Antibiotic Dispensing & Prescription Pattern in Pharmacies of Islamabad & Rawalpindi: Pakistan

Faisal Imtiaz[1], Assad Hafeez[2], Farah Ashraf [3]*, Hassan Imtiaz[4]

1 Consultant, Primary & Secondary Healthcare Department, Government of Punjab, Lahore, Pakistan
2 Executive Director, Health Services Academy, Chak Shehzad, Islamabad, Pakistan
3 Public Health Professional, Health Services Academy, Chak Shehzad, Islamabad, Pakistan
4 Department of internal medicine, Shifa International Hospital, Islamabad, Pakistan

* Corresponding Author: Farah Ashraf
Public Health Professional, Health Services Academy, Chak Shehzad, Islamabad, Pakistan
Email: farah_riphah@yahoo.com

Abstract

Background: Antibiotic resistance, a continuous threat to effective prevention and treatment of infections is a common problem the world facing these days. The severity of problem has increased especially in developing countries with self medication and multiple antibiotics use as main contributing factors.

Objective: To describe the pattern of prescription and antibiotics dispensing from pharmacies along with identification of determinants regarding self-medication of antibiotics among consumers.

Methodology: Cross sectional study design was used. Data was collected from 5 conveniently selected pharmacies in Islamabad & Rawalpindi using a standardized structured questionnaire during evening shift at each pharmacy.

Results: Overall, 525 antibiotics were dispensed to 386 patients or representatives with a total cost of 44174 PKR (approximately $437 USD). About 64.8% (n=250) of the respondents received antibiotics on an official prescription whereas 35.2% (n=136) of the respondents received antibiotics on self-demand or on pharmacist recommendation. Significant association was observed between gender, age, occupation of respondents, cost spent on antibiotics and self-medication.

Conclusion: Antibiotics prescribing and dispensing practices in Islamabad & Rawalpindi are not in complete accordance with the standard guidelines. Antibiotics were frequently prescribed and dispensed through pharmacies of twin cities without official prescriptions. Moreover, higher percentage of antibiotics was dispensed per prescription in majority and people tended more towards self-medication because they found it a cheap solution for their health issues.

Key words: Antibiotic resistance, Dispensing, Prescription pattern, Self-medication

Introduction and Background

Antibiotic resistance has been reached to an alarming level globally especially in developing countries. [1-6] There are multiple reasons behind this increase in resistance, but research has shown that single as well as multiple antibiotic use are the main contributing factors. [7-9] World Health Organization (WHO) also identified inappropriate use of antibiotics as an important driving force behind this antibacterial resistance and a study in South India also supported this fact. [10] The WHO Global Strategy for Containment of Antimicrobial Resistance defines the appropriate use of antimicrobials as "the cost-effective use of antimicrobials which maximizes the clinical therapeutic effect while minimizing both drug-related toxicity and the development of antimicrobial resistance". [11] Hence, inappropriate use includes unnecessary use of antibiotics to treat non-responsive conditions along with sub-optimal use of antibiotics to treat antibiotic responsive conditions including overuse of broad spectrum antibiotics, incorrect drug doses and durations. [12] It is estimated that antimicrobial prescriptions are inappropriate in around one-third of the out-patients according to the National Centre for Disease Control and Prevention.

It is multidimensional global issue and emergence of highly resistant bacterial strains poses a serious public health threat as it includes efforts to limit the spread of infectious diseases linked with increased mortality, morbidity and economic burden. [11] Antibodies are commonly dispensed medications from community pharmacies and they are also frequently prescribed for inappropriate indications. This burden is greater in developing countries [1-6] because of the fact that antibiotics are bought directly from drug outlets and pharmacies without a prescription despite the presence of laws and regulations that limit access to antibiotics as reported in Bangladesh, Caracas, Greece, Syria, and Spain. [12] A study conducted in Yemen, Saudi Arabia and Uzbekistan stated that inappropriate use of antibiotics has dramatically resulted in the sudden increase of antimicrobial resistance in developing countries and they found out that the pharmacies are the main dispensing source of non-prescribed antibiotics. [13]

