Biological and Clinical Sciences Research Journal
ISSN: 2708-2261
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v2021i1.51
*Biol. Clin. Sci. Res. J., Volume, **2020**: 51*
Original Research Article

PERCEPTION REGARDING SELF-MEDICATION OF ANTIBIOTICS IN GENERAL PUBLIC SECTOR UNIVERSITY OF SOUTHERN PUNJAB: A COMPARISON BETWEEN MEDICAL AND NON-MEDICAL STUDENTS

KHALID S, ALI Q, *HAFEEZ MM, MALIK A

Institute of Molecular Biology and Biotechnology, The University of Lahore, Lahore, Pakistan

Corresponding author email: mansoorhafeez140@gmail.com

(Received, 17th March 2020, Revised 20th January 2020, Published 23rd January 2021)

Abstract: *Self-medication with antibiotics is a most rapidly emerging problem especially in developing countries like Pakistan. Antibiotics are easily accessible to the general public without consulting any practitioner even without prescriptions. So there are many risks linked to the inappropriate use of antibiotics. The main aim of this study was to assess the wrong practice of self-medication in public sector universities of southern Punjab. The current study also compares the self-medication practices in various departments of universities. A validated questionnaire was used to collect data. Descriptive statistics were used to analyze the data and inferential statistics (chi-square test). The study was included data from 900 students including both males and females from various departments. Among 900 students, 450 students of medical while 450 were non-medical students. Frequency of self-medication was found to 57 %. The antibiotics more frequently use for self-medication were Augmentin (37 %), Amoxicillin (23 %). Fever and cough were the most frequent indication for the use of self-medicated antibiotics. Because of their sufficient knowledge of pharmacology, most students were self-medicated (40%). Academic knowledge is the principal source of antibiotic information (60%). Just (39%) of the students thought that self-medication is part of the self-core, 31% of the students perceived that the availability of non-prescription drugs could prevent the growing trend of self-medication with antibiotics. 30% of students perceived that antibiotics were aware of the harms of self-medication or informed about them. Based on this study, it can be concluded that a high proportion of medical students and non-medical students use antibiotics without medical prescription and such practices are more common in the general public sector.*

Keywords: self-medication, antibiotics, pharmacology, drugs, Augmentin, Amoxicillin

Introduction

Several problems such as antimicrobial resistance, are caused by excessive and unfair use of antibiotics is one of the major concerns worldwide. This inappropriate use of antibiotics resulting in bacterial resistance. Bacterial resistance endorsing more financial burden because of multiple expensive antibiotics use. Because of expensive treatment for resistant bacteria low-class population is unable to afford hence many precious lives are being lost (Smith *et al*., 2001). In different countries, antibiotic consumption varies: higher rates are observed in South European countries and lower rates are observed in Northern European countries (Goossens *et al*., 2005). Reported data from research indicates that up to 50% of hospital antibiotic usage is excessive (Davey *et al*., 2006). However, the main antibiotic load comes from the primary health care stage. Research from different countries shows that 75-94% of all antibiotics are directly used by ambulatory patients (Picazo *et al*., 2003). There is a strong inclination for overuse of antibiotics due to their extensive use in the treatment of viral and self-limiting bacterial diseases. The favoured use of broad-spectrum antibiotics is often baseless (Bronzwaer, 2002; Johnston, 1998; Lipsitch and Samore, 2002). Self-medication with antibiotics is among the means of their irrational use. As a basic medicine, people use antimicrobials, usually self-prescribed, for various kinds of infections. Soon, such unchecked use of antibiotics could lead to a 'pre-antibiotic era' until the discovery of penicillin, not just in humans but also in animals, when many disease infections would be almost impossible to treat again because of antimicrobial resistance (Okumura *et al*., 2002; Samaranayake and Johnson, 1999). Each country has its antimicrobial drug use policies and regulations, but its implementation is not always effective. Following numerous evidence-based advice and newly gained expertise or facts, this situation should improve.

