ASSESSMENT OF KNOWLEDGE ATTITUDES AND PRACTICES REGARDING ANTIBIOTIC USE IN TRANG PROVINCE, THAILAND

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ABSTRACT: Knowledge, attitudes, and practices (KAP) regarding antibiotics use were assessed in a cross-sectional study of 396 adults. Data were collected with a self-administered questionnaire. Chi square tests and Spearman's correlations were used to examine associations of knowledge, attitude, and practice with study participants' sociodemographic characteristics and with each other. 75.5% of participants were females, 50.3% were married, 68.2% worked in the non-agricultural sector, 68.2% had monthly income <7000 Baht, 72.0% were free of co-morbid diseases, and 78.0% had used some medication in the past 3 months. Minimum, mean, and maximum knowledge scores were 3, 10.43±2.84, and 16, respectively. Corresponding attitude scores were 1.27, 2.49±0.39, and 3.00. Corresponding practice scores were 1.81, 2.68±0.22, and 3.00. Females, younger persons, unmarried persons, persons with higher education, and persons with lower income tended to have better knowledge about antibiotics. Females, younger persons, unmarried persons, persons with higher education, persons with lower income, persons without co-morbid disease, and persons who used medication in the past 3 months tended to have better attitudes toward antibiotics. Females, younger persons, Buddhists, persons with higher education persons without co-morbid disease, and person who used medication in the past 3 months tended to have better practices regarding antibiotics use. There was a relatively weak, but statistically significant, positive correlation between knowledge and practice regarding antibiotics use ($r=0.204$, $p<0.001$). There was a moderate and significant positive correlation between attitude and practice regarding antibiotics use ($r=0.474$, $p<0.001$). The study participants tended to have inadequate knowledge, inappropriate attitudes, and incorrect practices toward using antibiotics. Improvement of KAP should result in more appropriate use. Further research is needed to advance understanding of factors associated with KAP regarding antibiotics use, and to inform strategies to improve the appropriateness of their use.

Keywords: Antibiotic use, Knowledge attitudes and practices, Thailand

INTRODUCTION

Essential medicines are one of the important tools needed to improve and maintain health. However, for many people throughout the world, medicines are still unaffordable, unavailable, unsafe, and improperly used [1]. Medicines are often used incorrectly; around the world half of all medicines are prescribed, dispensed, or sold inappropriately, while 50% of all patients fail to take their medicines rationally [1, 2]. Irrational use of medicines is a major problem worldwide. The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread health hazards [2 - 4]. Antibiotics are considered among the most commonly sold drug classes in developing countries [5, 6]. An estimated two-thirds of global antibiotic sales occur without any prescription [2].

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The irrational, overuse or inadequate uses of antibiotics result not only in the rise of resistant bacteria but also ineffective therapy, more adverse drug reactions, wasted resources, higher cost of therapy and ultimately more economic burden on national and global health system [2, 6-8]. Growing resistance to antibiotics is a particularly serious global challenge and results largely from inappropriate prescribing and utilization of antibiotics [2]. Numerous studies revealed that people in the community level around the world mostly have incorrect knowledge, wrong attitudes, and inappropriate practices regarding antibiotic use [5-7, 9-12].The studies in Thailand and around the world regarding antibiotics revealed that socio-demographic characteristics are related to the level of knowledge, attitude, and practice [5, 6, 11, 13]. The relationship between knowledge, attitude, and practice regarding antibiotics use was seen in many research papers [9, 12]. There are not many studies indicated results about the level of knowledge, attitude, and practice of community antibiotics use in southern region of Thailand. The studies are formerly placed in Songkhla and Yala Province [11, 14], but in the author's knowledge, there is not available in Trang Province. This study, therefore, aims to describe the socio-demographic characteristics among study participants and to assess the level of knowledge, attitude, and practice regarding antibiotics use in Kuanthani subdistrict, Kantang district, Trang province, Thailand.

MATERIALS AND METHODS

Study design

A cross-sectional descriptive research design was used to assess the level of knowledge, attitudes, and practices regarding antibiotics use in Kuanthani sub-district, Kantang district, Trang province, Thailand between March – April 2013.

