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Multipurpose prevention technologies: Determination of an interest in its use for STI and contraception by Nigerian women.

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ABSTRACT

Introduction: Multipurpose preventive technologies (MPTs) have the potential to address sexual and reproductive health requirements by concurrently protecting against HIV and unplanned pregnancy in a single product. The recognized lack of provision and knowledge of MPTs and contraceptives in general among Nigerian women between the ages 15-49 plays a large role in the occurrence of unintended pregnancies, its concurrent mismanagement, and the contraction and inefficient handling of HIV and other STI's.

Method: An online cross-sectional survey was conducted using Google Forms® distributed to the prospective respondents via WhatsApp platform across all geopolitical zones in Nigeria. Sexually active women (n = 393) currently residing in Nigeria were enrolled into the study following informed consent. Interest in MPT's was evaluated using descriptive analysis with the sociodemographic characteristics of the participants as a factor.

Results: Only 36% of the women had heard of MPTs prior to the study however, 86% of them expressed interest in the use of technologies that will protect them from unintended pregnancies and STIs including HIV. Income category and prior knowledge of MPTs were the only factors significantly linked to interest in MPTs. Other sociodemographic factors did not have much bearing on the interest in MPTs.

Conclusion: Given the diversity of women's tastes and their evolving needs in terms of sexual and reproductive health throughout their lives, choice is crucial when it comes to the provision of HIV and pregnancy prevention products. This study shows that the majority of the sexually active women in Nigeria are interested in MPTs. Women who have had their desired number of children and sexually active unmarried women who are at risk of contraction of STIs are interested in MPTs. Affordable pricing is crucial in sparking interest in its use so the pricing should be within an affordable range, as the data shows that the majority of the women are middle-income earners.

1. INTRODUCTION

Globally, women face connected sexual and reproductive health (SRH) risks including human immunodeficiency virus (HIV) infection, other sexually transmitted infections (STIs) and unintended pregnancies (either mistimed or unwanted)[1,2]. Multipurpose prevention technologies (MPTs), also called combination or dual technologies[3] are designed to simultaneously protect against these combined risks in a unified delivery method [3]. At present, the most basic type of MPTs is represented by condoms. However, due to inconsistent condom use and women's limited ability to ensure their use, the current use of condoms contributes to high pregnancy rates, reaching 18 to 21 % annually. Therefore, the focus of MPT development is on creating products that women can control, aiming to reduce the need for negotiation with partners[4]. From the field of contraception and HIV prevention, gaining more alternatives for users enhances method adoption and

persistence overall, as well as population-level coverage and positive health effects. With a single product, multipurpose preventive technologies, MPTs, can target two or more of these health concerns by providing multidimensional prevention. The MPT pipeline has expanded, with a primary focus on combining hormonal contraceptive medications with anti-HIV medications to create a single therapy[5].

Unintended pregnancies have huge public health implications as they often result in induced abortions with attendant complications[6]. Other negative outcomes include late or no prenatal care-seeking behavior, induced abortions or social vices that expose the unborn foetuses to substances of abuse, and childhood mortality [7]. More so, it reflects challenges in contraceptive access and use, increased risk of physical abuse, and domestic violence, because the majority of the unintended pregnancies occur among adolescents and youth, who become susceptible to gender-based violence due to lack of empowerment[8–10].

Globally, of the about 210 million pregnancies that occur annually about 38% are unplanned and 22% are terminated and this is a known cause of maternal mortality [11]. Of the approximately 10.3 million cases of pregnancies in Nigeria, 24% were not planned. (i.e., unwanted, or not wanted in the next two years). Women with an unmet need for modern contraception accounted for 90% of all unintended pregnancies [12]. In 2017, the Nigerian government committed to achieving a modern contraceptive prevalence rate of 27% among all women aged 15–49, regardless of marital status, by 2020 [13,14]. The total contraceptive prevalence rate (CPR) for married women using both traditional and modern methods increased by 2 percentage points over the last five years, from 15% to 17% and the use of modern contraceptive methods among all women increased from 10% to 12% [15].

