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Availability and Affordability of Fertility Medicines in Abuja, Nigeria

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Abstract

Background: Infertility and childlessness in Nigeria have devastating consequences for families. Infertility treatment and Assisted Reproductive Technology (ART) services are not accessible to many infertile couples due to the high cost of treatments. This study assessed the availability and affordability of fertility medicines to patients at different healthcare outlets in Abuja.

Methods: This was a cross-sectional study conducted in several public (government) hospitals, private clinics, missionary hospitals, and private community pharmacies using a modified methodology manual of World Health Organization and Health Action International (HAI) for collection and analysis of medicine prices. The collected data was sorted and analyzed by the calculation of mean prices, percentage availability and profit margins, using Microsoft excel spreadsheet. Affordability in number of days' wages the least paid government worker will need to work to be able to purchase their medicines were also computed. Inferential analysis was calculated using students t-test and One-Way ANOVA with the aid of GraphPad Instat 3.0 with $p < 0.05$ interpreted as significant.

Results: Out of the ten (10) fertility medicines studied, only six (6) innovator's brands were available. Menopur 75IU was more available (48.75%) in private clinics while community pharmacies had the least availability of all the fertility medications. At $p<0.05$, community pharmacies had a significantly higher profit margin for Menopur 75IU (30.01 ± 3.00%), LG IVF HMG 75IU (31.86 ± 2.93%) and Diclair HMG 75IU (34.14 ± 2.93%) when compared to other facilities. The least paid unskilled government worker will need to work for 786.38 days to be able to pay for a complete treatment dose of Menopur 75IU compared to 635.67 days and 894.78 days for Diclair HMG 150IU and Gonal-F- 75IU respectively. Fertility medicines were totally absent from all missionary hospitals and generic versions were not seen in all facilities studied.

Conclusion: Fertility medicines had poor availability and are not affordable to most people residing in Abuja, Nigeria. There is a need for government subsidies and for pharmaceutical companies to invest in research and manufacturing affordable generic versions of fertility medicines.

Keywords: Affordability; Availability; Fertility Medicines; Infertility; ART; Profit Margin

Abbreviations: LMIC: Low and Middle-Income Countries; ART: Assisted Reproductive Technology; IVF: In Vitro Fertilization;

Background

There has been an increase in the prevalence of the inability to bear children in most developing countries [1]. Infertility in low and middle-income countries (LMIC) is not just a health problem, but a social concern and a public health matter that is often neglected [2]. Based on a 2023 World Health Organization (WHO) meta-analysis, Africa is estimated to experience 13.1% of infertility, with an estimated infertility period (the proportion of individuals/couples with infertility at a specific point in time) of 16.4%, the highest globally [3,4]. It is estimated that 8-12% of individuals in their reproductive age experience infertility, affecting approximately 50% each of males and females [5]. Infertility has significant psychological and social impacts, such as fear, guilt, depression, self-blame, marital stress, emotional abuse, intimate partner violence, divorce and abandonment of the partner, social isolation, economic deprivation, loss of social status, and in some regions (e.g. Africa and Asia) even starvation, disease, violence-induced suicide and loss of dignity in death

[6-8]. Childlessness which results from infertility has great psychological and economic impact on the affected couples [9]. A couple's perception of childlessness is often geared toward perceived benefit of parenthood and economic benefits attributed to having children [9]. For many individuals, being able to have children and having the desired number of children is seen as a key lifetime achievement [10] and makes their lives worthwhile and meaningful [11].

The most common etiologies of infertility in LMIC are male related factors, tubal disease secondary to sexually transmitted infections, unsafe abortion and complications of childbirth [12,13]. About 85% of infertility in Sub-Saharan Africa is due to tubal related infertility compared with 33% worldwide [12]. The most effective treatment is Assisted Reproductive Technology (ART) [2,14]. Most individuals, including those in low-income brackets encounter great financial difficulties in accessing medical interventions and paying for assisted reproduction [15].

Over the past few years, infertility care has gained attention and there has been marked improvement in infertility care services from health care providers. Several treatments, including expensive options such as Assisted Reproductive Technology (ART), are now available for routine use in several public and private healthcare outlets [16]. Annually, 2.6 million in vitro fertilization (IVF) cycles are performed globally, with more than 500 000 babies born [17,18]. The uptake of ART (in vitro fertilization) varies significantly between countries [19,20] possibly due to the cost of treatment, from a patient perspective since most patients pay for these services out-of-pocket as well as from a societal perspective in private and public healthcare systems.

