



Assessment of Availability of Contraceptive Commodities in Osun State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors COO and MOA contributed the research concept and design. Author COO prepared the initial draft of the manuscript. Author OJOO was responsible for data analysis, interpretation of results and critical revision of the study. Author MOA was responsible for final approval of the study. All authors read and approved the final manuscript.

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ABSTRACT

Background: Family planning (FP) is an important aspect of socio-economic development for which access to contraceptive commodities (CCs) by users is critical. Unfortunately, availability of CCs is usually compromised in most developing countries.

Aims: The aim of the study was to assess availability of contraceptive commodities in Osun State, Nigeria.

Study Design: A cross-sectional survey.

Place and Duration of Study: The study was conducted at the FP unit of the State Ministry of Health (State central warehouse) and at Service Delivery Points (SDPs) for CCs in Osun State from April, 2015 to November, 2015.

Methods: Ethical clearance was obtained for the study. The study sample consisted of all 15 Service Providers (SPs) at the State central warehouse (SCW) and 336 SPs at the SDPs selected by multistage sampling technique. The study employed primary sources of data obtained with the

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aid of a semi-structured questionnaire; personal interview; physical observation of storage and transportation facilities; and review of contraceptives inventory records. The 19-item questionnaire was adapted from previously standardized instrument and validated giving a test-retest reliability coefficient of 0.79 and Cronbach's alpha value of 0.80 for internal consistency. The items were made of statements with dichotomous 'yes/no' responses to elicit information on availability. The collected data were analysed using descriptive statistics such as frequencies and percentages including average percentage of unexpired availability (APOUA) of CCs and average percentage of stock-out time (APOSOT) of CCs while chi-square inferential statistics was employed to determine significant relationship between variables.

Results: The responses of SPs show that there was full supply of CCs at SCW (APOUA=100%; APOSOT=0%) but non-full supply at SDPs (APOUA=74.94%; APOSOT=14.28%). While all inventory CCs were available at the SCW at all time for the period under review, only 25% of SDPs had all inventory CCs available all the time. Identified factors responsible for non-full supply of CCs at SDPs include a pull system of inventory control accompanied by transportation inadequacy and logistics officers that appeared to possess low capacity and low motivation.

Conclusion: The study concluded that availability of CCs was optimal at State (regional) central warehouse but sub-optimal at SDPs. The sub-optimal availability of CCs at SDPs portends grave implications for attainment of contraceptive security and expectedly population control among the studied population. This calls for urgent government action in addressing identified issues.

Keywords: Contraceptive commodities, service delivery points, service providers, stockout time.

1. INTRODUCTION

There is growing recognition of the global importance of family planning (FP) as a means for ensuring adequate reproductive health especially among women. One fifth of the global burden of illness and premature death is due to problems associated with reproductive and sexual health [1] and FP is one of the most cost-effective ways to prevent maternal, infant and child mortality [2]. It can reduce maternal mortality by reducing the number of unintended pregnancies and abortions as well as the proportion of births at high risk [2]. The widespread shift in the developing world from large families to smaller families is arguably one of the most important social transformations of the 20th century, and it parallels a similar transition that took place in the developed world much earlier [3,4]. As of 2014, there were over 44 million women of reproductive age (15 - 49 years) in Nigeria [5] with only 15.1% contraceptive prevalence rate (CPR) [6]. FP programmes require an uninterrupted supply of contraceptive commodities (CCs) so that clients can choose, obtain and use their preferred method [7,8]. However, lack of a method of choice, knowledge about safety, effectiveness, availability of choices and financial constraints are listed among key barriers to contraceptive use worldwide [1]. In the absence of a continuous supply, clients may switch to methods that they may prefer less, or else go without a method entirely, potentially resulting in

