World Journal of Pharmaceutical Sciences
ISSN (Print): 2321-3310; ISSN (Online): 2321-3086
Available online at: http://www.wjpsonline.org/
Original Article

Pattern of fluoroquinolones dispensing among community pharmacists in Port Harcourt, Nigeria

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Received: 17-03-2020 / Revised Accepted: 30-03-2020 / Published: 01-04-2020

ABSTRACT

Community pharmacies, specialized drug stores within the neighborhood, are usually the first point of contact for treatment of common illnesses. This promotes access to medicines including antibiotics particularly fluoroquinolones sometimes without prescription. Besides making medicines accessible, this practice has also contributed to antimicrobial resistance. A six (6) months retrospective study was undertaken to determine the frequency of over-the-counter antibiotic requests and how readily pharmacists in community pharmacies in Port Harcourt metropolis dispensed antibiotics particularly fluoroquinolone without prescription. Results showed that all (100%) pharmacists dispensed antibiotics from their premises during the study period. In spite of reasonable awareness of and support for prescription-based dispensing of antibiotics, 70.3% of pharmacists still dispensed fluoroquinolones without prescriptions. Approximately 52% of pharmacists' consultations resulted to antibiotics dispensing 62.6% of which were fluoroquinolones majorly recommended for typhoid fever due to their effectiveness and affordability by clients. The frequency of dispensing fluoroquinolone antibiotics in community pharmacies was in decreasing order of ciprofloxacin (36.1%)> ofloxacin (26.6%)> levofloxacin (17.7%)> pefloxacin (17%)> sparfloxacin (1.3%). In conclusion, a large proportion of antibiotics particularly fluoroquinolones are dispensed without prescription by community pharmacists in Port Harcourt metropolis regardless of the consequences. A review of government policies and institution of strong antibiotic stewardship programs with emphasis on regulation, monitoring and control of antibiotics use is urgently mandated. Continuing education, enlightenment and attitudinal changes with respect to antibiotics use is critical to forestall antibiotic resistance and ensure rational and cost- effective medical care.

Keywords: Antibiotics, Prescription, Resistance, Consultation, Pharmacy, Education.

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How to Cite this Article: Catherine Nonyelum Stanley and Chidozie Ngozi Endarlyn Ibezim. Pattern of fluoroquinolones dispensing among community pharmacists in Port Harcourt, Nigeria. World J Pharm Sci 2020; 8(4): 1-7.

INTRODUCTION

Every year Nigeria joins the rest of the world to mark antibiotics awareness week the focus of which is the responsible use of antibiotics aimed at reducing the emergence of antimicrobial resistance [1]. The introduction of antimicrobial agents dramatically transformed the management of infectious diseases with resultant improvement in global health. The emergence of antimicrobial resistance resulting from irrational use of antibiotics has however, necessitated a reevaluation of the use of these agents if optimum therapeutic outcomes are to be achieved. Antibiotic dispensing and use without prescription has a deleterious health implication including antimicrobial resistance, therapeutic failure, increased medical costs and drug associated side effects [2,3]. Irrational, misguided and unnecessary use of antibiotics practiced globally among patients and sometimes health workers includes self - medication, irrational prescriptions, misuse and overuse of these drugs [3-5]. It has been reported that lack of legislation, poor enforcement of regulations, high cost of medical consultation, and lack of health insurance contribute to irrational drug use [6,7]. Furthermore, in developing countries, poor drug regulation and monitoring system often promote inappropriate drug prescription, dispensing and overt irrational drug use [5,8]. Presence of a community pharmacy in the neighborhood grants patients access to their medicines need because they walk into the premises, explain their symptoms and seek medication [9]. Community pharmacists, therefore, fill the gap between patients and clinicians in addition to expediency, easy access, shorter waiting time, cost reduction, availability of credit and flexible opening hours[10]. It was reported that in Nigeria 95% of drugs recommended and dispensed without prescriptions are antibiotics[9] among which are the fluoroquinolones.

Fluoroquinolones are semi-synthetic antibacterial agents with excellent safety profiles. They have a broad antibacterial spectrum of activity against Gram-positive, Gram-negative and atypical pathogens as well as anaerobes by inhibitory function of bacterial DNA gyrase and topoisomerase IV. They have good pharmacokinetic profile with good oral absorption and tissue penetration in humans resulting in high clinical efficacy in the treatment of many kinds of infections[11-13].