Infertility and ART are not considered a priority in many LMIC due to overpopulation, other health priorities (e.g. family planning, vaccinations, malaria, HIV) competing for limited government budgets and inadequate experience of providers with sub-optimal facilities for performing sophisticated procedures [21]. In Vitro Fertilization (IVF), which is the cornerstone of modern fertility treatment, is not affordable for everyone due to its costs and the lack of inadequate insurance coverage [22]. In the United States, the direct cost of one complete IVF cycle, which includes all fresh and frozen transfers of embryos derived from one oocyte retrieval cycle, is around US$12 000 [23,24], which represents about one-fifth of the average disposable income while in many countries infertility treatment is not reimbursed [25].

Availability and affordability constitute the dimensions of access to medicines [26]. In a developing nation like Nigeria, pricing and availability is a key factor to determine access to effective treatment [27]. Availability is the relationship between the type and quantity of a medicine required and type and quantity delivered [28]. Affordability of treatment of any disease is estimated as the number of day's wages, the lowest paid government worker would be required to pay to purchase the drug at the standard or common dose [29]. It is also the ability of the user to pay for the product measured as the ratio of medicines price and household income [28]. Affordability of medicines is influenced by the patent status of the medicine, market authorization requirements, pricing and reimbursement policies etc.

Infertility and childlessness, particularly in LMIC, have devastating consequences; ART services are not accessible to many of these infertile couples due to the high cost of treatments. Unlike many expensive medical treatments that are covered by health insurance, infertility treatment is usually paid for out of pocket, hence the need to understand the availability and affordability of medicines used in IVF procedures. Knowing the potential full cost of IVF treatment allows for more informed policy making and better individual choice. To the best of the authors' knowledge, there has not been any study to assess the availability and affordability of fertility medications in Nigeria. This study assessed the availability of fertility medicines in the different healthcare outlets and the affordability of these medicines by the lowest paid unskilled government worker in Abuja, Nigeria.

Materials and Methods

Study Type and Setting

A cross-sectional study that investigated the availability and affordability of fertility medicines in healthcare facilities in Abuja, Nigeria. This study was conducted in the 6 Local Government Areas (LGAs) of Abuja, federal capital territory of Nigeria. The study population consists of all government hospitals, private clinics, missionary hospitals and community pharmacies. The city is metropolitan.

Sample and Procedure

The sample of health facilities from which data was collected consists of all government hospitals (since each LGAs has only two each), all missionary hospitals, 35 private clinics and 100 community pharmacies. The clinics and pharmacies were purposely selected to ensure uniform distribution within each LGA with the aid of a healthcare facility registration list obtained from their appropriate regulatory bodies with name and location addresses. A data collection sheet was used to collect data on name and stock keeping unit of fertility medicines that were physically seen and available for dispensing to clients. When a product is identified as available to patients, a 'yes' is indicated in the appropriate row of the availability column of the data collection sheet. A request is also made to see the generic version and if there is any lowest priced one for a client to reduce the cost of treatment. Other information collected included the price for the doses required for a complete IVF procedure and the wholesale price that the facility bought the medicine. The data collection sheet was adapted from Health Action International (HAI) and the

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World Health Organization published manual on the methodology for collection and analysis of medicine prices across sectors in a country [30]. Whenever the necessary approvals required for a facility to be part of the study were not granted the next closest facility in its category (either a clinic or pharmacy) was approached to participate.

Statistical Analysis

Data collected was sorted and analyzed, using Microsoft excel spreadsheet. The availability of each medicine was computed by calculating the proportion of facilities that had the product by the total number of facilities in each category. Profit margins were calculated for the complete doses required for an IVF procedure by dividing the difference between the selling price and the whole sale price by the whole sale price. Both availability and profit margin values were converted to percentages. Affordability in terms of number of days' wages required for the least paid government worker (monthly wage = NGN30,000) to purchase a particular infertility medicine was computed by dividing the price for a complete treatment dose by a day' wage. Inferential analysis was conducted using students t-test and One-Way ANOVA with the aid of GraphPad Instat 3.0 at a statistical level of significance set at $p < 0.05$.