Study population and sample

There were 3,639 adults age 18 years old and over living in Kuanthani sub-district. The samples were specified to obtain suitable sample size, using Yamane formula. The total sample size was 396 subjects. Participants were selected by systematic random sampling method and proportional to size from 6 villages in Kuanthani sub-district.

Measurement tool

Self-administered structured questionnaire was the material used for this study. It was developed with the help of literature review on how to conduct KAP survey, worldwide studies regarding antibiotics, and similar studies regarding antibiotics in Thailand. The questionnaire items were internally reviewed for content validity by three experts in the field of pharmaceutical sciences, epidemiology and public health. Modifications of questionnaire items were made based on expert feedback and recommendations to suit the local population.

The pretest was conducted with 33 eligible adults aged 18 years and over with approximately the same level of socio-demographic characteristics of the study participants. The pretest results were used to adapt and develop the questionnaire until arrived with satisfactory Kuder-Richardson 20 and Cronbach alpha reliability test score. Minor changes and improvement in questionnaire items were made following the pilot test. The KR-20 score for 16 knowledge items was 0.881. The Cronbach's alpha for 15 attitude items was 0.707, and for 27 practice items was 0.721, which was appropriate.

The questionnaire was composed of four parts with most of the questions being close-ended. The first part of the questionnaire contained 9 questions about general information on the socio-demographic characteristics of the study participants, including gender, age, marital status, education, occupation, monthly income, co-morbid disease and current medication use within last 3 months. The second part contained 16 questions on knowledge regarding antibiotics such as appropriate antibiotic indications, antibiotic administration for children and adult, compliance and completion of antibiotic course, leftover antibiotics, bacterial resistance, antibiotic side effects, antibiotic allergy, drug interactions and storage of antibiotics. The right answer got 1 point and wrong answer or 'do not know' answer got zero point. The reverse score (right answer or 'do not know' answer got 0 point, wrong answer got 1 point) were calculated for items with reverse answer. The third part contained 15 questions about attitude regarding antibiotics use such as source of antibiotics, appropriate indication of antibiotics, antibiotics administration for children and adult, compliance and completion of antibiotic course, and antibiotics allergy. A five-point Likert scale ranging ('strongly agree', 'agree', 'neutral', 'disagree', and 'strongly disagree') was used to assess the response of the study participants. And reverse score marking was done for negative statement. The fourth part of the questionnaire contained 27 questions about practice regarding antibiotics use such as appropriate indication of antibiotics, source of antibiotics and the method to obtain antibiotics, self-medication with antibiotics,

compliance and completion of antibiotic course, label reading of expiry date, antibiotics sharing with others, keeping antibiotics stock at home for emergency use, and storage of antibiotics. The answers in this part have 3 levels: "Always/Usually" get 3 points and mean that the study participant practice more than half of their time. "Occasionally" get 2 points and mean that the study participant practice one-third to half of their time. And "Rarely/Never" get 1 point and mean that the study participant practice less than one-third of their time. And vice versa marking was used for negative statement.

Data collection

Data collection was conducted in March 2013 using anonymous self-administered questionnaire in Thai language. The author gave a brief review of the study and asked for written informed consent before conducting the data collection. The study participants were completely explained and assured of their confidentiality and privacy.

Data analysis

The completed questionnaires were coded and entered for analysis by SPSS program version 17 (licensed for Chulalongkorn University). Descriptive statistics of study participants' socio-demographic characteristics was reported. Numerical data was expressed as mean ± standard deviation or percentage as appropriate. The test for association on knowledge, attitude and practice was done by using Chi square statistical measurement. The study of correlation among knowledge, attitude, and practice regarding antibiotics was done by using Spearman's correlation as statistical measurement. The data was interpreted as significant when p-value is less than 0.05. The knowledge score was classified into 3 categorical levels using classification from relevant KAP study in antibiotics use [6, 15]. The knowledge score that was below 50% correct response was classified as "Low knowledge level" group. The knowledge score that was between 50-70% correct responses was classified as "Moderate knowledge level" group. The knowledge score that was above 70% correct response was classified as "High knowledge level" group. Attitude levels were categorized into 3 levels using mean score of respondents to determine. "Poor" attitude level was less than mean minus standard deviation. "Moderate" attitude level was equal mean ± standard deviation. "Good" attitude level was higher than mean plus standard deviation. Practice levels were categorized into 3 levels using mean score of respondents to determine. "Poor" practice level was less than mean minus standard deviation. "Moderate" practice level was equal mean ± standard deviation. "Good" practice level was higher than mean plus standard deviation.

