

Determinants of out-of-Stock Syndrome in a Public Hospital in Southern Nigeria in a bid to ensure Continuous Medicines Availability

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ABSTRACT

Background: Out of stock syndrome is gradually charactering public hospitals in Nigeria. Ensuring continuous medicines availability in hospitals will reduce incidences of purchase of fake and substandard medicines from the open drug market. This study evaluated the status of the Drug Revolving Fund in a public hospital, factors responsible for out-of-stock syndrome in the hospital, as well as recommendations to ensure continuous medicines availability.

Method: These were achieved through use of pre-tested questionnaires administered to 60 pharmacists at Federal Medical Centre, Asaba in July, 2022. Questionnaire evaluated demographics of respondents, status of DRF in the hospital, factors responsible for shortage of medicines and recommendations on how to overcome the shortage. Data obtained were analyzed using SPSS Version 20. Descriptive and chi square statistics were obtained. P value of less than 0.05 was considered statistically significant

Results: 60 questionnaires distributed, 58 were returned, response rate was 96.7%. Majority (43.1%) were aged 21 to 29 years, female (58.6%), married (48.3%), in practice for 1 to 5 years (31.0%). Half (58.6%) were sole holders of Bachelor of Pharmacy Degree, a third (39.7%) were interns. DRF was functioning partially, factors responsible for medicines shortage ranged from DRF was not being properly funded (P=0.001), poor inventory management (P=0.047), delay in supply from DRF stores (P=0.001), lack of electronic management systems (P=0.005), inadequate staffing (P=0.005) poorly trained stores officers (P=0.011). Recommendations to improve availability include: DRF should be properly funded (P=0.048), public hospitals to begin producing medicines locally (P=0.009), government should expedite action on take-off of National Drug Distribution Guidelines (P=0.000). Majority (72.2%) agreed DRF remains best system for making medicines continuously available.

Conclusion: Factors responsible for medicines shortage were elucidated in this study, as well as recommendations to ensure continuous availability. Proper funding of DRF by hospital management is recommended. Hospitals should commence local production of essential medicines. Government should ensure speedy implementation of National Drug Distribution Guidelines to ensure reduction in availability of substandard medicines.

1. Introduction

Essential medicines are a critical component of effective preventive and curative care.^{1, 2, 3, 4} The provision of safe, effective, and affordable drugs to the whole population at the right quantity is a priority in health and drug policy.^{5, 6} For essential medicines to save lives, reduce suffering and improve health, they must be available, affordable, of good quality and properly used. Essential Medicines are those that satisfy the priority health care needs of the population and are intended to be available in functioning health systems at all times, in appropriate dosage forms, of assured quality, and at prices individuals and health systems can

afford.⁷

Access to essential medicines of assured quality in most countries still poses problems due to rising prices of new medicines, persisting shortages and stock-outs and increasing numbers of substandard and falsified medical products.^{8, 9, 10, 11, 12} Access to medicines is defined as “having essential medicines continuously available and affordable at public or private health facilities or retail pharmacies that are within one hour's walk from the homes of the population.”⁵ About one third of the world's population, approximately two billion people, have no access to life-saving and other essential medicines.⁷ Low or no

availability of essential medicines causes problems for the treatment of diseases that predominantly affect the developing countries and undermine global health reforms to improve access to health for all, especially the chronically ill and poor.^{3,9} An estimated 40% of health budgets in low- and middle-income countries are spent on medicines, with much of the cost borne out-of-pocket by patients.¹³ Widespread health system inefficiencies have resulted in a quarter of spending on medicines being wasted due to poor procurement and irrational use, substandard and expired medicines.^{13,14} Several studies have revealed that access to essential medicines for various diseases was lower than the 80% recommended by the World Health Organization.^{8,9,15,16} A recent study¹⁵ revealed that the availability of generics in the public sector ranged from 29.4% in Africa to 54.4% in the Americas, attributed to inadequate health financing systems, inefficient medicines supply systems, and out-of-pocket payment for drugs.¹⁵ A study in Burkina Faso¹⁷ and some other studies reported that introduction of fees-for-services had an adverse effect on service utilization.^{3,17,18}

