EFFECTIVENESS OF THE URI PROGRAM ON PRESCRIBED ANTIBIOTICS IN UPPER RESPIRATORY INFECTION AMONG HEALTH PERSONNEL UNDER PADAD CONTRACTING UNIT FOR PRIMARY CARE, PADAD DISTRICT, CHAING RAI.

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PRIMARY HEALTH CARE MANAGEMENT
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2013

Thesis
entitled

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for the degree of Master of Primary Health Care Management
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ACKNOWLEDGEMENTS

This research paper would not have been possible without the help and support of many people.

First and foremost, it is my honor and pleasure to express my sincere gratitude to Asst. Prof. Nate Hongkrailert, my major-advisor, for his invaluable guidance, generosity, support and inspiration throughout the research paper period. His effort, assistance and commitment made the entire research paper process an enjoyable experience that I will always live to remember.

I sincerely appreciate my co-advisor, Assoc. Prof. Boonyong Keiwkarnka, for his valuable guidance and his rational way of thinking, especially concerning research methodology. My grateful appreciation is expressed to Dr. Yongyuth Pongsupap, for his valuable suggestions and comments. I will always be grateful to you both.

Also, I express sincere thanks to the leader of Chiang Rai Provincial Public Health, Dr. Chammnan Harnsuthiwetchakul, for allowing me to study in Padad district. I am also grateful to the leaders of Padad district health office and Phaya Mengrai district health office. Special thanks to all health personnel in both padad district and Phaya Mengrai district who supported and participated in this study.

I am truly grateful to Lect. Supattra Srivanichakorn, all the professors and staff of AIDH and my fellow graduate students, for sharing their intellectual ideas and extensive knowledge that enabled me to strengthen my work and their support to enable me to complete my research paper successfully. I am also thankful the ASEAN house staff for their facilities during my stay in ASEAN house.

Finally, I would like to extend my thanks to my parents and my family for their continuous support in my happy and hard times. I am forever indebted to them for their love and sacrifice.

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ABSTRACT

A quasi-experimental study was conducted on health personnel in the primary care unit of Padad district, Chiang Rai province, Thailand. The aims of this study were to compare knowledge, perception, self-efficacy of health personnel and to compare antibiotic prescription rate in URI disease before and after intervention and between an intervention and a control group. The URI program was implemented in 18 health personnel. After which, data collections were collected during the period of February to June, 2013.

The results of this study showed that the intervention group had an average score knowledge perception and self-efficacy level higher than the control group ($p < 0.0001, 0.001, 0.01$), and that average score after intervention increased over the first trial ($P = 0.0025, 0.01, 0.001$). Antibiotics prescription rate in the intervention group was reduced significantly ($P <0.0001$), while no change in control group occurred.

This study found that implementing the URI program can improve the knowledge, perception and self-efficacy of health personnel and reduced antibiotics prescription rate in URI disease throughout Padad district. Larger and long-term trials are needed to further determine the effectiveness of this intervention for URI disease.

KEY WORDS: URI DISEASE / ANTIBIOTICS PRESCRIPTION RATE / PADAD

82 pages

ประสิทธิผลของโปรแกรมโรคติดเชื้อระบบทางเดินหายใจส่วนบนที่มีผลต่อการสั่งจ่ายยาปฏิชีวนะในกลุ่มผู้ป่วยโรคติดเชื้อระบบทางเดินหายใจส่วนบนของบุคลากรสาธารณสุขในหน่วยบริการปฐมภูมิภายใต้เครือข่ายบริการสุขภาพอำเภอป่าแดด จังหวัดเชียงราย

EFFECTIVENESS OF THE URI PROGRAM ON PRESCRIBED ANTIBIOTICS IN UPPER RESPIRATORY INFECTION AMONG HEALTH PERSONNEL UNDER PADAD CONTRACTING UNIT FOR PRIMARY CARE, PADAD DISTRICT, CHAING RAI

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บทคัดย่อ

การวิจัยกึ่งทดลอง โดยการนำโปรแกรมโรคติดเชื้อระบบทางเดินหายใจส่วนบนศึกษาในบุคลากรสาธารณสุขหน่วยบริการปฐมภูมิ อำเภอป่าแดด จังหวัดเชียงรายจำนวน 18 คน วัตถุประสงค์เพื่อเปรียบเทียบความรู้ การรับรู้ ความมั่นใจของบุคลากรสาธารณสุขและเปรียบเทียบอัตราการสั่งจ่ายยาปฏิชีวนะในโรคติดเชื้อระบบทางเดินหายใจส่วนบนระหว่างก่อนและหลังได้รับโปรแกรม และระหว่างกลุ่มทดลองและกลุ่มควบคุม ดำเนินการเก็บข้อมูลตั้งแต่เดือนกุมภาพันธ์ - มิถุนายน 2556

ผลการศึกษา กลุ่มทดลองมีคะแนนเฉลี่ยความรู้ การรับรู้ มีความมั่นใจในการรักษามากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญ ($p < 0.0001$, 0.001, 0.1) คะแนนเฉลี่ยหลังการทดลองมีค่ามากกว่าก่อนทดลอง ($p < 0.0025$, 0.01, 0.001) และอัตราการสั่งจ่ายยาปฏิชีวนะหลังการทดลองลดลงอย่างมีนัยสำคัญทางสถิติเช่นกัน ($p < 0.0001$) ในขณะที่กลุ่มควบคุมไม่มีการเปลี่ยนแปลง

การศึกษานี้แสดงให้เห็นถึงผลของโปรแกรมทำให้บุคลากรมีความรู้ การรับรู้ มีความมั่นใจในการรักษาโรคมากขึ้นและทำให้การจ่ายยาปฏิชีวนะที่ไม่สมเหตุผลลดลง อย่างไรก็ตามควรมีการศึกษาในกลุ่มตัวอย่างที่ใหญ่ขึ้น ระยะเวลาศึกษาที่ยาวนานขึ้นเพื่อแสดงให้เห็นถึงประสิทธิผลของโปรแกรมการให้ความรู้โรคติดเชื้อระบบทางเดินหายใจส่วนบนต่อไป

82 หน้า

CONTENTS

CONTENTS (cont.)

LIST OF TABLES

LIST OF TABLES (cont.)

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABOs	Antibiotics
AMR	Anti Microbial Resistance
ASU	Antibiotics Smart Use
CI	Confidence Interval
CPG	Clinical Practice Guideline
CUP	Contracting Unit for Primary care
DOD	Difference Of Difference
FDA	Food and Drug Administration
GYN	Gynecology
HBM	Health Believe Model
IAU	Inappropriate Antibiotics Utilization
JHCIS	Java Health Center Information System
MOPH	Ministry Of Public Health
NART	National Antimicrobial Resistance
OB	Obstetrics
OPD	Out Patient Department
OR	Odds Ratio
PCUs	Primary Care Units
PMN	Polymorphonuclear
SD	Standard deviation
SCT	Social Cognitive Theory
URI	Upper Respiratory Infection
WHO	Worth Health Organization

CHAPTER I
INTRODUCTION

1.1 Rationale and Background

Currently, one of the most critical medical problems is the irrational use of medicines. In primary care, less than 40 % of patients in the public sector and 30 % of patients in the private sector are treated in accordance with the standard treatment guidelines of developing and transitional countries (1). Common examples of irrational drug use are; too many medicines are prescribed per patient (polypharmacy), injections are used where oral formulations would be more appropriate, antibiotics are prescribed for non-bacterial infections or prescribed in inadequate doses or for an inadequate duration - thereby contributing to the growing problem of ABOs resistance, the prescribed do not follow clinical practice guidelines, patients self-medicate inappropriately or do not adhere to the prescribed treatment. These factors lead to unnecessary adverse medicine events, such as rapidly increasing antimicrobial resistance or AMR (due to over-use of antibiotics) and the spread of blood-borne infections such as HIV and hepatitis B or C (due to unsterile injections), all of which cause serious morbidity and mortality and cost billions of dollars per year. Hence, the World Health Organization (WHO) strongly recommends that governments should focus on prevention efforts in four main areas to prevent antimicrobial resistance. These focuses are the surveillance of antimicrobial resistance, rational antibiotics use including education for healthcare workers and the public in the appropriate use of antibiotics, introducing/enforcing legislation related to stopping the selling of antibiotics without prescription, and strict adherence to infection prevention and control measures including the use of hand-washing measures, particularly in healthcare facilities (2-4).

Since 1996, policies and strategies to deal with AMR have been launched. The first draft of a national policy on antibiotics was developed and ministry of public health, Thailand set up a committee to promote the appropriate use of antimicrobial within ministry of public health hospitals. After which, the Thai ministry of public health set up the National Antimicrobial Resistance (NART) surveillance in 1997, NART was designated as a WHO Collaborating Centre in 2005. This encouraged Thai food and drug administration to initiate the Antibiotics Smart Use (ASU) Project supported by WHO. The objectives of ASU are to promote rational use of ABOs in community hospitals (e.g. for diarrhea, common cold and would) and discourage self-medication (3).

Upper respiratory tract infection (URI) seems to be the most common disease in outpatients, however, it is not a fatal disease. Up to 80 % of this illness is caused by viral infection (5). This indicates that antibiotics appear non-essential for URI treatment. On the other hand, antibiotics are widely used in practice (6-10).

As stated, in practice antibiotics are widely used. In the United States of America, antibiotics are prescribed for URI treatment in approximately 44-75 % of cases involving children and in 51- 76 % of cases involving adults (11, 25, 26). Furthermore, the antibiotic prescription rate for URI in Indonesia is 92.3 % (27). The contradiction of this knowledge showed that this illness is caused by viral infection in 80 % of cases. Therefore, antibiotics appear non-essential for URI treatment.

The Office of Disease Prevention and Control, 6, of Thailand reported that in 2006, the irrational antibiotics were prescribed among children under five years old diagnosed with acute upper respiratory tract infection amongst their area and suggested that this problem should be tackled urgently (28). Furthermore, in 2008, antibiotics were prescribed for URI at a level of 74 % in Siriraj Hospital (29). Additionally, a pilot study of antibiotic smart use in upper respiratory tract infection, acute diarrhea and laceration, was conducted in Saraburi by the Thai Food and Drug Administration and the World Health Organization in 2008. The study revealed that antibiotics were prescribed for 54.5 % of the cases (34). It can be assumed that antibiotic use in Thailand is not rational. This may lead to drug resistance (14, 15, 30, 31), adverse drug reaction (6, 9), hospitalization, death and non-necessary medical expenditure (32).

In Padad, during the period from 2008 to 2012, URI was the highest common disease in primary care units. Antibiotics were prescribed for 90 % of URI treatment (acute bronchitis, acute pharyngitis, acute sinusitis and acute tonsillitis) between October 2009 and September 2011. A health care team evaluated this problem and concluded that health professionals were lack of knowledge and confidence, the patients or their relatives needed antibiotics were the causes of the issue. Therefore, an improvement on health professional knowledge, implementation of rational antibiotics guidelines in URI, and patient education on the medicine's use and the disease could reduce antibiotic prescription.

1.2 The Research Questions

1.2.1. Can the URI Program increase knowledge, perception and self-efficacy of upper respiratory infection in health personnel?

1.2.2. Can the URI Program reduce antibiotics prescribing rate in upper respiratory infection in primary care units?

1.3 Objectives of the Study

The goal of this study is to develop the URI Program to increase knowledge, perception and self-efficacy of upper respiratory infection disease in health personnel, and to reduce antibiotic prescribing rates in upper respiratory infection disease in primary care units. Objectives of this study were to:

1.3.1 Compare knowledge, perception, and self-efficacy in antibiotic prescription for URI between an intervention group and a control group.

1.3.2 Compare knowledge, perception and self-efficacy in antibiotic prescription for URI before and after the intervention group has been educated in the URI program.

1.3.3 Compare the antibiotic prescription rate for URI between the intervention and the control group.

1.3.4 Compare the antibiotic prescription rate for URI before and after intervention group have been educated in the URI program.

1.4 Research hypothesis

Research hypothesizes consist of the following 4 keys:

1.4.1 After intervention, the intervention group will be significantly different in knowledge, perception and self-efficacy compared to the control group.

1.4.2 After applying the URI Program, the intervention group will have a greater knowledge, perception and self-efficacy than before using the program.

1.4.3 After the URI Program, the intervention group's prescribing rates will be reduced, compared to those of the control group.

1.4.4 After receiving the URI Program, antibiotics prescribing rates will be reduced, compared to before starting the program.

