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Research Article

Public Attitudes Towards Antibiotic Consumption and Antimicrobial Resistance in Dakshina Kannada.

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Abstract

Antimicrobial resistance (AMR) poses a significant global health threat, primarily driven by the excessive and inappropriate use of antibiotics. This leads to ineffective treatments, prolonged illnesses, increased healthcare costs, and higher mortality rates. Understanding public attitudes towards antibiotic use is crucial for developing strategies to combat AMR, especially in regions with high antibiotic consumption. This research aims to evaluate the knowledge, attitudes, and practices related to antibiotic use and resistance among the general public in Dakshina Kannada, Karnataka, India. A cross-sectional descriptive study was conducted with 569 participants aged 18 and above, selected through stratified random sampling to represent various demographic segments. Data were collected using a structured questionnaire distributed both online and offline over one month. The study found that 75.6% of participants were aware of AMR, with healthcare professionals being the primary source of information (49.2%). Despite high awareness, 35.0% reported using antibiotics without prescriptions, and 28.1% admitted to stopping antibiotics prematurely. Additionally, 24.6% incorrectly believed that antibiotics could cure viral infections, although 72.0% recognized the consequences of improper antibiotic use.While there is a significant awareness of AMR in Dakshina Kannada, concerning behaviors regarding antibiotic misuse persist. Targeted educational initiatives are essential to promote responsible antibiotic use and mitigate the threat of AMR. Limitations of the study include potential biases from self-reported data and a sample size that may not fully represent the diverse population of the region. However, the findings highlight the need for region-specific strategies to address AMR effectively.

INTRODUCTION

Antimicrobial resistance (AMR) constitutes a significant global health menace that presents impediments to the efficacious management of infectious ailments on a worldwide scale [1]. The principal catalysts of AMR are the excessive utilization and inappropriate application of antibiotics, a phenomenon that results in the inefficacy of standard treatments, protracted illnesses, escalated healthcare expenditures, and augmented mortality rates [2]. In regions characterized by elevated antibiotic consumption, discerning public attitudes and behaviors towards antibiotics is imperative for formulating strategies to counteract AMR [3].

The prevalence of AMR exhibits noteworthy discrepancies among diverse regions [4]. Industrialized nations report relatively low AMR rates, typically ranging between 1-5% [5]. Conversely, developing countries grapple with substantially higher AMR prevalence, typically falling within the range of 10-50% [6]. India, commonly identified as the "AMR capital of the world," confronts a formidable challenge stemming from the inappropriate and excessive use of antimicrobial agents in both human and animal healthcare domains. The nation contends with a heightened prevalence of AMR, with reported rates of 30-40% in humans and 50-60% in animals [7,8].

Numerous factors underpin the heightened prevalence of AMR in India. The excessive and inappropriate use of antimicrobial agents in human and animal healthcare constitutes key drivers of AMR [9]. Within India, antibiotics are extensively employed for self-medication purposes and as growth stimulants in animal feed, culminating in the proliferation of resistant bacteria. Moreover, the dearth of adequate healthcare infrastructure, limited accessibility to diagnostic resources, and the widespread utilization of antimicrobial

agents devoid of proper medical prescription further accentuate the elevated prevalence of AMR [10].In response to the escalating apprehensions regarding AMR, the Indian government has devised a National Action Plan (NAP) for AMR. The NAP endeavors to curtail the misapplication and overuse of antimicrobial agents, enhance infection prevention and control protocols, and fortify surveillance and monitoring mechanisms for AMR. Additionally, the NAP underscores the significance of environmental monitoring and advocates for a multisectoral approach to tackle AMR [11].

Dakshina Kannada, a district situated in the Indian state of Karnataka, furnishes a distinctive case study for scrutinizing public perceptions concerning antibiotic consumption and AMR, owing to its heterogeneous populace and varying degrees of healthcare accessibility. The district's residents, encompassing well-educated urban dwellers and individuals from rural settings with limited healthcare provisions, exhibit divergent levels of awareness and attitudes towards antibiotic usage. This diversity underscores the necessity to explore the populace's comprehension of antibiotics and the repercussions for AMR within this locale [12].