Nigeria has the second largest HIV epidemic in the world[1]. Although HIV prevalence among adults is much less (1.3%) than in other sub-Saharan African countries such as South Africa (19%) and Zambia (11.5%), the size of Nigeria's population means 1.8 million people were living with HIV in 2019[16,17] Unprotected heterosexual sex accounts for 80% of new HIV infections in Nigeria, with the majority of remaining HIV infections occurring in key affected populations such as sex workers[1]. In response to rates of HIV, the Food and Drug Administration (FDA) approved the anti-retroviral (ARV) combination Truvada for pre-exposure prophylaxis (PrEP) among men and women at high risk for HIV infection[1]. Despite attempts to improve HIV prophylaxis, knowledge of PrEP remains low [18,19]. Huge personal and community benefits will be derived when strategies to keep women free of HIV, other STIs, and unwanted pregnancies are properly deployed and monitored though most of the MPTs are still in development and require considerable investment of human and capital resources to get them out into the global market. There is an urgent need for technologies including multi-purpose technologies to meet the sexual reproductive health needs of women in sub-Saharan Africa. This study aims to document the knowledge, and interest of women in Nigeria in using multipurpose prevention technologies for pregnancy, HIV, and other STIs.

2. METHODS

An online nationwide cross-sectional study was conducted among women in Nigeria between November and December 2020. The target population was sexually active Nigerian women who are living in Nigeria and willing to participate. The data collection tool was developed using Google Forms®, an online mobile tool for developing customized surveys.

The questionnaire was developed by the authors based on currently available information about multiple prevention techniques around contraception and protection against sexually transmitted infections (STIs), including HIV. The tool was previewed and pretested using 15 female postgraduate students in the Faculty of Pharmacy, University of Lagos, who were subsequently not included in the final survey to assess the internal consistency of the tool and required modifications were carried out to accommodate the inconsistencies identified.

The survey tool consisted of two parts firstly, questions about the sociodemographic status of the respondents and secondly, those about the research questions on knowledge and interest in MPTs. Access to the survey was granted after willingness to participate was indicated. A sample size of 384 study participants was calculated for this study at a 95% level of confidence, 5% margin of error, and an estimated percentage at 50% (Raosoft Sample size calculator). The survey tool was deployed for one month on various WhatsApp platforms to which the researchers belonged, to enable women across different geopolitical zones to participate using a snowballing technique that encouraged those that had filled to recruit women around them. Weekly reminders were sent to get as many respondents as possible in the survey period. The data collected was checked for completeness and pre-analysed using the FormsApp® tool.

The entire database was then exported to Microsoft Excel and SPSS version 21.0 for further analysis. Descriptive

analysis (frequency, percentages, means, and mode) was employed to describe the participants with respect to their sociodemographic characteristics. Interest in MPTs was evaluated using chi-square for categorical outcomes with Fisher's Exact Test carried out as necessary. Results were presented as charts and tables. Ethical approval was obtained from the Health and Research Ethics Committee of the Lagos University Teaching Hospital, Idiaraba, Lagos by a Notice of Exemption with assigned number: ADM/DCST/HREC/APP/3958 dated 28th October 2020.

3. RESULTS

The respondents' sociodemographic characteristics are as shown in Table 1. The mean age was 35.51 years (SD ± 8.96). The largest proportion came from South-West, Nigeria (39.1%) followed by South -East constituting one quarter (25.2%). About half (50%) of the respondents were married or in a relationship, approximately 77% had earned a bachelor's degree or higher and over three – quarters (86%) were in a form of employment. Also, approximately 46% of the women had been pregnant.

Table 1: Respondents Socio-Demographic Characteristics

Variable	Options	Freq. (%) n = 393	Remarks
Age (years)	18 -29	210 (53.4)	Mean age ± SD
	30 -39	112 (28.5)	31.46 years ± 8.97
	40 -49	49 (12.5)	
	50 +	22 (5.6)	
Geo -political zone	North Central	44 (11.2)	
	North -East	22 (5.6)	
	North -West	12 (3.1)	
	South -East	99 (25.2)	
	South -South	60 (15.3)	
	South -West	156 (39.6)	
Marital Status	Single	184 (46.8)	
	Married/in a relationship	198 (50.4)	
	Separated / Divorced	11 (2.8)	
Education Level	Primary	2 (.5)	Informal
	Secondary	16 (4.1)	Informal
	V ocational school	4 (1.0)	Informal
	OND	50 (12.7)	Informal
	HND/BSc/BA-bachelors	241 (61.3)	Formal
	Masters	63 (16.0)	Formal
	Doctoral level	17 (4.3)	Formal
Employment status	Full time employment	204 (51.9)	

Table 2 below shows additional demographic characteristics of the respondents. It shows that over three – quarters (86%) were in one form of employment or the other with about 51% falling in the middle-income bracket. Approximately 46% of the women had been pregnant.

