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## Perception of General Public on Antibiotic Resistances- A Survey Study

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### ABSTRACT

To evaluate the general public's awareness, knowledge, attitude, and behavior about the use of antibiotics and the emergence of antibiotic resistance. From January to April 2025, A study using a cross-sectional survey standardized question was given to the participants. To gather information from 205 respondents, a questionnaire was created. In order to gather information on sociodemographic traits, antibiotic use, antibiotic knowledge, and antibiotic resistance, the survey was divided into three components. A total 205 participated in this study, 52.7% were male and 46.3% were female successfully answered every question, demonstrating a 99% response rate. 118 participants, or 57.6% of the sample, agreed with that the use of antibiotics was a significant and grave public health concern in your community. And the 39 (19%) patient were not aware about antibiotic resistance is a growing concern in your community. The result of study show that patient and public aware to use of antibiotic and antibiotic resistance. The present study discovered that a high proportion of participants unaware being of "Antibiotic resistance and its risk to public health". To change their attitudes about the use of antibiotics and their knowledge and views of antibiotic resistance, more educational programs are required. Overall, the study participants had an extensive knowledge of antibiotic resistance.

**Keywords:** Antibiotic Resistance, Antibiotic Usage, Public Perception, Knowledge, Awareness

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## INTRODUCTION

Rapidly rising antibiotic resistance in bacterial infections is one of the biggest global health concerns, as it limits effective treatment and increases morbidity and mortality<sup>1, 2, 3</sup>. A major and growing danger to public health is antibiotic resistance.<sup>4, 5</sup> AMR is sometimes referred to as the "Silent Pandemic" and requires prompt and effective action rather than being put off until later.<sup>6</sup> There are a number of reasons why antibiotic resistance is so common in the general population. The improper use of antibiotics is among the most prevalent problems. When antibiotics are ineffective for viral diseases like the flu or the common cold, people may take them. Furthermore, the growth of resistant bacteria is facilitated by the use of leftover drugs or the inability to finish prescribed regimens of antibiotics. Despite the complexity of the link, antibiotic use is a major contributor to resistance.<sup>6, 7, 8</sup>

The most common causes in patient cases include overuse or not taking the entire term of therapy; self-medication by sharing medications with others, storing some for later use, or purchasing them from pharmacies without a prescription<sup>9</sup>. Fighting this problem requires raising public knowledge of the dangers of antibiotic resistance and the significance of using antibiotics responsibly. Antimicrobial resistance is a concern that is growing more serious and spreading quickly. Raising awareness of its importance and gravity is the first step in slowing its advancement. Numerous studies have demonstrated a substantial association between antibiotic use and antibiotic resistance, with groups using less drugs developing fewer resistant bacteria<sup>10</sup>

It's critical to comprehend the general public's existing attitudes and understanding regarding the usage of antibiotics and to spot common misconceptions. The purpose of this study is to assess the general public's knowledge-based views toward antibiotics and antibiotic resistance. For this reason, it is crucial to understand their understanding of antibiotics, how they utilize them, and how they handle the problems caused by antibiotic resistance.

## MATERIALS AND METHOD

### **Study Design:**

The survey utilized in this cross-sectional descriptive Survey was developed to gather information from the general public. The study was conducted from January 2025 until April 2025. (Figure 1)



**Figure 1: Time Line Plan**

### **Study Setting:**

A web-based survey of 20 questions was carried out between January and April 2025 utilizing Google Forms as the medium. Aim to gathering information from public about antibiotic usage and antibiotic resistances with total 205 responses. Several social media platforms and emails were used to distribute the survey. A "cloud" database was used to securely store the participant responses, and the data was automatically sorted, organized, and examined.

### **Questionnaire Development:**

Based on sociological methodology and understanding, A individual question developed particularly for this study was carried out. Closed-ended, multiple-choice, and questions utilizing different types of a Likert scale with six points are all included in the questionnaire. The specific points of the scale vary according on how the question is phrased. The general public's' perceptions and knowledge were evaluated using the validated pre-tested questionnaire. Three sections make up the questionnaire: knowledge, awareness, and also their attitudes toward antibiotics and antibiotic resistance and sociodemographics.

The details of the questionnaire are as follows:

### **Questions about sociodemography:**

Three questions concerning the participant's demographics and general information, including qualification, age, and sex, make up the first section.

