Knowledge and Attitude towards Antibiotic Use and Bacterial Resistance among Medical Students at PUMHS Nawabshah.

Ghulam Mustafa Jamali[1], Bhagwani[2], Moti Ram Bhatia[3], Masood Noor Nabi Dahri[4], Hajira Naila Rahu[5], Ghulam Mujtaba Shah[6].

ABSTRACT

Background: A growing public health issue around the globe is resistance to antibiotics and it is concerned with deficiency of knowledge in part to physicians and pharmacists. So it is important to stress this concern towards healthcare professional students. **Objective:** This research had been conducted to evaluate the awareness and assertiveness towards antibiotics practice and bacterial resistance amongst the MBBS students of different universities. **Design:** Current study is a descriptive cross sectional. **Sample size:** A 260 students from all professional years of MBBS. **Place of study:** Current study was performed at PUMHS Nawabshah, Sindh Pakistan. **Data collection and analysis:** A predesigned, pretested questionnaire was used for collection of data. Questionnaires were divided into two parts; knowledge, and attitude towards antibiotic use and their resistance. Data were analyzed by Independent T-Test, using SPSS Version 20. **Results:** This study analyzed that 49% of the total study population had poor knowledge concerning the use of antibiotics and their resistance. Almost half (51%) of the total study population had good knowledge concerning the use of antibiotics and their resistance. Additionally, 42% of the total population had poor attitude concerning the use of antibiotics and their resistance. Students who have no family affiliation with the medical field have 6.719 times more poor knowledge than students who have family affiliation with the medical field. Students with poor knowledge contributed to being poor in attitude 2.342 times. **Conclusion:** The knowledge and attitude concerning antibiotics use was good in study population, but still it needs that there should be proper, targeted and vital knowledge and attitude concerning the use of antibiotics especially in junior medical undergraduates. Activities such as seminars and workshops regarding antibiotics usage are needed to emphasize students.

Keywords: Antibiotic, Knowledge, Attitude, Medical students

1. Senior registrar, medicine, PUMHSW, SBA
2. Lecturer , community medicine, PUMHSW, SBA
3. Assistant professor, psychiatry, PUMHSW, SBA
4. Assistant professor, physiology, PUMHSW, SBA
5. Associate professor, physiology, PUMHSW, SBA
6. Lecturer, physiology, PUMHSW, SBA

Correspondence: Ghulam Mustafa Jamali, Senior Registrar, Medical Unit #3 PUMHSW, SBA

Email:dr_mustafa_jamali72@yahoo.com

INTRODUCTION

The antibiotic resistance is related with the extensive misuse of these agents, particularly in those health care systems which are inadequately regulated. Informal workers are involved in significant segments of basic healthcare, but their knowledge level, attitude and practice are not acknowledged well in the literature. Antibiotics are the most active chemotherapeutic agents among drugs; they exert their therapeutic effect by antagonizing the growth of bacteria. The majority of antibiotics are considered as safe, but any antibiotic can cause side effects and in some cases life-threatening side effects may be observed such as; leukopenia, thrombocytopenia, anaemia, skin rash, photosensitivity and anaphylactic reaction[1].

Formerly the antibiotics were considered as magic bullets. These magic bullets did not survive constantly as magical, because more or less severe disadvantages were associated with them. Resistance in bacterial populations emerged subsequent to use and misuse of antibiotics[2]. Actually the problem was not associated with antibiotics; but the problem lies in their use. The antibiotics remain as one

of the most active tool for infectious diseases. Over or irrational use of these drugs results in adverse effects as well as occurrence of resistant to certain bacterial strains. Economic burden on health systems is also related with misuse or irrational use of antibiotics[3]. 'No Action Today, No Cure Tomorrow' this was the theme of WHO (World Health Organization) on world health day as Combat Antimicrobial Agent[4]. In September 2013 CDC reported a 35 billion dollars burden on health system, due to the treatment of antibiotic resistant infections and about eight million hospital days per year in United States[5]. Unregulated availability of drugs, unruffled health rules related with the use of antibiotics are the main factors that may influence the use of antibiotics. Other factors as over the counter acquisition, self-medications, knowledge and attitude of patients and physicians concerning the use of antibiotics and patient prescriber interaction also influence the use of antibiotics.

