

The public health sector supply of modern contraceptives in rural Nigeria: an analysis of selection, forecasting and inventory control

La fornitura pubblica dei moderni contraccettivi nella Nigeria rurale

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Abstract

Public health facilities in rural Nigeria have been experiencing a long period of stock-outs and unavailability of modern contraceptives. This work was carried out to review the public health sector supply of modern contraceptives in rural Nigeria in order to make recommendations on how to improve the supply of modern contraceptives in this area. The study reviewed secondary data from country documents and literature obtained from Pubmed, Popline, and Global Health databases; as well as websites of USAID/DELIVER Project, Measure DHS and Federal Ministry of Health. The study revealed that a wide range of contraceptives are included in the essential drug list to be used in secondary facilities, while only a few ones are selected to be used in primary facilities which serve the majority of rural population. Forecasting is done using issue data from the central warehouse because facilities are not generating reliable consumption data. Inventory control is poor in rural facilities, and these facilities do not follow the established inventory control guidelines. The study therefore demonstrates that the current essential drug list should be reviewed in order to include injectables for use in primary facilities, strengthen the current forecasting, data reporting and inventory control system.

Keywords

Modern contraceptives; Selection; Forecasting; Inventory control; Rural-Nigeria

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Disclosure

The authors declare that they have no financial competing interests

Introduction

There is no successful family planning program without contraceptives. According to Steven W. Singing, Director-General of International Planned Parenthood Federation, «trying to run sexual and reproductive health programs without contraceptives [...] is like trying to eradicate smallpox without vaccines. It simply cannot be done» [1]. Nigeria is faced with the challenges of meeting the increasing demand for modern contraceptives as a result of the population growth and the increased utilisation of modern contraceptives [2]. Meeting this increase in demand requires an efficient supply system in order to make contraceptives available to clients at service delivery points (SDPs).

Access to modern contraceptive supplies in Nigeria is crucial because unmet needs for family planning (20%), total fertility rate (5.7), maternal mortality ratio (545 deaths per 100,000 live births), and rate of unintended pregnancies (20%) and abortions (10%) are high [3,4].

Furthermore, in this country a great difference exists in contraceptives access and utilization between urban and rural areas. The use of modern contraceptives in rural Nigeria is low: only about 6.5% of married rural women use some methods of modern contraception compared to about 16.7 % of married urban ones [3].

The health system in Nigeria is decentralised into tertiary, secondary and primary levels of care [5]. Rural Nigeria is mainly served by secondary and primary facilities, with the primary institutions serving the majority of rural people. There are about 4,000 primary facilities and 800 secondary ones providing family planning services [6].

The private sector is the major source of contraceptives (60%) in Nigeria [3]. It is not well represented in rural areas because private companies are mostly profit-driven and therefore prefer to be located in urban areas where demands, and consequent profits, are higher. As a consequence, rural population depends mainly on the public sector for the provision of modern contraceptives [2]. This makes access to modern contraceptives difficult, especially for those living in areas where there are no public SDPs or where contraceptives are in short supply or unavailable due to the weak performing supply system in the public health sector [7].

This research aims at studying the public health sector supply of modern contraceptives in rural Nigeria by analysing contraceptives product selection into the essential drug list (EDL), forecasting (quantifying contraceptives need) and inventory control (monitoring when to order or issue a product); the final aim is to make recommendations on how to improve the supply of modern contraceptives in rural Nigeria.

Search of the literature

This study reviewed secondary data from country documents and literatures obtained from Pubmed, Popline, and Global Health databases, as well as USAID/DELIVER Project, Measure DHS, Federal Ministry of Health, and National Population Commission websites to review the modern contraceptives supply in public health facilities in rural Nigeria and learn lessons from other developing countries and international practices.

Search terms used to retrieve information electronically include: *contracept**, *family planning*, *birth control*, *child spacing*, *avail**, *supply*, *access**, *logistics*, *selection*, *forecast**, *inventory*, *distribution*, *contracept* avail**, *contracept* management*, *contracept* supply*, *contracept* access**, *family planning method supply*, *family planning methods avail**, *Nigeria*, *Rural*, *village*, *developing countr**, *low and middle income countr**. Single and combinations of terms (using “AND/OR”) were used in the search. The search yielded different number of hits and article titles and abstracts were read for relevance before selection. Articles were selected based on relevance to study subject; studies performed in developing countries, and articles published before 1990 were excluded from the review.