The Drug Revolving Fund (DRF) was introduced to improve access to essential drugs for the most vulnerable in the society and thus improve health outcomes.^{3,18,19,20,21,22,23} It has its origin in the Bamako Initiative, which was adopted to tackle the poor availability of medicines in sub-Saharan Africa, especially at the primary health care level. In 1987, African health ministers gathered in Bamako, Mali, and adopted the Bamako Initiative, with support from WHO and the United Nations Children's Fund (UNICEF).¹⁴ The initiative equally proposed the use of an essential drug list and the development of realistic national drug policies to support the provision of essential drugs.^{19, 20, 24} DRF is a scheme where medicines are sold at a light mark-up on the cost price and the revenue generated is used to replenish stocks, ensuring that medicines remain affordable and sustainably available.^{2,19,24} The DRF scheme is established with a one-time capital investment (seed money), typically provided by the government, donor agencies or interested communities which is used to purchase an original stock of essential and commonly used medicines to be dispensed at prices sufficient to replace the stock of medicines and ensure a continuous supply. It promotes access and ensures that quality drugs and medical consumables are sustainably available and affordable in public health facilities.^{3,18,25} DRF was adopted in 1990 by the Government of Nigeria, and is a very effective strategy for ensuring uninterrupted drug supply in health care delivery.^{18,25} Before the introduction of DRF, acute shortage of essential drugs was seen in most

public hospitals in Nigeria.

DRF when properly managed, can create revenue capable of covering recurring costs in the health system, thereby making low-cost essential medicines more accessible.^{3,26,27} However, more than 30 years post inception, the outcomes and impact of the Bamako Initiative on the health indices of many implementing African countries including Nigeria remains varied, with no significant improvement in health status being registered in a majority of countries.^{19, 20, 28} Problems with its sustainability and management have not permitted a full realization of the expected benefits. Weak political, socioeconomic, managerial and administrative structures all of which have consequences for the DRF system operation have been reported.^{17, 24, 25} Most DRF systems in Nigeria failed mainly as a result of inability of the hospitals to pay for the medicines supplied on credit.²⁴ It has been alleged that public hospitals in Nigeria are owing pharmaceutical manufacturers and suppliers huge debts running into billions of naira, with some of the companies laying off their workers and going into liquidation. The Nigerian House of Representatives is currently investigating the veracity of such debts and it is hoped that this intervention by the House will result in some, if not all of the debts being finally paid to the suppliers. Some of the drug suppliers have had to blacklist the public hospitals in return. Recent reports from government hospitals are hinting that their hospital management are resorting to Public Private Practice (PPP) in an attempt to ensure availability of essential medicines in their hospitals. This PPP Model involves partnership with community pharmacies to make medicines available inside the hospital premises, with patients being asked to patronize them, and then profit sharing between the community pharmacist and hospital management.

Following the Bamako initiative, Nigeria launched her National Drug Policy in 1990 and this was revised in 2005.²⁹ The Document clearly enunciates and provides policy direction for the core objective of the Bamako Initiative which is "Equitable Access to Essential Drugs at the Community level."^{20,29,30} The Policy seeks to make available at all times to the Nigerian populace adequate supply of drugs that are effective, affordable, safe and of good quality; to ensure the rational use of such drugs and to stimulate increased local production of such drugs.^{4,29} A recent Study revealed that the DRF scheme was functional in only 35.5% of the facilities, with 77.8% of the functional facilities having a management team in place.²⁵ The authors discovered low funding of the scheme and poor management as the major problems, and recommended a

thoughtful design, careful implementation associated with quality improvement, good management, reliable source of low-cost drugs and fee levels towards a successful and truly revolving scheme.²⁵ DRF systems in most public health institutions in Nigeria today are decapitalized and poorly managed with interferences from the management of various hospitals where they operate. Sometimes funds are collected from the system for other non-related purposes.³ Corruption, pilfering, expiration of drugs are usually occasioned by lack of improved softwares, and good management information systems in managing the operations of the scheme.³

Management of pharmaceuticals and funds need well-coordinated selection, procurement, quality assurance, distribution, management information systems, and effective medicines use. The entire process is meant to be in a continuum and in line with the essential drug list.³ Rational drug use and proper inventory management, and accountability of every money spent helps to avoid depletion of the capital.³

A Nigerian study³¹ revealed that Treasury Single Account (TSA) is largely responsible for the increasing cases of lack of drugs in public hospitals under the DRF scheme. TSA impedes easy access to funds in public hospitals, thus obstructing purchase and disbursement of drugs^{32,33} TSA was introduced by President Buhari's administration as a measure to curb corruption, ensure accountability, transparency and efficiency in public organizations and it refers to public account system which uses a single account or a set of linked account by ministries, departments or agencies of government to ensure that all revenue receipts and payments are done through a Consolidated Revenue Account domiciled at Central Bank of Nigeria.^{31,33}

Another study¹⁹ revealed causes of failure of DRF to include underestimation of capitalization costs, prices set below true replacement costs, delays in cash flow which make funds unavailable for replenishment of drug stocks, rapid programme expansion for which additional capital funds are not available, losses due to theft and deterioration of drugs, unanticipated price increases due to inflation or changes in parity rates and foreign exchange restrictions.¹⁹ Though revolving funds offer great potential for supplying drugs in many parts of the Third World, they must be carefully planned and the organizers should bear in mind the pitfalls which commonly undermine the programmes.¹⁹ An international organization⁵ reported failure of the international community to keep its promises of assistance to developing countries as well as inadequate human resources as challenges.⁵

