

Knowledge and attitude of patients indicated extraction or impacted third molar  
surgery toward antibiotic use



A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Science in Oral and Maxillofacial Surgery

Department of Oral and Maxillofacial Surgery

FACULTY OF DENTISTRY

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ความรู้และทัศนคติของผู้ป่วยที่มีข้อบ่งชี้ในการถอนฟันหรือการผ่าฟันคุดต่อการใช้ยาปฏิชีวนะ



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ในประเทศไทย ประชาชนยังขาดความรู้เกี่ยวกับการใช้ยาปฏิชีวนะ และยาปฏิชีวนะสามารถเข้าถึงได้ง่าย ทำให้คนไทยซื้อยาปฏิชีวนะทานเอง ซึ่งส่งผลให้เกิดปัญหาการต้านทานยาปฏิชีวนะ ทันตแพทย์เองก็มีบทบาทในการใช้ยาปฏิชีวนะ งานวิจัยนี้จัดทำขึ้นเพื่อศึกษาความรู้และทัศนคติของผู้ป่วยเกี่ยวกับการใช้ยาปฏิชีวนะในกรณีที่ต้องทำการถอนฟันหรือผ่าฟันคุด โดยใช้การสำรวจด้วยแบบสอบถามกับผู้ป่วยที่คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย แบบสอบถามประกอบด้วยสองส่วนหลัก คือข้อมูลโดยทั่วไปและการประเมินความรู้และทัศนคติใช้เกณฑ์ระดับความเห็นด้วย 5 ระดับในการประเมิน ทำการวิเคราะห์ทางสถิติเพื่อหาความสัมพันธ์ระหว่างข้อมูลโดยทั่วไป ความรู้ ทัศนคติ และการตัดสินใจใช้ยาปฏิชีวนะ โดยตัวแปรอิสระที่มีค่า  $p\text{-value} < 0.2$  จะถูกนำเข้าสู่การวิเคราะห์การถดถอยโลจิสติก จากผลการวิจัย พบความสัมพันธ์ระหว่างความรู้หรือทัศนคติของผู้ตอบแบบสอบถามกับการตัดสินใจใช้ยาปฏิชีวนะ ผู้ตอบแบบสอบถามที่เชื่อว่ายาปฏิชีวนะไม่ลดอาการปวดและการอักเสบ เข้าใจว่ายาปฏิชีวนะมีประสิทธิภาพต่อเชื้อแบคทีเรีย หรือเชื่อว่ายาปฏิชีวนะไม่ส่งผลให้การฟื้นตัวเร็วขึ้น จะมีโอกาสน้อยกว่าที่จะใช้ยาปฏิชีวนะหลังทำการรักษาทันตกรรมด้วยตัวเอง กล่าวโดยสรุป การตัดสินใจในการใช้ยาปฏิชีวนะหลังการถอนฟันหรือผ่าฟันคุดด้วยตัวเองได้รับอิทธิพลจากความรู้และทัศนคติ

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# # 6470003932 : MAJOR ORAL AND MAXILLOFACIAL SURGERY

KEYWORD: Knowledge, Attitude, Antibiotic

Kamoltham Ekmetipunth : Knowledge and attitude of patients indicated extraction or impacted third molar surgery toward antibiotic use. Advisor: Asst. Prof. PAKSINEE KAMOLRATANAKUL, D.D.S., Ph.D. Co-advisor: ISSARAPONG KAEWKAMNERDPONG, D.D.S., M.P.H, Ph.D.

In Thailand, there is a significant gap in public knowledge about the use of antibiotics, and antibiotics are easily accessible. People prefer self-medication, leading to antibiotic resistance. Dentists play a role in the use of antibiotics. This study was designed to determine knowledge and attitude of patients related to antibiotic use if extraction or impacted third molar surgery is indicated. A cross-sectional survey with questionnaire was conducted at the Faculty of Dentistry, Chulalongkorn University. The questionnaire consisted of two main sections: demographic data and an evaluation of knowledge and attitude. A 5-point Likert scale was used. Bivariate analysis was conducted to explore the association between demographic data, knowledge, attitude, and the decision to use antibiotics. Independent variables with a p-value  $< 0.2$  were entered into multiple logistic regression models. A significant association was found between respondents' knowledge or attitude and their decision to use antibiotics. Respondents who believed that antibiotics do not reduce pain and inflammation, aware that antibiotics are effective against bacteria, or thought that antibiotics do not accelerate recovery were less likely to use antibiotics after a dental procedure. In conclusion, patients' decision on self-medication with antibiotics after impacted third molar surgery or extraction is influenced by their knowledge and attitude.

|   |                              |
|---|------------------------------|
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# Chapter I

## Introduction

### 1.1 Background and Rationale

Nowadays antibiotic resistance is one of the biggest problems in global health. Antibiotic resistance causes infections harder to treat and leads to longer hospital stays, higher medical costs and increased mortality. (1) In Thailand, most people stated that they did not know about antibiotic resistance and were not afraid of antibiotic resistance. (2)

One of the causes of antibiotic resistance is the overuse of antibiotics. In Thailand National Strategic Plan on Antimicrobial Resistance 2017–2021, they found that there is a large gap of public knowledge about the use of antibiotics and the main communication channel about antibiotics is through healthcare professionals. (3)

Many people believe that they can self-medicate without proper diagnosis from a doctor because of their prior successful use of antibiotics. (4) In Thailand, antibiotics can be easily accessed. Moreover, in COVID-19 pandemic, access to healthcare services is reduced. Therefore, they prefer to self-medicate instead of going to hospital or healthcare services, leading to increased antibiotic resistance. (5) Self-medication of antibiotics can result in drug interactions and the emergency of antibiotic resistance due to lack of knowledge and access to health services. Countries in the South East Asia Region including Thailand had a high level of inappropriate use of self-medicated antibiotics. (3)

10% of antibiotic prescribing for humans worldwide are from dentists. Therefore, dentists are also responsible for participating in the usage of antibiotic. (6) Although a number of studies have determined knowledge and attitude of patients toward antibiotic use in general terms, to our knowledge there are no study in dental terms. Thus, this study was designed to determine knowledge and attitude of patients related to antibiotic use if extraction or impacted third molar surgery is indicated.

## 1.2 Research question

What is the patient's knowledge and attitude in antibiotic use for medical adjunctive treatment if extraction or impacted third molar surgery is indicated ?

## 1.3 Research objective

To determine knowledge and attitude of patients related to antibiotic use if extraction or impacted third molar surgery is indicated.

## 1.4 Research hypothesis

Patients' knowledge and attitude effect their usage of antibiotics.

## 1.5 Research design

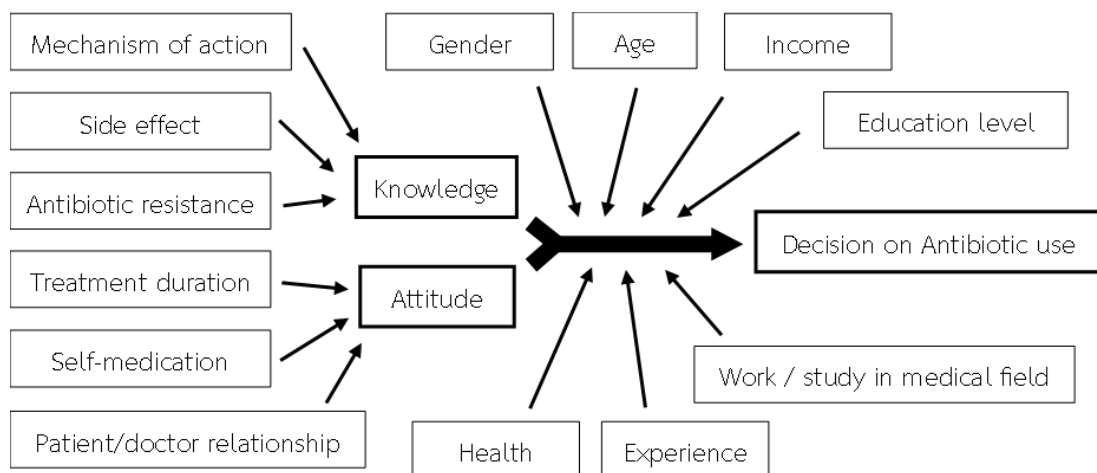
Cross-sectional survey, Self-administered structured questionnaire