Findings

Selection

The study revealed that a wide range of contraceptives are selected and included in the EDL to be used at tertiary and secondary facilities in Nigeria (Table I) [8]. However, a majority of the rural population does not have access to these range of contraceptives because secondary facilities offering family planning services are few and inaccessible to them [6].

The study also showed that the primary health care essential drug list for primary health centres (PHCs) contains oral contraceptives and barrier methods while only the condom is selected for village dispensaries [8].

Forecasting

Forecasting in the public sector is done bi-annually by the United Nations Population Fund (UNFPA) and the Federal Ministry of Health (FMOH) through the Forecasting and Procurement Committee.

Forecasting in Nigeria is done using issue data (i.e. data based on amount of contraceptives supplied to state stores) from the central warehouse, because there are no reliable consumption data (i.e. based on amount of contraceptives dispensed to client) from states and local government areas (LGAs) SDPs [7,9]. A survey shows that only 30.4% of stores sends reliable store distribution reports and of the SDPs sending consumption reports, only 12.3% sends reliable consumption data to the higher levels [7]. Reliable consumption data are inadequate because of poor reporting rate and inaccurate filling of requisition report forms by SDPs [7].

Inventory control

An analysis performed to identify the strengths and weaknesses in seven key areas that affect the availability of reproductive health commodities in Nigeria [5] showed that in this country both guidelines for maximum and minimum stock level (maximum and minimum amount/period during which contraceptives can be held by a facility) and a reordering process for facilities in each level of the supply chain exist. However, facilities do not comply with the reordering process due to inadequate number of staff members with technical knowledge on inventory management, poor supervision from higher level to ensure proper reporting, lack of funds to order the quantity of contraceptives needed and low demand for contraceptives in some facilities [5]. An assessment of state stores and SDPs shows that most facilities were stocking most contraceptives below minimum levels [7]. In particular, about 80-90% of SDPs stocks below minimum levels the most commonly preferred method of contraceptives, the injectables. This study also showed that there are no established guidelines for redistribution of unused contraceptives; moreover, communication between lower and higher facilities is poor [5]. This can lead to accumulation and expiring of unused contraceptives in facilities.

Contraceptives type	Tertiary facility	Secondary facility	Primary facility
Oral contraceptives	Selected	Selected	Selected
Injectables	Selected	Selected	Not selected
Intrauterine devices	Selected	Selected	Not selected
Barrier methods	Selected	Selected	Selected

Table I. Contraceptives selected and included in the essential drug list (EDL)