### **Perception and Knowledge Related Question:**

A total of 20 questions were created for the participants perception and awareness of public and pharmacist towards antibiotic usage and antibiotic resistances. It was measure using YES or NO responses. The question were ask on a three point Likert Scale (1-yes, 2-no). This indicated whether they are aware, demented and cognizant with the statements regarding antibiotics and

antibiotic resistance. The total questions was measured the importance of antibiotic, How it is affected on health, whether they are fussy about what they taken.

### Study Population:

A representative sample of the general population participated in the study. We recruited 205 individuals to participate in our survey.

### Data Collection:

The responses to the questionnaires were given distributed in between January to April four months and the data was collected through online survey (Google Form). They were requested to answer the survey in an anonymous manner. This was completed within the survey's allotted time.

### Data Analysis:

The frequencies and percentages were used to express the information collected. The data on demographics, knowledge and perception of people and pharmacist towards antibiotics resistance collected from completed surveys were sorted and examined using a Microsoft Excel spreadsheet, The percentage (%) of the respondents was used to display the data.

**Table 1: Question Related to Knowledge and Attitude about Antibiotic Resistance**

Sr.no	Questions	Responses	Frequency	Percentage(%)
1	Do you know antibiotic and antibiotic resistance?	Yes	181	88.3
		No	24	11.7
2	Have you ever taken antibiotic without prescription?	Yes	101	49.3
		No	104	50.7
3	Do you self-medicate antibiotics?	Yes	96	46.8
		No	109	53.2
4	Do you take all course of antibiotics are prescribed by doctor?	Yes	170	82.9
		No	35	17.1
5	Do you think antibiotics are effective against all infections?	Yes	91	44.4
		No	114	56.6
6	Do unnecessary use of antibiotics cause any harm to you ?	Yes	124	60.5
		No	81	39.5
7	Do you think it's acceptable to take antibiotics for viral infections like common cold or flu?	Yes	107	52.2
		No	98	47.8
8	Do you believe antibiotic resistance is a growing concern in your community?	Yes	118	57.6
		No	87	43.4
9	Are you been instructed by doctor the hazardous if, you don't take the full course of antibiotic?	Yes	114	55.6
		No	91	44.4
10	Do you check the expiry date of the antibiotic before using it?	Yes	192	93.7
		No	13	6.3
11	Have you ever received education or information about antibiotic resistance?	Yes	143	69.8
		No	62	30.2
12	Are you aware of any national or local programs aimed at reducing antibiotic resistance?	Yes	96	46.8
		No	109	53.2
13	Do you think there is a need for more education and awareness about antibiotic resistance?	Yes	153	74.6
		No	52	26.4

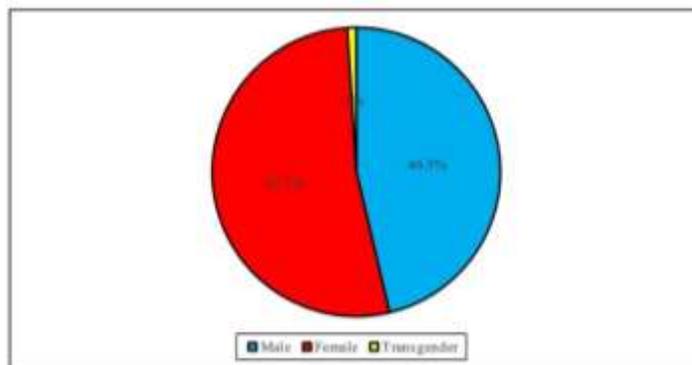
**Table 2: Question Related to Perception and Awareness about Antibiotic Resistance**

Sr.no	Questions	Frequency	%
1	How often do you take antibiotic?		
	-Frequently	21	10.2
	-Occasionally	73	35.6
	-Rarely	111	54.1
2	How you experienced any of the following side effects due to antibiotic resistance?		
	-Prolong illness	34	16.6
	-Increased severity of symptoms	24	11.7
	-Increased risk of complications	24	11.7
	-Chronic infections	18	8.8
	-Antibiotic dependence	41	20
	-Other	64	31.2
3	How severe the side effects you experience?		
	-Moderate	76	37.1
	-Mild	96	46.8
	-Severe	33	16.1
4	How antibiotic resistance impacted your daily life?		
	-Increased healthcare cost	57	27.8
	-Reduced quality of life	61	29.8
	-Emotional distress	28	13.7
	-Other	59	28.8
5	How concerned are you about the impact of antibiotic resistance on your health?		
	-Very concerned		
	-Somewhat concerned	86	42
	-Not at all concerned	80	39
		39	19
6	From where did you received information about antibiotic resistance?		
	-Doctor	63	30.7
	-Social media	52	25.4
	-Others	90	44.9

