001**
Artisan	89 (82.4)	19 (17.6)	53.198
Farmer	48 (63.2)	28 (36.8)	
Civil Servant	119 (89.5)	14 (10.5)	
Trading	290 (81.7)	65 (18.3)	
Student	42 (53.2)	37 (46.8)	
Type of residence			
Rural	231 (60.0)	154 (40.0)	< **0.001**
Urban	431 (93.9)	28 (6.1)	142.259
State of residence			
Lagos	150 (59.5)	102 (40.5)	< **0.001**
Oyo	156 (76.5)	48 (23.5)	111.556
Niger	153 (82.7)	32 (17.3)	
Plateau	203 (100.0)	0 (0.0)	

χ2; Chi-Square

The Figure 1 shows that among the respondents who have used modern contraceptives, 74.8 percent of them are using DMPA-SC/SI in the surveyed areas.

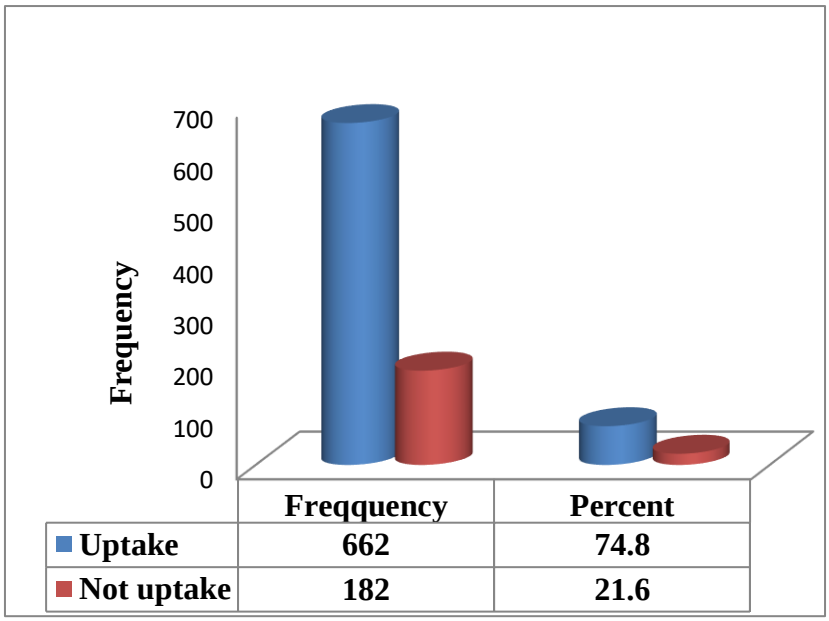

Figure 1. Uptake of DMPA-SC/SI among Respondents

Respondents' geopolitical zones, the local government of residence, parity, number of living children, desire for more children, awareness of modern contraceptive, DMPA-SC/SI, and self-injection were all statistically significantly associated with uptake of DMPA-SC/SI (<0.001). A higher proportion of respondents from the north-central states and local government areas had higher uptake of DMPA-SC/SI when compared with their southwestern counterparts. Awareness of DMPA-SC/SI, modern family planning, and self-injection provided the respondent a higher opportunity for a higher uptake of DMPA-SC/SI among the study participant. The association between geopolitical zones, local government, parity, number of living children, awareness of modern contraceptives, DMPA-SC/SI, and self-injection was statistically significant (p <0.001) (Table 4b).

Table 4b. Socio-demographic Characteristics of the Respondents and Uptake of DMPA-SC/SI Continued

Uptake of DMPA-SC/SI			
Variables	**Uptake (n = 662)**	**No Uptake (n = 182)**	**p-value/χ2**
Geopolitical zone of residence			
Southwestern	306 (67.1)	150 (32.9)	< **0.001**
Northcentral	356 (91.8)	32 (8.2)	75.292
LGA of residence			
Epe	19 (16.1)	99 (83.9)	< **0.001**
Ifako Ijaiye	131 (97.8)	3 (2.2)	388.786
IBNE	111 (88.1)	15 (11.9)	
Ido	45 (57.7)	33 (42.3)	
Bassa	83 (100.0)	0 (0.0)	
Jos South	119 (100.0)	0 (0.0)	
Bosso	89 (88.1)	12 (11.9)	
Tafa	65 (76.5)	20 (23.5)	
Parity (number of children)			
None	29 (46.0)	34 (54.0)	< **0.001**
1-3.	335 (80.1)	83 (19.9)	42.913

