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A Questionnaire - Based Analytical Survey on the Pattern and Use of Antibiotics among the Rural Maharashtra Population.

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ABSTRACT

The inappropriate use of antibiotics is a major public health issue, contributing to antimicrobial resistance (AMR). Understanding the knowledge, attitudes, and practices (KAP) related to antibiotic use is crucial for designing effective interventions. Our study aimed to assess the KAP regarding antibiotic use among the rural population of Maharashtra. A cross-sectional survey was conducted with 350 participants from rural localities in Maharashtra. A structured questionnaire assessed demographic information, knowledge about antibiotics and AMR, attitudes towards antibiotic use, and self-reported practices. The survey revealed that 80% of participants correctly identified antibiotics as effective against bacteria, but 20% incorrectly believed they could treat viral infections. While 82.9% were aware that misuse of antibiotics could lead to AMR, only 71.4% were familiar with the term "AMR." Trust in medical prescriptions was high (80%), yet 25.7% found self-medication acceptable. Practices showed 42.9% always completed their antibiotic course, 37.1% stored leftovers, and 8.6% shared antibiotics. Education level positively correlated with AMR awareness ($r = 0.35$, $p < 0.001$). Significant gaps in knowledge and risky practices were identified, indicating the need for targeted public health interventions to promote rational antibiotic use and combat AMR.

Keywords: Antibiotic Use, Antimicrobial Resistance, Public Health Interventions

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INTRODUCTION

The inappropriate use of antibiotics is a significant public health concern globally, contributing to the rise of antimicrobial resistance (AMR) [1]. This issue is particularly pressing in rural areas of developing countries like India, where over-the-counter access and self-medication practices are widespread [2]. Maharashtra, one of India's most populous and urbanized states, presents a critical case for studying these practices [3]. The rural population in Maharashtra, characterized by diverse socio-economic backgrounds and varying levels of healthcare accessibility, offers a unique perspective on antibiotic usage patterns [4, 5].

Our study aims to investigate the knowledge, attitudes, and practices (KAP) regarding antibiotic use among the rural population in Maharashtra through a comprehensive questionnaire-based survey. By understanding the factors that influence antibiotic consumption, including awareness of AMR, trust in medical professionals, and the tendency towards self-medication, this research seeks to identify gaps in public knowledge and potential areas for intervention [6]. The findings from our survey will provide valuable insights into the current state of antibiotic use in rural Maharashtra, highlighting the need for targeted public health campaigns and policy reforms to promote rational use of antibiotics [7].

METHODOLOGY

Our study employed a cross-sectional questionnaire-based survey methodology to assess the knowledge, attitudes, and practices (KAP) regarding antibiotic use among the rural population of Maharashtra. The survey was conducted over a period of three months, from Jan to March 2023. A structured questionnaire, developed and validated by experts in public health and infectious diseases, was used as the primary data collection tool. The questionnaire included sections on demographic information, awareness of antibiotics and antimicrobial resistance (AMR), attitudes towards antibiotic use, and self-reported practices regarding antibiotic consumption.

A sample size of 350 participants was targeted to ensure a representative analysis of the rural population. Participants were selected through stratified random sampling to cover various socio-economic backgrounds and different rural localities within Maharashtra. Inclusion criteria required participants to be residents of rural areas, aged 18 years and above, and capable of providing informed consent. Data collection was facilitated through both online and face-to-face interviews, ensuring accessibility for participants with varying levels of internet connectivity and technological proficiency. Informed consent was obtained from all participants prior to their inclusion in the study.

Data were analyzed using descriptive and inferential statistics to identify key trends and correlations. Descriptive statistics provided an overview of the demographic characteristics and KAP related to antibiotic use, while inferential statistics, including chi-square tests and logistic regression analysis, were used to explore associations between demographic factors and antibiotic-related behaviors. The results were then synthesized to draw conclusions and recommend targeted interventions aimed at improving antibiotic use practices among the rural population in Maharashtra.

RESULTS

Table 1: Demographic Characteristics of Participants (N = 350)

Characteristic	Frequency (n)	Percentage (%)
Age Group		
18-29 years	90	25.7
30-39 years	105	30.0
40-49 years	80	22.9
50 years and above	75	21.4
Gender		
Male	175	50.0
Female	175	50.0
Education Level		
No formal education	15	4.3

Primary education	35	10.0
Secondary education	100	28.6
Higher education	200	57.1
Income Level		
Low income (< ₹20,000)	100	28.6
Middle income	150	42.9
High income (> ₹50,000)	100	28.6

Table 2: Awareness and Knowledge of Antibiotics and AMR (N = 350)

Statement	Correct Response (n)	Correct Response (%)
Antibiotics are effective against bacteria	280	80.0
Antibiotics can cure viral infections	70	20.0
Misuse of antibiotics can lead to AMR	290	82.9
It is safe to stop taking antibiotics when symptoms improve	95	27.1
Awareness of the term "Antimicrobial Resistance"	250	71.4

