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ORIGINAL STUDY

Availability of Essential Medicines in Healthcare Facilities Offering Maternal and Reproductive Healthcare Services in Nigeria

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Abstract

Background: The availability of essential medicines is important in preventing maternal and child deaths. This study assessed the availability of essential medicines in healthcare facilities offering maternal and reproductive healthcare services in Nigeria.

Method: This study was cross-sectionally designed using structured interviewer-administered survey questions and site inspections. The study was conducted across all States in Nigeria except three states (Borno, Adamawa, and Yobe) that had security challenges. The survey was carried out between May and July 2019. The data were analysed with IBM-SPSS version 25.0.

Results: The mean availability of 17 essential medicines was 58.8%. South-East has a very low availability of 49.1%, North East, South West, and South–South had availability below 60% whereas North-West (71.8%) and North–central (60.2%) had higher availability ($p < 0.05$). Only 45 of 861 (5.2%) facilities were assessed for all the essential medicines. Mean availability of some drugs was either low or fairly high: ampicillin (71.5%–84.1%), metronidazole (72.4%–90.9%), oxytocin (71.2%–92.2%), Sodium lactate/Sodium chloride (74.5%–95.5%), and Gentamicin (69.7%–90.0%). Our study also found a low and fair availability of medicines including misoprostol (44.5%–69.5%), Azithromycin (23.0%–61.0%), Betamethasone/Dexamethasone (56.2%–59.0%), Calcium Gluconate (16.8%–50.0%), Cefixime (22.6%–48.7%), and Mifepristone (2.2%–20.1%), depending on regions (lowest in the South–South/South-East and highest in the North-West/North–Central). The level of availability of the seven life-saving medicines was significantly higher in urban (71.7%) locations than rural areas (47.3%) ($p < 0.05$).

Conclusion: It is advocated that these medicines be made available in all health facilities offering Nigeria's maternal and reproductive healthcare services.

Keywords: Essential medicines, Maternal deaths, Reproductive health, Healthcare facilities

1. Introduction

The idea of the availability of essential medicine is like the collection, delivery, and quantification of pharmaceutical logistics systems. Failure in any of these processes would cause the pharmacy management process to fail [1]. Many significant factors are contributing to maternal and infant mortality, and morbidity in low-resource settings,

some of them are poor quality, unaffordable and inaccessible healthcare [2–6]. Pharmaceuticals are particularly critical in health care delivery, and careful supply chain management can improve their daily availability. To realise the goal of dropping maternal mortality and morbidity, maternal healthcare programmes strive to help pregnant women stay healthy and strong during pregnancy and delivery [5,7–9]. Facilities should be made adequate and open to achieve this goal through

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functionally structured clinical systems to improve patient safety.

In developing countries, including Nigeria, the secondary challenge of the health scheme and monetary obstacles faced by both policymakers and end consumers is said to be caused by the hindrances that hinder access to adequate provisions, the insufficiency of high-grade health supplies, and the failure to control these provisions [2,10–13]. The areas of sub-Saharan Africa and Southern Asia jointly accounted for between 66% and 76% of all global maternal deaths in 2015 (303,000 out of a total of roughly 401,000 deaths) [14]. This was the product of postpartum haemorrhage occurring in low-income countries, with death rates of approximately 150 per 100,000 deliveries in sub-Saharan Africa. In the UK, mortality rates were nil per 100,000 deliveries [15]. The United Nations (UN), in its sustainable development goal 3 (SD-3), planned to “advance the policy of reducing the global maternal mortality ratio to less than 70 per 100,000 live births and to prevent the death of children under five years of age with health objective targets as low as 12 per 1000 live births by 2030” [6] Achieving these goals largely depends on the availability of quality health services and quality medicines, and other healthcare commodities.

