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Intenal Medicine Section

Self-Medication with Antibiotics among People Dwelling in Rural Areas of Sindh

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ABSTRACT

Introduction: Self-medication with antibiotics is becoming increasingly common due to multiple factors. The public who are using these antibiotics generally do not have full information regarding their proper use, especially the dosages and possible side-effects. Hence, unregulated use of such medicines may cause dangerous adverse effects in the patients.

Aim: The study was aimed to evaluate the prevalence and practice of self-medication with antibiotics among people dwelling in the rural areas of province Sindh.

Materials and Methods: A cross-sectional survey was performed at Outpatient Department of Civil Hospital Karachi, from January to March 2015. Four hundred rural dwellers who lived in the outskirts of Karachi city area of province Sindh were recruited for the study in the aforementioned time period through non-probability convenience sampling.

Results: The investigation reported a prevalence of 81.25% among rural dwellers of Sindh with regards to self-medication of antibiotics. The most common reason behind self-medication were economic reasons (88.0%). Amoxicillin (52.0%) was found to be the most self-prescribed antibiotic. Majority of the participants (74.7%) didn't know about the phenomena of antibiotic resistance associated with inadequate use of antibiotics and only 25 subjects identified correctly that the situation would lead to increase resistance.

Conclusion: The self-medication rates with antibiotic are higher in rural areas of Sindh. There is an urgent need for the government to enforce stricter laws on pharmacies dispensing medications, especially antibiotics, without prescriptions. Lastly, provision of cost effective treatment from public sector can significantly reduce self-medication with antibiotics among rural dwellers of Sindh.

Keywords: Adverse effects, Antibiotics, Antibiotic resistance, Self-medication, Rural dwellers

INTRODUCTION

Self-medication has previously been defined to be "the taking of drugs, herbs or home remedies on one's own initiative, or on the advice of another person, without consulting a doctor" [1]. This may involve use of medication by oneself or giving it to family members, including children or the elderly [2]. Previous literature revealed that the prevalence of self-medication is comparatively greater in developing as compared to developed countries [3,4]. Regions of southern and Eastern Europe had comparatively higher rates of self-medication than northern and western areas of Europe [4]. The prevalence has been proclaimed to be 3% in northern Europe [4]. Widespread self-medication practices have also been observed in Latin America [5]. On the other hand, there is a huge increase in Asia, with the values being reported to be around 4-75% [6]. A previous study carried out in Karachi showed the self-medication rate in university students to be around 80.4% and that in the urban population to be around 68.1% [7,8].

The World Health Organization (WHO) has encouraged the use of self-medication without medical council, in order to prevent and treat diseases in a faster and more efficient manner and also to reduce the load on healthcare centers in the rural areas [9,10]. However, uninstructed use of medicines may lead to problems in the short and long-term. Self-medication is becoming increasingly common due to multiple factors. People are exposed to a greater amount of information and they want to make independent decisions regarding their lives, which includes medications too [11]. Another important reason is the increased access to antibiotics in countries where they are sold without prescription, thereby allowing people to ignore the physician and use their own opinion or the advice of others to self-medicate [12-15]. It could also be due to financial problems, illiteracy, inadequate healthcare facilities or even a lack of time [9]. Studies conducted in Argentina, Brazil, Chile, Colombia, Costa Rica and Nicaragua connected the high self-medication rates to a lack of access to healthcare facilities [5]. An interesting finding in Honduras was that self-medication was linked to urban dwellers, however, no association was built with socioeconomic status [16].

The public who are using these antibiotics generally do not have full information regarding their proper use, especially the dosages and possible side-effects [17,18]. Hence, unregulated use of such medicines may cause dangerous adverse effects in the patients. Also, a perception has been built up in the public that common respiratory infections can be treated by antibiotics [19]. This has led to widespread unrestricted use of antibiotics that has resulted in many pathogens becoming resistant to them. Strains of *S. pneumonia, S. typhi, Neisseria gonorrhoeae* and *Shigella* species have been found that are now resistant to common antibiotics [20-23]. Sturm et al., also found a direct relationship between inappropriate drug use and antibiotic resistance [24]. In Pakistan, the pharmacies are under legal requirement to sell specific drugs only on prescription from a registered medical professional [25,26]. However, the conformity to the law by these pharmacies is not satisfactory, leading to the high rates of self-medication [25,27].

The prevalence of self-medication in university students and urban dwellers of Karachi has been calculated in previous studies [8,9]. However, to the best of our knowledge, there is no study that has seen the rates of self-medication in the rural population of Sindh.