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

For instance, in France, one of the leading countries in outpatient antibiotic use, more than half of the population expects an antibiotics prescription for the common cold (Harbarth *et al*., 2002). In developing countries such as Pakistan, this issue is in its worse form due to the poor economic condition of its inhabitants. Other developing countries are Trinidad and Tobago, where issues with self-medication have been reported. .(Awad *et al*., 2005; Parimi *et al*., 2004). However, developed countries are also effected from this problem and many studied have reported problem because of it in countries such as the USA, Spain, Russia, Greece and Israel (Grigoryan *et al*., 2006; Guillemot *et al*., 1998). Several antibiotics work to remove the symptoms of his disease from the point of view of the self-medication user, but it is scientifically understood that if he takes large doses, he is responsible for side effects and the pathogen will become resistant to the body of the patient and more pathogenic (Guillemot *et al*., 1998; Okeke *et al*., 2005; WHO, 2001). In order to safely and efficiently alleviate symptoms without medical consultation, WHO supports self-medication activities and to reduce the burden on health care facilities that are often understaffed and ineffective in rural and remote areas (Gonzales *et al*., 2001; WHO, 2001). The pattern of antibiotic use is based on public perceptions and information, particularly whether optimal doses are given and/or whether complete courses of therapy are taken (Laxminarayan *et al*., 2013; Van Boeckel *et al*., 2014). It was difficult for patients to understand the value of antibiotic doses or the patient age, the theory of resistance and the implications of such malpractice. Public knowledge of antibiotics is of particular significance in developing countries like Pakistan, where antibiotics are available without a prescription. When it comes to administering antibiotics to rationalise the usage and strengthen tolerance, research on people who know the antibiotic is important (Holmes *et al*., 2016; Silbergeld *et al*., 2008).

Methodology

Area and Location

The study area was a public sector the University of South Punjab, Khawaja Fareed University of Rahim Yar Khan. Raheem Yar Khan is located in the south-east of Punjab province, is about 700kmfrom Karachi with a population of 3434108 of which 30.6% were urban. The Khawaja Fareed University is a public sector university, which has more than Departments, Disciplines, Facilities and Centers.

Objectives

Objective may be general and specific. Self-medication assessment by students from the public-sector university of Southern Punjab. To compare self-medication among university student studying in various departments.

Study Design

A cross-sectional study design was adopted to conduct this study.

Study Population

The target population was taken from university students who came to this university from different cities. Currently enrolled students were invited to participate in the study.

Sampling Method

A semi structured questionnaire developed and pilot tested by the principle investigator was used as sample.

Sampling Procedure

I. Inclusion Criteria

Inclusion criteria for the respondent of the study were as follows:

i. Students enrolled in Khawaja Fareed University, Rahim Yar khan (Medical, Law, CS, BBA, Commerce department).

ii. Students willing to participants in the study.

II. Exclusion Criteria

Exclusion criteria for the respondents of the study were as follows:

• Students who had already completed their education were not invited to participate in the study.

• Students who were not willing to participate in the study.

Data Collection Tool

The information was collected through a self-administered questionnaire (tool). The questionnaire comprises four parts that include both Closed, Open Complete Problems. A first phase involved included demographic variables, such as ages, genders, and subject fields which have concerns about the policies and expertise of using antibiotics and on evidence, not just in violation. The second part comprised of a whole chain of land the nine questions related to the reason for self-medication, condition for self-medication, commonly self-medicated antibiotics e.tc

The third section contains three questions related to self-medication part of self-care, continues the self-medication with antibiotic and advises self-medication to your friends.

The last question had one question inquiring method about prevention of self-medication of antibiotics.

Reliability (internal consistency) testing of tool

A pilot study was conducted and Cronbach's Alpha test conducted to evaluate the internal consistency of questionnaire, and alpha value was 0.65 (n=19).

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

Validity Testing (face and control testing)

Experts evaluated the data collection tool for its face and content validity.

Data Analysis

Using SPSS versions 15.0, and descriptive statistics all the data were analyzed (frequencies percentages, mean, median, standard derivation and IQR) were conducted to summarize data and Chi-square test was applied as inferential statistics. A P value than 0.05 was considered as statistical significance.