Many maternal and infant deaths are preventable or treatable through essential medicines and products. The WHO, UNICEF, and UNFPA issued a list of 30 drugs to help meet the critical health needs of mothers and children in 2011. Healthcare facilities offering maternal and reproductive healthcare services in Nigeria provide drugs for the prevention and treatment of postpartum haemorrhage, extreme pre-eclampsia, and eclampsia, as well as sepsis, parental conditions, medical abortion, and complications related to abortion or miscarriage [16]. Essential drugs for infants encompass the treatment of diarrhoea, malaria, neonatal sepsis, HIV/AIDS, and vitamin A deficiency. This was intended to make sure the maternal and child health care hospitals were still open so that mothers and their babies could receive the medicines at all times. Droiti et al. (2019), in their study titled “poor availability of essential medicines for women and children threatens progress towards Sustainable Development Goal 3 in Africa”, found that “the mean availability of 12 essential medicines for women and children varied. For women, it ranged from 22% to 40%, while for children, it ranged from 28% to 57%; also, below 1% of all the facilities had all the essential medicines.” Information on the current state of essential medicines in Nigerian health facilities is scanty, and the few data available either

address this issue in a few facilities or regions. This study aimed to determine the availability of essential medicines in healthcare facilities offering maternal and reproductive healthcare services in Nigeria.

2. Methodology

2.1. Study design

This study was cross-sectionally designed using structured interviewer-administered survey questions and site inspections. The facility assessment was performed using a quantitative method. Both site inspections and one-on-one interviews methods were employed during data collection.

2.2. Setting

The study was conducted across all States in Nigeria except three states (Borno, Adamawa, and Yobe) that had security challenges. The survey was carried out between May and July 2019.

2.3. Data sources and collection

There were two major sources of data: people and site visits. Individuals at the facility levels were consulted for the evaluation through individual interviews. The team visited facilities to elicit information from the key personnel to obtain data to calculate output indicators. Data obtained from various sites were examined, cleaned and analysed for inference and drawing conclusions. A questionnaire was designed and used to collect relevant data at the facilities.

2.4. Cleaning and analysis of data

The data collected from the different sources were collated in a database using MS Excel. The IBM-Statistical Package for Social Sciences (SPSS) version 25 was adopted for data analysis. The data was analysed using statistical tests, including frequency, percentage, and chi-square, the results and reported findings were presented accurately and impartially. In this study medicines are said to be available if present on the day the research teams visit the facilities [17] and was grouped based on the number of facilities having essential drugs using the Availability evaluation index ranges: “<30% - very low; 30%–49% - low; 50%–80% - fairly high, >80% - high” [18]. The generated data were exported to MS Excel to calculate final indicators as presented in the National and state tables.

2.5. Ethical issues

The site inspection and interviews were briefly conducted to avoid interference with the interviewees and facility working processes. Respondents were also supplied with adequate information regarding the survey, the potential use of the outcome, and the process and duration of interviews. The team also assured respondents about the confidentiality of the source for obtained information. It allowed them to refrain from answering questions if they felt uncomfortable responding.

3. Results

Table 1 shows the regional distribution of 17 essential medicines in Nigerian health facilities, with statistical significance indicated by $p < 0.05$. Among the regions, the north central region (179) had the most significant number of health facilities visited. In all regions, the availability of certain medicines such as ampicillin, metronidazole, oxytocin, and Sodium lactate/Sodium chloride was fairly high (>70%). In the North-West region, the availability of Azithromycin Benzathine Benzylpenicillin was fairly high, with rates of 61.0% and 71.1% respectively. However, in the other areas, the availability was low, measuring less than 49% and less than 60% respectively ($p < 0.001$). In all regions, the availability of Betamethasone/Dexamethasone remained generally below 60% ($p > 0.05$). In all

regions, the availability of Calcium Gluconate, Cefixime, and Mifepristone was very low. However, the North-West and South-West regions exhibited slightly higher levels of availability ($p < 0.05$). The availability of the 17 essential medicines in the Nigerian health facilities visited was calculated for each region, and the results were expressed as percentages. The overall percentage was fair (58.8%) in all regions and significantly higher in North-West (71.8%), North-Central (60.2%), and South West (57.9%), but south-east had the least availability (41.9%), ($p < 0.001$).