There is significant variability in the prevalence of self-medication among developed and developing countries because of intrinsic differences in socio demographic & cultural factors, variations in health care systems for example reimbursement policies, access to health facilities [14] Consequently, Self-medication using antibiotics are largely practiced in countries where antibiotics are easy to access and patients are influenced by their relatives, friends and family members to opt any specific antibiotic for treatment purposes. [15] Similarly, Antibiotics are prescription only medication in Pakistan and cannot be sold as Over the Counter Medication but lack of awareness, expensive health care services, extensive marketing of medications and insufficiency of health oriented services are some reasons behind self- medication [16] and studies showed that it is practiced regularly, particularly in financially deprived communities. According to a study conducted in Karachi, any drug available in the market can be purchased over the counter without a prescription. In the context of rapid urbanization the problem of self-medication becomes more serious because neither the pharmacist or pharmacy personnel, spare time to explain nor the customers have time or enough awareness to ask for the professional advice. [17] The trend of self-medication not only affects the usual process of diagnosis, but it also delays the therapeutic treatment and produces a number of side effects as well like

gastrointestinal disorders, fatal anaphylactic shock and other severe complications. It has also been found that 75% of antibiotic need is of controversial therapeutic value. A study has also revealed that during the past few years, Pakistani dentists have prescribed more antibiotics than required, which may also have contributed in the development of bacterial resistance. [7, 9, 15, 18]

In Pakistan there is no vibrant governmental monitoring of antibiotic prescribing and dispensing by the official bodies. We are facing not only epidemic, but pandemic of antibiotic resistance. The changing focus of health care from traditional practices to western scientific evidence based practices has resulted in enhanced access of pharmaceutical agents for health care providers and communities in the absence of proper regulatory mechanisms. Mostly the research has focused on patients' contribution to inappropriate use of medications while less attention has been paid to the role of professionals. Furthermore the low profit return linked with developing new and more potent antibiotics is strongly discouraged by pharmaceutical companies to invest resources in the development of new antibiotics. [19-20] .The sudden increase in antimicrobial resistance highlights the need for rationalization of antibiotics used in the treatment of infections. [21]

Furthermore, previous research studies in Pakistan focused mainly on antibiotic use in tertiary care hospitals & clinical settings and on interventions to improve it but the studies in the Pharmacy settings which are the main public access point to antibiotics are lacking. [22] Hence the main purpose of this study is to collect descriptive data on the proportion of the antibiotics dispensed through Prescriptions, Pharmacist recommendation, on patient request and to identify the determinants of self-medications in order to give a blueprint for future Interventional research and also it gives a snapshot of on the ground situation to policy makers.

Methodology

The study has been conducted in urban setting at pharmacies situated in the Islamabad Capital territory and Rawalpindi after obtaining approval from Ethical Review Committee (ERC) of Health Services Academy, Islamabad. Cross Sectional study design has been used to describe the pattern of prescription and antibiotics dispensing from pharmacies along with identification of determinants regarding self-medication of antibiotics among consumers. Quantitative approach of data collection was used in this regard. After pilot-testing, information against socio-demographic variables, antibiotic prescription and dispensing was collected from both patients/caregiver and pharmacists, using a standardized structured questionnaire. Time of administration for this questionnaire was 5 minutes. Data was collected from 4 pharmacies, 2 from Islamabad and 2 from Rawalpindi, with approximately 50 prescriptions per day. Sample size estimated was 386; however convenient sampling technique (non-probability sampling) was used to recruit participants. Participants of this study mainly include pharmacist and patients/caregivers visiting pharmacies and asking antibiotics either on prescription or on self-demand. Pharmacies on which pharmacist was absent due to any reason and pharmacies attached to hospitals were excluded from the study.