The aim of this investigation was to evaluate the knowledge, attitudes, and practices associated with antibiotic utilization and resistance among the general public in Dakshina Kannada. The outcomes will contribute to local endeavors aimed at combating AMR and enrich the broader repository of knowledge indispensable for addressing this global health predicament. By pinpointing specific misconceptions and behaviors, targeted interventions can be devised to advocate for judicious antibiotic usage and safeguard the efficacy of these crucial medications for forthcoming generations.

METHODOLOGY

Study Design: This study adopts a cross-sectional descriptive design to explore public attitudes towards antibiotic consumption and antimicrobial resistance (AMR) in Dakshina Kannada.

Population: The target population consists of residents of Dakshina Kannada district.

Sample Size:A total of 569 participants will be included in the study.

Sampling Technique:A stratified random sampling method will be employed to ensure representation from various demographic segments, including different age groups, genders, educational backgrounds, and urban-rural settings within Dakshina Kannada.

- **Inclusion Criteria:** Individuals aged 18 years and above who are residents of Dakshina Kannada.
- **Exclusion Criteria:** Individuals working as doctors, pharmacists, or other medical professionals will be excluded from the study

Data Collection Methods

Questionnaire Development:

- **Sections:** The questionnaire will encompass sections on demographic information, antibiotic usage patterns, attitudes and beliefs about antibiotics and AMR, and sources of information regarding AMR.
- **Format:** A structured questionnaire consisting of multiple-choice questions, Likert scale items, and open-ended questions.
- **Validation:** Pre-testing of the questionnaire with a sample of individuals (approximately 10-15) to ensure clarity and relevance.

Distribution and Collection:

- **Mode:** Questionnaires will be distributed both online (via email or survey platforms) and offline (paper-based) in various public places such as

community centers, markets, educational institutions, and residential areas.

- **Duration:** Data collection will be conducted over one month to allow sufficient time for responses and ensure a diverse representation of the population.

RESULTS

Table 1 provides a comprehensive demographic overview of the survey participants from Dakshina Kannada. It shows that the sample includes a slightly higher proportion of females (52.5%) compared to males (47.5%). Age distribution indicates that the largest group of respondents falls within the 30-49 years age range (40.4%), followed by the 18-29 years group (31.6%), and those aged 50 and above (27.9%). Regarding education levels, the majority have higher education (40.2%), with secondary education being the next most common (35.2%), followed by primary education (17.6%), and a small percentage with no formal education (7.0%). Finally, the table illustrates that a majority of the participants reside in urban areas (59.7%), while the rest are from rural settings (40.3%)

Table 1: Demographic Data of Survey Participants in Dakshina Kannada.

Question Number	Question	Response Options	Number of Respondents (n)	Percentage (%)
1	What is your gender?	Male	270	47.5
		Female	299	52.5
2	What is your age group?	18-29 years	180	31.6
		30-49 years	230	40.4
		50+ years	159	27.9
3	What is your highest level of education?	No formal education	40	7.0
		Primary education	100	17.6
		Secondary education	200	35.2
		Higher education	229	40.2
4	Where do you live?	Urban	340	59.7

		Rural	229	40.3

Table 2 provides a comprehensive insight into the knowledge, attitudes, and practices (KAP) regarding antibiotic consumption and antimicrobial resistance among residents of Dakshina Kannada. The data reveals a significant level of awareness, with 75.6% of participants acknowledging antibiotic resistance, predominantly receiving information from healthcare professionals (49.2%). However, concerning trends emerge, with 35.0% admitting to antibiotic misuse without prescriptions, and 28.1% expressing willingness to prematurely discontinue treatment. Additionally, while 72.0% recognize the consequences of improper antibiotic use on resistance, there's a notable 24.6% who erroneously believe antibiotics can cure viral infections. These findings underscore the urgent need for targeted education campaigns to instill responsible antibiotic practices and mitigate the growing threat of antimicrobial resistance in the region.

