Research Article

Self-Medication of Antibiotics in Pharyngitis and Gastroenteritis - A Community Based Study in Karachi, Pakistan

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ABSTRACT

To assess the irrational antibiotic use in pharyngitis and gastroenteritis by self-medication in Karachi, Pakistan. Self-medication is a common trait among residents of Karachi. Inappropriate use of antibiotics in pharyngitis and gastroenteritis play a major role in the development and spread of antibiotics resistant strains. A self-constructed, prevalidated questionnaire with open and close ended items was administered on the local residents of Karachi, Pakistan (August 2011to July 2012). Participants were enrolled following informed consent and knowledge of the purpose of the study. The tendency to self-medicate in pharyngitis (30%) is more than seeking appropriate medical treatment 22%, whereas in gastroenteritis 23% as compare to prescription by doctor 25%.Self-medication in pharyngitis is by co-amoxiclav 14.65%, cefixime 14.42%, amoxicillin 13.73%, clarythromycin 9.15% erythromycin 5.95% and antibiotics use in gastroenteritis by self-medication is metronidazole 29.23%, tetracycline 11.59%, ciprofloxacin 7.97%, metronidazole + diloxamide furoate 7.25%, clindamycin 4.11%. Antibiotics acquired from licensed pharmacists are 33.49% whereas 46.42% antibiotics are purchased from local stores and 20.09% are borrowed.42.07% antibiotic regimen is completed while 57.93%remain incomplete. Irrational antibiotic use on such a large scale leads to acquired pathogenic resistance, hence signifying the need of appropriate pharmacovigilance in order to constrain the intricate scenario.

Keywords: Antibiotics, Gastroenteritis, Pharyngitis, Self-medication, Resistance.

INTRODUCTION

Antibiotics are readily prescribed by physicians and can be easily acquired from medical stores and local pharmacies without prescription in Karachi, the largest and most populated city in Pakistan. The tendency of antibiotic use is majorly inappropriate leading to inevitable adverse implications such as decreased efficacy, organ toxicity, allergic reaction and enhanced risk of emergence of resistant strains. On the other hand, the incidence rate of bacterial and fungal infections is high in the dense population of Karachi. The most reported cases among these infections are pharyngitis and gastroenteritis whereas the latter tends to complicate specially in children due to acquired pathogenic resistance against antimicrobial therapy.[1] Resistance of isolated species causing gastroenteritis in Karachi against frequently used antibiotics such ascotrimoxazole, ampicillin or nalidixic acid rendering ineffectiveness to the therapy has been reported earlier.[2] Antimicrobials (i.e. antibiotics) are prescribed and dispensed extensively in Karachi; however, the drug utilization practice may be inappropriate and implicate the relative hazard of acquired pathogenic resistance.[3] Whereas "rising antimicrobial resistance among commonly used and low-cost oralagentsis of significant concern".[4] The use of antibiotics is usually not followed by proper medical consultation and easily acquired without a legal prescription.[5] The patients who use antibiotics are not completely aware about the toxic profile of these

drugs and they are obscure about the adverse effects in majority of cases.

Another common practice observed in the patients who are prescribed with antibiotics is that even after proper medical consultation, they discontinue the therapy without completing the regimen, whereas few others tend to prolong the regimen unnecessarily.[6] Many patients restart the antibiotic therapy on their own accord when the symptoms of the infection reappear with severity and acquired resistance. The return of symptoms after antibiotic treatment due to relapse of the infection for either case can be determined by the recurrent number of visits to the clinician, or for filling of prescription again, which is a marker for inefficacy of antibiotic treatment in the community which requires recording and publishing of such data in order to construct an effective intervention.[7] Inapt and frequent prescription of antibiotics like fluoroquinolones leads to rapid emergence of pneumococcal resistance especially in children whereas fluoroquinolones resistance is an emerging issue following resistance by penicillin and macrolides.[8] Some GI infections on presentation of clinical symptoms are wrongly treated with lone therapy of a single antibiotic which may be rendered ineffective resulting in the prolongation of the disease giving way to complications in conditions like *H. Pylori* infections, which require combination therapy with antibiotics, with no single agent used as monotherapy, due to lack of efficacy and the potential development of resistance.[9] Many super

infections may also be exacerbated with varying degrees of intensity due to prolonged, wrongly intermittent, or inappropriate dosing of specially the broad spectrum antibiotics, or irrational combinations. The present study is in line with studies based on an extensive research study on the irrational use of medicines without prescription in the community of Karachi[10-12] which is now further extended to focus primarily on the utilization of antibiotics for pharyngitis and gastroenteritis.