The goal of this retrospective study was to determine the frequency of over-the-counter antibiotic requests and how readily pharmacists in community pharmacies in Port Harcourt metropolis dispensed antibiotics particularly fluoroquinolone without prescription. The Pharmacists' opinion and awareness of effects of irrational drug use on the population, their recommendation and dispensing pattern and the reason for choice of antibiotics recommended also formed part of the focus of the study.

MATERIALS AND METHODS

Study area: The study was undertaken among Pharmacists in community or private practice in Port Harcourt metropolis Rivers State. Port Harcourt lies between latitudes of 04°4'N and longitudes 07°10'E at the Southern region of the Federal Republic of Nigeria in West Africa. Port Harcourt enjoys a tropical monsoon climate characterized by extreme temperature, low pressure and high wetness all year spherical. It has a mean temperature of 30°C (86°F) and a mean annual rainfall of 2,300 mm[14].

Inclusion and exclusion criteria: The sampling frame included community or private pharmacies under the control of a certified Pharmacist as a superintendent or a locum Pharmacist in Port Harcourt Metropolis. All other drug stores such as patent medicine outlet, hospital/clinic pharmacies were excluded from the study.

Data Collection: A six (6) months retrospective study was undertaken using well-structured-questionnaires randomly distributed to community pharmacies with superintendent pharmacists in-charge. Pharmacies were recruited and questionnaires administered based on personal contact, verbal consent of pharmacist in-charge and/or Pharmacist on duty after presentation of valid identification cards/letters by the research assistants. The identities of superintendent pharmacist, pharmacist on- duty and the premises were anonymized.

Statistical analysis: A total of 158 questionnaires were retrieved and the data were double-entered, cross-checked and merged into a single data set in a Microsoft Office Excel 2010 document. Statistical analysis was performed using SPSS version 20 (SPSS, Chicago, IL, USA). Descriptive statistical analyses were performed using mean and frequency to describe the characteristics of the studied population.

RESULTS

The result obtained from the completed questionnaires indicated that all (100%) information was given by Pharmacists. The population was made up of more female than male (58.9%, 41.1%), experienced Pharmacists with the minimum B.Pharm. and /or Pharm.D degree qualification for practice while 18(11.4%) had

additional post graduate qualifications. Majority of Pharmacists encountered had 3-10 years practicing experience (Table 1). The majority opinion of Pharmacists (61.4%) revealed awareness and support of prescription-based antibiotic dispensing (Fig.1). It was evident from Table 2 that 41-60% of Pharmacist-client interactions led to antibiotics recommendation and dispensing 82 (51.9%). From the study, most frequently dispensed antibiotic included ciprofloxacin (31.0%), levofloxacin (17.7%), cephalosporins (14.0%) and amoxicillin-clavulanate (12.7%). The result of fluoroquinolone dispensing pattern is shown in Table 3. Of the 82(51.9%) antibiotics recommendation and dispensing, 73.2% were fluoroquinolones. While 60 (38.0%) of Pharmacists dispensed fluoroquinolone on prescription, there was 70.3% obvious fluoroquinolone dispensing without prescription. Typhoid fever, urinary tract infection (UTI), respiratory tract infections (RTI) and septicemia were the common indications for fluoroquinolone dispensing among pharmacists in private practice in Port Harcourt metropolis. It was however reflected from the study that ciprofloxacin, ofloxacin, levofloxacin and pefloxacin were the frequently dispensed fluoroquinolone during the period under survey while gatifloxacin, gemifloxacin and moxifloxacin were not recommended nor dispensed probably because of their high cost or non - availability. The choice of fluoroquinolones was based on their effectiveness 45 (28.5%) and affordability by the client 49 (31.0%).