Table 2: Other socio-demographic characteristics of respondents

Variable	Option	Freq. (%)	Remarks
Employment type	Part time employment	58 (14.8)	
	Self -employed	77 (19.6)	
	Housewife	12 (3.1)	
	Student	42 (10.7)	
Occupation	Healthcare worker	188 (47.8)	
	Administrative work	38 (9.7)	
	Legal profession	11 (2.8)	
	Engineer/IT	11 (2.8)	
	Teacher/Education	47 (12.0)	
	Trader	52 (13.2)	
	Others	20 (5.1)	
	None	26 (6.6)	
Monthly Income	18,000	22 (5.6)	Low income
	18,000 – 30,000	33(8.4)	Low income
	30,000 – 60,000	64 (16.3)	Middle income
	60,000 – 100,000	62 (15.8)	Middle income
	100,000 – 200,000	75 (19.1)	Middle income
	200,000 – 500,000	57 (14.5)	High income
	500,000	11 (2.8)	High income
	Rather not say	69 (17.6)	
Have you ever been pregnant?	No	211 (53.7)	
	Yes	182 (46.3)	
Number of pregnancies	0-4	149 (37.9)	
	5-9	31 (7.9)	
	10 +	2 (.5)	
	Blank	211 (53.7)	
Number of children	0-4	174 (44.3)	
	5-9	8 (2.0)	
	Blank	211 (53.7)	

Figure 1A below shows that over one third (36%) of the women have heard about multipurpose prevention technologies (MPTs) and Figure 1B shows that well over three quarters (86%) expressed interest in using technologies that will protect them against pregnancy and STIs including HIV.

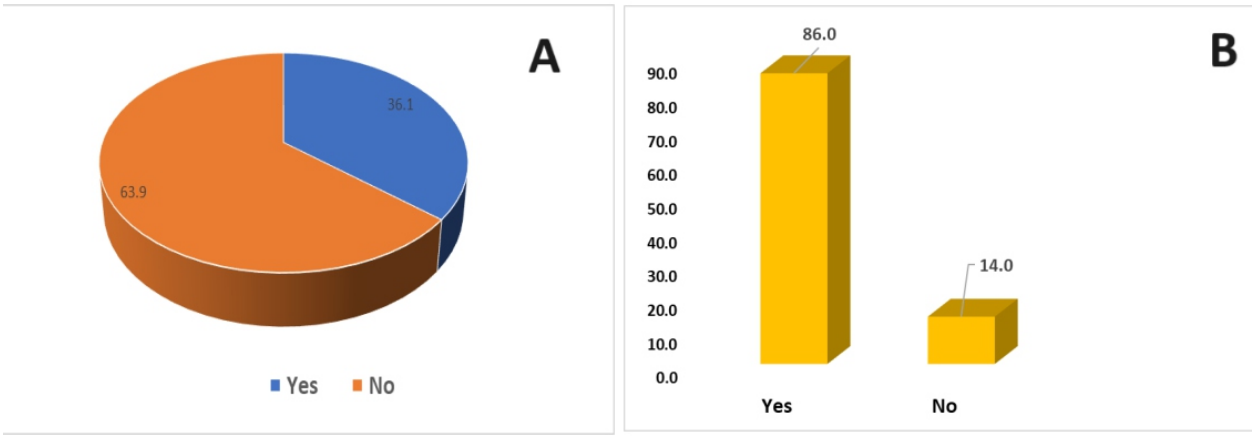

Figure 1A: Respondents that have heard about MPTs (B)Interest in MPT use

About 44% of those that know about MPTs correctly defined it. About 9% did not volunteer any definition rather saying they were unsure. About 67% indicated that an MPT must protect at least 99% of the time for them to use it with another 19% indicating that up to 50% protection is sufficient. About a quarter of the respondents are not willing to pay for MPTs while the remaining three quarters are willing to pay with some of them up to double what they currently pay for their birth control method. Over 83% of the respondents willing to pay would pay between one hundred naira and more than 5000 naira for a MPT (Table 3).