Ethical consideration

The study proposal and questionnaire were sent to experts from the Ethics Review Committee for Research involving Human Research Subjects, Health Science Group, Chulalongkorn University to approve for ethical aspects before initiate data collection. Necessary changes and revision were carried out as per the feedback from the committee board before moving ahead with the data collection. The Ethics Review Committee for Research involving Human Research Subjects, Health Science Group, Chulalongkorn University approved this study (Research Number 193.1/55) on 20 February 2013.

RESULTS

Socio-demographic characteristics, co-morbid diseases, current medication use and current antibiotics use within last 3 months of study subjects were presented in Table 1. Most of the study participants were female (74.49%), almost half of them were belong to the age group 18-29 years old (45.20%), most of them were Buddhism (74.75%), around half of them were married (50.25%), the majority finished secondary school or vocational school (31.25%), worked in non-agricultural sector (68.18%), had monthly income less than 7,000 Baht (42.97%), had no underlying diseases (71.97%), currently used some medication within last 3 months (78.03%), and 40 subjects (10.10%) currently used antibiotics within last 3 month, respectively.

Table 2, regarding knowledge of the study subjects, mean knowledge score was 10.43 ± 2.84, maximum knowledge score was 16, and minimum knowledge score was 3. Distribution of knowledge level about antibiotics of the study subjects showed that less than half (41.16%) of the study subjects had high knowledge level. The moderate knowledge level was 40.91% and low knowledge level was 17.93%, respectively. The classification of knowledge level was adapted from relevant KAP study in antibiotics use [6, 15]. The knowledge score that was below 50% correct response was classified as "Low knowledge level" group, that was between 50-70% correct responses was classified as "Moderate knowledge level" group, and that was above 70% correct response was classified as "High knowledge level" group.

Table 3, regarding attitude towards antibiotics, mean attitude score was 2.49 ± 0.39, maximum

Table 1 Socio-demographic characteristics, co-morbid diseases, current medication use and current antibiotics use within last 3 months of the study subjects

Socio-demographic characteristic	Number (n)	Percentage (%)
Gender (n=396)		
Male	101	25.51
Female	295	74.49
Age (n=396)		
18-29	179	45.20
30-49	175	44.19
≥ 50	42	10.61
Religion (n=396)		
Buddhism	296	74.75
Non-Buddhism	100	25.25
Marital status (n=396)		
Married	199	50.25
Single/Widowed/Divorced/Separated	197	49.75
Education (n=395)		
≤ Primary school	76	19.24
Secondary school/Vocational school	125	31.65
Diploma	92	23.29
≥ Bachelor degree	102	25.82
Occupation (n=396)		
Agricultural sector	126	31.82
Non-agricultural sector	270	68.18
Monthly income (n=391)		
≤ 7,000 Baht	168	42.97
7,001-10,000 Baht	107	27.37
≥ 10,001 Baht	116	29.67
Co-morbid diseases (n=396)		
Yes	111	28.23
No	285	71.97
Current medication use within last 3 months (n=396)		
Yes	309	78.03
No	87	21.97
Current antibiotics use within last 3 months (n=396)		
Yes	40	10.10
No	356	89.90

Table 2 Knowledge about antibiotics of the study subjects

Statement	True n (%)	False n (%)
- Antibiotics is the medicine to treat bacterial infection	247 (62.37)	149 (37.63)
- Antibiotics is the medicine to treat viral infection, such as cold and flu	175 (44.19)	221 (55.81)
- Antibiotics is the medicine to treat muscle pain and inflammation from hard work or sport injury	232 (58.59)	164 (41.41)
- Unfinished antibiotics can be kept to use in the future	105 (26.52)	291 (73.48)

attitude score was 3.00, and minimum attitude score was 1.27. Attitude levels were categorized into 3 levels using mean score of respondents to determine. "Poor" attitude level was less than mean minus standard deviation. Therefore, respondents who had attitude mean score between 2.09 to 1.00 would be classified as "Poor Attitude Level". "Moderate" attitude level was equal mean ± standard deviation. Therefore, respondents who had attitude mean score between 2.88 to 2.10 would be classified as "Moderate Attitude Level". In addition, "Good" attitude level was higher than mean plus standard deviation. Respondents who had attitude mean score between 2.89 to 3.00 would be classified as "Good Attitude Level", respectively. The majority (75.13%) of the study subjects had moderate attitude level, follow by 65 subjects (16.67%) with poor attitude level, and 32 subjects (8.21%) with good attitude level, respectively.

