

Assessment of Dental Professional Attitudes Regarding Antimicrobial Usage and Resistance Awareness

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ABSTRACT

This study aimed to assess dentists' attitudes towards, and awareness of, antimicrobial usage and antimicrobial resistance, in order to promote rational usage of antimicrobials in the future. This was a cross-sectional questionnaire survey. The questionnaire contained closed-ended and open-ended questions, which covered antimicrobial resistance, and was distributed to dentists in Mahidol Dental Hospital. The data were collected, tabulated and statistically analyzed. Content analysis was applied for open-ended questions. The results were categorized in terms of answer frequency, which allowed assessment of a subject's comprehension of the theme of the study. The majority of the participants were aged 25-30 years old (78.9%) with 0-5 years work experience (69.2%). Most participants in the present survey were oral and maxillofacial surgery specialists (88.9%) and the data of different participants'

attitudes towards antimicrobial resistance and recommendations for solutions to combat this growing problem were presented. Our study provides an important insight in to the attitudes towards and awareness of antimicrobial resistance among dentists in the dental hospital. The majority of the participants viewed antimicrobial resistance as a preventable public problem, if appropriate strategies were to be designed. Nonetheless, most of them held some misconceptions regarding antimicrobial resistance, and their knowledge and attitudes significantly varied across their field of study. Thus, improving knowledge, consequences and strategies to control antimicrobial resistance might be an approach to better dentists' attitudes and to rationalize their use of antimicrobials in the hospital.

Keywords: Dental professional, Attitudes, Antimicrobial resistance

THJPH 2020; 50(2): 176-183

Received: May 24, 2020; Revised: June 25, 2020; Accepted: July 13, 2020

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Introduction

The World Health Organization (WHO) defines antimicrobial resistance as a biological phenomenon that develops when microorganisms (bacteria, fungi, viruses or parasites) change when they are exposed to antimicrobials. This change renders the microorganism resistant, which means that they can survive previously lethal antimicrobials¹. Antimicrobial resistance occurs as a result of various factors including: lack of effective antimicrobials to treat infectious diseases, inappropriate use of antimicrobials in humans and animals, and improper control of infections. The overuse, misuse, or inappropriate use of antimicrobials are major contributing factors to the emergence of antimicrobial resistance. This not only leads to failure of therapy, but also results in increased morbidity and mortality, and a rise in healthcare costs².

A few studies³⁻⁵ suggest that inadequate or incorrect attitudes of healthcare professionals regarding the use of antimicrobials can be the drivers of irrational use of antimicrobials and this attitude might be promoting the emergence of antimicrobial resistance.

In particular, dentists belong to one of the healthcare professions that may have a key role in rationalizing the use of antimicrobials and reducing the emergence of resistance. In one review, over one hundred articles were retrieved; it found that 10% of antibiotics are

being prescribed by dentists. The authors of the review evaluated the therapeutic and prophylactic antibiotic prescribing practices of dentists, with a focus on indications of antibiotics, type of antibiotic prescribed, and the duration of prescription⁶. However, there was a lack of research on the attitudes of dentists towards the prescription of antimicrobials and their resistance awareness.

Many studies have suggested that bettering attitudes, via the creation of antimicrobial resistance awareness for healthcare professionals, could be an effective and encouraging approach to promoting rational prescribing behavior in future practitioners⁷. Thus, this study aimed to assess dentists' attitudes and practices related to antimicrobial usage and antimicrobial resistance, as a step towards promoting the rational usage of antimicrobials in the future.

Materials and Methods

This study was a cross-sectional survey, which was conducted from December 2018 to January 2019. The Faculty of Dentistry/ Faculty of Pharmacy, Mahidol University Institutional Review Board, issued the study proposal with a certificate of exemption (COE. No. MU-DT/PY-IRB 2018/050.0211). The participants were dentists at Mahidol Dental Hospital, who voluntarily participated in the study.

