Full Length Research Paper

Factors affecting physicians' prescription and pattern of prescription in the management of secondary infertility

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The management of infertility is a medical and social need and the drugs are usually not in common use and are quite expensive. Several factors may affect choice of drugs and prescription pattern. This work assessed the factors that influence physicians' prescribing decisions for this specialized condition and the prescription pattern in its management. Commonly prescribed drugs and prescribing indicators were evaluated using patients' cases notes and prescriptions for 12 months while a structured questionnaire was administered on the physicians in the unit to assess the factors guiding them in prescription. Data obtained was analyzed using Chi-square statistics. Effectiveness of drugs and costs are major factors that guided the physicians' choice of drugs but the patient's income level however did not have any effect on drug choice. Physicians relied mainly on medical textbooks, journals and the internet for technical information. Generic drugs were perceived as above average quality by the physicians (89.5%), but the years of experience significantly affected their perception of quality of generic drugs and the sources of information. On the filled prescriptions, 51.57% of the drugs were in generics, 96.86% from the essential drug list and an average of 3 drugs appeared per prescription. 51.41% contained antibiotics, while no injection was prescribed. The causes of infertility, effectiveness of the medication and affordability to patients are major factors affecting prescription decisions. Years of experience of physicians greatly influenced decision making. Prescription indicators however fall short of WHO standards.

Key words: Secondary infertility, prescription pattern, factors guiding physician.

INTRODUCTION

Certain factors have been known to affect doctors' prescription pattern in health facilities. Such factors include cost of drugs, perception of drug quality through company image and the country's essential drug list.

Others include patient pressure and high powered salesmanship by drug company representatives (Geoffery et al., 2011; Anteneh, 2013). These factors exert their influence to varying degrees. Availability of

such drugs and pattern inherited from senior physicians are reported to be of high significance while factors like company's promotional activity, promotional tools and cost of drugs are of less sensitivity (Arafat and Halder, 2014).

Irrational prescription is a global problem, evidenced by high average number of drugs prescribed per encounter, high percentage of injections, prescription by brand names and high percentage of antibiotic use (Debalto et al., 1991; Choi et al., 2012). The pattern of physician prescription determines the type and class of drugs that are used and this will in turn have effects on the overall cost of patient medications. Prescription drug expenditures have been seen as the most rapidly growing component of total health care expenditures with the two main factors being price and use (Dubois et al., 2000). Drugs routinely prescribed for management of secondary infertility are usually not covered by health insurance in Nigeria, the cost of medication will therefore hinder patients' ability to obtain maximum therapeutic benefits from prescribed drugs. Most patients would therefore obtain treatment through out of pocket expenses (Katz et al., 2011). This usually translates to extra healthcare burdens on the family and community at large with the ultimate consequence of non- adherence.

Secondary infertility refers to a situation in which a woman is unable to become pregnant after the birth of a child (Kumar, 2007). There exists a high level of secondary infertility in sub-Saharan Africa with an incidence of 77.5% reported in South West Nigeria, while prevalence in the South East was 75% (Orji, 2008; Umeora et al., 2009; Dhont et al., 2011). Majority of the secondary infertility results from unhealthy delivery practices, postpartum infections, induced abortions, prolonged unsupervised labor and sexually transmitted diseases (Ericksen and Brunette, 1996; Okonofua, 2002). Stigmatization is a major factor and may negatively impact human productivity. The management of infertility is therefore a medical and social need and the social impact on the livelihood of the affected couples is oftentimes unquantifiable. This makes it imperative for any healthcare system to consider its management as an important issue. WHO drug use indicators are the tools for the assessment of drug use patterns to promote rational drug use in developing countries. The purpose of this work is to assess the factors that influence physicians' prescription decisions as well as the pattern of prescription for medications used in the management of secondary infertility. The prevalence of the condition in health facility was evaluated as a factor of occurrence in the course of the study.

METHODOLOGY

Research design

This study was a retrospective study carried out by assessing patients' records and prescriptions from the gynecology department

for all infertile couples who visited the Gynaecology Clinic of LUTH between January and December, 2011.