So, monitoring the antibiotic usage necessitates practicable means of interference. Various policies had been suggested for using the antibiotics. Other strategies include; formulary replacement or restriction, education of health care providers, response activity, authorization for drug prescription from infectious disease expert and logical use of antibiotics around the globe[6,7]. Irrational use of antibiotics is enhanced by many factors such as; uncertainty of diagnosis by doctors, expectations of patient, deficient knowledge of patients and health professionals, marketing by pharmaceuticals, accessibility of antimicrobials without medical prescription, also political and economical reasons[4]. Many of the researchers had emphasized about the deficient teaching of the healthcare professionals at their under graduate level[8].

For the creation of the guidelines and leading the practice of antimicrobial agents to right way, it is essential to understand the patterns of antibiotic resistance. For the judicious use of the antibiotics many researchers had highlighted about revising the curriculum at the level of the junior healthcare professionals. It is essential to confirm the understanding of future healthcare providers about the rational use of antibiotics before embarking any intervention of them to public or patients [9].

Current research was conducted to observe the familiarity and approach about the use of antimicrobials and the bacterial resistance amongst medical students of MBBS from different academic years.

METHODOLOGY

Ethical authorization to current research was obtained under permission from Research Ethics Committee. Collection of data was being started after obtaining approval from Ethical Committee. Written well-versed agreement was taken verbally from the entire study contestants. This is an observational cross-sectional university student's based study. This study was conducted on students from first year MBBS to Final Year MBBS at PUMHS Nawabshah SBA, during the periods from 20[th]February to 20[th]April 2019. The 260 subjects in this study were selected randomly from university students. Students from various years of MBBS not willing for to participate were excluded.

Facts were composed on a predesigned pretested questionnaire. Questionnaires were filled by the researcher via a direct interview with the study subjects. The questionnaire was used for assessing knowledge. The score in knowledge and attitude domains were was categorized as poor and good.

All the collected data was introduced into the SPSS computer based software for scrutiny. Qualitative variable were explored by descriptive analysis. The quantitative

variables were succinct by consuming mean ±SD (Standard Deviation).The differences in magnitudes of qualitative variables were compared by using the Chi-square. The usual dissimilarities in quantitative variables through medical students were analysed by paired student's t-tests. Statistically significant value was reflected as p < 0.05. Scores were generated to observe the extent of knowledge and attitude about the practical use of antibiotics. Separately scores were demarcated by way of the proportions of question (s) for which the replies were accurate.

Results:

There were a total number of 260 female medical students from PUMHS with age range from 16-22 years, mean was 18.43 with SD ± 1.56 years. As shown in table 1.

The age was divided in two groups due shorter difference of age among different classes from 15-20 and 21-25 years. Students were from different classes junior to senior, majority was belonging to urban areas than rural. Most of the students were hostel residents, majority having good knowledge and attitude towards the antibiotic usage. As shown in table 2

Knowledge and other variable associations

Regarding knowledge and other variables showing that there is strong statistical correlation of knowledge score with address $p < 0.000$, current residence $p < 0.000$, occupation of father $p < 0.000$, occupation of mother $p < 0.000$ and attitude score $p<0.000$. While no significant relation of knowledge score was observed with, age group p .554 and study class p .886. as shown in table 3.

Attitude and other variable associations

Regarding attitude score and other variables showing that there is strong statistical correlation of attitude score with address $p <0.000$, current residence $p <0.000$, occupation of father $p <0.000$, occupation of mother $p <0.000$ and attitude score $p <0.000$.

While no significant relation of knowledge score was noted with age group p .254 and study class p .864. as shown in table 4.

Paired Samples Statistics and Paired Samples Correlations

The paired samples statistics and correlations were statistically significant with knowledge with study class $p <0.000$, address $p <0.000$, current residence p 0.002, occupation of father $p <0.000$, occupation of mother $p <0.000$ and attitude p 0.009. While insignificant with age p .556 and age group p 0.418 as shown in table 5.