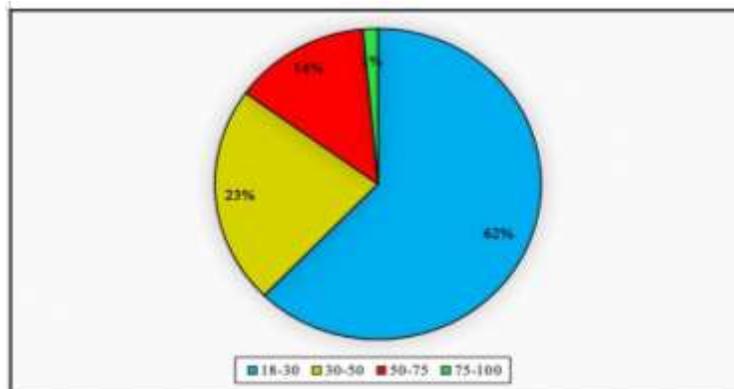
## RESULTS AND DISCUSSION

### Study Population:

A total 205 participated in this study, 52.7% were male and 46.3% were female effectively answered every question, demonstrating a response rate of 99%. (Figure 2), the age grouped distributed in 18-30(62%), 30-50(22.9%), 50-70(12.7%) and the oldest age grouped 75-100 less number of respondents (Figure 3). The highest prevalence respondents of age group 18-30(62%). Those with lower levels of education reported using antibiotics at significantly higher rates than those with higher levels of education.



**Figure 2: Gender Distribution of Participants**



**Figure 3: Age Distribution of Participants**

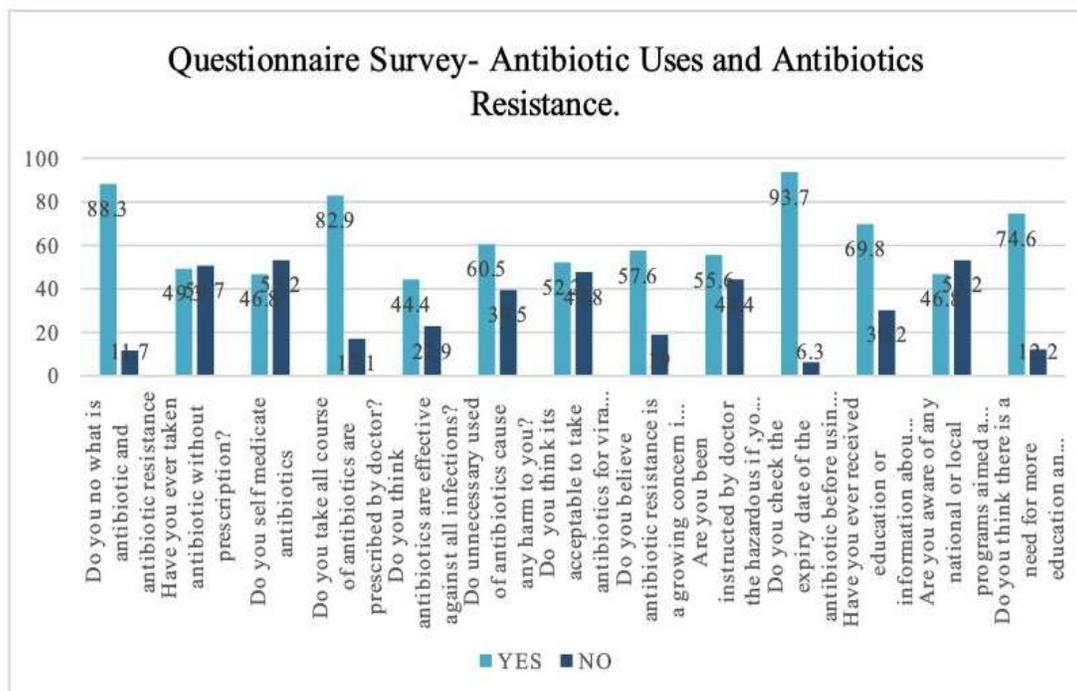
### Perception and Attitudes about Antibiotic use:

In our study, who took part in the survey, 181(88.3%) people's they had heard about antibiotics resistance, 24 (11.7%) people's did not know about antibiotic resistance. Out of 205 respondents, 96 (46.8%) participants take self-medicated antibiotics and 109 (53.2%) participants were do not self-medicated antibiotics.