DISCUSSION

The ease with which antibiotics are obtained from community pharmacies without prescription poses a challenge to the control of irrational antibiotics consumption. Majority opinion of Pharmacists in support of prescription-based antibiotics dispensing is in line with the regulation enacting the professional practice of Pharmacists in Nigeria where Pharmacists are licensed to dispense prescription only medicines (POM) including fluoroquinolone antibiotics against a valid prescription [15]. This is also the case in most countries of the world where pharmaceutical retailing is governed by regulations regarding ownership, prescription practices, staffing and prices [16]. However, in practice this is not obtainable as reflected from the study. This further conforms with other reports from other countries like Jordan [3], Bangladesh [5], Ethiopia [17] and Togo [10] where non-prescription, over-the-counter (OTC) antibiotic dispensing is practiced in community or retail pharmacies. This may be attributed to a complex set of factors from the government, Pharmacists and the consumers/clients. Poor regulatory mechanism, weak drug law enforcement, lack of efficient quality control measures from government and regulatory bodies; pressures from pharmaceutical companies and clients, lack of antibiotic stewardship program, revenue maximization, professional conflicts of interest from pharmacy owners; and customers' ease of accessibility to community pharmacies, time constraint, inaccessibility of health insurance scheme, high cost of medical consultation [3], [5-7], [17-19] greatly contribute to non-prescription based antibiotics dispensing including Port Harcourt metropolis, Nigeria. Furthermore, empirical and repetitive prescribing often undertaken by physicians breeds loss of confidence on physicians' diagnosis and this may further encourage antibiotics dispensing without prescription. Our results show that approximately half (51.9%) of drugs dispensed based on Pharmacists' advice were antibiotics. Furthermore, these antibiotics were dispensed empirically based on clients' complaints and symptoms but without laboratory investigations. This is an inappropriate and unsafe practice. It has also been reported that there is a relationship between irrational antibiotic use and development of antibiotic resistance. Antibiotic selection pressure has been postulated as the mechanism for antimicrobial resistance following excessive antibiotics consumption. In the light of these, efforts should be intensified on drug use regulation enforcement, monitoring and controlling the use of antibiotics. There should be upward review of policies regarding antibiotics stewardship, increase in education, follow up and modification in dispensing habits to make medical care rational and cost effective.

From the study, fluoroquinolones were the leading and the most frequently dispensed antibiotics. Fluoroquinolones are broad spectrum antibiotics with direct inhibitory activity on bacterial DNA synthesis. They have good pharmacokinetic action and are orally absorbed. However, they are an important risk factor for colonization and infection with fluoroquinolone – resistant Gram-negative bacilli and for *Clostridium difficile* infection (CDI)[20]. In the global surveillance study [12], there has been demonstrated increase in fluoroquinolone-resistance in the past years in almost all bacteria except *S.pneumoniae* and *H. influenzae*. The implication of this therefore, is that fluoroquinolone should neither be used as first line antibiotic therapy nor for empiric prescribing.

The result showing ciprofloxacin (31.0%) as the frequently dispensed fluoroquinolones is in agreement with a similar report implicating ciprofloxacin as one of the commonly dispensed antibiotics among retail pharmacies in Addis Ababa [17]. The choice of an antibiotic is

determined by its spectrum of activity as well as its pharmacokinetic and pharmacodynamic properties. According to Zachary *et al*, ciprofloxacin, being a broad-spectrum, semi synthetic fluoroquinolone is one of the most widely used antibiotics whose resistance has rendered it less effective thus causing worry for its further use [13].

The use of fluoroquinolones for the treatment of typhoid fever from this study is in line with the WHO recommendation [25] especially in areas with known resistance against the older first-line conventional antityphoid drugs. Typhoid fever, an enteric fever caused by *Salmonella* serotype Typhi is a food or water borne bacterial infection and a major health concern in the developing world. Over 6 million new cases of typhoid fever have been documented annually globally [21] with several cases of treatment failure with fluoroquinolone recorded all over the world [22,23]. Resistance to fluoroquinolones including ciprofloxacin could be attributed to increasing incidence of reduced susceptibility and resistance by bacteria as reported in United kingdom [24] and Pakistan [21] or possible inadequacy of present laboratory guidelines for fluoroquinolone resistant-strain detection. Howbeit, empiric prescribing and dispensing of fluoroquinolones either in the hospital or community pharmacies should be greatly discouraged to forestall further emergence of such strains.

From this study, it was shown that the choice of fluoroquinolone to be dispensed by the Pharmacists was influenced principally by cost of drug or its affordability 45(28.5%) by the client. Though drug's effectiveness was part of the consideration, the financial power of customer was paramount. Nevertheless, pharmacy is a profession, this could be expected in any business and as such could be seem as a mechanism put in place by the pharmacist in order to retain patronage by the client.

