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Article

Assessment of public hospital drug supply financing through the public-private partnership: pharmacists' perspectives

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In Nigeria, drug financing by the public has been challenged by financial constraints through public fund due to a limited fund available to the government to meet all its demands. The objectives of this study were to determine the variability of the hospital patient prices of same drugs under the Public-Private Partnership (PPP) and in Private Retail Community Pharmacy (PRCP), and to investigate the perceived efficiency and effectiveness of the PPP by comparing it with the Drug Revolving Fund (DRF) model in drug supply financing. This study was conducted in Nigeria utilizing a mixed method. Mann-Whitney U test analysis was used to compare the median drug price of the two facilities. The majority (76.19%) of the drugs were sold at a cheaper rate in the hospital than what was obtained in the PRCP with no significance difference ($p > 0.05$). Dominant responses from the focused group discussions supported the PPP model. This study shows that the median patient price of the basket of matched pairs of same drugs in the hospital under the PPP and in the PRCP was identical. Overall, the participants were of the opinion that the PPP model was more efficient and effective than DRFin the financing drug supply.

Keywords: Drug Revolving Fund (DRF). Maiduguri. Nigeria. Public Private Partnership (PPP).

INTRODUCTION

Health is a fundamental human right, access to health care including essential drugs is pivotal to realizing this right. The World Medicines Situation 2004 (WHO 2004) estimated that about one-half of African populations do not have regular access to essential drugs. A baseline assessment of the Nigerian pharmaceutical sector in 2002 revealed low availability of the key drugs in public health facilities (Federal Ministry of Health, 2002). Improving access to quality drugs is of greater concern in sub-Saharan Africa (Bennette *et al*., 1997) and it is currently the most important strategy to reduce disability and death from many diseases.

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The Nigerian healthcare system is organized into primary, secondary and tertiary healthcare levels. The Local Government Areas are responsible for primary healthcare; the State Governments are responsible for providing secondary care while the Federal Government is responsible for policy development, regulation, overall stewardship and providing tertiary care.

In the public sector, funding for health care is insufficient and the available resources may not be well managed; drug stock-outs are common, drug deliveries often late and inadequate (Bennette *et al*., 1997). Consequently, due to low availability of generic essential drugs, the Nigerian government set up a drug revolving fund (DRF) in 1988 on the creation of the National Health Policy (NHP) to guarantee a reliable supply of low-cost generic drugs at all levels of health care.

The DRF was part of a series of health care reforms initiated by the Nigerian government after the meeting of African Health Ministers at Bamako in 1987. DRFs

are a way to guarantee good-quality drugs direct from manufacturers at affordable costs in accordance with the goals of the National Drug Policy (Federal Ministry of Health, 2005a). After an initial capital investment, drug supplies are replenished with the money collected from the drug sales. The DRF is a cost recovery scheme which eliminates intermediaries who often markup drug prices excessively.

Despite many notable successes in expanding access to low-cost essential drugs through DRF during the last two decades, problems persist. These persistent problems compelled the management of the studied hospital to explore the alternative strategy of financing drug supply in order to achieve the National Drug Policy goals. The proposed strategy was to involve the private sector as a means to bring extra funds into the pharmacy and to improve the availability of drugs at a reduced cost. This strategy is congruent with the NHP which also emphasizes the importance of partnerships and collaborations in healthcare provision (Federal Ministry of Health, 2004), hence the development of "National Policy on Public Private Partnership (PPP) for Health in Nigeria" in November 2005 (Federal Ministry of Health, 2005b). As part of the reform process, health sector policy-makers in many countries are actively seeking opportunities to increase the role of private providers and to work more effectively with the private sector (Bennette *et al*., 1997). A "PPP" in healthcare is a collaborative relationship between the public and private sectors aimed towards harnessing and optimizing the utilization of all accessible resources, knowledge, and facilities needed to promote efficient, effective, affordable, accessible, equitable and sustainable healthcare for all people in a country (Federal Ministry of Health, 2005b). PPP has the capacity to expand health-care service delivery and access, and offer a path forward in the pursuit of universal health coverage towards achieving sustainable development goals. Therefore, there has been increased utilization of the PPP model for both community-based and hospital-based integrated health-care service delivery in low-income and middle-income countries, including in sub-Saharan Africa (Schwarz, Nepal, 2018).