Overall, 91 (44.45%) Participants are thought to be antibiotics beneficial against all infections by participants, although more people 114 (55.49%) not believe that antibiotics are not effective against all type of infections. 118 respondents, or 57.6%, said they believed that antibiotic resistance was a significant and grave public health concern in their community. And the 39 (19%) patient ware not aware about antibiotic resistance is a growing concern in your community. 107 (52.2%) patient thought like that i.e. antibiotics are acceptable for viral infection like common cold or flu and 98 (47.8%) respondents are not acceptable to take antibiotics. Out of 205 participants 153 (74.6%) People believe that more education and awareness about antibiotic resistance are needed, while 52 (25.4%) people do not think that any education or awareness is necessary.

192 (93.7%) of the participants in our study make sure to verify the antibiotics' expiration date before using them, only 13 (6.3%) patients use it without seeing the expiry date. 124(60.5%)

peoples believed that unnecessary use of antibiotic harm to them and 81(39.5%) peoples does not. The vast majority of respondents 170(82.9%) stated that the take all course of antibiotics prescribed by doctor and 35 (17.1%) respondents does not take.



**Figure 4: Perception and Attitude about Antibiotic Resistance**

About 86 (42%) people revealed that they are very concerned, 80(39%) people somewhat concerned and 39 (19%) people not at all concerned about the impact of antibiotic resistance on their health (Figure 5). Most of the peoples 111 (54.1%) were take antibiotics rarely, additionally 73(35.6%) occasionally and other 21 (10.2) frequently (Figure 6).

The majority of participants declared that 57(27.8%) people increased their healthcare cost, 61(29.8%) respondent reduced their quality of life, 28 (13.7%) people faced problems like emotional distress and 59(28.8%) peoples faced other problems by antibiotic resistance impacted on their daily life (Figure 7). The people experienced side effects due to antibiotic resistance like 34 (16.6%) prolong illness, 34 (11.7%) increased severity of symptoms, 24 (11.7%) increased of complications, 18 (8.8%) chronic infections, 41 (20%) antibiotic dependence and 64 (31.2%) faced other side effects (Figure 8)

