



Evaluation of the participation of community pharmacists in family planning services: A nonrandomized controlled trial

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ABSTRACT

Background: Community pharmacists (CPs) are increasingly participating in family planning services (FPS) in different health systems but the underpinnings of effectiveness in these services remain poorly understood and rarely documented.

Objectives This study examined knowledge, attitude and practice (KAP) of FPS among CPs and assessed the impact of an intervention on these indices.

Methods: A nonrandomized controlled trial was conducted using two equivalent groups ($n = 61$ each) of randomly-selected CPs in Southwestern Nigeria. Intervention comprised a training package for the intervention group followed by a 2-month monitoring of participants' practices. Pre- and post-intervention data were collected using validated questionnaire and analyzed using appropriate descriptive (frequency, percentages, mean) and inferential statistics including chi-square test to examine association between categorical variables, and *t*-test to compare differences between means at alpha level of 0.05 for all statistical tests.

Results: Pre-intervention knowledge of FPS in both groups was poor with no significant difference in their mean scores [$t(120) = 0.34; p = 0.74$]. Post-intervention, 79% of intervention group demonstrated good knowledge (controls remained poor), with significant difference in mean knowledge scores across the groups [$t(120) = -33.59; p < 0.05^*$]. Pre-intervention attitude in both control (97%) and intervention group (95%) were negative. Post-intervention, 93% of intervention group exhibited positive attitude (controls remained negative), Mean difference 72.8 [$t(120) = -77.21; p < 0.05^*$]. Preintervention practice scores were poor in control (92%) and intervention (90%) groups. Post-intervention, 83.6% of intervention group had good practice scores (controls remained poor), Mean difference 48.9 [$t(120) = -31.0; p < 0.05^*$].

Conclusion: Pre-intervention scores for KAP of FPS were poor among respondents. All the indices were significantly improved by the study intervention. Policy reforms are recommended to train CPs in the provision of FPS for enhanced reproductive health services.

1. Introduction

Family planning (FP) refers to the use of contraceptive methods by couples in a deliberate effort to limit or space the number of children they want to have.¹ It empowers individuals and couples to plan and attain how many children they want to have, when to have them, how much time interval between their births, and in some cases the choice to have no children at all.^{2,3} Many scholars do not consider abortion as an element of FP, but having access to contraception significantly reduces the perceived need for abortion.⁴ Family planning services (FPS) encompass a comprehensive set of activities in fertility management including prevention of unplanned pregnancies with its negative health and economic consequences.⁵ The prevalence of unplanned pregnancies in Nigeria is about 10.8%.⁶ Unmarried teenagers and young married couples building a career while delaying childbearing may use contraception but are not necessarily planning a family.⁷ Beyond contraception, FPS include sex education, pre-conception counselling and management, prevention and management of sexually transmitted

infections, and infertility management.

The projected population figure for Nigeria in 2022 was 216,783,381 with 108,432,971 (50%) as females, whose average age at marriage was 21.2 years.⁸ In Nigeria as at 2020, about 1047 women died out of every 100,000 live births due to pregnancy-related causes, while by 2021, 102 out of every 1000 girls aged 15–19 gave birth.⁹ Nigeria's contraceptive prevalence rate (CPR) at 17% stands among the lowest in Africa.¹⁰ The country has a total fertility rate (TFR- representing live births per woman) of 5.24. This TFR is the second highest in the world (Angola (5.35) being the highest) as at 2021.¹¹ Despite the prevalence of modern contraceptive use in sub-Saharan Africa, accessibility of most contraception methods among the Nigerian populace is still limited.¹² Low CPR has long been associated with high rate of unintended pregnancies,¹³ and illegal / unsafe abortions.¹⁴ A recent study found a one-year abortion incidence of 29.0 per 1000 women (aged 15–49) in Nigeria, with highest incidence among women in their 20s, women with secondary education or higher, and women living in urban areas.¹⁵ Evidence suggests that 56% of unintended pregnancies in Nigeria were

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resolved through abortions with 212,000 women treated for complications of unsafe abortion while 285,000 experienced complications but did not receive the treatments they needed.¹⁶ In 2014, the Nigeria Federal Ministry of Health reported that lack of awareness of the types, side effects of FP methods, misperceptions about unwanted and desired effects and a lack of understanding of the health and economic advantages of using FP methods were factors negatively impacting FP service delivery.¹⁷ This scenario underscores the need for more trained experts such as community-based pharmacists to be involved in the delivery of FPS in Nigeria.