## 1.6 Expected benefits

To provide information of knowledge and attitude of patients indicated extraction or impacted third molar surgery toward antibiotic use

To provide data needed to inform or educate patient about antibiotic abuse to prevent antibiotic resistance

## 1.7 Conceptual framework



## Chapter II

### Review of Literature

#### 2.1 Antibiotic prophylaxis in tooth extraction

Tooth extraction usually performed in case that has severe dental caries or periodontal infection. The prevalence of postoperative infection among patients undergoing tooth extraction is only 1% (7). However, the role of antibiotic prophylaxis rarely evaluated by dentist in groups of patients affected by those clinical conditions. (8) There is no statistically significant evidence supporting that post-operative complications will be reduced if the routine use of prophylactic antibiotics is performed under normal conditions. (9)

#### 2.2 Antibiotic prophylaxis in impacted third molar surgery

Impacted third molar surgery is a clean-contaminated surgery. The consideration of prophylactic antibiotic use for third molar surgery was based on the depth of impaction, need for osteotomy, trauma to the surrounding tissues, and postoperative inflammation. (10) Other factors are patients' specific characteristics such as age, tobacco use, diseases and immune system. (11) There is no clear evidence for the optimal timing of prophylaxis (preoperative, intraoperative, or postoperative). (10)

Many studies have shown the effect of antibiotics. Ren et al. has shown the benefit of preoperative antibiotics that reduced the rate of dry socket and wound infection. Their meta-analysis included 16 randomized clinical trials in patients with alveolar osteitis and 12 randomized clinical trials in patients with wound infection. They found that giving systemic antibiotics before third molar surgery were effective in reducing the frequencies of alveolar osteitis and wound infection after the procedure. (12)

Many systematic reviews demonstrated that prophylactic antibiotics reduced the infection risk after extraction by 60% to 70%. From 23 randomized clinical trials in patients undergoing third molar extractions, Lodi et al. demonstrated that antibiotics may reduce the risk of postsurgical infectious complications by approximately 66% and may also reduce the risk of dry socket by 34%. They also found limited and uncertain evidence suggesting that there is no significant rise in the likelihood of adverse effects. (8) From 22 papers in the qualitative and 21 in the quantitative review, Ramos et al. demonstrated that systemic antibiotics significantly reduce the risk of infection and dry socket in patients undergoing third molar removal. (13)

However, the incidence of postoperative infection in patients undergoing third molar removal is less than 1% and the adverse effects of antibiotics have shown to occur in 6% to 7% of patients. Therefore, the adverse effects of antibiotics and the potential risks of antibiotic resistance have to be considered. (14)

Postoperative antibiotics are a controversial issue but many studies have shown that healthy patients with uncomplicated cases are not indicated for antibiotic use. (15)

#### Preoperative antibiotic prophylaxis

From Bezerra's randomized controlled trial study, preoperative antibiotic prophylaxis before surgical removal of third molar does not seem to benefit to a young, healthy, adult patient because this therapeutic strategy did not significantly reduce postoperative infection. (16) In unpredicted postoperative infection case, the decision on antibiotics use should be made after surgery to prevent the patient from being exposed to antibiotics on a regular basis. Thus, antibiotic therapy is only recommended for surgical operations with a high risk of infection and where the benefits of using it outweigh the risk of side effects. (16)

Poeschl found that a significant effect of preoperative antibiotic prophylaxis on postoperative infection-related complications is only found in bony impacted third molar surgery case. (17)

### Postoperative antibiotic prophylaxis

From Poeschl's study, antibiotics were not shown to improve overall postoperative infection rates or non-infection-related adverse effects such as dry socket, pain, or limited mouth opening. Therefore, postoperative prophylactic antibiotic administration is not recommended for routine use. (17)

There was a study compared efficacy of antibiotic prophylaxis during surgical removal of impacted third molars in 3 groups; preoperative antibiotic prophylaxis, postoperative antibiotic prophylaxis and no antibiotic. There were no significant differences between the 3 groups in the incidence of complications; pain, infection, swelling, alveolar osteitis, and interincisal mouth opening. Thus, antibiotic prophylaxis is not recommended for routine use in third molar surgery in healthy patients. (18)

### Medically compromised patient

In patient with systemic disease, antibiotic prophylaxis can be medically harm by increasing the risk of antibiotic-induced allergy, toxicity and drug-related adverse effect. Thus, before antibiotic use, there should be evaluated that the benefit of the antibiotic prophylaxis is outweigh the risk of antibiotic use. (19)

## **2.3 Antibiotic prophylaxis in oral surgery**

The indications of antibiotic prophylaxis in oral surgery have not yet been scientifically proven. Not all procedures in oral surgery rely on antibiotic prophylaxis. The risk factors which included surgical technique employed (osteotomy degree) and characteristics of each patient (age, tobacco use, diseases, and immune system) need to be assessed. The combination of amoxicillin and clavulanic acid theoretically covers almost all of the entire bacterial spectrum of the odontogenic infection. However, the lack of knowledge about the relationships between pathogenesis and bacteria that lead to local infection after extraction does not rule out the value of other antibiotics. (11)

Many dentists give oral antibiotics to patients after dentoalveolar surgery as a prophylaxis against wound infection. In major surgery, the risk of infection is higher

and the consequences of infection are more severe. The factors that need to be considered are the degree of tissue trauma, the extent of host compromise, other medical comorbidities and length of hospitalization. (20)

On the other hand, dentoalveolar surgery mostly has short duration with minimal tissue damage and can be performed in the dental chair under local anesthesia. Dentoalveolar surgery which in contrast to major surgery has an infection rate less than 5% and severe adverse consequences are rare. (20)

Many studies of both mandibular third molar surgery and dental implant surgery have shown that there is little or no evidence of benefit from antibiotic prophylaxis but there is an adverse risk from the antibiotic. Lawler et al. concluded that in most dentoalveolar surgery in healthy patients, there is no need for antibiotic prophylaxis. Giving a single high preoperative dose can be considered in a few cases. (20)

#### **2.4 Antibiotic resistance**

Antibiotics is a drug that treats many types of infections by killing or slowing the growth of bacteria causing the infection. Antibiotic resistance occurs when microorganisms like bacteria and fungi are resistant or not killed by antibiotics and continue to grow. Antibiotic resistance can affect people regardless of stage of life, healthcare, veterinary, and agriculture industries. It is one of the world's most urgent public health problems. (5)

Nowadays antibiotic resistance is one of the biggest problems in global health, food security, and development. Antibiotic resistance causes infections harder to treat and leads to longer hospital stays, higher medical costs and increased mortality. (1) Resistance to antibiotics can cause serious problems because it makes patients required to use second- or third-line treatments that can be harmful to patients by side effects and prolong care and recovery. Moreover, many medical advances need the ability of antibiotics to fight infections, including joint replacements, organ transplants, cancer therapy, and the treatment of chronic

diseases like diabetes, asthma, and rheumatoid arthritis. In the worst cases, some infections have no other treatment options. (5)

### Etiology

Factors that have caused the growing antibiotic resistance are increasing use of antimicrobial drugs and improper prescribing of antimicrobial therapy. Many physicians prescribe overuse of many common antibiotics because the choice of drug is limited by cost and toxicity. Initial prescription of a broad-spectrum drug can also be improper prescribing of antibiotics because it can be ineffective for bacteria that cause the infection. The excessive use of antibiotics can lead to emergence of resistant bacteria. Moreover, patients with higher exposure to antibiotics have more chances to be infected with resistant microorganisms. (21)

### Mechanisms

The factors those drive the increase in antibiotic resistance are a combination of microorganisms exposed to antibiotics, the spread of them and their resistance mechanisms. Antibiotics can cause the development of resistant bacteria by pressuring bacteria to adapt. Antibiotics are used to kill bacteria that cause infections, but they also kill helpful bacteria that protect our body from infection. Bacteria that survive from antibiotics continue to grow and spread their resistance traits in DNA to other bacteria. (5)

Resistance mechanisms are defense strategies that bacteria develop to survive against antibiotics. Resistance mechanisms are determined by specific proteins made by DNA in genes. Their DNA can be shared with other bacteria those have not been exposed to antibiotics. (5)

### $\beta$ -lactamases

The most common antibiotic resistance bacteria causing infections in Thailand is  $\beta$ -lactamase-producing bacteria. (2)

$\beta$ -lactam drugs are the most widely used group of antibiotics. All drugs in this group share a specific core structure which consists of a four-sided  $\beta$ -lactam ring.



