

Factors Influencing Inappropriate Antibiotic Usage Among Patients of Multan Periphery

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ABSTRACT

Objective: To determine the factors that contribute to the inappropriate utilization of antibiotics and to determine their knowledge antimicrobial resistance (AMR).

Materials and methods: A total of 280 people who had history of use of antibiotics within last 30 days were included. A questionnaire was built to collect information from respondents (including two separate parts). The first part was including their age, gender socioeconomic status and residential area. The questionnaire also included information to diagnose either the antibiotics use was appropriate or in-appropriate. The 2nd part included information regarding the peron's knowledge regarding AMR.

Results: Among the 280 patients, only 104 (37.1%) patients had appropriate use of antibiotics and remaining 176 (62.9%) had inappropriate use of anti-biotics. patients of age ≤ 40 years had higher percentage of appropriate antibiotics use; 90 (86.5%) versus 123 (69.9%) using inappropriate antibiotics (p-value 0.000). People living in urban area had higher use of appropriate antibiotics; 70 (67.3%) versus 101 (55.7%) in inappropriate group with p-value 0.05. Patients having high school or more-higher education had higher frequency of appropriate use of antibiotics; 73 (70.8%) versus 97 (55.2%) in inappropriate group, p-value 0.01. On average there was poor knowledge of people regarding AMR, on 37 (35.6%) patients in appropriate and 39 (22.2%) in inappropriate antibiotics group had knowledge regarding antibiotics, p-value 0.01.

Conclusion: Age < 40 years, living in rural area, and low level of education are significant factors of inappropriate antibiotics use. The knowledge of AMR was poor in all people, however, people having appropriate use of antibiotics had higher knowledge of AMR.

Keywords: Antimicrobials, antibiotics, inappropriate use,

INTRODUCTION

Antimicrobial resistance (AMR) is a worldwide problem that has a negative impact on patient health and puts the long-term well-being of people as well as animals in considerable jeopardy.¹ It is generally accepted that the use of antibiotics when they are not necessary is a large and variable contributor to the development of antibiotic resistance.² Antibiotic resistance is associated with a wide variety of unfavorable consequences, some of which include an increase in the costs of medical care, an increase in the rates of morbidity and death, and a reduction in the efficiency with which health services are provided.³

It is possible that by the year 2050, AMR will be responsible for 10 million deaths yearly if the essential modifications are not taken quickly.⁴ It is anticipated that the impacts will be particularly detrimental in low- and middle-income countries (often abbreviated as LMIC).⁵

In the past, antibiotic-resistant bacteria were only seen in hospitals, but now they are increasingly prevalent outside of healthcare settings.⁶ In low- and middle-income countries (LMIC), improper use of antibiotics is a significant contributor to antibiotic resistance, and it is widespread since medications can be purchased or received without a prescription from private, often illicit, providers.⁷ Patients who buy antibiotics from these sources have the option to acquire antibiotics in lower quantities if they are unable to finance a complete course of treatment, which contributes to improper use of antibiotics.⁸ The education of the general public on antibiotic resistance is absolutely necessary in order to make headway against this sneaky issue. It is well-established that a lack of understanding regarding the optimal use of antibiotics leads to inappropriate intake of antibiotics, which in turn leads to the emergence of microbes that are resistant to the antibiotic.⁹

In Pakistan, most people still don't know much about antibiotic resistance and don't know how much they know about it. Understanding how much people know about antibiotics and how they use them is important for setting up educational interventions. This is because the first step in solving the problem of antibiotic resistance is to make sure people know the risks of using antibiotics in the wrong way. This study was initiated with the purpose of

determining the factors that contribute to the inappropriate utilization of antibiotics by the people of Pakistan.

PATIENTS AND METHODS

In this cross-sectional study we included the data of 280 peoples living in Multan territory from June-2022 to January-2023. The respondents were the persons who took antibiotics in the last month due to any reason. A questionnaire was built to collect information from respondents (including two separate parts). The first part was including their age, gender socioeconomic status and residential area. The questionnaire also included information to diagnose either the antibiotics use was appropriate or in-appropriate. If the person took anti-biotics without proper prescription, took anti-biotics for shorter period than the recommended or took lower dose of anti-biotics or took for wrong indications such as in viral infections was labelled as inappropriate antibiotics use.¹⁰ the questionnaire also included information regarding person's education, marital and socio-economic status.