1.5 Conceptual framework

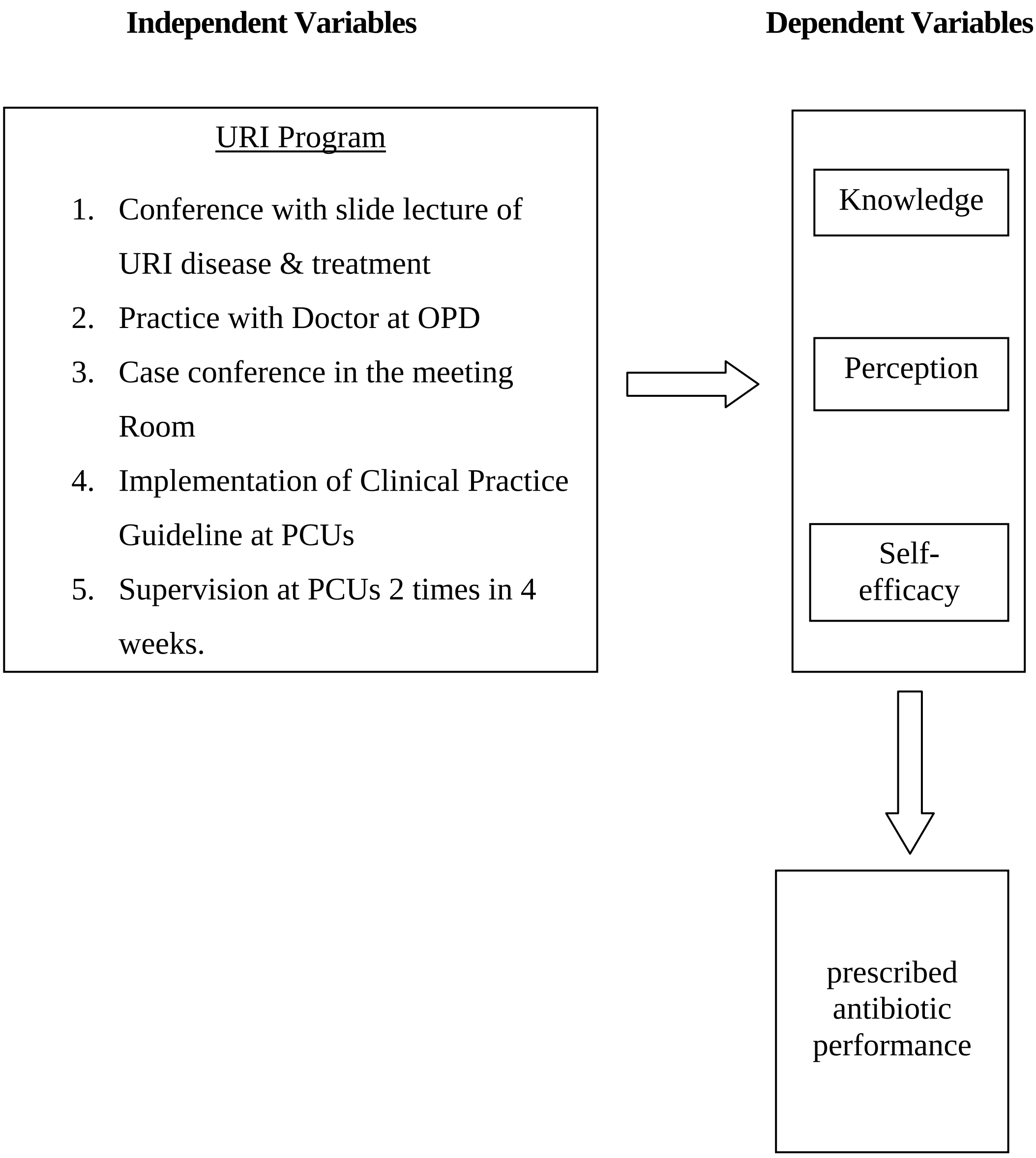

Figure 1.1 Conceptual framework

1.6 Definition of Terms

Based on the conceptual framework, the operational definitions of the variables are as follows:

1.6.1 Dependent Variables

1.6.1.1 Knowledge

This refers to the health personnel's understanding of the theory of upper respiratory tract disease and treatment, including the cause, signs and symptoms, diagnosis and treatment, antimicrobial resistant, rational antibiotic use, and rational use of clinical practice guidelines.

1.6.1.2 Perception

Perception refers to health personnel perceived risks and harms from inappropriate antibiotics prescription and the perceived severity of URI progression.

1.6.1.3 Self – efficacy

This refers to the level of a health personnel's confidence in his or her ability to diagnose and treat URI disease using antibiotics.

1.6.1.4 prescribed antibiotic performance

Prescribed antibiotics performance refers to the prescription of antibiotics to treat upper respiratory infection in PCUs by health personnel. Performance compared before and after intervention in both groups.

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16.2 Independent Variables

URI Program

The URI program refers to the instrument used in this study for the improvement of knowledge, perception and self-efficacy of health personnel, consists of the 5 following activities:

1.6.1.5 Conference in URI disease & treatment

In this activity, the conference consists of a slide lecture about the global rational use of medicine, common factors of irrational drug use and problems relating to antimicrobial resistant. Also explored are the theories of upper respiratory tract disease, including cause, signs and symptoms, diagnosis and treatment of upper respiratory disease.

The duration of this activity is two and a half (2.5) hours in the morning with two-ways communication and discussion, held at Padad hospital meeting room.

1.6.1.6 Practice with doctor

Health personnel practice learning from a URI patient with a doctor from the outpatient department of Padad hospital, exploring the history of the patient and carrying out a physical examination, diagnosis and treatment under the control of the doctor for one and a half hours (1.5). This activity is from 1.00 pm. to 2.30 pm., held after the conference.

1.6.1.7 Case conference

Health personnel are presentation with a case, which they discuss with the group by means of two-ways communication under the supervision of the doctor in the meeting room. This activity is carried out from 2.30 pm. to 4.00 pm. following practice with the doctor.

1.6.1.8 Clinical Practice Guidelines

Clinical Practice Guidelines refers to the flow chart of URI diagnosis and treatment from the ASU project (Rational drug use initiative and implementation, by Nithima et al., Thai Food and Drug Administration 2011). It is taken as a guideline for patient care in PCUs. The health personnel are instructed to treat the patient following the clinical practice guidelines fully.

1.6.1.9 Supervision

The supervision refers to the inclusion of a researcher who visits the health personnel at the PCUs, to assist and guide them in recognizing the problem from the work and to put together a solution. The researchers monitor medical records and conduct case discussion, recall knowledge of URI and encourage and direct the health personnel. Supervision is conducted for two hours, once every two weeks for two times per PCU.

1.7 Limitation of the study

The study was carried out in small district in Chiang Rai Province, Thailand. Therefore, it may not be generalized for the whole Chiang Rai Province. Because of the limitation of budget and respondents, this study need to be completed in short period of times. A larger group of respondents and long-term period were suggested to be done for further research.

CHAPTER II
LITERATURE REVIEW

This chapter reviews theory and the relevant literatures on the following topics:

2.1 URI Disease
2.2 Theoretical Model
2.3 Related Study

2.1 URI Disease

The items below address the relevant literatures in these topics:

2.1.1 The Global Rational Use of Medicines.
2.1.2 Common Irrational Drug Use.
2.1.3 WHO Recommendation to Combat Antimicrobial Resistance.
2.1.4 Policy and Strategy for Antimicrobial Resistance in Thailand.
2.1.5 Antibiotics Use in Upper Respiratory Infection.

2.1.1 The Global Rational Use of Medicines

The world medicines situation 2011 has been summarized by WHO (1).

2.1.1.1 Irrational use of medicines is an extremely serious global problem that is wasteful and harmful. In developing and transitional countries, in primary care less than 40 % of patients in the public sector and 30 % of patients in the private sector are treated in accordance with standard treatment guidelines.

2.1.1.2 Antibiotics are misused and over-used in all regions. In Europe, some countries are using three times the amount of antibiotics per head of population compared to other countries with similar disease profiles. In developing and transitional countries, while only 70% of pneumonia cases receive an appropriate antibiotic, about half of all acute viral upper respiratory tract infection and viral diarrhoea cases receive antibiotics inappropriately.

2.1.1.3 Patient adherence to treatment regimes is about 50 % worldwide and lower in developing and transitional countries, where up to 50 % of all dispensing events are inadequate (in terms of instructing patients and/or labelling dispensed medicines).

2.1.1.4 Harmful consequences of irrational use of medicines include unnecessary adverse medical events, rapidly increasing antimicrobial resistance (due to over-use of antibiotics) and the spread of blood-borne infections such as HIV and hepatitis B/C (due to unsterile injections), all of which cause serious morbidity and mortality and cost billions of dollars per year.

2.1.1.5 Effective interventions to improve use of medicines are generally multi-faceted. They include provider and consumer education with supervision, group process strategies (such as peer review and self-monitoring), community case management (where community members are trained to treat childhood illness in their communities and provided with medicines and supervision to do it) and essential medicines programmes with an essential medicine supply element. Printed materials alone have little effect and for guidelines to be effective, they need to be accompanied by reminders, educational outreach and feedback.

2.1.1.6 Less than half of all countries are implementing many of the basic policies needed to ensure appropriate use of medicines; such as regular monitoring of use, regular updating of clinical guidelines and having a medicine information centre for prescribers or drug (medicine) and therapeutics committees in most of their hospitals or regions.

2.1.1.7 The second International Conference on Improving Use of Medicines in 2004 and World Health Assembly Resolution WHA60.16 in 2007 recognize the difficulty of promoting rational use of medicines in fragmented health systems. They recommend a cross-cutting health system approach and the establishment of national programmes to promote rational use of medicines, which would require much more investment than governments and donors have so far been willing to give.

2.1.2 Common factors of Irrational Drug Use

Typical factors of irrational drug use are (2):

2.1.2.1 Too many medicines are prescribed per patient (polypharmacy).

2.1.2.2 Injections are used where oral formulations would be more appropriate.

2.1.2.3 Antimicrobial medicines are prescribed in inadequate doses or for incorrect durations, or antibiotics are prescribed for non-bacterial infections, thereby contributing to the growing problem of antimicrobial resistance.

2.1.2.4 Prescriptions do not follow clinical guidelines.

2.1.2.5 Patients self-medicate inappropriately or do not adhere to prescribed treatment.

2.1.3 WHO. Recommendation for Combat Antimicrobial Resistance

Due to antimicrobial resistance, WHO strongly recommends that governments focus control and prevention efforts in four major policies (4):

2.1.3.1 Surveillance for antimicrobial resistance.

2.1.3.2 Rational antibiotic use: education of healthcare workers and the public in the appropriate use of antibiotics.

2.1.3.3 Introducing or enforcing legislation related to stopping the selling of antibiotics without prescription.

2.1.3.4 Strict adherence to infection prevention and control measures, including the use of hand-washing measures, particularly in healthcare facilities.

2.1.4 Policy and Strategy for Antimicrobial Resistance in Thailand

The first draft of national policy in Thailand on antimicrobials was developed in 1996 through its Health Systems Research Institute. Optimal formulary for antimicrobial in Thailand was drafted; the draft indicated the following topics (3):

2.1.4.1 Standard microbiological labs

2.1.4.2 Development of human resources at all levels

2.1.4.3 Systems in hospitals

2.1.4.4 Appropriate antimicrobial use in live stocks

2.1.4.5 Ethical guidelines for drug dispensing and prescribing

2.1.4.6 A monitoring system for antimicrobial sensitivity

2.1.4.7 Epidemiological surveillance of AMR at various levels.

In 2008, the draft policy was revisited and is being revised.

In 1996 the Thai MOPH set up a committee to promote the appropriate use of antimicrobials in MOPH hospitals. In 1997, the Ministry of Public Health set up the National Antimicrobial Resistance (NART) surveillance. NART was designated as a WHO Collaborating Centre in 2005. Thai FDA initiated the "Antibiotics Smart Use - ASU" Project (with support from WHO) with the objectives to promote rational use of antibiotics in community hospitals (for common diseases, e.g. diarrhoea, common cold and wound) and to discourage self-medication.

Chulalongkorn University (with support from Thailand's Health Promotion Fund) established a three-year project in 2008 to strengthen drug surveillance and develop a drug system with five strategies: knowledge generation model development for social monitoring and intervention, network strengthening, public communication and policy advocacy.

2.1.5 Antibiotics Use in Upper Respiratory Infection

Upper Respiratory Infection (URI)

URI is an infectious process of any of the components of the upper airway. Including:

- rhinitis (inflammation of the nasal cavity).
- sinus infection or sinusitis or rhinosinusitis (inflammation of the sinuses located around the nose).
- common cold or nasopharyngitis (inflammation of the nares, pharynx, hypopharynx, uvula, and tonsils).
- otitis media (inflammation of middle ear).
- pharyngitis and tonsillitis (inflammation of the pharynx, uvula, and tonsils).

- epiglottitis (inflammation of the upper portion of the larynx or the epiglottis).
- laryngitis (inflammation of the larynx).
- laryngotracheitis (inflammation of the larynx and the trachea),
- tracheitis (inflammation of the trachea).and
- bronchitis (inflammation of the bronchus).

Upper Respiratory Infection is caused by viral infection in up to 80 % of all cases; this indicates that antibiotics appear non-essential for URI treatment. Clinical practice guidelines for URI are described below.

2.1.5.1 Antibiotics are medicines for bacterial infection. Hence, it has no role for viral infection, allergic rhinitis and the complications from them (13, 20).

2.1.5.2 Antibiotics have no role in treating viral infection but may lead to drugs resistance, adverse drug reaction, hospitalization, death and unnecessary medical expenditure (14, 15).

2.1.5.3 Antibiotics are rational in the treatment of tonsillitis or pharyngitis infected by group A beta hemolytic streptococcus (16) and may be rational for some cases such as acute otitis media (17) and acute sinusitis (18, 19).

2.1.5.4 Symptoms of upper respiratory disorder are: a runny or stuffed up nose, sneezing, coughing, sore throat, hoarseness, headache, chill, fever, muscle pain and/or fatigue (20).

2.1.5.5 Symptoms as described in item 2.1.5.4 may be caused by viral or bacterial infection, or by other medical issues. Up to 80 % of cases are caused by viral infection and 20 % of cases are caused from bacterial infection (13, 20).

2.1.5.6 From the statistic at item 2.1.5.5, it can be concluded that antibiotics should be prescribed for URI in 20 % of cases (12).