In 2010, the management of the studied hospital led a delegation to the University College Hospital (UCH), Ibadan of Nigeria to understudy the PPP model of financing drug supply. Satisfied with the implementation of the PPP model in UCH, the management of the studied hospital adopted this model in financing drug supply and other pharmaceuticals to its facility in 2011. Fund managers were introduced to the pharmacy department in December 2011 to take over the stock and management.

Since the adoption of the PPP model in financing drug supply to the studied hospital, to our knowledge, no study has evaluated its performance. Therefore, the objectives of the present study were to determine the variability of the hospital patient price of drugs under the PPP model and private retail community pharmacy (PRCP) patient price of the same drugs (same strength and brand), and to investigate the perceived efficiency and effectiveness of the PPP by comparing it with the DRF model of drug supply financing. We hope that this study will contribute to the literature in this area of research by providing baseline data on the PPP in healthcare from Africa.

MATERIAL AND METHODS

Study Design and Setting

This was a cross-sectional, prospective study of two months (January-February) duration of 2017 in Maiduguri, Nigeria.

Sampling and Participants

Pharmacy department of University of Maiduguri Teaching Hospital (UMTH), Maiduguri was purposively selected since it was the only hospital in entire northern Nigeria that that was implementing the PPP model in financing drug supply as of the time of the current study. Additionally, one PRCP was randomly selected by balloting out of the two PRCPs within 500 meters from the main gate of the hospital to compare drug prices with a view to ascertaining the effects the PPP model on the drug price in the public healthcare facility studied.

For the quantitative study, 30 essential drugs were identified and selected among the commonly prescribed drugs in the study hospital (Okoro, Shekari, 2013), which is a reflection of the prevalence of diseases in the area. On the other hand, for the qualitative study, eight pharmacists out of all (10) the pharmacists that have participated in the implementation of the two models in the study hospital that were invited agreed and participated in the focused group discussions (FGDs).

Ethical Issues

Ethical approval was obtained from the Research and Ethical Committee of the UMTH, Maiduguri, Nigeria. Informed consent was obtained from the pharmacists that voluntarily agreed to participate in the FGDs.

Qualitative Study Structure

Two FGDs were conducted among eight pharmacists. Group 1 was among three pharmacists who had worked for 8-10 years and has been involved in the implementation of both models, whereas the second group was among five pharmacists who had worked for over 10 years in the service of the hospital and had also been involved in the implementation of both models.

Data collection

Mixed methods (quantitative and qualitative research techniques) were used for data collection. Quantitatively, drug price data were collected from the drug price list of the hospital. To ensure that the actual patient prices of the selected drugs were collected from the PRCP, surrogate customers (3 final year pharmacy students) were used. Qualitatively, responses during the FGDs were recorded in observational notes by a trained research assistant (final year pharmacy student) while audio recordings were also done during the discussion sessions.

Data Analysis

The prices of only 21 successful matched pairs of same drugs (same strength and brand) across the hospital and PRCP were included in the analysis. Price variability across the hospital pharmacy and PRCP was calculated using the formula below:

Price Variability = Hospital patient's price of one tracer drug/Community pharmacy patient's price of same drug X 100

The Nigerian Naira (NGN) to United States of America Dollar (USD) exchange rate on the day of drug prices collection was 1 NGN = 0.0033 USD (Historical Rates for the USD/NGN Conversion, 2017). The drug price data were entered into Microsoft Excel spread sheet and was subsequently transferred into the Statistical Package for Social Sciences software version 21.0 (SPSS, Chicago, IL, USA) for analysis. The patient median price of the basket of 21 matched pair tracer drugs in both the hospital pharmacy and PRCP was compared with the Mann-Whitney U test. The significance threshold was set at $p < 0.05$.

Qualitatively, the audio-record was replayed to get the required information while the observational note was used to complement the information which was subsequently analyzed. Factors affecting the sustainability outcomes of each model were triangulated. Data and method triangulations were done to establish the completeness and confirmation of findings.

