Assessment of antibiotic self-medication practice among public in the northwestern region of Pakistan

Shabnam Nazir,¹ Marium Azim²

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¹Kohat University of Science and Technology, Kohat, KPK, Pakistan

²Department of Pharmaceutical Sciences, Kohat University of Science and Technology, Kohat, Khyber Pakhtunkhwa (KPK), Pakistan

Correspondence to

Dr Shabnam Nazir, Kohat University of Science and Technology, Kohat, KPK 26080, Pakistan; nazirshabnam875@gmail.com

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ABSTRACT

Background Self-medication with antibiotics is a common practice, which may lead to the development of antimicrobial resistance (AMR)—a major health concern worldwide. The most common reason for the development of AMR is a lack of education and regulatory policies and the lack of community pharmacists.

Objective To assess various factors that lead to self-medication with antibiotics, which might cause AMR and hinder effective healthcare.

Methods A cross-sectional study was carried out using a predesigned questionnaire to collect data from 800 respondents. The respondents were selected by simple random sampling during November 2014 to January 2015 from different regions of Khyber Pakhtunkhwa (KPK), Pakistan. Only properly completed questionnaires were assessed for different variables. The collected data were analysed using SPSS V.16.

Results 527 people completed and returned the questionnaire—a response rate of 66%. Self-medication with antibiotics was reported by 135 participants (26%), with a higher prevalence of men than women (48% vs 38%, respectively). The main reason for self-medication was previous experience with the same antibiotic (68%). The most commonly used antibiotics were amoxicillin-clavulanate (40%) and major indications for self-medication were sore throat (29%) and flu (24%). Of the 527 respondents, only 104 (20%) were aware of AMR.

Conclusions This study is the first to evaluate self-medication with antibiotics in KPK, Pakistan. In view of the high prevalence of self-medication, introduction of a public health policy through drug regulatory authorities, public awareness programmes/campaigns, patient education about AMR and appropriate use of antibiotics are critically required. The role of community pharmacists needs to be strengthened.

INTRODUCTION

Self-medication with antibiotics, a class of substances that can kill or inhibit the growth of some strains of bacteria, is common in developing countries, leading to antimicrobial resistance (AMR).^{1–3} People tend to self-medicate to treat self-diagnosed disorders, sometimes using drugs previously prescribed for chronic or recurring disease.^{4 5}

AMR can be defined as the genetically determined ability of micro-organisms to resist inhibition by antibiotic substances through a variety of mechanisms.² It poses a global challenge as it leads to many deaths owing to development of resistance to various second- and third-line agents, leading to treatment failure.^{6 7} According to the WHO global report on surveillance (2014), development of

resistance by micro-organisms is evolving and widespread, and intensified by uncontrolled use of antibacterial drugs. The report also suggests that systematic data for AMR in southeastern Asia are lacking. However, available data on selected diseases suggest that AMR is growing in the region, but is highly neglected; the prevalence of AMR is high in Pakistan. Mastro *et al*⁸ found that AMR of *Streptococcus pneumoniae* and *Haemophilus influenzae* was a threat to clinical management in Pakistani children, while another study⁹ showed AMR of *pneumococci* in Pakistani children with acute lower respiratory tract infection. Zafar *et al*⁹ reported AMR of *shigella* in the urban slums of Karachi, Pakistan.

A ‘Self-medication with Antibiotics and Resistance’ consortium survey showed that the prevalence of self-medication is up to 23% in developed countries such as Europe and the USA,¹¹ being used mainly for upper respiratory tract infections, teeth infections and urinary tract infections.¹²

The trend towards self-medication with antibiotics is also high in Asian countries. A few studies have shown that antibiotics are most commonly used after antipyretic agents for self-medication.^{4 13} Studies conducted among students in Karachi University and Islamabad University of Pakistan reported the prevalence of self-medication with antibiotics as 35.2%¹⁴ and 41%,¹⁵ respectively. However, further study of self-medication with antibiotics in Pakistan is needed. This is particularly true for the Khyber Pakhtunkhwa (KPK) region. Several factors may increase the incidence of self-medication with antibiotics, such as the over-the counter availability of antibiotics as in the USA and Europe, pharmacies staffed by untrained personnel, storage of left-over antibiotics at home and patient non-compliance.^{12 13 16 17}

This study aims to assess various factors that lead to self-medication with antibiotics, which might cause AMR and hinder effective healthcare.

METHODS

The study was carried out in various regions of KPK, Pakistan, between November 2014 and January 2015. A predesigned questionnaire was used to collect the relevant information—namely, demographic data, including gender, age, location and socioeconomic conditions; and assessment of factors that might lead to self-medication with antibiotics. The questionnaire is shown in online supplementary appendix I. The questionnaire was sent to community pharmacists of various regions of KPK, who were important for collection of the data in our study. Of 800 questionnaires sent out,

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527 (66%) were returned; only correctly completed questionnaires were assessed for different variables. The collected data were analysed using SPSS V16. The ethics committee of Kohat University of Science and Technology, Kohat approved the study. No specific inclusion and exclusion criteria were used.