AIM

Therefore, the aim of our study was to evaluate the prevalence and practice of self-medication with antibiotics among people dwelling in the rural areas of Sindh.

MATERIALS AND METHODS

Study Design and Setting:

This was a cross-sectional study conducted at Civil Hospital, Karachi from January to March of 2015, in which the prevalence of self-medicated antibiotics among the rural dwellers of Sindh was calculated. Civil Hospital is the largest tertiary care hospital run by the government. It is one of the major suppliers of free-of-cost healthcare for the rural dwellers of Sindh, who cannot afford to pay for their treatment. Four hundred people were recruited from the OutPatient Department (OPD) of the hospital. This study was approved by the review board of Dow University of Health Sciences.

Sample Size Determination

This questionnaire went through a pilot phase in which 30 people who conformed to the inclusion criteria were given these questionnaires to fill. The data collected from these participants was analyzed and proportion of the subjects that self-medicated was calculated which reported to be 50%. Therefore, we used this as reference prevalence to calculate a sample size of 364 at a confidence interval of 95%. Furthermore, for statistical analysis, 400 participants were recruited. Their responses were collected and they were questioned regarding their experience of the whole process. The ambiguities present in the questionnaire were adjusted accordingly. The data collected through pilot study was not included in the study results.

Inclusion and Exclusion Criteria

Those people were included who had come from the rural areas of Sindh or lived in the outskirts of Karachi. Only people studying medicine or those with a profession related to medicine were excluded from the study. This was because they would have excessive information as compared to the other participants related to the use of antibiotics, which would introduce bias in the study.

The definition of self-medication was set as the use of any antibiotics within the last 6 months, without the prescription of a doctor. This time limit of 6 months was set to eliminate the possible recall bias among the participants. Antibiotics are the medications consumed to treat bacterial and protozoal infections and that are depicted on the World Health Organization's (WHO) model list of necessary medicines [28,29].

Data Collection

Informed consent was acquired from every participant, both verbal and written. Most of the people who could not understand English, the consent form was translated into their native tongue, Sindhi, and then given to be filled.

A questionnaire was then given to the volunteers to fill out. It contained 5 sections (A, B, C, D and E). Participants were given the option of answering the questionnaire themselves or having the researcher fill it based on verbal responses. Section A evaluated the demographics of the patients, including age, gender, marital status, level of education, household income, occupation and health insurance. The relevant data is summarized in [Table/Fig-1]. Section B assessed the different antibiotics that the participants bought for self-administration [Table/Fig-2]. Section C gauged the reasons for self-medication and its frequency, the location for obtaining medicines and the people they approached for advice [Table/Fig-3]. Section D determined the knowledge of adverse effects caused by antibiotics [Table/Fig-4] while section E asked about the knowledge of inadequate use of antibiotics on antibiotic resistance [Table/Fig-5]. Each participant was asked at the start of the questionnaire whether they self-medicated. Those who did were required to fill the whole questionnaire while the rest only filled sections A, D and E. The questionnaire was compiled from the already validated versions used by Ramay et al., and Shah et al., in their studies [29,30].

STATISTICAL ANALYSIS

The data was entered using SPSS version 19 and same software was used to employ data analysis and data management. A descriptive analysis was performed and frequency tables were tabulated to calculate the prevalence of self-medication. The same descriptive analysis was used to calculate frequency and percentages for the reasons which led to use of self-medication of antibiotics and classes of antibiotics medicated. Furthermore, Chi-square test was performed to determine the association of socio demographic features between users and non-users. The p-value <0.05 was set to be significant. We also determined frequencies and percentages with regards to most common adverse side effects experienced and knowledge regarding antibiotic resistance was calculated.

RESULTS

Study Population

A total of 400 participants dwelling in rural areas of Sindh were investigated in this cross-sectional survey. The mean age of study participants was 48.6(±4.4). The study comprised of 263 (65.7) males and 137 (34.3) females. Out of the 400 participants, 161 (40.2%) were uneducated, 222 (55.5%) were married and 180 (45.0%) participants had earnings of less than 7000 PKR. The demographic features are illustrated in [Table/Fig-1].

