

The Awareness of Antimicrobial Resistance Among Adult Population in an Urban Setting of Rawalpindi

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ABSTRACT

Objective: To determine the association of various aspects of antimicrobial resistance awareness and socio-demographic determinants among residents of Rawalpindi.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Rawalpindi Cantonment, Pakistan, from Jan to Dec 2021.

Methodology: A validated (World Health Organization) multi-country questionnaire was completed by a total of 400 participants, aged 16 years and older, by using two-stage sampling technique. The relationship between social and dependent variables was analyzed using chi-square test of significance.

Results: Study results showed that 53.8% of participants were aware of the term 'antibiotic resistance' whereas only 29.5% understood what antimicrobial resistance meant. In comparison to males, more females (65.3%) knew the term antibiotic resistance. Antibiotic resistance awareness was higher among young adults aged 16-24 years (67.8%) than among older age groups ($p=0.001$). Antibiotic resistance awareness in relation to gender ($p<0.001$), education level ($p<0.001$), occupation ($p<0.001$) and monthly household income ($p<0.001$) was found statistically significant. Antibiotic resistance, according to nearly one-third of respondents (31.8%), was a problem in other countries but not in Pakistan.

Conclusion: Awareness and level of understanding regarding spread of antimicrobial resistance and antibiotic resistance itself were found to be low. The study findings revealed that older adults, those with lower education and lower socioeconomic status had the least knowledge and attitudes regarding antibiotic resistance and antimicrobial resistance as compared to other groups.

Keywords: Antimicrobial Resistance, Antibiotic resistance, Community, Pakistan.

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INTRODUCTION

Antibiotics have widely been used in humans over the last few decades for prophylaxis and treatment, with many modern medical and surgical procedures being made possible because of antibiotics.¹ Extensive and inappropriate use of antibiotics in recent years has led to the emergence of antibiotic resistance (AR), a condition in which bacteria develops resistance to the specific antibiotic prescribed against it.² World Health Organization (WHO) encompasses antimicrobial resistance (AMR) as a public health emergency and considers it a threat to human well-being and global health security.³ Globally, annual deaths associated with AMR are estimated to be 700,000, and it is expected to cause over 10 million deaths per year by 2050, with over 100 trillion dollars in financial loss, if current AMR

projections continue.⁴ AMR has received significant worldwide attention and resources in the wake of COVID-19 as it poses a considerably bigger clinical, economic and environmental threat.⁵ Pakistan is ranked third among low-income countries, with 65% growth in antibiotic usage from 0.8 to 1.3 billion daily doses between 2000 and 2015.⁶ According to a study from Pakistan, inappropriate antibiotic consumption, self-medication, over-the-counter availability of antibiotics, irrational prescriptions, and lack of public awareness about AMR are contributing to resistant pathogenic bacteria across the country.⁷ One of the key strategic objectives for Pakistan's Global and National Action Plan on AMR is to increase general awareness among the community and improve understanding of AMR.^{7,8} Community-based antimicrobial stewardship programs are essential as they can inculcate a progressive change in antibiotic usage behavior and ultimately in reducing AR.^{9,10}

This study will provide an overview of AMR awareness in relation to social determinants, which can be used to bridge potential gaps in the irrational

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use of antibiotics from social perspective at community level.

METHODOLOGY

The cross-sectional analytical study was conducted after obtaining approval of Armed Forces Post Graduate Medical Institute's Ethical Review Committee (Re: 0155-AAA-ERC-AFPGMI). Data was collected from an urban setting of Rawalpindi Cantonment, Pakistan, from January to December 2021, using a two-stage cluster random sampling technique. After obtaining permission from local authorities, the sampling frame was obtained from Rawalpindi Cantonment Board. Rawalpindi Cantonment comprises a total of 18 sectors out of which four sectors were chosen at random. WHO sample size calculator was used to calculate the sample size keeping AR awareness knowledge at 55%. The total sample size was calculated to be 400.

Inclusion Criteria: Subjects aged 16 years or older, of either gender, belonging to an urban locality of Rawalpindi City, were included.

Exclusion Criteria: Participants who could not understand Urdu or English language or were unwilling to participate in survey.

Data was systematically collected in all four sectors, from every fifth house that met the eligibility criteria. Participants were asked about their gender, age group, educational status, occupation, and monthly household income. Subsequently, a WHO validated, closed-ended multi-country questionnaire survey on public awareness of AMR was administered to participants in both English and Urdu languages. The standard forward and backward method was applied to evaluate the translation in Urdu language.

The questionnaire was completed for 400 participants and the data was then entered and analyzed using Statistical Package for the Social Sciences (SPSS) v 25.0. Frequencies and percentages were used to represent categorical variables. The relationship between demographic and dependent factors was analyzed using chi-square test of significance, with the p -value of ≤ 0.05 considered statistically significant.