Table 6: Paired Samples Test with paired associations (95% Confidence Interval of the Difference)

The paired sample test was statistically significant with knowledge with study class $p <0.000$, address $p <0.000$, current residence p 0.002, occupation of father $p <0.000$, occupation of mother $p <0.000$ and attitude p 0.009. While paired sample test was insignificant with age group p.730. as shown in table 6.

DISCUSSION

This was a descriptive cross-sectional university student's based study. 260 medical students of different classes from first year to year final MBBS were enrolled. Data were collected using predesigned pretested questionnaires. The questionnaires were divided into two parts; knowledge and attitude concerning the practice of antibiotics and their resistance. In the advancement of the medical management, the development of antibiotics had a vital role. Those ailments (microbial) which were left untreated in the past has been treated now effectively by these agents and thus the morbidity and mortality from microbial ailments were reduced [10]. Irrational use of antibiotics in the shape of veterinary misuse or overuse, contamination

Table 1. Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age in years	260	16.00	22.00	18.4308	1.56180
Valid N (listwise)	260				

Table 2: Demographics			
		Frequency	Percent
Age group	15-20 years	138	53.1
	21-25 years	122	46.9
	Total	260	100.0
Study class	First year MBBS	50	19.2
	Second year MBBS	57	21.9
	Third year MBBS	44	16.9
	Fourth year MBBS	56	21.5
	Final year MBBS	53	20.4
	Total	260	100.0
Address	Urban	190	73.1
	Rural	70	26.9
	Total	260	100.0
Current residence	Hostler	168	64.6
	Non hostler	92	35.4
	Total	260	100.0
Knowledge score	Good	142	54.6
	Poor	118	45.4
	Total	260	100.0
Attitude score	Good	161	61.9
	Poor	99	38.1
	Total	260	100.0
Occupation of father	Non health professional	232	89.2
	Health professional	28	10.8
	Total	260	100.0
Occupation of mother	Non health professional	245	94.2
	Health professional	15	5.8
	Total	260	100.0

Table 3: Knowledge and other variable associations					
Variable of study		Knowledge score		Total	Asymp. Sig. (2-sided)
		Good	Poor		
Age group	15-20 years	73	65	138	.554
	21-25 years	69	53	122	
Study class	First year MBBS	27	23	50	.886
	Second year MBBS	29	28	57	
	Third year MBBS	23	21	44	
	Fourth year MBBS	31	25	56	
	Final year MBBS	32	21	53	
Address	Urban	137	53	190	.000
	Rural	5	65	70	
Current residence	Hostler	121	47	168	.000
	Non hostler	21	71	92	
Occupation of father	Non health professional	142	90	232	.000
	Health professional	0	28	28	
Occupation of mother	Non health professional	142	103	245	.000
	Health professional	0	15	15	
Attitude score	Good	125	36	161	.000
	Poor	17	82	99	

Table 4: Attitude and other variable associations

Variable of study		Attitude score			Asymp. Sig. (2-sided)
		Good	Poor	Total	
Age group	15-20 years	81	57	138	.254
	21-25 years	80	42	122	
Study class	First year MBBS	29	21	50	.864
	Second year MBBS	33	24	57	
	Third year MBBS	28	16	44	
	Fourth year MBBS	36	20	56	
	Final year MBBS	35	18	53	
Address	Urban	155	35	190	.000
	Rural	6	64	70	
Current residence	Hostler	141	27	168	.000
	Non hostler	20	72	92	
Knowledge score	Good	125	17	142	.000
	Poor	36	82	118	
Occupation of father	Non health professional	161	71	232	.000
	Health professional	0	28	28	
Occupation of mother	Non health professional	161	84	245	.000
	Health professional	0	15	15	