Table 3: Respondents' knowledge about and willingness to pay for MPTs

What is multipurpose prevention technologies (MPTs)	***Ways of preventing things lik e pregnancy and sexually transmitted infections (including HIV)***	62 (15.8)
	Different uses of contraception	
	Ways of preventing many things like chronic diseases, pregnancy and respiratory infections	58 (14.8)
	Unsure	9 (2.3)
		13 (3.3)
How well must a n MPT protect you for you to use it	Not likely to use even if >99% effective	38 (9.7)
	At least 99% effective	274 (69.7)
	At least 90% effective	57 (14.5)
	At least 75% effective	12 (3.1)
	At least 50% effective	8 (2.0)
	At least 10% effective	4 (1.0)

Willingness to pay for MPT	If available, I will be willing to pay for these products	194 (49.4)
	If available, I will only be willing to pay as much as I pay for my current birth control method	66 (16.8)
	If available, I will be willing to pay not more than double what i currently spend on my current birth control method	34 (8.7)
	If available, I will not be willing to pay for these products	99 (25.2)
Amount respondents are willing to pay for MPTs	Nothing	64 (16.3)
	N100 -<N500	74 (18.8)
	N500 -<1,000	106 (27.0)
	N1,000 -<5,000	107 (27.2)
	5,000 and above	42 (10.7)

Table 4 below shows that only income category and prior knowledge of MPT were significantly associated with interest in using it. Age group, marital status, geopolitical zone, occupational and educational status were not significantly associated with interest in use of MPTs.

Table 4: Association between Demographic factors and Interest in MPTs

Items	**Interest i n MPTs**		**Chi-Square value**	**p-value**
	No	**Yes**		
Age Group				
18-29	28	185	1.689	0.64
30-39	16	93		
40-49	6	43		
50 +	5	17		
Marital status				
Married	25	173	1.005	0.61
Single	29	155		
Separated/Divorced/Widowed	1	10		
Geopolitical zone				
South-West	33	134	5.789	3.79
South-East	13	87		
South-South	5	56		
North-West	2	9		
North-East	6	15		
North-Central	7	37		
Occupational status				
Full time	23	182	5.264	0.26

Part time	12	45		
Self employed	14	63		
Housewife	1	11		
Student	5	37		
Education Level				
Informal Education	11	62	0.086	0.71 $^{\alpha}$
Formal Education	44	276		
Monthly Income				
Low Income Earners	14	43	8.57	0.04*
Middle Income Earners	23	177		
High Income Earners	6	62		
Rather not say	12	56		
Ever been preg nant				
No	34	181	1.305	0.31 $^{\alpha}$
Yes	21	157		
Heard about MPT				
Yes	49	6	9.462	0.002 $^{\alpha}$*
No	233	105		

Key: $^{\alpha}$ Fisher's Exact Test; * Statistically significant

4. DISCUSSION

Literature has shown that women who are at risk for unintended pregnancies are also those who are at risk of acquiring STIs (including HIV), and vice-versa, thus a clear need exists for the development of technologies or methods that can offer dual or multiple protection in the sexual and reproductive health space [3]. To our knowledge, interest in MPTs has not previously been studied among a Nigerian population.

The study showed that about 86% of the women expressed interest in using these technologies. A similarly high average value of 93% for interest of women in using dual technologies was obtained in a study conducted in Uganda, Nigeria and South Africa [20], interest in dual protection technologies ranged from 69% to 79% among participants in two microbicide gel trials in South Africa. This interest is justified based on the high rates of unwanted pregnancies and reproductive tract infections (especially STIs and HIV) and the risk HIV poses to maternal mortality in sub-Saharan Africa including Nigeria [3].

The mean age was 31.46 years (SD ± 8.97). Median and modal ages were 29 years and 25 years respectively. Over 80% of the women in this study are between the ages of 18-39 which is the most sexually active stage prone to unwanted or mistimed pregnancies and infection with STIs including HIV [21,22]. About half of the respondents were married or in a relationship unlike in the study by El-Sahn *et al.* [12] where most of the women were single. The data for the Nigeria aspect of the study also showed that more of the respondents were single. Unlike in the study by El-Sahn *et al.* [12] most of the women had obtained at least undergraduate education and were in one form of employment or the other. About half of the women had incomes in the middle-income bracket and this is expected from their level of education and employment. Housewives and students as alternatives to work constitute less than 15% of the respondents. This result is supported in the El-Sahn *et al.*, [12] study for Nigeria also. On the average about 40% of the respondents in the El-Sahn *et al.* [12] study had had no children unlike in this study where about 54% of the respondents had no children.