RESULTS

Among respondents, 198 men (66%) and 103 women (34%) had used antibiotics. Collected data were assessed for prevalence of self-medication with antibiotics among respondents and various factors which might lead to it and also the level of awareness about AMR due to misuse of antibiotics. Of 527 people, 135 reported self-medication. This study showed that the prevalence of self-medication with antibiotics was 48% (n=96) among men and 38% (n=39) among women (table 1). Most of the respondents were aged 21–25 years (64%) and the largest group had an income of >40 000 PKR/month (42%). The highest rate of self-medication was reported in the region of Peshawar (26%).

Of the reasons for self-medication with antibiotics, previous exposure to the same antibiotic was the most common (68%), followed by not having access to a doctor (6%) and poor economic condition (5%) (table 2).

The indications for self-medication were sore throat (29%), followed by flu (24%), diarrhoea (7%) and a number of other indications, including chest tightness, rhinitis, infections and toothache (table 3).

The most common antibiotics used were amoxicillin-clavulanate (40%) followed by ciprofloxacin (14%), metronidazole (11%), doxycycline (10%) and azithromycin (8%), etc (table 4).

Table 1 Demographic characteristics and prevalence of self-medication with antibiotics among respondents

Demographic characteristics	Self-medicated N (%)	Non-self-medicated N (%)	Total N %
Gender			
Male	96 (48)	102 (52)	198 (66)
Female	39 (38)	64 (62)	103 (34)
Age (years)			
16–20	36 (27)		
21–25	86 (64)		
26–30	6 (4)		
31–35	4 (3)		
>35	3 (2)		
Total	135 (100)		
Region			
Peshawar	35 (26)		
Kohat	20 (15)		
Karak	21 (16)		
Bannu	15 (11)		
Waziristan	12 (9)		
Dir	5 (4)		
Buner	20 (15)		
Swat	7 (5)		
Total	135 (100)		
Socioeconomic status (PKR/month)			
<20 000	30 (22)		
20 000–40 000	48 (36)		
>40 000	57 (42)		
Total	135 (100)		

Table 2 Factors contributing to self-medication (134 patients)

Factors	N (%)
Poor economic condition	7 (5)
No access to physician care	8 (6)
Previous experience	91 (68)
Miscellaneous	28 (21)

Pharmacies were most the common suppliers of antibiotics (46%), followed by drugs available at home kept after previous use (21%) and then relatives or friends (18%). The most common sources for information about antibiotics were previous experience (39%), pharmacists (25%), relatives or friends (17%), followed by doctors and leaflets, etc (table 5). Most patients did not complete the due course of antibiotic therapy and stopped even on the third day (70%), as soon as their symptoms improved. 'Awareness level' shows that the average extent of knowledge among the public about AMR was 20%.

DISCUSSION

The prevalence of antibiotic self-medication in KPK, Pakistan found in this study was 26%, which is similar to the prevalence found in a study from Spain.¹⁸ Almost twice the prevalence was found in Sudan (48.1%).¹⁹ Studies conducted among students in the University of Karachi and Islamabad (Pakistan) showed a rate of 35.2%¹⁴ and 41%,¹⁵ respectively, which is 1.5- and 1.6-fold higher than the rate found in our study. On the other hand, the prevalence rate found in our study is nearly fourfold higher than in Indonesia (6%). In our study the prevalence of self-medication with antibiotics was found to be high among men (48%), possibly because men have greater access to pharmacies in KPK, Pakistan. Similar results were seen in the United Arab Emirates.⁵ In contrast, many studies showed a greater prevalence of self-medication among women.^{4 17 20}

In our study the most common reason for self-medication was previous experience, as has been reported by Grigoryan *et al.*¹² The same finding is supported by studies conducted in Karachi, Malaysia, Latin America and Ethiopia.⁴ The most common indication for antibiotic self-medication in our study was upper respiratory tract infections/sore throat and flu, as in many other studies.^{19–21} However, in Nigeria diarrhoea is the most commonly self-medicated indication.⁴ We found that previous experience and pharmacists/druggists were the main sources of

Table 3 Indications for which self-medication with antibiotics was used (N=153)

Indications	N (%)
Diarrhoea	11 (7)
Runny nose	7 (5)
Flu	36 (24)
Toothache	3 (2)
Sore throat	45 (29)
Chest tightness	8 (5)
UTIs	1 (0.7)
Acne	2 (1)
Tonsil infection	9 (6)
Others	31 (20)

UTIs, urinary tract infections.