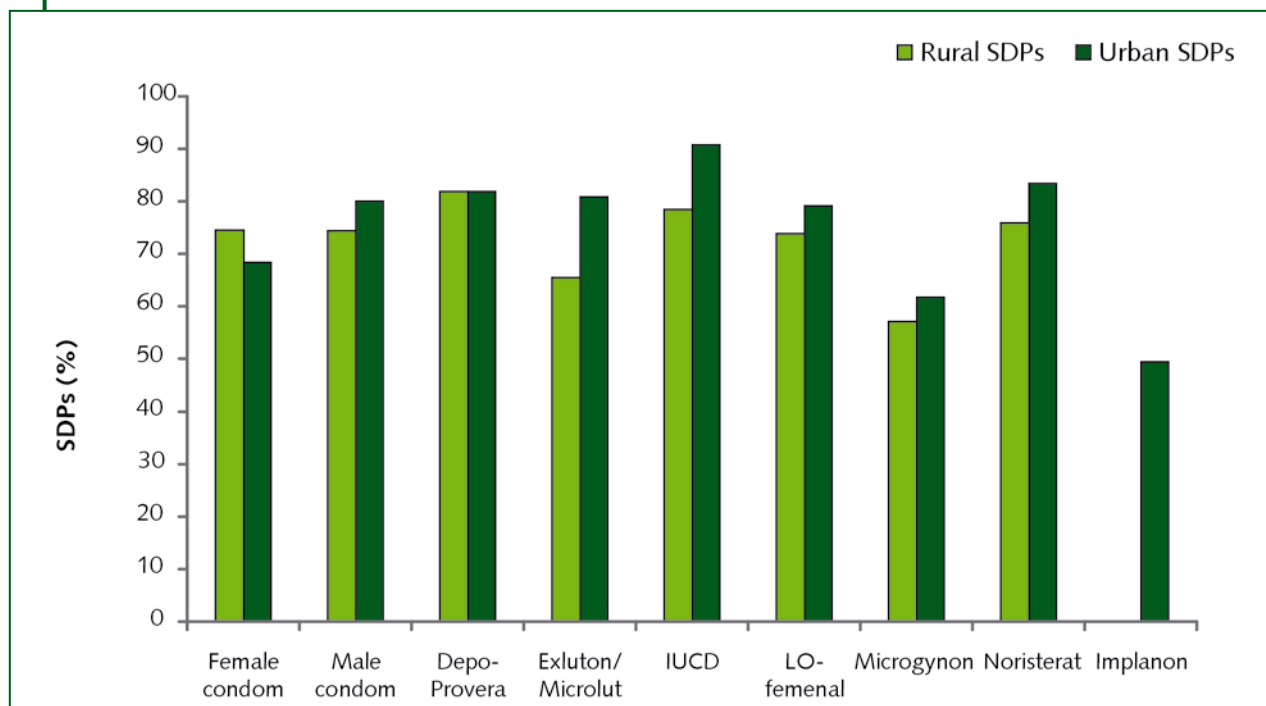


Figure 1. Availability of contraceptives at urban and rural levels [7]

IUCD = intrauterine contraceptive device; SDPs = service delivery points

There are no accurate records of daily contraceptives dispensed and, as a result, safety stock (i.e. stock set aside to prevent stock-out) is not maintained and inappropriate orders are placed by rural SDPs. In the previous quoted survey, only 58% of rural SDPs' order met the minimum benchmark for ordering of contraceptive [7]. The poor inventory control and lack of proper monitoring of safety stocks by SDPs may be responsible for the long period (74-139 days) of stock-out of contraceptives observed in SDPs; moreover stock-outs were more marked in rural facilities with the availability of contraceptives in rural facilities ranging from 0 to 80% (Figure 1) [7,9].

Analysis of findings

The study revealed that injectables and long-term methods of contraception were not included in the EDL at the primary level. This may be associated with the inadequate technical capacity of staff and safety of administration of these contraceptives at this level. However, some PHCs have been shown to have trained doctors and nurses who are qualified to administer these contraceptives [10].

The consequence of the non-inclusion of these contraceptives, and especially the injectables, for use in PHCs, is the low utilisation of modern contraceptives and the resultant high fertility rate and unmet need of contraceptives in rural Nigeria, since injectables have been shown to be the most preferred method of contraception in rural Nigeria [3,11]. In addition, this will continue to create a great difference between urban and rural areas and hence inequity in terms of access to contraceptives, thus negating the goal of the National Drug Policy of ensuring equitable access to essential medicines [12,13]. This may account for the reason why the urban woman is 2 times more likely to use injectables than the rural woman [3]. Some developing countries like South Africa have injectables included in their EDL for use at the primary health care level [14]. A trial performed in Uganda shows that contraceptives injections can

Mean	Examples
Technological developments that can make injections safer for administration	<ul style="list-style-type: none"> • Subcutaneous injections, which have less complications than intramuscular injections • Non-reusable disposable syringes
Actions that need special attention	<ul style="list-style-type: none"> • The possibility that a woman is already pregnant (or seeking an abortion by using an injectable) • The screening of women with pre-existing conditions or on medications • The need for counselling for side effects (in particular: vaginal bleeding irregularities, amenorrhea, weight gain, delay in return to fertility) • The safety of injections to the woman and to the health worker • The possible confusion between different injectables
Means aimed at supporting community workers providing injectables	<ul style="list-style-type: none"> • Medical eligibility criteria wheel to screen for eligibility • Pregnancy checklist • Simplified material for the management of side effects (bleeding, amenorrhea, weight changes, etc.)