Results

Descriptive Analysis

Table 1 Section a (part 1) Demographic data of Gender, Age and Field of study of students

Variables		Frequency	Percentage
Gender	Male	402	44.7
	Female	498	55.3
	Total	900	100
Age		(Mean)	(SD)
		20.7	12.2
Field of study	Medical	450	50
	Non-medical	450	50
	Total	900	100

Demographic data was analyzed through descriptive statistics. Frequencies and percentages of variable were analyzed from which mean and standard deviation of variables obtained. The majority of the students (498) were female's. The students were from variety of disciplines participated in the study. Age of the students was also recorded the most significance age group was (20-21) years. About 50% respondents were from medical discipline and 50% from Non-medical disciplines (Table 1).

Table 2 Section A (part 2) knowledge of student about self-medication

Questions	Response	Frequency	Percentage
Do you know what is Antibiotic?	Yes	866	96.2
	No	34	3.8
	Total	900	100
Antibiotic use without consultation of doctor.	Yes	500	55.6
	No	400	44.4
	Total	900	100

Knowledge was also analyzed through descriptive statistics. 96.2% students were aware of antibiotics and 3.8% were not known. Similarly, from analysis it was also known that 55.6% students use antibiotic without doctor consultation and 44.4% students do not use antibiotic without doctor consultation (Table 2).

Inferential Analysis

Inferential Analysis was done with the help of Pearson's Chi-squared test and obtained P values (Table 3).

Table 3 Section A (Part 1): knowledge of students about antibiotic with respect to gender

Questions	Response	Male No%	Female No%	P value
Do you know, what is antibiotic?	Yes	388(96.5)	478(96.0)	.768
	No	14(3.5)	20(4.0)	
Do you use antibiotic without doctor consultation.	Yes	224(55.7)	276(55.4)	
	No	178(44.3)	222(44.6)	.513

Table 4 Selection A (Part 2): knowledge of students about antibiotic with respect to medical and non-medical students

Questions	Response	Medical No%	Non-medical No%	P value
Do you know what is antibiotics?	Yes	448(99.6)	418(92.9)	<0.001
	No	2(0.4)	32(7.1)	
Do you use antibiotic without doctor consultation?	Yes	256(56.9)	244(54.2)	
	No	182(43.1)	206(45.8)	.318

It is found that more medical field students (99.6%) had knowledge about antibiotics than non-medical students (92.9%) and there was significant difference (<0.001) between them (Table 4).

Table 5 Section A (Part 3): Reason for not practicing the self-medication of antibiotics

Question	Response	Frequency	Percentage
What is the reason for not practicing the self-medication of antibiotics?	Wrong drug	316	35.1
	ADR's	242	26.9
	Wrong diagnosis	188	20.9
	Others	154	17.1
	Total	900	100

Through descriptive statistics, it was analyzed that 35.1% students were not practicing self-medication because of perception of wrong drug use, 26.9% due to expected adverse drug reaction, 20.9% due to

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

susceptibility of wrong diagnosis and 17.1% due to other reasons (Table 5).

Descriptive Analysis

Table 6 Section B (Part 1): Practice of self-medication of antibiotics

Questions	Response	Frequency	Percentage
Do you know the active ingredient of antibiotic that you self-medicate?	Yes	520	57.8
	No	380	42.2
	Total	900	100
Do you think that antibiotic can recover any type of infection?	Yes	540	60
	No	360	40
	Total	900	100
Do you know any idea in which disease antibiotic use?	Yes	660	73.3
	No	240	26.7
	Total	900	100
Do you think that self-medication with antibiotic is safe?	Yes	468	52
	No	432	48
	Total	900	100
Have you experience any un-expected reaction due to antibiotic use?	Yes	218	75.8
	No	782	100
	Total	900	100

Note:

Frequencies and percentage are based on observed values. Through descriptive statistics, data of the practice of self-medication of antibiotics were analyzed. 57.8% of students know the active ingredient of antibiotic, which they self-medicate, and 42.2% do not know the active ingredients of antibiotic that they self-medicate. 60% of students believe that antibiotic can recover any type of infection (Table 6). 52% of students think self-medication with an antibiotic is safe and 48% do not think so. 24.2% of students experienced adverse drug reaction and 75.8% remained unaware of the adverse drug reaction or did not experience.