A self-administered online questionnaire about antimicrobial usage and antimicrobial resistance was developed and reviewed by an expert panel consisting of two independent antimicrobial experts and was prepared in English. It contained 10 closed-ended questions, for example, “do you usually ask the patient whether they have an allergy before prescription or treatment?”, and open-ended questions, such as, “what action might be taken to combat antimicrobial resistance?”. The questionnaire was distributed to all 161 dentists who were working in Mahidol Dental Hospital (Human Resource Department, 2016).

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The data were collected and tabulated, and statistically analyzed (IBM SPSS version 22, USA). Content analysis was applied to categorize answers to open-ended questions. The answers were read through to become familiar with them, then the results were categorized in terms of answer frequency. Following this, a summary was made in a frequency table, which allowed assessment of the subject’s comprehension of the theme of the study.

Results

A total of 104 (65.0%) dentists responded to this survey. Most of the participants were aged between 25-30 years (78.9%) and had

0-5 years work experience (69.2%). Many respondents (46.2%) were oral and maxillofacial surgery specialists (Table 1).

For closed-ended questions that addressed antimicrobial resistance, all participants agreed that dentists should adhere to the guidelines relating to antimicrobial usage for prescription and should ask patients about the presence of allergies before prescribing antimicrobials. More than 96.2% of participants agreed that a global system for tracking antimicrobial resistance was needed. Together with antimicrobial usage, asking the patient about past dental/medical history or any patient-related disease before prescription was needed. Moreover, in this study, participants agreed that self-medication with antimicrobials by patients may be responsible for antimicrobial resistance.

Thirty point eight percent of participants agreed that the spread of an infection would occur, if dentists did not prescribe antimicrobials. Twenty five percent agreed that overdose of antimicrobials cannot lead to resistance. Some participants specifically stated that antimicrobials were not absolutely necessary, but 15.4% noted that dentists gave antimicrobials because of pressure from patients (Table 2).

Table 1 Characteristics of 104 dentists

Characteristics	n	%
Age (years)		
25-30	82	78.9
>30	22	21.1
Years of working experience (years)		
0-5	72	69.2
6-10	18	17.3
11-15	8	7.7
>15	6	5.8
Area of specialization		
General Dentistry	26	25.0
Prosthodontics	4	3.8
Periodontics	4	3.8
Endodontic	14	13.5
Operative Dentistry	2	1.9
Orthodontics	2	1.9
Pediatric Dentistry	2	1.9
Oral and Maxillofacial Surgery	48	46.2
Oral and Maxillofacial Pathology	2	1.9

Table 2 Number and percentage of agreement with each item measuring attitudes towards antimicrobial resistance among 104 dentists

Item measuring attitudes towards antimicrobial resistance	Agree	
	n	%
• Usually asking the patient about having allergy before prescription or treatment	104	100.0
• Usually asking the patient about having any related disease before prescription	102	98.1
• Prescribing the same antimicrobials to a patient suffering recurrent oral infection	24	23.1
• Refer to the guidelines for antimicrobial prescription	104	100.0
• Over prescribing antimicrobials can lead to resistance	78	75.0
• The spread of an infection just because you have not prescribed antimicrobials	32	30.8
• Antimicrobial prescription should depend upon patients' preferences	16	15.4
• It is necessary to take past dental/medical history of consumption of antimicrobials before prescribing antimicrobials	98	94.2
• Self-medication with antimicrobials by patients to treat dental problems may be responsible for antimicrobial resistance	102	98.1
• A global system for tracking antimicrobial resistance is needed	100	96.2

Lastly, the participants were asked open ended questions to recommend a solution to combat the growing problem of antimicrobial resistance. Some of their replies are presented in Table 3. The most common suggestion to combat antimicrobial resistance was to prescribe antimicrobials based on rational

antimicrobial usage guidelines (67.3%), while some participants chose to prescribe antimicrobials based on the severity of a patient's symptoms or following laboratory culture (9.6%). Other suggestions were based on patient compliance (9.6%) and dentists' knowledge of antimicrobial usage (3.9%) (Table 3).