RESULTS

Of the thirty essential drugs selected for the study, 27 (90%) was available in the hospital on the day of price determination. These available drugs in the hospital formed the trace drug base. Out of these twenty-seven tracer drugs, 21 (77.78%) matched pair of the same drug (same strength and brands) were successfully obtained from the selected PRCP. Table I reveals the comparative assessment of the cost of drugs in the PRCP and PPP model of the hospital pharmacy. Of these twenty one matched pairs of same drugs obtained, only 4(19.05%) drugs (i.e. Tablet Alpha-methyldopa 250 mg, Injection Amoxycillin/clavulanic acid 600 mg, Tablet Azithromycin 250 mg, and Tablet Diclofenac potassium 50 mg were sold at a higher rate than what was obtained in the PRCP whereas, 16 (76.19%) of the drugs were sold at a cheaper rate than what was obtained in the PRCP. Overall, the patient prices of drugs in the hospital was not significantly different with that from the PRCP ($U = 196$, $p = 0.5737$).

Dominant factors identified by the FGD participants that led to a shift in policy from DRF to the PPP model in drug supply financing in the hospital were shrinkage of DRF, constant out of stock syndrome, PPP is a national policy for health in Nigeria and all federally financed tertiary and teaching institutions were encouraged to formulate, review and implement this national policy, lack of sustenance of infrastructure where drugs are kept, "Boko Haram" insurgency, high cost of some drugs, improper accountability, and non-sustainability of funding of drug purchase by the hospital alone under DRF model. The identified advantages and challenges of the PPP model in the hospital are summarized in Table II.

The FGDs revealed that pharmacists were very much involved in the designing and implementation of the PPP model in the hospital as shown in Table III.

TABLE I – Variability of the patient drug price of the same drug across studied hospital and private retail community pharmacy

Pharmaceutical Products	Pack size	Hospital Patient Price	Private retail community pharmacy patient price	Hospital patient price/private retail community pharmacy patient price x 100 (%)
		NGN(USD)	NGN(USD)	
Tablet Nifedipine 20 mg (Nifedin® by Dexcel Pharma)	30	360(1.19)	900(2.97)	40.00
Tablet Nifedipine 30 mg (Nifecard® by Lek)	30	1650(5.45)	1800(5.94)	91.67
Tablet Furosemide 40 mg (Actavis)	1000	4000(13.20)	4300(14.19)	93.02
Tablet Alpha-methyldopa 250 mg (Dopatab® by Hovid)	100	4650(15.35)	3000(9.90)	155.00
Tablet Amlodipine 5 mg (Norvasc® by Pfizer)	100	7800(25.74)	13500(44.55)	57.78
Tablet Amlodipine 10 mg (Norvasc® by Pfizer)	100	16000(52.80)	18500(61.05)	86.49
Capsule Amoxicillin 500 mg (Amoxyl® by GSK)	100	4800 (15.84)	5000(16.50)	96.00
Tablet Amoxicillin+Clavulanic Acid 625 mg (Augmentin® by GSK)	14	2700(8.91)	3200(10.56)	84.38
Injection Amoxicillin+Clavulanic Acid 600 mg (Augmentin® by GSK)	1	920(3.04)	900(2.97)	102.22
Tablet Cefuroxime 500 mg (Zinnat®by GSK)	10	2480(8.18)	3200(10.56)	77.50
Injection Cefuroxime 750 mg (Zinnat® by GSK)	1	900(2.97)	900(2.97)	100.00
Injection Ceftriaxone 1 g (Rocephin® by Roche)	1	3840(12.67)	4500(14.85)	85.33
Tablet Metronidazole 200 mg(Loxagyl® by May and Baker)	100	500(1.65)	850(2.81)	58.82
Tablet Metronidazole 400 mg (Loxagyl® by May and Baker)	100	400(1.32)	850(2.81)	47.06
Capsule Ampicillin+Cloxacillin 500 mg (Emzoclox® by Emzor)	100	1650(5.45)	2000(6.60)	82.50
Tablet Azithromycin 250 mg (Zithromax® by Pfizer)	6	2970(9.80)	1800(5.94)	165.00
Capsule Fluconazole 50 mg (Drugfield)	10	780(2.57)	1500(4.95)	52.00
Tablet Glibenclamide 5 mg (Daonil® by Sanofi-Aventis)	100	1500(4.95)	2500(8.25)	60.00
Injection Artemether (Paluther® by Aventis)	6	1080(3.56)	2000(6.60)	54.00
Capsule Celecoxib 200 mg (Celebrex® by Pfizer)	10	1850(6.11)	2000(6.60)	92.50
Tablet Diclofenac Potassium 50 mg (Cataflam® by Novartis)	100	7150(23.60)	7000(23.10)	102.14