Table 7 Section B (part 2): practice of self-medication of antibiotics

Questions	Response	Frequency	Percentage
What is the reason for self-medication of antibiotic?	Illness of trivial	52	20.7
	Pharma knowledge	104	41.4
	Save time	62	24.7
	High fee	26	10.4
	Privacy	7	2.8
	Total	450	100
What is the source of information about antibiotic?	Old prescription	57	22.8
	Drug advertise	35	14
	Academic knowledge	135	54
	Friends	22	8.8
	Total	450	100
Which antibiotic you use for self-medication?	Amoxicillin	55	22
	Ciprofloxacin	33	13.2
	Erythromycin	28	11.2
	Augmentin	93	37.2
	Others	38	15.2
	Total	450	100
In which condition do you use self-medication of antibiotic?	Fever	54	20.9
	Cough	63	24.4
	Cold	35	13.6
	Malaria	5	1.9
	All	100	38.1
	Total	450	100

The students were provided with possible options for the reason of use of self-medication of antibiotics. 41.4% students use to purchase self-selected antibiotics due to their pharma knowledge, 24.7% to save their time, 20.7% due to illness of trivial, 10.4% due to high consultant fee, 2.8% for keeping privacy. Students were provided with possible option for the source of information about antibiotic 54% students use academic knowledge, 22.8% use old prescriptions 14% use drug advertisement 8.8% seek information from their friends (Table 7). The students were asked to pick antibiotic from most commonly

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

used antibiotics about 37.2% used Augmentin, 22% Amoxicillin, 13.2% Ciprofloxacin, 11.2% Erythromycin and the remaining 15.2% use others. 24.4% students use in cough, 20.9% in fever, 13.6% in cold, 1.9% in malaria and 38.1% use antibiotics in all given conditions.

Table 8 Section B (part 2): practice of self-medication of antibiotics with respect to gender

Questions	Response	Male No%	Female No%	P value
What is the reason for self-medication of antibiotic?	Illness of trivial	22(19.0)	30(22.2)	.046
	Pharmacological knowledge	41(35.3)	63(46.7)	
	To save time	30(25.9)	32(23.7)	
	High consultant fee	18(15.5)	8(5.9)	
	Privacy	5(4.3)	2(1.5)	
What is the source of information about antibiotic?	Old prescription	25(21.7)	32(23.7)	.708
	Drug advertise	18(15.7)	17(12.6)	
	Academic knowledge	60(52.2)	75(55.6)	
	Friends	12(10.4)	10(7.4)	
Commonly used antibiotic for self-medication	Amoxicillin	29(25.0)	26(19.3)	.090
	Ciprofloxacin	10(8.6)	23(17.0)	
	Erythromycin	15(12.9)	13(9.6)	
	Augmentin	38(32.8)	56(41.5)	
	Others	23(19.8)	15(11.1)	
Common condition in which you use self-medication of antibiotic	Fever	23(19.3)	31(22.3)	.461
	Cough	27(22.7)	36(25.9)	
	Cold	19(16.0)	16(11.5)	
	Malaria	4(3.4)	1(.7)	
	All of these	46(38.7)	54(38.8)	

Note: Frequencies and percentage are based on observed values P-value for the Chi-square test.

Results show that most female students are practicing self-medication because of sufficient pharmacological knowledge 63(43.7%) and male students are practicing self-medication because of to save time 30(25.9%) (Table 8) so there is a significant difference (0.046) and explanation for self-medication between the activities of antibiotics

Descriptive analysis

Table 9 Section C: Behavior of the student toward the self-medication of antibiotics

Questions	Response	Frequency	Percentage
Do you think that self-medication is a part of self-care?	Yes	171	38
	No	150	33.3
	Total	450	100
Do you think you should continue with or start self-medication of antibiotic?	Yes	97	21.6
	No	220	48.0
	Total	450	100
Do you advise self-medication of antibiotic to your friends?	Yes	96	21.3
	No	319	70.9
	Total	450	100

Note: frequencies and percentage are based on observed values

38% of students show a positive attitude towards self-medication and 33% do not think that self-medication is part of self-care. 21.6% think that they should continue with self-medication of antibiotics and 48% think do not continue with self-medication of antibiotic (Table 9). 21.3% of students usually advise the self-medication of antibiotics to their friends and 70.9% do not advise.