Study population and data collection

The total number of patients treated within the study period in the clinic was five hundred and four (504) and all their medical records were examined to select those with cases of secondary infertility. Prescriptions for the secondary infertility cases were examined for the pattern of prescription, while the medical records were examined for the causative factors.

Questionnaire design

Twenty (20) physicians in the clinic with cognate experience of 3 years and above were selected randomly for assessment of the factors that affect their prescribing decisions. A structured, pre-tested questionnaire was administered on the physicians to obtain data. The questionnaire sought to assess factors that influence prescription pattern of physicians for drugs in the management of secondary infertility. The major causes of secondary infertility and commonly prescribed medications were also assessed. The questionnaire consisted of two sections: Section A, obtained demographic data, educational background and years of post-qualification of the physicians; while Section B assessed the factors that affect the type and pattern of drugs prescribed. All the twenty questionnaires administered on the physicians were returned and analyzed. Specific questions on factors affecting their prescribing decisions as contained in the questionnaire and the responses are presented as shown in Tables 1 to 5.

Study site

The study was conducted at a tertiary hospital in Lagos State (Lagos University Teaching Hospital, LUTH), Nigeria. Patients are usually treated at the clinic based on referral from either the emergency section of the hospital or other lower level hospitals.

Ethical approval

This study was duly approved by both the Health Research and Ethics Committee of the hospital and the Head of Gynecology Department. Confidentiality of all information obtained was guaranteed.

Statistical analysis

Patients' data were analyzed and presented descriptively as percentages and frequencies of cases of secondary infertility and encounters with prescribed drugs. Analysis of data from questionnaire was carried out using SPSS model 16 with differential and inferential analysis.

Limitations

The study was retrospective and therefore provided information on patients that had been treated in the past, placing a limit to access on information from current or prospective patients.

RESULTS

The number of cases with secondary infertility was

obtained from the patients' medical records. A total of five hundred and four patients attended the gynecology clinic within the study period with three hundred and seventy two (372) cases of infertility. 73.81% of patients with infertility had cases of secondary infertility with modal age of 36 years.

From the medical records of patients, the most frequently reported causes of secondary infertility were tubal factors (28.9%), ovulatory factors (21.74%), male factors (20.29%) and polycystic factors (PCOS) (17.39%). Figure 1 compares actual causes of secondary infertility as recorded in the medical records with the doctors' submission on causes of the disease condition.

Anti-infectives/Antibiotics (32.24%) had the highest frequency of occurrence followed by Clomiphene citrate (20.76%). The herbal supplement Manix$^{®}$ was frequently used, with a frequency of 13.66%. The hormonal drugs, Norethisterone acetate (6.55%) and Bromocriptine (5.45%) and the growth supplement folic acid (7.5%) occurred severally in the prescriptions.

Clinical effectiveness was regarded as the major factor; however, cost to the patient was also an important factor.

Physicians consider cost of drugs as an important factor in the selection of drugs at the gynaecology clinic. Patient's income level is also a major factor considered by all the physicians (70% moderately, 30% very much) in taking decisions on choice of drugs in the management of secondary infertility.

The physicians' years of experience did not significantly affect choice of sources of information that guides drug prescriptions.

All the physicians (100%) consider generic products as being of above average quality, with 10% actually regarding them as excellent. On the frequency of prescription, 80% of the physicians' responded that they will often prescribe generic products, while only 5% will not prescribe generic products at all in the management of secondary infertility. However, the physicians' years of experience significantly affected the perception of the quality of generic drugs compared to branded versions (P-value<0.01).

Analysis of patients' prescriptions

A total of 177 prescriptions assessed showed the following indicators.