Table 2 presents the percentage distribution of essential medicines in rural and urban health facilities in Nigeria. The analysis examined the association between the location of the health facilities using the chi-square (χ^2) test, with statistical significance assessed by the p-value. The availability of some drugs was extremely low in rural health facilities. These include Azithromycin (24.6), Calcium Gluconate (23.1), Cefixime (18.7), Hydralazine (31.0), Magnesium Sulfate (25.7), and Misoprostol (37.8) while Mifepristone was almost absent in both urban (16.7) and rural (4.4) health facilities.

Fig. 1 shows the availability of seven lifesaving maternal/RH medicines in health facilities by region and location. These lifesaving maternal/RH medicines include the two mandatory medicines [Magnesium Sulfate and Oxytocin] and any other five remaining medicines on the list. Any Sodium chloride and Sodium lactate compound solutions are

Table 1. Regional variation of availability of essential drugs in Nigeria.

SN	Medicines	North West (154)	North East (76)	North Central (179)	South West (176)	South East (137)	South-South (139)	Total (861)	P-value $p < 0.05$.
1	Ampicillin	118 (76.6)	56 (73.7)	142 (79.3)	148 (84.1)	98 (71.5)	105 (75.5)	667 (77.5)	0.130
2	Azithromycin	94 (61.0)	26 (34.2)	78 (43.6)	72 (40.9)	35 (25.5)	32 (23.0)	337 (39.1)	<0.001
3	Benzathine Benzylpenicillin	111 (72.1)	34 (44.7)	104 (58.1)	82 (46.6)	80 (58.4)	72 (51.8)	483 (56.1)	<0.001
4	Betamethasone/Dexamethasone	90 (58.4)	45 (59.2)	106 (59.2)	100 (56.8)	77 (56.2)	82 (59.0)	500 (58.1)	0.992
5	Calcium Gluconate	77 (50.0)	31 (40.8)	67 (37.4)	77(43.8)	23(16.8)	46 (33.1)	321(37.3)	<0.001
6	Cefixime	75 (48.7)	22 (28.9)	62 (34.6)	73(41.5)	31 (22.6)	45 (32.4)	308 (35.8)	<0.001
7	Gentamicin	140 (90.0)	53 (69.7)	156 (87.2)	134 (76.1)	103 (75.2)	116 (83.5)	702 (81.5)	<0.001
8	Hydralazine	107 (69.5)	34 (44.7)	101 (56.4)	77 (43.8)	43 (31.4)	66 (47.5)	428 (49.7)	<0.001
9	Magnesium Sulfate	110 (71.4)	44 (57.9)	89 (49.7)	80 (45.5)	29 (21.2)	45 (32.4)	397 (46.1)	<0.001
10	Methyldopa	124 (80.5)	34 (44.7)	109 (60.9)	117 (66.5)	73 (53.3)	96 (69.1)	553 (64.2)	<0.001
11	Metronidazole	140 (90.9)	55 (72.4)	164 (91.6)	160 (90.9)	121 (88.3)	124 (89.2)	764 (88.7)	<0.001
12	Mifepristone	31 (20.1)	12 (15.8)	22 (12.3)	9 (5.1)	3 (2.2)	11 (7.9)	88 (10.2)	<0.001
13	Misoprostol	107 (69.5)	43 (56.6)	91 (50.8)	94 (53.4)	61 (44.5)	63 (45.3)	459 (53.3)	<0.001
14	Nifedipine	124 (80.5)	43 (56.6)	110 (61.5)	103 (58.5)	64 (46.7)	87 (62.6)	531 (61.7)	<0.001
15	Oxytocin	142 (92.2)	61 (80.3)	146 (81.6)	140 (79.5)	102 (74.5)	99 (71.2)	690 (80.1)	<0.001
16	Sodium lactate/Sodium chloride	142 (92.2)	57 (75.0)	137 (76.5)	138 (78.4)	102 (74.5)	112 (80.6)	688 (79.9)	0.001
17	Tetanus Toxoid	147 (95.5)	66 (86.8)	147 (82.1)	129 (73.3)	98 (71.5)	108 (77.7)	695 (80.7)	<0.001
	% Availability	71.80%	55.40%	60.20%	57.90%	49.10%	55.40%	58.80%	<0.001

Significant at $p < 0.05$.

Table 2. Percentage distribution of essential medicines in rural and urban health facilities in Nigeria.