Other studies reported insufficient financial resources, undue political interference in the functioning of the scheme,^{3, 25, 34} inadequate managerial and financial autonomy, barrier to access for the very poor and vulnerable, poor capacity of facility staff, and operation guidelines insensitive to the local environment and poor management^{3,20} as factors. Others were lack of a culture of transparency and accountability within the health system, and limited capacity for rolling out the scheme militate against the effectiveness of the system.³

The emergence of COVID-19 global pandemic compounded shortage of medicines in Nigeria^{4,35} and several other countries of the world, majorly as a result of global lockdown, decreased manufacturing, unaddressed regulatory affairs, poor access to resources by the population, lack of buffer stocks, insecurity and poor funding of the healthcare system.^{35,36,37,38,39,40,41,42} Other factors were increased reliance on foreign sources for finished products, inefficient storage, transportation and distribution facilities, poor selection and procurement practices, involvement of incompetent persons in procurement, distribution and sale of drugs, poor performance of drug suppliers to public health care institutions, irregular power supply, weak policies, insurgency, lack of monitoring and evaluation framework.^{43,44,45,46,47,48,49,50}

This study evaluated the status of the Drug Revolving Fund in a public hospital, factors responsible for out-of-stock syndrome in the hospital, as well as recommendations to ensure continuous medicines availability.

2. Method

2.1 Study design

A prospective study involving the use of structured, self-administered questionnaires was carried out on 58 hospital pharmacists practicing at the Federal Medical Centre, Asaba, Nigeria, to evaluate the factors responsible for shortage of medicines in the hospital, as well as recommendations on how to make medicines continuously available in the hospital.

2.2 Study Setting

The study was carried out in Asaba, capital of Delta State and home to the Anwai Campus of the Delta State University. The Federal Medical Centre Asaba was created by the government of Chief Olusegun Obasanjo in 1999. The hospital inherited the structures of the former Central Hospital, Asaba, located on Anwai Road. The hospital is a

200-bed hospital with well over 8 wards. The Hospital offers full range of medical services in obstetrics, gynecology, ophthalmology, orthopedics, pediatrics, pharmacy, radiology, ear, nose, and throat, internal medicine, oral surgery, community health and anesthesia. The hospital has a staff strength of about 1,500 workers, comprising medical consultants, residents, medical officers, pharmacists, nurses, medical laboratory scientists, physiotherapists, community health workers and others. The hospital is being managed on daily basis by a top management team comprising the medical director, chairman medical advisory committee, director of administration and director of finance.

Delta state has a population made up of 2,069,309 males and females 2, 043,136,⁵¹ and was created on 27th August, 1991, with Asaba as the capital. It is one of the oil producing states of the country. Other mineral deposits in the state include lime, kaolin, laterite and clay. The state is situated in the South-South Geo-Political Zone of Nigeria. Asaba is strategically located on a hill, at the Western edge of the majestic River Niger. The River Niger is a trans- West African link beginning from the Futa Jalon highlands in Guinea and empties into the Atlantic Ocean in the Niger Delta region of Nigeria. The greater Asaba occupies a land mass of over 300 square kilometers. Since becoming the Delta State capital, Asaba has grown in population from the last census figure of 149,603 in 2006 (52). The people are very hospitable, and Asaba now maintains a cosmopolitan population of predominantly non-indigenous people.⁵² The hospital runs a drug revolving fund (DRF) scheme that is responsible for purchasing all her medicines needs. A DRF Committee headed by the chairman medical advisory committee (CMAC) is in charge of overall operations of the scheme. A high ranking pharmacist usually of designation assistant director or deputy director of pharmaceutical services is in charge of the day to day operations in the DRF Pharmacy as Project Manager. A stores unit exists that makes requisitions for all medicines needs of the hospital on a regular basis. The list is usually compiled on generic basis and when it is ready, it is passed to the Project Manager for vetting and approval. The Project Manager then collates list of all items to be purchased, copies the head of pharmacy department, and then approaches the CMAC for award of Tender. Usually, the hospital procures her medicines needs directly from manufacturing companies. Upon successful bidding, companies are contacted and given deadline to make supplies.

When the medicines are brought to the hospital, some samples are removed and taken to the Quality Control Unit

of the Pharmacy Department for quality control tests to determine their safety from microbial contamination, and also confirm status of quoted active ingredients. Upon successful passing of the quality tests, the bulk of the supplies are then received into the DRF Stores and entries are made into the appropriate and designated books for documentation, such as ledgers, tally cards and computers. It is instructive to note that the DRF Department operations are fully computerized and operate an electronic management system throughout the supply chain.