4-6.	259 (82.5)	55 (17.5)	
≥7	39 (79.6)	10 (20.4)	
Number of children alive			
None	29 (46.0)	34 (54.0)	< **0.001**
1-3.	372 (81.8)	83 (18.2)	43.630
4-6.	243 (80.7)	58 (19.3)	
≥7	18 (72.0)	7 (28.0)	
Desire for more children			
Yes	345 (82.3)	74 (17.7)	**0.007**
No	317(74.6)	108 (25.4)	7.494
Ever heard of modern FP			
Yes	658 (87.2)	97 (12.8)	< **0.001**
No	4 (4.5)	85 (95.5)	321.602
Ever heard of DMPA-SC/SI			
Yes	662 (80.3)	162 (19.7)	< **0.001**
No	0 (0.0)	20 (100.0)	74.513
Ever heard of self-injection as a FP			
Yes	622 (83.3)	125 (16.7)	< **0.001**
No	40 (41.2)	57 (58.8)	89.662

$\chi 2$; Chi-Square

Respondents who were between the ages of 20 – 29 years were found to be statistically significantly less likely to uptake DMPA-SC/SI when compare with those who were 40 years and above (AOR, 0.42; 95% CI, 0.23-0.77; P = 0.005). Those who had no educational level as well as those who had secondary level of education were found to be statistically significantly less likely to have DMPA-SC/SI uptake when compared with those with tertiary level of education (AOR, 0.30 95% CI, 0.16-0.56; p <0.001) and (AOR, 0.46; 95% CI, 0.29-0.74; p = 0.001) respectively. Those who are artisans, civil servants, and traders were about 4 times, 6 times and 4 times statistically significantly more likely to uptake DMPA-SC/SI family planning method when compared with those who were students (AOR, 3.77; 95% CI, 1.54-9.18; p < 0.004), (AOR, 6.07; 95% CI, 2.30-16.02; p <0.001) and (AOR, 4.05; 95% CI, 1.88-8.72; p < 0.001) respectively. Respondents from the rural areas were statistically significantly less likely to uptake or use DMPA-SC/SI when compared with those from the urban areas (AOR, 0.08; 95% CI, 0.05-0.14; p <0.001) (Table 5a).

Table 5a. Predictors of Uptake of DMPA-SC/SI among Respondents

Uptake of DMPA-SC/SI			
Variables	**Regression coefficient**	**AOR (95% CI)**	**p-value**
Age (years)			
≤19	-0.440	0.633 (0.19-2.20)	0.482
20-29	-0.861	0.42 (0.23-0.77)	**0.005**
30-39	-0.415	0.66 (0.36-1.20)	0.175
≥40		1	
Marital status			
Married	-0.697	0.50 (0.06-3.96)	0.510
Single	-1.842	0.16 (0.02-1.33)	0.090

Separated	-1.131	0.32 (0.03-3.15)	0.330
Divorced	-0.832	0.44 (0.04-5.18)	0.510
Widowed		1	
Highest educational level			
None	-1.217	0.30 (0.16-0.56)	**<0.001**
Primary	-0.309	0.73 (0.39-1.37)	0.333
Secondary	-0.771	0.46 (0.29-0.74)	**0.001**
Tertiary		1	
Occupation			
Housewife	-0.216	0.81 (0.27-2.42)	0.701
Artisan	1.326	3.77 (1.54-9.18)	**0.004**
Farmer	0.498	1.65 (0.61-4.48)	0.329
Civil Servant	1.804	6.07 (2.30-16.02)	**<0.001**
Trading	1.399	4.05 (1.88-8.72)	**<0.001**
Student		1	
Type of residence			
Rural	-2.496	0.08 (0.05-0.14)	**<0.001**
Urban		1	
Geopolitical zone of residence			
Southwestern	-0.221	0.801 (0.36-1.76)	0.582
Northcentral		1	