unintended pregnancies [9]. The government of Nigeria, in collaboration with development partners, became one of the first countries to incorporate Reproductive Health Commodity Security (RHCS) into its programmes in 2002, after completing a comprehensive Strategic Pathway to Reproductive Health Commodity Security (SPARHCS) assessment [10]. The aim of RHCS is to ensure sustained universal access to and use of reproductive health (RH) commodities for men and women. In spite of increased government interventions and huge spending on contraceptive services (CSs) in Nigeria, there have been reported issues with availability of CCs [9,10] such as limited accessibility of products by clients [9], high unmet need (15%) of FP [6], low CPR of 15% [6] resulting in high maternal mortality (560 per 100, 000 live births) [7], high rate of school drop-out as 36% of women and 21% of men had no education [6] and high rate of unintended pregnancies [5]. All these have attendant socio-economic consequences [11]. The main problems that prevent access to and use of birth control are unavailability, poor health care services, spousal disapproval, religious influence, and misinformation about the effects of birth control [7]. Availability of CCs at the SDPs is very crucial for ensuring, not only client satisfaction with CSs, but also contraceptive commodity security [10]. Secure and sustained access to quality and affordable commodity supplies is a critical driver of reproductive and sexual health, as it is for child health and

communicable disease treatment and prevention [12]. Improved access to contraceptives is essential for the success of wider efforts to scale up health services [13]. In 1999, the Federal Government of Nigeria adopted the National Contraceptive Logistics Management System (NCLMS), and the system was designed to improve access of Nigerians to good quality CCs [14]. Government sources have reported that there was availability of contraceptive products in Nigeria, and that it rose between 2005 and 2007 due to aggressive Contraceptive Logistics Management System (CLMS), but fell in 2007 and rose again in 2011 [14]. Average percentage of unexpired availability (APOUA) and average percentage of stockout time (APOSOT) are two reliable indicators for measuring and predicting the performance of CLMS [8,15]. The targets for APOUA and APOSOT are 90% and 7.13% (≈ 10 days in six months) respectively [8,15]. A recent study in a peri-urban community in Ghana found that availability of modern contraceptives differed according to the type and brand of contraceptive and that there was low availability of contraceptives especially female condom and long acting reversible contraceptive (LARC) methods such as implants and IUDs in all the public health facilities surveyed unlike the private facilities [12]. The continuous availability of contraceptives in Nigeria is a challenge, with all levels experiencing periods of shortages and stock-outs [16]. This study aimed, therefore, to assess availability of CCs at the State central warehouse (regional level) and at the service delivery points (SDPs) of Osun State, Nigeria.

2. METHODS

The study is a cross-sectional survey of service providers (SPs) for supply of CCs in Osun State of Nigeria. Ethical clearance for the study was obtained from the ethics committee of Institute of Public Health, Obafemi Awolowo University (OAU) Ile-Ife, Osun State, Nigeria. The study employed primary sources for the data collection. Table of sample size determination [17] was employed to determine the sample size (306) for SPs. Multistage sampling technique was employed. The first stage involved dividing Osun State into the three senatorial districts. The second stage involved selecting eight LGAs from each of the senatorial districts by simple random sampling totalling 24 out of 30 Local Government Areas (LGAs). The third stage involved selecting 14 SPs by simple random sampling from each of the 24 LGAs totalling 336 SPs of the 1500 SPs.

In order to make up for any loss of the questionnaire during data collection, 15% was added to give 352 SPs. The instruments employed were a set of pretested semi-structured questionnaire, personal interviews of SPs on personnel training experience and physical observation of storage and warehousing conditions as well as transportation and distribution facilities. Document review of logistics records such as contraceptive registers; and daily and monthly records kept for six months preceding beginning of data collection were employed to determine records adequacy and stock-outs for the period. The 19-item questionnaire was adapted from previously standardized instruments, Logistics Indicators Assessment Tool (LIAT) and Logistics System Assessment Tool (LSAT) [18]. The questionnaire was validated through judgement of faculty members in the field of logistics and logistics officers at the State Ministry of Health. Pretesting of the questionnaire gave a test-retest reliability coefficient of 0.79 and Cronbach's alpha value of 0.80 for internal consistency. The items were made of statements with dichotomous 'yes/no' responses. 352 SPs in the 24 LGAs and all the 15 SPs at the State central warehouse were administered with the questionnaire. All the respondents gave their informed consent to fill the questionnaire. Initial rapport was created with the SPs for several weeks before data collection. The questionnaire was distributed to the SPs during office hours by trained research assistants and collected during return visits after three to five days. All the 15 SPs at the State central warehouse (SCW) and 336 SPs at the SDPs adequately filled and returned the questionnaire. Thus out of the 367 questionnaire administered, 351 were retrieved for a return rate of 95.5%. The retrieved questionnaires were examined to ensure proper filling and the responses coded and loaded into computer with the aid of Statistical Package for Service Solutions (SPSS) Version 20. The data were screened and cleaned of errors. Descriptive statistics used to organize and summarize the data include frequencies and percentages such as average percentage of unexpired availability (APOUA) of CCs and average percentage of stock-out time (APOSOT) of CCs while chi-square inferential statistics was used in determining significant differences between variables.