2.1.5.7 Common pathogens in URI are *Streptococcus pyogenes, Streptococcus pneumonia, Haemophilus influenza* and *Branhamellan (Moraella) catarrhalis* (20).

2.1.5.8 Oral drugs in the national essential medicines list 2008 for bacterial infection are: penicillin V (capsule, tablet, dry syrup) for *Streptococcus pyogenes*, amoxicillin (capsule, tablet) for *Streptococcus* and *Haemophilus influenza*, erythromycin (suspension, dry syrup) and roxithromycin for penicillin allergy (12).

2.1.5.9 Co-trimoxazole, clindamycin, chloramphenicol, co-amoxyclav, cephalosporins (cefalexin, cefuroxime, cefaclor, cefdinir, cefixime),clarithromycin, azithromycin, telithromycin and quinolones (ofloxacin, ciprofloxacin, levofloxacin) are avoided to treat URI because all items are not workable for URI treatment and should be prescribed by specialists to prevent antimicrobial resistance (12).

2.1.5.10 Mucoid or purulent is not an indication for antimicrobial treatment because color discharge is polymorphonuclear (PMN) after viral infection has occurred. This is progression of disease (5, 20).

2.1.5.11 Mucopurulent rhinitis (thick, opaque or discolored nasal discharge) commonly accompanies the common cold and is not an indication for antimicrobial treatment unless it persists without signs of improvement for a period of 10 to 14 days, suggesting possible acute bacterial sinusitis (10, 12).

2.1.5.12 Purulent sputum is not an indication for antimicrobial treatment because this clinical occurrence can be found in 50 % of acute bronchitis cases infected by virus at a level of 90 % (12).

2.1.5.13 High fever is not an indication for antimicrobial treatment because it can be seen in influenza or measles or dengue (16).

2.1.5.14 Pharyngitis is not an indication for antimicrobial treatment because it is not included in Centor criteria (7, 11).

2.1.5.15 No signs of fever, sore throat, runny nose, sneezing, hoarseness, red or watery eyes, rash, coughing, pneumonia clinical, apthous, diarrhoea (children) seem to indicate that it is not bacterial infection (16).

2.1.5.16 Fever (39^{o}C) with pharyngitis is not an indication for antimicrobial treatment (12).

2.1.5.17 Fever (39^{o}C) with sore throat, tonsillar exudates, enlarged lymphnode, pharyngitis, patechiae without coughing or runny nose indicates that it is infected by group A beta hemolytic streptococcus. Penicillin V, roxithromycin or amoxycillin for 10 days are rational methods of treatment (16).

2.1.5.18 Fever with earache after common cold indicates acute otitis media. The symptom will be improved within 72 hours, if the symptom persists for more than 72 hours, antibiotics may be used in this case (17).

2.1.5.19 Acute sinusitis with persistent symptom lasting more than 10 to 14 day, indicates that it is infected by bacterial infection. Amoxicillin or roxithromycin for 7 days are rational for treatment (10, 18).

2.2 Theoretical Model

The Concepts used in this study, created by 2 health care behaviour theories, are as follows:

2.2.1 Health belief model

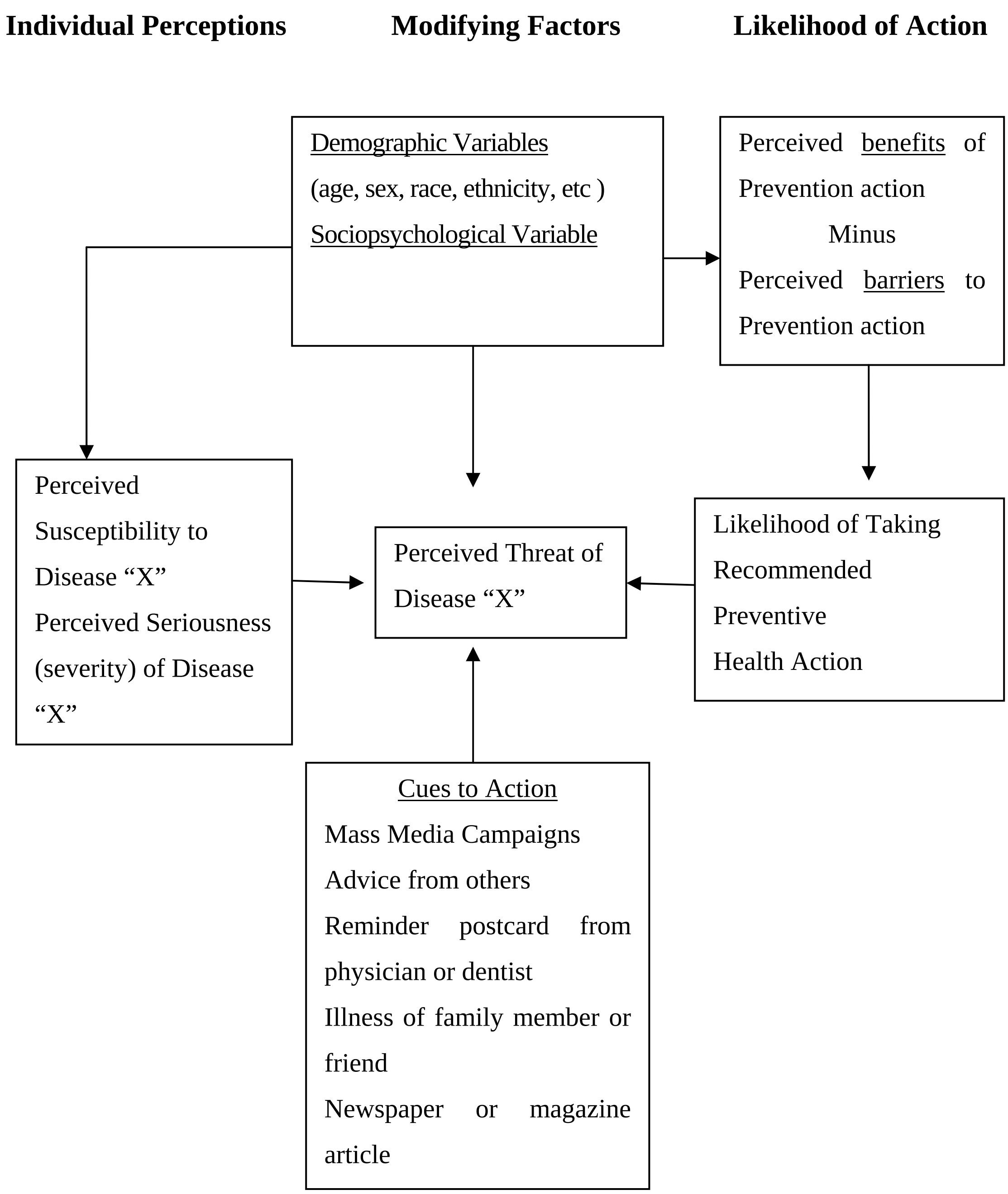

Figure 2.1 Conceptual Flame work of Health Belief Model

The Health Belief Model (HBM) was developed in the early 1950s by social scientists at the U.S. Public Health Service in order to understand the failure of people to adopt disease prevention strategies, and the use of screening tests for the early detection of disease. Later uses of HBM were for patients' responses to symptoms and compliance with medical treatments. The HBM suggests that a person's belief in personal threat of illness or disease, together with a person's belief in the effectiveness of the recommended health behaviour or action, will predict the likelihood of how the person will adopt the behaviour.

The HBM derives from psychological and behavioural theory with the foundation that the two components of health-related behaviour are 1) the desire to avoid illness, or conversely get well if already ill; and, 2) the belief that a specific health action will prevent, or cure, illness. Ultimately, an individual's course of action often depends on the person's perceptions of the benefits and barriers related to health behaviour. There are six constructs of the HBM. The first four constructs were developed as the original tenets of the HBM. The last two were added as research about how the HBM evolved.

Perceived susceptibility - This refers to a person's subjective perception of the risk of acquiring an illness or disease. There is wide variation in a person's feelings of personal vulnerability to an illness or disease.

Perceived severity - This refers to a person's feelings on the seriousness of contracting an illness or disease (or leaving the illness or disease untreated). There is wide variation in a person's feelings of severity, and often a person considers the medical consequences (e.g., death, disability) and social consequences (e.g., family life, social relationships) when evaluating the severity.

Perceived benefits - This refers to a person's perception of the effectiveness of various actions available to reduce the threat of illness or disease (or to cure illness or disease). The course of action a person takes in preventing (or curing) illness or disease relies on consideration and evaluation of both perceived susceptibility and perceived benefit, such that the person would accept the recommended health action if it was perceived as beneficial.

Perceived barriers - This refers to a person's feelings on the obstacles to performing a recommended health action. There is wide variation in a person's feelings of barriers, or impediments, which lead to a cost/benefit analysis. The person weighs the effectiveness of the actions against the perceptions that it may be expensive, dangerous (e.g., side effects), unpleasant (e.g., painful), time-consuming, or inconvenient.

Cue to action - This is the stimulus needed to trigger the decision-making process to accept a recommended health action. These cues can be internal (e.g., chest pains, wheezing, etc.) or external (e.g., advice from others, illness of family member, newspaper article, etc.).

Self-efficacy - This refers to the level of a person's confidence in his or her ability to successfully perform a behaviour. This construct was added to the model most recently in mid-1980. Self-efficacy is a construct in many behavioural theories as it directly relates to whether a person performs the desired behaviour.(29 -31)

The concept of this study was created from HBM. Its belief is that if health personnel have more knowledge, perceived risk and harm of disease (perceived susceptibility), perceived severity of disease and perceived benefits from appropriated treatment, then health personnel will have more self-efficacy and non prescription antibiotics performance (rational antibiotics use) will indeed happen (21, 22, 24).

2.2.2 Social cognitive theory

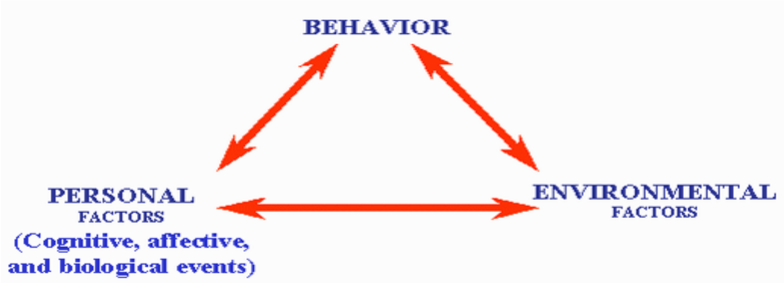

Figure 2.2 Conceptual Model of Social Cognitive Theory

Social Cognitive Theory (SCT) began as the Social Learning Theory (SLT) in the 1960s, started by Albert Bandura. It developed into the SCT in 1986 and posits that learning occurs in a social context with a dynamic and reciprocal interaction of the person, environment, and behaviour. The unique feature of SCT is the emphasis on social influence and its emphasis on external and internal social reinforcement. SCT considers the unique way in which individuals acquire and maintain behaviour, while also considering the social environment in which individuals perform the behaviour. The theory takes into account a persons past experiences, which factor into whether behavioural action will occur. These past experiences influence reinforcements, expectations, and expectancies, all of which shape whether a person will engage in a specific behaviour and the reasons why a person engages in that behaviour.

The goal of SCT is to explain how people regulate their behaviour through control and reinforcement to achieve goal-directed behaviour that can be maintained over time. The first five constructs were developed as part of the SLT; the construct of self-efficacy was added when the theory evolved into SCT.

Reciprocal Determinism - This is the central concept of SCT. This refers to the dynamic and reciprocal interaction of person (individual with a set of learned experiences), environment (external social context), and behaviour (responses to stimuli to achieve goals).

Behavioural Capability - This refers to a person's actual ability to perform a behaviour through essential knowledge and skills. In order to successfully perform a behaviour, a person must know what to do and how to do it. People learn from the consequences of their behaviour, which also affects the environment in which they live.

Observational Learning - This asserts that people can witness and observe a behaviour conducted by others, and then reproduce those actions. This is often exhibited through "modelling" of behaviours. If an individual see successful demonstration of a behaviour, they can also complete the behaviour successfully.

Reinforcements - This refers to the internal or external responses to a person’s behaviour that affect the likelihood of continuing or discontinuing the behaviour. Reinforcements can be self-initiated or in the environment, and reinforcements can be positive or negative. This is the construct of SCT that most closely ties to the reciprocal relationship between behaviour and environment.

Expectations - This refers to the anticipated consequences of a person's behaviour. Outcome expectations can be health-related or non health-related. People anticipate the consequences of their actions before engaging in the behaviour, and these anticipated consequences can influence successful completion of the behaviour. Expectations derive largely from previous experience. While expectancies also derive from previous experience, expectancies focus on the value that is placed on the outcome and are subjective to the individual.

Self-efficacy - This refers to the level of a person's confidence in his or her ability to successfully perform a behaviour. Self-efficacy is unique to SCT although other theories have added this construct at later dates, such as the Theory of Planned Behaviour. Self-efficacy is influenced by a person's specific capabilities and other individual factors, as well as by environmental factors (barriers and facilitators).

Social cognitive theory is a learning theory based on the ideas that people learn by watching what others do and will not do, these processes are central to understanding personality. While social cognovits agree that there is a fair amount of influence on development generated by learned behaviour displayed in the environment in which one grows up, they believe that the individual person (and therefore cognition) is just as important in determining moral development.