Table II. Means of expanding access to injectable contraception [17]

be safely and effectively administered by community health workers (CHWs) in rural areas and Madagascar has effectively administered injectables through 7,000 CHWs [15,16]. In addition, a technical consultation held at World Health Organization (WHO) by a group of experts concluded that evidence supports the introduction of injectables at the primary care level [17].

The popularity of injectables as a contraceptive method is increasing in Nigeria. The use of modern contraception has increased from 4% in 1990 to 10% in 2008 and the use of injectables increased from 1% to 3% respectively (while condom use increased from less than 1% to 2%). The most commonly used injectables in Nigeria are medroxyprogesterone acetate (63%) and norethindrone enanthate (21%) [18]. The Nigerian National Family Planning and Reproductive Health Policy guidelines and standards of practice designate the Community Health Extension Worker (a low cadre of trained medical professionals working mainly in PHC facilities and the main health workforce in rural areas) as facility-based providers of all family planning (FP) methods except surgical methods, implants and intrauterine contraceptive device (IUCD). Therefore, given:

- the preference for injectables in rural Nigeria;
- evidence for safe administration by lower cadre staff at the primary level; and
- the effectiveness of injectables as a contraceptive method than all the other available methods in PHCs in rural Nigeria,

it seems necessary to include injectables in the EDL for use in PHCs as this will improve access to injectables in rural Nigeria and reduce inequity [19].

In addition, this measure will increase rural clients' satisfaction as it gives them the opportunity to choose from a range of contraceptives. However, the appropriate model for delivery of injectable contraceptives in Nigeria would be in the first instance in PHCs that have trained doctors and nurses. After which, CHWs can be trained to administer contraceptive injections. Some means that can usefully expand access to injectable contraception are summarised in Table II.

Various data sources are used for forecasting of contraceptives needs. These include [20]:

- consumption data, i.e. data on amount dispensed to users;
- issue data, i.e. data on amount supplied to facilities by higher level stores;
- service statistics data, i.e. data on clients visits and services provided;
- demographic data, i.e. data based on the contraceptives prevalence rate; and
- distribution system capacity data (data based on the storage and transport capacity of the system).

Nigeria uses issue data in forecasting. The disadvantage with the use of issue data is their non-reflection of contraceptives demand as they do not take into account the consumption of the commodity. Hence, contraceptives need at the rural SDPs may not be easily demonstrated as stock-outs, i.e. the amount of non-consumed contraceptives, would not have been appropriately estimated when using the issue data from central warehouse.

The use of historical consumption data in forecasting is internationally considered the best method of forecasting as it gives reliable projection of future need when compared to other methods of forecasting [20]. Consumption data used in forecasting are effective in enhancing product availability. In Bangladesh, contraceptives stock-out at the SDPs level were observed to be very low as a result of the use of consumption data (about 98% of SDPs sending their reports) in forecasting [21].

In absence of reliable consumption data, like in Nigeria, a combination of data sources can be used to enhance estimates [22]. In Nepal, for example, both consumption and demographic data were used to derive a consensus data for contraceptives forecasting [23].

Strategies used by countries to improve the generation and reporting of consumption data include making the re-supply of contraceptives prerequisite to sending of report (as practiced in Ghana), and training and supervision of staff [24]. In Bangladesh, reporting of consumption data increased from 25% to 98% when SDPs staff were offered training, and regular supervision was carried out [21].

Decentralising forecasting by giving SDPs the opportunity to make their own forecast, have been shown to enhance the accuracy of forecasting [22]. Studies in Ghana and Guatemala have shown that decentralising forecasting and quantifying medicines needs at the lower level facility and sending such needs to the higher level were associated with better performance of the medicine supply system [25]. Staff must have the technical capacity to make accurate forecasting for decentralised forecasting to be successful. This form of forecasting requires having skilled staff in forecasting in all SDPs and may not be feasible in rural Nigeria for now where skilled staff is inadequate.

Therefore centralising forecasting of contraceptives as it is being practiced would be best for Nigeria at the moment. However, the current forecasting can be enhanced by using a combination of issue and demographic data since demographic data are readily available (unlike service statistics and distribution system data which are unavailable and difficult to generate in developing countries from experience). In the long-term, SDPs staff should be trained and regular supervision instituted to promote generation of consumption data.