3. RESULTS

The demographic distribution of SPs at State central warehouse and SDPs is presented in

Table 1. The distribution by gender of SPs shows that majority were female at State central warehouse (73.3%) and at SDPs (88.1%). Most (92.4%) of SPs at the State central warehouse were within the 40 – 59 years age range but more widely distributed across the age ranges (30 – 49 years) at the SDPs (74.7%). Nearly all of SPs were married at State central warehouse (86.7%) and at SDPs (92.9%). Majority of the SPs were Christians at State central warehouse (86.7%) but only 55.4% at SDPs. All the SPs, and nearly all, were Yoruba at the State central warehouse (100%) and SDPs (92.9%) respectively. Almost all the SPs had tertiary education at the State central warehouse (93.3%) and at SDPs (99.7%). Majority of SPs

were nurses at State central warehouse (86.7%) and at SDPs (81.5%).

The self reports of the SPs at the State central warehouse and at the SDPs for CCs availability are presented with five logistics indicators in Tables 2 and 3 respectively. The results show that all the indicators of CC availability including adequacy of stock, adequacy of information system, appropriate supplies, adequacy of inventory control and appropriate storage and warehousing conditions were reported as available ($p < .05$). The five indicators combined into a composite variable of overall availability also show significant availability of CCs at both levels ($p < .05$).

Table 1. Demographic distribution of SPs at State central warehouse and at SDPs

Variable	SPs at SCW		SPs at SDPs	
	f	%	f	%
Gender				
Female	11	73.30	296	88.10
Male	4	26.70	40	11.90
Age range (in yrs)				
20 – 29	0	0	27	8.00
30 – 39	1	6.70	123	36.60
40 – 49	7	46.70	128	38.10
50 – 59	7	46.70	58	17.30
marital status				
Single	1	6.70	6	1.80
Married	13	86.70	312	92.90
Separated	0	0	1	0.30
Divorced	0	0	2	0.60
Widow	1	6.70	15	4.50
Religion				
Christianity	13	86.70	186	55.40
Islam	2	13.30	149	44.30
Traditional	0	0	1	0.30
Ethnicity				
Yoruba	15	100	312	92.90
Igbo	0	0	13	3.90
Others	0	0	11	3.30
Educational background				
Tertiary	14	93.30	335	99.70
Others	1	6.70	1	0.30
Profession				
Medical	2	13.30	5	1.50
Nursing	13	86.70	274	81.50
Community health	NR	NR	57	17.00
Expected Total	15	100	336	100

Key: SPs = Service Providers, SCW = State central warehouse, SDPs = Service Delivery Points, NR = No Response

Table 2. Availability of contraceptive commodities at the State central warehouse

Indicators for contraceptive availability	Yes f (%)	No f (%)	χ^2	df	p
Adequacy of stock	121 (89.63)	14 (10.37)	84.81	1	0.00*
Adequacy of Logistics Management Information System (LMIS)	130 (96.3)	5 (3.7)	115.74	1	0.00*
Appropriate supplies	15 (100)	0 (0)	-	-	-
Adequacy of inventory control system	23 (76.7)	7 (23.3)	8.53	1	0.00*
Appropriate storage and warehousing conditions	176 (97.8)	4 (2.2)	164.35	1	0.00*
Overall availability of contraceptive commodities at State central warehouse			223.53	5	0.00*