Results

Six innovator brands of fertility medicines were found to be available in a total of 147 health facilities that participated in this study. There were no generic versions in any of the facilities. In addition, none of the missionary hospitals located in Abuja had fertility medicines. The most available product was found to be Gonal-F 75iu (29.25%) followed by Menopur 75iu (25.85%). Both were most common in both private clinics and community pharmacies. Menogon 75iu is more available in government hospitals with 25% of them having the product in stock whereas it is the least available in community pharmacies. See Table 1. Community pharmacies appear to have higher profit margins ranging from about 30 to 34% for 5 out of the 6 medicines found to be available. This was found to be significant for Menopur 75iu, LG IVF HMG 75iu and Diclair HMG 75iu at $p<0.05$ when compared to government and private hospitals. However, Diclair HMG 150iu had the highest mean percent profit margin of 33.33 ± 5.39% in government hospitals though this was found not to be significant ($p = 0.1145$) when compared with other facilities. Further details are presented in Table 2.

Table 1: Availability of fertility medicines in Abuja, Nigeria.

Infertility Medicines	Percentage of facilities with fertility medicines			Total* (N= 147)
	Hospital Pharmacies			
	Government Hospital (n=12)	Private Hospital (n=35)	Community Pharmacy (n=100)	
Menopur 75IU	25	48.57	18	25.85
Menogon 75IU	25	11.43	5	8.16
LG IVF HMG 75IU	8.33	8.57	6	6.12
Diclair HMG 75IU	16.67	17.14	11	12.93
Diclair HMG 150IU	8.33	17.14	6	8.84
Gonal-F 75IU	8.33	65.71	19	29.25

*Availability for all facilities combined.

Table 2: Profit Margins of Fertility medicines.

Infertility Medicines	Mean Percent Profit Margin ± SD (n)			P-value
	Hospital Pharmacies			
	Government Hospital	Private Hospital	Community Pharmacy	
Menopur 75IU	27.78± 3.02 (3)	20.61 ± 9.67 (17)	30.01 ± 3.00 (18)	0.001
Menogon 75IU	24.97 ± 3.43 (3)	30.58 ± 9.12 (4)	30.53 ± 3.01 (5)	0.3987
LG IVF HMG 75IU	21.43 ± 0.00 (1)	23.19 ± 9.59 (2)	31.86 ± 2.93 (6)	0.0001
Diclair HMG 75IU	21.74 ± 0.00 (2)	27.25 ± 9.66 (6)	34.14 ± 2.93 (11)	0.0409
Diclair HMG 150IU	33.33 ± 5.39 (1)	23.85 ± 9.48 (6)	30.85 ± 2.91 (6)	0.1145
Gonal-F- 75IU	21.74 ± 0.00 (1)	30.05 ± 9.75 (23)	32.73 ± 3.01 (19)	0.2564

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Table 3 shows that the least paid unskilled government worker will need to work for 786.38 days to be able to pay for a complete treatment dose of Menopur 75iu compared to 635.67 days and 894.78 days for Diclair HMG 150iu and Gonal-F 75iu respectively in private clinics. Affordability in days wages seems to be higher for all medicines in private clinics though this was only significant for Gonal-F 75iu (p=0.0027) and Menopur 75iu (<0.0001). Gonal-F 75iu is the least affordable in all facilities while Diclair HMG 150iu appears to be the most affordable in government hospitals.

Table 3: Affordability of Fertility Medicines in Abuja.

Infertility Medicines	Affordability of Anti-fertility drugs in days ± SD (n)			P-value
	Hospital Pharmacies			
	Government Hospital (n)	Private Hospital (n)	Community Pharmacy(n)	
Menopur 75IU	516.00 ± 32.12 (3)	786.38 ± 216.22 (17)	468.00 ± 115.11 (18)	<0.0001
Menogon 75IU	451.83 ± 39.45 (3)	550.35 ± 212.37 (4)	416.16 ± 113.47 (5)	0.4125
LG IVF HMG 75IU	490.00 ± 0.00 (1)	540.67 ± 217.19 (2)	475.80 ± 113.56 (6)	0.5815
Diclair HMG 75IU	517.50 ± 53.63 (2)	558.27 ± 224.25 (6)	505.98 ±112.81 (11)	0.5265
Diclair HMG 150IU	340.00 ± 0.00 (1)	635.67 ± 221.09 (6)	434.17 ± 113.36 (6)	0.0751
Gonal-F 75IU	644.00± 0.00 (1)	894.78 ± 220.83 (23)	714.16 ± 117.93 (19)	0.0027

Discussion

The availability of fertility medicines in Abuja, Nigeria was found to be far below 50% which is suboptimal. This study revealed that only the innovator brands fertility medicines were available in the various healthcare facilities. This finding aligns with similar studies on availability of medicines for chronic conditions where they found that availability of drugs in the public sector was about 25% for branded products and 19.44% for generics. In another study, availability of generic medicine was 29.9% to 54% [31,32]. This appears to show that treatment will not be available to those who need it since availability correlates with accessibility [27].