Respondents who were resident in Epe and Ifako Ijaiye local government areas of Lagos State, southwest geopolitical zone were found to be statistically significantly less likely and about 19 times more likely, respectively, to use or have an uptake of DMPA-SC/SI when compare with those from Tafa in Niger State north central geopolitical zone (AOR, 0.08; 95% CI, 0.04-0.10; p <0.001) and (AOR, 19.39; 95% CI, 5.46-68.91; p <0.001). Those who are resident in Ibadan North-East local government area of Oyo State and those living in Bosso local government area of Niger State were about 3 and 2 times respectively, statistically significantly more likely to have DMPA-SC/SI uptake when compared with those residents in Tafa (AOR, 3.06 95% CI, 0.16-0.56; p = 0.005) and (AOR, 2.36 95% CI, 1.08-5.19; p = 0.032). Respondents who had no child or any living child are statistically significantly less likely to make use of DMPA-SC/SI when compared with those who have at least 7 children (AOR, 0.26 95% CI, 0.07-0.93; p = 0.038) and (AOR, 0.03; 95% CI, 0.01-0.21; p < 0.001) respectively. Respondents who have never heard about self-injection were statistically significantly less likely to uptake or use DMPA-SC/SI when compared with those who have heard (AOR, 0.01; 95% CI, 0.00-0.01; p < 0.001) (Table 5b).

Table 5b. Predictors of Uptake of DMPA-SC/SI among Respondents Continued

Uptake of DMPA-SC/SI			
Variables	**Regression coefficient**	**AOR (95% CI)**	**p-value**
LGA of residence			
Epe	-2.505	0.08 (0.04-0.18)	**<0.001**
Ifako Ijaiye	2.965	19.39 (5.46-68.91)	**<0.001**
IBNE	1.118	3.06 (1.39-6.72)	**0.005**
Ido	NA	NA	NA

Bassa	20.170	0	0.996
Jos South	20.122	0	0.996
Bosso	0.860	2.36 (1.08-5.19)	**0.032**
Tafa		1	
Parity (number of children)			
None	-1.346	0.26 (0.07-0.93)	**0.038**
1-3.	0.125	1.13 (0.40-3.19)	0.812
4-6.	0.209	1.23 (0.44-3.49)	0.694
≥7		1	
Number of children alive			
None	-3.56	0.03 (0.01-0.21)	**<0.001**
1-3.	-1.85	0.16 (0.02-1.05)	0.056
4-6.	-1.47	0.23 (0.04-1.51)	0.125
≥7		1	()
Desire for more children			
No	0.147	1.16 (0.69-1.95)	0.580
Yes		1	
Ever heard of modern FP			
No	-5.530	0.01(0.00-0.01)	**<0.001**
Yes		1	
Ever heard of self-injection as a FP			
No	0.430	1.54 (0.32-7.51)	0.595
Yes		1	

The below Figure 2 showed an upward trend in the utilization of DMPA-SC in the 4 study sites from November 2020 to January 2021 followed by a sharp decline in March 2021. This was largely due to the national stock-out of DMPA-SC units. Following the resupply of the commodity to the states, there was an upward increase of 139% (18,100) in April 2021 from the utilization of the previous month (7,564).