*Significant at $p < 0.05$

Table 3. Availability of contraceptive commodities at the SDPs

Indicators for contraceptive availability	Yes f (%)	No f (%)	Test statistics		
			χ^2	df	p
Adequacy of stock	2368 (78.31)	656 (21.69)	969.23	1	0.00*
Adequacy of logistic management information system (LMIS)	2905 (96.06)	119 (3.94)	2566.73	1	0.00*
Appropriate supplies	301 (89.6)	35 (10.4)	210.5	1	0.00*
Adequacy of inventory control	360 (53.57)	312 (46.43)	3.43	1	0.06
Appropriate storage and warehousing conditions	3175 (78.75)	857 (21.25)	1332.62	1	0.00*
Overall availability of contraceptive commodities at SDPs			3738.63	5	0.00*

*Statistically significant at $p < 0.05$

Key: SDPs = Service Delivery Points, LMIS = Logistics Management Information System

Results obtained from document review of contraceptive records on percentage of unexpired availability (POUA) of CCs at State central warehouse and at SDPs are presented in Table 4. The POUA values of the nine CCs investigated were the same at State central warehouse (100%) whereas there were variations in the POUA values at SDPs with average percentage of unexpired availability of CCs (APOUA) computed as 100% and 74.9% at State central warehouse and SDPs respectively.

Results obtained from document review of contraceptive records on percentage of stock-out time (POSOT) of CCs at State central warehouse and at SDPs are presented in Table 5. The results of POSOT values of the nine CCs investigated were the same at State central warehouse (100%) whereas there were variations in the POSOT values at SDPs giving average percentages of stock-out time of CCs (APOSOT)

with their equivalent numbers of day of stock-out as 0% (0 day) and 14.3% (21 days) at the State central warehouse and SDPs respectively.

The results of contraceptive commodity security assessment obtained with the aid of personal interview and physical observation at state central warehouse (SCW) and service delivery points (SDPs) are presented in Table 6. The results obtained using the two instruments were the same at the SCW but with variations at the SDPs. However, chi square tests showed that the variations were significant for only 'on the job training' where 3.6% of the respondents agreed, during interview, to previous 'on the job training' but records showed that 35.7% had been previously trained; and 'presence of functional fire extinguisher' in the facility for which 53.6% of the respondents had reported in the affirmative but only in 14.3% of the facilities were they found to be functional.

Table 4. Unexpired availability of contraceptive commodities at State central warehouse and SDPs

S/N	Commodities	Unexpired availability of contraceptive commodities	
		SCW %	SDPs %
1	Female condom	100	52.38
2	Male condom	100	66.67
3	Depo-provera	100	91.86
4	Exluton	100	64.29
5	IUD	100	86.91
6	Microgynon	100	77.40
7	Noristerat	100	90.48
8	Jadelle implant	100	66.67
9	Implanon implant	100	77.78
	Average % of unexpired availability of contraceptive commodities (APOUA)	100	74.94

Key: SCW = State central warehouse, SDPs = Service Delivery Points

Table 5. Stockout time of contraceptive commodities at State central warehouse and SDPs

S/N	Commodities	Stockout time of contraceptive commodities		
		SCW %	SDPs %	Approximate number of days
1.	Female condom	0	34.21	50
2	Male condom	0	15.54	21
3.	Depo-provera	0	2.98	4
4	Exluton	0	27.32	40
5	IUD	0	6.40	8
6	Microgynon	0	15.04	22
7	Noristerat	0	2.06	3
8	Jadelle implant	0	18.12	25
9	Implanon implant	0	6.89	10
	Average percentage of stock-out time (APOSOT)	0	14.28	21

Key: SLCW = State central warehouse, SDPs = Service Delivery Points

Table 6. Comparison of interview and observation results of assessment of contraceptive commodity security at State central warehouse (SCW) and service delivery points (SDPs)