It seems a higher proportion of private clinics have fertility medicines in stock which could be demand driven since only a few government hospitals run fertility clinics compared to private clinics. Demand for fertility drugs in community pharmacies will be based on physician request because pharmacies in general prefer keeping stocks that are fast moving even if they involve substantial capital outlay due to fears of expiration. Waiting for physician request and the lead time needed to make the drug available for use could lead to avoidable delays in treatment. Availability of medicines have been identified as a major determinant of access to treatment [27].

Evidence from previous studies have revealed community pharmacies' mark-ups of 25-38 % on innovator brands and 100-140 % on generic brands. Therefore, profit margins from generic drugs will be higher than that of the innovator brand. Hence, there may be no incentive to stock a slow-moving innovator's product especially if it is not affordable to most of the clients that need it. It is logical to assume that most community pharmacies in Nigeria would prefer to stock generic brands of fertility medicines if they were to be available. This implies that fertility medicines are not easily accessible to infertile individuals since community pharmacies are usually the first point of call for medicines in Nigeria. Thus, access to fertility and IVF treatment is limited in Abuja despite its popularity. This problem may be addressed by the local manufacturing of generic versions of fertility medicines under license from the innovator company.

Higher profit margins in community pharmacies does not imply higher affordability when compared to other facilities. Further investigation revealed that hospitals and clinics obtained their stocks from pharmacies and further mark-up on the product for their own profit income drove up the affordability values for their patients compared to if the client was to purchase the drug directly from the community pharmacy.

About 70 % of Nigerians live on less than US$1.00 a day [33]. This study has identified that a patient who is undergoing IVF treatment for infertility will have to work for not less than 410 days to pay for the complete treatment of the least priced fertility medicine in a private hospital. Since affordability values in days wages appears to be higher in private clinics, it may be an indication that dispensing doctors marking up their medicines could possibly set the stage for irrational drug use as has been reported in Zimbabwe where a desire to increase income was associated with less clinically and economically appropriate prescribing [34]. A Malaysian study has shown that doctors applied markups of 50-76 % on branded drugs and 316% on generics [35]. Though, our finding on profit margins were not this high, allowing patients to obtain the medicines directly from community pharmacies could reduce the cost of the drug component of IVF procedure.

This lack of affordability of fertility medicines due to high costs will reduce assess to fertility medicines for infertile individuals since affordability of medication is a measure of accessibility of the medication to the poor people in a country [36]. The more

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a worker must work to get treatment, the less accessible is the medication. The unaffordability of fertility medicines may also have a negative effect on compliance and a resultant increase in failure rates of IVF treatment in Nigeria [36].

The cost of medicines incorporates several added costs prior to reaching patients and includes the base prices from the manufacturer, costs for transportation, storage, import tariffs and taxes, wholesale and retail mark-ups, staff salaries, stock losses and procurement practices [33]. In Nigeria, it has been reported that landing costs constitute about 44 % of a medicine's price while mark-ups make up a total of 43 %, with the retailer getting 23 %, while the importer gets 12 % and the rest goes to the distributor [37]. In addition, multiple taxation of healthcare facilities in Nigeria by both local and state governments is rampant. These taxes are passed on to patients in the form of high cost of medicines and miscellaneous charges. If landing cost of pharmaceuticals is reduced without price monitoring and control, profits for retailers and dispensing doctors will increase without a price reduction for end users for fertility medicines and IVF treatments [35]. Usifoh and Udezi in a 2014 study opined that there is need for prices of drugs in private clinics to be monitored and controlled [28]. In some countries like Italy and France, prices of medicines are regulated directly through price control [38]. However, in Australia, pharmacoeconomic analysis and reference pricing are used to determine the price of drugs to be subsidized by the government [39].

In Nigeria, a study conducted by Bello et al. [40] revealed that the willingness-to-pay value of an IVF treatment option with a 26% probability of live birth was about NGN700,000 [40]. This amount is more than 22 times higher than the minimum wage thus implying the need for subsidies in infertility treatment. Government should, therefore, explore multiple ways of improving affordability and availability of fertility medicines in Nigeria [28].

Conclusion

Availability of fertility medicines in Abuja, Nigeria, is suboptimal and they are unaffordable due to the extremely high number of days an unskilled government worker will need to work to purchase the quantities required for a complete IVF treatment. Encouraging local manufacture of generic version, price controls, reduction or elimination of taxes and introduction of subsidies maybe possible solutions that can help improve access to fertility medicines.

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