

A cross-sectional study on public knowledge and awareness of antibiotic use and antimicrobial resistance in Mangalore, India

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Background: Antimicrobial resistance (AMR) is a growing global public health issue that requires immediate attention. **Aim:** This study aimed to assess the knowledge, attitudes, and practices related to antibiotics and AMR among the general population in Mangalore, India.

Materials and Method: A cross-sectional survey was conducted among 250 participants, out of which 220 were used for reporting results, and 30 were excluded due to incompleteness.

Result: The results showed that many participants had limited knowledge regarding the proper use of antibiotics, and a significant number tended to misuse them. 74.3% of participants did not complete the full course of antibiotics, and 51.82% used leftover antibiotics for the same cases. On the other hand, the majority of participants recognized the importance of checking the expiry date of antibiotics 80.91% said yes and 66.36% agreed that unnecessary use of antibiotics causes bacterial resistance. **Conclusion:** This study highlights the gaps in public knowledge and practices related to antibiotics and AMR in Mangalore, India. It underscores the need for more public education and awareness campaigns to prevent the misuse and overuse of antibiotics, and to prevent the emergence and spread of antimicrobial resistance. A multi-faceted approach that involves healthcare providers, policymakers, and the public is necessary to tackle this global public health challenge.

Keywords: Antimicrobial resistance (AMR), Antibiotics, Infections, Mangalore, Knowledge.

INTRODUCTION

Antimicrobial resistance (AMR) is a worldwide risk to public health [1]. The primary causes of AMR, which has increased morbidity and mortality rates around the world, are the misuse and abuse of antibiotics. AMR's financial toll is also a major worry; estimates suggest that by 2050, it will have cost the world more than \$100 trillion and resulted in 10 million deaths annually [2]. The origin and spread of AMR are significantly influenced by attitudes towards the usage of antibiotics [3]. Antibiotics are frequently administered for diseases like viral infections that are not caused by bacteria yet do not react to antibiotics. Patients who are prescribed broad-spectrum antibiotics for mild diseases or who receive antibiotics without the required diagnostic testing run the risk of overusing antibiotics [4]. AMR can occur as a result of self-medication and inadequate antibiotic treatments [5]. It is essential to evaluate public awareness and attitudes regarding antibiotic use and AMR in order to solve this issue. Studies have revealed that the general public lacks awareness regarding the proper use of antibiotics and the effects of their overuse and misuse. The answer to solving this problem is education.

People may make wise decisions about their health and contribute to reducing AMR by spreading awareness about the proper use of antibiotics and the effects of overuse and misuse [6]. Informing patients on the proper use of antibiotics and the significance of finishing the entire course of therapy is another important task for healthcare professionals [7]. Policies and regulations can help stop the establishment and spread of AMR in addition to education. AMR rates are lower in some nations, like Sweden, where the use of antibiotics in food production is strictly regulated [8]. The creation of novel antibiotics, the application of complementary medicines, and enhanced infection prevention and control methods are other tactics [9].

It is crucial to remember that combating AMR requires an international strategy. The genesis and spread of AMR are not confined to a single nation or region, hence international cooperation and coordination are required in the fight against AMR [10]. This entails exchanging knowledge and best practices as well as creating and putting into effect global laws and regulations. AMR is a serious public health issue that has to be addressed right away, to sum up. The key contributing causes to the emergence of AMR are the improper usage and over use of antibiotics [11]. The development of innovative therapies and preventative measures, as well as legislation and regulations, are all necessary components of the multifaceted strategy needed to address this problem [12]. To address AMR and guarantee that antibiotics are still effective for next generations, worldwide cooperation is crucial [13].

MATERIALS AND METHOD

Study Area

The study was conducted in Mangalore, Karnataka, India. Valachil village, Mannagudda, and Vamanjoor village were the three locations used for the study.

Survey Tool Development

The questionnaire was constructed using a survey carried out to assess public knowledge and behaviors regarding antibiotic use [14]. The information was modified to correspond with the study population. The questionnaire consisted of three components. The first section ensures that the demographic qualifications of the participants are guaranteed. The attitude towards the usage of antibiotics is the subject of the questionnaire's second section. These variables make up this section: I never stop taking antibiotics even when I feel better. I maintain antibiotics in my house in case I need them in an emergency, I utilise leftover medicines for the same situation, and the last component is about participant understanding of antibiotic use. The factors that make up this statement include: Different antibiotics are used to treat different diseases, antibiotics are effective against viruses and bacteria, antibiotics can be used to treat fevers, antibiotics do not have side effects, and antibiotics can cause allergic reactions.

Data Collection

The study was conducted between March 25th and April 25th, 2023. All general population members, excluding physicians, chemists, and other health professionals, received self-administered questionnaires. The poll was completely voluntary, and each participant gave their written agreement before participating. Prior to data collection, participants were informed of the study's goals, the confidentiality of participant data, and any ethical issues that were included in the survey's protocols. They were instructed to respond to as many inquiries as they could. But they may leave it blank if they aren't sure about the response. The study employed a total of 250 participants.

Data Presentation

Due to the similarity of responses, certain respondents have been dropped from the sample. The results specifically excluded 30 reports. To summarise the data, descriptive statistics were used. The outcomes were presented as percentages.