Community pharmacists (CPs) are perceived as the most accessible healthcare providers due to the easy access by clients including women of reproductive age in under-served communities.¹⁸ As their roles evolve from medicines dispensing to more-engaging patient-focused services, it is important that they demonstrate adequate knowledge and the right attitude towards expanding the range of FPS accessible to their clients.¹⁹ There is evidence in many health systems that CPs provide various FPS but the underpinnings of effectiveness in these services remain poorly understood and rarely documented.²⁰ With fast-changing demographic configurations, it is essential to understand how CPs can contribute more effectively to improved reproductive health in their communities. However, there is limited information on the current stock of knowledge, attitude and skills of CPs in this regard.^{20,21} Such information will help pharmacy educators enhance the training curriculum of pharmacy undergraduates as well as the content of the mandatory professional development programmes for practicing pharmacists.²² It will also provide guide for regulators to ensure reliable and high quality FPS to clients via community pharmacies.²³

Evidence shows that CPs provide over-the-counter FP supplies such as emergency contraceptives, oral pills, and condoms.²⁴ However, the FP needs of most clients include a wide range of professional services beyond these products. A recent scoping review established the feasibility, high user-acceptability, and wide reach of CP-led FPS but identified insufficient data on the participation of the CPs in services such as long-lasting reversible contraception, prescription and education on reproductive health, integration into multidisciplinary teams and coordination of care.²⁵ There is also a dearth of information in most developing health systems regarding product availability and accessibility, non-stigmatizing spaces and services, accuracy of information, and availability of clinical services in community pharmacy settings.^{20,26}

This study examined the knowledge, attitude and practice (KAP) of FPS and assessed the impact of a hands-on training intervention and follow-up on these indices among CPs in Nigeria.

2. Materials and methods

2.1. Study design

This study adopted a trial design involving two equivalent (control and intervention) groups of CPs whose knowledge, attitude, and practice scores were measured and compared pre- and post-intervention. The study was conducted in four (4) stages (Table 1):

2.2. Study area and setting

The study was conducted in Osun and Ondo States in Southwestern Nigeria, a geopolitical zone with a total population of about 47 million according to National Population Commission figs.⁸ Community pharmacists in these two contiguous States were recruited for the study. These States were purposively selected in view of their common cultural, linguistic, and socio-economic indices as these have been shown to minimize selection bias in community-based studies.²⁷ Recruiting participants from these States was also beneficial in terms of enhanced feasibility of data collection. Community Pharmacies in the selected States constituted the study sites. Given the low CPR of 17.7% in Ondo State (the lowest in the zone, while Osun State has CPR of 27%),^{2,28}

Table 1
Stages of the study implementation with activity timelines.

Stage	Activities
Stage 1: Baseline Assessment	Pre-intervention assessment of current knowledge, attitude and practice of family planning services among participants using validated, structured questionnaires for data collection. Selected, consenting participants were surveyed at the side-lines of their technical group's monthly meetings (being the last Wednesdays of every month) at Osogbo (Osun State) and Akure (Ondo State)
Stage 2: Intervention	Development and delivery of training modules to participants aimed at improving participants' knowledge and effectiveness in delivery of FPS to clients. Specifically, participants were trained on administration of Depot Medroxyprogesterone Acetate - Subcutaneous (DMPA-SC™); a low-dose, easy-to-use, long-term injectable female contraceptive requiring limited/no hospital visits, taken every 13 weeks and with reported 99% effectiveness rate (PATH, 2017). DMPA-SC™ combines the drug and needle in the prefilled BD Uniject™ injection system. The four major focus areas of the training (deemed appropriate for the study objectives) include: <i>Knowledge of FPS:</i> Training about FP methods and how to determine and recommend appropriate methods to clients. <i>Counselling Capability:</i> Improving CPs' capability for giving instructions (to clients) for use, special warnings and precautions for use, possible side effects, what to do when discontinuation is desired and steps to staying on track. <i>Referral System:</i> Improving CPs' capacity for knowing when and how to refer patients <i>Documentation:</i> Improving CP's documentation skills; provision of logistics management information system (LMIS) tools for documentation. The one-day intensive group training was delivered at Akure Ondo State (on Wednesday 29th June 2022), by family planning experts from the Department of Family Health, Ministry of Health, Ondo State, and Family Planning Unit, Ondo State Primary Health Care Development Agency. The training modules comprised in-person talks, audio-visual displays, mock demonstrations, and graphic inscriptions on banners, followed by role-play sessions.
Stage 3: Follow-up	Supply of adequate stock of DMPA-SC™ and LMIS forms; A 2-month long monitoring of participants' service provision by the researchers to ensure adherence to instructions and possible referrals of clients to appropriate healthcare facilities. Weekly telephone calls (by researchers) and online submission of scanned copies of filled LMIS forms (by participants) were key aspects of the follow-up.
Stage 4: Endline Assessment	Post-intervention evaluation of the CPs' knowledge, attitude and practice of family planning services using the same validated questionnaires originally administered pre-intervention (on Wednesday 31st August 2022)