The 2nd part included information regarding the peron's knowledge regarding AMR. The questionnaire included 4 sections (total of 52 questions), including information regarding anti-biotics, indications of antibiotics usage, side-effects of antibiotics, anti-biotics resistance and related terminology of resistance, the answer was either yes, no and don't know, for correct answer score was for 1. So the total score was 52, the higher the score the more the person's knowledge regarding anti-biotics.

Association of risk factors with inappropriate use of anti-biotics was determined using chi-square test.

RESULTS

Among the 280 patients, only 104 (37.1%) patients had appropriate use of antibiotics and remaining 176 (62.9%) had inappropriate use of anti-biotics. patients of age ≤ 40 years had higher percentage of appropriate antibiotics use; 90 (86.5%) versus 123 (69.9%) using inappropriate antibiotics (p-value 0.000). People living in urban area had higher use of appropriate antibiotics; 70 (67.3%) versus 101 (55.7%) in inappropriate group with p-value 0.05. Patients having high school or more-higher education had higher frequency of

appropriate use of antibiotics; 73 (70.8%) versus 97 (55.2%) in inappropriate group, p-value 0.01. On average there was poor knowledge of people regarding AMR, on 37 (35.6%) patients in appropriate and 39 (22.2%) in inappropriate antibiotics group had knowledge regarding antibiotics, p-value 0.01. There was no significant association of gender and socioeconomic status with inappropriate use of antibiotics (Table 1).

Table 1: Risk Factors of Inappropriate use of Antibiotics.

	Antibiotics Use		P-value
	Appropriate (N=104)	Inappropriate (N=176)	
Age			
<40 Years	90 (86.5%)	123 (69.9%)	0.001
41-60 Years	14 (13.6%)	53 (30.1%)	
Gender			
Male	37 (35.6%)	48 (27.3%)	0.14
Female	67 (64.4%)	128 (72.8%)	
Residence			
Rural	34 (32.7%)	78 (44.3%)	0.05
Urban	70 (67.3%)	98 (55.7%)	
Socioeconomic Status			
Poor	38 (36.5%)	75 (42.6%)	0.31
Rich	66 (63.5%)	101 (57.4%)	
Education			
≤middle	31 (29.2%)	79 (44.8%)	0.01
High school or higher	73 (70.8%)	97 (55.2%)	
Knowledge Score			
≤22	67 (64.4%)	137 (77.8%)	0.01
≥23	37 (35.6%)	39 (22.2%)	

DISCUSSION

The purpose of this study was to investigate the factors that contribute to the incorrect utilization of antibiotics at the community level in the Pakistani population. In general, policies and actions that are effective in maximizing the use of antibiotics and reducing resistance.

Research have demonstrated that the population as a whole has a low degree of understanding of antibiotic resistance and the reasons that are responsible for it.^{11, 12} In the same vein, the majority of people who participated in this research had no prior knowledge of the concepts of drug resistance, antimicrobial resistance, or superbugs. It's possible that the general public has a limited understanding of the many mechanisms that contribute to antibiotic resistance, as well as the repercussions of antibiotics being overused or abused. There is evidence to suggest that raising awareness efforts that were addressed at the general community led to a significant reduction in the amount of prescribing.¹² To this day, there are not enough public awareness-raising programs in Malaysia that are geared toward educating people about how to make responsible decisions regarding their use of antibiotics. As a result, the time has come to launch a campaign with the goal of improving the general public's knowledge of the factors that lead to antibiotic resistance and the severe effects that result from it in order to encourage the correct application of antibiotics.

Another possible cause of antibiotic misuse is the simple fact that antibiotics are widely available without a doctor's prescription.¹³ These results on excessive antibiotic use are consistent with those from other studies, and they help explain why first-line antibiotics are no longer considered a viable therapeutic option.¹⁴ Almost half of antibiotics are bought and used without a prescription, just like in other low- and middle-income countries.^{15, 16}

Professionals in the medical field, such as physicians and nurses, might be enlisted to spread awareness about the importance of avoiding antibiotic overuse and the spread of antimicrobial resistance. These are recognized as the best places to learn about AMR-related concepts. Better antibiotic use by patients has been linked to patient-doctor interactions, such as drug counseling and shared decision making for antibiotic treatment programs.¹⁷ Since primary care clinics are where approximately 80% of the study population received their most recent course of

antibiotics, these can be excellent venues for providing opportune education on antibiotic use.