Table 1: List of common pathogens and their resistance pattern isolated from patients suffering from Gastroenteritis and Pharyngitis

Reported By	Reported In	Conditions	Causative Organisms	Age of Patients	Antibiotic Resistance Pattern	Reasons
Riaz et al. (13)	2012	Gastroentritis	*Vibrio cholerae* Salmonella spp, Campylobacter spp, Shigellaspp	Adult	Quinolones (78%)	N.A
Palla et al. (14)	2012	Phyrangitis	Group A beta hemolytic streptococcus (GABHS)	14–65 years	Macrolides	N.A
Khan et al. (15)	2011	Phyrangitis	Klebsiella	N.A	Erythromycin (41.67%) Clarithromycin (58.34%)	N.A
Baber et al. (16)	2009	Gastroentritis	*Vibrio cholerae*Inaba, El Tor	All ages	Nalidixic Acid, Polymaxin B, Co-trimaxazole	N.A
Khan et al. (17)	2009	Gastroentritis	Shigella species	Children under 5 years	Ceftriaxone, Ampicullin, Trimethoprim-Sulfamethoxazole	N.A
Zafar et al. (18)	2009	Gastroentritis	*S. flexneri, S.dysenteriae, S. sonnei, S. boydii*	N.A	Co-Trimoxazole, Ampicillin	N.A
Memon (19)	2007	Phyrangitis	Streptococcus pyogenes Group A	N.A	Erythromycin (90%)	Both intrinsic and acquired mechanisms

STUDY DESIGN AND METHOD

A descriptive cross sectional study was designed to assess the magnitude and the comparative aspects of self-medication practice with antibiotics for treatment of pharyngitis and gastroenteritis. The study was conducted in the local residents of Karachi, Pakistan from August 2011 to July 2012. The survey was performed by 50 fifth year Pharm.D students selected from two private general Universities through the use of questionnaires. The students were well aware of the rationale of study and voluntarily participated to conduct the study in an attempt to gain knowledge and generate awareness. They were informed about the ethical considerations and method to administer the survey. 'Convenient contact list' by each student in alphabetical order was devised containing 25 people each e.g. school fellows, family friends, neighbors, relatives and domestic help (to attain heterogeneous characteristics of local residents of Karachi). Twenty people were selected from the 'convenient contact list' by random sampling.1000 local residents of Karachi, hence selected were contacted in the process at their workplaces, educational institutes and residential areas. Among the total number of contacted people 851 individuals comprising of mean age 35.65 $\pm$5.14 were accessible and evaluable. A pre validated questionnaire (n=35), devised from similar studies, comprising of close ended items was administered to the subjects to be filled anonymously following informed consent and the purpose of the study. Cronbach's alpha value of the questionnaire was 0.87.

Factor analysis was used for the construct validity. Internal consistency tests were used to evaluate the questionnaires reliability. Spearman brown coefficient was 0.76 for the whole questionnaire. For the participants of the study who were unable to read the questionnaire and apprehend it, the questions were spoken out loud, clarity of concept was confirmed and the answers were reconfirmed and entered into the questionnaire by the investigator. They were investigated about the use of antibiotics in Pharyngitis or Gastroenteritis described in the survey, the choice of antibiotics and the conditions in which they had used that drug without consulting any doctor or medical officer during the last six months. The demographic details, treatment choice, source of prescriber, attitude and the relevant tendency of self-medication were carefully taken into account and hence categorized. Data was analyzed by SPSS version 19 and results were expressed in counts and percentages.