RESULTS

The study included 400 participants, the majority of whom were males 210(52.5%) while 190(47.5%) were females. Almost one-third of those who participated 116(29%) were between the ages of 25 and 34 years, as displayed in Table. Participants were

asked about their knowledge and familiarity with commonly used terms for AMR among whom the term 'antibiotic resistance' was known to 215(53.8%) while only 27(6.8%) had heard the term 'superbugs', as shown in Figure-1. Out of the total of 24 doctors, only 8(33%) were aware of the term superbugs. The term AR was heard by more females 124(65.3%) and 16-24 years old 61(67.8%) as compared to males 91(43.3%) and those aged 45-54 years old and older 19(40.4%). AR was also found to be statistically significant in relation to gender ($p < 0.001$) and age groups ($p = 0.001$). In terms of occupational category, 20(83.3%) doctors knew the term AR. People in the fifth quintile in the category of monthly household income 42(93.3%) were more familiar with the term AR than those in the first quintile 39(54.2%). Similarly, awareness of the term AR was also found to be statistically significant in relation to other demographic variables including education, occupation, and a household monthly income, as shown in Table. Among those who had previously heard the term AR, 120(56%) said they had heard it from a doctor or nurse. To determine the level of understanding of AR, the majority 298(74.5%) of the participants incorrectly identified the following statement as true: "Antibiotic resistance occurs when your body becomes resistant to antibiotics, and they no longer work as well". The age group of 35-44-year-old displayed the highest percentage 94(82.5%) in wrongly identifying it while the association with education ($p < 0.001$) and monthly household income ($p = 0.01$) was found statistically significant. Over half 202(50.5%) incorrectly believed that AR only affects people who regularly take antibiotics. Furthermore, more than half 247(61.8%) of the participants correctly identified all five AR-related statements, as shown in Figure-2. The survey results to responses surrounding attitudes of respondents toward AR revealed that 308(77%) agreed or strongly agreed that one of the world's most grave concerns is AR, as illustrated in Figure-3. The association of AR in relation to education ($p = 0.03$) was also statistically significant. In addition, 356(89%) were concerned about how AR would affect their own and their family's health while the majority 372(93%) of respondents asserted that everyone is responsible for taking antibiotics safely. Despite these beliefs, 328(82%) of respondents said they are not at risk of contracting an AR infection if they stick to their antibiotic regimen and 44(11%) of the participants did not agree or strongly disagreed

that specialists in medicine will address the AR problem if it becomes too serious.

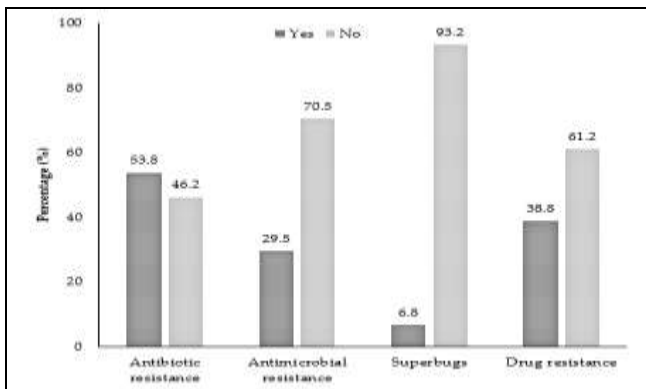


Figure -1: Familiar with the Term Related to Antimicrobial Resistance (n=400)

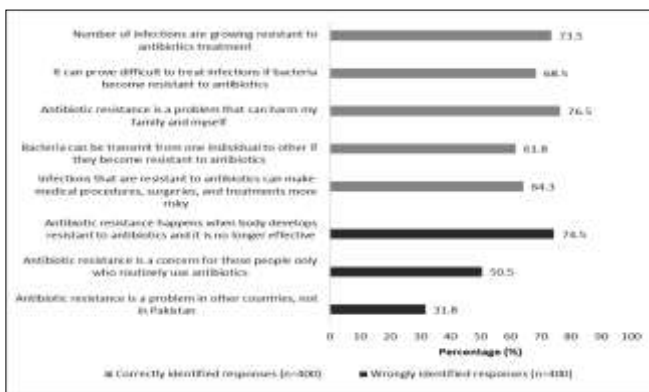


Figure-2: Correctly And Wrongly Identified Responses To The Level of Understanding of Different Aspects of Antibiotic Resistance (n=400)