Women that have children may be in no hurry to have more children so may not be interested in multiple protection methods. The influence of these sociodemographic characteristics on interest in use of multiple prevention technologies was however not significant except for income range (p-value=0.04). This could be due to the high influence of culture and tradition on contraceptive practices in the region.

Only about 14% of the respondents had heard about MPTs prior to this study and only 44% of them could correctly define the term. Much work needs to go into raising awareness of women in Nigeria and probably much of sub-Saharan Africa about these useful products to ensure good uptake that will assist in enhancing maternal and child health through access to sexual and reproductive health services which are cardinal thrusts of the SDG program globally [6, 12]. Currently, the male, and lately the female condoms are the only available dual protection options available, and the male condom is a very common option for contraception globally[3,12,22,23]

The study revealed that about 75% of the respondents were willing to pay for MPTs if available. This is encouraging to note especially as payment for health is mostly out-of-pocket in Nigeria as corroborated by the study by El-Sahn *et al.*, [12] where the Nigeria data shows that over 50% pay for contraception themselves. The data for South Africa, however, shows that about 75% of the respondents assessed contraception-free. Thus, the price of MPT products when available must be realistic and fall within the average spending income of women in Nigeria [26] and use of social marketing programs to achieve this will be encouraged.

69% of the population were seen to be keen on having 99% effectiveness of the MPT for protection before usage. The most likely women to be interested in MPT were those who understood their hazards and took precautions to keep themselves safe [4]

In a study by Nkomo et al., the potential for an MPT in the form of an implant was enthusiastically acknowledged by the participants and according to the women, three important factors to take into account while developing the product were discretion, the capacity to autonomously extract the HIV or pregnancy prevention component, and social adoption issues [24]

The majority of what is now known about end users' preferences for MPTs comes from trials that employed placebo or fictitious MPT devices, some were obtained from end users' experiences with single indication HIV prevention and contraception hence research that allows for the evaluation of end users' experiences with current goods will help us better understand end users' preferences and the acceptance of MPTs [25]

As evident in the study, the highest amount respondents willing to pay for MPTs fell within 27.2% of the population who were interested in purchasing MPTs at the price range of N1,000 -<5,000 and this was the highest. Pricing is an important factor for MPTs. Affordable pricing is crucial in sparking interest on its use[5].

In a study by Walker, taking into consideration African American (AA) in the South-eastern region of the United States, interviewees showed interest in MPTs for women in general particularly due to the product's dual protection feature. Research indicates that women in the United States who have taken oral contraceptive pills (OCPs) in the past or who have indicated worry about infection are highly interested in MPTs. The findings portrayed that AA women's reduced perceived risk for pregnancy, STIs, and HIV infection, as well as their romantic relationships or partner dynamics, may be factors in their decreased interest in MPTs [26].

Women who have shown interest in MPTs have highlighted safety, affordability, accessibility, efficacy, ease of use, and lack of influence on sex as the most crucial qualities of any of such product, regardless of their differences in preferences for product kinds and formulations[27]. Creation of awareness and proper sensitization remains an important tool in the establishment of interest among Nigerian women hence, more research has to be conducted[28].

Limitations of the study

As this was an online study, the data collected is believed to be the individual honest responses to each item. The data collection tool excludes women without access to the internet and/or GSM facilities required for participation in the study. Also, from the spread of data collected, the study population is not a nationally representative sample, with 79.6% of the women coming from the South and 8.7% from the North

5. CONCLUSION

The study shows that most of the women are interested in the use of multipurpose prevention technologies with income category and prior knowledge of MPTs being the only statistically significant variables to this interest. It also shows that they will be willing to pay for the technologies when available however the product must be fairly priced in line with the minimum wage of the country. Future studies should focus on assessing the interest of women in extreme resource limited settings such as settlements, women living

in internally displaced camps, where access to mobile communication systems are limited.

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