S/N.	Variable	State central warehouse (SCW)		Service delivery points (SDPs)		P value
		Interview f (%)	Observation f (%)	Interview f (%)	Observation f (%)	
A.	Personnel training					1.000
1	Formal training on CLMS	1 (100)	1 (100)	27 (96.43)	18 (64.29)	0.18
2	On the job training	0	0	1 (3.57)	10 (35.71)	0.007*
B.	Transportation					1.000
1	Public transport	0	0	20 (71.43)	23 (82.15)	0.647
2	Facility vehicle	1 (100)	1 (100)	3 (10.71)	2 (7.14)	0.655
3	Private vehicle	0	0	5 (17.86)	3 (10.71)	0.48
C.	Distribution					1.000
1	Commodities delivered from higher level facility	1 (100)	1 (100)	6 (21.43)	2 (7.14)	0.157
2	Commodities picked-up by facility	0	0	22 (78.57)	26 (92.86)	0.564

S/N.	Variable	State central warehouse (SCW)		Service delivery points (SDPs)		P value
		Interview f (%)	Observation f (%)	Interview f (%)	Observation f (%)	
D.	Social Amenities					
	Main source of power supply:					1.000
1	National grid power	1 (100)	1 (100)	18 (64.29)	13 (46.43)	0.369
2	Solar	0	0	5 (17.86)	3 (10.71)	0.48
3	Generator	0	0	5 (17.85)	12 (42.85)	0.09
	Main source of water supply:					1.000
1	Pipe-borne water	0	0	7 (25.00)	8 (28.57)	0.796
2	Bore hole	1 (100)	1 (100)	15 (53.57)	7 (25.00)	0.088
3	Deep well	0	0	6 (21.43)	13 (46.43)	0.108
E.	Storage					0.847
1	Commodities placed on pallets	1(100)	1(100)	11(39.29)	12(42.86)	0.835
2	Stacked at least 10cm off the floor	1(100)	1(100)	10(35.71)	10(35.71)	1.000
3	Stacked at least 30cm from the walls	1(100)	1(100)	5(17.86)	6(21.43)	0.763
4	Stacked no more than 2.5 meters high	1(100)	1(100)	5(17.86)	5(17.86)	1.000
5	Products arranged with expiry dates visible	1(100)	1(100)	20(71.43)	19(67.86)	0.873
6	Damaged commodities stored separately	1(100)	1(100)	27(96.43)	27(96.43)	1.000
7	Expired commodities stored separately	1(100)	1(100)	28(100)	28(100)	1.000
8	Commodities in good condition	1(100)	1(100)	27(96.43)	28(100)	1.000
9	Commodities protected from sunlight	1(100)	1(100)	28(100)	28(100)	1.000
10	Commodities protected from humidity	1(100)	1(100)	28(100)	28(100)	1.000
11	Commodities stored at appro temperature	1(100)	1(100)	22(78.57)	25(89.29)	0.662
F.	Ware housing					0.207
1	Dedicated store for commodities	1(100)	1(100)	16(57.14)	15(53.57)	0.857
2	Store room always well ventilated	1(100)	1(100)	18(64.29)	16(57.14)	0.732
3	Store rooms avoid water penetration	1(100)	1(100)	27(96.43)	27(96.43)	1.000
4	There is functional fire extinguisher	1(100)	1(100)	15(53.57)	4(14.29)	0.012*
5	There is functional air-conditioner	1(100)	1(100)	2(7.14)	1(3.57)	0.564

Key: SCW = State central warehouse, SDPs = Service delivery points, CLMS = Contraceptive logistics management system; Difference is significant at 0.05 levels (2-tailed)

4. DISCUSSION

The study sought to assess the availability of contraceptive commodities at two levels in Osun State namely at the state level central warehouse

and at the facilities within the districts. The fact that more females than males were in the sampled population of SPs may be due to the fact that FP is a female dominated area and clients are known to be more comfortable to

utilize health facilities for contraceptives services if females were the one attending to them [19,20]. The females unlike their male counterparts are directly at the risk of unintended pregnancy, although both females and males are at risk of sexually transmitted infections (STIs). There have been previous reports that “the use of modern contraceptive methods prevents unwanted pregnancy and subsequent abortions” hence, females within the early reproductive age are more likely to use contraceptive commodities than males [19]. The age distribution of SPs at State central warehouse and SDPs can be attributed to the fact that they are senior staff members with technical experience to render contraceptive services. The fact that nearly all the SPs were married at both facilities was not surprising because they were senior staff members. It was not unexpected that nearly all the SPs had tertiary education because the minimum level of training for these categories of SPs is School of Health Technology which is at tertiary level. The professional cadre of the SPs showed that majority were nurses and this may not be unconnected with the fact that FP services fall in the domain of nurses who have been trained in Basic Obstetric and Emergency Contraception (BOEC) services [21].