Moreover, the data underscores the necessity for concerted efforts to address misconceptions and promote judicious antibiotic use. The significant proportion (63.1%) understanding the inefficacy of antibiotics against viral infections highlights a foundation for education. However, the concerning prevalence of self-medication (35.0%) and the acceptance of premature discontinuation of treatment (28.1%) warrant immediate attention. These findings emphasize the critical role of healthcare professionals in educating the public and advocating for responsible antibiotic practices. By fostering a collective understanding of the implications of antimicrobial resistance, targeted interventions can be devised to safeguard the efficacy of antibiotics and combat the global health threat posed by AMR.

Table 2: Knowledge, Attitudes, and Practices (KAP) Regarding Antibiotic Consumption and Antimicrobial Resistance

Question Number	Question	Response Options	Number of Respondents (n)	Percentage (%)
5	Have you heard about antibiotic resistance?	Yes	430	75.6
		No	139	24.4
6	From where did you first hear about antibiotic resistance?	Doctors/Healthcare professionals	280	49.2
		Internet	120	21.1
		Friends/Family	100	17.6
		Media (TV, newspapers, etc.)	69	12.1
7	Can antibiotics cure viral infections like the common cold or flu?	Yes	140	24.6
		No	359	63.1
		Not sure	70	12.3
8	Do you think antibiotic resistance is a serious issue?	Yes	398	70.0
		No	45	7.9
		Not sure	126	22.1
9	Do you complete the full course of antibiotics as prescribed by a doctor?	Always	200	35.2
		Sometimes	259	45.5
		Never	110	19.3
10	Have you ever used antibiotics without a prescription?	Yes	199	35.0
		No	370	65.0
11	Do you think it's acceptable to stop taking antibiotics once you feel better, even if the course is not complete?	Yes	160	28.1
		No	340	59.7
		Not sure	69	12.1
12	Do you believe that improper use of antibiotics can lead to resistance?	Yes	410	72.0
		No	30	5.3
		Not sure	129	22.7
13	How often do you use antibiotics?	Frequently	100	17.6

		Occasionally	200	35.2
		Rarely	159	27.9
		Never	110	19.3
14	Where do you usually get your information about antibiotics?	Doctors/Healthcare professionals	310	54.5
		Internet	120	21.1
		Friends/Family	90	15.8
		Media (TV, newspapers, etc.)	49	8.6
15	Have you ever requested antibiotics from a doctor even when they said it was unnecessary?	Yes	150	26.4
		No	419	73.6
16	Do you think antibiotics should be available over-the-counter without a prescription?	Yes	120	21.1
		No	379	66.6
		Not sure	70	12.3
17	Are you aware of any public health campaigns or initiatives addressing antibiotic resistance?	Yes	210	36.9
		No	359	63.1
18	Do you think the government should implement stricter regulations on antibiotic sales and usage?	Yes	398	70.0
		No	80	14.0
		Not sure	91	16.0
19	Would you support the implementation of educational programs about antibiotic resistance in schools and communities?	Yes	429	75.4
		No	50	8.8
		Not sure	90	15.8
20	How concerned are you about the impact of antibiotic resistance on future healthcare?	Very concerned	270	47.5