Participants were approached by paying personal visits to the pharmacies in the twin cities. Informed verbal consent was obtained after explaining aim and objectives of the study to the participants. At baseline, socio demographic information was collected an participants were asked regarding antibiotics prescribing and dispensing pattern on pharmacies, dosage form

dispensed, dispensing according to physician/pharmacist recommendation or self-medication. The data was entered after looking for incomplete responses manually and analyzed by using SPSS (Statistical Package of Social Sciences) software to calculate both descriptive and inferential statistics. Pie charts and bar graphs were used to represent socio-demographic variables of the respondents. The chi - square test was applied to look for associations between facets of self-medication and socio-demographic variables, cost/price of antibiotics and dosage forms. P value less than 0.05 considered as significant.

Results

A total of 386 respondents participated in this study and questionnaire was administered to collect relevant information by trained data collector. Among respondents, 67.9% were males while female ratio was 32.1%.Respondents of almost all ages were observed and categorized into five groups based on ages in years. Majority of the participants were of age group 11-25 years (28.8%) while only 7.8% were with age above 56 years. Participants recruited for study were from all categories, that is Government and Non-Government employees, students, self employed and unemployed but frequency non-government employees was high (28.3%). Majority of the participants (41.8%) had average household income of above 50K and education level graduate or above was highest among others (49.8%). Only 7.9% were illiterate. Participants visiting pharmacies for antibiotics other than patients were mostly from their families (71.1%) and majority with education status of intermediate (26.6%).

A) Antibiotics Dispensed on Official Medical Prescription

A sum total of 525 antibiotics were dispensed to 386 patients during the study period with the total cost of 44174 PKR (approximately $437 USD). About 64.8% (n=250) of the respondents received 337 antibiotics on an official prescription whereas 35.2% (n=136) of the respondents received antibiotics on self-demand or on pharmacist recommendation. Out of 250 prescriptions, 73.2% (n=183) were solid, 16.8% (n=42) were liquid and 10% (n=25) were parenterals. Almost 68.8% (n=172) prescriptions were handed over by patients themselves, whereas 32.2% (n=78) were presented by the representatives of the patients. During the study period the total cost of antibiotics dispensed on official medical prescription was 31,401 PKR (approximately USD $308). The cost per prescription was further classified into four classes as shown in Figure 1.

About 68% (n=170) prescriptions were issued from private hospitals/clinics while about 32% (n=80) prescriptions were issued from public sector hospitals. The largest number of prescriptions 27.6% (n=69) were issued by pediatricians both from private and public sector hospitals in Islamabad & Rawalpindi. Number of antibiotics per prescription was also recorded and was highest for 1 antibiotic per prescription (68.1%).Frequency of respondents who received antibiotic on official medical prescription was highest of age group below 10 years (27.6%)

B) Antibiotics Dispensed Without Official Medical Prescription

Out of 386 respondents, included in the study, 136 respondents received antibiotics without official medical prescription. During the study period the percentage of antibiotics dispensed on

patient demand was 70.5% (n=96) while of pharmacist recommendation were 29.5%(n= 40).Frequency of respondents who received antibiotic without official medical prescription was highest of age group 26-40 years (33.1%) and majority antibiotics dispensed were of solid dosage form (66%). Almost 77% (n=105) antibiotics were dispensed by technicians/salesmen whereas only 23% (n=31) were dispensed by pharmacists. In response to a question that why patient selected any specific antibiotic, 52% (n=71) said that they tried this specific antibiotic before as well, 29% (n=25) said their selection is based on family/friend recommendation & 19% (n=40) said that they heard about this antibiotic. This study depicted that 26% (n=35) respondents were recommended by pharmacist to visit a doctor while 74% (n=101) respondents were dispensed antibiotics without any such recommendations. Frequency of antibiotics dispensed on pharmacist recommendation was highest for one antibiotic (62.5%) as in Figure 2. During this study, the cost of antibiotics dispensed on self-medication was 12,733 PKR (approximately USD $126). It was further classified into five classes (Table 1)

C) Determinants of Self Medication of Antibiotics among Consumers/Respondents

Determinants of self-medication were identified by cross-tabulation of socio-demographic variables, response to questions regarding antibiotic demand on the official medical prescription and dosage form of antibiotic dispensed at pharmacies during the study period. Age, gender, patient's occupation and price were identified as determinants of self-medication. The male respondents, 101 out of 136, showed more tendencies towards self-medication and respondents showed a visible inclination towards self-medication because of less expenditure.