There are 3 general mechanisms to resist  $\beta$ -lactam drugs; 1) Alterations of PBPs to prevent the interaction between PBP and  $\beta$ -lactam drug, 2) Efflux pumps extrude  $\beta$ -lactam drugs, and 3)  $\beta$ -lactamase enzymes hydrolyze  $\beta$ -lactam drugs. (21)

$\beta$ -lactamases inhibit  $\beta$ -lactam drugs by hydrolyzing a specific site in the  $\beta$ -lactam ring structure, causing  $\beta$ -lactam drugs unable to bind to PBP proteins.  $\beta$ -lactamase genes are most commonly found in gram negative bacteria, but may also be found in some species of gram-positive bacteria such as *Staphylococcus aureus*, *Enterococcus faecalis*, and *Enterococcus faecium*.  $\beta$ -lactamases is the most common resistance mechanism used by gram negative bacteria against  $\beta$ -lactam drugs such as penicillin and cephalosporin. (21)

$\beta$ -lactamase inhibitors such as clavulanic acid have weak antibiotic ability alone, but in combination with  $\beta$ -lactam drugs such as amoxicillin, it works synergistically. (21)

### Prevention

The best way to prevent antibiotic resistance is preventing infections in the first place. There are many ways to prevent antibiotic resistance such as improving antibiotic use to slow the development of resistance, stopping the spread of resistance when it does develop, and using antibiotics appropriately. (5)

For individuals, to prevent antibiotic resistance is to use only antibiotics that prescribed by health professional. Moreover, using leftover antibiotics is not recommended. (1)

## **2.5 Antibiotic use and resistance in dentistry**

One of the causes of antibiotic resistance is the overuse of antibiotics. 10% of antibiotic prescribing for humans worldwide are from dentists. Dental professionals are responsible for participating in and contributing to global, national and local efforts to combat antibiotic resistance. (6)

Studies have shown that there are too many antibiotics that are prescribed by dentists. (22) A study in the United Kingdom found that only 19% of antibiotics were

prescribed in cases where their use was indicated by clinical guidelines. (23) A study in the United States found that 80% of antibiotic prophylaxis prescriptions before dental visits were inappropriate or unnecessary. (24)

Dental surgeons and family practitioners frequently prescribed antibiotics for their patients as outpatient care. (25) Many studies showed that dental surgeons were often over and unreasonably prescribed antibiotics for dental diseases that had no indication, leading to antibiotic resistance. (26)

The study showed that dentists prescribed antibiotics indiscriminately and almost unnecessarily. Their choices of antibiotics for examined diagnoses could be considered unreasonable. This study recommended the need for improvement of rational antibiotic prescription of dentists. (27)

## **2.6 Antibiotic use and resistance in Thailand**

In 2011, Thailand Antimicrobial Resistance (promoting AMR) Containment and Prevention Program was established with 3 pillars; 1) stop AMR production by encouraging rational antibiotic use, 2) stop AMR acquisition, and 3) stop AMR transmission by encouraging appropriate hygiene and compliance with infection control. (2)

From a national survey in Thailand, they found that antibiotics were commonly referred to as anti-inflammatory medications and many people thought they were similar. When people had any symptoms that they suspected themselves as an inflammation, they would take anti-inflammatory drugs. For minor ailments, people usually bought drugs from grocery stores or retail shops near their homes. If they did not get better within a few days, then they would go to healthcare facilities. Most people stated that they did not know about AMR and were not afraid of AMR. As a result, there are 4 key messages that they want to publicize; 1) antibiotics are not anti-inflammatory drugs, 2) antibiotics are beneficial only in bacterial infections, 3) overuse and misuse of antibiotics will create AMR, and 4) overuse and misuse of antibiotics must be stopped. (2)

In Thailand National Strategic Plan on Antimicrobial Resistance (AMR) 2017–2021, they found that there was a large gap of public knowledge about the use of antibiotics and the main communication channel about antibiotics was through healthcare professionals. Therefore, increasing public knowledge of antibiotics and awareness on AMR is one of the five goals of Thailand national strategic plan on antimicrobial resistance. (28)

Sources of antibiotics vary due to the healthcare systems, financing medicines and access to antibiotics. In high-income countries, almost all of the source of antibiotics is through physicians' prescriptions because antibiotics are prescription-only medicines; while in developing countries like Thailand, people can access antibiotics over the counter and commonly self-medicate. Policies to limit easy access to antibiotics should be created to improve the rational use of antibiotics. Most antibiotics in Thailand are categorized as "dangerous medicines" by the Thai Food and Drug Administration, which means that prescriptions are not required in retail pharmacies and can only be dispensed by certified pharmacists. (3)

The higher the education levels, the higher level of knowledge about antibiotics. This underscores the significance of delivering correct information to the general public about antibiotics and AMR. Individuals with low education, members from poor households, and younger persons are targeted for public campaigns to improve knowledge about proper antibiotics usage. Furthermore, public information about appropriate use of antibiotics and AMR awareness can be provided by health professionals because they are a major source of antibiotics dispensing and information. (3)

## **2.7 Self-medication with Antibiotics**

Self-medication is defined as the use of medicines to treat self-diagnosed disorders without consulting a doctor. (4) Self-medication of antibiotics is a worldwide phenomenon that can result in drug interactions and the emergency of AMR due to lack of knowledge and access to health services. Countries in the South

East Asia Region had a high level of inappropriate use of self-medicated antibiotics. (3)

Antibiotics are bought and used without the prescription of a doctor. Overall, 50% of total antibiotics used are purchased over-the-counter. Health hazards are repercussions of self-medication with antibiotics. (4)

Self-medication of antibiotics is associated with the risk of inappropriate drug use. Prior experiences of treating a similar illness, ignorance regarding the seriousness of the disease, an assured feeling of not requiring a visit to the physician, less expensive and easily affordable in terms of time and money, knowledge of the antibiotics, and suggestions from others were the major reasons for self-medication with antibiotics. (4)

Almost all antibiotics used in self-medication were obtained from various sources, such as pharmacies, leftover drugs, hospitals, and from friends and family. Amoxicillin was the most common antibiotic used for self-medication. An abrupt stoppage of the antibiotic course after the disappearance of symptoms was the most inappropriate practice. Another inappropriate practice was sharing antibiotics, saving antibiotics for future use, and switching antibiotics if symptoms were not relieved. (4)

Developed countries, such as those of Europe have much lower prevalence rates of self-medication with antibiotics because over-the-counter antibiotic sales are strictly controlled. Pharmacies were the main source of antibiotics used for self-medication. Thus, pharmacists were important in educating patients, rationalizing antibiotic use, and stopping antibiotic sales without a prescription. (4)

Effective multifaceted interventions that target healthcare professionals and patients should be developed to ensure provision of adequate and affordable access to healthcare services thus self-medication with antibiotics can be prevented. (3)