Hospital units that patronize the DRF Stores normally make their requisitions online. These are attended to by the stores pharmacist, who is usually a middle level officer such as Principal Pharmacist or a chief pharmacist. After approvals, invoices are generated online via the hospitals MEDCHART Online System. Supplies are made, and then the Stores send the supplies to the requesting unit, who crosscheck the invoices and other documents and then sign the copies that are finally returned to the stores.

Arrangement of stock in the DRF Stores follows the LIFO Principle: Last in First Out. Regular checks are conducted on stock in the stores to ensure there are no expired medicines on shelves. There are pallets in the stores, and as a rule, medicines are not stored on the floor. Thermo labile medications are stored in refrigerators. All stores are equipped with functional thermometers for gauging the room temperature. Suppliers are supposed to receive payment for supplies made to the hospital within one month. The hospital boasts of at least 2 giant generators as well as smaller capacity generators assigned to specific units, this way, light is constantly available to power the air conditioning units as well as refrigerators in the stores.

2.3 Study population

The study population comprised 58 hospital pharmacists that practice at the hospital. The Pharmacy Department boasts of a staff strength of 30 regular pharmacists and 35 intern pharmacists, bringing the total to 65. The department has over 10 satellite Pharmacy units comprising Accident and Emergency Pharmacy, In Patient Pharmacy, General Outpatient Clinic Pharmacy, Public Health Pharmacy, Pediatric Pharmacy, National Health Insurance Pharmacy, Obstetrics and Gynecology Pharmacy, Drug Revolving Fund Pharmacy, Ophthalmic Pharmacy and Pack Unit Pharmacy. Each of these units is headed by a deputy director, assistant director or chief pharmacist as the case may be. The study population was made up of pharmacists practicing in the Pharmacy Department which comprised deputy directors, assistant directors, chief pharmacists,

principal pharmacists, senior pharmacists, pharmacists Grade I and intern pharmacists.

2.4 Sampling method

Well structured, self-administered questionnaires were randomly pretested on 5 pharmacists in the department after which minor errors in typing and outlay were corrected, before the corrected questionnaires were administered to the general body. Informed consent was sought and obtained from respondents before they received the questionnaires. Consent to undertake the study was obtained from the leadership of the Pharmacy Department and the hospital management.

2.5 Data collection and analysis

A total number of 60 questionnaires were self-administered to pharmacists. The questionnaire was made anonymous, with open questions in some cases and were structured into 4 parts to enable researchers evaluate demographics of respondents, factors responsible for shortage of medicines in the hospital, and recommendations on how to make medicines continuously available in the hospital. The essence of the open questions was for the respondents to volunteer additional information in the desired areas. The questionnaires were collated, and data fed into the computer and analyzed using Statistical Package for Social Sciences (SPSS Version 20). Results were presented as frequency and percentage of variables. Chi Square statistics was used to test for level of significance of factors responsible for medicines shortage as well as recommendations on how to make medicines continuously available in the hospital. A P-value of less than 0.05 was statistically significantly.

3. Results

Sixty questionnaires were distributed to respondents, 58 were returned, giving a response rate of 96.7%. Majority (43.8%) were aged 30-39 years, there were more females (58.6%) than males, half (53.8%) were married. Few (19.0%) were holders of the Doctor of Pharmacy Degree (PharmD), majority (39.7%) were interns, about a third (31.0%) were in practice for 1-5 years. All other demographic information is as in Table 1. In response to a question on how often they experience out of stock syndrome in the hospital, majority (51.7%) said always. (Table 2). When asked how they feel when stock out arises in the hospital, majority (87.9%) said they were unhappy, few (5.2%) said they were not sure, another few (5.1%) said they were indifferent while very few (1.7%) did not

respond. About half (51.7%) reported that medicines are only available occasionally in the hospital (Table 3). When asked about the status of the Drug Revolving Fund (DRF) in the hospital, more than half (55.2%) said that DRF was functioning partially (Table 4); when asked what system will be best for ensuring continuous medicines availability in the hospital, majority (67.2%) said DRF is the best system (Table 5). When asked if they think stock outs can be completely eliminated from the hospital system, half (50.0%) said Yes (Table 6).

With regards to factors responsible for out of stock syndrome in the Study area, more than half (58.6%) agreed that Drug Revolving Fund (DRF) is not properly funded, majority (62.1%) agreed that administrative bottlenecks resulting from delay of issuance of local purchase orders (LPO) to suppliers was a factor, about half (43.1%) agreed that poor supply chain practices such as poor forecasting and under requisition by store officers was a factor, about half (46.6%) agreed that delay in delivery and supply of medicines by contractors was a factor. More than half (55.2%) agreed that poor inventory management by store officers was a factor. Majority (44.8%) said they were not sure that high cost of imported products reduces availability. About a third (37.9%) agreed that inadequate human resources was a factor. Majority (48.3%) said they were not sure that lack of electronic management systems was a factor. Majority (37.9%) said they were not sure that delay in making medicines available to satellite pharmacies from DRF stores

Half, (50.0%) said they were not sure that lack of incentives for DRF operators was a factor. Few (3.4%) agreed that lack of regular payment to suppliers was a factor, while very few (1.7%) agreed that head ship of DRF was in wrong hands, very few (1.7%) said that misappropriation of DRF funds was a factor (Table 7).