D) Prescription Patterns of Antibiotics Used

Prescription patterns of antibiotics used was checked by calculating the percentage of antibiotics prescribed during the study period. The percentages were calculated by using the standardized formula given by W.H.O. The percentage of antibiotics prescribed during the study period was57.70% which is more than the standard values provided by W.H.O ($< 30\%$). The average number of medicines per prescription is another important prescribing indicator to check the pattern of physician's prescription and it was calculated to be 2.3 by using a standardized formula (more than WHO standard value i.e. below 2).

Discussion

During this study, antibiotics dispensing practices were observed in sample pharmacies of Islamabad & Rawalpindi. The results stated above shown that a majority of the antibiotics were dispensed on official medical prescription but a considerable number of antibiotics (about 35%) were dispensed without prescription either on patient's demand or on self medication. Furthermore, not all antibiotics dispensed by a pharmacist, but technicians or salesmen dispensed a considerable proportion of antibiotics to respondents.

As discussed above, in Pakistan antibiotics are not over the counter medications according to Drug Act 1967 and they should be dispensed on official medical prescriptions and by law they should not be legally available to patients without prescriptions from pharmacies, but on contrary

to this, in practice they are freely available and self medication is very much common. [16] In case of self medication, it was observed that pharmacist's tended to recommend newer & wide spectrum antibiotics without completely reviewing the patient's condition and other problems for example allergy problems. In this study, conducted in Islamabad & Rawalpindi, almost 35% of antibiotics were dispensed without official medical prescription or on pharmacist recommendation, but a recent study conducted in another city of Pakistan showed about 60% of self medication which is considerably high percentage as compared to this study. [17] According to another study conducted in 3 Asian countries, including Pakistan the prevalence of self medication in Pakistan is reported to be about 76%. A similar study conducted in Egypt reported 23.2% dispensing of non-prescription antibiotics in Egypt. [1] According to study conducted in Nepal, self medication reported to be 59%. [21]

In this study while reporting self-medication, a large proportion almost 52% of respondents said that they are asking for specific antibiotics because they used it earlier and it was also seen that antibiotics were not dispensed under the complete supervision of pharmacists as only 23% of antibiotics were dispensed with them and remaining 77% were dispensed by salesmen or technician. Study depicted that out of almost one third of total prescriptions, 68% came from private clinics and hospitals whereas only 32% prescriptions came from public sector hospitals because this study didn't include pharmacies that are attached with hospitals. This study also indicated that the maximum antibiotics were dispensed in solid dosage form.

It was documented that the cost of almost 45% prescriptions lied in the range of 75-150 PKR while on self medication almost 41% bills costs less than 75 PKR. This result is evident of the fact that in developing countries like Pakistan less income and less resources forced people towards cheaper ways of getting health facilities and treatment & it is also evident that in Pakistan the out of pocket expenditure for health is very high, so people find self medication as a cheap alternative source to avoid physician or consultant fees. [16] Another reason behind the high cost of prescriptions antibiotics is that trade names are usually used in both private & public health facilities & generic prescribing is still very much limited. The current study also highlighted the fact that in almost 30% cases of self medication, patients/ respondents asked the pharmacist to recommend any suitable medicine against their illness and pharmacists by using their latest knowledge recommended & dispensed antibiotics to them.

The study also indicated a significant association between self medication& several demographic variables like age, gender & respondent's occupation. A similar study conducted in another city of Pakistan also showed that gender has a significant association with self medication and males indulged more in self medication. [16] Furthermore, Price/cost of antibiotics per prescription also showed a significant association with self medication. According to a study conducted in Faisalabad, significant association of antibiotics cost was found with self medication. [16] A study conducted in Egypt also showed a significant association between self medication and antibiotics price. [1] This shows that antibiotics sell on prescription cost higher to patients as compared to self medicate because it saves both money & time.