	Participants using self-medication (N=325)	Participants not using self-medication (N=75)
Variable	**N (%)**	**N (%)**
Age	49±4.5	47±3.9
Gender		
Male	211(64.9%)	52(69.3%)
Female	114 (35.1%)	23(30.7%)
Education		
Matric	81(24.9)*	5(6.7%)*
Intermediate	49(15.1%)	16(21.3%)
Graduation/ Bachelors	26(8%)*	24(32%)*
Post-graduation/Masters	10(3.1%)*	28(37.3%)*
No education	159(48.9)*	2(2.7%)*
Marital status		
Single	113(30.1%)	23(30.7%)
Married	178(54.8%)	44(58.6%)
Divorce	34(10.5%)	8(10.7%)
Monthly household income		
<7000 PKR	172(52.9%)*	8(10.7%)*
7000-14,000	62(19.1%)	11(14.7%)
14,000-28,000	36(11.1%)	13(17.3%)
28,000-55,000	29(8.9%)	7(9.3%)
>55,000	26(8%)*	36(48.0%)*
Occupation		
Housewife	68(20.9%)	20(26.6%)
Salaried employee	198(60.9%)	42(56.0%)
Independent workers	65(20.0%)	13(17.4%)
Health care expenses covered		
Yes	30(9.2%)*	63(84.0%)*
No	295(90.8%)*	12(16.0%)*

[Table/Fig-1]: Demographic features of rural dwellers.
*p-value<0.05

Prevalence of Self-medication and Its Association with Demographic Features

A total of 325 rural dwellers reported usage of antibiotics not prescribed by health physician in the last 6 months; indicating a prevalence rate of 81.25%. A further analysis was performed on frequencies obtained from self-medicated patients. It was evident that there was a significant difference between self-medication practiced by male and females (p=0.04; 64.9 vs35.1), participants earning less than 14,000 PKR and greater then this amount (p=0.02; 72.o% vs 28.0%)), study subjects having education of less than Intermediate and above it (p=0.01; 88.9% vs 11.4)) and for the participants having healthcare expenses covered with those who have to pay from their own pocket(p=0.01; 9.2% vs 90.8). We also deduced that there was no statistical significance for frequency of self-medication with antibiotics with regards to age, sex, marital status and occupation of participants between users and non-users.

Trends in Antibiotic Usage

Among the participants who self-medicated antibiotics, Amoxicillin (52.0%) was most commonly purchased followed by Tetracycline (16.9%), Ciprofloxacin (14.8), Co-trimoxazole (11.4%) and Ampicillin (8.3%). Cefadroxil and Cefixime were not purchased for self-medication in the last 6 months by study subjects. Rest of the antibiotics inquired were less frequently employed by our participants. [Table/Fig-2] depicts the frequency of usage for each antibiotic.

Antibiotic purchased for use in self-medication+	Number of respondents (N=325)	Percentage
Amoxicillin	195	52
Tetracycline	55	16.9
Trimethoprim-sulfamethoxazole (co-trimoxazole)	37	11.4
Erithromycin	21	6.5
Ciprofloxacin	48	14.8
Cefadroxil	0	0
Cefixime	0	0
Azithromycin	14	4.3
Ampicillin/cloxacillin	27	8.3
Secnidazol	13	4.0
Albendazol	10	3.1
Metronidazol	104	32
Levofloxacin	9	2.8
Ceftriaxone	9	2.8
Clarithromycin	3	0.9

[Table/Fig-2]: Number of respondents purchasing antibiotics when self medicating.
+(multiple ans)

Characteristics of Self-medication

Among the rural dwellers who self-medicated antibiotics, the most common symptom resulting in self-medicating antibiotics was flu like symptoms (60.0%). Furthermore, when inquired about the reasons, the economic reasons (88.0%) followed by easy availability of drugs from pharmacies (72.0%) were the most frequent responses. Majority of the participants obtained antibiotics without prescription from pharmacies in the rural areas (84.9%). It was also revealed that 83.1% of participants do not read antibiotic information handout while employing them. Forty four percent of the self-medicated subjects sought advice from family members followed by pharmacies (35.4) and friend (N=20.6). In the same section of the questionnaire, participants were also required to rate, on a scale of 1-10, the impact of self-medication on one's health (1 being a negative effect and 10 being a positive effect). More than half of the participants (52.6%) marked 5 and above, deducing a small scale or no negative impact of self-medicating antibiotics. The detailed frequencies of characteristics of self-medication are illustrated in [Table/Fig-3].