Table 10 Section C: Attitude of the students toward the self-medication of Antibiotics with respect to gender

Questions	Response	Male No%	Female No%	P value
Do you think that self-medication is a part of self-care?	Yes	81(40.3)	90(36.1)	0.164
	No	69(34.3)	81(32.5)	
	Not sure	51(25.4)	78(31.3)	
Do you think should continue	Yes	45(24.4)	52(20.9)	.180
	No	93(46.3)	127(51.0)	
	Not sure	63(31.3)	70(28.1)	

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

or start with self-medication of antibiotic?				
Do you advise self-medication of antibiotic to your friends?	Yes No Not sure	53(26.4) 129(64.2) 19(9.5)	43(17.3) 190(76.3) 16(6.4)	0.019

Note: Frequencies and percentage are based on observed values P value for Chi square test (Table 10).

Table 11 Section D: perception of students regarding method to prevent self-medication of antibiotics

Questions	Response	Frequency	Percentage
What should be the method to prevent the growing trends of self-medication?	Prevents the availability of medicine without prescription	145	32.2
	Usage and instruction in the harms of the self-medication	176	39.1
	Compliance of stringent regulations on inappropriate pharmaceutical promotion	38	8.4
	Working toward making healthcare facilities easily available	51	11.3
	No opinion	40	8.9

The students were asked possible options regarding the method to prevent the growing trend of self-medication. 39.1% students agreed with awareness or education regarding harms of self-medication, 32.2% students agreed to prevent the availability of medicine without a prescription (Table 11), 11.3% agreed with working toward making healthcare facilities easily available, 8.4% agreed with enforcing the strict rule regarding misleading pharmaceutical promotion and 8.9% have no opinion about this.

Table 12 section D: Students understanding of the technique for preventing self-medication of antibiotics with respect to gender

Question	Response	Male No%	Female No%	P value
Method to discourage the increasing trend of self-medication	Prevent the supply of medication without prescription	57(28.4)	88(35.3)	0.001
	Awareness or education regarding harms of self-medication	69(34.3)	107(43.0)	
	Enforcing the strict rule regarding misleading pharmaceutical promotion	21(10.4)	17(6.8)	
	Make health-care facilities easily available	25(12.4)	26(10.4)	
	No opinion	29(14.4)	11(4.4)	

Note: Frequencies and percentage are based on observed values P-value for Chi-square test

Study shows that most pharmacy students are practicing self-medication because of sufficient pharmacological knowledge 76(55.1%) and non-pharmacy students are practicing self-medication because of to save time 33(29%) so there is a significant difference (<0.001) between the reasons for practicing self-medication of antibiotics (Table 12). More female students have the perception that growing trend of self-medication of antibiotics can be prevented by awareness or education regarding harms of self-medication 107(43.05) and male students have the perception that it can be controlled by preventing the supply of medication without prescription 57(28.4%).

Discussion

Our results are confirming the expectations are strong with antibiotics by our public sector the University of Southern Punjab with considerable resources, self-assignments of antibiotics are practicable (they are legally available over the counter). Antibiotics primarily given by physicians will be preserved in the absence of medicinal consultation and added to the medicines later. With their equivalents, they are simpler antibiotics that can be obtained over the Internet. Many people know about antibiotic and they use antibiotic without doctor consultation. This study