Average number of drugs per prescription

Total number of drugs prescribed = 446
Total number of prescriptions = 177
Average Number of Drugs = 446 ÷ 177 = 2.52 ~ = 3

Antibiotics

Total number of prescriptions with antibiotics = 91

Percentage of prescriptions with Antibiotics = 91 ÷ 177 × 100% = 51.41%

Percentage of drugs prescribed from the essential drug list (EDL)

Total number of drugs prescribed on the EDL = 432
Total number of drugs = 446
Percentage of drugs prescribed from the EDL = 432 ÷ 446 × 100% = 96.86%

Percentage of drugs prescribed by generic name

Total number of drugs prescribed by generic name = 230
Total number of drugs = 446
Percentage of drugs prescribed by generic name = 232 ÷ 451 × 100% = 51.57%

Percentage of prescriptions with an injection

Total number of prescriptions with injections = None

DISCUSSION

The psychosocial impact of infertility can be enormous, especially in African societies where children are viewed as the central point of a marital union and the social consequences usually more grave for women than men. The result of this study reveals a high prevalence rate of secondary infertility (73.81%) amongst patients attending the gynecology clinic at the Lagos University Teaching Hospital. Sule et al. (2008) and Umeora et al. (2009) reported similar prevalence rates of 77.5 and 75%, respectively in South East and West regions of Nigeria, whereas an earlier population-based study carried out in Nigeria's South-Western city of Ile-Ife revealed a prevalence rate of about 20% (Snow et al., 1995). This seems to depict an increase in the occurrence of secondary infertility over the years.

The etiology of infertility has been reported to have a fair distribution between male and female factors (uterine, ovarian and tubal factors) (Jose-Miller et al., 2007). The results of this particular study corroborate findings in literature, with the major causes of infertility also being distributed between male and female factors. These factors are responsible for 31, 21.5, 19 and 10% of the cases, respectively (Figure 1). The major factors implicated as causative agents were infection-related (49.28%) for both the male and female. These findings were corroborated by the high level of occurrence of prescriptions containing antibiotic medications (Table 2). Earlier studies had similarly attributed the high incidence rates of secondary infertility mostly to post-partum or post-abortal infections as well as sexually transmitted
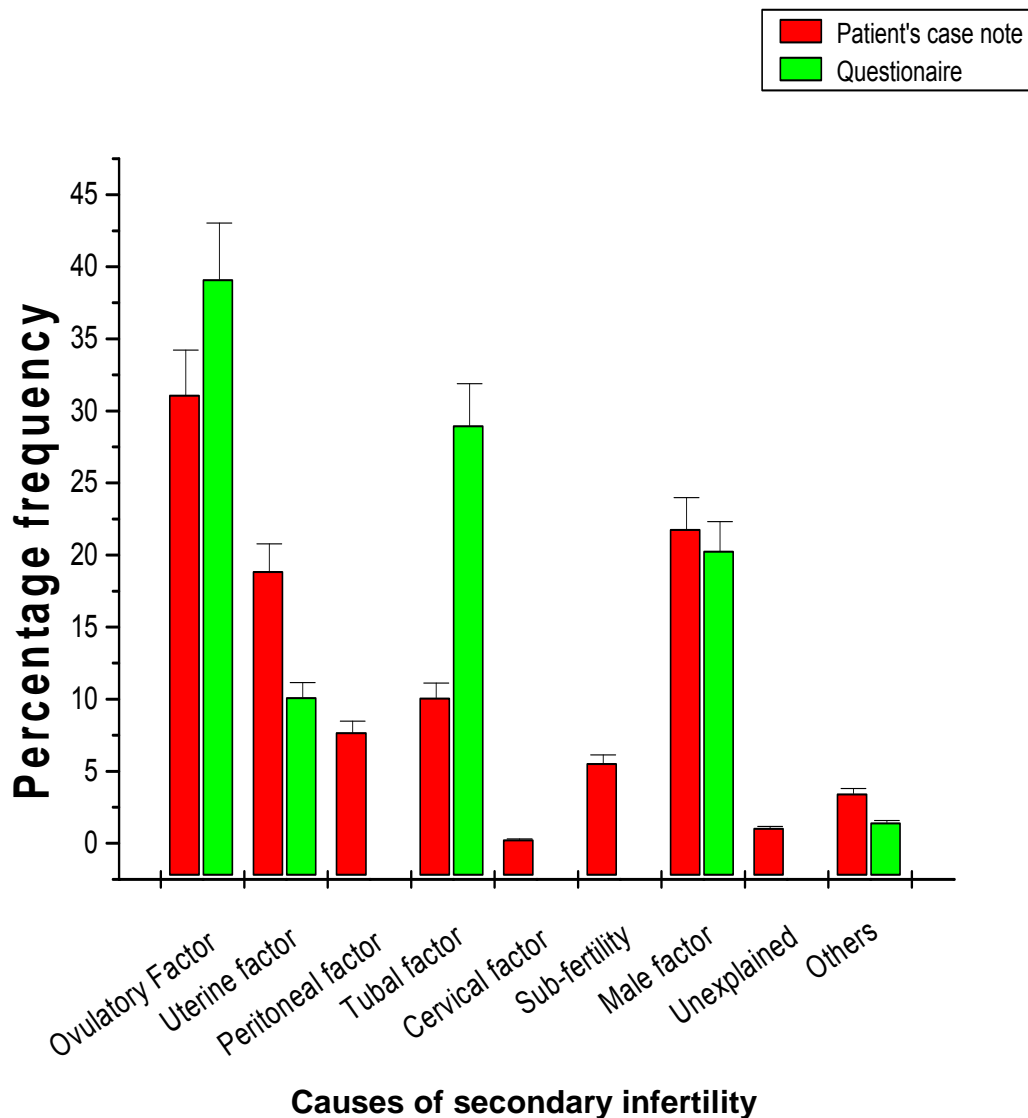
Figure 1. Percentage frequency of causes of secondary infertility.