Inventory control in rural SDPs in Nigeria is poor as SDPs do not adhere to the established minimum and maximum stock level, and re-order process. There is also no communication between SDPs and their higher level stores for the redistribution of oversupplied/unused contraceptives.

Adherence to the inventory management system has been shown to improve thanks to supervision and training. For example a randomised control trial performed in Zimbabwe shows a significant improvement in inventory management in PHCs as a results of training of PHCs staff in stock management and adequate supervision [26]. Also in Bangladesh, staff training and supervision promoted adherence to the established minimum and maximum stock level and this led to a reduction of stock-out and wastage related to expired contraceptives (reduced to less than 1%) [21].

Appropriate channels must be established for product redistribution from SDPs accumulating unused contraceptives [27]. In Uganda, stock-outs were reduced by redistributing contraceptives among facilities. This was achieved through good communication and supervision between SDPs and their higher level stores [28].

Therefore inventory management in rural SDPs in Nigeria can be improved with adequate training of SDPs staff on inventory management and regular supervision.

A new strategy used in inventory monitoring in hard to reach areas is the use of basic mobile phones to send text messages to higher level facilities on inventory status. This has been used with much success (reduce stock-out by 75%) in 135 villages in Tanzania to track the supply of anti-malarias and it

only requires basic training of staffs in sending text messages [29]. Also in Nigeria, UNICEF has used mobile phone technology to track data on immunisation and the distribution of 63 million bednets. Text messages were sent at no cost using no-charge codes donated by telecommunication companies in Nigeria [30]. This technology can be employed to monitor inventory and in reporting consumption data, given its cost-effectiveness and the mobile network coverage of about 60% with more than 63 million subscribers in Nigeria [31].

Conclusion

This study identifies a number of strengths and weaknesses associated with the public health sector supply of modern contraceptives in rural Nigeria. Key strategies identified that would improve the supply of modern contraceptives in rural Nigeria include reviewing the current essential drug list to include injectables for use in PHCs with trained doctors and nurses; strengthening the current forecasting system by using a combination of stock issue and demographic data to make forecast; and employing the use of mobile technology to strengthen data reporting and inventory management.

Questions for further research

It could be interesting to conduct further research in order to investigate safety of injections in private retail outlets, such as pharmacies and drug shops, training pharmacists and drug shop operators as community-based distribution agents. Furthermore it could be useful to collect data about feasibility and acceptability of home- and self-injection and to investigate the pattern-of-use dynamics, reasons for discontinuation, and expected range of discontinuation rates.

The review in brief

Clinical question	This work was carried out to review the public health sector supply of modern contraceptives in rural Nigeria in order to make recommendations on how to improve the supply of modern contraceptives in this area.
Type of review	Narrative
Search of the literature	Secondary data from country documents and literature obtained from Pubmed, Popline, and Global Health databases; as well as websites of USAID/DELIVER Project, Measure DHS and Federal Ministry of Health. Keywords: contracept*, family planning, birth control, child spacing, avail*, supply, access*, logistics, selection, forecast*, inventory, distribution, contracept* avail*, contracept* management, contracept* supply, contracept* access*, family planning method supply, family planning methods avail*, Nigeria, Rural, village, developing countr*, low and middle income countr* (in single and combinations of terms, using "AND/OR")
Conclusions	The current essential drug list should be reviewed in order to include injectables for use in primary facilities, strengthen the current forecasting, data reporting and inventory control system. Centralising forecasting of contraceptives as it is being practiced would be best for Nigeria at the moment. Supply management and product availability are fundamental especially in rural areas, where clients likely have no alternative source in case of a stock-out. Training is necessary to needs to emphasise competencies, and refresher and maintain skills and implementation of supervision and monitoring systems are essential to improve the outcomes. Innovative measure, such as the use of mobile sms, can be useful both in monitoring and in reporting consumption data
Limitations	It is noteworthy that some states/regions may have peculiar challenges with respect to modern contraceptives supply, this was not covered in this study due to inadequate state/region-specific information. In addition, the use of secondary data in this study may not have perfectly addressed all the issues raised because the objectives set when the primary data were collected might be different from that of this study

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