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

has been carried out to analyze the understanding, approach, and actions of medical and non-medical learners of the State sector residency. The prevalence of self-medication is worrying about incipient youth education in Pakistan. It is in contradiction with the male students that female students engaged in self-medication rather than male. This study emphasized in research, similar results were made (Grigoryan *et al*., 2006; Holmes *et al*., 2016; Richman *et al*., 2001). In this research, self-medication frequencies among university studies that are both medical and non-medical very high; similar findings can be assessed between the studies on research carried out with university students of Karachi with the individual drug data made to the analysis they conducted in India, comparable with what was found in Tamil Nadu in Spain (Al-Azzam *et al*., 2007; Grigoryan *et al*., 2007). According to our study, most of the pharmacy students know the active ingredient of antibiotic that they self-medicate. In the present study, Augmentin and Amoxicillin are most commonly self-medicated antibiotics. Another study was performed in Jordan and Sweden showed that Amoxicillin was the most in use antibiotic for self-medication (Morgan *et al*., 2011; Stratchounski *et al*., 2003). According to this study, half of the respondents think that the self-medication of antibiotic is safe and most of the respondents did not experience any unexpected reaction due to the self-medication of the antibiotics. The most participants involved in our study reported that they think any antibiotic can recover any type of infection. A research performed in Yogyakarta city Indonesia showed that only a few participants believe that antibiotics can cure any disease (Al-Azzam *et al*., 2007; Davey *et al*., 2006). As the students of this study have reported, Cough has been the primary source of treatment with antibiotics. An in-India trial study identified that throat loss is a main indicator of antibiotic (Huttner *et al*., 2010; Laxminarayan *et al*., 2013). Another study performed in Jordan population showed that the condition for which antibiotics were self-medicated, pharyngitis was most prevalent followed by flu (common cold) and rhinorrhea (Al-Azzam *et al*., 2007; Ruiz, 2010). In studies from Nigeria (Grigoryan *et al*., 2007; Napolitano *et al*., 2013). Diarrhea and gastro-intestinal infections have been identified as the most frequent marker for use, while Turkish or Greek have been reported as the most widespread (Laxminarayan *et al*., 2013). The most popular indication for the antibiotics was a common cold. In this study, respondents thought self-drugs were part of self-care, which is marginally lower than that recorded trial in India (Van Boeckel *et al*., 2014). Most of the participants involved in our study though that they should not continue with or start self-medication of antibiotics while few wished to continue with or start self-medication with antibiotics. However, study performed in India showed that 50% of the participants were wishing to continue with or start self-medication with antibiotics (Llor and Bjerrum, 2014; Marston *et al*., 2016). In addition, awareness or understanding about the illness and strict policies for stopping the pharmaceutical drug without the treatment has emerged as the response to preventing the increasingly increasing transition towards without prescription medication. The comparison work in our study conducted in India showed that pointed steps were appropriate to prevent supplies of prescribed by avoiding rising phenomena in self prescription (Bryce *et al*., 2016; Exner *et al*., 2017). For the education of young people, particularly women, serious steps have to be taken. This is the only way miss-use of antibiotics can be minimized

Recommendation

Practice

- Prevent the supply of medicine without prescription.
- Health and knowledge about the consequences of self-medicating.
- In our local environment, a reevaluation of the purpose and scope of self-medication is given.
- The safe use of antibiotics needs tighter regulation over the marketing of antibiotic agents and helping to encourage them.

Policy

- The government should enforce a strict rule regarding misleading pharmaceutical advertising.
- The government should make policies regarding work together making healthcare facilities easily available.
- The government should take serious actions towards making policies to prevent the growing trends of self-medication of antibiotics.

Future Research

This study has also opened a gateway for future research

- Future research should be on resistance developed due to self-medication of antibiotic and other harms related to self-medication of antibiotics.
- Further studies are essential to evaluate the impacts of self-medication of antibiotics on the health of students

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

- It would also be informative to know the factors associated with the self-medication of antibiotics.
- Further research may also focus on the influence of family on the self-medication of antibiotics.
- Further research may also focus on the economic factors that are associated with the self-medication of antibiotics.
- Developing a sustainable prevention program is important to reduce antibiotic mental perceptions and raise public awareness of the possibility of improper application of antibiotics.

Conclusion

From the study, it can be concluded that the trend of miss-use of antibiotics are very high in both medical and non-medical students and necessary steps, as mentioned above, should be taken to prevent the accelerated antibiotics resistance just due to lack of information.

Conflict of interest

The authors declared absence of any conflict of interest.

Reference

Al-Azzam, S. I., Al-Husein, B. A., Alzoubi, F., and Masadeh, M. M. (2007). Self-medication with antibiotics in Jordanian population. *International journal of occupational medicine and environmental health* **20**, 373.