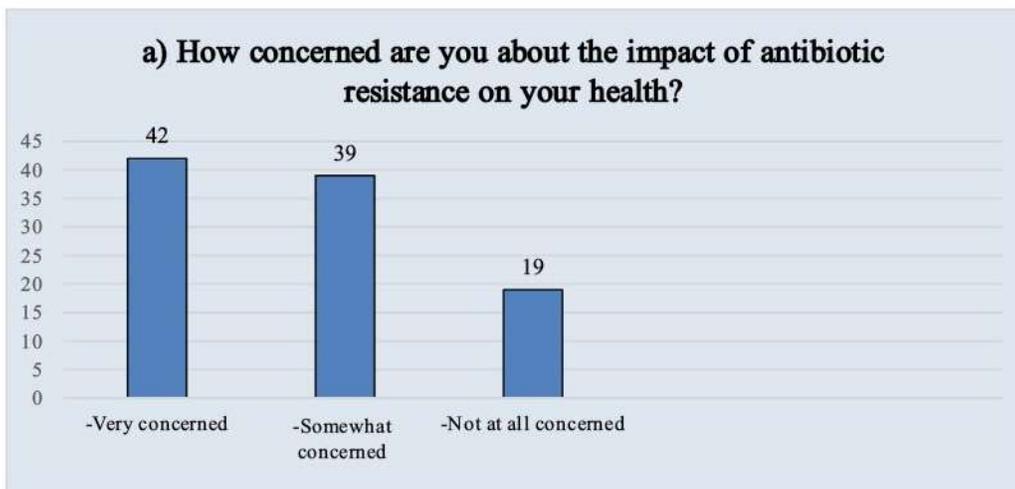


Figure 5: Impact of antibiotic resistance on their health

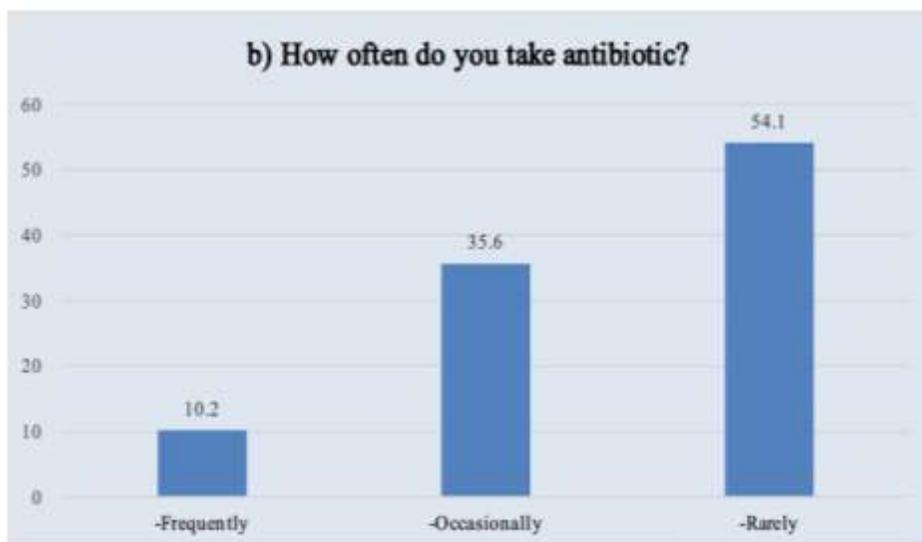


Figure 6: How often do you take antibiotics?

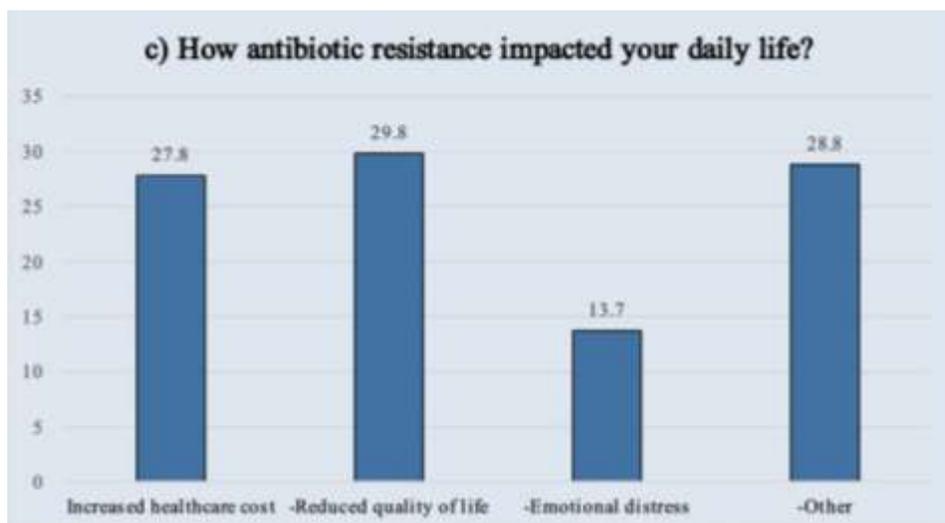
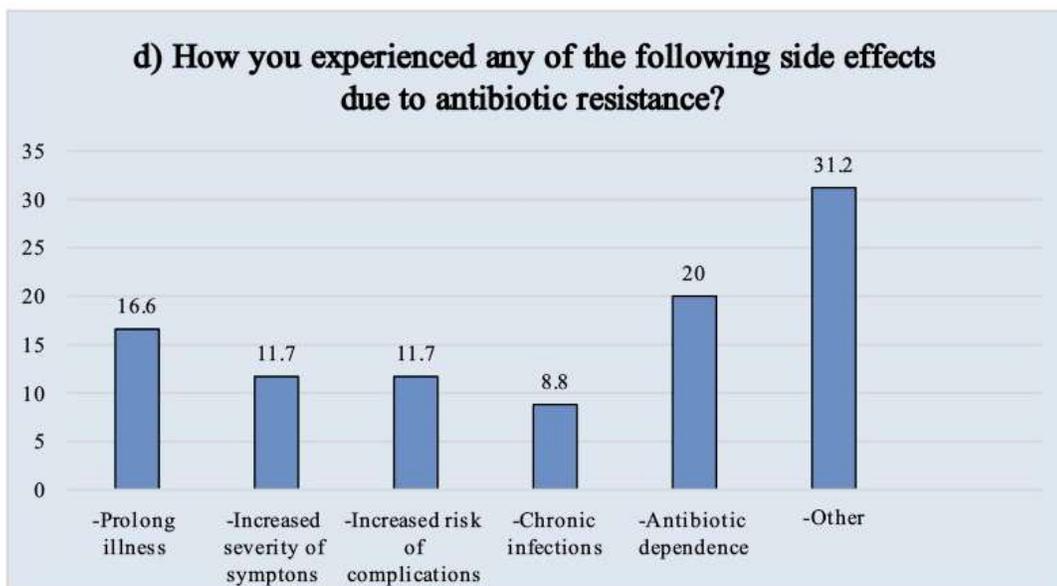


Figure 7: How antibiotic resistance impacted your daily life?