As regarding recommendations on how to make medicines continuously available in the hospital, majority (69.0%) agreed there was need for DRF to be properly funded by hospital management and government. Majority (70.7%) of respondents agreed there was need to strengthen DRF further and that Government should grant autonomy to DRF and expedite action on the proposed Pharmaceutical Society of Nigeria (PSN) sponsored DRF Bill. Majority (70.7%) agreed that Head of Pharmacy Department in public hospitals should be made signatories to DRF account, while another majority (79.3%) agreed that there was need for continuous training and retraining of staff to improve their efficiency. Majority (79.3%) agreed on the need to engage personnel with relevant skills to improve

their efficiency. Majority (72.4%) agreed that purchase of generic products should be in line with the Essential Drugs List. Majority (82.8%) agreed that stocking of medicines should be in line with standard treatment guidelines and the Hospital Formulary. More than half (55.2%) agreed that there is need for Government to introduce cut in tariff of imported medicines to encourage availability. Majority (62.1%) agreed that public hospitals should be supported by government to set up manufacturing units to produce essential medicines locally. More than half (56.9%) agreed that Government should expedite action on implementation of National Drug distribution Guidelines that is aimed at sanitizing the chaotic drug distribution system in the country, and this will in turn engender continuous availability of safe, genuine and effective medicines (Table 8). When asked if it was possible to attain continuous medicines availability in public hospitals, majority (62.1%) agreed that it was possible (See Table 8).

Cross tabulation of age and factors responsible for causing out of stock revealed the following statistically significant associations:

*Age versus status of DRF in the hospital was statistically significant at P=0.046

*Age versus DRF is not properly funded was statistically significant at P=0.000

*Age versus Poor Inventory Management was statistically significant at P=0.047

*Age versus Delay in making medicines available from DRF stores was statistically significant at P=0.001

*Age versus inadequate human resources was statistically significant at P=0.005

*Age versus poorly trained stores officers was statistically significant at P=0.011

*Age versus lack of electronic management system was statistically significant at P=0.005

Cross tabulation of age versus recommendations revealed the following statistically significant relationships:

*Age versus “DRF to be properly funded by government” was statistically significant at P=0.048

*Age versus “All public hospitals should set up manufacturing units” was statistically significant at P=0.009

*Age versus “Can stock outs be completely eliminated from public hospitals” was statistically significant at P=0.046

*Age versus “Delay in making medicines available to

satellite pharmacies from DRF stores” was statistically significant at P = 0.001 All other cross tabulations for recommendations were not statistically significant.

Table 1: Demographics of Respondents. N= 58

Variable	Frequency	Percent (%)
Age (years)		
Less than 20	1	1.3
20-29	20	25.0
30-39	35	43.8
40-49	17	21.3
50-59	5	6.3
No response	2	2.6
Sex		
Male	22	37.9
Female	34	58.6
No response	2	3.4
Marital status		
Single	25	31.3
Married	43	53.8
Divorced	6	7.5
Separated	3	3.8
No response	3	3.8
Educational qualification		
B.Pharm only	34	58.6
PharmD	11	19.0
Masters	4	6.9
FPCPharm	9	15.5
Designation		
Director/Deputy Director	5	8.6
Assistant director	4	6.9
Chief Pharmacist	7	12.1
Principal pharmacist	4	6.9
Senior Pharmacist	1	1.7
Pharmacist I	13	22.4
Interns	23	39.7
NYSC	1	1.7
Length of practice (years)		
Less than 1	14	24.1
1-5	18	31.0
6-10	9	15.5
11-15	7	12.1
More than 15	10	17.2

Table 2: How often do you experience out-of-stock syndrome in your hospital? (n = 58)

	Frequency	Percent (%)
Always	30	51.7
Occasionally	26	44.8
Never	1	1.7
Not sure	1	1.7

Table 3: What is the status of Drug Revolving Fund (DRF) in your hospital? (n = 58)

	Frequency	Percent (%)
Functioning very well	14	24.1
DRF is non - functional	2	3.4
Functioning partially	32	55.2
Not sure	9	15.5
No response	1	1.7

*P= 0.048

Table 4: What System will be best for ensuring continuous, cost-effective medicines availability? (n = 58)