## **2.8 Surveys of antibiotic use and resistance**

From the study of Pristianty et al., 2 factors that have a significant effect on patient compliance with antibiotic therapy is knowledge and attitude. (29)

There is a survey that described the attitudes and self-reported practices of French dentists towards antibiotic use and resistance and compared practices with national guidelines. 455 questionnaires were included in the analyses. The most frequently prescribed antibiotic is amoxicillin, followed by spiramycin+metronidazole and amoxicillin-clavulanic acid. Abscess, cervicofacial cellulitis and pericoronitis were the main indications for use. 90% of dentists concerned about antibiotic resistance but only half of them felt that they did not get enough information about antibiotic use. Many dentists did not comply with the national guidelines. The main factor influencing their prescriptions is the publication of clinical guidelines. The regular updates of national guidelines in the form of practical sheets is what they want. (30)

There is a survey about public knowledge, attitudes and practices related to antibiotic use and resistance in Singapore. The study demonstrated important information about perceptions of the population towards antibiotics and antibiotic resistance. This study highlights the importance of effective public communication strategies to promote responsible antibiotic use at the local level and should be used to advise future application of programs and activities. (31)

There is a review of public knowledge, attitudes, and perceptions of antibiotics use. This review of the 20 articles found that there are 5 issues that cut across different countries; 1) insufficient knowledge and awareness of antibiotics use, 2) self-medication and the use of leftover antibiotics, 3) treating viral diseases with antibiotics or used as painkillers, 4) expecting antibiotic prescription as a culmination of consultation, and 5) the credibility of information obtained. (32)

## Chapter III

### Materials and methods

#### 3.1 Study population and sample size

##### 3.1.1 Study population

Patients indicated extraction or impacted third molar surgery in faculty of dentistry, Chulalongkorn University.

##### 3.1.2 Sample size

Sample size was calculated using data from a study of knowledge, attitudes and practices relating to antibiotic use among community members of the Rupandehi District in Nepal. (33) Sample size was calculated by using n4Studies program based on the hypothesis of two independent proportions.

$$n_1 = \left[ \frac{z_{1-\frac{\alpha}{2}} \sqrt{\bar{p}\bar{q}\left(1+\frac{1}{r}\right)} + z_{1-\beta} \sqrt{p_1 q_1 + \frac{p_2 q_2}{r}}}{\Delta} \right]^2$$

$$r = \frac{n_2}{n_1}, q_1 = 1 - p_1, q_2 = 1 - p_2$$

$$\bar{p} = \frac{p_1 + p_2 r}{1+r}, \bar{q} = 1 - \bar{p}$$

$$m_1 = \frac{n_1}{4} \left( 1 + \sqrt{1 + \frac{2(r+1)}{n_1 r |p_2 - p_1|}} \right)^2$$

$n_1$  = sample size for a group 1

$p_1$  = proportion of outcome occurring in a group 1

$p_2$  = proportion of outcome occurring in a group 2

$r$  = ratio between sample size group 2 and group 1

$\alpha$  = significant level

$\beta$  = type II error probability

$m_1$  = sample size for a group 1 from a continuity correction

Given that  $p_1 = 0.248$ ,  $p_2 = 0.403$ ,  $r = 1$ ,  $\alpha = 0.05$  and  $\beta = 0.2$ . The sample size of  $m_1 = 155$  was calculated. A total sample size of 310 was required.

### 3.1.3 Sample selection

#### Inclusion criteria

1. Patients indicated extraction or impacted third molar surgery in faculty of dentistry, Chulalongkorn University.
2. Patients who can read, write, and communicate in Thai language fluently.

#### Exclusion criteria

1. The incompletely filled questionnaire.
2. More than 1 questionnaire from the same respondents.

## 3.2 Data collection

A cross-sectional survey was conducted in faculty of dentistry, Chulalongkorn University during the period from September to December 2022. Self-administered structured questionnaire was randomly given to patients indicated extraction or impacted third molar surgery.

## 3.3 Questionnaire development

### 3.3.1 Question selection

The questionnaire comprises of 2 main sections. The first section covers demographic data including gender, age, education level, work or study in medical field, income, health and experience. The second section is knowledge and attitude evaluation form. This section consists of 15 questions, of which 10 questions are knowledge based, 4 questions are attitude based and 1 question determines the decision on antibiotic use. Questions about knowledge divide into 3 topics, namely “mechanism of action” (Q2-Q6), “side effect” (Q7-Q8) and “antibiotic resistance” (Q9-Q11). Questions about attitude divide into 3 topics, namely “treatment duration” (Q12), “self-medication” (Q13-Q14) and “patient/doctor relationship” (Q15). A 5-point Likert scale (strongly disagree, disagree, uncertain, agree and strongly agree) was used to evaluate the participants’ responses. These questions was adapted from a study of knowledge, attitudes and practices relating to antibiotic use among community members of the Rupandehi District in Nepal (31) and a study of knowledge, attitude

and practice towards antibiotic use among the public in Kuwait. (34) The English version of the questionnaire was translated into Thai and back translated into English to ensure the accuracy of the translated text.

### 3.3.2 Reliability, validity and consistency of the questionnaire

A self-administrated structured questionnaire was examined to have a clear question. The respondents can answer truthfully without persuasion from an interviewer. (35) This questionnaire was developed based on a thorough literature review of comparable studies to measure patients' knowledge and attitudes regarding antibiotic use. The content validity, clarity, and overall quality of the questionnaire were reviewed by the content expert. Contextual validity was taken into consideration by examining specific contexts to ensure their appropriateness and meaningfulness. The questions were clarified to ensure that respondents clearly understood the objective of each question. Test-retest reliability was assessed by comparing responses between two administrations of respondents on separate occasions to evaluate the questionnaire's stability over time. The questionnaire was reviewed and rephrased until there were no discrepancies in the responses, and the constructs remained conceptually sound and relevant to the research objectives. The internal consistency of the questionnaire was assessed using Cronbach's alpha to examine the interrelatedness of the items within it. Each related factors in this questionnaire were evaluated for reliability separately. The questionnaire was sent to 30 respondents, and it was found that the values for Cronbach's alpha for each factor ranged from 0.7 to 0.8. Hence, this questionnaire was considered acceptable reliability.

### 3.3.3 Pilot test

If the coefficient of Cronbach's alpha is setting larger than 0, the sample size for the pilot test should be at least 30. (36) Thus, this pilot test was conducted with a sample of 30 individuals for improving the quality of questions. These 30 individuals were randomly selected from patients indicated extraction or impacted third molar surgery in faculty of dentistry, Chulalongkorn University. The contents were easily understood and accurate with no controversy.



**Table 1** Topics of knowledge and attitude questions

|                             |  |  |
|-----------------------------|--|--|
| Decision on Antibiotic use  |  | Q1 : Antibiotics are always needed after dental procedure.   |
| Knowledge                   | Mechanism of action  | Q2 : Antibiotics reduce pain and inflammation.   |
|                             |  | Q3 : Antibiotics are effective against bacteria.   |
|                             |  | Q4 : Antibiotics are effective against virus.  |
|                             |  | Q5 : Antibiotics speed up the recovery.  |
|                             |  | Q6 : Different antibiotics are needed to cure different diseases.  |
|                             | Side effect  | Q7 : If you get side effect during a course of antibiotics treatment, you should stop taking them as soon as possible. |
|                             |  | Q8 : If you get some kind of skin reaction when using an antibiotic, you should not use the same antibiotic again.     |
|                             | Antibiotic resistance  | Q9 : Unnecessarily use of antibiotics can cause antibiotic resistance.   |
|                             |  | Q10 : Overuse of antibiotics can cause antibiotic resistance.  |
|                             |  | Q11 : Antibiotics resistance is a worldwide problem.   |
|                             | Attitude   | Treatment duration   |
| Self-medication             |  | Q13 : If you don't get antibiotics from dentist after dental procedure, you can buy them by yourself.                  |
|                             |  | Q14 : You should keep antibiotics at home in case there may be a need for them later.                                  |
| Patient/doctor relationship | Q15 : Dentist should take time to inform how antibiotics should be used. |  |

### 3.4 Data analysis

Demographic variables and responses to the knowledge and attitude questions were analyzed using descriptive statistics. Responses to the 5-point Likert scale for the knowledge and attitude evaluation form were combined into 2 groups: group 1 was strongly agree and agree, group 2 was strongly disagree, disagree and uncertain. Reverse coding was applied to negative statements. Responses to Q1 were referred to decision on antibiotics use. Responses to the knowledge and attitude questions (Q2-Q15) were given a score of “1” for a correct response and “0” for an incorrect or uncertain response, and scores were summed for each of the topics. The median score based on responses to questions in each of the knowledge and attitude sections was used as the cut-off to dichotomize the continuous variable for use as the dependent variable in multiple logistic regression analysis. Respondents scoring higher than the median were assessed as having “better knowledge” and “more appropriate attitudes” relating to antibiotic use.