		Somewhat concerned	200	35.2
		Not concerned	50	8.8
		Not sure	49	8.5

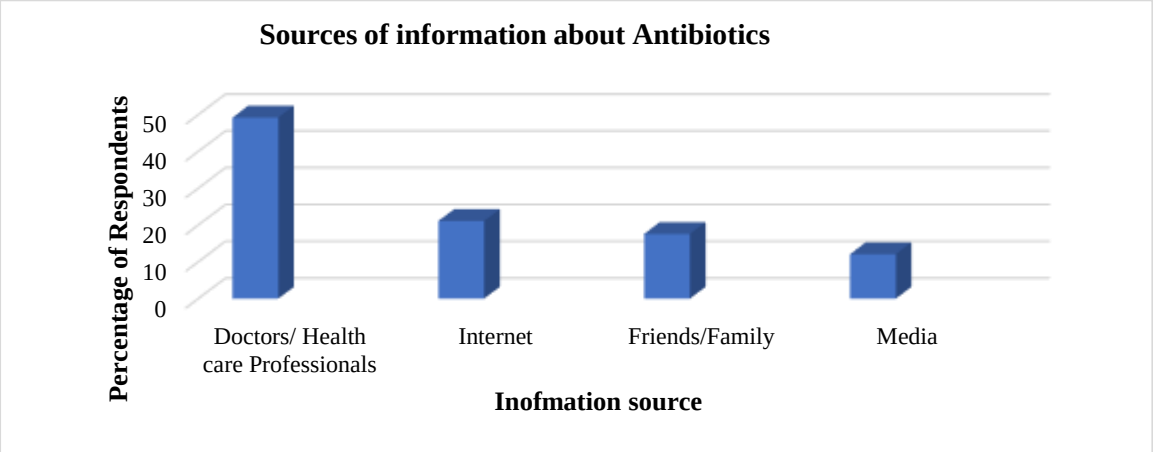

Fig. 1: Sources of Information regarding Antibiotics.

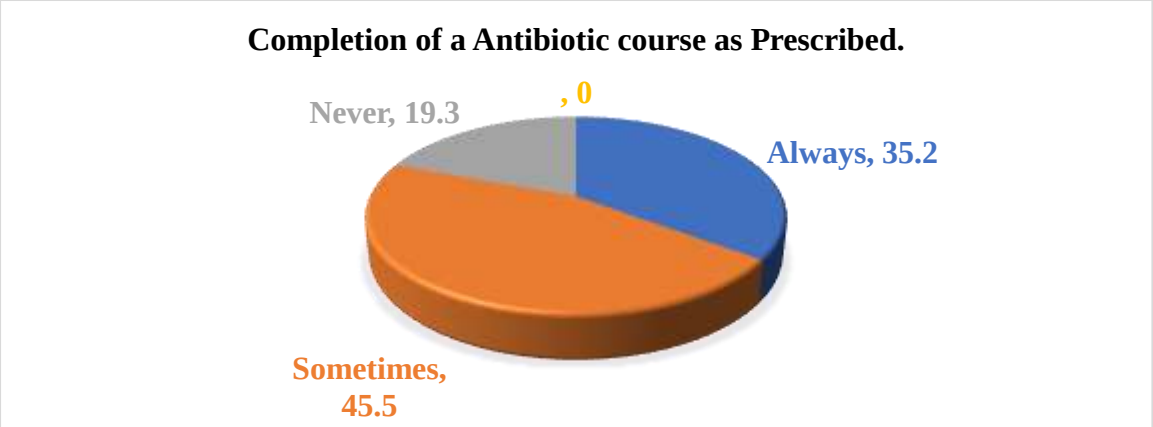

Fig.2: Sources of Information regarding Antibiotics.