Table 4, regarding practice about antibiotics use of the study subjects, mean practice score was 2.68 ± 0.22, maximum practice score was 3.00 and

Table 3 Attitudes towards antibiotics of the study subjects

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
- You should buy same antibiotics that worked for you because it helps save more money	75 (18.94)	45 (11.36)	276 (69.70)
- You should buy same antibiotics that worked for you because it helps save time to visit clinic or hospital	73 (18.43)	33 (8.33)	290 (73.23)
- You think that having antibiotics injection can treat infection faster than oral antibiotics	181 (45.82)	69 (17.47)	145 (36.71)
- You think that it is boring to finish the whole antibiotics course when your symptom is getting better	99 (25.00)	84 (21.21)	213 (53.79)
- After you recover from an illness, you think that it is not useful to take the antibiotics until finished	82 (20.87)	63 (16.03)	248 (63.10)
- You think that one should share their antibiotics with their friends	43 (10.89)	64 (16.20)	288 (72.91)

Table 4 Practice regarding antibiotics use of the study subjects

Statement	Always/Usually n (%)	Sometimes n (%)	Rarely/Never n (%)
- You take antibiotics every time that you start to feel unwell	4 (1.01)	148 (37.37)	244 (61.62)
- You search for leftover antibiotics in your house to use	8 (2.02)	126 (31.82)	262 (66.16)
- You request your doctor or healthcare professional to give you antibiotic injection for relieving your illness	9 (2.27)	64 (16.16)	323 (81.57)
- You buy antibiotics yourself by telling the trade name that you prefer	10 (2.53)	124 (31.31)	262 (66.16)
- You buy antibiotics yourself by bringing old antibiotics packaging or the sample of used antibiotics that succeeded your illness to seek for	15 (3.81)	130 (32.99)	249 (63.20)
- You buy antibiotics yourself by suggestions from your friends, family, or the person you know	8 (2.02)	68 (17.17)	320 (80.81)
- You buy antibiotics yourself by suggestions from advertisement in television, radio, newspaper and internet	4 (1.01)	69 (17.47)	322 (81.52)
- You distribute antibiotics that make your illness better to other person who have the same symptoms as you to try out	9 (2.28)	110 (27.85)	276 (69.87)
- You stop taking antibiotics as soon as your symptoms are relieved	79 (20.00)	178 (45.06)	138 (34.94)
- You keep stock some antibiotics at home in case of emergency	14 (3.55)	104 (26.40)	276 (70.05)

minimum practice score was 1.81. Practice levels were categorized into 3 levels using mean score of respondents to determine. “Poor” practice level was less than mean minus standard deviation. Therefore, respondents who had practice mean score between 2.45 to 1.00 would be classified as “Poor Practice Level”. “Moderate” practice level was equal mean ± standard deviation. Therefore, respondents who had practice mean score between 2.90 to 2.46 would be classified as “Moderate Practice Level”. In addition, “Good” practice level was higher than mean plus standard deviation. Respondents who had practice mean score between 2.91 to 3.00 would be classified as “Good Practice Level”, respectively. The majority (69.59%) of the study subjects had moderate practice level; follow by 65 subjects (16.75%) had poor practice level, and 53 subjects (13.66%) had good practice level, respectively.