Table 3 Opinions on combatting antimicrobial resistance of 104 dentists

Opinions on combatting antimicrobials resistance	n	%
Rational antimicrobial usage guidelines	70	67.3
Rational drug use		
Using essential and appropriate antibiotics as first- or second-choice empiric treatment options		
Antibiotic smart use		
Lab (Culture sensitivity)	10	9.6
Knowledge of the dentist	4	3.9
Other (e.g. patient compliance)	10	9.6
No comment	10	9.6

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Discussion

It is well known that widespread and inappropriate usage of antimicrobials is rated as the most potential contributing factor in the development of antimicrobial resistance, which is a crucial concern for dentists. This study found that some dentists had experience that was directly related to antimicrobial prescription and antimicrobial resistance.

With regards to participants' attitudes, the results indicated that participants were

well informed about the effect of the frequent use of antimicrobials, the cause of antimicrobial resistance and the consequences of inappropriate utilization of antimicrobials⁸. Nevertheless, according to some studies, there is misconception about antimicrobial resistance^{9,10}. For instance, participants agreed that overdose of antimicrobials cannot lead to resistance, and taking the past medical history or the current disease status of a patient is unnecessary before prescribing.

Moreover, in current dental practice, some participants still prescribed antimicrobials based on patients' preferences.

In other findings from the open question, participants suggested methods of combatting antimicrobial resistance. Interestingly, the vast majority of the dentists mentioned following the updated prescription guidelines of rational drug use. Recently, several dental treatment guidelines have been published. There is a possibility that the dentists might have had updated knowledge on rational antimicrobial use together with antimicrobial prescribing guidelines¹¹. The overall results indicate that providing dentists with updated antimicrobial guidelines and improving their knowledge might be approaches to encourage an appropriate attitude towards antimicrobial resistance.

Additionally, participants responded that the culture sensitivity test might be taken to combat antimicrobial resistance. In general, it is not common practice to see culture samples from dental treatment because it usually takes several days to weeks to cultivate and do a susceptibility test¹². However, some studies^{12,13} supported the use of microbiological cultures and antimicrobial susceptibility tests in response to dental infections would be ideal if it could always be undertaken before the prescription of antimicrobials. Thus, culture sensitivity testing prior to using antimicrobials might be a means of combating

antimicrobial resistance.

This study found that most participants were dental professionals with 0-5 years of experience (69.2%) and aged between 25 and 30 years old (78.9%). Since the majority of participants were young and had fewer years of experience, many had a positive attitude and resistance awareness. Dentists' attitudes and resistance awareness may have depended on the numbers of years of experience and age. So, in a future study, studies should be conducted in many groups of dental professionals.

There were some limitations in this study. Even though this work concentrated on a potential target hospital and dentistry group who play important roles in the prevention of antimicrobial resistance, the sufficiency of the sample size was not completely addressed. So, generalization to other hospitals and dentistry groups might be fairly limited. Another limitation was related to the design of the questionnaires. Although the questions regarding knowledge and attitude allowed the respondents to state their true thoughts without any investigator influence, there is a possibility that respondents gave socially acceptable answers.

Conclusion

This study provides an important insight regarding the attitudes towards and awareness

of antimicrobial resistance among dentists in a dental hospital. The majority of the participants viewed antimicrobial resistance as a preventable public problem, if appropriate strategies were to be designed. Nonetheless, most of them held some misconceptions regarding antimicrobial resistance, and their knowledge and attitude significantly varied across their field of study. Thus, improving knowledge, consequences and strategies to control antimicrobial resistance might be an approach to better dentists' attitudes and to rationalize their use of antimicrobials in the hospital.

Author Contributions

PR and SC devised the project, the main conceptual ideas, proofed the outline and directed the project. PR designed the intervention tools and knowledge questionnaire. NN, KM, SJ, KN and SN conducted the study under the supervision of PR and SC. NN, KM and SJ contributed to the interpretation of the results and the initial statistical analysis of data, following advice from PR and SC. PR re-analyzed the data and took the lead in writing the manuscript. All authors discussed the results and commented on the manuscript prior to submission for publication.

Acknowledgements

The authors would like to thank all staff who participated in this study.

Source of Funding

The authors did not receive funding to carry out the work presented in this article.

Conflicts of Interest

The authors declare they have no conflict of interests regarding the publication of this paper.

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