### 3.5 Statistical analysis

The data were analyzed using the SPSS software (SPSS version 29, IBM, New York, USA). The significance level of 5% was set for the study. The significance level was set at 5%. Descriptive statistics were used to analyze demographic variables and responses to the knowledge and attitude questions. The bivariate analysis, chi-square testing, was used to explore the association between demographic data, respondents’ knowledge, respondents’ attitude and decision on antibiotic use. Independent variables with a p-value < 0.2 for their association with dependent variable in the bivariate analysis were entered into the multiple logistic regression models. (37)

### 3.6 Ethical consideration

This study was approved by the ethical committee in human research of the Faculty of Dentistry, Chulalongkorn University (study code HREC-DCU 2022-085, approval number 104/2022).

### 3.7 Timeline

| Activities                                   | Time (Month) |    |    |      |   |   |   |   |   |   |   |   |    |    |    |      |   |   |
|--|--------------|----|----|------|---|---|---|---|---|---|---|---|----|----|----|------|---|---|
|  | 2021         |    |    | 2022 |   |   |   |   |   |   |   |   |    |    |    | 2023 |   |   |
|  | 10           | 11 | 12 | 1    | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1    | 2 | 3 |
| Review literature                            | ■            |    |    |      |   |   |   |   |   |   |   |   |    |    |    |      |   |   |
| Research proposal preparation / presentation |              |    |    |      |   | ■ | ■ | ■ | ■ |   |   |   |    |    |    |      |   |   |
| Ethical approval                             |              |    |    |      |   |   |   |   |   | ■ | ■ |   |    |    |    |      |   |   |
| Data collection                              |              |    |    |      |   |   |   |   |   |   |   | ■ | ■  | ■  | ■  |      |   |   |
| Data analysis / discussion                   |              |    |    |      |   |   |   |   |   |   |   |   |    |    |    |      | ■ |   |
| Report preparation                           |              |    |    |      |   |   |   |   |   |   |   |   |    |    |    |      | ■ |   |
| Research presentation                        |              |    |    |      |   |   |   |   |   |   |   |   |    |    |    |      |   | ■ |

### 3.8 Budget

|  |        |      |
|--|--------|------|
| 1. Gift (estimated price 50-100 baht) for 310 participants | 31,000 | Baht |
| 2. Document  | 1,000  | Baht |
| Total  | 32,000 | Baht |

## Chapter IV

### Results

#### 4.1 Demographic data

Table 2 provides an overview of the demographic characteristics of the 384 survey respondents. Of the total respondents, the majority were female (60.9%). Nearly half of the respondents fell in the age range of 21-30 years (47.9%). Additionally, 80% of the respondents had obtained a bachelor's degree or higher level of education. The majority of the participants, comprising 88.3%, were not affiliated with the medical field. More than 60% of respondents had an income of less than 15,000 baht (62.0%). Most participants reported not having any systemic diseases (79.7%). Moreover, around 67.2% of respondents had undergone the extraction or impacted third molar surgery.

The chi-square test results displayed in Table 2 aimed to examine the relationship between respondents' demographic information and their decision on antibiotic use. The test did not find any significant associations between the two variables.

#### 4.2 Knowledge regarding antibiotics

Table 3 displays the responses of respondents regarding their knowledge on 3 topics. The majority of respondents gave accurate answers on 2 out of the 3 topics, namely side effects and antibiotic resistance. A significant number of respondents, specifically 92.2%, were knowledgeable that discontinuing antibiotics as soon as possible is essential if they experience side effects during treatment. Likewise, 84.4% of respondents knew that they should not reuse the same antibiotic if they develop side effect such a skin reaction. Moreover, a vast majority, comprising 84.1% and 81.5%, were aware that the overuse and unnecessary use of antibiotics can lead to

antibiotic resistance. About 57.3% of participants recognized that antibiotic resistance is a global issue.

According to the results, the only subject where respondents gave more incorrect than correct answers was the mechanism of action of antibiotics. A meager proportion of respondents, accounting for only 21.9%, knew that antibiotics did not reduce pain and inflammation. Similarly, merely 18.2% of the participants were aware that antibiotics is not effective against viruses. Only 18.8% of respondents knew that antibiotics did not accelerate the healing process. However, more than half of the participants (62.2%) recognized that different types of antibiotics are necessary to treat various conditions. Additionally, a significant proportion of respondents (76.6%) acknowledged that antibiotics are useful against bacterial infections.

The chi-square test has revealed a significant relationship between the respondents' knowledge of antibiotics and their decision to use antibiotics (See Table 3). The decision to use antibiotics was found to be associated with the respondents who gave incorrect answers to two questions about antibiotics, which were “Antibiotics reduce pain and inflammation” and “Antibiotics speed up the recovery.”. Furthermore, respondents who gave a correct answer to the question “Antibiotics are effective against bacteria” were also associated with their decision to use antibiotics.



#### **4.3 Attitude regarding antibiotics**

Table 4 shows that approximately 52.6% of the participants believe that they should adhere to the dentist's advice and complete the entire course of antibiotics treatment. Furthermore, around 66.4% of the respondents were aware that they should not purchase antibiotics on their own. On the other hand, about 57.8% of the respondents were not aware that they should not keep antibiotics at home. Moreover, a significant proportion of the participants (98.2%) agreed that dentists should dedicate time to educate patients about the proper use of antibiotics.

The chi-square test revealed significant associations between the attitudes of the respondents towards antibiotics and their decisions on antibiotic use (See Table 4). In particular, the decision on antibiotic use was found to be related to two questions related to self-medication with antibiotics. The first question was “If you don’t get antibiotics from dentist after dental procedure, you can buy them by yourself.” while the second question was “You should keep antibiotics at home in case there may be a need for them later.”.

#### **4.4 The associations of demographic data, knowledge and attitude with antibiotic use**

The multiple logistic regression models are shown in Table 5. In Model 1.1, a significant association was found between knowledge regarding antibiotics and antibiotic use. In Model 1.2, a significant association was found between attitude regarding antibiotics and antibiotic use. When knowledge and attitude towards antibiotics were included in Model 2, 3 knowledge questions were found to be significant. Respondents who believed that antibiotics reduce pain and inflammation were 2.252 times (95% CI: 1.176, 4.311) more likely to decide to use antibiotics after a dental procedure. Respondents who were aware that antibiotics are effective against bacteria were 0.260 times (95% CI: 0.150, 0.454) more likely to decide to use antibiotics after a dental procedure. Finally, respondents who thought that antibiotics accelerate recovery were 3.035 times (95% CI: 1.477, 6.236) more likely to decide to use antibiotics after a dental procedure.