**Figure 8: How you experience any of the following side effects due to antibiotic resistance?**

## DISCUSSION:

Our study provides valuable insights into the knowledge, awareness, perception with respect to usage of antibiotic and their resistance. The survey should have included more in-depth questions to measure not just awareness but understanding of the consequences of resistance to antibiotics, like as the potential to make previously treatable infections deadly. It's clear that a greater effort in public education is needed to improve the depth of knowledge surrounding this issue.

Antibiotics work most effective for bacterial illnesses; they don't work well for viral infections like the flu, the common cold, or most sore throats. The frequent, extensive, and inappropriate use of antibiotics are the main causes of drug-resistant bacteria. Of the patients in our study, 107 (52.3%) voiced doubts regarding the effectiveness of antibiotics against bacteria or viruses. Confusion and disagreement over the ineffectiveness of antibiotics against viral infections were also discovered non the current study. We must pay significantly more attention to antibiotics and antibiotic resistance<sup>11</sup>.The general public need to be educated that an antibiotic's effectiveness may only be maintained when it is taken as directed by a doctor and for the duration of the prescribed course.<sup>18,19</sup>

Our results show that the general public Participating in our study is aware of the negative effects of antibiotic resistance. They acknowledge the primary causes of antibiotic resistance, including overuse and abuse, limited access to bacterial diagnostics, and misunderstanding of the adverse effects of antibiotic resistance. Controlling antibiotic resistance depends on how the general population views conditions that need antibiotic therapy, where to get antibiotics, and whether they follow their doctor's orders.<sup>15</sup> Patients' knowledge and beliefs are linked to their conduct and

attitude.<sup>16,17</sup> Giving the public accurate information can improve patient adherence to optimal antibiotic use.<sup>24</sup>

One of the major challenges facing the public health sectors has been the issue of antibiotic use and resistance. The frequency of antibiotic use within a certain time frame is essential to addressing the issue of antibiotic resistance. Antibiotic use indicates the frequency of antibiotic use, as a significant majority of respondents acknowledged using antibiotics. Compared that in our study, respondents taking antibiotics in three categories i.e. 111 (54.1%) people's show rarely, 73 (35.6%) occasionally and 21 (10.2) frequently.

Although WHO conducts awareness campaigns<sup>12,23</sup>, 96 (46.8%) participants can aware of national of local program to reducing antibiotics resistance but out of that 109 (53.2%) unaware about the same. Out of 205 participants 153 (74.6%) people think that more education and awareness on antibiotic resistance are needed, although 52 (25.4%) people do not require any of these things.

The threat of antibiotic resistance can be significantly increased by self-medication<sup>14</sup> over-the-counter antimicrobials available without a prescription<sup>13</sup>, and ignorance of the negative effects of excessive antibiotic usage.<sup>18</sup> Self-medication is one of the main causes of the increase in antibiotic use and the development of antibiotic resistance.<sup>22</sup> 101 participants (49.3%) in the current study agreed that using antibiotics without a prescription or in any other way is dangerous. Similarly, 96 individuals (46.8%) said that taking medication on one's own initiative or at the advice of a health care provider or non-healthcare provider was allowed.

Few suggestions have been shared respondents about their experience with antibiotics resistance;

1. Generally most of the people used to take antibiotics without prescription, and also they cannot complete the dose of antibiotics for prescribed days. This may leads into antibacterial resistance. For example - if one person can use levofloxacin frequently to treat upper respiratory tract infection, then it may leads to lost effectiveness of levofloxacin in the treatment of tuberculosis where it need to take for prolong days. Thus you cannot take antibiotics your own unless n until you have thorough knowledge of it.
2. Antibiotics are crucial for treating bacterial infections, saving lives, reducing complications, and preventing the spread of disease. Good to cure a disease.
3. I'm B Pharm student in Buldhana and basically my project based on antibiotics so I am aware of that. Antibiotic Resistance's Future Antibiotic resistance appears to have a difficult future, but with concerted efforts, we can mitigate its impact. Antibiotic resistance .Use antibiotics responsibly, only use antibiotics when necessary and as directed by a

healthcare professional Practice good hygiene. Follow proper hand hygiene, cleaning, and disinfection practices.