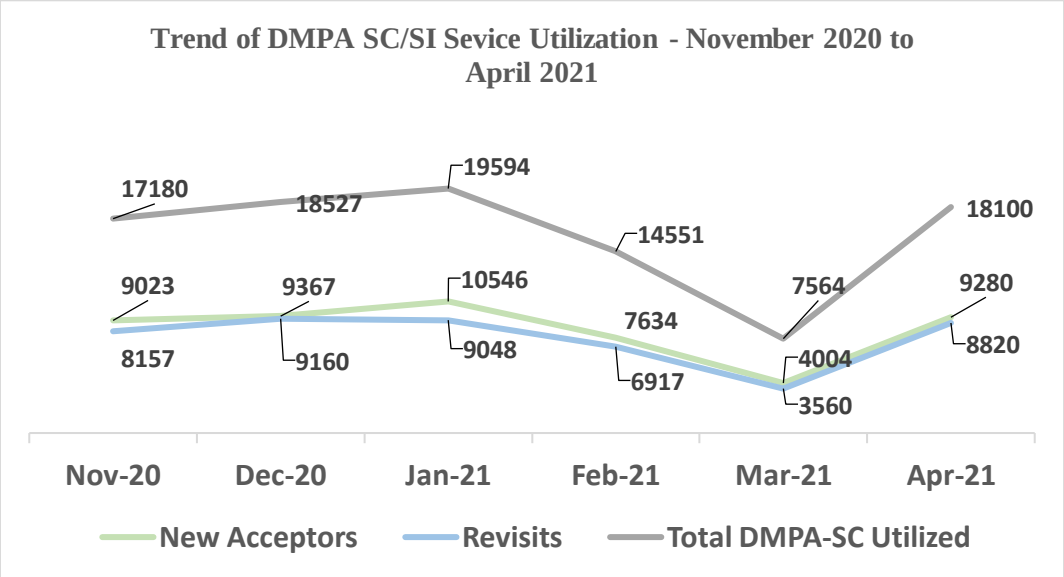

Figure 2. Trend of Service Utilization – November 2020 to April 2021

Source: Secondary Data-HMIS from 4 study states: Six months trends in uptake

The contribution of new users of DMPA-SC to the total new users of family planning in the 4 states was 21.2% (table 6 above). This implies that 1 in 5 Women of Reproductive Age (WRA) will choose DMPA-SC as a family planning method among the broader family planning method mix. Among the 4 study sites, Niger state has the highest contribution of new users of DMPA-SC (32.7%) among the total new users of family planning methods in the State followed by Plateau state (29.7%), Oyo state (21.6%), and Lagos state (11.4%) (Table 6).

Table 6. Percentage Contribution of New Acceptors of DMPA-SC to Total New Acceptors of other Family Planning methods combined

States	Contribution
Lagos	11.4%
Oyo	21.6%
Niger	32.7%
Plateau	29.7%
Summary	**21.2%**

Source: Secondary Data-HMIS from 4 study states: Six months trends in uptake

Figure 3 below depicts the approaches in the delivery of DMPA-SC and self-injection. Community providers – CORPs – contributed more to self-injection uptake (62%) than their facility counterpart (37%). This suggests direct-to-client access at the community level holds greater promise than facility channels in closing the access gap, averting thousands of unplanned pregnancies, and addressing the unmet need for FP.

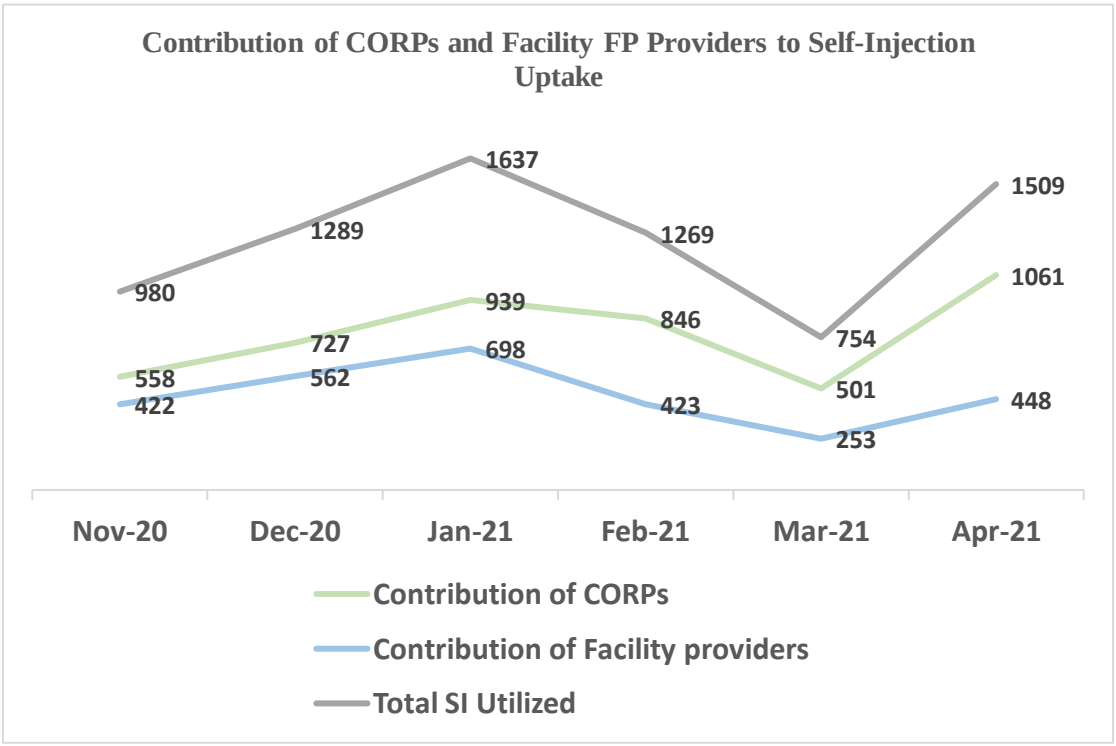

Figure 3. Percentage Contribution of Cadres of Service Providers to Self-injection Uptake

Source: Secondary Data-HMIS from 4 study states: Six months trends in uptake

Figure 4 below shows that among the respondents who have used modern contraceptives, 74.8 percent of them are using DMPA-SC/SI in the surveyed areas.