TABLE II – Advantages and challenges of the PPP model in comparison with DRF model in the studied hospital itemized during the FGD

Advantages	Challenges
Availability of wider range of drugs	Delay in the release of PPP fund trapped in autonomous units (National Health Insurance Scheme (NHIS), Retainership, and Amenity) accounts by the hospital management.
Reduced cost of drugs	Non-reimbursement of the cost of drugs for exempted patients (military, paramilitary personnel and others) by the hospital management.
Provision and maintenance of infrastructure where drugs are kept	Fund managers not abiding by the terms of memorandum of understanding (MoU) by manipulating drug prices and quantity.
Reduced pilferage	Supply of sub-standard drugs by the fund managers.
Shorter time to stock	Monopoly of drug supply due to insurgency.
Stable profit	Non-payment of PPP pharmacist's allowance.
Transfer of risk (hospital no longer responsible for pilferage and expired drugs)	Data intensiveness (requires so much documentation).
Availability of fund for drug supply (private funding of drug supply)	
More robust accountability system	
Employment opportunity for Maiduguri residents	

TABLE III – Pharmacists' involvement in the PPP model design and implementation in the hospital studied

Questions	Participants dominant responses
What was the level of involvement of pharmacists in the designing of PPP?	Pharmacy department drafted the MoU, but the PPP allowance for pharmacists was struck out by the hospital management
What was the level of involvement of pharmacist in the implementation of PPP?	Pharmacists implement the programme except for financial and monitoring aspects
How has PPP helped in achieving National Drug Policy goals in terms of quality, availability and cost of drugs in the studied hospital?	Drug stock-out persists due to difficulty in accessing PPP fund trapped in autonomous units accounts

Table IV reveals the comparative analysis of the PPP and DRF models using some performance indicators. These indicators showed that the PPP model as it was currently run in the study hospital was not sustainable just as the DRF model.

Performance of fund managers in financing drug supply was rated an average of 8.5 on a scale of 1-10 by participants of FGDs, whereas comfort level of pharmacists with the PPP model got an average score of 3.6 on a scale of 1-10. For the PPP model to be sustainable, participants made some recommendations as summarized in Table V.

TABLE IV – Comparative analysis of the PPP and DRF models by participants during FGDs

Indicator	PPP	DRF
Payment schedule: *Fund Managers* *Companies*	**Better:** *Money is given in advance* *Within 1 week of supply of drugs*	**Worse:** - *1 month or more*
Credibility/Stability of suppliers: *Fund managers* *Companies*	**Same:** *Not credible and stable* *Credible and stable*	**Same:** *Not credible and stable* *Credible and stable*
Management of fund	Same	Same
Bureaucracy	Low	High
Mark-up	10 - 20%	Standard 20%
Stock-out	Episodic	Constant
Sustainability	Not sustainable	Not sustainable

TABLE V – Participants recommendations for the PPP model sustainability during FGDs

	Recommendations
1.	Hospital management should endeavour to promptly release the PPP fund trapped in the autonomous units (National Health Insurance Scheme, Retainership, and Amenity) accounts.
2.	Reviewing of the law that created the office of the Chief Medical Director (CMD) of federal teaching hospitals in Nigeria to enable the law itself constitute top management personnel for CMD.
3.	Head of the pharmacy department should be made signatory to the PPP account

DISCUSSION

In this study, we assessed the variability of the hospital patient prices of matched pairs of same drugs under PPP model and from PRCP, and to investigate perceived efficiency and effectiveness of the PPP model by comparing it with DRF model in the drug supply management system of the hospital.

Based on our findings, overall, there was no statistically significant difference in the price of the basket of the matched pairs of the same drugs in the hospital and PRCP. The majority of the pharmacists were of the opinions that the PPP model of drug supply financing in the hospital was better than the deposed DRF model.

More than three-quarters of the basket of drugs surveyed had patient prices cheaper in the PPP model than what was obtained in the PRCP, although the overall variability was not statistically significant. In contrast, an earlier study (Oseni, Afolabi, 2014) reported higher patient drug prices under the PPP than in the PRCP. On the other hand, the finding of our study is comparable to the finding of a nationwide survey done in Nigeria in 2004 (Federal Ministry of Health, 2006) which revealed

that overall patient prices of the same drugs were not so different in public facilities and private pharmacies. This suggests that the PPP model has neither made drug prices much lower nor higher in the public hospital studied.