**Table 2** Demographic data of respondents (n = 384)

| Variables                             | N (%)       | N (%)<br>Antibiotic<br>use<br>(n = 176) | N (%)<br>No antibiotic<br>use<br>(n = 208) | $\chi^2$<br>(p = value) |
|---------------------------------------|-------------|---|--|-------------------------|
| <b>Gender</b>                         |             |   |  |                         |
| Male                                  | 150 (39.1%) | 70 (46.7%)                              | 80 (53.3%)                                 | 0.069<br>(p = 0.793)    |
| Female                                | 234 (60.9%) | 106 (45.3%)                             | 128 (54.7%)                                |                         |
| <b>Age (year old)</b>                 |             |   |  |                         |
| Teenage (11-20 years old)             | 92 (24.0%)  | 42 (45.7%)                              | 50 (54.3%)                                 | 1.865<br>(p = 0.601)    |
| Young adult (21-30 years old)         | 184 (47.9%) | 90 (48.9%)                              | 94 (51.1%)                                 |                         |
| Adult (31-60 years old)               | 80 (20.8%)  | 33 (41.3%)                              | 47 (58.8%)                                 |                         |
| Elderly (more than 60 years old)      | 28 (7.3%)   | 11 (39.3%)                              | 17 (60.7%)                                 |                         |
| <b>Education level</b>                |             |   |  |                         |
| Lower than bachelor degree            | 76 (19.8%)  | 37 (48.7%)                              | 39 (51.3%)                                 | 0.310<br>(p = 0.578)    |
| Bachelor degree or higher             | 308 (80.2%) | 139 (45.1%)                             | 169 (54.9%)                                |                         |
| <b>Work or study in medical field</b> |             |   |  |                         |
| Yes                                   | 45 (11.7%)  | 19 (42.2%)                              | 26 (57.8%)                                 | 0.268<br>(p = 0.605)    |
| No                                    | 339 (88.3%) | 157 (46.3%)                             | 182 (53.7%)                                |                         |
| <b>Income (Baht per month)</b>        |             |   |  |                         |
| Low (less than 15,000 baht)           | 238 (62.0%) | 110 (46.2%)                             | 128 (53.8%)                                | 0.141<br>(p = 0.932)    |
| Moderate (15,000-30,000 baht)         | 102 (26.6%) | 47 (46.1%)                              | 55 (53.9%)                                 |                         |
| High (more than 30,000 baht)          | 44 (11.5%)  | 19 (43.2%)                              | 25 (56.8%)                                 |                         |
| <b>Health</b>                         |             |   |  |                         |
| Systemic disease                      | 78 (20.3%)  | 31 (39.7%)                              | 47 (60.3%)                                 | 1.462<br>(p = 0.227)    |
| No systemic disease                   | 306 (79.7%) | 145 (47.4%)                             | 161 (52.6%)                                |                         |
| <b>Experience</b>                     |             |   |  |                         |
| Experience Ext or SR                  | 258 (67.2%) | 119 (46.1%)                             | 139 (53.9%)                                | 0.027<br>(p = 0.870)    |
| No experience Ext or SR               | 126 (32.8%) | 57 (45.2%)                              | 69 (54.8%)                                 |                         |

Ext, Extraction; SR, Surgical removal

**Table 3** Knowledge of respondents regarding antibiotics (n = 384)

| Topic  | Variables   | N (%)       | N (%)<br>Antibiotic<br>use<br>(n = 176) | N (%)<br>No antibiotic<br>use<br>(n = 208) | $\chi^2$<br>(p = value) |
|--|---|-------------|---|--|-------------------------|
| Mechanism<br>of action   | <b>Q2 : Antibiotics reduce pain and inflammation.</b>   |             |   |  |                         |
|  | Correct   | 84 (21.9%)  | 24 (28.6%)                              | 60 (71.4%)                                 | 12.905<br>(p < 0.001)   |
|  | Incorrect or uncertain  | 300 (78.1%) | 152 (50.7%)                             | 148 (49.3%)                                |                         |
|  | <b>Q3 : Antibiotics are effective against bacteria.</b>   |             |   |  |                         |
|  | Correct   | 294 (76.6%) | 154 (52.4%)                             | 140 (47.6%)                                | 21.662<br>(p < 0.001)   |
|  | Incorrect or uncertain  | 90 (23.4%)  | 22 (24.4%)                              | 68 (75.6%)                                 |                         |
|  | <b>Q4 : Antibiotics are effective against virus.</b>  |             |   |  |                         |
|  | Correct   | 70 (18.2%)  | 26 (37.1%)                              | 44 (62.9%)                                 | 2.604<br>(p = 0.107)    |
|  | Incorrect or uncertain  | 314 (81.8%) | 150 (47.8%)                             | 164 (52.2%)                                |                         |
|  | <b>Q5 : Antibiotics speed up the recovery.</b>  |             |   |  |                         |
|  | Correct   | 72 (18.8%)  | 16 (22.2%)                              | 56 (77.8%)                                 | 19.899<br>(p < 0.001)   |
|  | Incorrect or uncertain  | 312 (81.3%) | 160 (51.3%)                             | 152 (48.7%)                                |                         |
| <b>Q6 : Different antibiotics are needed to cure different diseases.</b> |   |             |   |  |                         |
| Correct  | 239 (62.2%)   | 111 (46.4%) | 128 (53.6%)                             | 0.095<br>(p = 0.758)                       |                         |
| Incorrect or uncertain   | 145 (37.8%)   | 65 (44.8%)  | 80 (55.2%)                              |  |                         |
| Side effect  | <b>Q7 : If you get side effect during a course of antibiotics treatment, you should stop taking them as soon as possible.</b> |             |   |  |                         |
|  | Correct   | 354 (92.2%) | 165 (46.6%)                             | 189 (53.4%)                                | 1.101<br>(p = 0.294)    |
|  | Incorrect or uncertain  | 30 (7.8%)   | 11 (36.7%)                              | 19 (63.3%)                                 |                         |
|  | <b>Q8 : If you get some kind of skin reaction when using an antibiotic, you should not use the same antibiotic again.</b>     |             |   |  |                         |
| Correct  | 324 (84.4%)   | 148 (45.7%) | 176 (54.3%)                             | 0.020<br>(p = 0.888)                       |                         |
| Incorrect or uncertain   | 60 (15.6%)  | 28 (46.7%)  | 32 (53.3%)                              |  |                         |
| Antibiotic<br>resistance   | <b>Q9 : Unnecessarily use of antibiotics can cause antibiotic resistance.</b>   |             |   |  |                         |
|  | Correct   | 323 (84.1%) | 150 (46.4%)                             | 173 (53.6%)                                | 0.301<br>(p = 0.583)    |
|  | Incorrect or uncertain  | 61 (15.9%)  | 26 (42.6%)                              | 35 (57.4%)                                 |                         |



|  |  |             |             |             |                 |
|--|--|-------------|-------------|-------------|-----------------|
|  | <b>Q10 : Overuse of antibiotics can cause antibiotic resistance.</b> |             |             |             |                 |
|  | Correct  | 313 (81.5%) | 148 (47.3%) | 165 (52.7%) | 1.436           |
|  | Incorrect or uncertain   | 71 (18.5%)  | 28 (39.4%)  | 43 (60.6%)  | ( $p = 0.231$ ) |
|  | <b>Q11 : Antibiotics resistance is a worldwide problem.</b>          |             |             |             |                 |
|  | Correct  | 220 (57.3%) | 101 (45.9%) | 119 (54.1%) | 0.001           |
|  | Incorrect or uncertain   | 164 (42.7%) | 75 (45.7%)  | 89 (54.3%)  | ( $p = 0.972$ ) |