The result of overall availability of CCs at State central warehouse which show full supply agrees with the findings of Nigerian Federal Ministry of Health [22] that there was availability of CCs in Nigeria between 2005 and 2007, which fell in 2007 and rose again in 2011. Also, the finding of non-full supply at the SDPs agrees with earlier findings that contraceptive availability remained sporadic with stock-outs at lower level of the health system [18]. It also agrees with previous reports that “availability of contraceptives especially female condom and long acting reversible contraceptives (LARC) is low in public health facilities” [12].

The APOUA result at the State central warehouse conforms to WHO guideline’s minimum level of 90% [15] whereas APOUA result at the SDPs did not conform to the guideline, an indication of non-full supply of CCs. APOSOT values at the State central warehouse conforms to WHO guideline limit of 10 days in six months [15] whereas APOSOT value obtained at SDPs exceeded the limit, an indication of non-full supply of CCs at SDPs. This portends grave implication for FP amongst the studied population since clients may not be able to obtain

and use the reproductive health commodities when they need them [18,23].

State central warehouse took delivery of CCs from higher facility whereas SPs at SDPs picked-up CCs by themselves from higher level (State central warehouse). The State central warehouse had facility vehicles which were used to transport CCs to lower facilities whereas at the SDPs nearly all available facility vehicles were grounded. Therefore, most of the commodities at SDPs were picked up by public transportations (hired vehicles and motorcycles). The CLMS places high premium on transportation of CCs right from the point of manufacturing to the point of usage by clients, and this has a link with distribution of commodities at various levels of the logistics system. The implication of having to collect CCs needed at SDPs by ‘pick-up’ mode of transportation is that supply of CCs is subject to the performance of the logistic personnel at the lower level with low capacity and inadequate transportation as evident in the obtained results, hence the difference in the values of APOUA and APOSOT at State central warehouse and SDPs.

The importance of availability and convenient access to electricity supply for smooth and effective operations at facility level by SPs cannot be overemphasized as it serves as an important indicator of CLMS [18]. Availability of electricity is important for generation of light that facilitates vision needed for various supply activities and needed for effective storage and warehousing of commodities. Documentation of record of activities with the aid of computer and internet services requires constant supply of electricity which is hampered when there is power outage. Availability of water at facilities is essential for proper hygiene both for the SPs and the clients. Unhindered and “sustainable access to quality and safe drinking water and basic sanitation” is a critical part of sustainable development goals (SDGs), which is the sixth of the millennium development goals (MDGs) [24]. Storage of contraceptives, as with other medicines, requires appropriate conditions to ensure the efficacy of the products. Physical availability of contraceptive commodities at SDPs is desirable but, ensuring that they are stored and warehoused in appropriate conditions to ensure that they are therapeutically available when used by clients is very important. Relevant factors responsible for the low/sub-optimal availability of contraceptives at SDPs as revealed by the study include paucity of funds for

transportation of CCs to SDPs, lack of facility vehicles to pick-up CCs, over-reliance of SDPs on public transportation to deliver CCs due to breakdown of facility vehicles, sub-optimal conditions of storage and warehousing, and inadequacies in skills and competencies of SPs in delivering contraceptive services.

5. CONCLUSION

The findings of this study reveal that there is compromise of contraceptive commodity security in Osun State with full supply at the State central warehouse but non-full supply at the SDPs. The identified factors responsible for non-full supply of CCs at SDPs include a pull system of inventory control accompanied by transportation inadequacies and logistics officers that appeared to possess low capacity and low motivation. This portends grave implications for population control and calls for attention of relevant authorities. The findings of this study underscore the need for correct formulation, effective implementation and efficient monitoring of policies that will ensure contraceptive commodity security.

ETHICAL APPROVAL

This work was approved by the Research and Ethics Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Nigeria.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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