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Knowledge of Anti-microbial resistance among dental professionals in Chennai city- A cross-sectional study

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Abstract

This study aims to assess the knowledge of Anti-microbial resistance among dental professionals in Chennai city. A cross-sectional study was conducted among 120 dental professionals in Chennai city based on stratified random sampling method. A questionnaire consists of 10 items were distributed to the participants which includes demographic variables, use of antibiotics, cause of AMR, etc. The collected data was tabulated and analyzed using Chi-square test. The years of clinical practice had a significant association with knowledge on antibiotics for Methicillin-resistant Staphylococcus Aureus (P=0.001) and antibiotic capable of crossing blood brain barrier (P=0.003). The government should conduct programs regarding Anti-microbial resistance to upgrade the knowledge of dentists for the maximum beneficiaries of people.

Keywords: Knowledge, Dentists, Anti-microbial resistance, Antibiotics, Drugs.

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1. Introduction

Antimicrobial resistance (AMR) arises due to the irrational and inappropriate use of antibiotics, posing a significant global public health threat with extensive economic, social, and political implications [1,2]. Originally susceptible microbes now display resistance patterns, rendering standard treatments ineffective and leading to prolonged illnesses, increased healthcare costs, elevated risks of complications, and potentially fatal outcomes [1]. The progression of AMR is driven by various factors in both developed and developing countries. These factors include the over-prescription of antimicrobials, incorrect selection of antibiotics, improper dosing and treatment durations, limited access to timely diagnostic tools, the influence of pharmaceutical marketing, inadequate public awareness, the availability of antibiotics without prescriptions, self-medication practices, and the improper utilization of leftover antibiotics [2,3,4,5]. Additionally, insufficient infection control measures contribute to the dissemination of resistant organisms within healthcare facilities and communities, exacerbating the crisis [6]. Furthermore, the misuse and overuse of antibiotics contribute significantly to the growing threat of antimicrobial resistance, posing a serious global health concern [7]. This issue not only leads to ineffective treatment of bacterial infections but also increases healthcare costs and burdens healthcare systems [8]. Addressing the problem of antibiotic resistance requires coordinated efforts, including public awareness campaigns, education of healthcare professionals, and prudent antibiotic prescribing practices [7,9,10]. Failure to take decisive action may lead to a future where common infections become untreatable, undermining decades of medical progress [9]. Additionally, exploring the reasons behind the tendency to prescribe antibiotics excessively and for extended durations among Jordanian dentists is essential for devising effective strategies to mitigate inappropriate antibiotic use [11,12,13]. Factors such as clinical guidelines adherence, patient expectations, and perceived efficacy of antibiotics in managing dental conditions may influence prescribing behaviors and warrant investigation. By gaining insights into these factors, healthcare policymakers and dental associations in Jordan can implement tailored educational initiatives and interventions to promote rational antibiotic prescribing practices among dentists, ultimately contributing to the global efforts in

combating antibiotic resistance [12,13,14,15,16]. Furthermore, fostering interdisciplinary collaborations between dentists, infectious disease specialists, and antimicrobial stewardship programs can facilitate ongoing monitoring and improvement of antibiotic prescribing practices in dental settings, thereby safeguarding the effectiveness of these crucial medications for future generations.

2. Materials and Methods

A cross-sectional study was conducted among dental practitioners in Chennai city regarding their knowledge on antimicrobial resistance. The sample size was estimated to be 70 by setting confidence interval 95% and margin of error being 5%. The ethical approval for this study was obtained from the Institutional ethical committee Department of Public Health Dentistry, Sree Balaji Dental College & Hospital. The inclusion criteria of this study are those who are willing to participate and fulfil the consent form were included. The exclusion criteria are those who didn't fulfil the questionnaire and non-clinical practitioners were excluded. A total number of 120 dental practitioners were recruited from various regions of Chennai city based on Stratified random sampling method. A prevalidated questionnaire consists of demographic variables, causes of AMR, appropriate use and knowledge were distributed to all the participants. The collected data was tabulated and analyzed using Chi-square test.