Associations between general socio-demographic characteristics with knowledge, with attitudes, and with practices regarding antibiotics use were demonstrated. There were significant associations between knowledge with gender ($p = 0.001$), age ($p < 0.001$), marital status ($p < 0.001$), education ($p < 0.001$), and monthly income ($p= 0.005$), respectively. Female, younger age group, unmarried person, person who receive higher education, and person with lower income tend to had better knowledge about antibiotics. There were significant associations between attitude with gender ($p < 0.001$), age ($p < 0.001$), marital status ($p = 0.008$), education ($p < 0.001$), monthly income ($p = 0.001$), co-morbid disease of the study subjects ($p = 0.013$), and current medication use within last 3 months of the study subjects ($p = 0.005$). Female, younger age group, unmarried person, person who receives higher education, person with lower income, person who did not have co-morbid disease, and person who used some medications within last 3 months tends to had better attitudes towards

antibiotics. There were significant associations between practice with gender ($p < 0.001$), age ($p = 0.007$), religion ($p = 0.021$), education ($p = 0.006$), co-morbid disease ($p = 0.003$), and current medication use within last 3 months of the study subjects ($p = 0.004$), respectively. Female, younger age group, person who were Buddhism, person who receive higher education, person who did not have co-morbid disease, and person who used some medications within last 3 months tend to had better practices regarding antibiotics use.

There was significant weak positive correlation between knowledge and practice regarding antibiotics use ($r = 0.204$, $p < 0.001$). The study subjects who had higher knowledge score were more likely to have better practice regarding antibiotics use. There was significant moderate positive correlation between attitude and practice regarding antibiotics use ($r = 0.474$, $p < 0.001$). The study subjects who had better attitude level were more likely to have better practice regarding antibiotics use.

DISCUSSION

Around 10 per cent (10.10%) of the study subjects used antibiotics within last 3 months and the most mentioned antibiotics by the study subjects is Amoxicillin. This finding is the same as the finding from research in Greece by Skliros, et al. [16] and the research in Indonesia by Widayati, et al. [17] that Amoxicillin was the most mentioned antibiotics by the study participants. But the research in Sweden by Svensson, Haaijer-ruskamp and Lundborg [18] found that the most mentioned antibiotics medication by the study participants was Penicillin V.

Regarding knowledge questions, there was still inappropriate and inadequate knowledge and misconception among study subjects. The majority (62.37%) of the study subjects gave right answer to statement indicating correct antibiotic indication "Antibiotics is the medicine to treat bacterial infection", while 37.63% gave wrong answer to this statement, implies that there are still some misconceptions about antibiotics in the study populations. This finding is in the same direction as the study in Malaysia by Oh et al. [19] that the majority of the subjects (76.7%) could correctly identify that antibiotics are indicated for the treatment of bacterial infections. However, Oh et al. [19] also found that 67.2% of the study subjects incorrectly thought that antibiotics are also indicated to treat viral infections. This finding is in the same aspect as the author.

There were 44.19% of respondents who misunderstood that "Antibiotics is the medicine to treat viral infection, such as cold and flu". That is almost half of the respondents who have wrong knowledge. Maybe this is because they mostly experienced when they got common cold or flu and they were more likely to receive antibiotics. When they had treatment from health care facilities, such as hospitals, medical clinics, and drugstores, health care professionals might give them antibiotics when they got a common cold or flu. The findings from South Korea by Kim et al. [12] also indicated that only 31% of the study subjects can correctly answered that antibiotics cannot kill virus. In addition, the finding from Jordan by Shehadeh et al. [6] found that 67.1% of the respondents believed that antibiotics can treat common cold and cough.

There were more than half of the respondents (58.59%) who misunderstood that "Antibiotics is the medicine to treat muscle pain and inflammation from hard work or sport injury", while 41.41% have appropriate knowledge that is not the right indication of antibiotics. This statement shows that the majority of the respondents are still understand that antibiotics are the medicine to help relieve any kind of inflammation. Maybe this is because antibiotics in local Thai language called "Ya Kae Aksep" or anti-inflammatory drug in English. The respondents may link the antibiotics with other anti-inflammatory drugs, which includes NSAIDs and steroids, of which are used to treat muscle pain and inflammation. And maybe the study respondents do not aware that there are differences between inflammations caused by bacteria and by other causes. The study in Jordan by Shehadeh et al. [6] also found that 28.1% of the study respondents misused antibiotics as analgesics and anti-inflammatory drugs.