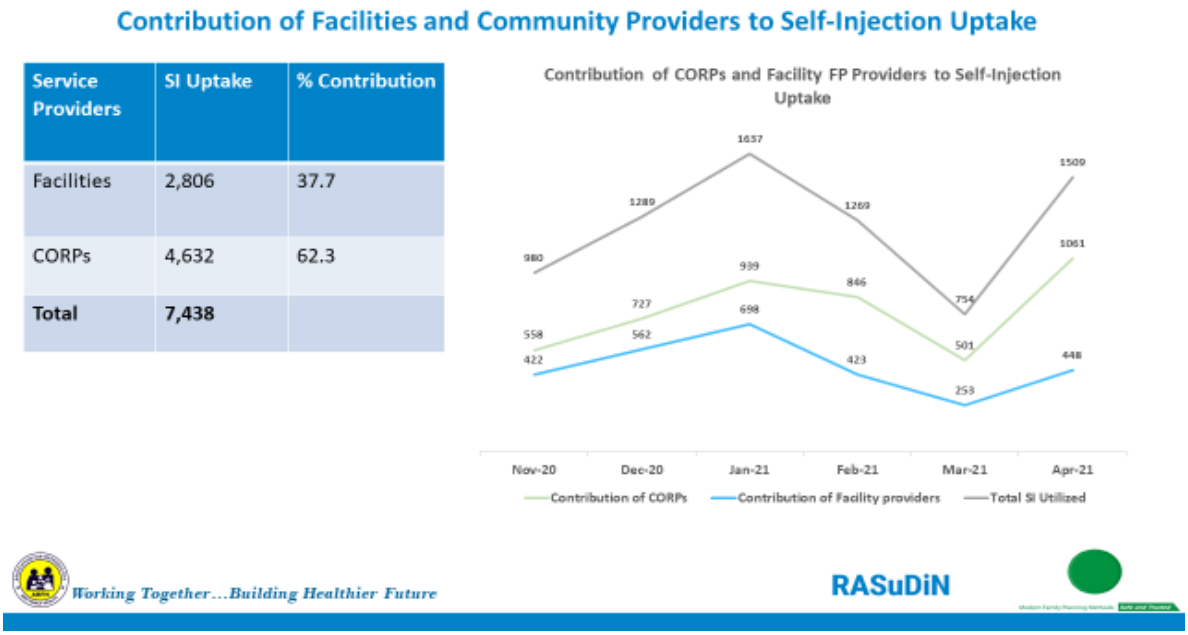

Figure. 4. Secondary Data from HMIS in Four study sites-November 2020 – April 2021

Source: Secondary Data-HMIS from 4 study states: Six months trends in uptake

Discussion

This study explored the uptake of Depot Medroxyl -Progesterone –Acetate-Subcutaneous/Self Injection (DMPA-SC/SI) among women in two geopolitical zones of Nigeria. The study was conducted in two selected states from the southwestern geopolitical zone of Nigeria (Lagos and Oyo States) and two selected states of north-central geopolitical zone (Niger and Plateau States). The respondents were made up of mostly women at the middle of their reproductive age, 20 – 39 years, constituting about 82% of the total population of the study participants. There are not many differences in the socio-demographic characteristics of the women in terms of their type of residence (whether urban or rural dwellers). The average age of 31.4 ± 6.9 was observed among the respondents in this study. This mean age is similar to prior Nigerian studies [26-27]. This could indicate that DMPA-SC is most commonly used for terminal contraception by women who have reached the end of their reproductive careers and want to stop having children [26]. This is not surprising given that the surgical method of contraception is not widely accepted by women in this society for cultural and religious reasons [4].