3. Results

Table 1 depicts that gender had significantly associated with knowledge on inappropriate prescription of antibiotics (P=0.005), use of antibiotics on viral infection (P=0.001) and antibiotic activity against anaerobes (P=0.02). Table 2 depicts years of clinical practice had a significant association with knowledge on antibiotics for Methicillin-resistant Staphylococcus Aureus (P=0.001) and antibiotic capable of crossing blood brain barrier (P=0.003).

4. Discussion

Implementing antimicrobial stewardship (AMS) strategies in outpatient dental practices is crucial for addressing antibiotic resistance, a significant global public health challenge associated with heightened patient morbidity, mortality, and financial burden. Dental antibiotic prescribing alone accounts for approximately 10% of all antibiotic prescriptions, with an alarming estimated 80% of these prescriptions being deemed inappropriate. The current study focused on assessing the knowledge on antimicrobial resistance (AMR) among dental professionals in various regions of Chennai city. Out of 120 participants, 44% of dentists reported extensive use of AMR causes a major issue to patients; only 9.1% dentists stated that knowledge on AMR was most helpful in clinical practice; only 5% of dentists reported that antibiotics are inappropriately prescribed in India; 25.8% individuals reports that AMR is a major global issues; 65.8% dentists stated that both overuse and incomplete course of antibiotics are the major cause of AMR; 65% of dental professionals stated that antibiotics should not be prescribed during viral infections. In a notable revelation, 17.69% of the respondents surveyed held the belief that prescribing antibiotics does not inflict harm upon patients, even when they are unnecessary. Additionally, 39.7% of clinicians were unable to correctly identify antibiotics capable of crossing the blood–brain barrier, while a striking 41.8% of respondents from various centers inaccurately estimated the incidence of Pseudomonas aeruginosa resistance to ciprofloxacin in their respective hospitals (Figure 1). These findings parallel those reported in a study conducted in Peru [17]. In the present research, almost 78.3% dentists responded Amoxicillin can be prescribed safely during pregnancy; 75% of dentists stated that metronidazole has best activity against anaerobes; 72.5% people responded vancomycin was effective for methicillin- resistant staphylococcus aureus; 63.3% dentists reported that ceftriaxone has the capable of crossing blood brain barrier. The study done by Chatterjee et al in 2021 [18], reported almost half of the clinicians surveyed, totaling 47.52%, acknowledged that their choice of antibiotics was influenced more by availability than by appropriateness.