RESULTS

Out of 1000 planned samples, 86 refused to participate and 63 incomplete questionnaires were excluded. Therefore, 851 subjects completed the survey. The demographics of the study population are presented in Table 2. The drug utilization features of the respondents are shown in Table 3.The comparative use of antibiotics by self-medication and prescription by doctors is shown in Fig. 1 for pharyngitis and Fig. 2 for gastroenteritis. Prevalence of self-medication in pharyngitis and gastroenteritis is illustrated in Fig. 3.
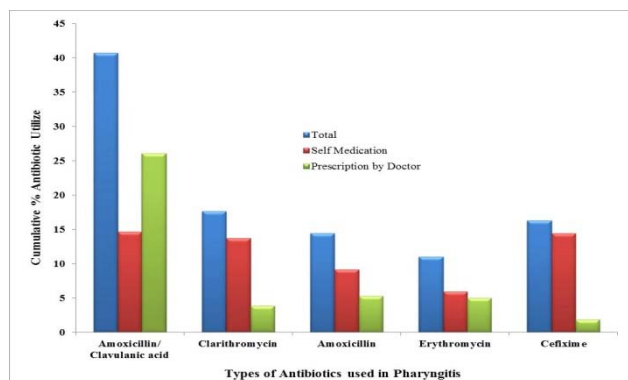
Figure 1: Total use of antibiotics in pharyngitis with individual frequency of self-medication
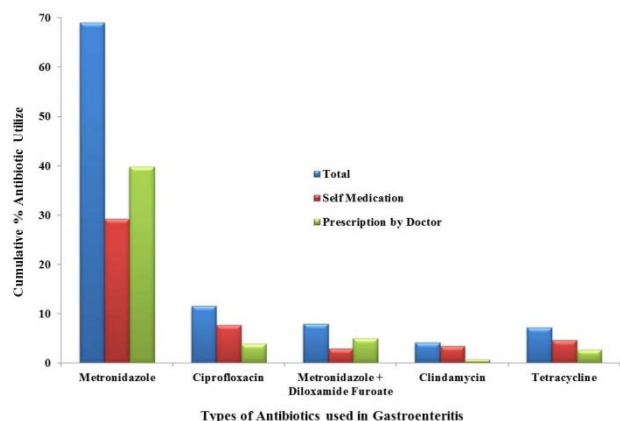

Figure 2: Total use of antibiotics in phyrangitis with individual frequency of self-medication

Table 2: General baseline characteristics of the study population (n=851)

Characteristics	Respondents	
	N	%
Gender		
Male	532	62.51
Female	319	37.49
Age (Years)		
15 - 35	123	14.45
36 - 55	485	56.99
56 -75	243	28.55
Education Level		
Educated	364	42.77
Basic Primary Education	235	27.61
Uneducated	252	29.61
Comorbid Profile		
History of asthma	10	1.18
Hypertensive	102	11.99
Diabetic	212	24.91
Joint pains/body pains/fatigue	198	23.27
Undiagnosed disease conditions*	188	22.09
Normal general status	141	16.57
Place of contact for study		
Educational Institute	150	17.63
Work Place	567	66.63
Residential Area	134	15.75

*self-reported chronic symptoms of ill health but not undergone proper diagnosis.

Table 3: Antibiotic utilization features of respondents (851)

| Parameters	Respondents	
	N	%
Prescriber		
Doctors	353	41.48
Pharmacists	137	16.10
Drug Retailers	104	12.22
Friends and Relatives	55	6.46
Self-Prescriber	202	23.74
Antibiotics acquired from		
Licensed Pharmacy	285	33.49
Local Store	395	46.42
Borrowed	171	20.09
Amount Purchased		
Whole Pack With Leaflet	263	30.90
Few Dosage Forms With Leaflet	134	15.75
Few Dosage Forms Without Leaflet	454	53.35
Regimen		
Complete	358	42.07
Incomplete	493	57.93
Frequency of Antibiotic Utilization		
Rarely	517	60.75
Frequently	334	39.25
Awareness of Adverse Effect		
Complete	168	19.74
Limited	359	42.19
None	324	38.07
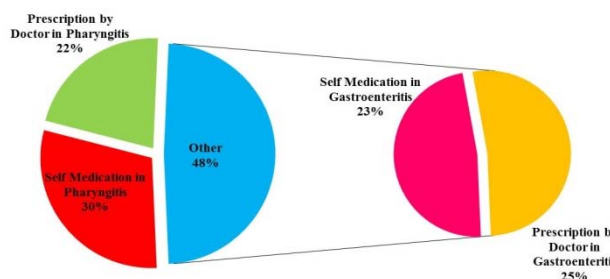
Figure 3: Prevalence of self-medication in pharyngitis and gastroenteritis

DISCUSSION

Several studies in the local population of Pakistan report the phenomenon of resistance against antibiotics used in pharyngitis and gastroenteritis, few of which are consolidated in Table 1. The most frequently prescribed and utilized antibiotic for pharyngitis is Co-amoxiclav followed by a macrolide, clarithromycin. The use of antibiotics by self-medication is reported after the onset of symptoms like sore throat, tenderness of glands, difficulty in swallowing, tonsillitis or fever. An important concern on such practice is that, similar symptoms are reported for viral pharyngitis (e.g. sore throat-a chief symptom, low grade fever) rendering inappropriate use of antibiotics. The clinical picture of edema and erythema which may not correlate to the degree of soreness, with less effusive exudates (as compared to bacterial

pharyngitis) is typical in viral pharyngitis, which may be missed out by antibiotic consumers who tend to self-diagnose and escape proper medical evaluation. The most common viral pharyngitis is by adenovirus and rhinovirus both of which will not respond to bacterial antibiotic therapy, exposing the patient further only to the adverse effects of the drug. Such a behavior depicted in considerable number of patients utilizing antibiotics on the appearance of first signs of the disease can be described as misuse of antibiotics. It has been resolved after credible research, reviews and studies that antibiotics should not be prescribed or used in upper respiratory infections such as pharyngitis unless the symptoms worsen or fail to improve after several days of disease onset.[20] Awareness of clinical manifestations that help differentiate viral from bacterial infection and the use of guidelines can promote the appropriate management of respiratory tract infections.[21]