SN	Medicines	Urban (406)	Rural (455)	χ^2	P-value ($p < 0.05$).
1	Ampicillin	330 (81.3)	337 (74.1)	6.398	0.011
2	Azithromycin	225 (55.4)	112 (24.6)	<0.001	
3	Benzathine Benzylpenicillin	262 (64.5)	221 (48.6)	22.192	<0.001
4	Betamethasone/Dexamethasone	291 (71.7)	209 (45.9)	58.386	<0.001
5	Calcium Gluconate	216 (53.2)	105 (23.1)	83.272	<0.001
6	Cefixime	223 (54.9)	85 (18.7)	122.675	<0.001
7	Gentamicin	358 (88.2)	344 (75.6)	22.526	<0.001
8	Hydralazine	287 (70.7)	141 (31.0)	135.271	<0.001
9	Magnesium Sulfate	280 (69.0)	117 (25.7)	161.521	<0.001
10	Methyldopa	323 (78.6)	230 (50.5)	78.574	<0.001
11	Metronidazole	374 (92.1)	390 (85.7)	8.802	<0.003
12	Mifepristone	68 (16.7)	20 (4.4)	35.681	<0.001
13	Misoprostol	287 (70.7)	172 (37.8)	93.231	<0.001
14	Nifedipine	328 (80.8)	203 (44.6)	118.767	<0.001
15	Oxytocin	365 (89.9)	325 (71.4)	46.001	<0.001
16	Sodium lactate/Sodium chloride	359 (88.4)	329 (72.3)	34.707	<0.001
17	Tetanus Toxoid	373 (91.9)	322 (70.8)	61.394	<0.001
% Availability		71.70%	47.30%	210.535	<0.001

Significant at $p < 0.05$.

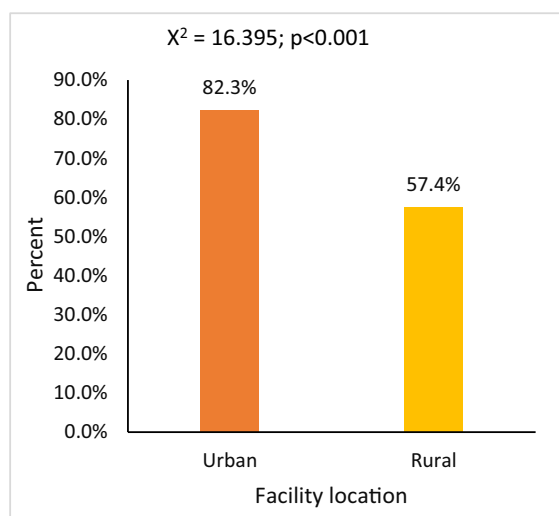
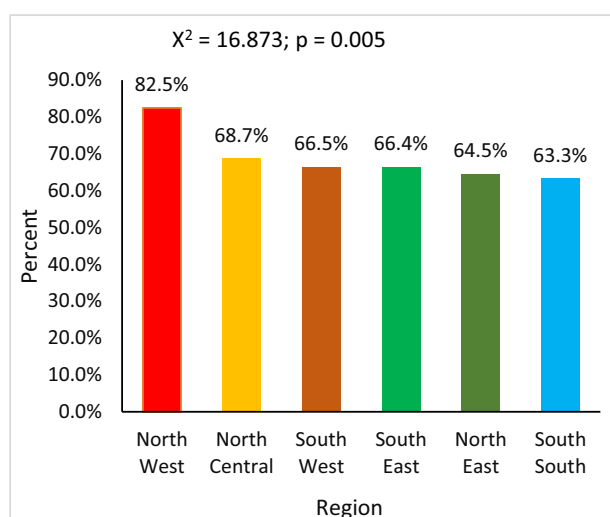


Fig. 1. Availability of 7 essential medicines for MRH by region.

alternatively considered available. Also, any of Dexamethasone and Betamethasone is alternatively regarded as public. Availability of the seven life-saving maternal/RH medicines was high in North-West only (82.5%) and fairly high in all other regions ($<70.0\%$) ($p < 0.05$). Also, urban facilities had high availability (82.4%) of the lifesaving maternal/RH medicines as compared to low availability (57.4%) in rural health facilities ($p < 0.001$).