In this study, the concept was created form SCT by observational learning with the environment, behaviour, and cognition as the chief factors in influencing development (23, 24).

2.3 Related Study

2.3.1 Gonzales et al. (1997) measured antibiotic prescription rates and identified predictors of antibiotic use for adults diagnosed as having colds, upper respiratory tract infections and bronchitis in the United State, [sample survey of practicing physicians participating in the National Ambulatory Medical Care Survey, 1992.]

In office-based physician practices, subjects are physicians (n=1529) completing patient record forms for adult office visits (n = 28,787). Main outcome measures are antibiotic prescriptions for colds, upper respiratory tract infections and bronchitis.

The results of office visits for colds, upper respiratory tract infections, and bronchitis resulted in approximately 12 million antibiotic prescriptions, accounting for 21% of all antibiotic prescriptions to adults in 1992. A total of 51% of patients diagnosed as having colds, 52% of patients diagnosed as having upper respiratory tract infections and 66% of patients diagnosed as having bronchitis were treated with antibiotics. Female sex (odds ratio [OR], 1.65; 95% confidence interval [CI], 1.05-2.62) and rural practice location (OR, 2.25; 95% CI, 1.33-3.80) were associated with greater antibiotic prescription rates, whereas black race (OR, 0.44; 95% CI, 0.21-0.93) was associated with lower antibiotic prescription rates. Patient age, Hispanic ethnicity, geographic region, physician specialty, and payment sources were not associated with antibiotic prescription rates in the bivariate analysis. Multivariate logistic regression analysis identified only rural practice location (adjusted OR, 2.58; 95% CI, 1.39-4.76) to be independently associated with more frequent antibiotic prescriptions for colds, upper respiratory tract infections and bronchitis. In conclusion, antibiotics have little or no benefit for colds, upper respiratory tract infections or bronchitis, yet these conditions account for a sizable proportion of total antibiotic prescriptions for adults by office-based physicians in the United States. Overuse of antibiotics is widespread across geographical areas, medical specialties, and payment sources. Therefore, effective strategies for changing prescribing behaviour for these conditions will need to be broad based (25).

2.3.2 Nyquist et al. (1998) evaluated antibiotic-prescribing practices for children younger than 18 years who had received a diagnosis of cold, upper respiratory tract infection (URI) or bronchitis in the United States. A study design was represented by a national survey of practicing physicians participating in the National Ambulatory Medical Care Survey, conducted in 1992 with a response rate of 73%. The demographic was office-based physician practices, with physicians completing patient record forms for patients younger than 18 years being the participants. Principal diagnoses and antibiotic prescriptions was the main outcome. Results show a total of 531 paediatric office visits were recorded that included a principal diagnosis of cold, URI, or bronchitis. Antibiotics were prescribed to 44% of patients with common colds, 46% with URIs, and 75% with bronchitis. Extrapolating throughout the United States, 6.5 million prescriptions (12% of all prescriptions for children) were written for children diagnosed as having a URI or nasopharyngitis (common cold), and 4.7 million (9% of all prescriptions for children) were written for children diagnosed as having bronchitis. After controlling for confounding factors, antibiotics were prescribed more often for children aged 5 to 11 years than for younger children (odds ratio [OR], 1.94; 95% confidence interval [CI], 1.13-3.33) and rates were lower for paediatricians than for non-paediatricians (OR, 0.57; 95% CI, 0.35-0.92). Children aged 0 to 4 years received 53% of all antibiotic prescriptions and otitis media was the most frequent diagnosis for which antibiotics were prescribed (30% of all prescriptions). It could be concluded then, that antibiotic prescribing for children diagnosed as having colds, URIs, and bronchitis, conditions that typically do not benefit from antibiotics, represents a substantial proportion of the total of antibiotic prescriptions to children in the United States each year (26).

2.3.3 Coenen et al. (2004) assessed the effect of a tailored professional intervention, including academic detailing on antibiotic prescribing for acute cough. Methods used included a cluster-randomized control before and after study, 85 Flemish GPs included adult patients with acute cough, consulting in the periods of February–April 2000 and 2001. The intervention consisted of a clinical practice guideline for acute cough, an educational outreach visit and a postal reminder to support its implementation in January 2001. Antibiotic prescribing rates and patient’s symptom resolution were the main outcome measures. Results show 36 of the 42 GPs received the intervention and 35 of 43 GPs served as controls; 1503 patients were eligible for analysis. Only in the intervention group were patients less likely to receive antibiotics after the intervention [ORadj (95% CI) 5 0.56 (0.36–0.87)]. Prescribed antibiotics were also more in line with the guidelines in the intervention group [1.90 (0.96–3.75)] and less expensive from the perspective of the National Sickness and Invalidity Insurance Institute {MDadj (95% CI) = –6.89 euros [211.77 2 (22.02)]}. No significant differences were found between the groups at the time of symptom resolution. Its conclusions, an (inter) actively delivered tailored intervention implementing a guideline for acute cough is successful in optimizing antibiotic prescribing without affecting patients' symptom resolution. Further research efforts should be devoted to cost-effectiveness studies of such interventions (33).

2.3.4 Nitima et al. (2008) assessed the effect of Antibiotics Smart Use Project (ASU) on antibiotic prescribing for acute upper respiratory infection, acute diarrhoea and bleeding wounds in Saraburi province compared with Ayuttaya province, Thailand. Methods used were a quasi-experimental study and a before and after study of 315 health personnel from community hospitals and health centres. The study took place between December 2006 and May 2008. Conceptual flam work of ASU used a PRECEDE-PROCEED planning model. The outcome was knowledge, confidence, intention to not prescribe antibiotics and the lowering of antibiotics non-prescribing rate in URI patients. The result of this study showed that, knowledge, confidence and intention to adhere to the non-prescribing of antibiotics throughout health personnel in the intervention group was rising significantly ($p<0.001$). Statistically, in the intervention group the non-prescribing rate was 45.5% and 74.7 %, and in the control group 42.3 % and 44.2 % respectively. The non-prescribing rate in intervention group was statistically significant ($p<0.001$), while in the control group statistically was not significant (34).

2.3.5 Saengcharoen et al. (2008) investigated predictors of intention to dispense antibiotics for URI among community pharmacists. Self-administered questionnaires were used in this study. The questionnaires were mailed to all community pharmacists in the south of Thailand, measuring intention to dispense antibiotics, attitude, subjective norm, perceived behavioural control, behavioural beliefs, normative beliefs and control beliefs. A total of 656 completed questionnaires were returned out of the 833 sent. The pharmacists' intention to dispense antibiotics for URI was low (mean ± SD; 2.35 ± 1.85 on a 7-pointscale), and strongly influenced by attitude. The beliefs in no benefit of antibiotics had the strongest effects on attitude. Subjective norm had a weak effect on intention, whereas perceived behavioural control had practically no effect. To draw a conclusion, based on this experience of well-informed community pharmacists having proper intention of practice and low control effect, future programmes for rational drug use should emphasize education rather than regulation (36).

2.3.6 Apisanthanarak et al. identified prevalence and factors associated with inappropriate antibiotic utilization. Two point prevalence surveys of antibiotics utilization were performed in a 400-bed teaching hospital, Thailand. Data corrected included: demographics, hospital units, prescribing physicians, indication of antibiotic prescription, request for ID consultation, appropriate antibiotic utilization and reasons for inappropriate antibiotic utilization. Measures were scored compared to pre-existing guidelines. Results showed that of the 502 patients admitted during the period of study, antibiotics were prescribed for 319 patients (63.5 %), 71.5 % of this group received antibiotics as empirical therapy and 24.8 % of them received inappropriate antibiotic utilization. The most common reason for inappropriate antibiotic utilization was the use of antibiotics without evidence of infection (39 %). Surgery (39 %) and OB and GYN (25 %) were the most common units associated with inappropriate antibiotic utilization, while antibiotics associated with inappropriate antibiotic utilization were third generation cepharosporins, vancomycin. By multivariate analysis, inappropriate antibiotic utilization was associated with admission to surgery (95% CI = 1.1-3.7) and OB and GYN (95% CI = 1.1-4.1). Patients who received ID consultation were less likely to receive IAU (95% CI = 0.03-0.65). There was no significant difference in respect to demographics, prevalence of inappropriate antibiotic utilization and factors associated with inappropriate antibiotic utilization between the two surveys. In conclusion, inappropriate antibiotic utilization is common in this hospital. Intervention targeting patients admitted to specific services, improving clinical recognition of infectious diseases by education and ID consultation may reduce inappropriate antibiotic utilization (37).

2.3.7 Gerber et al. (2010) studied the effect of an outpatient antimicrobial stewardship intervention on broad-spectrum antibiotic prescribing by primary care paediatricians. A randomized trial, the objective was to evaluate the effect of an antimicrobial stewardship intervention on antibiotic prescribing for paediatric outpatients. The test group was a network of 25 paediatric primary care practices in Pennsylvania and New Jersey; 18 practices (162 clinicians) participated. The study used a Cluster randomized trial of outpatient antimicrobial stewardship, comparing prescribing between intervention and control practices using a common electronic health record. After excluding children with chronic medical conditions, antibiotic allergies, and prior antibiotic use, an estimation was drawn of prescribing rates for targeted ARTIs standardized for age, sex, race, and insurance, from 20 months before the intervention to 12 months afterward (October 2008-June 2011). The result found that Broad-spectrum antibiotic prescribing decreased from 26.8% to 14.3% (absolute difference, 12.5%) among intervention practices varies from 28.4% to 22.6% (absolute difference, 5.8%) in controls (difference of differences [DOD], 6.7%; P = .01 for differences in trajectories). Off-guideline prescribing for children with pneumonia decreased from 15.7% to 4.2% among intervention practices compared with 17.1% to 16.3% in controls (DOD, 10.7%; P < .001) and for acute sinusitis from 38.9% to 18.8% in intervention practices and from 40.0% to 33.9% in controls (DOD, 14.0%; P = .12). Off-guideline prescribing was uncommon at baseline and changed little for streptococcal pharyngitis (intervention, from 4.4% to 3.4%; control, from 5.6% to 3.5%; DOD, -1.1%; P = .82) and for viral infections (intervention, from 7.9% to 7.7%; control, from 6.4% to 4.5%; DOD, -1.7%; P = .93) (38).

2.3.8 Jerkins et al. (2012) studied the effects of clinical pathways for common outpatient infections on antibiotic prescribing. The objective was to evaluate the effect of a clinical pathway-based intervention on antibiotic use. Studies in Eight primary care clinics were randomized to receive clinical pathways for upper respiratory infection, acute bronchitis, acute rhinosinusitis, pharyngitis, acute otitis media, urinary tract infection, skin infections, and pneumonia, with patient education materials (study group) versus no intervention (control group). Generalized linear mixed effects models were used to assess trends in antibiotics prescriptions for non-pneumonia acute respiratory infections and broad-spectrum antibiotic use for all 8 conditions during a 2-year baseline and 1-year intervention period. The results found that in the study group, antibiotic prescriptions for non-pneumonia acute respiratory infections decreased from 42.7% of cases at baseline to 37.9% during the intervention period (11.2% relative reduction) (P<.0001) and from 39.8% to 38.7%, respectively, in the control group (2.8% relative reduction) (P=.25). Overall use of broad-spectrum antibiotics in the study group decreased from 26.4% to 22.6% of cases, respectively (14.4% relative reduction) (P<.0001) and from 20.0% to 19.4%, respectively, in the control group (3.0% relative reduction) (P=.35). There were significant differences in the trends of prescriptions for acute respiratory infections (P<.0001) and broad-spectrum antibiotic use (P=.001) between the study and control groups during the intervention period, with greater declines in the study group (39).

2.3.9 Kanya panintorn (2004) studied the effect of an applied health belief model with occupational infection solution and personnel involvement at the surgery intensive care unit, King Phramongkut hospital, using a quasi-experimental study. The aim was to know the results of the application of the Health Belief model with the finding of solutions by the participation of health personnel. The sample consisted of 35 personnel. Participants were encouraged to join specific activities. The sample group participants held discussions 4 times a week, increasing their knowledge and observation, for 6 weeks. The results showed that after the activities, personnel had an average knowledge of the understanding of infectious diseases. This increased significantly to 0.001, and average perception of risk of infection increased to the level of 0.01. An average behaviour of operating by following the principles of infectious diseases after the experiment found that the samples where increasing their performing behaviour more than before the experiment, at the significant level of 0.01 (40).

2.3.10 Thanawat jundamhee (2008) was a study in the effectiveness of the health program by the application of the Health Belief Model with social support to prevent smoking habits. The objective was to study the application of the Health Belief Model and increase social learning on smoking habits to students at grade 3.

Each group, the test group and the control group, consisted of 35 students from an expanding educational school in Muang district, Nhong kai. The intervention was giving activity-based health education programming to the experimental group consisting of 5 areas. These areas included video lectures, group discussion, a home visit and a study role model. The results showed that cognitive, self-efficacy to various matters and behavioural intentions not to smoke had increased further to before the experiment, more than the comparison group and statistically significant at the 0.05 level (41).

CHAPTER III
RESEARCH METHODOLOGY

In this study, the researcher has used the concept of theory and research related to the study to make guidelines for the program, in order to educate health personnel under Padad contracting unit for primary care (CUP) and to change the behavior of antibiotics prescribed for URI treatment. The study process is shown in the following topics.