diseases (Ericksen and Brunette, 1996; Okonofua, 2002).

The commonly prescribed drugs as observed in patients' prescription were antibiotics/anti-infectives, Clomiphene citrate and Bromocriptine and the herbal preparation, Manix® (Table 1). Other drugs with closer occurrences in prescriptions were the hormones Norethisterone acetate (Primolut N®) and Bromocriptine (Parlodel®). These drugs are prescribed for anovulatory conditions, infections, male factor infertility, amenorrhea and hyper-prolactinemia. As observed, the pattern of medications prescribed for this medical condition was largely affected by the diagnosis and the doctor's perception. It is of paramount importance that drugs prescribed are indicated for presenting conditions in order to achieve desired therapeutic outcomes and ensure the judicious use of limited healthcare resources. Under

utilization, improper use of medications as well as prescription pattern usually result in increased cost of healthcare that could have otherwise been prevented (Cohen et al., 1996).

An analysis of the factors guiding physicians' drug choice on patient's prescription revealed that clinical effectiveness (41.67%), cost (29.16%) and recommended daily dose (14.58%) were the three main factors guiding prescriptions for the physicians (Table 2). Physicians' awareness of drug cost have been analyzed and findings revealed that the physicians actually desire to obtain information on cost of medications as a major factor influencing prescribing decisions (Allan et al., 2007). About half of the physicians in this study (55%) considered cost as an important factor in prescription, while the others (45%) viewed it as highly important. The

Table 1. Patients' encounter with prescribed drugs.

S/N	Drug name/Class	Frequency of occurrence in prescriptions	Percentage frequency
1	Clomiphene citrate	38	20.76
2	Bromocriptine	10	5.45
3	Antinfectives/Antibiotics	59	32.24
4	Norethisterone acetate	12	6.55
5	Danazol	1	0.55
6	Analgesics	4	2.18
7	Oral contraceptives	1	0.55
8	Im HCG 100,000 IU	1	0.55
9	Letrozol	1	0.55
10	Metformin	1	0.55
11	Vit.E 1,000 I.U	1	0.55
12	Folic acid	14	7.65
13	Heamatinics	8	4.37
14	Tranexamic acid	3	1.64
15	Tamoxifen	1	0.55
16	Manix®	25	13.66
17	Levthyrone	1	0.55
18	Calcium carbonate ($CaCo_3$)	1	0.55
19	Aspirin (Early pregnancy)	1	0.55
	Total	183	100

Table 2. Factors guiding physicians' prescriptions.