Regarding attitudes among study subjects, there were inappropriate attitudes towards antibiotics in many ways. The study by Shehadeh et al. [6] found out that 67.1% of the respondents believed that antibiotics can treat common cold and cough. Cespades and Larson [10] also found that their study participants were inaccurately believe that antibiotics help treat viral infections. You et al. [20] found that 26% of the respondents believed that antibiotics were need for common cold. Kim et al. [12] found that 48.2% of the study participants believed that antibiotics help them recover from a common cold more quickly. Vanden Eng et al. [13] found that 27% of the respondents believed that taking antibiotics when they had a cold made them better more quickly, and 32% believed that taking antibiotics when they had a cold prevented

more serious illness. Belongia et al. [9] also reported that many respondents believed that they knew when an antibiotic was needed for themselves before they went to see doctor. Belongia et al. [9] also reported that patients often have misconceptions regarding antibiotic use, and most expect to receive an antibiotic for viral respiratory illness. The study from Malaysia by Oh et al. [19] also reported that 38% of the respondents believed that taking antibiotics when they have cold symptoms could help recovery faster, while 47.3% expected antibiotics to be prescribed for common cold symptoms. Those findings are in the same direction to the author's finding that 22.22% of the respondents believed that one should start taking antibiotics as soon as possible when the symptom of sore throat or fever starts to develop. Also, 13.38% of the respondents believed that when they start to feel unwell they should take antibiotics as soon as possible to prevent more symptoms. In addition, 25% of the respondents believed that was boring to finish the whole antibiotics course when their symptom is getting better. Around 13% of the respondents had attitudes that they need to take antibiotics every time whenever they are not feeling well. Also almost half of the respondents (45.82%) believed that having antibiotics injection can treat infection faster than oral antibiotics, which was showed that they had wrong attitude.

There are also inappropriate practices regarding antibiotics seen in this study in many ways. The study by Sirirasamee [15] in Nakornpathom province, Thailand found that the inappropriate practice regarding antibiotics use such as; using antibiotics without accurate indication, buying antibiotics from grocery store, too short interval between taking food and antibiotics, incomplete antibiotics dose, and no observation of drug expiratory date. This finding by Sirirassamee [15] was also in the same way of the author's finding as well. Some of the study subjects inaccurately practice regarding antibiotics use in many aspects. Around one-third (37.37%) of the study respondents took antibiotics some time that they started to feel unwell, while 1.01% said that they always took antibiotics when they start to feel unwell. Kim et al. [12] found that 30% of the study participants said that they had requested antibiotics for treating a cold. In addition, the author's finding was similar which 18.43% of the respondents request their doctor or healthcare professional to give antibiotic injection for relieving illness. Around half of the respondents (58.48%) sometimes or never took antibiotics 30 minutes to 1 hour before meal. This is similar to Sirirassamee [15] which indicated the problem of too short interval between taking food and antibiotics. Because most antibiotics require empty stomach condition to receive better absorption.

About 13.90% of the respondents took antibiotics without looking for the label information, while 18.19% sometimes or never read the manufacturing date and expiry date of the antibiotics they were going to take.

You et al. [20] reported that 8% of the respondents share their antibiotics with family members. The author's finding that 30.13% of the respondents always or sometimes share antibiotics that make their symptoms better to others that experienced the same symptoms to try. Also, 20.2% of the respondents requested to share some antibiotics from person who have experienced the same symptoms as they were in that time.

The problem of antibiotics cessation, which was improper practice, was seen and recognized around the world in many studies. Kim et al. [12] reported that 77.6% of the respondents stop taking antibiotics when they feel better. This is similar with the author's finding that 65.06% of the respondents always or sometimes stop taking antibiotics as soon as their symptoms were relieved. In addition, the finding from Skliros et al. [16] also said that 31.5% of the respondents had earlier cessation of antibiotics when their symptoms were subside. This was malpractice and could lead to bacterial resistance and worsening of the symptoms in the future.

Morgan et al. [21] found out that many of antibiotics are sold without prescription or professional consultation, also non-prescription use and self-medication were common for non-bacterial infections. Buke et al. [5] also reported that 45.8% of the respondents self-medication with antibiotics. This is similar with the author's finding about self-medication with antibiotics in study respondents. Around one-third (33.84%) of the respondents self- medicate by telling the trade name that they prefer. Thirty-six point eight percent of the respondents self- medicate by bringing old antibiotics packaging or the sample of used antibiotics that succeeded their illness to seek for. The research findings from Sumpradit [8] also in the same direction that 70 – 80% of study subjects from Bangkok, Thailand self-medicated with antibiotics, while 40 – 60% of the study subjects from another provinces self-medicated with antibiotics. In addition, Marnous, Diaz, and Carnermolla [22] also found out that many study participants suggested self-medicating was the

preferable option to going to the doctor. Cespades and Larson [10] also found out that their participants chose self-medication because of financial and socio-cultural barriers. But this findings are in contrary with the finding from Widayati et al. [17] that only 7.3% of the respondents practice self-medication.