CONCLUSION

From our study, it can be concluded that antibiotics particularly fluoroquinolones were substantively dispensed without prescription in Port Harcourt metropolis the reasons emanating from a combination of factors: government, prescribers, pharmacist in practice as well as the consumer (patient). Against this practice, it is very pertinent that such recommendation should be made following antibiogram request and result analysis in order to clamp down on microbial resistance to antimicrobial agents. A review of government policies and institution of strong antibiotic stewardship programs with emphasis on regulation, monitoring and control of antibiotics use is urgently mandated. Continuing education, enlightenment and attitudinal changes with respect to appropriate use of antibiotics is critical to ensure rational and cost–effective medical care and reduction in the emergence of antibiotic resistance.

Table 1: Demographic information of respondents	**Number n=158(%)**
Status	
Pharmacist	158(100)
Gender	
Male	65(41.1)
Female	93(58.9)
Qualification	
First degree (BPharm/Pharm.D)	158(100)
*Additional degree	18(11.4)
Years of experience	
1-2 years	13(8.2)
3-5 years	67(42.4)
6-10 years	58(36.7)
> 10 years	20(12.7)

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Table 2: General Pattern of antibiotics dispensing

Characteristics	n=158(%)
Pharmacists' opinion on antibiotics dispensing	
Prescription -based dispensing	97(61.4)
Non-prescription	61(38.6)
Percentage antibiotics dispensed after consultation	
0-20%	4(2.5)
21-40%	21(13.3)
41-60%	82(51.9)
61-80%	39(24.7)
> 80%	12(7.6)
Frequently dispensed antibiotics	
Amoxicillin	19(12.0)
Ciprofloxacillin	49(31.0)
Levofloxacillin	28(17.7)
Ofloxacin	11(7.0)
Cephalosporins	22(14.0)
Amoxicillin+Clavulanate	20(12.7)
Pefloxacin	9(5.7)

Table 3: Fluoroquinolone dispensing pattern

Characteristics	
Percentage Frequency of fluoroquinolone antibiotic dispensing	n (%)
0-20%	2(50)
21-40%	11(52.4)
41-60%	60(73.2)
61-80%	22(56.4)
> 80%	4(33.3)
Common indications for fluoroquinolone recommendation & dispensing	n (%)
Typhoid Fever	67(42.4)
Urinary tract infection (UTI)	42(26.6)
Septicaemia	10(6.3)
Respiratory tract infection (RTI)	39(24.7)
Fluoroquinolone dispensing based on prescription	n (%)
Always	0(0.0)
Very often	49(31.0)
Often	60(38.0)
Sometimes	49(31.0)
Never	0(0.0)

Fluoroquinolone dispensing without prescription	n (%)
Always	0(0.0)
Very often	14(8.9)
Often	33(20.9)
Sometimes	111(70.3)
Never	0(0.0)

Frequently prescribed and dispensed fluoroquinolone	n (%)
Ciprofloxacin	57(36.1)
Gatifloxacin	0(0.0)
Ofloxacin	42(26.6)
Sparfloxacin	2(1.3)
Moxifloxacin	0(0.0)
Pefloxacin	29(18.4)
Gemifloxacin	0(0.0)
Levofloxacin	28(17.7)

Reasons for fluoroquinolone choice	n (%)
Patient/Client preference	11(7.0)
Affordability	49(31.0)
Commercial influence	17(10.8)
Ease of compliance	11(7.0)
Ease of administration	25(15.8)
Effectiveness	45(28.5)

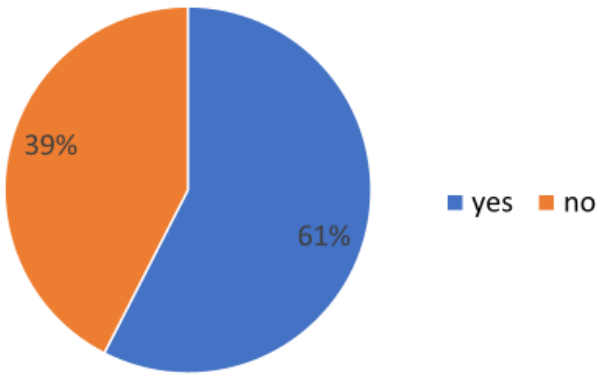

Fig. 1 : Pharmacists' opinion on prescription-based antibiotic dispensing

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