However, the pharmacists who had participated in the implementation of the DRF and PPP models were of the opinion that the PPP model was better in terms of drug supply financing and availability believing that it has more advantages than the DRF model if various relevant stakeholders strictly adhere to the operational guidelines. These findings are incongruent with that of an earlier study conducted in Ibadan, southwest Nigeria (Oseni, Afolabi, 2014). Participants believed that the challenges of the PPP in the hospital can be handled administratively if the management can promptly reimburse the PPP fund trapped in the autonomous units' accounts, and legislatively if the law that established the office of Chief Medical Director (CMD) of federal teaching hospitals in Nigeria can be reviewed to enable the law itself to constitute the top management officers for the CMD in order to reduce his overbearing influence on the operation of the model. Additionally, they pointed out pharmacists allowance is paramount for the success of PPP model and should be included in the PPP in healthcare policy document as contained in the DRF model. This suggests that staff motivation is critical and should be taken into consideration in the PPP model for its success and sustainability (Oseni, Afolabi, 2014). This corroborates the fact that no matter how well designed and well-considered policies to change programme are, they will falter if the process of implementation is insensitive to the interests of the people and groups who will be affected by them (Bennette *et al*., 1997). Therefore, high-quality service delivery requires a responsive, competent healthcare workforce satisfied with its professional identity and workplace conditions (Papkalla, Kupfer, 2009).

This study is not without limitations. The first limitation is that to ensure comparability, we limited our drug price analysis to the matched pair of only 21 same pharmaceutical products found in both hospital pharmacy and PRCP; however, these findings may not apply to different drugs. Secondly, as at the time of this study, only the hospital studied was implementing PPP model of drug supply financing in entire northern Nigeria, therefore, median price ratio (MPR) of the selected drugs could not be calculated, hence the simple price adopted by this study cannot be used for cross-country comparisons.

CONCLUSION

This study shows that there was no statistically significant difference in the price of the same drugs across the public healthcare facility under PPP and private retail community pharmacy. Moreover, pharmacists who had participated in the implementation of both models were of the opinion that PPP model was more effective and efficient than DRF model in terms of drug supply financing and availability if the operational guidelines are strictly adhered to by the relevant stakeholders.

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REFERENCES

Bennett S, Quick JD, Velásquez G. Public-Private Roles in the Pharmaceutical Sector: Implications for equitable access and rational drug use; 1997.

Federal Ministry of Health. Baseline Assessment of the Pharmaceutical Sector; 2002.

Federal Ministry of Health. Revised National Health Policy (NHP), 1st revised ed. Abuja, Nigeria; 2004, p.2-6.

Federal Ministry of Health. National Drug Policy; 2005a, p.14-16.

Federal Ministry of Health. Medicine prices in Nigeria: Prices people pay for medicines; 2006, p.21-22.

Federal Ministry of Health. National Policy on Public Private Partnership for Health in Nigeria; 2005b, p.7-8.

Historical Rates for the USD/NGN currency conversion on 31 January 2017. https://www.poundsterlinglive.com/best-exchange-rates/us-dollar-to-nigerian-naira-exchange-rate-on-2017-01-31. (accessed 20 March 2018).

Okoro RN, Shekari BG. Physicians' drug prescribing patterns at the national health insurance scheme unit of a teaching hospital in the North Eastern Nigeria. Arch Pharma Pract. 2013;4:3-8.

Oseni YO, Afolabi O. Comparative analysis of drug revolving fund (DRF) and public private partnership (PPP) program on drug supply management in University college hospital (UCH), Ibadan, Nigeria. West Afr J Pharm. 2014;25(2):76-87.

Papkalla U, Kupfer G. HIV-related public-private partnership and health system strengthening. UNAIDS, Geneva, Switzerland; 2009, p.1-32.

Schwarz R, Nepal P. Public-private partnership integrated health-care delivery: experience and lessons from Nepal. The LANCET Global Health Blog. 2018. http://globalhealth.thelancet.com/2018/02/20/public-private-partnership-integrated-health-care-delivery-experience-and-lessons-nepal. (accessed 04 April 2018).

World Health Organization. The World Medicines Situation; 2004.

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