	Frequency	Percent (%)
Drug Revolving Fund	39	67.2
Public Private Partnership	9	15.5
Special Programme Management	6	10.3
No response	4	6.9

Table 5: Can stock out be completely eliminated in the hospital? n=58

	Frequency	Percent (%)
Yes	29	50.0
No	18	30.0
Not sure	11	19.0

*P= 0.046

Table 6: Factors responsible for out-of-stock syndrome in the Study Area N = 58

Variable	Agree (%)	Not sure (%)	Disagree (%)	No Response (%)
DRF is not properly funded	34(58.6)	20(34.5)	4(6.9)	0(0)
Administrative bottlenecks resulting from delay of issuance of LPO to suppliers	36(62.1)	20(34.5)	2(3.4)	0(0)
Poor supply chain practices such as poor forecasting/under requisition by store officers	22(37.9)	25(43.1)	10(17.2)	1(1.7)
Delay in delivery/supply of medicines by contractors	27(46.6)	24(41.4)	6(10.3)	1(1.7)
Poor inventory management by stores officers	13(22.4)	32(55.2)	12(20.7)	1(1.7)
Delay in making medicines available to satellite pharmacies from DRF stores	15(25.9)	22(37.9)	20(34.5)	0(0)
High cost of imported products reduces availability	24(41.4)	26(44.8)	8(13.8)	0(0)
Inadequate human resources	22(37.9)	19(32.8)	17(29.3)	0(0)
Lack of electronic management systems	12(20.7)	28(48.3)	18(31.0)	0(0)
Lack of incentives for DRF operators	13(22.4)	29(50.0)	14(24.1)	0(0)
Lack of regular payment to suppliers	2(3.4)	0(0)	0(0)	56(96.6)
Headship of DRF is in wrong hands	1(1.7)	0(0)	0(0)	57(98.3)
Misappropriation of DRF	1(1.7)	0(0)	0(0)	57(98.3)

Table 7: Recommendations to ensure continuous medicines availability n = 58

Variable	Agree (%)	Not sure (%)	Disagree (%)	No (%) Response
DRF to be properly funded by Government/hospital management	40(69.0)	11(19.0)	2(3.4)	5(8.6)
Need to strengthen DRF further				
Government should grant autonomy to DRF and expedite action on proposed DRF Bill	41(70.7)	0(0)	12(20.7)	5(8.6)
Head of Pharmacy Department in public hospitals to be made signatories to DRF account	41(70.7)	11(19.0)	1(1.7)	5(8.6)
Continuous training and retraining of staff on logistics and supply chain management to improve their efficiency	46(79.3)	5(8.6)	2(3.4)	5(8.6)
Engagement of personnel with relevant skills	46(79.3)	5(8.6)	2(3.4)	5(8.6)
Purchase of generic products should be in line with Essential Drugs List	42(72.4)	7(12.1)	4(6.9)	5(8.6)
Stocking of medicines should be in line with standard treatment guidelines/Hospital Formulary	48(82.8)	4(6.9)	1(1.7)	5(8.6)
Government should introduce cut in tariff of imported medicines to encourage availability	32(55.2)	18(31.0)	1(1.7)	7(12.1)
Public hospitals to be supported by government to set up manufacturing units to produce essential Medicines	36(62.1)	17(29.3)	0(0)	5(8.6)
Government should expedite action on implementation of National Drug distribution Guidelines	33(56.9)	19(32.8)	0(0)	6(10.3)
It is possible to attain continuous medicines availability in public hospitals	36(62.1)	16(27.6)	1(1.7)	5(8.6)

4. Discussion

This study evaluated the status of the Drug Revolving Fund, factors responsible for medicines shortage and recommendations to ensure medicines sustainability at the Federal Medical Centre, Asaba. There were more females than males, majority were married, belonged to the 30-39 years age bracket and had been in practice for 1 to 5 years. Majority were interns, there were few holders of the Doctor of Pharmacy Degree (PharmD), with more than half of respondents possessing the Bachelor of Pharmacy only, without any additional post graduate qualifications.

The study revealed that out-of-stock syndrome was a regular occurrence in the centre and that the Drug Revolving Fund (DRF) was only functioning partially. As regards the best system to employ that will guarantee continuous availability of medicines in the centre, majority of respondents answered that DRF still remained the best method, even though it was only functioning partially. This seems to suggest that the respondents believed that there were factors responsible for the present partial functional-status of DRF in the Centre and that once those obstacles are removed, DRF will begin to function optimally. When asked if they believed that stock-outs can be completely eliminated from the hospital, majority answered in the affirmative, thereby lending credence to the notion that ensuring continuous medicines supply in the hospital is feasible.