Shehadeh et al. [6] also found out that most of the respondents used antibiotics based on a relative or friend's advice. The author's finding that 19.19% of the respondents took antibiotics by suggestions from their friends, family, or the person they know. In addition, 18.48% of the respondents bought antibiotics by suggestions from advertisement in television, radio, newspaper and internet.

About leftover antibiotics and home stock for emergency or future use issues, they are many research findings that indicate such practice. Skliros et al. [16] found out that leftover antibiotics medicine at home was among one of the major source of antibiotics the study respondents were using. Shehadeh et al. [6] found that 49% of the respondents used leftover antibiotics, and 28.5% kept some unconsumed antibiotics at home for emergency use. Tan et al. [23] found out that 21.5% of the respondents used leftover antibiotics, and 31% used unfinished previously prescribed antibiotics first before they were going to see the doctor. Kim et al. [12] found out that 46.9% of the respondents took unconsumed antibiotics. These findings are similar with the author's finding that 33.84% of the respondents used leftover antibiotics and 29.95% kept stock some antibiotics at home in case of emergency.

Regarding knowledge, attitudes, and practices, the study participants have inadequate knowledge, inappropriate attitudes, and incorrect practices towards antibiotics in many ways. There are significant associations between practice with gender, age, education, occupation and monthly income. There is weak positive correlation between knowledge and attitude regarding antibiotics use ($p < 0.001$). The study subjects who have higher knowledge score are more likely to have better attitudes regarding antibiotics use. There is weak positive correlation between knowledge and practice regarding antibiotics use ($p < 0.001$). The study subjects who have higher knowledge score are more likely to have better practice regarding antibiotics use. There is moderate positive correlation between attitude and practice regarding antibiotics use ($p < 0.001$). The study subjects who have higher attitude level are more likely to have better practice regarding antibiotics use.

The recommendation for this study could be the policy to increase knowledge and awareness regarding antibiotics. Because some of the study participants still have wrong knowledge about antibiotics, especially correct indication of antibiotics. Some of them still have knowledge that antibiotics can treat inflammations other than inflammations caused by bacteria. And some of them have knowledge that antibiotics can kill virus that caused cold and flu. The author's point of view is that if the knowledge about antibiotics is increasing, then antibiotics awareness is also increasing, then people will use antibiotics more appropriately. Such policies to increase antibiotics knowledge may include early education in the primary or secondary school level to create good basics for Thai children on how to use medicine wisely. Another suggested policy may include mass media advertisement by the Ministry of Public Health. The advertisement may express in the television, radio, internet, or newspaper media. The story of advertisement must include appropriate antibiotics indication, and how to treat oneself without taking antibiotics in common cold or flu. The message conveyed by the advertisement should include self-medication with Thai herbal medicines such as Andrographis herb and other medicine but not using antibiotics at the first 1-2 days of common cold symptoms. Further studies should investigate more into which factors related to antibiotics knowledge, attitudes towards antibiotics use and misuse, and malpractices regarding antibiotics.

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REFERENCES

1. Hardon A, Hodgkin C. How to investigate the use of medicines by consumers. Geneva: WHO; 2004.
2. World Health Organization [WHO]. The world medicines situation. Geneva: WHO; 2004.
3. World Health Organization [WHO]. Report on infectious diseases 2000; Overcoming antimicrobial resistance. [cited 2011 Nov 20]. Available from: http://www.who.int/infectious-disease-report/2000/