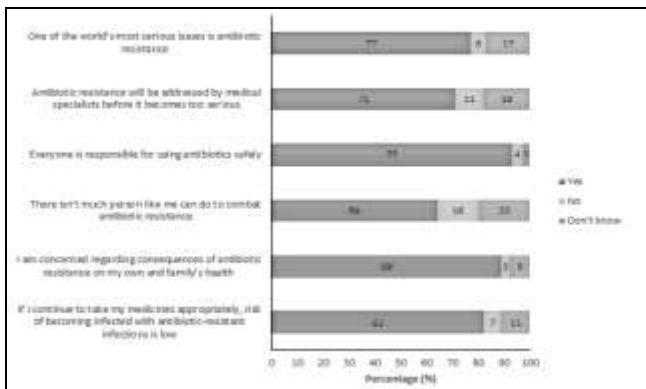


Figure-3: Responses Surrounding Attitudes of Respondents towards Antibiotic Resistance, (n=400)

DISCUSSION

In this study, respondents demonstrated low levels of awareness regarding AR as 53.8% of the participants had understanding of the term 'Antibiotic Resistance' whereas the term 'Antimicrobial

Resistance' was only known to a small percentage of respondents (29.5%). In Pakistan, similar low findings of AR awareness were reported in studies conducted at Wah (52.5%), Bahawalpur, Gujranwala and Gujrat (60%), and Swat (17%).¹¹⁻¹³ This shows that awareness regarding AR has become a serious public health concern in Pakistan and with widespread antibiotic usage, it is a serious public health threat worldwide including Saudi Arabia, India, China, and Australia¹⁴. In our study only 8(33.3%) doctors were aware of the term 'superbugs', emphasizing the importance of educating our healthcare providers about superbugs, by supplementing their knowledge and awareness through workshops and educational interventions.¹⁵⁻¹⁶ The level of education of respondents in our study affected their knowledge and attitudes towards AMR awareness. Respondents with a high level of knowledge had significantly more positive attitudes. Previous research from Nepal, Bhutan, and South Africa presented that higher level of education will increase awareness and attitudes towards AMR.¹⁷⁻¹⁹ Level of understanding regarding different aspects of AR is very critical and in our study 298(74.5%) respondents incorrectly believed that 'AR happens when the body develops resistant to antibiotics and it is no longer effective', which was similar to studies conducted in Italy (77%) and a WHO survey (78%)^{20,21}. Encouragingly 257(64.3%) participants identified correctly that AMR infections are making medical procedures unsafe, which was similar to the findings of the study conducted at Wah (65.8%) and a WHO survey.¹¹⁻²² In a statement surrounding attitudes of respondents towards AR, 356(89%) of our respondents were concerned about the impact of AR on their own health and upon the health of their family, which was similar to the studies conducted in Cyprus(78%) and Ecuador(86%).²³⁻²⁴

LIMITATION OF STUDY

The study was conducted in an urban setting of Rawalpindi only.

CONCLUSION

The awareness and level of understanding regarding spread of antimicrobial resistance and antibiotic resistance were found low and the outcomes were found to be statistically significant in relation to gender, age, education, occupation, and socioeconomic status, where older adults and those with lower education levels and lower socioeconomic status had the least knowledge and attitudes regarding AR and AMR.

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Table: Association of Socio-Demographic Variables with Awareness of Term Antibiotic Resistance.

Variables	Antibiotic Resistance Awareness No n(%)	Antibiotic Resistance Awareness Yes n(%)	p-value
Gender			
Male	119(56.7)	91(43.3)	< 0.001
Female	66(34.7)	124(65.3)	
Age Groups			
16-24 years	29(32.2)	61(67.8)	0.001
25-34 years	66(56.9)	50(43.1)	
35-44 years	43(37.7)	71(62.3)	
45-54 years	28(59.6)	19(40.4)	
55-64 years	11(57.9)	8(42.1)	
65 plus	8(57.1)	6(42.9)	
Education			
Primary or Middle	54(77.1)	16(22.9)	< 0.001
Secondary or Higher secondary	99(56.9)	75(43.1)	
Bachelor's	27(23.1)	90(76.9)	
Master's or equivalent	5(12.9)	34(87.1)	
Occupation			
Government employees	46(41.1)	66(58.9)	< 0.001
People in business/private employees	62(66.0)	32(34.0)	
Doctors	4(16.7)	20(83.3)	
Other Professionals (teachers, engineers, etc.)	28(58.4)	20(41.6)	
Students	22(30.1)	51(69.9)	
Jobless/retired/housewives	23(47.0)	26(53.0)	
Monthly household income (PKR)			
First/poorest Quintile (<20000 PKR)	33(45.8)	39(54.2)	< 0.001
Second Quintile (≥20000 <30000 PKR)	78(61.9)	48(38.1)	
Third Quintile (≥30000 <40000 PKR)	42(46.2)	49(53.8)	
Fourth Quintile (≥40000 <65000 PKR)	29(43.9)	37(56.1)	
Fifth/richest Quintile (≥65000 PKR)	3(6.7)	42(93.3)	

Conflict of Interest: None

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

QJ & NA: Conception, study design, drafting the manuscript, approval of the final version to be published.

NK & SI: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

NS & MR: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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