Table 4 Most common antibiotics used for self-medication

Antibiotics	N (%)
Amoxicillin-clavulanate	53 (40)
Ciprofloxacin	19 (14)
Metronidazole	15 (11)
Ampicillin/cloxacillin	1 (0.7)
Levofloxacin	5 (4)
Moxifloxacin	3 (2)
Erythromycin	5 (4)
Azithromycin	11 (8)
Ceftriaxone	3 (2)
Doxycycline	13 (10)
Ampicillin	3 (2)
Cefixime	3 (2)
Total	134 (100)

information. However, a study conducted in India found that textbooks were the main source.⁴ Amoxicillin-clavulanate was the most commonly used antibiotic in our study together with other classes of antibiotics, including macrolides, tetracyclines and quinolones (mostly associated with incomplete duration of treatment). Similar results were also found in Greece,²⁰ Sudan,¹⁹ Israel²² and Ethiopia.²³

Most respondents reported discontinuation of antibiotics by the third day or even earlier. Our study also showed that the level of awareness about AMR among respondents was low (20%). The same pattern was seen in Latin America.¹⁷ These studies show that malpractices, including random drug use and non-compliance, lead to the emergence and spread of resistant pathogens, which can be countered by the rational use of antibiotics.¹⁹ We suggest that the healthcare system of Pakistan needs to be re-examined, as it ignores the pharmacist's role in

educating the public, developing and implementing an effective healthcare plan.

Limited education of respondents about the misuse of antibiotics and resulting AMR seems to be a primary factor leading to self-medication with antibiotics. However, lack of education and awareness cannot be considered the sole reason behind the irrational use of antibiotics.²⁴ Health policy makers, doctors and pharmacists have equal responsibility to ensure their rational use. Stopping the supply of antibiotics without a physician prescription is the most important step, which can be implemented by health policy makers; medicine supply without prescription is a general practice in developing countries.²⁵ This malpractice by healthcare authorities builds up an attitude in the public towards misuse of antibiotics, even though they may know that this is unwise. Health workers who visit the general public for various reasons could play an important role in educating them. Electronic and print media could also be a useful tool for educating the public about which illnesses require antibiotics and which do not.

Hospital and community pharmacists are particularly important in providing education as they are in close interaction with the public. Hospital and community pharmacists may warn the patient that irrational use of antibiotics can harm teeth and bones and may lead to life-threatening allergic reactions.²⁶ According to a study conducted into pharmacy practice in Pakistan and India, the role of the pharmacist as part of the healthcare team in wards and clinical set ups needs to be strengthened.²⁷ Pharmacists in Pakistan are facing a challenge to play their proper role in hospitals and to improve their working relationship with doctors and nurses. Nurses' perception of pharmacists in hospitals in Pakistan is not good, although they consider them to be knowledgeable about drugs.²⁸ The underlying cause of this attitude on the part of both doctor and nurse might be a perception of a pharmacist as a rival professional at hospitals. Regulatory policies and an understanding of the professional skills of each member of the healthcare team are extremely important. Training about the merits of collaborative work may be the answer.

This study was limited to the northwestern region of Pakistan. It may be expanded to southern and eastern regions of Pakistan. Future investigations could correlate the results with the incidence of AMR in various regions.

Table 5 Supply sources of antibiotics used for self-medication and sources of information about self-medication, duration of use of antibiotics and level of awareness of AMR

Variable	N (%)
Source of antibiotic supply	
Pharmacy	62 (46)
Relatives and friends	25 (18)
Household	28 (21)
Others	20 (15)
Source of information	
Physician	12 (9)
Pharmacist	34 (25)
Relatives or friends	23 (17)
Leaflet	5 (4)
Previous experience	51 (39)
Others	9 (7)
Duration of use (days)	
1–3	94 (70)
5–7	35 (26)
>10	6 (4)
Awareness about AMR	
Aware	104 (20)
Unaware	423 (80)

AMR, antimicrobial resistance.

Key messages

- ▶ Previous studies have shown that self-medication has increased greatly among developed countries for several decades.
- ▶ Self-medication with antibiotics has become common worldwide and there is a lack of awareness about antimicrobial resistance owing to the over-the-counter availability of antibiotics.
- ▶ This was the first study in an area of Pakistan with low literacy where the community knows little about antibiotics and antimicrobial resistance but continues to self-medicate owing to poor drug regulatory laws.
- ▶ This study demonstrated the poor awareness of the public of Khyber Pakhtunkhwa in Pakistan about antibiotic use and antimicrobial resistance, for which little published information is available.

CONCLUSION

This study showed a marked prevalence of self-medication with antibiotics in KPK, Pakistan. Regulating the availability of antibiotics as 'prescription-only medicine' might automatically reduce the use of antibiotics. The role of hospital and community pharmacists is pivotal in this regard as they are directly involved with patient counselling. Hospitals also need to adopt a uniform policy about the frequent and unnecessary use of antibiotics, in order to control AMR.

Implementation of regulatory policies by relevant authorities, an awareness programme for the general public and strengthening the role of community pharmacists are highly recommended steps.

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Competing interests None declared.

Ethics approval Ethics committee of Kohat University of Science and Technology, Kohat, KPK, Pakistan.

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