Ondo State was used for the intervention (treatment) group while Osun State was used as the control State. Only registered, full-time, consenting pharmacists were recruited. Interns and part-time pharmacists were excluded (as they may not be available for the entire duration of the study). Same number of participants was selected per State to improve statistical efficiency of the study.

2.3. Sample size and sampling techniques

Out of a population of 65 and 93 registered CPs in Ondo and Osun States respectively (as at December 31, 2021) giving a total of 158, the Kirkwood and Sterne²⁹ formula for independent samples comparing two proportions was used to calculate the sample size of 102. A 20% overage was added for possible attritions, making 122 (Appendix 1). Simple random sampling technique was employed using computer-generated random numbers to select actual participants.

2.4. Study variables

Variables of interest were respondents' scores of knowledge, attitude, and practice of FPS while impact of the training intervention was assessed by comparing mean scores of these variables pre- and post-intervention.

2.5. Development and validation of survey instrument

The structured questionnaire used for primary data collection was adapted from the World Health Organisation template³⁰ which has been used in a related study by the Society for Family Health.³¹ The instrument was designed in four sections:

Section A comprised 10 items that sought information ranging from demographic variables, employment status to previous training on FPS.

Section B contained 14 items presented in multiple choice format (with only one correct option) that sought information on respondents' knowledge of FPS generally and DMPA-SC specifically.

Section C comprised 10 attitude items measured on a 4-point Likert scale ranging from "Strongly Agree" (Agree to every extent) to "Strongly Disagree" (disagree completely). Some of the statements under the attitude section of the questionnaire were negatively worded such that agreements to them were indicative of negative attitude while disagreement meant positive attitude.

Section D comprised 18 items presented in a "Yes" or "No" format that sought information on the current practice of FPS by respondents.

The draft questionnaire was scrutinized by the research supervisor and another senior faculty member whose expert contributions improved appropriateness of content, comprehensibility, clarity and identified omissions in a bid to ensure face and content validity. Then a test-retest validation survey was conducted 14 days apart, using 12 CPs from Oyo State, outside the study area. The Cronbach's alpha coefficient was computed from their responses. All sections of the questionnaire were found to have high reliability coefficients ($\alpha > 0.70$) implying sufficient consistency and reproducibility of results.

2.6. Ethical considerations

Ethical clearance for the study was obtained from the Research and Ethical Committee of the Ministry of Health, Ondo State OSHREC (19/4/2021/318). All respondents gave their written informed consent before participation in the study.

2.7. Data collection and analysis

The same trained research assistants were used to administer questionnaires on selected CPs in the two States both pre- and post-intervention. The researchers worked with the resource persons (experts) to deliver the training intervention at a central location where all selected participants were invited. The research team conducted both the pre- and post-intervention surveys and the follow-up data collection. This eliminated likely cases of missing data and loss to follow up.

Data from filled questionnaires were analyzed using the Statistical Package for the Social Sciences version 26.0 for Windows software at 5% level of significance. A normality test was conducted which showed that KAP scores of respondents were normally distributed (Appendix 2). The categorization of the scores was adapted from the original Bloom's cut-off points for Likert scales³² as earlier used in a similar report.³³ Frequencies and percentages were used to summarize sociodemographic data of respondents. Each correct response to knowledge and practice items was scored 1 while wrong answers were scored 0. Attitude items were sequentially scored 1 to 4 corresponding to "strongly disagree" to "strongly agree" with a cut-off score "70% and above" as indicative of positive attitude while <70% indicates negative attitude to FPS. Agreement with a correct statement (same as disagreement with an incorrect statement) was taken as depicting a positive attitude, and vice

versa. Knowledge scores were categorized as good (70% and above), fair (50%–69%), or poor (< 50%); while practice scores were categorized as either good (70% and above) or poor (<70%).