The study indicated clearly that antibiotics prescribing were not happening according to the indicators laid by the World Health Organization. The results of the present study showed that percentage of antibiotics per prescription in a sample of Islamabad & Rawalpindi are 58%, which is far more than the standards of less than 30%. A survey conducted by WHO in Asian

countries to check the prescribing indicators shows that the average number of antibiotics prescribed per prescription in Pakistan is above 70%. [18] Another indicator used in this study to describe prescribing practices, the average number of medicines per prescription comes out to be 2.3 which is still higher than the standard of below 2 medicines per prescription as led by the World Health Organization.

Conclusion

The results of this study show that the antibiotics prescribing and dispensing practices in Islamabad & Rawalpindi are not in complete accordance to the standard guidelines. Antibiotics are dispensed frequently from pharmacies without official medical prescriptions. The majority of the antibiotics are dispensed according to the prescriptions with a significantly higher percentage of antibiotics per prescriptions. All these findings highlighted the need for complete enforcement of pharmacy laws.

Conflict of Interest

We have read and understood IJCRIMPH policy on declaration of interests and declare that we have no competing interests.

Limitation

This study was conducted in Islamabad & Rawalpindi with relatively much better demographic variables & with improved socioeconomic status so the results of this study cannot be generalized completely to the rest of the country. Moreover, the study was conducted in a limited time, so the results of this study didn't include the names of frequently prescribed antibiotics & conditions against which the antibiotics were prescribed resulted in prescribing pattern not completely established.

Acknowledgment

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Table 1: Price groups of antibiotics in case of self –medication

Price Groups (PKR)	Frequency	Percentage
Less than 75	83	61
76-150	40	29.4
151-225	11	8.1
225 & above	2	1.5

Table 2: Cross tabulation among demographic variables, antibiotic demand on official medical prescription and dosage form of antibiotics dispensed.

Variables	Chi-square	P-value (<0.05)
Age	39.534	< 0.01
Gender	3.931	0.047
Educational status	6.533	0.163
Patient's occupation	30.155	<0.01
Price/Cost	34.712	<0.01
Dosage form	33.513	0.153

Figure 1. Price Groups
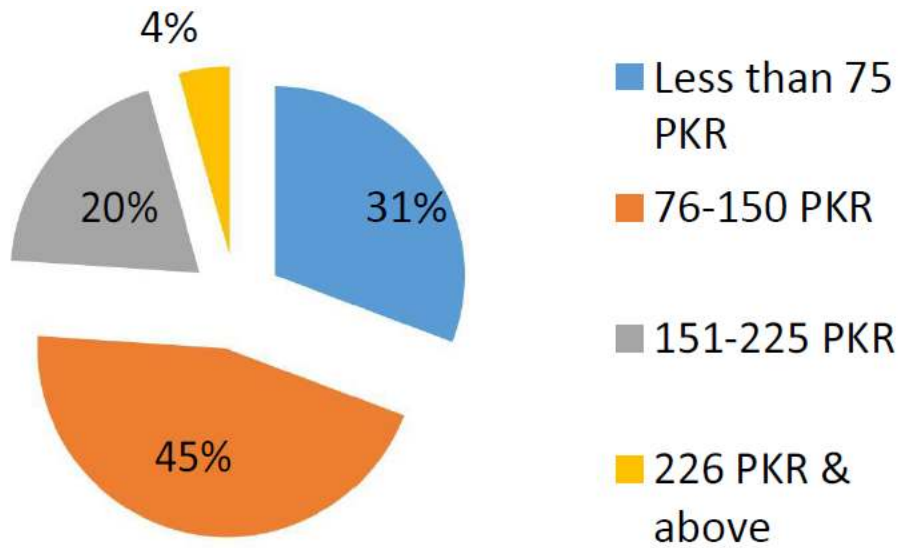
Figure 2. Antibiotics dispensed in case of self-medication