Variable	Number of respondents	Percentage
Symptoms resulting in self-medication+	211	64.9
Cold/flu	195	60.0
Pain	98	30.2
Fever	62	19.1
Stomach ache	52	16.0
Diarrhea	49	15
Allergy	15	4.6
Reasons for self-medicating+		
Lack of time and to save time	72	22.1
Easily purchasable medications from pharmacies	234	72.0
Economic reasons (High costs of visits to doctor/Low cost of purchasing drugs)	286	88.0
Simple sign and symptom of a disease	218	67.1
Convenient (ease of curing perceived symptoms)	211	64.9
Lack of trust toward doctors	29	8.9
Locations for obtaining medications+		
Pharmacies	276	84.9
Corner stores	179	55.1
From home (previously purchased)	244	75.1
Frequency of self-medication		
One time per week	36	11.1
One time per month	49	15.1
Two times per month	6	1.8
Every two months	6	1.8
Every three months	42	12.9
Every six months	49	15.1
Two times per year	58	17.8
One time per year	79	24.3
Regarding the antibiotic information handout		
Do not read antibiotic information handout	270	83.1
Read antibiotic information handout	55	16.9
How it can effect one's health, 1 negative effect 10 positive effect		
1 on a scale of 10	105	32.3
2-4 on a scale of 10	121	37.2
5-6 on a scale of 10	49	15.1
7-8 on a scale of 10	26	8.0
9-10 on a scale of 10	24	7.4
Who respondents go to for advice		
Pharmacy employee	115	35.4
Family	143	44
Friend	67	20.6

[Table/Fig-3]: Characteristics of self-medication among rural dwellers.
+(multiple ans)

The rural dwellers were also questioned about the knowledge of the adverse effects that were caused by antibiotics. Tiredness/ Dizziness (55.4%) followed by Diarrhea/abdominal pain (N=21.5) were most commonly reported. The other effects that rural dwellers responded about most awareness include Yellow eyes/ skin (10.8), Sleep problems (9.2%), Headaches (9.5) and Allergic Reactions (7.8%). The individual frequencies obtained from rural dwellers for knowledge on each adverse effect is depicted in [Table/Fig-4].

Symptoms	Frequency (n=400)	Percentage (%)
Diarrhea/abdominal pain	70	21.5
Nausea/Vomiting	20	6.5
Allergic Reactions	23	7.8
Yellow eyes/skin	35	10.8
Tiredness/Dizziness	180	55.4
Headache	31	9.5
Fever	23	7.1
Kidney problems	15	4.6
Liver problems	19	5.8
Teeth discoloration	12	3.7
Muscle/joint pain	21	6.5
Numbness/tingling	15	4.6
Sleep problems	30	9.2

[Table/Fig-4]: Knowledge of adverse effects caused by antibiotics.

Moreover, only 25.0% (N=100) narrated of suffering adverse effects after employing antibiotics. Among them, 75 rural dwellers indicated which adverse effect they had encountered. Forty eight percent indicated diarrhea/ abdominal pain, 32% reported an allergic reaction (N=24) and 20% reported for sleep disturbances (N=15).

Lastly, participants were also inquired about the knowledge of inadequate use of antibiotics. As illustrated in [Table/Fig-5], only 6.3% (N=25) appreciated that inadequate use of antibiotics can lead to increase in antibiotics resistance. However, majority of participants (74.7%) didn't know about the phenomena of antibiotic resistance.

Effect on antibiotic resistance	Frequency (n=400)	Percentage (%)
Increases	25	6.3
Decreases	44	11
Remains the same	32	8.0
I don't know	299	74.7

[Table/Fig-5]: Knowledge of effect of inadequate use of antibiotics on antibiotic resistance.

DISCUSSION

The prevalence of self-medication with antibiotics in our study was found to be 81.25%. No such research has been carried out in Pakistan, studying the prevalence of self-medication with antibiotics amongst the rural population. Therefore, comparison with another study is not possible. However, a study found self-medication with antibiotics among non-medical university students of Karachi to be 47.6% [30]. In the urban population of Karachi, it was found to be around 68.1% [9]. A comparable study found that 16.7% of the people in a rural town of Northern India used antibiotics as self-medication [31]. Our prevalence rate is much higher as compared to other countries of the world, with the self-medication rate being 32.7% in Italy [3], 48% in Iran [32], 47.8% in Southern China [33], 79.5% in Sudan [34], 73.7% in Saudi Arabia [35], 56.3% in UAE [36], 23% in Jordan [37], 78.14% in Albania [38], 11% in Spain [39], 3% in Denmark [40], 19% in Malta [41] and 22% in Lithuania [42]. The differences in the self-medication rates may be due to ethnic diversity among the different populations and different healthcare systems in each country.

We also gauged the reasons that could have contributed to people self-medicating. No association was found between demographic factors such as gender, marital status and occupation among self-medication with antibiotics between users and non-users. These results are congruent with those of Shah et al., [30]. However, Ramay et al., found that gender was related to self-medication, with women more involved in these practices as compared to males [29]. A similar result was also achieved in a study carried out in Mexico [43]. Our study found that education level, socioeconomic status and health insurance were related to self-medication. In the study population, self-medicating had a low level of education, with almost half of them uneducated, and mostly belonging to the low socioeconomic class. This is similar to the study conducted by Balbuena et al., in Mexico, in which low socioeconomic background and low educational level were directly correlated to self-medication [18,29]. On the other hand, a study carried out in Guatemala City found no such association. Age was not found to be linked to self-medication which is in contrast to other studies that have assigned either the young or adult population as a risk factor for self-medication [3,35,36].