4. Chuengsatiansup K, Sringernyuang L, Paonil W. Community drug use in Thailand: a situational review. Bangkok: Task Force on Situational Review of Community Drug Use in Thailand; 2000.
5. Buke A, Ermertcan S, Hosgor-Limoncu M, Cicekliogluo M, Eren S. Rational antibiotic use and academic staff. Int J Antimicrob Agents. 2003 Jan; 21(1): 63-6.
6. Shehadeh M, Suaifan G, Darwish RM, Wazaify M, Zaru L, Aljafari S. Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan: a pilot study. Saudi Pharm J. 2012 Apr; 20(2): 125-33.
7. Dy EER. Inappropriate antibiotic use in the Philippines. Phil J Microbiol Infect Dis. 1997; 26(2): 77-87.
8. Sumpradit N. Antibiotics smart use program. [Microsoft PowerPoint]; 2010 [cited 2011 Nov 20]. Available from: http://ihppthaigov.net/presentation/attachjournal/245/PPT/ppt1.ppt
9. Belongia EA, Naimi TS, Gale CM, Besser RE. Antibiotic use and upper respiratory infections: a survey of knowledge, attitudes, and experience in Wisconsin and Minnesota. Prev Med. 2002 Mar; 34(3): 346-52.
10. Cespedes A, Larson E. Knowledge, attitudes, and practices regarding antibiotics use among Latinos in the United States: reviews and recommendations. Am J Infect Control. 2006; 34(8): 495-502.
11. Kaewmang K. Knowledge, attitude, and antibiotic use for upper respiratory tract infection in Yala province [Master's thesis]. Hat Yai, Songkla: Department of social and administrative pharmacy, Faculty of pharmaceutical sciences, Prince of Songkla University; 2010.
12. Kim SS, Moon S, Kim EJ. Public knowledge and attitudes regarding antibiotic use in South Korea. J Korean Acad Nurs. 2011 Dec; 41(6): 742-9.
13. Vanden Eng J, Marcus R, Hadler JL, Imhoff B, Vugia DJ, Cieslak PR, et al. Consumer attitudes and use of antibiotics. Emerg Infect Dis. 2003; 9(9): 1128-35.
14. Saengcharoen W, Lerkiatbundit S, Kaewmang, K. Knowledge, attitudes, and behaviors regarding antibiotic use for upper respiratory tract infections: a survey of Thai students. Southeast Asian J Trop Med Public Health. 2012 Sep; 43(5): 1233-44.
15. Sirirassamee B. Antibiotics use behavior of people in Nakornpathom province. Nakornpathom: Institute for Population and Social Research, Mahidol University; 1997.
16. Skliros E, Merkouris P, Papazafiropoulou A, Gikas A, Matzouranis G, Papafragos C, et al. Self-medication with antibiotics in rural population in Greece: a cross-sectional multicenter study. BMC Fam Pract. 2010 Aug; 11: 58. doi: 10.1186/1471-2296-11-58.
17. Widayati A, Suryawati S, De Crespigny C, Hiller JE. Self-medication with antibiotics in Yogyakarta city, Indonesia: a cross sectional population-based survey. BMC Res Notes. 2011 Nov; 4: 491. doi: 10.1186/1756-0500-4-491.
18. Svensson E, Haaijer-ruskamp FM, Lundborg CS. Self-medication with antibiotics in a Swedish general population. Scand J Infect Dis. 2004; 36(6-7): 450-2.
19. Oh AL, Hassali MA, Al-Haddad MS, Sulaiman SAS, Shafie AA, Awaisu A. Public knowledge and attitudes towards antibiotic usage: a cross-sectional study among the general public in the state of Penang, Malaysia. J Infect Dev Ctries. 2011 May; 5(5): 338-47.
20. You JHS, Yau B, Choi KC, Chau CTS, Huang QR, Lee SS. Public knowledge, attitudes and behavior on antibiotic use: a telephone survey in Hong Kong. Infection. 2008 Mar; 36(2): 153-7.
21. Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systemic review. Lancet Infect Dis. 2011 Sep; 11(9): 692-701.
22. Mainous AG, Diaz VA, Carnemolla M. Factors affecting Latino adults' use of antibiotics for self-medication. J Am Board Fam Med. 2008 Mar-Apr; 21(2): 128-34.
23. Tan YSL, Hong CY, Chong PN, Tan ES, Lew YJ, Lin RTP. Knowledge that upper respiratory tract infection resolves on its own is associated with more appropriate health-seeking behaviour and antibiotic cognition. Singapore Med J. 2006 Jun; 47(6): 518-24.