Table 5: Paired Samples Statistics and Paired Samples Correlations

	Mean	Std. Deviation	Std. Error Mean	Correlation	Sig.
Age in years	18.4308	1.56180	.09686	-.037	.556
Knowledge score	1.4538	.49883	.03094		
Age group	1.4692	.50001	.03101	-.050	.418
Knowledge score	1.4538	.49883	.03094		
Study class	3.0192	1.42361	.08829	.579	.000
Knowledge score	1.4538	.49883	.03094		
Address	1.2692	.44442	.02756	.473	.000
Knowledge score	1.4538	.49883	.03094		
Current residence	1.3538	.47908	.02971	.381	.000
Knowledge score	1.4538	.49883	.03094		
Occupation of father	1.1077	.31059	.01926	.271	.000
Knowledge score	1.4538	.49883	.03094		
Occupation of mother	1.0577	.23361	.01449	.271	.000
Knowledge score	1.4538	.49838	.03094		
Attitude score	1.4538	.49883	.03094	.590	.000
Knowledge score	1.3808	.48651	.03017		

Table 6: Paired Samples Test with paired associations (95% Confidence Interval of the Difference)

	Paired Differences			
	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Knowledge score - age group	-.01538	.71912	.04460	.730
Knowledge score - study class	-1.56538	1.53201	.09501	.000
Knowledge score - address	.18462	.43557	.02701	.000
Knowledge score - current residence	.10000	.50250	.03116	.002
Knowledge score - occupation of father	.34615	.47666	.02956	.000
Knowledge score - occupation of mother	.39615	.49004	.03039	.000
Knowledge score-attitude	.07308	.44640	.02768	.009

of environment, nosocomial transmission, suboptimal diagnosis and dosage had a big contribution to the appearance and assortment of resistant bacteria colonies [11].The globe is in going to the era 'post-antibiotic' as warned by W H O. In post-antibiotic era subjects with a minor microbial infection or any wound may result in the cost lives [12].

Most of the patients and general population from large number of countries have very less knowledge about antimicrobial agents 1[3-19]. Despite of conflicting clinical suggestions to the use of antimicrobials, these agents are frequently suggested for the acute respiratory tract infections especially upper respiratory tract [21-23]. India is ranked at top in the world as antibiotic consumer [23]. Irrational use of antimicrobials is outstanding in India [23].

This study showed comparability with the study conducted in Malaysia (2012), which establishes a comparison to final year medical students and pharmacy students who showed better understanding and adequate knowledge [9].

However, there was another in a study conducted in Croatia (2018), which analysed that there was no difference in the average knowledge score among final year medical, and students of pharmacy, and revealed that the students from medical and pharmacy both have a relatively good understanding of antibiotic resistance [24].

Nearly half of the total students had poor knowledge and attitude towards the use of antibiotics and bacterial resistance. Sufficient knowledge is associated with a better attitude and vice versa. Government university students were associated with better knowledge and attitude towards antibiotic use; private universities should be investigated to detect the barriers. Nursing and medicine students were associated with poorer knowledge and attitude. Family members working in the medical field affect positively on the knowledge and attitude

toward antibiotics use. Curricula should be modified, especially for medicine and nursing students. Activities such as seminars and workshops regarding antibiotics are needed to emphasize students [1].

Final year undergraduate paramedical Ethiopian students exposed insufficient knowledge about the use of antibiotics and their resistance 25, also study from Western China had shown same results [26]. About 38.1% of public had agreed that they took antibiotics when they have common cold as prevention from further serious disease [27]. Jorak et al. analyzed in their study that all the medical interns were knowing well that antibiotics are not used in the common cold and viral diseases, Scaioli et al. found that 99.62% of subjects did not use antibiotics for cold and/or sore throat [28,29]. A study by Ahmed et al. had shown that only 08.3% of the subjects were with the opinion that antimicrobials had role in the prevention of common cold and flu [8], while Jamshed et al. found that most of the study subjects (95.1%) knew that antimicrobials are not used in the treatment of the cough and common cold [9]. So it is entailed that the education especially regarding the antibiotics that delivered to the undergraduate medical students are insufficient, hence enhanced education is essential for rational use of antimicrobials as to improve the knowledge of undergraduate medical students about the use of these agents and their resistance.

Limitations

The research was conducted among medical students in single university, it is needed the number of universities should be high for a more accurate results and at the time of research, most universities were closed. The study period was short.