Option	Responses	Frequency (%)
Clinical effectiveness	20	41.67
Pharmaceutical delivery mode	5	10.42
Recommended daily dose	7	14.58
Cost to the patient	14	29.16
Patient preference	2	4.17
Others	0	0
Total	48	100

patients' level of income was also viewed by physicians as moderately influencing prescription choices. However, majority of the physicians were of the opinion that the price of a drug is not really linked with its clinical effectiveness (75%) nor even connected at all (15%). When placed in proper perspective, cost consideration will help in ensuring adherence to medication and therapy because affordability is a major factor in access to medication (Garnica-Rodriguez et al., 2005; Katz et al., 2011).

Technical information guiding prescription by physicians in this study (Table 3) was obtained mainly from publications in medical journals (30.19%), medical textbook/index (26.42%) and the internet (15.09%). The years of experience did not significantly affect sourcing of technical information (p < 0.1). As reported, the physicians do not depend much on information from medical representatives with only 7.5% utilizing manufacturers' materials as sources of information for guidance. The pharmaceutical sector is an integral part of the healthcare industry. According to studies, about §57 billion was spent by pharmaceutical industries in the USA in 2004. The major portion of this fund was spent on marketing which included detailing, physician clinical meetings and advertisement (Geoffery et al., 2011). Medical representatives target physicians in order to market their drug. There is therefore a concern about considerable influence of these spending on the prescription behavior or pattern of physicians. Hospital managements have tried to streamline the activities of medical representatives, while some countries have recently placed an outright ban on one-on-one meetings

Table 3. Importance of cost of drugs and patients' income in prescription selection.

Cost	Frequency (%)	Patients income	Frequency (%)
Highly important	45	Very much	30
Important	55	Moderately	70
Not very important	0	Almost not at all	0
Not important at all	0	Not at all	0
Total	100	Total	100

Table 4. Years of experience of physicians and sources of information guiding prescriptions.

Option	0 - 5	5 - 10	10 - 15	>15	Total	Frequency (%)
Publications in medical journals	6 (5.74)	6 (5.43)	1 (2.42)	3 (2.42)	16	30.19
Medical textbooks	6 (5.02)	4 (4.76)	3 (2.11)	1 (2.11)	14	26.42
Medical libraries	3 (2.87)	2 (2.72)	1 (1.21)	2 (1.21)	8	15.09
Internet databases	1 (2.87)	3 (2.72)	2 (1.21)	2 (1.21)	8	15.09
Medical Representatives	2 (1.43)	1 (1.36)	1 (0.60)	0 (0.60)	4	7.55
Information from patients	1 (1.08)	2 (1.02)	0 (0.45)	0 (0.45)	3	5.66
Total	19	18	8	8	53	100

χ^2 calculated= 8.401; χ^2 tabulated= 24.996; p- value>0.1; α-level= 0.05; DF= 15.

between physicians and medical representatives (Theodorou et al., 2009; Arafat and Halder, 2014).

The view of the physicians towards the therapeutic quality of generic drugs ranged from excellent to average with majority (47.37%) viewing generics as satisfactory and 80% of them more likely to prescribe generics often instead of the branded versions (Table 4). Eighty percent (80%) of physicians reported that they will prescribe generic products instead of branded versions in the management of secondary infertility, while 15% will rarely prescribe and 5% will not prescribe generic products at all. About 58% of the physicians perceive generic products as excellent/satisfactory, while 42% regard them as average in terms of quality. This implies that some of the physicians who believe that generic products are of average quality will still prescribe them. The years of experience of the physicians significantly affected their perception of quality of generic drugs. The prescribing pattern of physicians has been reportedly influenced by the level of specialization of the physician (Rutschman and Domino, 2004; Choi et al., 2012). The report of a study carried out by Huang et al. (2004) in Taiwan also showed that the age of the physician and the practice settings reflects in the prescribing pattern.

Prescriptions are legal documents that reflect and convey the prescriber's therapy intentions to the patient. It is of crucial importance that prescriptions should comply with set standards for prescribing indicators (WHO, 1993). These indicators are used for the assessment of the performance of health systems and the rational use of medications. On analysis of prescriptions

obtained during the period of study at the Gynecology Clinic of LUTH, the average number of drugs per consultation, which is an indication of polypharmacy, was approximately three (3). This figure is relatively high, when compared with the WHO standard (1.6 to 1.8) as established through previous works (Isah et al., 2004) but it is however still within the average of 3.8 reported for Nigeria in a baseline field test (Bimo, 1992).