4. Avoid taking antibiotics without a doctor's prescription as much as possible. But you can use sometime antibiotics occasionally like in emergency condition by knowing their side effects not regularly.
5. Yes it's certainly a warning sign for all humanity. But the responsibility of it is not shared and accepted by anyone including common people, doctors, chemists etc. For example If a patient come to either a pharmacist or doctor for his medical problem then he comes with a wish that I will be cured within 24 hrs. And that's what reflects in doctor's prescription containing higher antibiotics with irrational use in it so that patient suffering from unnecessary Antibiotics Resistance issue. Pharmacist if any want to stop or resist this he is surrounded by many useless restrictions by government and surrounding competition that he can't do anything though he want to contribute in wellbeing of patients. So if we want to do really something concrete for all mankind we shall first impose very stringent restrictions on use of irrational use of antibiotics by doctors.
6. No more consume antibiotics in daily life. Verify in doctor prescription.

Most of the people who responded concurred that the likelihood of resistance developing and spreading increases with the amount of antibiotics used in a society. Furthermore, the general public is growing more being aware of the issue of antibiotic resistance as a result of the extensive coverage and publicity of the subject in the media, press, and online discussion forums. Since the media and the internet have grown to be significant information sources, particularly for young people<sup>25,26</sup> they have evolved into a means of learning about and raising awareness of a range of public concerns.

The current study mainly focused on the opinions, attitudes, and knowledge of the general public about antibiotic use and resistance. Raising public awareness requires technical knowledge. Additionally, more details regarding antibiotic resistance must be given. Although most public are knowledgeable about the concept of "antibiotic resistance". They are not entirely aware of its implications or definition. As more individuals become aware of the use of antibiotics can decrease antibiotic resistance.

## CONCLUSION

The cross-sectional study provides a deeper understanding of public perception and knowledge about antibiotic resistance and usage. Taking the distributions of the responses into consideration, Based to our surveys, the number of hours of antibiotic resistance needs to be increased in the

general population, and students are calling attention to this requirement based on the distributions of replies we obtained. Their restrictive approach is concerning and needs immediate attention, despite their recent demonstration of awareness on the negative effects of indiscriminate antibiotic usage. We recommend concentrating on the community's attitudes, understanding, and knowledge on the use of antibiotics and antibiotic resistance in addition to the curability of diseases. More educational efforts on antibiotic resistance should be introduced based on the level of understanding among respondents with lower educational levels. It emphasizes the necessity of educational initiatives to raise awareness of the negative effects of antibiotic misuse and to foster responsible behavior in the practice of using antibiotics. Their vital role in preventing antibiotic resistance can have a significant influence on the community as a whole as well as on individuals in the fight against this global issue.

## REFERENCE

1. Sobierajski T, Mazińska B, Wanke-Rytt M, Hryniewicz W. Knowledge-Based Attitudes of Medical Students in Antibiotic Therapy and Antibiotic Resistance. A Cross-Sectional Study. *Int J Environ Res Public Health*. 2021 Apr 8;
2. Cohen J., Findlay D., Gyssens I., Heuer O.E., et al. The global threat of antimicrobial resistance: Science for intervention. *New Microbes New Infect*. 2015; 16:22–29. doi: 10.1016/j.nmni.2015.02.007.
3. Cassini A., Högberg L.D., Plachouras D., Quattrocchi A., Hoxha A., Simonsen G.S., Colomb-Cotinat M., Kretzschmar M.E., Devleeschauwer B., Cecchini M., et al. Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: A population-level modelling analysis. *Lancet Infect. Dis*. 2019; 19:56–66. doi: 10.1016/S1473-3099(18)30605-4.
4. Thomas F, Depledge M. Medicine ‘misuse’: implications for health and environmental sustainability. *Soc Sci Med*. 2015; 143:81–7.
5. Viens AM, Littmann J. Is antimicrobial resistance a slowly emerging disaster? *Public health ethics*. 2015; 8(3):255–65.
6. R.C. Founou, A.J. Blocker, M. Noubom, C. Tsayem, S.P. Choukem, M. Van Dongen, L.L. Founou, The COVID-19 pandemic: A threat to antimicrobial resistance containment.
7. Goossens H, Guillemot D, Ferech M, Schlemmer B, Costers M, Breda VM, Baker LJ, Cars O, Davey PG (2006) National campaigns to improve antibiotic use. *Eur J Clin Pharmacol* 62: 373-379.