Conclusion

Nearly half of the total students had poor knowledge and attitude towards antibiotic use and bacterial resistance. Sufficient knowledge is associated with a better attitude and vice versa. Government university students related with better knowledge and attitude toward antibiotic use; private universities should be investigated to detect the barriers. Nursing and medicine students are associated with poorer knowledge and attitude. Family members working in the medical field affect positively on the knowledge and attitude toward antibiotics. Curricula should be modified, especially for medicine and nursing students. Activities such as seminars and workshops regarding antibiotics are needed to emphasis students.

REFERENCES

1. F Hamad , Osman T * Knowledge And Attitude Towards Antibiotics Use And Bacterial Resistance Among Final Year Medical Students. World Journal Of Pharmaceutical Research, Volume 8, Issue 12, 1628-1642.

2. Fischbach MA, Walsh CT. Antibiotics for emerging pathogens. Science. 2009;325:1089–1093. doi: 10.1126/science.1176667. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

3. Gyssens IC. Quality measures of antimicrobial drug use. Int J Antimicrob Agents. 2001;17:9–19. doi: 10.1016/S0924-8579(00)00208-9. [PubMed] [CrossRef] [Google Scholar]

4. WHO. World Health Day. Antimicrobial resistance: no action today, no cure tomorrow. 2011. http://www.who.int/mediacentre/news/statements/2011/whd_20110407/en/index.html.

5. Dantas G, Sommer M. How to fight back against antibiotic resistance. Am Sci. 2014;102:41–51. doi: 10.1511/2014.106.42. [CrossRef] [Google Scholar]

6. Tunger O, Karakaya Y, Cetin CB, Dinc G,Borand H. Rational antibiotic use. J Infect Dev Ctries. 2009;3:88–93. doi: 10.3855/jidc.54. [PubMed] [CrossRef] [Google Scholar]

7. Parimalakrishnan AA, Mohanta GP, Patel I, Manna PK. A study on utilization pattern of higher generation antibiotics among patients visiting community pharmacies in Chidambaram, Tamil Nadu at South India. Int J Pharm. 2012;2:466–471. [Google Scholar]

8. Ahmad A, Khan MU, Moorthy J, Jamshed SQ, Patel I. Comparison of knowledge and attitudes about antibiotics and resistance, and antibiotics self-practicing between Bachelor of Pharmacy and Doctor of Pharmacy students in Southern India. Pharmacy practice, 2015; 13(1).

9. Jamshed SQ, Elkalmi R, Rajiah K, Al-Shami AK, Shamsudin SH, Siddiqui MJA, et al. Understanding of antibiotic use and resistance among final-year pharmacy and medical students: a pilot study. The Journal of Infection in Developing Countries, 2014; 8(06):780-5.

10. Facts about antimicrobial resistance. 2018 [cited 21 April 2018]. In: European Centre for Disease Prevention and Control- an agency of the European Union [Internet]. Available from: https://ecdc.europa.eu/en/antimicrobial-resistance/facts

11. Bashir A, Abbas Z, Farhat S, Tandon V, Singh Z, et al. Rationalizing antibiotic use to limit antibiotic resistance and novel antimicrobials. JK Pract. 2012;17(4): 1–6. [Google Scholar]

12. Antimicrobial resistance: global report on surveillance 2014. 2016 [cited 1 April 2018]. In: World Health Organization [Internet]. Available from: http://www.who.int/drugresistance/documents/surveillancereport/en/

13. Napolitano F, Izzo MT, Di Giuseppe G, Angelillo IF. Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy.PloS one. 2013. December 23;8(12):e84177 10.1371/journal.pone.0084177 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

14. Davis M, Liu TL, Taylor Y, Davidson L, Schmid M, Yates T, Scotton J, Spencer M. Exploring patient awareness and perceptions of the appropriate use of antibiotics: a mixed-methods study. Antibiotics. 2017. December;6(4):23. [PMC free article] [PubMed] [Google Scholar]

15. Barker AK, Brown K, Ahsan M, Sengupta S, Safdar N. Social determinants of antibiotic misuse: a qualitative study of community members in Haryana, India. BMC Public Health. 2017;17(1): 333 10.1186/s12889-017-4261-4 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