Chi-square test was used to examine association of demographic characteristics of the 2 groups. Paired *t*-test and independent sample *t*-test were used to compare means within and across groups respectively in order to ascertain the effect of the training intervention on CPs' knowledge, attitude, and practice scores at $p < 0.05$.

3. Results

All 122 CPs ($n = 61$ per group) who were selected for this study actually participated in pre-intervention, follow-up, and post-intervention activities giving a response rate of 100%.

3.1. Socio-demographic characteristics of respondents

Table 2 contains demographic characteristics of respondents and shows that there were more males in both controls (56%) and intervention (71%) cohorts with a significant association ($p < 0.050$) between ages of respondents in control and intervention groups. Most respondents in both control (84%) and intervention (79%) had no postgraduate qualifications. All the controls were married as was 85% of the intervention group. As at the time of the survey, 33% of the controls and 57% of the intervention group were not using family planning products themselves. A fairly equal proportion of controls (33%) and intervention group (34%) had previous training on FPS but none within the 8 weeks prior to the study.

3.2. Comparison of pre- and post- intervention knowledge of FPS by respondents

Pre-intervention knowledge scores among controls were 80%, 13%, and 7% respectively for poor, fair, and good knowledge of FPS; while intervention group had 85%, 8%, and 7% respectively. However post-intervention, the controls had 80%, 15%, and 5% respectively of poor, fair and good knowledge which were not significantly different from pre-intervention scores. Among the intervention group, the post-intervention knowledge scores were 3%, 18%, and 79% respectively for poor, fair and good knowledge, showing significant improvements.

Table 3 presents the comparison of means of pre- and post-intervention knowledge scores within and across the two groups. Pre-intervention, the control and intervention groups did not differ significantly in mean knowledge scores. However, post-intervention, there was a significant difference in the mean knowledge scores across the groups [$t(120) = -33.59; p < 0.05^*$] showing the effectiveness of the intervention. Within the groups, the controls did not achieve significant improvements in knowledge scores pre- and post-intervention; means difference = 5.4 [$t(60) = -1.44; p = 0.502$], unlike the intervention group with mean difference of 53.2 [$t(60) = -40.60; p < 0.05^*$]. The improved post-intervention knowledge score of the intervention group was driven by majority of them correctly acknowledging that the client seeking contraceptive method was the most appropriate person to select a contraceptive method (95.1%); that effectiveness was the most important characteristic of any FPS for clients (88.5%); that clients should be permitted to handle FP samples; that DMPA-SC was administered only subcutaneously (97.7%); 13 weeks apart (85.2%); only to clients 18 years and above (85.2%); and even during breastfeeding (86.9%).

3.3. Comparison of pre- and post- intervention attitude of respondents towards FPS

Table 4 shows the comparison of mean pre- and post-intervention attitude scores of respondents measured using 10-item statements on a 4-point Likert scale. Pre-intervention, most respondents in both control

Table 2
Groups equivalent test of socio-demographic characteristics of CPs in both groups.

Characteristics		Control N (%)	Intervention N (%)	χ^2	p-value
Gender	Male	34	43(70.5)	1.76	0.19
	Female	(55.7)	18(29.5)		
Age		27		8.30	0.04*
	<35	2(3.3)	9 (14.8)		
	35–44	15	19(31.1)		
	45–54	(24.6)	21(34.4)		
	55+	29	12(19.7)		
Education Background	Graduate	51	48(78.7)	0.48	0.49
	Postgraduate	(83.6)	13(21.3)		
Religion	Christian	20	14(23.0)	1.47	0.23
	Islam	(32.8)	47(77.0)		
Marital Status	Single	0(0.0)	8(13.1)	9.72	0.08
	Married	61	52(85.2)		
	Widowed	(100.0)	1(1.6)		
Number of children ever born	None	3(4.90)	10(16.5)	4.69	0.10
	1–3	28	28(45.9)		
	4+	(45.9)	23(37.7)		
Do you currently use FP	Yes	41	26(42.6)	3.32	0.07
	No	(67.2)	35(57.4)		
What is your position at your pharmacy	Decline to indicate	0(0.0)	0(0.0)	2.15	0.34
	Superintendent	55	51(83.6)		
	Locum	(90.2)	6(9.8)		
	Working fulltime but not superintendent	2(3.3)	4(6.6)		
Other healthcare professional in your pharmacy	Nurse	7(11.5)	6(9.8)	4.82	0.08
	Pharmacy technician	12	21(34.3)		
	Community Health Worker	(19.7)	7(11.5)		
	None	7(11.5)	27(44.3)		
Year of work experience	<5	20	9(14.5)	5.86	0.07
	6–10	12	12(19.7)		
	11–20	(19.7)	16(26.2)		
	21–30	24	17(27.9)		
	Above 30	(39.3)	7(11.5)		
Have you ever been trained on FPS	Yes	20	21(34.4)	0.32	0.57
	No	(32.8)	40(65.6)		