3.1 Study design & research model

3.2 Study location

3.3 Study population

3.4 Research instrument

3.5 Step of study & data collection

3.6 Data management & analysis

3.1 Study design & research model

This study is a quasi-experimental study to improve health personnel knowledge. The study is intended to support knowledge and perception for health personnel, by using the URI program. After which, the objective will be to compare knowledge, perception, self-efficacy and antibiotic prescription rate before and after intervention from the intervention group, as well as the comparing of the intervention group and the control group.

Research model is Pre test- post test with Two-Group Design. The chart was as follows.

Group	Pre-test	Intervention	Post-test
Intervention Group	O1	X	O2
Control Group	O1	-	O2

Figure 3.1 The chart of trial 1

O1 = Pre-test and data collection
X = URI program
O2 = Post-test and data collection

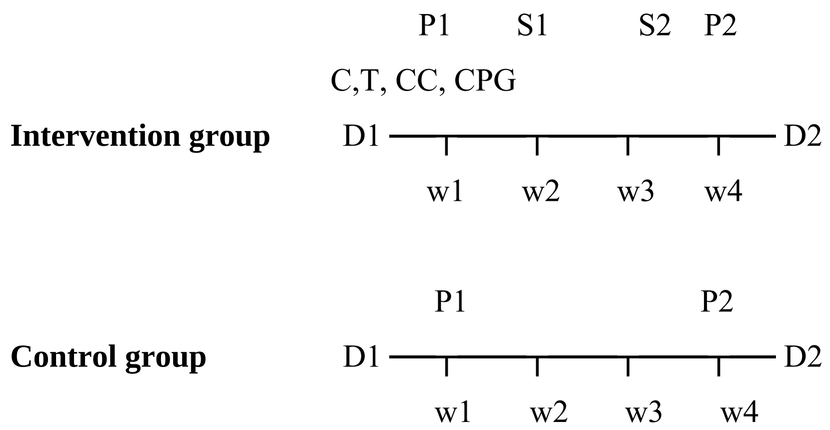

Figure 3.2 The chart of trial 2

P1 = Pre-test
P2 = Post-test
C = Conference in URI disease
T = Training at OPD
CC = Case Conference
CPG = Implementing clinical practice guidelines
S1 = First supervisor
S2 = Second supervisor
D1 = First data collection of antibiotic prescribing in URI
D2 = Second data collection of antibiotic prescribing in URI

3.2 Study location

This research was undertaken at Padad District and Phaya Mengrai District, Chiang Rai Province in Northern Thailand.

General information of Padad district and Phaya Mengrai district:

Padad is a small district located at the southern part of Chiang Rai province. It is about 53 kilometers from Chiang Rai and the area is 333 square kilometers. Padad district is divided to 5 sub-districts, with 58 villages. There are 7,262 households and 26,247 people residing in the area: 13,122 persons are male and 13,125 are female. The Main occupation is agriculture and almost all people are Buddhist. In relation to health facilities, Padad has a 30-bed hospital, a district health office and 6 Health Centers. For health centers, there are 6 heads of PCUs, 6 practitioner nurse, 4 public health professionals and 2 local public health officers, totaling 18 persons.

Phaya Mengrai district is located in the middle-east part of Chiang Rai province. It is about 46 kilometers from Chiang Rai and the area is 620 square kilometers in size. Phaya Mengrai district is divided to 5 sub-districts, with 71 villages. There are 42,080 people residing in the area: 21,138 of which are male and 20,942 female. The Main occupation is agriculture and almost all people are Buddhist. As concerns health facilities, Phaya Mengrai has a 30-bed hospital, a district health office and 8 Health Centers. For health centers, there are 8 heads of PCUs, 8 practitioner nurse, 2 public health professionals and 2 local public health officers, totaling 20 persons.

3.3 Study Population

The Study population was health personnel who work in PCUs at Padad District and Phaya Mengrai District. There were divided into two groups:

1) Intervention group: The intervention group is made up of health personnel who work in PCUs at Padad district, Chiang Rai province. This group consists of 6 heads of PCUs, 6 practitioner nurse, 4 public health professionals and 2 local public health officers, totaling 18 persons.

2) Control group: The control group is made up of health personnel who work in PCUs in Phaya Mengrai district, Chiang Rai province. This group consists of 8 heads of PCUs, 8 practitioner nurse, 2 public health professionals and 2 local public health officers, totaling 20 persons.

3.3.1 Inclusion criteria

- Health personnel who work in PCUs under Padad Contracting Unit for Primary care, Padad district, Chiang Rai province.
- Health personnel who work in PCUs under Phaya Mengrai Contracting Unit for Primary care, Phaya Mengrai district, Chiang Rai province.

3.3.2 Exclusion criteria

- Health personnel who where not available or refused to provide information.
- Health personnel who work in Primary Care Units at Padad Hospitals.
- Health personnel who work in Primary Care Units at Phaya Mengrai Hospitals.

3.4 Research instruments

Instruments used in this study are categorized into two main types – instruments used in the study and instruments used to collect data.

3.4.1 Instrument used in the study

Instruments used in this study for the URI Program were developed and began in March 2012. The process was divided into 2 steps, content validity and reliability. Content validity and reliability were assessed by 3 experts regarding the content and duration of the URI Program (including: slide lecture, practicing, case conference, supervision and content of clinical practice guidelines). In relation to the experts' suggestions, the URI program has been conducted accordingly. After which, a 'think aloud' technique was performed to include 5 health care personnel who work in PCUs at Pan district, Chiang Rai Province.

The URI Program included the following 5 activities:

3.4.1.1 Conference in the meeting room with a slide lecture

This activity consists of a slide lecture about global rational use of medicine, commonness of irrational drug use, the problem of antimicrobial resistant and the theory of upper respiratory tract disease, including the causes, signs and symptoms, the diagnosis and the treatment of upper respiratory disease. The duration of this activity was 2 hours and 30 minutes, from 09.30 am to 12.00 am.

3.4.1.2 Practice with doctor

In this activity, health personnel were divided into 3 groups. Each group practiced learning from a URI patient with a doctor from the outpatient department of Padad hospital in at least 1 case. The activity consisted of patient history, physical examination, diagnosis and treatment under the control of the doctor. This activity took place from 13.00pm to 14.30pm.

3.4.1.3 Case conference at meeting room

After practice with the allocated doctor, from 14.30pm – 16.00 pm a case conference was held in the meeting room, with 1 case per group. Case presentations were shown, then were discussed with the group by means of two-way communication under the supervision of the doctor.

3.4.1.4 Clinical Practice Guideline

Clinical Practice Guideline was presented through the flow chart of URI diagnosis and treatment. It was taken as a guideline for patient care at PCUs. The health personnel who treated the patients where instructed to follow the clinical practice guideline.

3.4.1.5 Supervision

For supervision, the researcher visited health personnel at PCUs once every two weeks, for two times per PCU. This activity was carried out for the purpose of 1) recognizing the problem from the work and putting together a solution, 2) the monitoring of medical records and case discussion, 3) reinstating knowledge of URI, and 4) to encouraged and guide health personnel.

3.4.2 Instruments used for collect data

The research instruments used to collect data in this section of the study were divided into two types, questionnaire and JHCIS program. Details of instruments mentioned were as follows:

3.4.2.1 Questionnaire: A structured questionnaire written in English and in Thai based on the conceptual framework, and developed for data collection. Most of the questions were closed ended questions, with a few short opened questions included. The researcher distributed Thai questionnaire to health personnel to collect relevant data. The questionaire consists of 32 questions in four categories:

Part 1: This part contains 6 questions about **socio-demographic factors** of the respondent. This includes age, sex, education status, occupation, duration of work, and main workplace.

Part 2: This part has 14 questions about the recipatents knowledge of URI disease, rational antibiotic use and rational clinical practice guidelines**.** The answers are multiple choice, using the most accurate answer by choosing 1 of 4 options for each question. Answered correctly will count as 1 point whilst a wrong answer will count as 0 points. Interpretation to be done by assessing the knowledge score obtained by the respondents.

Part 3: This part has 7 questions about perception of risks and harms from inappropriate antibiotic prescriptions and the severity of URI progression.

The questions consist of 5 levels of rating scale, which include both positive and negative stances, defined by the following criteria.

Positive questions scaling		**Negative questions scaling**	
Strongly Agree	= 5	Strongly Agree	= 1
Agree	= 4	Agree	= 2
Neutral	= 3	Neutral	= 3
Disagree	= 2	Disagree	= 4
Strongly disagree	= 1	Strongly disagree	= 5

Part 4: In the final part, the questionnaire has 5 questions about the self-efficacy of healthcare workers towards non-prescribed antibiotics in URI. The questions consist of 5 levels of rating scale, which include both positive and negative stances, defined by the following criteria.

Positive questions scaling		**Negative questions scaling**	
Extremely confident	= 5	Extremely confident	= 1
Confident	= 4	Confident	= 2
Not sure	= 3	Not sure	= 3
Not confident	= 2	Not confident	= 4
Extremely not confident	= 1	Extremely not confident	= 5

Questionnaire Development

This process will be divided into 2 steps, content validity and reliability. The perception of antibiotic prescription for URI will be tested and developed.

1) Content validity is the means to indicate whether questions are related to objectives of the study, 3 experts to achieve this will assess it. Due to the experts suggestions, question revision will be conducted, then think aloud technique in 5 health care professional in PCUs will be performed to recognize whether questions are clear and understandable.

2) Reliability is to determine whether the questionnaire is consistent. Attitude towards antibiotic prescription for URI will be tested in this process.

The questionnaire will be completed by 20 health care professional of PCUs who have been educated in Antibiotic Smart Use Program in Chiang San district, Chiang Rai province.

3.4.2.2 JHCIS Program: the instrument used for collecting prescribing data was the JHCIS Program, all of the PCUs collected data from the patient using the computer. The JHCIS program is a program for data collection and processing information for all services. Therefore, the data of an URI patient can be retrieved from the RAM in the computer of all PCUs.

3.5 Step of study & Data collection Procedure.

3.5.1 Step of study

URI Program has been constructed based on the Health belief model and Social cognitive theory. Believing that, if Health personnel have more knowledge of URI disease, rational antibiotics use, rational clinical practice guidelines, perception of risks and harms from inappropriate antibiotic prescriptions and the severity of URI progressions, they will have the self-efficacy to not prescribe antibiotics in URI disease. The result of which being, that non-prescribed antibiotic behaviors will incur.

This program was carried out for 4 weeks starting in April 2013. The steps of study was carried out as follows: (Figure 3.3)

Duration (weeks)	Detail of Program
1	**First Day** **Intervention group** : 08.30 AM - 09.00 AM: The intervention group was met at Padad hospital meeting room, the researcher distributed the questionnaires to them and described them in detail. They completed the pre-test in about 30 minute and the questionnaires were collected after completion. 09.00AM-12.00 AM: Conference about knowledge and treatment of Upper Respiratory infection disease at meeting room Padad hospital. 13.00PM - 14.30 PM: Practice with doctor at OPD of Padad hospital 14.30 PM - 16.00 PM: Case conference at Padad hospital meeting room. After finishing the conference, the clinical practice guidelines were distributed to all PCUs for treatment of the URI patient, in order that the PCU's follow the clinical practice guidelines. **Control group:** pre-test only at phaya Mengrai Health District office.
2 - 3	**Intervention group**: Supervision of PCUs for the first time.
4	**Intervention group**: Supervision for the last time followed by post-test by PCUs **Control group**: post-test at Phaya Mengrai Health district office.

Figure 3.3 Step of study

3.5.2 Data collection

The data collection was started with following steps:

3.5.2.1 Asking permission from Padad and Phaya Mengrai health district officer to collect database from PCUs (JHCIS Program).

3.5.2.2 Preparation and development of questionnaire to obtain collected data from the health professional.

3.5.2.3 Clarifying sample groups to understand the research process and to allow data collection.

3.5.2.4 The questionnaires were distributed to the health personnel in both groups for pre-testing. Intervention was applied in intervention group. Following intervention, the questionnaire was distributed to the health personnel in both groups again for post-testing and collected after completion.

3.5.2.5 Data from pre-tests and post-tests were collected

3.5.2.6 Data from the URI patients have been collected from JHCIS program. The data was divided into two phases, 2 months for pre-phase (Feb 2013 - March 2013) and post-phase after intervention for 2 months (May 2013- June 2013).

3.6 Data management and analysis

This study is a quasi-experiment study, with the sample size being 18 persons in intervention group and 20 persons in control group. The study using small sample sizes (less than 30) means nonparametric statistical test results will prove to be better and more accurate than statistical parametric. On the other hand, the study with the large sample size (more than 30) means the parametric statistical test result will be provided better and more accurate than statistical nonparametric. So in this study, non parametric were used to analyze pre-test data and post-test data of health personnel (sample size less than 30), while parametric was used to analyze antibiotics prescription rate were the sample size was larger (more than 30). The data analysis was analyzed by statistical tests as follows:

3.6.1 The Wilcoxon test was used to compare pre-test and post-test scores in the intervention group for the knowledge, perception and self-efficacy parts of the study.

3.6.2 The Mann-Whitney test was applied to compare the pre-test and post-test score between the intervention and the control group for the knowledge, perception and self-efficacy parts of the study.

3.6.3 Z test for proportions was performed to compare antibiotic prescription rate for URI before and after intervention to the intervention group, and will be used by the URI program to compare with the control group simultaneously.

CHAPTER IV
RESULTS

The objectives of the study were 1) to compare knowledge, perception and self-efficacy of antibiotic prescribing in upper respiratory tract infection (URI) between the intervention and the control group 2) to compare knowledge, perception and self-efficacy in upper respiratory tract infection before and after intervention 3) to compare antibiotic prescription rate in URI between the intervention and the control group 4) to compare antibiotic prescription rate in URI of the intervention group before and after intervention.