16. Hawkings NJ, Wood F, Butler CC. Public attitudes towards bacterial resistance: A qualitative study. J Antimicrob Chemother. 2007;59(6): 1155–60. 10.1093/jac/dkm103 [PubMed] [CrossRef] [Google Scholar]

17. Norris P, Chamberlain K, Dew K, Gabe J, Hodgetts D, Madden H. Public Beliefs about Antibiotics, Infection and Resistance: A Qualitative Study. Antibiotics. 2013;2(4): 465–76. 10.3390/antibiotics2040465 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

18. Kotwani A, Wattal C, Joshi P, Holloway K. Knowledge and perceptions on antibiotic use and resistance among high school students and teachers in New Delhi, India: A qualitative study. Indian J Pharmacol. 2016;48(4): 365 10.4103/0253-7613.186208 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

19. Antibiotic Resistance: Multi-country public awareness survey. 2015 [cited 23 April 2018]. In: WHO Library Cataloguing-in-Publication Data [Internet]. Available from: http://apps.who.int/medicinedocs/documents/s22245en/s22245en.pdf.

20. Akkerman AE, van der Wouden JC, Kuyvenhoven MM, Dieleman JP, Verheij TJ.Antibiotic prescribing for respiratory tract infections in Dutch primary care in relation to patient age and clinical entities.Journal of Antimicrobial Chemotherapy. 2004. December 1;54(6):1116–21. 10.1093/jac/dkh480 [PubMed] [CrossRef] [Google Scholar]

21. Bianco A, Papadopoli R, Mascaro V, Pileggi C, Pavia M. Antibiotic prescriptions to adults with acute respiratory tract infections by Italian general practitioners. Infection and drug resistance. 2018;11:2199 10.2147/IDR.S170349 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

22. Lindberg BH, Gjelstad S, Foshaug M, Høye S. Antibiotic prescribing for acute respiratory tract infections in Norwegian primary care out-of-hours service. Scandinavian journal of primary health care. 2017. April 3;35(2):178–85.10.1080/ 02813432. 2017.1333301 [PMC free article] [PubMed] [CrossRef] [Google Scholar]

23. George S, Stetz L, Patel M. Antibiotic resistance: Toward better stewardship of a precious medical resource. Aetna White Papers. 2018: 1–22[Google Scholar]

24. Rusic D, Bozic J, Vilovic M, Bukic J, Zivkovic PM, Leskur D, et al. Attitudes and Knowledge Regarding Antimicrobial Use and Resistance Among Pharmacy and Medical Students at the University of Split, Croatia. Microbial Drug Resistance, 2018; 24(10):1521-8.

25. Seid MA, Hussen MS. Knowledge and attitude towards antimicrobial resistance among final year undergraduate paramedical students at University of Gondar, Ethiopia. BMC infectious diseases, 2018; 18(1): 312.

26. Lv B, Zhou Z, Xu G, Yang D, Wu L, Shen Q, et al. Knowledge, attitudes and practices concerning self-medication with antibiotics among university students in western China. Tropical Medicine & International Health, 2014; 19(7): 769-79.

27. Khan AKA, Banu G, Reshma KK. Antibiotic resistance and usage-a survey on the knowledge, attitude, perceptions and practices among the medical students of a southern Indian teaching hospital. J Clin Diagn Res. 2013;7:1613–1616. [PMC free article] [PubMed] [Google Scholar]

28. Jorak A, Keihanian F, Saeidinia A, Anwar M, Sarfraz M. A cross sectional study on knowledge, attitude and practice of medical students toward antibiotic resistance and its prescription, Iran. Adv Environ Biol. 2014;8:675–681. [Google Scholar]

29. Scaioli G, Gualano MR, Gili R, Masucci S, Bert F, Siliquini R. Antibiotic use: a cross-sectional survey assessing the knowledge, attitudes and practices amongst students of a school of medicine in Italy. PLoS One.2015;10:e0122476. doi: 10.1371/journal.pone.0122476. [PMC free article] [PubMed] [CrossRef] [Google Scholar]