The results on the status of DRF from the study area are consistent with results from other studies such as the study that evaluated the DRF scheme³ which revealed that DRF systems in most public health institutions in Nigeria today are decapitalized and poorly managed with interferences from the management of such hospitals. The poor funding of DRF reported in this study agrees with the finding that evaluated DRF operations two decades after inception²⁵ that poor funding and poor management of DRF were the major problems identified. Proper planning, appropriate pricing, monitoring, evaluation and good management towards a successful implementation of the DRF. They also suggested that the implementation of the DRF scheme be strengthened at all levels of government. Their suggestions agree with the recommendations from respondents in this study on the need to strengthen DRF operations and proper funding of the scheme.

Factors responsible for medicines shortage in the study area included poor funding of DRF by hospital management ($P=0.000$), poor inventory management by stores officers ($P=0.047$), delay in making medicines available from DRF stores ($P=0.001$), and inadequate human resources ($P=$

0.005). Others were poorly trained officers ($P=0.011$) and lack of electronic management system ($P=0.005$). Other were lack of incentives for DRF operators, lack of regular payment to suppliers, misappropriation of DRF Funds, headship of DRF was in wrong hands, and delay in delivery of medicines by suppliers. Also, administrative bottlenecks resulting from delay in issuance of local purchase orders to suppliers, high cost of imported products, poor supply chain practices such as poor forecasting and under requisition by stores officers

Some of the factors observed in this study are similar to those reported in study³ which found out that insufficient financial resources, undue political interference in the functioning of the scheme, poor management, inadequate managerial and financial autonomy and poor capacity of facility staff were barriers to continuous medicines availability. The results are also similar to the study on vaccines availability⁴ which reported that inefficient procurement systems, poor equipment and corruption are part of the identified challenges associated with medicines supply in Nigeria. Also listed in that study were difficulty with medicines selection, procurement, distribution, inventory management, and inadequate storage infrastructure. The results from this study differ from the vaccines study because inadequate storage facility was not a challenge. The finding that financial constraints, poor information management and inadequate human resources were identified as part of the challenges confronting the supply chains for vaccines in the country, are in agreement with the results from this study, where inadequate human resources, misappropriation of DRF Funds, poor inventory management and distribution of medicines resulted in stock outs.

The factors listed in this study are similar to the Nigerian study on COVID-19³⁶ which reported that inadequate funding of drug supply, transportation and distribution facilities, poor selection and procurement practices, involvement of incompetent persons in procurement, and poor performance of drug suppliers to public health care institutions were responsible for medicines shortage. The results also agree with the survey of asthma medications that reported inefficient procurement systems as being responsible for shortage.⁴³ The results are also similar to the survey on vaccines wastage in Lagos which reported poor reliability and availability of data for forecasting and decision making as factors.⁴

The results are also in agreement with the South African study⁴⁵ which identified inefficient inventory control systems as part of the causative factors, but differ from the

reports on inadequate storage facilities and irregular power supply as causative factors. They also differ from the Ethiopian Study⁴⁶ which reported inadequate storage space for antiretroviral drugs and other HIV/AIDS related products as factors. The results differ from the Indian Study⁴⁷ which identified weak policies, non-adherence and poor implementation of policies on medicines supply as challenges. The results differ from that of the Nigerian study⁴⁰ which listed insurgency as a challenge to the medicines supply chain as well as natural disasters and pandemics such as COVID-19.⁴⁰

The results are similar to the Ugandan Study that identified financial challenges, lack of human resources and corruption as challenges.⁴⁸ The results differ from the second Ugandan study¹⁴ which reported slow adoption and use of Electronic Logistics and Information Systems to support supply chain processes and functions whereas in this study, lack of electronic management system was not a factor.

Factors listed in this study differ from that of the Nigerian study during the COVID-19 pandemic³⁴ which reported that lack of effective research and development due to poor research support from the government and private companies was a major factor associated with drug scarcity in Nigeria. The finding on inadequate human resources from this study is in agreement with that of the United Nations Group (5), which identified inadequate human resources as a challenge to medicines availability.

As regards recommendations for DRF to function optimally, The Nigerian Study that evaluated DRF operations two decades after inception²⁵ suggested proper planning, appropriate pricing, monitoring, evaluation and good management towards a successful implementation of the DRF, and that the implementation of the DRF scheme be strengthened at all levels of the government. This is similar to the recommendation from this study that DRF be strengthened further to make it more operational. The recommendations from this study are in agreement with the Nigerian study on medicines availability in public hospitals²² which concluded that it is crucial for government to fulfill its mandate of equitable access to care for all by making medicines available and cheap through reviving and sustaining the drug revolving fund scheme and encouraging the prescription of generic drugs in all public health facilities.²²