The data collection process was conducted from February 2013 to June 2013 in Padad district and Phayamengrai district, Chiang Rai province, Thailand. The data of pre-test and post-test from the personnel group was analyzed by using the Wilcoxon and Mann-whitney tests, while the data of the prescription of antibiotics in URI patients was analyzed by using Z-test for proportions. The significance level of 0.05 was applied for the statistical test in this study. The results were analyzed and illustrated. This is shown below:

4.1 Demographic and characteristics of participants.

4.2 Comparison of knowledge, perception and self-efficacy of antibiotic prescribing in URI between intervention and control group.

4.3 Comparison of knowledge, perception and self-efficacy in URI before and after intervention.

4.4 Comparison of antibiotic prescription rate in URI between the intervention group and control group.

4.5 Comparison of antibiotic prescription rate in URI of intervention group before and after intervention has taken place

4.1 Demographic and characteristics of participants

A total of 38 participants were enrolled, which consisted of 18 and 20 participants in the intervention and the control group respectively. In the intervention group, most participants were female (61.11%). The majority of them (83.33%) held graduate bachelor degrees, while 11.11 percent finished Diploma degrees. Only 5.56 percent held graduate Masters and all of them work at PCU. The range of age was from 24 to 53 years with a mean age of 39.84 years. 44.44 percent of them were aged 30 to 39 years, followed by 40 to 49 (22.22 %) and 50 to 59 year olds (22.22 %). The range working experience was from 2 years to 31 years with a mean of 10.33 years. 55.56 percent of them had working experience of 6 to 10 years and 27.78 % had work experience of 1 to 5 years.

In regards to the control group, three quarters of the participants were female and three quarters held a graduate bachelor degree. 15 percent had graduated with a Master's and only 10 percent finished a Diploma degree. The average age of the control group was 40.7 years, with the range age being from 25 to 50 years. 55 percent of them were aged 40 to 49 years, followed by 30 to 39 year olds (30 %). The range working experience was from 3 years to 17 years with a mean of 7 years. Half of them had working experience of 1 to 5 years with 35% of them with work experience of 6 to 10 years. All where employees of PCU. (Table 4.1)

Table 4.1 Demographic Characteristics of Participants

No	Characteristics	Intervention group		Control group	
		Amount	Percentage (%)	Amount	Percentage (%)
1	Gender				
	Male	7	38.89	5	25
	Female	11	61.11	15	75
2	Education Level				
	Master's	1	5.56	3	15
	Bachelor	15	83.33	15	75
	Diploma degree	2	11.11	2	10
3	The workplace is PCUs	18	100	20	100
4	Age (years)				
	20 – 29	2	11.11	2	10.00
	30 – 39	8	44.44	6	30.00
	40 – 49	4	22.22	11	55.00
	50 – 59	4	22.22	1	5.00
	Intervention group Mean = 39.4	Min = 24	Max = 53	SD	= 8.59
	Control group Mean = 40	Min = 25	Max = 50	SD	= 6.73
5	Work experience (years)				
	1 – 5	5	27.78	10	50.00
	6 – 10	10	55.56	7	35.00
	11 – 15	-	-	1	5.00
	16 – 20	-	-	2	10.00
	21 – 25	1	5.56	-	-
	> 25	2	11.11	-	-
	Intervention group Mean = 10.33	Min = 2	Max = 31	SD	= 8.65
	Control group Mean = 7.00	Min = 3	Max = 17	SD	= 3.93

4.2 Comparison of knowledge, perception and self-efficacy of antibiotic prescribing in URI between the intervention and the control group.

4.2.1 Knowledge

The results of the pre-test and post-test show, that health personnel have more knowledge after use of the URI program as applied in the intervention group. Health personnel in the intervention group answered the questions correctly in 10 out of the14 items. The items that health personnel from both groups answered incorrectly were the items no 2 and no11. They where also mistaken in that the URI disease caused by virus together with bacteria, and subsequently used antibiotics that are inappropriate with the treatment of the disease. The results can be seen in table 4.2

Table 4.2 Number of participants that were correct in their answers of URI knowledge and treatment in the experimental group and control group, comparing pre-test and post-test by item.

	Intervention group				**Control group**			
	Pre test		**Post test**		**Pre test**		**Post test**	
Item.	Amount	(%)	Amount	(%)	Amount	(%)	Amount	(%)
1	17	94.44	18	100	18	90	18	90
2	9	50	13	72.22	15	75	11	55
3	16	88.89	18	100	19	95	20	100
4	18	100	18	100	18	90	15	75
5	18	100	18	100	18	90	16	80
6	18	100	16	88.89	19	95	16	80
7	15	83.33	18	100	17	85	17	85
8	18	100	18	100	17	85	16	80

Table 4.2 Number of participants that were correct in answers of URI knowledge and treatment in the experimental group and control group, compare pre-test and post-test by item. (cont.)

	Intervention group				**Control group**			
	Pre test		**Post test**		**Pre test**		**Post test**	
Item.	Amount	(%)	Amount	(%)	Amount	(%)	Amount	(%)
9	11	61.11	15	83.33	11	55	7	35
10	15	83.33	18	100	14	70	12	60
11	6	33.33	13	72.22	6	30	3	15
12	18	100	18	100	19	95	18	90
13	16	88.89	18	100	19	95	18	90
14	18	100	18	100	20	100	19	95

After intervention, the majority of the intervention group demonstrated higher knowledge, 11.83 (SD = 1.200) and 13.17 (SD = 0.92) before and after the URI program was implemented, respectively. The knowledge of control group before and after intervention is shown at 11.50 (SD = 1.70) and 10.3 (SD = 2.62). (Table 4.3)

Table 4.3 Knowledge of antibiotic prescribing in patients with the correct URI in the experimental and the control group before and after using the URI Program (by person).

Participant	Intervention group		Variance	Control group		Variance
	pre test	post test	of scores	pre test	post test	of scores
1	12	13	1	13	13	0
2	10	13	3	13	13	0
3	11	13	2	7	5	-2
4	13	12	-1	12	8	-4
5	11	13	2	13	9	-4
6	12	14	2	11	12	1
7	12	13	1	12	12	0
8	11	14	3	11	10	-1
9	13	14	1	10	10	0
10	13	14	1	12	12	0
11	11	14	3	13	12	-1
12	12	14	2	11	10	-1
13	12	12	0	13	8	-5
14	13	14	1	9	7	-2
15	14	13	-1	10	6	-4
16	9	12	3	12	13	1
17	12	11	-1	10	8	-2
18	12	14	2	14	14	0
19	-	-	-	11	13	2
20	-	-	-	13	11	-2
Mean	11.83	13.17	24	11.5	10.3	-24
SD	1.2	0.92		1.7	2.62	

The level of knowledge regarding rational antibiotic prescribing in URI between the intervention group and the control group was analyzed using the Mann Whitney test, before intervention the statistical evidence shows a non-significant difference (p-value = 0.70). (Table 4. 4)

Table 4.4 The knowledge of rational antibiotic prescribing in URI between the groups before Intervention [*]

Knowledge	N	MR	SR	U	Z	p-value
experimental group	18	20.25	364.50	166.5	-0.405	0.7
control group	20	18.83	376.50			
Total	38					

* = The data were analyzed by Wilcoxon signed ranks (Mann Whitney)

After intervention, the knowledge of rational antibiotic prescribing in URI showed statistically significant difference between the groups (p-value < 0.0001). (Table 4.5)

Table 4.5 The knowledge of rational antibiotic prescribing in URI between the groups after intervention[#]

Knowledge	N	MR	SR	U	Z	p-value
experimental group	18	9.50	171	0	- 5.303	<0.0001*
control group	20	28.50	570			
Total	38					

= The data were analyzed by Wilcoxon signed ranks (Mann Whitney)

4.2.2 Perception

After intervention, the average perception of health personnel had increased in most items in the intervention group, whilst in the control group the average perception showed no significant difference in all items. (Table 4.6)

Table 4.6 Mean and Standard Deviation of perception of rational antibiotics prescribing in URI between the intervention and the control group, before and after use of URI program (by item).

Item	Intervention group				Control group			
	Pre test		Post test		Pre test		Post test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	4.833	0.383	4.833	0.383	4.500	0.513	4.450	0.510
2	4.500	0.618	4.778	0.548	4.200	0.523	4.300	0.470
3	4.667	0.485	4.778	0.428	4.500	0.513	4.350	0.489
4	4.389	0.502	4.778	0.428	4.350	0.489	4.300	0.470
5	4.500	0.618	4.722	0.461	4.250	0.550	4.000	0.562
6	4.278	0.669	4.667	0.594	4.100	0.447	3.950	0.510
7	4.056	1.392	3.889	1.451	3.800	1.240	3.700	0.979

The pre-test score and post-test score of the intervention group was 29.89 (SD = 1.71) and 32.44 (SD = 2.83) respectively. For the control group, the pre-test score and post-test score was 29.7 (SD = 2.74) and 29.05 (SD = 2.58) consecutively. (Table 4.7)

Table 4.7 Perception of rational antibiotics prescribing in URI between the groups before and after intervention (by person).

Participant	Intervention group		Variance	Control group		Variance
	pre test	post test	of scores	pre test	post test	of scores
1	31	31	0	30	26	-4
2	29	34	5	34	31	-3
3	29	31	2	28	26	-2
4	32	35	3	30	26	-4
5	31	34	3	30	31	1
6	31	35	4	35	35	0
7	29	28	-1	35	35	0
8	31	34	3	29	28	-1
9	31	35	4	31	28	-3
10	31	35	4	28	28	0
11	29	33	4	30	29	-1
12	30	35	5	24	28	4
13	25	25	0	28	27	-1
14	32	33	1	28	28	0
15	29	34	5	26	28	2
16	28	29	1	29	31	2
17	29	32	3	29	31	2
18	31	31	0	29	29	0
19	-	-	-	32	28	-4
20	-	-	-	29	28	-1
Mean	29.89	32.44	46	29.7	29.05	-13
SD	1.71	2.83		2.74	2.58	

The perception before intervention, between the intervention group and the control group, were analyzed by the Mann Whitney test. There was no statistically significant difference between the groups (p-value = 0.38). (Table 4.8)

Table 4.8 Perception of rational antibiotics prescribing in URI between the groups before intervention .*

Perception	N	MR	SR	U	Z	p-value
experimental group	18	21.19	381.50	149.50	-0.909	0.38
control group	20	17.98	359.50			
Total	38					

* = The data was analyzed by Wilcoxon signed ranks (Mann Whitney)

Between the groups, after intervention, perception of rational antibiotics prescribing was compared. The results showed a statistically significant difference (p-value = 0.001) after intervention. (Table 4.9)

Table 4.9 Perception of rational antibiotics prescribing in URI between the groups after Intervention *

Perception	N	MR	SR	U	Z	p-value
experimental group	18	25.61	461.00	70.00	-3.261	0.001*
control group	20	14.00	280.00			
Total	38					

* =The data were analyzed by Wilcoxon signed ranks (Mann-Whitney)

4.2.3 Self-efficacy

The self-efficacy of health personnel increased on all items in both groups, with a higher increasing in the intervention group. (Table 4.10)

Table 4.10 Mean and Standard Deviation of self-efficacy of rational antibiotics prescribing in URI between the groups, before and after use of URI program. (by item).

Item	Intervention group				Control group			
	Pre test		Post test		Pre test		Post test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	3.528	0.528	4.416	0.492	3.725	0.595	3.750	0.500
2	3.584	0.647	4.389	0.471	3.850	0.609	4.000	0.699
3	3.555	0.969	4.389	0.471	3.975	0.499	4.100	0.552
4	3.611	0.814	4.333	0.453	3.800	0.594	4.000	0.429
5	3.916	0.549	4.389	0.471	3.875	0.792	4.100	0.447

The average score of self-efficacy before intervention was 19.2 (SD = 2.81) and 22.00 (SD = 2.15) after intervention, in the intervention group. As for the control group, the average score of self-efficacy before and after intervention was 19.10 (SD = 2.47) and 19.95 (SD = 2.12) respectively. (Table 4.11)

Table 4.11 Self-efficacy for rational antibiotic prescribing in URI between the groups (by person).

Participant	experimental group		Variance of scores	control group		Variance of scores
	pre test	post test		pre test	post test	
1	25	25	0	20	18	-2
2	19	20	1	21	22	1
3	24	25	1	18	18	0
4	19	20	1	19	18	-1
5	20	21	1	19	23	4
6	18	25	7	13	22	9
7	18	23	5	20	20	0
8	20	24	4	17	19	2
9	20	20	0	18	20	2
10	17	22	5	19	20	1
11	16	22	6	21	22	1
12	18	20	2	19	17	-2
13	18	18	0	15	16	1
14	22	23	1	21	20	-1
15	23	25	2	20	23	3
16	17	20	3	17	17	0
17	15	22	7	22	22	0
18	17	21	4	20	20	0
19		-		19	24	5
20		-		24	18	-6
Mean	19.2	22.00	50	19.1	19.95	17
SD	2.81	2.15		2.47	2.12	

The comparison of self-efficacy in rational antibiotic prescribing in URI between the groups before intervention was not statistically significant in difference (p-value = 0.57) (Table 4.12).