Awad, A., Eltayeb, I., Matowe, L., and Thalib, L. (2005). Self-medication with antibiotics and antimalarials in the community of Khartoum State, Sudan. *J Pharm Pharm Sci* **8**, 326-331.

Bronzwaer, S. (2002). European Antimicrobial Resistance Surveillance System. A European study on the relationship between antimicrobial use and antimicrobial resistance. *Emerg Infect Dis* **8**, 278-282.

Bryce, A., Hay, A. D., Lane, I. F., Thornton, H. V., Wootton, M., and Costelloe, C. (2016). Global prevalence of antibiotic resistance in paediatric urinary tract infections caused by Escherichia coli and association with routine use of antibiotics in primary care: systematic review and meta-analysis. *bmj* **352**, i939.

Davey, P., Brown, E., Fenelon, L., Finch, R., Gould, I., Holmes, A., Ramsay, C., Taylor, E., Wiffen, P., and Wilcox, M. (2006). Systematic review of antimicrobial drug prescribing in hospitals. *Emerging infectious diseases* **12**, 211.

Exner, M., Bhattacharya, S., Christiansen, B., Gebel, J., Goroncy-Bermes, P., Hartemann, P., Heeg, P., Ilschner, C., Kramer, A., and Larson, E. (2017). Antibiotic resistance: What is so special about multidrug-resistant Gram-negative bacteria? *GMS hygiene and infection control* **12**.

Gonzales, R., Bartlett, J. G., Besser, R. E., Cooper, R. J., Hickner, J. M., Hoffman, J. R., and Sande, M. A. (2001). Principles of appropriate antibiotic use for treatment of acute respiratory tract infections in adults: background, specific aims, and methods. *Annals of internal medicine* **134**, 479-486.

Goossens, H., Ferech, M., Vander Stichele, R., Elseviers, M., and Group, E. P. (2005). Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. *The Lancet* **365**, 579-587.

Grigoryan, L., Burgerhof, J. G., Haaijer-Ruskamp, F. M., Degener, J. E., Deschepper, R., Monnet, D. L., Di Matteo, A., Scicluna, E. A., Bara, A.-C., and Lundborg, C. S. (2007). Is self-medication with antibiotics in Europe driven by prescribed use? *Journal of Antimicrobial Chemotherapy* **59**, 152-156.

Grigoryan, L., Haaijer-Ruskamp, F. M., Burgerhof, J. G., Mechtler, R., Deschepper, R., Tambic-Andrasevic, A., Andrajati, R., Monnet, D. L., Cunney, R., and Di Matteo, A. (2006). Self-medication with antimicrobial drugs in Europe. *Emerging infectious diseases* **12**, 452.

Guillemot, D., Carbon, C., Balkau, B., Geslin, P., Lecoeur, H., Vauzelle-Kervroëdan, F., Bouvenot, G., and Eschwége, E. (1998). Low dosage and long treatment duration of β-lactam: risk factors for carriage of penicillin-resistant Streptococcus pneumoniae. *Jama* **279**, 365-370.

Harbarth, S., Albrich, W., and Brun-Buisson, C. (2002). Outpatient antibiotic use and prevalence of antibiotic-resistant pneumococci in France and Germany: a sociocultural perspective. *Emerging infectious diseases* **8**, 1460.

Holmes, A. H., Moore, L. S., Sundsfjord, A., Steinbakk, M., Regmi, S., Karkey, A., Guerin, P. J., and Piddock, L. J. (2016). Understanding the mechanisms and drivers of antimicrobial resistance. *The Lancet* **387**, 176-187.

Huttner, B., Goossens, H., Verheij, T., and Harbarth, S. (2010). Characteristics and outcomes of public campaigns aimed at improving the use of antibiotics in outpatients in high-income countries. *The Lancet infectious diseases* **10**, 17-31.

Johnston, A. (1998). Use of antimicrobial drugs in veterinary practice. *Bmj* **317**, 665-667.

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]

Laxminarayan, R., Duse, A., Wattal, C., Zaidi, A. K., Wertheim, H. F., Sumpradit, N., Vlieghe, E., Hara, G. L., Gould, I. M., and Goossens, H. (2013). Antibiotic resistance—the need for global solutions. *The Lancet infectious diseases* **13**, 1057-1098.