According to current scientific evidence, DMPA use has risen dramatically in Sub-Saharan Africa, and it is quickly becoming the most widely used modern method of contraception in many health facilities and reproductive and family health centers in Nigeria [26]. Also, the overwhelming majority 97.6% of the study participants was aware of the Depot Medroxyprogesterone Acetate Subcutaneous (DMPA-SC) contraceptive method, and self-injection, 88.5%. Generally, this study demonstrated that the level of knowledge of contraceptive methods is predicated upon the socio-demographic and socio-economic characteristics of the study participants. The FGD and IDI conducted among women in the two geopolitical zones also corroborated with the quantitative results regarding awareness of DMPA-SC/SI contraceptive methods. Participants from the northern region of the country seem to be more in the know of the DMPA-SC/SI family planning method compared to their southern

counterparts. This is noticed in both the FGDs and IDIs as DMPA-SC/SI family planning methods was mentioned among the northern participants than their counterparts in the south. The high awareness of DMPA-SC/SI observed from the qualitative and quantitative studies may still be due to the aggressive campaign embarked by many local non-governmental organizations to help in the unmet need rampant in the northern region of the country. It must also be noted that when DKT in collaboration with the federal government, introduced the DMPA-SC/SI some years ago, the northern region of the country was a major focus. The majority of the women have never self-injected themselves though over three-quarters of them are using the product. Fear of self-injecting was the most reason given by those who do not self-inject as the reason they have never self-injected themselves. Some of the respondents who have been using DMPA-SC/SI reported that they have stopped and the major reason for halting their uptake was among others, unavailability of DMPA-SC/SI at health facility and desire for pregnancy and to have more children.

Numerous factors were determinants of uptake of DMPA-SC/SI among the women respondents. Among these factors are those that influence them, which include health benefits associated with the use of contraceptive products, the prevailing economic situation in the country, encouragement they receive from their friends and members of their families. Other influencers are the availability, affordability, accessibility of the DMPA-SC/SI and the ease with which it is administered. When these women consider that often, DMPA-SC/SI is provided for then without cost, the education or enlightenment, and the encouragement and support they receive from their husbands, they are motivated to obtain DMPA-SC/SI. It, therefore, infers that that women empowerment through awareness creation, enhancement of husband's or partner's support, public mobilization and sensitization, economic and financial empowerment, and positive peer influence can bring an increase in the DMPA-SC/SI contraceptive or family planning method. To this end, an improvement on women's knowledge of contraceptives and granting them decision-making autonomy to decide about their health and that of their child are major factors that need urgent consideration by policy makers and implementers in the area of reproductive and family health. Health-related programs that focus in the provision of population-moderation benefits to a wide range of the societal sub-groups, especially the most vulnerable, are key to improving the health of women in general [18]. The consideration of financial implication in acquiring a family planning method by the study participants suggests that underprivileged women such as those financially incapacitated and those from strictly patriarchal societies will be prejudiced on the consequences of such inability of being unable to provide herself with contraceptives. These financial incapacitations could be indirect and direct costs, including travelling cost to a health facility for family planning method, the amount of time spent in facility visit, or cost of getting the needed health care service or acquiring family planning commodities [28, 29].

Though various factors were discovered to impact the uptake of DMPA-SC/SI by the study participants, there were significant differences in the motivational and enabling factors that influenced usage. Understanding the benefits of contraceptive use, sensitization/awareness creation, lack of adverse effects, financial hardships, and accessibility to contraceptive services, whether geographical or financial, was found to have a significant impact on DMPA-SC/SI contraceptive uptake. Several other reasons were identified to promote or influence the use of DMPA-SC/SI contraceptive methods by the study participants. This study's findings suggest that efforts to promote healthy interpregnancy intervals are needed to reduce negative child health outcomes [30].