Primary care physicians play a crucial role in educating patients during consultations, and the VALUE model suggests that patients and their doctors make joint decisions about antibiotic use.¹⁸

CONCLUSION

Age <40 years, living in rural area, and low level of education are significant factors of inappropriate antibiotics use. The knowledge of AMR was poor in all people, however, people having appropriate use of antibiotics had higher knowledge of AMR.

REFERENCES

1. Ferri M, Ranucci E, Romagnoli P, Giaccone V. Antimicrobial resistance: A global emerging threat to public health systems. *Crit Rev Food Sci Nutr.* 2017;57(13):2857-76.
2. Bell BG, Schellevis F, Stobberingh E, Goossens H, Pringle M. A systematic review and meta-analysis of the effects of antibiotic consumption on antibiotic resistance. *BMC Infect Dis.* 2014;14:13.
3. Chernov VM, Chernova OA, Mouzykantov AA, Lopukhov LL, Aminov RI. Omics of antimicrobials and antimicrobial resistance. *Expert opinion on drug discovery.* 2019;14(5):455-68.
4. Resistance RoA. Antimicrobial resistance: tackling a crisis for the health and wealth of nations: Review on Antimicrobial Resistance; 2014.
5. Larson E. Community factors in the development of antibiotic resistance. *Annu Rev Public Health.* 2007;28:435-47.
6. Carlet J, Pittet D. Access to antibiotics: a safety and equity challenge for the next decade. *Antimicrobial resistance and infection control.* 2013;2(1):1.
7. Merrett GL, Bloom G, Wilkinson A, MacGregor H. Towards the just and sustainable use of antibiotics. *Journal of pharmaceutical policy and practice.* 2016;9:31.
8. Peters DH, Bloom G. Health care: Order health systems in developing world. *Nature.* 2013;495(7439):47.
9. Almagor J, Temkin E, Benenson I, Fallach N, Carmeli Y. The impact of antibiotic use on transmission of resistant bacteria in hospitals: Insights from an agent-based model. *PloS one.* 2018;13(5):e0197111.
10. Ocan M, Obuku EA, Bwanga F, Akena D, Richard S, Ogwal-Okeng J, et al. Household antimicrobial self-medication: a systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries. *BMC Public Health.* 2015;15:742.
11. Allcock S, Young EH, Holmes M, Gurdasani D, Dougan G, Sandhu MS, et al. Antimicrobial resistance in human populations: challenges and opportunities. *Global health, epidemiology and genomics.* 2017;2:e4.
12. Lee CR, Lee JH, Kang LW, Jeong BC, Lee SH. Educational effectiveness, target, and content for prudent antibiotic use. *BioMed research international.* 2015;2015:214021.
13. Afari-Asiedu S, Kinsman J, Boamah-Kaali E, Abdulai MA, Gyapong M, Sankoh O, et al. To sell or not to sell; the differences between regulatory and community demands regarding access to antibiotics in rural Ghana. *Journal of pharmaceutical policy and practice.* 2018;11:30.
14. Ventola CL. The antibiotic resistance crisis: part 1: causes and threats. *P & T : a peer-reviewed journal for formulary management.* 2015;40(4):277-83.
15. Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis.* 2011;11(9):692-701.
16. Khalid L, Mahsood N, Ali I. The public health problem of OTC antibiotics in developing nations. *Res Social Adm Pharm.* 2016;12(5):801-2.
17. Zanichelli V, Tebano G, Gyssens IC, Vlahović-Palčevski V, Monnier AA, Stanic Benic M, et al. Patient-related determinants of antibiotic use: a systematic review. *Clin Microbiol Infect.* 2019;25(1):48-53.
18. Guo H, Hildon ZJ, Loh VVK, Sundram M, Ibrahim MAB, Tang WE, et al. Exploring antibiotic prescribing in public and private primary care settings in Singapore: a qualitative analysis informing theory and evidence-based planning for value-driven intervention design. *BMC Fam Pract.* 2021;22(1):205.