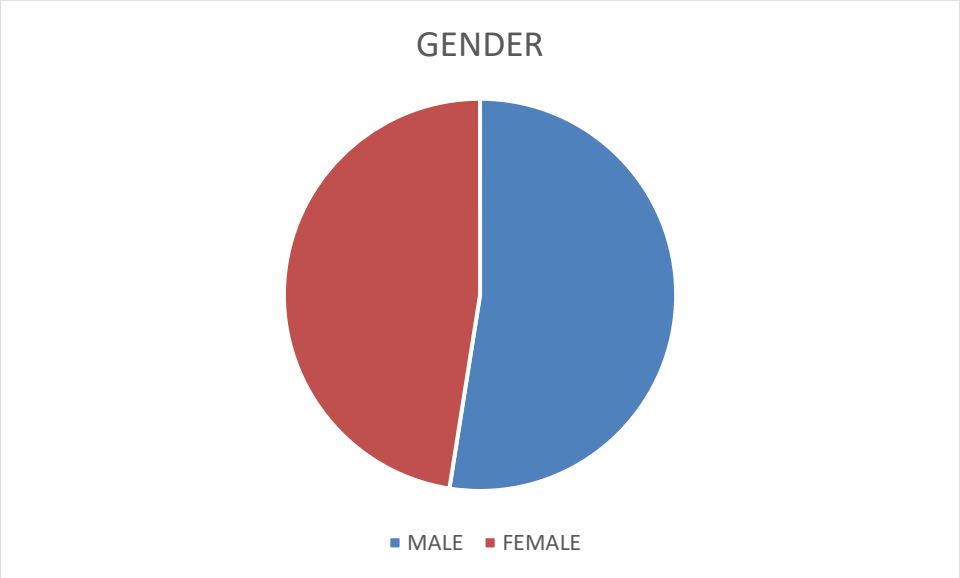

Figure 1: Percentage-wise distribution of gender

Table 1: Association between gender and knowledge on Anti-microbial resistance

QUESTIONNAIRE	VARIBLES	PERCENTAGE	P VALUE
Extent use of AMR is a major problem?	Yes	44%	0.7
	No	34%	
	Not sure	21.6%	
Do you think knowledge about AMR will be helpful in clinical practice?	Yes	9.1%	0.14
	No	43.3%	
	Not sure	47.5%	
Antibiotics are inappropriately prescribed in India?	Yes	5%	0.005*
	No	31.6%	
	Not sure	63.3%	
AMR is a global problem?	Yes	25.8%	0.86
	No	62.5%	
	Not sure	11.6%	
Perceived causes of AMR?	Overuse of antibiotics	22.5%	0.6
	Incorrect course completion	11.6%	
	Both	65.8%	
Do you think antibiotics should be taken during viral infection?	Yes	17.5%	0.001*
	No	65%	
	Not sure	17.5%	
Which antibiotics can be considered safe during pregnancy?	Amoxicillin	78.3%	0.43
	Ciprofloxacin	10.8%	
	Doxycyclin	6.6%	
	Gentamycin	4.1%	
Which antibiotics has best activity against anaerobes?	Ciprofloxacin	7.5%	0.02*
	Cotrimoxazole	15%	
	Metronidazole	75%	
	None of these	2.5%	
Choice of drug for Methicillin-resistant Staphylococcus Aureus?	Cefuroxime	9.1%	0.1
	Ceftriaxone	8.3%	
	Vancomycin	72.5%	
	None of these	10%	
Which antibiotic has capable of crossing blood brain barrier?	Cefuroxime	10%	0.2
	Ceftriaxone	63.3%	
	Vancomycin	11.6%	
	None of these	15%	

Figure 2: Percentage-wise distribution of Years of clinical practice

Table 2: Association between years of clinical practice and knowledge on Anti-microbial resistance

QUESTIONNAIRE	P Value
Extent use of AMR is a major problem?	0.2
Do you think knowledge about AMR will be helpful in clinical practice?	0.6
Antibiotics are inappropriately prescribed in India?	0.3
AMR is a global problem?	0.8
Perceived causes of AMR?	0.4
Do you think antibiotics should be taken during viral infection?	0.9
Which antibiotics can be considered safe during pregnancy?	0.6
Which antibiotics has best activity against anaerobes?	0.1
Choice of drug for Methicillin-resistant Staphylococcus Aureus?	0.001*
Which antibiotic has capable of crossing blood brain barrier?	0.003*

The current study also stated that gender had significantly associated with knowledge on inappropriate prescription of antibiotics (P=0.005), use of antibiotics on viral infection (P=0.001)and antibiotic activity against anaerobes (P=0.02). The years of clinical practice had a significant association with knowledge on antibiotics for Methicillin-resistant Staphylococcus Aureus (P=0.001) and antibiotic capable of crossing blood brain barrier (P=0.003) (Figure 2).

5. Conclusions

Certainly, your study highlights important findings regarding the prescribing attitudes of physicians in India regarding antimicrobials and antimicrobial resistance (AMR). The identified discrepancies in prescribing attitudes despite existing background knowledge underscore the need for interventions such as regular Continuing Medical Education (CME) programs, the development of institutional antibiotic policies, and the involvement of various healthcare professionals like infectious disease consultants, hospital infection control nurses, and pharmacists in implementing Antimicrobial Stewardship Programs (ASPs). Implementing antibiotic prescribing guidelines at the institutional level and introducing measures like restrictions are crucial steps in addressing the knowledge-attitude dissonance observed in your survey. These interventions not only enhance understanding of the scope of the problem but also contribute to more rational and effective use of antimicrobials, thereby mitigating the challenges posed by antimicrobial resistance.

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