**Table 4** Attitude of respondents regarding antibiotics (n = 384)

| Topic                              | Variables   | N (%)       | N (%)<br>Antibiotic<br>use<br>(n = 176) | N (%)<br>No antibiotic<br>use<br>(n = 208) | $\chi^2$<br>( $p = \text{value}$ ) |
|------------------------------------|---|-------------|---|--|------------------------------------|
| Treatment<br>duration              | <b>Q12 : If you feel better during a course of antibiotics treatment, you don't need to complete the course of treatment.</b> |             |   |  |                                    |
|                                    | Correct   | 202 (52.6%) | 86 (42.6%)                              | 116 (57.4%)                                | 1.823                              |
|                                    | Incorrect or uncertain  | 182 (47.4%) | 90 (49.5%)                              | 92 (50.5%)                                 | ( $p = 0.177$ )                    |
| Self-<br>medication                | <b>Q13 : If you don't get antibiotics from dentist after dental procedure, you can buy them by yourself.</b>                  |             |   |  |                                    |
|                                    | Correct   | 255 (66.4%) | 107 (42.0%)                             | 148 (58.0%)                                | 4.585                              |
|                                    | Incorrect or uncertain  | 129 (33.6%) | 69 (53.5%)                              | 60 (46.5%)                                 | ( $p = 0.032$ )                    |
|                                    | <b>Q14 : You should keep antibiotics at home in case there may be a need for them later.</b>                                  |             |   |  |                                    |
|                                    | Correct   | 162 (42.2%) | 58 (35.8%)                              | 104 (64.2%)                                | 11.357                             |
|                                    | Incorrect or uncertain  | 222 (57.8%) | 118 (53.2%)                             | 104 (46.8%)                                | ( $p < 0.001$ )                    |
| Patient/<br>doctor<br>relationship | <b>Q15 : Dentist should take time to inform how antibiotics should be used.</b>   |             |   |  |                                    |
|                                    | Correct   | 377 (98.2%) | 172 (45.6%)                             | 205 (54.4%)                                | 0.367                              |
|                                    | Incorrect or uncertain  | 7 (1.8%)    | 4 (57.1%)                               | 3 (42.9%)                                  | ( $p = 0.544$ )                    |

**Table 5** Multiple logistic regression models for the associations of knowledge and attitude with antibiotic use (n = 384)

| Variable  | Antibiotic use            |                  |                         |                  |                           |                  |
|---|---------------------------|------------------|-------------------------|------------------|---------------------------|------------------|
|   | Model 1.1<br>(95% CI)     | <i>p</i> -value  | Model 1.2<br>(95% CI)   | <i>p</i> -value  | Model 2<br>(95% CI)       | <i>p</i> -value  |
| <b>Q2 : Antibiotics reduce pain and inflammation.</b>   |                           |                  |                         |                  |                           |                  |
| Correct   | 1                         | <i>p</i> = 0.014 | -                       | -                | 1                         | <i>p</i> = 0.025 |
| Incorrect or uncertain  | 2.252 *<br>(1.176, 4.311) |                  | -                       |                  | 2.141 *<br>(1.098, 4.172) |                  |
| <b>Q3 : Antibiotics are effective against bacteria.</b>   |                           |                  |                         |                  |                           |                  |
| Correct   | 1                         | <i>p</i> < 0.001 | -                       | -                | 1                         | <i>p</i> < 0.001 |
| Incorrect or uncertain  | 0.260 *<br>(0.150, 0.454) |                  | -                       |                  | 0.260 *<br>(0.148, 0.455) |                  |
| <b>Q4 : Antibiotics are effective against virus.</b>  |                           |                  |                         |                  |                           |                  |
| Correct   | 1                         | <i>p</i> = 0.269 | -                       | -                | 1                         | <i>p</i> = 0.156 |
| Incorrect or uncertain  | 0.684<br>(0.349, 1.342)   |                  | -                       |                  | 0.608<br>(0.306, 1.209)   |                  |
| <b>Q5 : Antibiotics speed up the recovery.</b>  |                           |                  |                         |                  |                           |                  |
| Correct   | 1                         | <i>p</i> = 0.003 | -                       | -                | 1                         | <i>p</i> = 0.004 |
| Incorrect or uncertain  | 3.035 *<br>(1.477, 6.236) |                  | -                       |                  | 2.859 *<br>(1.387, 5.895) |                  |
| <b>Q12 : If you feel better during a course of antibiotics treatment, you don't need to complete the course of treatment.</b> |                           |                  |                         |                  |                           |                  |
| Correct   | -                         | -                | 1                       | <i>p</i> = 0.947 | 1                         | <i>p</i> = 0.614 |
| Incorrect or uncertain  | -                         |                  | 0.985<br>(0.630, 1.540) |                  | 0.883<br>(0.544, 1.432)   |                  |
| <b>Q13 : If you don't get antibiotics from dentist after dental procedure, you can buy them by yourself.</b>                  |                           |                  |                         |                  |                           |                  |
| Correct   | -                         | -                | 1                       | <i>p</i> = 0.438 | 1                         | <i>p</i> = 0.542 |
| Incorrect or uncertain  | -                         |                  | 1.208<br>(0.750, 1.947) |                  | 1.169<br>(0.708, 1.931)   |                  |

| Q14 : You should keep antibiotics at home in case there may be a need for them later. |   |   |                           |             |                         |             |
|---|---|---|---------------------------|-------------|-------------------------|-------------|
| Correct   | - |   | 1                         |             | 1                       |             |
| Incorrect or uncertain  | - | - | 1.895 *<br>(1.172, 3.065) | $p = 0.009$ | 1.637<br>(0.980, 2.734) | $p = 0.060$ |

CI, Confidence Interval

Model 1: adjusted for knowledge regarding antibiotic use; Model 2: further adjusted for attitude regarding antibiotic use

\*  $p < 0.05$



## Chapter V

### Discussion

In general, the respondents of this study displayed relatively good knowledge regarding the side effects of antibiotics and antibiotic resistance. Nonetheless, the majority of the respondents demonstrated insufficient knowledge regarding the mechanism of action of antibiotics. The results showed that almost all respondents held an appropriate attitude towards the relationship between patients and doctors, and more than half of respondents had an appropriate attitude about the duration of treatment and self-medication.

Believing that antibiotics can reduce pain and inflammation or speed up recovery causes most respondents to decide to use antibiotics after extraction or impacted third molar surgery. Their lack of knowledge about antibiotics may lead them to believe that antibiotics can reduce pain and inflammation or speed up recovery, despite the fact that antibiotics are not effective for those purposes. This corresponds to a study that found a significant knowledge gap among the general population in Thailand regarding the usage of antibiotics. (28)

More than half of the respondents who know that antibiotics are effective against bacteria decide to use antibiotics after extraction or impacted third molar surgery. The possibility should be personal consideration about post-operative infection consistently. Several research studies have indicated that antibiotics can decrease the likelihood of post-surgical infections and may also lower the risk of developing dry socket. (8, 13) However, risk of infection is low especially in healthy patients. (14) Thus, if patients decide to take antibiotics due to consideration of post-operative infection in every case, this may lead to antibiotic resistance among population.

More than half of the respondents who believe that they should not purchase antibiotics without a prescription from a dentist choose not to use antibiotics after extraction or impacted third molar surgery. On the other hand, more

than half of the respondents who believe that they can self-medicate with antibiotics decide to use antibiotics. It can be assumed that beliefs in self-medication affect their decision to use antibiotics. Moreover, if patients have high expectations of receiving an antibiotic prescription, it is more likely that they will resort to using antibiotics without a prescription. (33) A correlation has been reported between the level of education and self-medication with antibiotics. (38) Individuals with higher levels of education possess more knowledge regarding antibiotics. (3) Adequate knowledge empowers individuals to make informed decisions and refrain from self-medicating with antibiotics.

More than half of the respondents who believed they should keep antibiotics at home ended up using antibiotics after extraction or impacted third molar surgery. They believe they should keep antibiotics at home because they think they can self-medicate with antibiotics. Furthermore, if they do not follow their dentist's prescription for antibiotics, they may end up with leftover antibiotics that they keep at home in case they need them in the future. The likelihood of using leftover antibiotics may increase if non-compliance with the therapy is noted. (39)

According to the results of this study, respondents provided a higher number of incorrect responses compared to correct ones in terms of the mechanism of action of antibiotics. These results indicated that individuals tended to utilize antibiotics without a thorough understanding of how they function. This lack of knowledge can result in the inappropriate or excessive use of antibiotics, contributing to the emergence of antibiotic resistance.