8. Ling Oh A, Hassali MA, Al-Haddad MS, Syed Sulaiman SA, Shafie AA, Awaisu A. Public knowledge and attitudes towards antibiotic usage: a cross-sectional study among the general public in the state of Penang, Malaysia. *J Infect Dev Ctries* 2011; 28; 5:338-47.
9. Mason, T., Trochez, C., Thomas, R. et al. Knowledge and awareness of the general public and perception of pharmacists about antibiotic resistance. *BMC Public Health* 18, 711 (2018).
10. Goossens H. Antibiotic consumption and link to resistance. *Clin Microbiol Infect.*, 2009; 15: 12-5.
11. Effah, C.Y., Amoah, A.N., Liu, H. et al. A population-base survey on knowledge, attitude and awareness of the general public on antibiotic use and resistance. *Antimicrob Resist Infect Control* 9, 105 (2020). <https://doi.org/10.1186/s13756-020-00768-9>
12. AJ Desai, GV Gayathri, DS Mehta Public Perception, Knowledge, Attitude and Behaviour on Antibiotic Resistance- A survey in Davangere City, India.
13. Delhi Society for Promotion of Rational Use of Drugs.(WHO/SEARO). Promoting awareness amongst school children on rational use of drugs. Delhi; 2009.
14. Grigoryan L, Burgerhof JG, Degener JE, Deschepper R, Lundborg CS, Monnet DL et al. Attitudes, beliefs and knowledge concerning antibiotic use and self-medication: a comparative European study. *Pharmacoepidemiol Drug Saf* 2007; 16:1234-43.
15. You JH, Yau B, Choi KC, Chau CT, Huang QR, Lee SS. Public knowledge, attitudes and behavior on antibiotic use: a telephone survey in Hong Kong. *Infection*. 2008 Mar; 36(2):153-7. doi: 10.1007/s15010-007-7214-5. Epub 2008 Jan 29. PMID: 18231717.
16. Davey P, Pagliari C, Hayes A. The patient's role in the spread and control of bacterial resistance to antibiotics. *Clin Microbiol Infect*. 2002;8 Suppl 2:43-68. doi: 10.1046/j.1469-0691.8.s.2.6.x. PMID: 12427207.
17. Mangione-Smith R, McGlynn EA, Elliott MN, McDonald L, Franz CE, Kravitz RL. Parent expectations for antibiotics, physician-parent communication, and satisfaction. *Arch Pediatr Adolesc Med*. 200
18. Kardas P, Devine S, Golembesky A, Roberts C.A systematic review and meta-analysis of misuse of antibiotic therapies in the community. *Int J Antimicrob Agents*.2005;26(2):106–13.
19. Levy SB. The antibiotic paradox: how miracle drugs are destroying the miracle.Springer;2013
20. A.R. McCullough, S. Parekh, J. Rathbone, C.B. Del Mar, T.C. Hoffmann, A systematic review of the public's knowledge and beliefs about antibiotic resistance
21. World Health Organization. ((2015Global action plan on antimicrobial Resis .tance .World Health Organization. <https://iris.who.int/handle/10665/193736>

22. Eni Bushi, Zehadin Gashi, Ledjan Malaj. Evaluation of the Knowledge, Attitude and Public Awareness about the Use of Antibiotics and Antibiotic Resistance in Albania Indian J Pharma Education and Res Vol 58, Issue 1, Jan-Mar, 2024.
23. Kotwani A, Wattal C, Joshi PC, Holloway K. Irrational use of antibiotics and role of the pharmacist: an insight from a qualitative study in New Delhi, India. J Clin Pharm Ther. 2012 Jun; 37(3):308-12.
24. Dorlands Medical Dictionary: antibacterial. Archived from the original on 2010-11-17. Retrieved 12 March 2014.
25. Zafar SN, et al. Self-medication amongst university students of Karachi: Prevalence, knowledge and attitudes. JPMA. 2008,58:214-17.
26. K AK, Banu G, K RK. 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 of Diagn Res.2013; 7(8):1613-1616.

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