* Significant at p < 0.05 level.

Table 3
Comparison of pre- and post-intervention knowledge of FPS within and across groups of respondents.

Groups	Intervention	Paired t-test Comparing Means Within Groups					Independent t-test Comparing Means Across Groups				
		Mean	SD	t	df	p	Mean	SD	t	df	p
Control	Pre	37.60	8.76	-1.44	60	0.50	34.60	8.76	0.34	120	0.74
	Post	40.03	9.89				34.02	10.26			
Intervention	Pre	34.02	10.26	-40.60	60	0.00*	37.60	9.89	-33.59	120	0.00*
	Post	87.22	4.75				87.22	4.75			

* Significant at p < 0.05 level.

(97%) and intervention (95%) had overall negative attitudes towards FPS (Mean = 24.2, S.D. = 7.9; Mean = 22.9, S.D. = 5.7 respectively) [t (120) = 0.96; p = 0.338]. Post-intervention, there was no significant change in attitude among the controls while 93% of intervention group exhibited a positive attitude (Mean = 23.5.0; S-D = 7.1; Mean = 96.3; S-D = 1.9, respectively) with mean difference of 72.8 [t (120) = -77.21; p < 0.05*]. Within the intervention group, the training improved attitudes with a mean difference of 73.4 [t (60) = -94.2; p < 0.05*]. (See Table 5.)

3.4. Comparison of pre- and post- intervention practice of FPS by respondents

Table 4 presents a comparison of mean pre- and post- intervention practice scores of respondents. Pre-intervention, majority of respondents in both control (92%) and intervention (90%) groups had poor practice of FPS (Mean = 30.7, S.D. = 8.7; Mean = 28.5; S.D. = 7.9 respectively) [t (120) = 0.1.46; p = 0.15]. Post-intervention, there was no significant improvement in practice among the controls while 83.6% of the intervention group had good practice (Mean = 38.0, S.D. = 11.1; Mean = 86.9, S.D. = 5.3, respectively) with mean difference of 48.9 [t (120) = -31.0; p < 0.05*]. Within the intervention group, the training improved practice scores with a mean difference of 58.4 [t (60) = -47.4; p < 0.05*].

4. Discussion

As CPs embrace more patient-centred roles in their professional practice, this study revealed that the knowledge, attitude and practice of FPS are currently inadequate to meet the reproductive health needs of the communities. The effectiveness of the training intervention in significantly improving respondents' scores in all three dimensions of interest demonstrates the feasibility of improving access to FPS through the community pharmacy conduit. The 100% response rate achieved in this study shows the readiness of CPs to play more central roles in the provision of FPS. This high response rate may be understood in terms of the social exchange theory given the favorable cost-reward balance as the pharmacists perceived participation in the study as beneficial to their practice and were willing to invest their times and efforts to participate.³⁴ The zero loss to follow-up strengthens the validity of the findings.

This study found that over 65% of the respondents in both groups had no prior training in FPS. The impact of this lack of relevant training was apparent in their overall poor knowledge of FPS. This trend strengthens evidence from previous local studies in both public³⁵ and private³⁴ sectors of Nigeria health system. Additional findings from other studies have shown that health workers generally require oriented training in order to improve both the quality and uptake of family planning services, with those in the private sector (including CPs) less likely to have opportunities to be trained on new developments in family planning provision compared to their counterparts in public service.³⁶

The World Health Organisation (WHO) considers knowledge and attitude of health workers a critical component of the framework to ensure safe and effective provision of FPS to communities. The WHO published a set of recommendations on which categories of health

Table 4

Comparison of pre- and post-intervention attitude towards FPS within and across groups of respondents.