Table 3: Attitudes Toward Antibiotic Use (N = 350)

Statement	Agree (n)	Agree (%)	Neutral (n)	Neutral (%)	Disagree (n)	Disagree (%)
I prefer to get antibiotics prescribed by a doctor	280	80.0	45	12.9	25	7.1
I believe antibiotics are overprescribed	200	57.1	100	28.6	50	14.3
Self-medication with antibiotics is acceptable	90	25.7	60	17.1	200	57.1

Table 4: Practices Regarding Antibiotic Use (N = 350)

Practice	Always (n)	Always (%)	Sometimes (n)	Sometimes (%)	Never (n)	Never (%)
Completing the full course of prescribed antibiotics	150	42.9	120	34.3	80	22.9
Consulting a doctor before taking antibiotics	220	62.9	90	25.7	40	11.4
Storing leftover antibiotics for future use	60	17.1	130	37.1	160	45.7
Sharing antibiotics with family or friends	30	8.6	50	14.3	270	77.1

Table 5: Correlation Between Demographic Factors and Antibiotic Practices

Demographic Factor	Practice	Correlation Coefficient (r)	P-value
Age	Completing the full course of antibiotics	0.15	0.03
Gender	Consulting a doctor before taking antibiotics	0.10	0.12
Education Level	Awareness of AMR	0.35	<0.001
Income Level	Storing leftover antibiotics for future use	-0.20	0.01
Income Level	Sharing antibiotics with family or friends	-0.25	<0.01

DISCUSSION

The results of our survey study provide valuable insights into the knowledge, attitudes, and practices regarding antibiotic use among the rural population of Maharashtra. The findings underscore

significant gaps and misconceptions, which are crucial for guiding public health interventions aimed at combating antimicrobial resistance (AMR) [8, 9].

Knowledge and Awareness

The survey revealed that while a majority of participants (80%) correctly identified that antibiotics are effective against bacteria, a substantial minority (20%) erroneously believed that antibiotics can cure viral infections. This misconception is concerning as it highlights a critical area where public education is needed. The high awareness (82.9%) of the link between misuse of antibiotics and AMR is encouraging, suggesting that public health messages on this issue are reaching a significant portion of the population. However, the fact that only 71.4% of respondents were familiar with the term "Antimicrobial Resistance" indicates room for improvement in public health communication [10, 11].

Attitudes Towards Antibiotic Use

The attitudes towards antibiotic use reflect a complex interplay of trust in healthcare providers and a propensity for self-medication. A significant proportion of respondents (80%) preferred to get antibiotics prescribed by a doctor, indicating a general trust in professional medical advice. However, a notable minority (25.7%) agreed that self-medication with antibiotics is acceptable. This finding is critical as self-medication is a known driver of inappropriate antibiotic use, contributing to the development of AMR.

Furthermore, the perception that antibiotics are overprescribed (57.1%) suggests a skepticism towards healthcare practices and highlights the need for better doctor-patient communication. This skepticism might contribute to self-medication practices and the storage of leftover antibiotics for future use, as noted in the practices section of the survey [12].

Practices Regarding Antibiotic Use

The practices reported by participants reveal behaviors that are likely to exacerbate the problem of AMR. While 62.9% of respondents always consulted a doctor before taking antibiotics, a concerning 37.1% stored leftover antibiotics for future use, and 8.6% admitted to sharing antibiotics with family or friends. These practices are problematic as they indicate a lack of understanding of the importance of completing prescribed antibiotic courses and the risks associated with inappropriate antibiotic use [13].

Completing the full course of prescribed antibiotics was adhered to by only 42.9% of respondents, with 34.3% sometimes and 22.9% never completing the course. This behavior significantly contributes to the development of resistant bacterial strains, as incomplete courses may not fully eradicate the infection, allowing resistant bacteria to survive and proliferate [14].

Correlation Between Demographic Factors and Antibiotic Practices

The analysis revealed interesting correlations between demographic factors and antibiotic practices. Age was positively correlated with completing the full course of antibiotics ($r = 0.15$, $p = 0.03$), suggesting that older individuals are more likely to adhere to prescribed treatments. This may be due to greater health awareness or experience with healthcare systems.

Gender did not show a significant correlation with consulting a doctor before taking antibiotics ($r = 0.10$, $p = 0.12$), indicating that both men and women have similar behaviors in this regard. However, education level was strongly correlated with awareness of AMR ($r = 0.35$, $p < 0.001$), highlighting the role of education in promoting understanding of complex health issues.

Income level showed a negative correlation with storing leftover antibiotics for future use ($r = -0.20$, $p = 0.01$) and sharing antibiotics with family or friends ($r = -0.25$, $p < 0.01$). This suggests that higher-income individuals are less likely to engage in these risky practices, possibly due to better access to healthcare and medications.