Table 4.12 The comparison of self-efficacy for rational antibiotic prescribing in URI between the groups before intervention*

Self efficacy	N	MR	SR	U	Z	P-value
experimental group	18	18.39	331.00	160	-0.59	0.57
control group	20	20.50	410.00			
Total	38					

* = The data were analyzed by Wilcoxon signed ranks (Mann Whitney)

The comparison of self-efficacy for rational antibiotic prescribing in URI between the groups after intervention, found that the differences were statistically significant (p-value = 0.01). (Table 4.13).

Table 4.13 The comparison of self-efficacy for rational antibiotic prescribing in URI between the groups after intervention*

Self efficacy	N	MR	SR	U	Z	P-value
Intervention group	18	24.31	437.50	93.5	-2.551	0.01
Control group	20	15.18	303.50			
Total	38					

* = The data were analyzed by Wilcoxon signed ranks (Mann whitney)

4.3 The comparison of Knowledge, Perception and Self-Efficacy of rational antibiotic prescribing in URI before and after intervention in intervention group.

4.3.1 Knowledge

The knowledge before and after intervention was compared. In the intervention group, knowledge after intervention was superiorly statistically significant in difference (p-value = 0.0025) than before intervention. (Table 4.14)

Table 4.14 The comparison of rational antibiotic prescribing knowledge in URI before and after intervention in intervention group*

Knowledge (Score)	**N**	**MR**	**SR**	**Z**	**P-value**
Post-test > Pre-test	14	9.96	139.5	-3.031	0.0025**
Post-test < Pre-test	3	4.50	13.5		
Post-test = Pre-test	1				
Total	18				

* = The data were analyzed by Wilcoxon signed ranks;

** = Based on positive ranks

4.3.2 Perception

The perception of rational antibiotic prescribing in URI was compared before and after intervention. The perception score after intervention was higher than before intervention (p-value = 0.01). (Table 4.15).

Table 4.15 The comparison of rational antibiotic prescribing perception in URI before and after intervention in intervention group*.

Perception (Score)	**N**	**MR**	**SR**	**Z**	**P-value**
Post-test > Pre-test	11	8.43	118.00	-3.313	0.01**
Post-test < Pre-test	2	2.00	2.0		
Post-test = Pre-test	5				
Total	18				

* = The data were analyzed by Wilcoxon signed ranks.

** = Based on nagative ranks.

4.3.3 Self-Efficacy

The difference of self-efficacy before and after intervention was compared. The results indicated that the self-efficacy of rational antibiotic prescribing in URI after intervention was significantly greater than before intervention statistically (p-value = 0.001). (Table 4.16)

Table 4.16 The Comparison of self-efficacy for rational antibiotic prescribing in URI before and after intervention in intervention group*.

Self efficacy	N	MR	SR	Z	P-value
Post-test > Pre-test	15	8.0	120	-3.415	0.001**
Post-test < Pre-test	0	0	0		
Post-test = Pre-test	3				
Total	18				

* = The data were analyzed by Wilcoxon signed ranks; ** = Based on positive ranks

4.4 The Comparison of Antibiotic Prescribing Rate in URI before and after Intervention, between intervention and control Groups

After the URI program was provided, antibiotic prescribing rates in URI before and after intervention were compared. The results showed that 30.65 % and 10.96 % were the rates of the intervention group respectively. In the control group, 34.47 % and 34.92 % were the antibiotic prescribing rate in URI before and after intervention. (Table 4.17)

Table 4.17 Antibiotic Prescribing rate in URI between groups

Measurement	Intervention Group		Control Group	
	Before Intervention	After Intervention	Before Intervention	After Intervention
Total Cases of URI (Cases)	1302	712	2794	2002
Total Cases that received Antibiotics (Cases)	399	78	963	699
Prescription Rate (%)	30.65	10.96	34.47	34.92

Between the groups, antibiotic prescribing rate in URI was analyzed using the Z-test before the URI program was conducted. That presented the result that the antibiotic prescribing rate in both groups was not significantly different(p-value < 0.70). (Table 4.18).

Table 4.18 The comparison of antibiotic prescribing rate in URI before intervention between the groups*.

Group	N	Mean	SD	Z	P-value
Intervention	1302	30.65	0.1612	- 0.405	0.7
Control	2794	34.47	0.1374		
	4096				

* = The data were analyzed by Z-test

Between the groups, the antibiotic prescribing rate in URI was analyzed using Z-test after the URI program was conducted. This showed that the antibiotic prescribing rate in URI, of the intervention group, had lowered significantly (p-value < 0.0001). (Table 4.19)

Table 4.19 The comparison of antibiotic prescribing rate in URI after intervention between the groups*.

Group	N	Mean	SD	Z	P-value
Intervention	712	10.96	0.1171	- 12.148	<0.0001
Control	2002	34.91	0.1065		
	2714				

* = The data were analyzed by Z-test

4.5 The Comparison of Antibiotic Prescribing Rate in URI before and after Intervention within Intervention Group

The antibiotic prescribing rate in URI before and after intervention were compared and reported that the antibiotic prescribing rate after intervention was significantly less than the previous rate (p-value = 0.0001). (Table 4.20)

Table 4.20 The comparison of antibiotic prescribing rate in URI before and after intervention of intervention group*.

Duration	N	Mean	SD	Z	p-value
Before intervention	1302	30.65	0.1171	9.936	<0.0001
After intervention	712	10.96	0.1277		
Total	2014				

* = The data were analyzed by Z-test

CHAPTER V
DISCUSSION

This quasi-experimental study was conducted on health personnel from PCUs, Padad district, Chiang Rai province, Thailand. A total of 18 persons in the intervention group were compared with a total of 20 persons in the control group, all of which were health personnel PCUs in Phayamengrai district. The study's objective is to improve the knowledge, perception and self-efficacy of health personnel and to improve rational antibiotic prescription in upper respiratory infection.

The data was collected from Feb 1, 2013 to June 30, 2013. For analysis, the Wilcoxon test used to analyze the data of pre-test and post-test scores in the intervention group, the Mann-Whitney test was used to analyze the data of pre-test and post-test scores between the groups, with Z tests for proportions performed to compare the antibiotics prescription rate. From the analysis of data, discussion of research results were conducted by the following hypothesis's:

5.1 After intervention, the intervention group was significantly different in knowledge, perception and self-efficacy compared to the control group (First hypothesis).

The results of this study showed that the intervention group had an average score of knowledge, perception and self-efficacy that increased beyond the control group by a statistically significant amount ($p < 0.0001$, 0.001, 0.01, respectively), supporting the first hypothesis. From this we can gather that the Health Belief Model applied in the intervention group affected knowledge and perception, and increases may have resulted from the URI PROGRAM that had been used in the intervention group. The focus on knowledge and perception by media POWER POINT was the core of the lectures, increasing the individual perception by focusing on knowledge and perception concerning utilizing the irrational use of antibiotics, the severity of the problem and the conditions that will cause damage to the health system. Also demonstrated was there are clear and useful clinical practice guidelines for the prescribed antibiotics in upper respiratory infection which are beneficial. Two-way communication was used by sharing the problems and experiences of the work in group and face to face meetings, as well as lecturing case conferences and supervision. The group was formed to encourage the exchange of experiences and knowledge, which by doing so had the likelihood of increasing more correct knowledge and perception. By the increasing of the knowledge and perception, the aim is to cause an inner force to lead to a better adaptation of the behaviors. This cause of the increased knowledge and perception was identified earlier in the intervention group. The intervention promoted cognitive and other personal factors, so the self-efficacy increased significantly over the control group as well.

Consistent with the studies of Phanintron Kanya (2004) and Jandame Thanavat (2008), which studied the issue of effectiveness of health education program on track, the results of this study and showed that the intervention group had increased knowledge perception and self-efficacy, higher than the control group statistically to a sufficient level (40, 41).

5.2 After applying the URI Program, the intervention group had more Knowledge, Perception and Self-efficacy before using the program (2nd hypothesis).

The results of this study showed that the intervention group had an average score of knowledge, perception and self-efficacy that sufficiently increased over the first trial statistically (P = 0.0025, 0.01, 0.001), supporting the second hypothesis. An explanation for this being, that although samples are used to get knowledge across about the use of antibiotics which come from institutions providing education in the form of training, books, journals, newspapers and media channels, the knowledge and understanding of the information may be incorrect and not support the event. Cases were compared on previous experiments that showed that the intervention and control group knowledge, perception and self-efficacy were no different. From this result, it can be argued that the URI PROGRAM had in itself the effect of modifying knowledge, perception and self-efficacy. In addition, the intervention group will have a greater understanding about the correct amount of antibiotics used to treat URI patients. This principle will allow the intervention group to encourage in themselves a self-efficacy before the action will commence, in contrast to prior behavior and in accordance to the Health belief model as mentioned in the first hypothesis. The lecture techniques used to stimulate as well as increase knowledge and perception within the intervention group, included engaging them in solving samples of incorrect medicine prescription and giving them the opportunity to comment on the expert exchange experience openly, using the comments and suggestions to form group discussion. The information gained is by this is beneficial and can be used to solve the problem of prescribing issues.

Consistent with the studies of Pranintron Kanya (2004) and Jantamee Thanavat (2008), which studied the issue of effectiveness of health education programming on track, using the Health Belief Model give the result that receiving intervention sufficiently increased the knowledge, perception and self-efficacy higher statistically (40, 41).

5.3 After the URI Program, the intervention group prescribing rates were reduced, compared with the control group (3rd hypothesis).

The result of antibiotics prescription rate compared between groups of this study showed that prescription rate in the intervention group was 10.96% and 34.92% in the control group. The antibiotic prescription rate was reduced in intervention group statistically (P <0.0001), supporting the conclusion of the 3rdhypothesis. The effects of this study show, such changes can be explained as a result of modifying health behaviors by altering the social cognitive theory of health personnel. In the intervention group, it can be caused by social learning through their own direct experiences, the self-learning may be initialized from observational learning or from the modeling of Bandura (1986), The URI PROGRAM in this experiment provided clear guidelines for diagnosis, contributing to the learning of individuals in the organization whom by default adhere to the job seriously and continuously. Achieving the correct diagnosis became the role model of the practice in the organization, gained by individual learning, by observing and by the mastering of the correct implementation and changes in the behavior of the personnel by social cognitive theory.

The results of this study are consistent with the study of Nitima et al (2008), which studied Antibiotic Prescription rate (Antibiotic Smart Use Project) in upper respiratory infection, acute diarrhea and bleeding, using an intervention group (Saraburi Province, Thailand) and a control group (Ayutthaya Province, Thailand). The result found that in the study group, non-antibiotic prescriptions rates increased from 45.5% to 74.7 %, which is statistically significant (P <.0001), while in the control group non-antibiotic prescription rates showed no significant change (42.3% and 44.2 %, Respectively)(34). This study is also consistent with the study of Gerber et al (2010), which conducted a study of the effect of an outpatient antimicrobial stewardship intervention on broad-spectrum antibiotic prescribing by primary care pediatricians: a randomized trial. They studied with an emphasis on activities to care in prescribing a broad-spectrum of antibiotics for outpatients. It was found that, after using antimicrobial stewardship intervention, the prescribing of broad-spectrum antibiotics were reduced compared with the control group sufficiently (p = 0.01) (38). It is also consistent with the studies of Jerkins et al (2012) a study of the effects of clinical pathways for common outpatient infections on antibiotic prescribing, studying Primary care clinic treatments of patients with upper respiratory infection, acute bronchitis, acute rhinosinusitis, pharyngitis, acute otitis media, urinary tract infection, skin infections and pneumonia. The experimental results showed the difference between the antibiotic prescribing rate in the intervention group and the control group were significantly different as well (39).

5.4 After receiving the URI Program, Antibiotics Prescription rates decreased compared to before starting the program (4th hypothesis).

The results of this research showed that antibiotic prescription rate was 30.65% before intervention, and 10.96% after. The prescription rate in the intervention group was statistically different (P <0.0001). Supporting the 4th hypothesis and, explaining the effect of such changes, at first the intervention group was still operating as normal. This group had never started a new system of training courses or programs similar to this before, making them used to working on their own belief that their prescribing was correct. This can be attributed to the experiences of the past, making knowledge of the work process of each health personnel different. Notice the comparison of antibiotic prescription rate, between the groups, have similar values. This reflects the performance of health personnel that have never had the benefit of stimulus or indeed any form of external factors before. Upon receiving the URI program, it is shown to modify the behavior on how to prescribe antibiotics. The meeting discussions, experiences and the implemented clinical practice guidelines caused the concept that their understanding was different and indeed wrong to the correct understanding. Based on the concept of Bandura (1986), the person's behavior is not driven by inner force or modified automatically, but caused from the interaction of the three parts together. In this study, intervention is the mechanism to make cognitive and other personal factors. As a result many personnel change their behavior as a model, causing a good working environment. The outcome being that the majority of the intervention group changed its behavior in relation to prescribing rational antibiotics.

Consistent with the studies of Nitima et al (2008 in first year and second phase in the year 2009), the first year they studied antibiotic prescription rates (Antibiotic Smart Use Project) in upper respiratory infection, acute diarrhea and bleeding throughout Saraburi Province, Thailand. Their results found that in the study group, non antibiotic prescriptions rate increased from 45.5% to 74.7 %, (P <.0001) (34). In the year 2009, the study was extended to phase 2, studying in Ubon Ratchatani, Ayutthaya, Samut Songkhram and Kantrang hospitals in Trang province, and Sriwichai group hospital. The second phase showed the same result, that the non-prescription rate of antibiotics increased significantly (increased 8.4 – 14.6 %) (35).