Groups	Intervention	Paired t-test Comparing Means Within Groups					Independent t-test Comparing Means Across Groups				
		Mean	SD	t	df	p	Mean	SD	t	df	p
Control	Pre	24.17	7.91	0.51	60	0.61	24.17	7.91	0.96	120	0.34
	Post	23.47	7.10				22.97	5.67			
Intervention	Pre	22.97	5.70	-94.20	60	0.00*	23.47	7.10	-77.22	120	0.00*
	Post	96.33	1.98				96.33	1.98			

* Significant at $p < 0.05$ level.**Table 5**

Comparison of pre- and post-intervention practice of FPS within and across groups of respondents.

Groups	Intervention	Paired t-test Comparing Means Within Groups					Independent t-test Comparing Means Across Groups				
		Mean	SD	t	df	p	Mean	SD	t	df	p
Control	Pre	33.98	8.76	2.05	60	0.06	30.66	8.77	1.46	120	0.15
	Post	37.98	11.16				28.46	7.89			
Intervention	Pre	28.46	7.89	-47.38	60	0.00*	33.98	11.12	-31.04	120	0.00*
	Post	86.99	5.34				86.99	5.34			

* Significant at $p < 0.05$ level.

workers can provide FPS and recommended a framework for their training and education to improve service delivery.³⁷ Community-based pharmacists are among those who can safely provide FPS and the training on DMPA-SC is clearly indicated in the WHO framework. However, if the pharmacist has poor knowledge and negative attitude towards FPS as seen in the baseline survey, it becomes difficult to promote widespread acceptance and use of these services among the population. This finding is not different from those seen in similar studies in Ethiopia³⁹ and Pakistan³⁸ and represents important setback to attaining the global target of reducing maternal mortality ratio to <70 per 100,000 live births.³⁷

Socio-cultural norms and religious beliefs have long been identified as major barriers to uptake of FPs in developing countries and this has significantly limited progress towards achieving targets for maternal and child health globally.^{6,14} Community pharmacists, just like the general population, live within the established socio-cultural systems. Despite their training as pharmacists, this study found predominantly negative attitudinal biases among participants in both control and intervention groups. With all the pharmacists subscribing to either Islam or Christianity it may be interesting to further explore the possibilities of a nexus between their religious beliefs and their attitudes and practice of FPS. Negative attitudes towards uptake of FPS by adolescents and unmarried respondents may be connected with the social belief that adolescent and young persons are immature to have sex. As a cultural norm in the study area, unmarried women seeking FP services may be socially stigmatized as being promiscuous and morally irresponsible, while CPs who provide FPS may be perceived as encouraging promiscuity.^{39,40} Even in Saudi Arabia, where CPs were permitted as a matter of national policy to provide FP services, cultural acceptability remained a significant barrier, besides the fact that one-fifth of CPs themselves were not favourably disposed to providing counselling to their clients.^{40,41} Understandably, religion and culture are strong predictors of acceptance of FP in the general population; the level of attitudinal inhibition among CPs in this study at pre-intervention was a major concern. However, post intervention response among the community pharmacists was reassuring because results from the study showed that correct knowledge transfer dispelled negative attitudes towards FPS provision.

Practice remains the most objectively verifiable means of validating knowledge gains and translation. This study assessed and compared the CPs' pre- and post-intervention practice of FPS through improvements in counselling skills, adherence to standards through appropriate case referrals and ability to administer an advanced short term contraceptive (hormonal injectable). As earlier reported for Nigeria and Kenya,⁴² the

pre-intervention practice was poor with community pharmacists merely dispensing over-the-counter emergency contraceptives, combined oral contraceptives and condoms. The report found the only 41% of Nigeria CPs and <50% of their Kenyan counterparts had ever been trained on FPS, while only 33% (Nigeria) and 50% (Kenya) had promotional materials as job aids leading to poor practice. Meanwhile, knowledge, job aids, and hands-on- practical training have been established as critical success factors for effective FP practice among CPs, as seen in a recent pilot study in three counties in Kenya which was implemented as an innovative public-private partnership intervention.¹⁹ However, this study's intervention improved practice scores in all three dimensions of counselling, referrals, and providing the specified short term contraceptive method. This finding suggests a potential for significant improvements in overall reproductive health and family planning outcomes if CPs are trained, equipped and incentivized to provide FPS, given their widespread availability, convenient location and easy accessibility by members of the community.