Lipsitch, M., and Samore, M. H. (2002). Antimicrobial use and antimicrobial resistance: a population perspective. *Emerging infectious diseases* **8**, 347.

Llor, C., and Bjerrum, L. (2014). Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. *Therapeutic advances in drug safety* **5**, 229-241.

Marston, H. D., Dixon, D. M., Knisely, J. M., Palmore, T. N., and Fauci, A. S. (2016). Antimicrobial resistance. *Jama* **316**, 1193-1204.

Morgan, D. J., Okeke, I. N., Laxminarayan, R., Perencevich, E. N., and Weisenberg, S. (2011). Non-prescription antimicrobial use worldwide: a systematic review. *The Lancet infectious diseases* **11**, 692-701.

Napolitano, F., Izzo, M. T., Di Giuseppe, G., and Angelillo, I. F. (2013). Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy. *PloS one* **8**, e84177.

Okeke, I. N., Laxminarayan, R., Bhutta, Z. A., Duse, A. G., Jenkins, P., O'Brien, T. F., Pablos-Mendez, A., and Klugman, K. P. (2005). Antimicrobial resistance in developing countries. Part I: recent trends and current status. *The Lancet infectious diseases* **5**, 481-493.

Okumura, J., Wakai, S., and Umenai, T. (2002). Drug utilisation and self-medication in rural communities in Vietnam. *Social science & medicine* **54**, 1875-1886.

Parimi, N., Pereira, L. M. P., and Prabhakar, P. (2004). Caregivers' practices, knowledge and beliefs of antibiotics in paediatric upper respiratorytract infections in Trinidad and Tobago: a cross-sectional study. *BMC family practice* **5**, 28.

Picazo, J. J., Pérez-Cecilia, E., and Herreras, A. (2003). Respiratory infections outside the hospital. DIRA study. *Enfermedades infecciosas y microbiologia clinica* **21**, 410-416.

Richman, P. B., Garra, G., Eskin, B., Nashed, A. H., and Cody, R. (2001). Oral antibiotic use without consulting a physician: a survey of ED patients. *The American journal of emergency medicine* **19**, 57-60.

Ruiz, M. E. (2010). Risks of self-medication practices. *Current drug safety* **5**, 315-323.

Samaranayake, L., and Johnson, N. (1999). Guidelines for the use of antimicrobial agents to minimise development of resistance: FDI Commission. *International dental journal* **49**, 189-195.

Silbergeld, E. K., Graham, J., and Price, L. B. (2008). Industrial food animal production, antimicrobial resistance, and human health. *Annu. Rev. Public Health* **29**, 151-169.

Smith, R. D., Coast, J., Millar, M. R., Wilton, P., and Karcher, A.-M. (2001). Interventions against antimicrobial resistance: A review of the literature and exploration of modelling cost-effectiveness. *In* "Geneva: Global Forum for Health Research". Citeseer.

Stratchounski, L., Andreeva, I., Ratchina, S., Galkin, D., Petrotchenkova, N., Demin, A., Kuzin, V., Kusnetsova, S., Likhatcheva, R., and Nedogoda, S. (2003). The inventory of antibiotics in Russian home medicine cabinets. *Clinical infectious diseases* **37**, 498-505.

Van Boeckel, T. P., Gandra, S., Ashok, A., Caudron, Q., Grenfell, B. T., Levin, S. A., and Laxminarayan, R. (2014). Global antibiotic consumption 2000 to 2010: an analysis of national pharmaceutical sales data. *The Lancet infectious diseases* **14**, 742-750.

WHO (2001). "WHO global strategy for containment of antimicrobial resistance." World Health Organization.

[Citation: Khalid, S., Ali, Q., Hafeez, M.N., Malik A. (2021). Perception regarding self-medication of antibiotics in general public sector University of Southern Punjab: A comparison between medical and non-medical students. *Biol. Clin. Sci. Res. J.*, 2021*:* 51. doi: https://doi.org/10.54112/bcsrj.v2021i1.51]