Implications for Public Health Interventions

The findings of this survey highlight several areas for targeted public health interventions. Firstly, there is a clear need for educational campaigns to address misconceptions about antibiotics, particularly the erroneous belief that they can cure viral infections. Such campaigns should emphasize the importance of completing prescribed antibiotic courses and the dangers of self-medication and sharing antibiotics.

Healthcare providers play a critical role in this effort. Strengthening doctor-patient communication can help address the skepticism regarding antibiotic prescriptions and encourage adherence to prescribed treatments. Doctors should also be vigilant in not overprescribing antibiotics and explaining to patients the reasons for their prescriptions or lack thereof.

Given the correlation between education level and awareness of AMR, incorporating information about antibiotics and AMR into school curricula could be an effective long-term strategy. This approach would ensure that future generations are better informed about the responsible use of antibiotics.

Finally, addressing the socio-economic disparities in antibiotic use practices is crucial. Public health campaigns and interventions should be tailored to reach lower-income populations who are more likely to store and share antibiotics. Improving access to affordable healthcare and medications can reduce the need for these risky practices.

The correlation between demographic factors and antibiotic practices reveals significant associations, with education level showing a strong positive correlation ($r = 0.35$, $p < 0.001$) with awareness of antimicrobial resistance (AMR). Income level inversely correlates with storing leftover antibiotics ($r = -0.20$, $p = 0.01$) and sharing antibiotics ($r = -0.25$, $p < 0.01$). These findings highlight the need for targeted public health interventions, emphasizing the importance of educational programs to enhance AMR awareness and promoting responsible antibiotic use across different income groups. Tailored strategies can address specific demographic disparities, improving overall antibiotic practices and mitigating AMR risks.

CONCLUSION

Our study provides a comprehensive overview of the current state of antibiotic knowledge, attitudes, and practices among the rural population of Maharashtra. The findings reveal significant gaps and misconceptions that need to be addressed through targeted public health interventions. By improving education, strengthening healthcare provider communication, and addressing socio-economic disparities, it is possible to promote the rational use of antibiotics and combat the growing threat of antimicrobial resistance.

REFERENCES

- [1] Rajendran A, Kulirankal KG, Rakesh PS, George S. Prevalence and Pattern of Antibiotic Self-Medication Practice in an Rural Population of Kerala, India: A Cross-sectional Study. *Indian J Community Med* 2019;44(Suppl 1): S42-S45
- [2] Bennadi D. Self-medication: A current challenge. *J Basic Clin Pharm* 2013; 5:19–23.
- [3] Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self-medication. *Drug Saf* 2001; 24:1027–37.
- [4] Li LJ, Wang PS. Self-medication with antibiotics: A possible cause of bacterial resistance. *Med Hypotheses* 2005; 65:1000–1.
- [5] Balamurugan E, Ganesh K. Prevalence and pattern of self-medication use in coastal regions of South India. *BJMP* 2011;4: a428.
- [6] Ahmad A, Patel I, Mohanta G, Balkrishnan R. Evaluation of self-medication practices in rural area of town Sahaswan at Northern India. *Ann Med Health Sci Res* 2014;4: S73–8.
- [7] Banerjee I, Bhadury T. Self-medication practice among undergraduate medical students in a tertiary care medical college, West Bengal. *J Postgrad Med* 2012; 58:127–31.
- [8] Kotwani A, Wattal C, Katewa S, Joshi PC, Holloway K. Factors influencing primary care physicians to prescribe antibiotics in Delhi India. *Fam Pract* 2010;27(6):684-90.



- [9] Laxminarayan R, Duse A, Watal C. Antibiotic resistance-the need for global solutions. *Lancet Infect Dis* 2013; 13:1057-98.
- [10] Song Y, Bian Y, Petzold M, Li L, Yin A. The impact of China's national essential medicine system on improving rational drug use in primary health care facilities: an empirical study in four provinces. *BMC Health Serv Res* 2014; 14:507.
- [11] Patil SS, Agarwal S. A questionnaire-based survey on use of antibiotics among the southwest Maharashtra population. *Indian J Pharm Pharmacol* 2019;6(4):132-6
- [12] Kakkar M, Walia K, Vong S, Chatterjee P, Sharma A. Antibiotic resistance and its containment in India. *BMJ* 2017; 358:2687.
- [13] Desai AJ, Gayathri GV, Mehta DS. Public's perception, knowledge, attitude and behavior on antibiotic resistance—a survey in Davangere City, India. *J Prev Med Holistic Health* 2016;2(1):17-23.
- [14] Finch RG, Metlay JP, Davey PG, Baker LJ. International Forum on Antibiotic Resistance colloquium. Educational interventions to improve antibiotic use in the community: report from the International Forum on Antibiotic Resistance (IFAR) colloquium, 2002. *Lancet Infect Dis* 2004; 4:44-53.