The present study also indicates that the antibiotics are overprescribed to alleviate the symptoms of pharyngitis. Most of the respondents stated that the antibiotics were prescribed on their first visit to the physician on the onset of early symptoms. Over prescribing of antibiotics in self-limiting pharyngitis has been reported in studies earlier, revealing that the patient's expectations for speedy recovery and desire to get immediate relief from pain play a pivotal role.[22] Another factor that adds to antibiotic overprescription is the desire to address probable supportive complications, rheumatic fever, and acute glomerulonephritis or to decrease contagion with the alleviation of symptoms, although incidence of such complications may be less than estimated. The rational treatment for acute pharyngitis should comprise of antipyretics, analgesics and supportive care, whereas the antibiotic treatment should ensue after the persistence of symptoms.

The pattern of use of antibiotics in patients of pharyngitis is in line with the approved recommendations and guidelines e.g. narrow spectrum antibiotics with GABH coverage, Penicillin being the first choice and erythromycin the second if an allergy to penicillin is suspected.[23] The use of co-amoxiclav is more than amoxicillin which is a grey area in the drug utilization pattern, as adverse implications of the former drug are more intense.[24]

The use of antibiotics in gastroenteritis has been a matter of concern lately where arguments range from limiting the tendency of over prescription of antimicrobials and risk of drug induced toxicity to the surfacing reports of pathogenic resistance (Table 1). Our study has shown that ciprofloxacin is widely prescribed in gastroenteritis, the indication being valid for enteric typhoid fever and also for the coverage of shigella and *E.colispecies*.[25] Most of the respondents have reported the use of ciprofloxacin in recurrent gastroenteritis without appropriate knowledge about the doses and the recommended dosing frequency. They claimed to have bought a blister pack of oral ciprofloxacin and sometimes just two or three doses from

the drug store in the locality without the presentation of any prescription. They had stopped the therapy upon alleviation of symptoms (in this case mainly diarrhea) and have restarted the therapy after self-diagnosis on the emergence of recurrent symptoms. The whole practice indicates misuse or over use of the drug so that the consumers are more prone to the toxicity intensifying the risk of resistance at stake.[26] The recurring symptoms of the disease may indicate some immune disorder[27] or persistent infection and may require a more comprehensive regimen of antibiotics in combination.

Metronidazole is the most frequently used antibiotic, reported in our study for gastroenteritis which is either food borne or water borne. Metronidazole being the first line agent against pathogenic agents such as *Entamoeba histolytica* (Metronidazole, 750 mg PO 3 times daily for 5-10 days plus a luminal agent),bears considerable therapeutic efficacy. The standard regimen of metronidazole is associated with few, mild and tolerable adverse effects. Usual adverse effects of metronidazole are vomiting, nausea, insomnia, dizziness, headache, drowsiness and rash. Dry mouth and metallic taste is also reported after oral metronidazole treatment.[28]The major area of concern with metronidazole utilization lies with the therapeutic failure of the drug in the triple therapy (metronidazole, amoxicillin/tetracycline, bismuth colloidal compounds) against H.pylori infections of GIT."An important cause of antibiotic failure lies in the development of *H. Pylori* resistance; between 6% and 27% of *H. pylori*strains are primarily resistant to the 5-nitroimidazoles–metronidazole and tinidazole–both of which are used in triple therapy. In contrast, no resistance of *H. Pylori* to amoxicillin has been reported".[29] Higher rates of resistance against metronidazole therapy is reported in developing countries which is usually linked with the frequent use of the drug for the treatment of parasitic infections,[30] which indicates that the use of metronidazole on such a large scale, shown in our study, may contribute further to the risk of acquired pathogenic resistance in the local population of Karachi.

CONCLUSION

The antibiotics used without prescription by a large number of people for the treatment of gastroenteritis and pharyngitis indicates a pattern of irrational drug use based on self-medication and may correlate to the emerging resistant pattern in the dense population of Karachi. Awareness in the population is required about the importance of correct doses and dosing regimen. The prescribing practice of antibiotics in pharyngitis and gastroenteritis should be regulated and in line with international guidelines and the susceptibility pattern of the community.

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