Furthermore, healthcare stakeholders would find the study's findings fascinating and useful as a foundation for policy design and implementation. Under normal situations, there are factors that have been identified to be major contributors to the use of contraceptives in Nigeria. They include the type of health facility within a location, the geographical environment (urban or rural), and the cultural norms and beliefs of the geopolitical zone the individual comes from or lives in. Urban dwellers are more conscious of their reproductive health life and fertility rate than their counterparts in rural communities. Contraceptive use is generally poor in Nigeria, especially in the northern part of the country and other rural areas, where only 11 - 13% of women were reportedly using at least one modern contraceptive in 2010 [31]. This low use of contraceptive may be part of the reason there are high fertility rates in most rural communities, and this contributes to high infant mortality as well as maternal mortality and morbidity in Nigeria [31]. However, as have noted earlier, the high rate of DMPA-SC use observed in this study from the north-central zone of the country compared to the south western zone could be attributed to the effort of aggressive reproductive and family health campaigns that focus more on the northern part of the country. The age, marital status, occupation, whether respondents is rural or urban dwellers, their State of residence, geopolitical zone, parity, and number of living children were significant variables in the uptake of the DMPA-SC/SI contraceptive method.

In the typical African setting, women are usually dependent on their male partners or husbands for money and other resources required running the home. Contraceptives pose an extra cost in addition to the cost of housekeeping. Hence women whose partners agree to the use of contraceptives are likely to have their spouse's support monetary wise compared to those whose partner's decisions do not influence their use of contraceptives [5, 32]. The best decisions about family planning are those that people make for themselves based on accurate information and a range of contraceptive options. When one decides whether to use contraception or not without any interference, she can safely and effectively use the product and derive the benefit that accrued to it [32, 33]. Therefore, it is the responsibility of health care providers to help people make informed contraceptive choices. It has been reported that women whose use of contraceptives was influenced by informed choice and exposure to messages on contraception were more likely to use contraceptives. Exposure to messages on contraception serves as an avenue for individuals to know the various methods of contraception and gives them an opportunity to choose from the array of contraceptives available based on their preference. If there are insufficient or lack of information on proper use of contraceptive methods, it may result in low uptake of contraception, which has been the case in many African societies.

The six months secondary data from the HMIS records of trends in uptake showed the contribution of new users of DMPA-SC to the total new users of other family planning methods in the 4 states was 21.2% (table1b of trends). This implies that 1 in 5 women of reproductive age will choose DMPA-SC/SI as a family planning method among the broader family planning method mix. Among the 4 study sites, Niger state has the highest contribution of new users of DMPA-SC (32.7%) among the total new users of family planning methods in the State followed by Plateau state (29.7%), Oyo state (21.6%), and Lagos state (11.4%).

Conclusion and Policy Recommendations

This study noted that a high proportion of the women have heard of DMPA-SC and that slightly below average (46.5%) reported that they had self-injected themselves before. A higher proportion of the respondents had DMPA-SC/SI contraceptive uptake compared

to national estimates. The major reasons why respondents use DMPA-SC/SI family planning were its easily accessibility, affordability, and one being able to self-administer it. The sub-analysis based on the use of logistic regression showed that mothers who were between the age of 20 – 29 years and those without education and secondary education were less likely to report the use of DMPA-SC/SI contraceptive and that being an artisan, civil servant, and a trader confers an advantage in DMPA-SC/SI uptake while residing in rural parts of the country confers disadvantage in DMPA-SC/SI contraceptive uptake. Fears were associated with the use of self-injectable DMPA-SC, and common among the fears were phobias associated with self-injection, fear of side effects, and fear of self-injury. Intervention programmes with the intent to improve coverage of contraceptives should use health education programme, awareness, and public sensitization to encourage women to use contraceptives. Efforts should focus more on poor rural women with limited opportunities for education.

Interestingly Community-level service delivery of DMPA-SC/SI was successful in sustaining FP uptake among women of reproductive age during the COVID-19 pandemic. There was a 70.8% increase in Self Injection (SI) administered by CORPS between the Pre COVID and the peak of COVID-19. In conclusion, this study on DMPA-SC and self-injection has demonstrated that the use of self-Injection has the potential to be the game changer and paradigm shift for improving, bridging, and sustaining the FP Contraceptive Prevalence (CPR) in the Nigerian FP landscape.

Acknowledgement

The author appreciates the approval of the Association for Reproductive and Family Health (ARFH) for allowing this study to be conducted in four of the ten RASUDiN project states of DMPA-SC and Self Injection Implementation. The contribution of all stakeholders and study participants in the four states is sincerely acknowledged.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the National Health Research Ethics Committee, Nigeria, for PhD research study in the four study sites.

Consent for Publication

No consent to publish was needed for this study as the author did not use any details, images, or videos related to individual participants.

Conflict of Interest

There was no conflicting interest in this study.

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