We found that amoxicillin followed by metronidazol were the most commonly used antibiotics. This matches the results of a few studies carried out in Karachi [30,33]. However, in a study in Saudi Arabia, penicillins and macrolides were found to be the most commonly used antibiotics [35]. Another study in Europe stated that cephalosporins and macrolides were the most common antibiotics used [44].

Antibiotics were most commonly used for cold, pain and fever by our study population. This is in accordance with other studies [3,30,33,45]. This shows the dangers of such unregulated use of antibiotics because influenza or cold are self-limiting and do not require antibiotics [46]. An emerging problem resulting from such use of antibiotics is that of antibiotic resistance. This is a serious problem and has been referred to by a lot of studies carried out previously [47,48]. The main reasons for the practice of self-medication by our participants were economic reasons and easy availability of antibiotics [49]. The high doctor's fees and under-staffed healthcare centers in the rural areas that cannot bear the burden of the population eventually force people to look for alternatives and self-medication is the most viable one. The study carried out by Shah et al., found that the most common reasons were to save time, avoid the hassle of clinics and previous successful experiences [30]. The majority of our participants obtained the antibiotics from pharmacies without prescription. This has a lot to do with the fact that laws pertaining to sale of drugs are not properly implemented in Pakistan and the pharmacies are free to sell medications without prescriptions. In the study carried out in Guatemala City, they found that most of the antibiotics were obtained from the pharmacies [29]. These results were mirrored by a study carried out in Greece [45]. Most of our study population did not read the antibiotic information handouts. However, this is probably linked to the fact that most were uneducated or not educated enough to read it. The study in Guatemala City found that people did not read the handouts obtained with the medications and education level or socioeconomic class did not affect it [29]. In our study, we also found that our respondents seek advice regarding medication from family, pharmacists and then friends. Ramay et al., connected seeking advice to socioeconomic status and found that people from a lower socioeconomic class seek advice from family or friends while those from a higher class refer to pharmacists and family [29]. A study in Northern India found that along with the three sources of information previously mentioned, previous prescriptions were also used as a reference by people self-medicating [31].

Upon assessment of the knowledge of antibiotics, we found that a very small percentage of people were aware of the common side effects caused by these medications. Ahmad et al., also found that there was low awareness regarding drug interactions and adverse effects of common medications [31]. A previous Pakistani study found that a majority of their participants were aware of the risk of adverse effects caused by antibiotics [30].

A very important result that we found was that more than two-thirds (74.7%) of our study population had no idea about the possible

inadequate use of antibiotics leading to antibiotic resistance. Shah et al., described that a minority of their participants were aware of the term antibiotic resistance and even a lesser proportion knew that antibiotic resistance was related to inadequate use of antibiotics. An Italian study revealed that just 9.8% of the population knew the correct definition of antibiotic resistance while only 21.2% were aware of the proper consumption of antibiotics [3,30]. These figures are alarming to say the least because they show that there is potential of the current antibiotic resistance increasing. This may lead to diseases in the future being difficult to treat due to the decreased number of medications available.

LIMITATIONS

The limitations of this study were that only one province was studied (Sindh), hence, these results cannot be generalized to the whole country. Also, we introduced a selection bias by only choosing people from the OPD and setting the time limit of 6 months for self-medication. It could be possible that the self-medication rates would be greater in the rural population who do not visit the hospital or that some people might have self-prescribed some time before six months. Also, like any questionnaire-based survey, there is no way to gauge the truthfulness of the answers of the respondents.

CONCLUSION

The self-medication rates with antibiotic were observed to be significantly higher in rural areas of Sindh; owing to economic reasons and easy availability of drugs. Therefore, prompt actions must be taken by the government to enforce stricter laws on pharmacies dispensing medications, especially antibiotics, without prescriptions. Health care professionals, especially physicians, should play their role by providing guidance and counselling their patients regarding proper antibiotic use. Awareness and educational programs targeting the general population are also required so that people are made aware of the dangers of self-medication with antibiotics without sufficient knowledge. Lastly, availability of economical treatment from public sector and improved infrastructure facilities from government sector can enhance accessibility of rural dwellers to healthcare opportunities, thereby reducing self-medication rates among them.

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