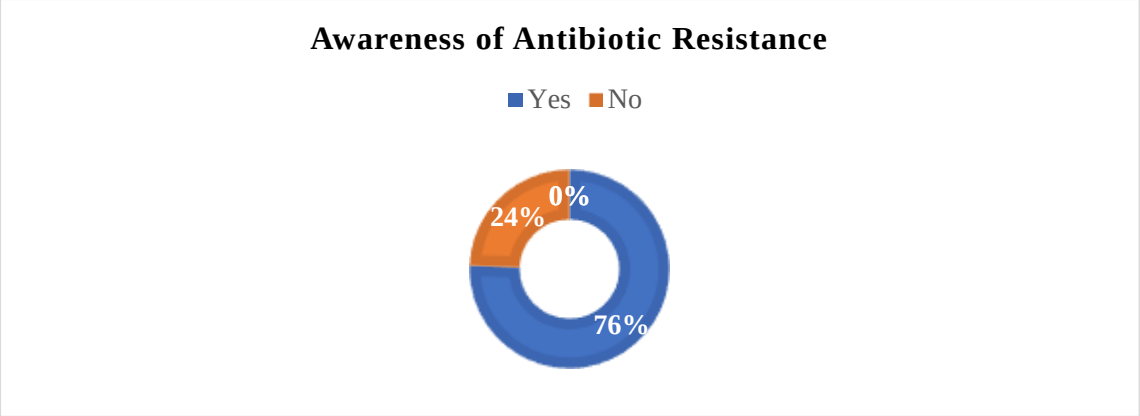

Fig. 3: Awareness of Antibiotic Resistance

DISCUSSION

The findings from Dakshina Kannada offer valuable insights into using antibiotics and antimicrobial resistance (AMR). They indicate a high level of awareness regarding antibiotic resistance (75.6%) and a substantial dependence on healthcare professionals for information (49.2%). Nevertheless, concerning behaviors, such as the 35.0% of individuals using antibiotics without a prescription and 28.1% prematurely discontinuing antibiotic treatments, underscore the necessity for improved educational initiatives and intervention programs to tackle these issues. Recognizing the significance of appropriate antibiotic usage is essential in mitigating the escalating threat of AMR.

In Dakshina Kannada, India, similar to the study by Tembo et al. (2022) in Zambia [13], there is widespread awareness about antibiotic resistance, indicating a shared concern for this global health issue among participants. However, both studies also highlight concerning trends regarding antibiotic misuse, with a notable proportion admitting to using antibiotics without prescriptions. Additionally, there is a recognition of the adverse consequences of improper antibiotic use on resistance, echoing findings from both studies. While pharmacy personnel in Zambia demonstrated superior knowledge and attitudes toward AMR compared to nurses,

no such distinction was observed among participants in Dakshina Kannada.

Similarly, the study by Cheoun et al. (2021) in Nepal [14], underscored the gap between theoretical and practical knowledge among healthcare professionals (HCPs), a finding consistent with the results from Dakshina Kannada. Both studies emphasize the importance of tailored educational interventions to bridge this gap and enhance attitudes and practices toward AMR among HCPs.

Balliram et al. (2021) in South Africa [15] found significant differences in knowledge scores among doctors, pharmacists, and nurses, with doctors having the highest scores. This contrasts with the results from Dakshina Kannada, where no such distinction was observed among participants. However, both studies highlight the gaps in understanding and confidence in prescribing practices among healthcare professionals, emphasizing the need for increased education and training.

Allabi et al. (2023)in Benin [16],revealed a limited understanding of antibiotic therapy definitions among pharmacy staff similar to the concerns raised in Dakshina Kannada regarding antibiotic misuse and dispensing without prescriptions. Both studies stress the urgent need for educational interventions targeting pharmacy staff and regulatory measures to promote prudent antibiotic use.

Vijay et al. (2021) in India [17], Highlighted the knowledge, attitude, and practices (KAP) regarding antibiotic use and the emergence of AMR among veterinarians. While the focus differs from the other studies, the findings underscore the importance of addressing gaps in KAP among healthcare professionals to combat the rising threat of AMR, aligning with the overarching theme observed in Dakshina Kannada.

These findings underscore the necessity for region-specific approaches to improve public understanding and behaviors concerning antibiotic usage, thereby

addressing the global health menace posed by antimicrobial resistance.

STRENGTH AND LIMITATIONS

Strengths of the study include its comprehensive exploration of antibiotic usage behaviors and AMR awareness, facilitated by a validated questionnaire and a diverse participant sample. However, limitations include potential biases from self-reported data, the exclusion of healthcare professionals, and the cross-sectional nature of the study, which limits causal inference. Despite these limitations, the findings underscore the urgency of region-specific strategies to address antibiotic misuse and enhance AMR awareness in Dakshina Kannada.

CONCLUSION

The study in Dakshina Kannada reveals high awareness of antimicrobial resistance (75.6%) and a significant reliance on healthcare professionals for information (49.2%), yet concerning behaviors persist, such as antibiotic use without prescriptions (35.0%) and premature discontinuation of treatments (28.1%). These findings, which mirror and diverge from global trends, highlight the need for targeted educational initiatives to promote responsible antibiotic use. Limitations include potential biases due to self-reported data and a sample size that may not fully represent the diverse population of Dakshina Kannada. Nonetheless, the study underscores the critical need for region-specific strategies to combat the escalating threat of AMR.

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