The results of the chi-square test suggest that there is no significant correlation between demographic factors and respondents' decisions about the use of antibiotics. Therefore, demographic factors may not be a reliable predictor of antibiotic use. However, there is still a tendency that respondents who decide not to use antibiotics after extraction or impacted third molar surgery to have higher education or work/study in medical field.

This study had some limitations, including the fact that it was conducted in a single center in Bangkok, which may not make the results generalizable to the broader population in Thailand. Additionally, studies examining the use of antibiotics

among the general public may encounter challenges if the respondents are not familiar with what antibiotics are. In this study, antibiotics were not explicitly defined, as the aim was to gauge the respondents' understanding, but an example was provided to clarify the distinction between antibiotics and other medications like NSAIDs and painkillers.

The findings of this study could be used as a foundation for the development of patient education programs regarding antibiotic use after surgical removal or extraction. Patients who have incorrect knowledge about antibiotics may assume that they should take antibiotics, leading to the inappropriate use of antibiotics and the development of antibiotic resistance. Educating patients on the appropriate use of antibiotics could help reduce the risk of self-medication, misuse, and overuse.

In the post-operative instructions after extraction or impacted third molar surgery, there is usually guidance on self-care practices, but there is often no specific advice regarding the use of antibiotics. We can utilize the results from this research to summarize and provide additional recommendations regarding the appropriate use of antibiotics. These recommendations can be incorporated into the post-operative instructions after extraction or impacted third molar surgery to ensure that patients are aware of the proper way to use antibiotics.

## Chapter VI

### Conclusion

Patients' decision on whether to use antibiotics after impacted third molar surgery or extraction is influenced by their knowledge and attitude towards antibiotics. The patients' comprehension of how antibiotics work, specifically that they do not reduce pain or inflammation or speed up the healing process but are effective against bacterial infections, can influence their decision to refrain from self-medication with antibiotics after undergoing impacted third molar surgery or extraction.



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## Appendix

### Section 1 : Demographic and general data

|   |  |
|---|--|
| <b>เพศ</b>                                    |  |
| - ชาย   |  |
| - หญิง  |  |
| - ไม่ระบุ                                     |  |
| <b>อายุ (ปี)</b>                              |  |
| - 11 - 20 ปี                                  |  |
| - 21 - 30 ปี                                  |  |
| - 31 - 40 ปี                                  |  |
| - 41 - 50 ปี                                  |  |
| - 51 - 60 ปี                                  |  |
| - 60 ปีขึ้นไป                                 |  |
| <b>ระดับการศึกษา</b>                          |  |
| - มัธยมศึกษา หรือ ต่ำกว่า                     |  |
| - ปวช. หรือ ปวส.                              |  |
| - ปริญญาตรี หรือ เทียบเท่า                    |  |
| - สูงกว่า ปริญญาตรี                           |  |
| <b>เรียนหรือทำงานในสาขาทางการแพทย์</b>        |  |
| - ใช่   |  |
| - ไม่ใช่                                      |  |
| <b>รายได้ต่อเดือน (บาท)</b>                   |  |
| - กำลังศึกษา / ไม่มีรายได้ต่อเดือน            |  |
| - น้อยกว่า 15,000 บาท                         |  |
| - 15,000 ถึง 30,000 บาท                       |  |
| - 30,000 ถึง 50,000 บาท                       |  |
| - มากกว่า 50,000 บาท                          |  |
| <b>มีโรคประจำตัวหรือไม่</b>                   |  |
| - มี  |  |
| - ไม่มี                                       |  |
| <b>เคยได้รับการถอนฟันหรือผ่าฟันคุดหรือไม่</b> |  |
| - เคย   |  |
| - ไม่เคย                                      |  |

Section 2 : Knowledge and attitude evaluation form

คำจำกัดความ ยาปฏิชีวนะ หรือ ยาฆ่าเชื้อ หรือ Antibiotics เช่น Amoxicillin  
ยาแก้ปวด/แก้อักเสบ หรือ NSAIDs เช่น Ibuprofen  
ยาแก้ปวด เช่น Paracetamol

|  | ไม่เห็นด้วย<br>อย่างยิ่ง | ไม่เห็นด้วย | ไม่แน่ใจ | เห็นด้วย | เห็นด้วย<br>อย่างยิ่ง |
|--|--------------------------|-------------|----------|----------|-----------------------|
| จำเป็นต้องทานยาปฏิชีวนะทุกครั้งหลังทำการ<br>ถอนฟัน/ผ่าฟันคุด   |                          |             |          |          |                       |
| ยาปฏิชีวนะใช้แก้ปวด/แก้อักเสบ  |                          |             |          |          |                       |
| ยาปฏิชีวนะใช้ฆ่าเชื้อแบคทีเรีย   |                          |             |          |          |                       |
| ยาปฏิชีวนะใช้ฆ่าเชื้อไวรัส   |                          |             |          |          |                       |
| ยาปฏิชีวนะช่วยให้แผลหายเร็วขึ้น  |                          |             |          |          |                       |
| ยาปฏิชีวนะต่างชนิดกันใช้รักษาโรคต่างกัน  |                          |             |          |          |                       |
| ถ้าคุณได้รับผลข้างเคียงจากการทานยาปฏิชีวนะ<br>เช่น มีผื่นขึ้น คุณควรหยุดทานยาปฏิชีวนะทันที   |                          |             |          |          |                       |
| ถ้าคุณเคยได้รับผลข้างเคียงจากการทานยา<br>ปฏิชีวนะ เช่น มีผื่นขึ้น คุณควรไม่ทานยา<br>ปฏิชีวนะตัวเดิมอีก   |                          |             |          |          |                       |
| การทานยาปฏิชีวนะโดยไม่จำเป็น จะทำให้เกิด<br>การดื้อยาปฏิชีวนะ  |                          |             |          |          |                       |
| การทานยาปฏิชีวนะมากเกินไป จะทำให้เกิดการ<br>ดื้อยาปฏิชีวนะ   |                          |             |          |          |                       |
| การดื้อยาปฏิชีวนะเป็นปัญหาระดับโลก   |                          |             |          |          |                       |
| ในกรณีที่คุณมีอาการดีขึ้นแล้ว คุณไม่จำเป็นต้อง<br>ทานยาปฏิชีวนะให้หมดตามที่ได้รับมา  |                          |             |          |          |                       |
| ในกรณีที่คุณไม่ได้รับยาปฏิชีวนะจากทันตแพทย์<br>หลังถอนฟัน คุณสามารถซื้อยาปฏิชีวนะทานเอง<br>ได้ โดยไม่ต้องมีใบสั่งยาหรือคำแนะนำจากทันต<br>แพทย์ |                          |             |          |          |                       |
| ควรมียาปฏิชีวนะไว้ติดบ้าน เพื่อมีกรณีที่ต้อง<br>ทานยาปฏิชีวนะ  |                          |             |          |          |                       |
| ทันตแพทย์ควรอธิบายวิธีการทานยาปฏิชีวนะให้<br>ดีก่อนให้ใบสั่งยา   |                          |             |          |          |                       |

## VITA

NAME กมลธรรม เอกเมธีพันธ์

DATE OF BIRTH 4 มีนาคม 2539

PLACE OF BIRTH กรุงเทพฯ

INSTITUTIONS ATTENDED ทันตแพทยศาสตร์บัณฑิต จุฬาลงกรณ์มหาวิทยาลัย

HOME ADDRESS 7/34 หมู่บ้านชัยพฤกษ์ ซ.ทวีวัฒนา 24 แขวงศาลาธรรมสพน์ เขตทวีวัฒนา กรุงเทพฯ 10170

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