Further interrogation of the effects of this study's intervention within the intervention group reveals that the size of increase in scores, though significant, was relatively least in knowledge (mean 53.2) and highest in attitude (mean 73.4). This seems to suggest that a one-off training may succeed in improving knowledge base of providers but a more systematic, curriculum-based approach will be required to drive sustainable improvement in the knowledge-base of pharmacists in specific clinical skills areas needed to practice (mean increase 58.4) as seen in other health systems.⁷ The enthusiasm to benefit from a robust training opportunity without paying a fee may have contributed to the relatively higher increase in respondents' attitude scores but it is not known how much this scenario can be sustained if respondents were to pay for such training.

Until recently, the role of CPs had been limited to dispensing of drugs. This role is fast changing as health system managers identify the increasing need for greater inclusion of CPs and other relevant health-care workers in health care delivery to under-served populations in rural or difficult to reach areas.^{12,37} The effectiveness of this study's intervention affirms earlier reports that optimizing the expanded roles of CPs will require efforts to improve their knowledge, skills, mental attitude, and competence in treatment guidelines and drug pharmacology.^{10,17,42} The recent transition of the protocols for undergraduate training of pharmacists to the Doctor of Pharmacy (Pharm.D.) curriculum in Nigeria holds significant promise for improved clinical skills of pharmacists and signals better days ahead for participation of CPs in FPS. This study's training intervention significantly improved participants' knowledge, attitude and practice of FPS which demonstrates that

pharmacists are lifelong learners who can be leveraged to improve access to quality reproductive health services. While CPs are easily accessible and conveniently located, empowering them to provide a variety of FPS without requisite training carries a high risk to the community, hence the need for targeted training, provision of support tools and enabling policy environment.

Adherence to treatment standards is fundamental to improving quality of care. This study trained CPs on key indicators for referral of FP cases using national guideline for FP service provision, in addition to providing tools for practice at pharmacies. The inclusion of injectable hormonal contraceptives in the practice of CPs in this study is an advancement over what is obtainable in some other studies,¹⁰ where FP roles for CPs had been limited to counselling of clients, over-the-counter dispensing or prescription of emergency contraceptives, oral contraceptive and condoms.⁴³ With inadequate numbers of trained workforce, the health systems of many low- and medium- income countries will benefit significantly from training, equipping, and authorizing CPs to participate more effectively in patient-centred services such as FPS.

4.1. Limitations of the study and suggestions for further studies

The effectiveness of FPS by CPs will be better assessed from the perspective of recipients of FPS (customers). The inability to examine customer perspectives in this study is considered an important limitation. Moreover, in this study, the absence of random assignment of participants to the two arms means that unknown confounders may be present with the risk of potential bias which may affect the generalizability of our findings. This study did not explore the factors affecting knowledge, attitude and practice of FPS among community pharmacists. This would have enabled evidence-based recommendations on possible practice reforms. Moreover, the sample size drawn (equally) from both States presents limitations in the generalizability of the findings.

5. Conclusion

Respondents' pre-intervention scores of knowledge, attitude and practice of FPS were poor, though the community pharmacists were ready and willing to be trained and to participate in FPS. The training intervention significantly improved all three dimensions of interest. Pharmacists' training curriculum should be reviewed, while policy reforms should be put in place to empower CPs to participate more effectively in FPS. This will help fill capacity gaps and improve overall reproductive health in the study area.

Disclosures

We confirm that this work is original and has not been published, nor is it currently under consideration for publication elsewhere.

CRediT authorship contribution statement

Folukemi Bosede Aladenola: Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization, Writing – review & editing. **Kanayo Patrick Osemene:** Validation, Supervision, Project administration, Methodology, Conceptualization, Writing – review & editing. **Romanus Maduabuchi Ihekoronye:** Validation, Supervision, Methodology, Formal analysis, Data curation, Conceptualization, Writing – review & editing, Writing – original draft.

Declaration of competing interest

All three authors declare no competing interests in this study.

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Data availability

Relevant data and protocols for this study may be accessed upon reasonable request to the corresponding author.

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Appendix A. Supplementary data

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