4. Discussion

The findings of this study showed the poor state of the availability of essential medicines in Nigeria's health facilities. The availability of 17 essential medicines was less than 60% across the country, with a mean availability of 58.8%. South-East has a very low availability below 50% while North East, South West, and South-South had availability below 60%. Only the North-West (71.8%) and North-central (60.2%) had higher availability of the 17 essential medicines, which significantly varied between regions. Only a few facilities, 45 of 861 (5.2%), had all the essential medicines assessed. This agrees with a study that reported low availability of 12 priority essential medicines for both children and women in eight sub-Saharan African countries though Nigeria was not included [14]. The study reported the mean availability of essential medicines for women like 22–40% and children 28–57%; besides, below 1% of the facilities had all the medicines assessed.

Availability of ampicillin, metronidazole, oxytocin, Sodium lactate/Sodium chloride ranged from fairly high to high in all regions: ampicillin (71.5%–

84.1%), metronidazole (72.4%–90.9%), oxytocin (71.2%–92.2%), Sodium lactate/Sodium chloride (74.5%–95.5%), and Gentamicin (69.7%–90.0%). Although several scholars have addressed the inclusion of essential medicines in maternal and reproductive health services (for women and children) to the best of our knowledge, studies assessing their availability in entire Nigeria are very rare.

In line with the findings of this study, the high availability of oxytocin and magnesium sulfate have been reported in previous studies. For example, a qualitative study comprising 37 countries, 18 were from Africa, reported regular availability of oxytocin in 89% and magnesium sulfate in 76% of the studied countries. Another study reported high oxytocin and magnesium sulfate availability of about 70% in 18 (16 of which were African countries) low-income countries [8]. Droti et al. (2019) also reported a range of 37%–85% availability of oxytocin in eight sub-Saharan African countries. Though oxytocin was available in most of the facilities, reported have however documented threats to the quality of this medicine posed by poor storage and lack of competent personnel to administer the drugs [9,19] which is, in turn, a challenge to the quality of care [20–22].

Our study also found a low and fair availability of medicines including misoprostol (44.5%–69.5%), Azithromycin (23.0%–61.0%), Betamethasone/Dexamethasone (56.2%–59.0%), Calcium Gluconate (16.8%–50.0%), Cefixime (22.6%–48.7%), and Mifepristone (2.2%–20.1%), depending on regions (lowest in the South–South/South-East and highest in the North-West/North–Central). Previous studies have reported insufficient availability of misoprostol of 1–11% of health facilities in eight sub-Saharan African countries [14] and 27% of facilities in 37 low-income countries [18]. This revealed that access to essential medicines is limited in some parts of Nigeria due to the non-availability of these medicines.

This study also shows that the availability of essential medicines in Nigeria is highly influenced by the region and location of the health facilities. This is reflected in the variation in the availability of these medicines from the North to the South and between rural and urban locations. Availability of seven lifesaving maternal/RH medicines significantly varied from 82.5% in the North-West to 63.3% in the South–South. Also, the gap was very wide between rural 57.4% and urban with 82.3% availability ($p < 0.05$). Droti et al. (2019) reported a mixed pattern of availability of essential medicine for women and a similar pattern for children in rural and urban locations, unlike this study that found

significantly higher availability in urban than in rural areas.

The strength of this study is its coverage of health facilities in 33 of 36 states, including the FCT, Nigeria. The large number of facilities surveyed showed a good representative of the Nigerian health sector. However, the limitation of the study is that we were unable to identify the causes of the unavailability, which may be low demand or inadequate supply of the essential medicines.

5. Conclusion

This study assessed the availability of essential medicines in Nigeria health facilities. The study found a low availability of these medicines in some regions such as South-East, South–South and North East, but fairly available in North-West, North–central, and South West. The availability of the seven live-saving medicines was significantly higher in urban locations than in rural areas. It is advocated that these medicines be made available in all health facilities offering maternal and reproductive healthcare services in Nigeria.

Conflict of interest

The authors report no conflict of interest.

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Nil.

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