The Nigerian study on DRF operations recommended among other things that the DRF bank account should be separated from other institutional revenue accounts. However, it is heartwarming that the Federal Government

in 2021 gave a directive for the setting up of dedicated DRF accounts at the Treasury Single Account (TSA) with the Central Bank. This will certainly go a long way to shorten the delay in hospitals accessing funds from the TSA account and this will aid faster payment of suppliers and ultimately improve availability. This agrees with the recommendations on TSA in another Nigerian Study.³¹ This is also in agreement with the views of respondents from this study, who believe incentives should be made available to DRF operators to boost efficiency. This also agrees with the study on Incentive Schemes, Employee Motivation and Productivity in Organizations in Nigeria⁵⁴ which recommends that management must identify the type of incentive that best motivates the employee, design and administer flexible incentive programmes, and also the Study⁵⁵ which revealed a statistically significant relationship between satisfaction with incentives received by frontline health workers and their productivity in rural areas.⁵⁵ The authors⁵⁴ also suggested removal of all forms of exemption from payments by some categories of patients, as this practice could lead to depletion of the capital with time. However, exemption was not observed in this study.

5. Conclusion

For Nigeria to fully benefit from the DRF scheme, the Scheme must be adopted as a health system reform approach that addresses service delivery, medicines supply, financing and management in an integrated way. Key strategies that need to be employed are encapsulated in the following recommendations:

Recommendations

- I. Deliberate and concerted efforts must be made by government and various hospital management to fund the DRF and guarantee medicines availability.
- II. Hospitals should have unfettered access to DRF accounts domiciled in the Federal Governments' TSA account with the Central Bank of Nigeria, to enable them meet up with their obligations to their medicine's suppliers.
- III. Additionally, there is need to further strengthen the DRF as seen from this study, by putting in place legal framework that will prevent hospitals from diverting proceeds from the scheme to other hospital projects. Defaulters should be sanctioned.
- IV. The recent Bill for an Act to give legal backing to the DRF that is being sponsored by the Pharmaceutical Society of Nigeria (PSN) is a

- step in the right direction. The news that the Federal Ministry of Health is sponsoring a Bill to strengthen the DRF as a follow up to the recommendations of a Report submitted by the Association of Hospital and Administrative Pharmacists of Nigeria (AHAPN) to the government is also a welcome development. However, there is need for government to harmonize both Bills, so they do not end up contradicting each other.
- V. Also, the news about the recent government approval of the Pharmacy Council Act is very apt because it will go a long to help sanitize the chaotic drug distribution system in Nigeria, close the open drug markets and with time, contribute to medicines security in Nigeria. The Council should swing into action immediately to sanitize the chaotic drug distribution system in the country, which will in turn make genuine medicines available in the country.
 - VI. The Pharmacy Council of Nigeria should not renew the license of any hospital that tries to introduce any form of PPP that is not in consonance with the procedure laid down by the Pharmacy Council of Nigeria (PCN), the federal government agency responsible for Pharmacy Education, Training and Practice in all its ramifications in Nigeria.
 - VII. There is need for government and various hospital management to address the poor staffing observed in this study by recruiting competent and skilled workers, including stores officers who are verse in supply and logistics chain management.
 - VIII. Hospital management should summon the courage to include heads of pharmacy departments as signatories to DRF accounts, as canvassed in this study. This will ensure that DRF funds are not diverted to other uses, but used to settle suppliers as and when due, in order to guarantee sustainability of the scheme.
 - IX. Despite the short comings of DRF, it is not advisable for government to discontinue the DRF scheme, because of consequences such as worsening medicines shortage (as is currently the case in most public hospitals in Nigeria)(53).
 - X. There is need for DRF operators to keep pace with market prices.
 - XI. Hospital management should put in place reliable supply system essential for regular availability of medicines.
 - XII. Strict supervision of DRF operations is important. There is need to prohibit medicines leakage through pilferage (though not reported as a factor in this study).
 - XIII. Regular monitoring and supervision are essential to assess the effect of DRF on patients and financial performance.
 - XIV. Introduction of incentives to DRF operators as canvassed for by respondents in this and other studies, will boost their morale and productivity (26)(54).
 - XV. Government should introduce cut in tariff of imported medicines to encourage medicines availability
 - XVI. Public hospitals should be supported by government to set up manufacturing units to produce essential Medicines.
 - XVII. Government should introduce a bail-out-fund for various hospitals to enable them offset their indebtedness to pharmaceutical manufacturers.
 - XVIII. Purchase of generic products should be in line with Essential Drugs List.
- This study has revealed that stock outs can actually be reduced to the barest minimum, if the above recommendations can be followed strictly.

Limitations of Study

This study was carried out on only 58 pharmacists practicing in the Pharmacy Department as at the time of the study, hence the small sample size of 58. There is need for further studies with large sample sizes for ease of generalization of the result to the general population.

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Conflict of Interests

The authors declare no conflict of interest.

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