RESULTS

The survey's findings are shown in tables 1–3. Table 1 shows the participants' demographics; Table 2 shows their attitudes towards using antibiotics; and Table 3 shows their knowledge on using antibiotics.

Characteristics		Number (n=220)	Percentage (%)
Age	18-27	120	53.5
	28-37	52	23.5
	38-47	29	13.3
	>47	19	9.7
Gender	Males	113	51.37
	Females	107	48.63
Marital Status	Single	91	41.36
	Married	129	58.64
Educational level	School	12	5.45
	Diploma	54	24.55
	Bachelor degree	99	45.8
	Postgraduate	55	24.2

Table 1. Demographic Characteristics of the Participants

This table presents the age, gender, marital status, and educational level of 220 individuals surveyed, with 54% aged 18-27, 51.37% male, 58.64% married, and 45% holding a bachelor's degree.

Variables	Number (n=220)		Percentage %
I always complete antibiotics even I feel better	Yes	56	25.7
	No	164	74.3
I keep antibiotics at home for emergency needs	Yes	79	35.9
	No	141	64.1
I use leftover antibiotics for the same cases	Yes	114	51.82
	No	106	48.18
I follow the instructions on the label	Yes	169	76.81
	No	51	23.19
I frequently check the expiry date of antibiotics	Yes	178	80.91
	No	42	19.09

Table 2. Attitude toward antibiotic use

This table presents the percentage of 220 individuals surveyed and their responses to questions about behaviors related to antibiotics, including completing antibiotics even when feeling better (25.7% yes), keeping antibiotics at home for emergency needs (35.9% yes), using leftover antibiotics for the same cases (51.82% yes), following instructions on the label (76.81% yes), and frequently checking the expiry date of antibiotics (80.91% yes).

Variables	Number (n=220)		Percentage %
Different antibiotics are used to cure various disease	Agree	166	75.45
	Disagree	44	20
	No answer	7	4.55
Antibiotics are effective against bacteria	Agree	178	80.91
	Disagree	16	7.28
	No answer	26	11.81
Antibiotics are effective against viruses	Agree	116	52.72
	Disagree	76	34.56
	No answer	28	12.72
Antibiotics can be used to stop the fever	Agree	119	54.09
	Disagree	52	23.63
	No answer	49	22.28
Unnecessary use of antibiotics causes bacterial resistance	Agree	146	66.36
	Disagree	12	5.45
	No answer	62	28.19
Antibiotics do not cause side effects	Agree	38	17.27
	Disagree	46	20.92
	No answer	136	61.81
Antibiotics may cause allergic reactions	Agree	111	50.45
	Disagree	12	5.45
	No answer	97	44.1

Table 3. Knowledge of antibiotic use among participants

This table presents the percentage of 220 individuals surveyed and their responses to beliefs or opinions about antibiotics, including whether different antibiotics are used to cure various diseases (75.45% agree), whether antibiotics are effective against bacteria and viruses (80.91% agree and 52.72% agree, respectively), whether antibiotics can be used to stop fever (54.09% agree), whether unnecessary use of antibiotics causes bacterial resistance (66.36% agree), whether antibiotics cause side effects and allergic reactions (17.27% agree and 50.45% agree, respectively).

DISCUSSION

The study found that a majority of the participants had limited knowledge regarding the proper use of antibiotics, and many had a tendency to misuse them. Specifically, only 25.7% of participants reported always completing antibiotics even when feeling better, 35.9% reported keeping antibiotics at home for emergency need, and 51.82% reported using leftover antibiotics for the same cases. However, 76.81% reported following the instructions on the label, and 80.91% reported frequently checking the expiry date of antibiotics. Regarding knowledge, 75.45% of participants believed that different antibiotics are used to cure various diseases, and 80.91% believed antibiotics are effective against bacteria. However, only 52.72% believed antibiotics are effective against viruses, and 54.09% believed antibiotics can be used to stop fever. On the positive side, 66.36% believed that unnecessary use of antibiotics causes bacterial resistance, and 50.45% believed that antibiotics may cause allergic reactions. However, only 17.27% believed that antibiotics do not cause side effects.

In contrast, participants in other research, which was carried out in Bagdad, Iraq (50.3%) had education about the rational use of antibiotics [15] and in the study conducted in Saudi Arabia, 74.9% knew that not completing a full course of antibiotics may cause antibiotics resistance [16]. In a study conducted in Nepal 84.6% of the population preferred self-medication of antibiotics in some part of their life for cough and sore throat [17]. Unnecessary use of leftover antibiotics and using them at need without advice from a clinician may increase antibiotic resistance of normal flora by carrying out a selective pressure in the gut and upper respiratory tract [1]. This study also highlights the importance of education from healthcare providers, as participants who had received information about antibiotics from healthcare providers had better knowledge and practices related to antibiotics and AMR. This underscores the need for healthcare providers to play a more significant role in educating their patients about antibiotics and the appropriate use of antibiotics.

CONCLUSION

According to the study's findings, more public education is required on the correct use of antibiotics and the dangers of AMR. It was discovered that many people behave improperly and harbour misconceptions about antibiotics. These findings can be used by legislators and healthcare practitioners to provide specialised instruction and regulations. Additionally crucial is global cooperation. The sample size is modest, and there are geographical limits. Larger and more diversified sample sizes should be the goal of future research.

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