The percentage of drugs prescribed by generic names gives a measure of the tendency to prescribe by generic names and has a direct influence on the cost of medications. The prescriptions assessed in this study had an average of 51.57% of drugs prescribed by generic names, a figure much lower than the ideal of 100% set by WHO. Generic prescription depends largely on the physician's perception of the quality of the generic drugs. Majority of the physicians involved in management of infertility at LUTH perceive generic drugs as having well above average quality. The number of drugs prescribed by generic names in the prescriptions examined did not reflect the high perception of quality reported by physicians in the survey. The reported low level of prescription may be a function of the fact that the hospital is a tertiary institution working with prescribed drugs without many generic alternatives. Higher levels of prescription have been reported in other hospitals and regions. 98.7% generic prescription was reported at a secondary hospital in Ethiopia whereas a tertiary institution in Lucknow district of India recorded an extremely low level of generic prescription of 1.1% (Anteneh 2013; Kumari et al., 2008). There is still a need

Table 5. Years of experience and physicians' perception of quality of generic drugs.

Response	0 - 5	5 - 10	10 - 15	>15	Total	Frequency (%)
Excellent	1 (0.88)	0 (0.44)	0 (0.33)	1 (0.33)	2	10.53
Satisfactory	2 (3.56)	3 (0.5)	2 (1.33)	1 (1.33)	9	47.37
Average	5 (3.56)	1 (0.5)	1 (1.33)	1 (1.33)	8	42.10
Slightly bad	0	0	0	0	0	0
Bad	0	0	0	0	0	0
Total	8	4	3	3	19	100

χ^2 calculated = 16.99; χ^2 tabulated = 12.59; S: There is significant difference; α-level = 0.05; Degree of (DF) = 6.

to advocate increased generic prescription at the gyneacology clinic to facilitate ease of dispensing and lower cost of therapy. Generic prescription provides the patient with the option of obtaining drugs with proven efficacy, but at lower cost. The management of secondary infertility is not covered by health insurance and this has huge financial implications for the patients (Allan et al., 2007).

No injection was prescribed in all the prescriptions examined. This is in line with the WHO recommended standards of drug management through the non-invasive routes of drug administration. The percentage of encounters with an antibiotic on the other hand was quite high (51.41%). The ideal as set by the WHO is 20.0 to 26.8%. This high rate of antibiotic prescription may be regarded as circumstantial because of the earlier reported causes of secondary infertility (Figure 1). There is however the need for physicians to make a careful choice of antibiotics in order to avoid cross resistance across the antibiotics group.

The Nigerian Essential Drugs List (EDL, 2003) gives a list of medications that are considered to satisfy the priority healthcare needs of the Nigerian populace. These drugs have been selected with regard to their public relevance, evidence of efficacy and safety, and their overall cost effectiveness. On average, 96.86% of drugs prescribed at the study center were from the Nigerian EDL. This compares favorably with the standard (100%) and is a good indication of the high degree of conformity of physicians to the National Drug Policy. Prescribers in Ethiopia recorded 96.6% prescription from the country's essential drug list while observations in Pune, India however revealed a low level of prescription from the EDL (Kschirsagar et al., 1998; Anteneh 2013). Manix[®], a herbal product is commonly prescribed in the clinic for erectile dysfunction (13.66%). Herbal products are however not on the essential drugs list and as such not supposed to be sold in public hospital pharmacies.

Conclusion

The main factors guiding prescriptions were clinical effec-tiveness, cost and recommended daily dose. Though

generic prescription is below the WHO set standard, years of experience had significant effect on perception of therapeutic quality of generics (Table 5) but frequency of prescription of generics and source of technical information was unaffected. The choice of drugs prescribed was dependent largely on the underlying causes of secondary infertility. Medications are the most common form of therapy in disease management and as such it becomes imperative that irrational prescriptions be avoided to eliminate or at least reduce the health, economic, and social impact on the community.

Conflict of Interest

Authors have not declared any conflict of interest.

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