Also shown are consistencies with the studies of Jerkins et al (2012), they studied the effects of clinical pathways for common outpatient infections on antibiotic prescribing in Primary care clinics. This study was conducted in patients with upper respiratory infection, acute bronchitis, acute rhinosinusitis, pharyngitis, urinary tract infection, skin infections and pneumonia. Theses result found that in the study group, antibiotic prescriptions rate decreased from 42.7% to 37.9 % (P <.0001) (39).

CHAPTER VI
CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This quasi-experimental study was conducted in all PCUs at Padad district and Phayamengrai district, Chaingrai Province, Thailand, in the topic of "Effectiveness of the URI program on prescribed antibiotics in Upper Respiratory Infection among health Personnel under Padad Contracting Unit for Primary care, Padad district, Chiang Rai." Objectives of the study were 1) to compare knowledge, perception and self-efficacy of antibiotic prescribing in upper respiratory tract infection (URI) between the intervention and the control group 2) to compare knowledge, perception and self-efficacy in upper respiratory tract infection before and after intervention 3) to compare antibiotic prescription rate in URI between the intervention and the control group 4) to compare antibiotic prescription rate in URI of the intervention group before and after intervention.

The data collection process was conducted from February 2013 to June 2013 at Padad district and Phayamengrai district, Chiangrai Province, Thailand. The data of pre-test and post-test from the personnel group was analyzed using Wilcoxon and Mann-Whitney tests, while the data of prescription antibiotics in URI patients was analyzed using Z-test for proportions. The significance level of 0.05 was applied for the statistical test in this study. The results were analyzed and illustrated.

6.1.1 Descriptive conclusion

6.1.1.1 Socio-demographic factors:

This study found that the intervention group consisted of 18 people, mostly (61.11%) female with 38.99% male, with an education level of mainly graduate bachelor degree (83.33 %). The range of age was from 24 to 53 years with a mean age of 39.84 years (SD = 8.59), mainly (44.44 %) of them aged 30 to 39 years. The main work place were PCUs (100 %) and the range of working experience was from 2 years to 31 years with a mean of 10.33 years, with 55.56 percent of them having a working experience of 6 to 10 years. Whilst the control group consisted of 20 people, the majority (75%) were female and 25% male, three quarters of them held a graduate bachelor degree. The average age of the control group was 40.7 years, with the range of age from 25 to 50 years. Mainly (55 %) of them were aged 40 to 49 years. The range of working experience was from 3 years to 17 years with a mean of 7 years. Half of them had working experience of 1 to 5 years, and the PCUs were their work place 100 %.

6.1.1.2 URI Program: The program was provided for the intervention group. The aims were to improve knowledge, perception and self-efficacy and to change behavior in antibiotic prescribing in URI. This program comprised of two theories, which were health belief model and social cognitive theory. After implementation, knowledge, perception, self-efficacy in URI and rational antibiotic prescribing rate was evaluated.

6.1.1.3 Knowledge: The average knowledge of the intervention group showed 11.83 and 13.17 points, before and after intervention respectively. For the control group, the average knowledge score before and after intervention was 11.50 and 10.30 points.

6.1.1.4 Perception: The results of the intervention group showed that the average perception previous to intervention was 29.89 points and the average perception after intervention to be 32.44 points. In the control group, 29.7 and 29.05 were average perception before and after intervention consecutively.

6.1.1.5 Self-Efficacy: For average self-efficacy, the intervention group previous to intervention and after intervention were 19.20 and 22.00 points. In the control group, average self-efficacy before the intervention was 19.10 and the after intervention the average self-efficacy being 19.95 point.

6.1.1.6 Antibiotics Prescribing Rate: Antibiotic prescription rate in URI before and after intervention were 30.65 % and 10.96 % in the intervention group. Of the control group, 34.47 % and 34.92 % were the before and after intervention antibiotic prescription rate respectively.

6.1.2 Comparison of the difference with significant associations

Wilcoxon and Mann-Whitney tests analyzed the data of pre-test and post-test from health personnel between the groups, and between pre-testing and post-testing. The data of prescription antibiotics in URI patients were analyzed by Z-test for proportions. The significance level of 0.05 was applied for the statistical test in this study. The results were analyzed and illustrated.

6.1.2.1 Comparison of Knowledge

The comparison of knowledge before intervention, between the intervention group and the control group, found that there was no significant difference in knowledge level. But after intervention, the difference is statistically significant at the 0.05 level. The knowledge of the intervention group comparison between before and after intervention showed that the difference is statistically significant at the 0.05 level.

6.1.2.2 Comparison of Perception

The comparison of Perception showed that before intervention, between the control group and the intervention group, there is no significant difference in the Perception level. But after the intervention, the difference is statistically significant at the 0.05 level. The Perception of the intervention group, comparing between before and after intervention, shows the difference to be statistically significant at the 0.05 level.

6.1.2.3 Comparison of self-efficacy

The comparison of self-efficacy showed that, before intervention between the intervention and the control group, there was no significant difference in the self-efficacy level. But after intervention, the difference is statistically significant at the 0.05 level. Comparing the self-efficacy of the intervention group before and after intervention shows the difference is statistically significant at the 0.05 level.

6.1.2.4 Comparison of Antibiotics Prescription rate

The comparison of antibiotics prescription rate was as follows: Before intervention, there is no significant difference in the antibiotics prescription rate between the intervention and the control group. But after intervention, the difference is statistically significant at the 0.05 level. The antibiotics prescription rate of the intervention group before and after intervention shows the difference is statistically significant at the 0.05 level.

From the comparison of knowledge, perception, self-efficacy and antibiotics prescribing rates in this study, results are summarized as following:

1). The knowledge, perception and self-efficacy of the intervention group were higher than the control group after the use of the URI Program, with a statistically significant difference of p-value 0.05.

2). The knowledge, perception and self-efficacy after use of the URI Program in the intervention group were greater than before, with a statistically significant difference of p-value 0.05.

3). Antibiotics prescribing rates in URI of the intervention group was reduced compared to the control group after using the URI Program, with a statistically significant difference of p-value 0.05.

4). Antibiotics prescribing rates, after using the URI Program in the intervention group was sufficiently reduced compared to before, statistically with a difference of p-value 0.05. While no statistically significant difference in control group was observed.

6.2 Recommendations:

With the aim of this research being to increase knowledge, perception, and self-efficacy of health personnel and to reduced antibiotics prescribing rates in URI disease in PCUs, the study will improve understanding in health personnel of URI disease and rational antibiotics use. Based on the findings discussed in chapter V, the following recommendations are suggested.

6.2.1 Recommendations for Antibiotics policy makers

Rational antibiotic use, reduced drug resistance, reduced adverse drug reaction and a saving on the budget will occur if the government has a policy on the use of antibiotics in the country and if the policy is taken seriously. Recommendations for policy was suggested as following:

6.2.1.1 The government and ministry of public health should be implementing a policy for the rational use of antibiotics in the country. The monitoring and evaluating should be conducted in the area seriously and thoroughly.

6.2.1.2 Regional and province policy should focus on the use of antibiotics in diseases that are common in the area and the high cost that goes with them.

6.2.2 Recommendation for administrator

To reduce and rational antibiotics use, recommendation for administrator was suggested as following:

6.2.2.1 To reduce antibiotics use, achieve a rational usage of antibiotics and reduce drug resistance, the area should be educating health personnel across all levels in knowledge, perceptions of common diseases and rational antibiotics use.

6.2.2.2 They should extend the study of *intervention* by the activity patterns obtained from this study to the public health of other areas. With similar characteristics or personnel.

6.2.3 Recommendation for healthcare personnel

To take benefit from this research and for benefit to be achieved more broadly, the health personnel should have the following operations:

6.2.3.1 Health care centers should explore the subject's knowledge of the prescribed antibiotic to achieve a resolution the problem.

6.2.3.2 Contracting for primary care units should provide training on the rational use of antibiotics to their personnel to have the means and ability to provide the correctives on the guidelines.

6.2.4 Recommendations for further research

6.2.4.1 This study was conducted at PCUs in small districts. There should be a continuation of the study on a larger and long-term scale in order to determine the effectiveness of this intervention for URI disease.

6.2.4.2 For the further research, an in-depth study about quality such as corrected diagnosis and treatment, improvement and satisfaction in patients and savings on the budget should be included.

6.2.4.3 It is suggested that the health Belief Model should be applied to the issue of irrational prescribing of antibiotics. This can be considered as a reasonable way to modify the behavior of the other problems faced.

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APPENDICES

APPENDIX A
QUESTIONNAIRES

EFFECTIVENESS OF THE URI PROGRAM ON PRESCRIBED ANTIBIOTICS IN UPPER RESPIRATORY INFECTION AMONG HEALTH PERSONNEL UNDER PADAD CONTRACTING UNIT FOR PRIMARY CARE, PADAD DISTRICT, CHAING RAI

This Questionnaire is a query on the knowledge perception and self efficacy of health personnel for diagnosis and treatment upper respiratory tract infection (URI). Please answer the questions actually and matching the most sense. This information will be benefit to the development of health care service for patients in this disease. The answer will not affect your work in any way. The answers will be kept confidential, and all data is processed and presented only in an overview.

The questionaire consists of 32 questions in four categories:

Part 1: Socio-demographic factors.

Part 2: Knowledge of upper respiratory tract infection and antibiotics prescription in URI disease.

Part 3: Perception of upper respiratory tract infection and antibiotics prescription in URI disease.

Part 4: self efficacy of health personnel to the diagnosis and treatment of upper respiratory tract infection.

Part 1 **Socio-Demographic characteristics**

Please answer the following question by filling in the blanks put ✓ in the appropriate box (❑) or answer the question.

1. Sex ❑ male ❑ female

2. age……………….years

3. education ❑ master degree ❑ Bachelor degree
   ❑ Lower than bachelor degree (specify……………..……….)

4. Job or Role
   ❑ Technical Nurse
   ❑ Registered nurse
   ❑ Practitioner Nurse
   ❑ Specialty Nurse. (specify your specialty ....)
   ❑ Public Health Technical Officer
   ❑ Public health officer
   ❑ Other (specify...)

5. Duration of your work in item 4. ……………….years

6. Work place
   ❑ primary care unit (PCU) name of PCU................................
   ❑ other (specify...)

<u>Part 2</u>: Knowledge about upper respiratory tract infection and antibiotics prescription in URI disease.

Please answer the following question by insert ✓ to the best choice.

1) Which of the following is not a disease of the upper respiratory tract?
   a) Common cold
   b) Sinusitis
   c) Tonsillitis
   d) Pneumonia

2) Infections of the upper respiratory tract were mainly caused by?
   a) Allergy
   b) Bacterial infection
   c) Viral infection
   d) Combination of Viral and bacterial infection

3) Which one of the disease is the most useful for using the antibiotics for treatment of acute upper respiratory tract infections?
   a) Common cold
   b) Acute tonsillitis which caused by Group A beta hemolytic streptococcus (GABHS or GAS)
   c) Acute viral pharyngitis
   d) Acute bronchitis

4) Which of the following symptoms usually indicated a bacterial infection?
   a) High fever , injected pharyng, and skin rash
   b) Oral ulcer, purulent sputum and hoarseness
   c) Runny nose, sneezing and conjunctivitis.
   d) High fever, sore throat, tonsillar exudate and cervical lymphadenopathy.

5) Which one is the most reason of rational antibiotics used?
   a) The antibiotics are expensive
   b) Antimicrobial resistance problem (AMR)
   c) Thailand relies on import antibiotics from abroad than necessary.
   d) Antibiotic's compliant problem, make the patients uncomforted to use it.

6) Which one of antibiotic is not suitable for used to treated the Acute URI?
   a) Penicillin V
   b) Amoxicillin
   c) Erythromycin
   d) Co-trimoxazole

7) About antibiotics which one <u>is not correct?</u>
   a) Antibiotic are drugs that effective or inhibited the growth of the virus.
   b) The disease which caused by viral infection, antibiotics were not shorten the disease.
   c) Antibiotics are useful. But may cause harm or risk of drug allergy or bacterial resistance.
   d) Antibiotics should be used only when the disease are caused by bacterial infections.

8) The URI patients that have symptoms of fever, sore throat, runny nose, cough with sputum and hoarseness. Which one is <u>correct</u>?
   a) Should receive antibiotics to shorten the disease.
   b) Should receive antibiotics to prevent the complications of disease.
   c) Antibiotics should be used only coughs very frequency.
   d) Do not use antibiotics. Should be treated symptomatically, because the most common cause of these symptoms is viral infection.

9) Prescribing of antibiotics in upper respiratory tract infection is correct in all of the following cases. Except?

a) Acute sinusitis that had continuous symptoms for 7 – 10 days.

b) Acute pharyngitis & acute tonsillitis that had high fever, sore throat, exudates and cervical lymphadenopathy.

c) Acute bronchitis with cough and had purulent sputum.

d) Acute otitis media which symptoms are not better within 72 hrs.

10) According to Centor Criteria by CDC (Center of Disease Control of USA.), which signs and symptoms in any of the following should be given antibiotics.

a) No Fever, sore throat, cough with purulent sputum and oral ulcer.

b) No fever, no cough, tonsillar exudates and cervical lymphadenopathy

c) High fever, headache, cough with sputum and mucopurulent discharge

d) High fever, mucopurulent discharge, hoarseness and skin rash.

11) Which one of the following used drug of choice for acute URI unsuitable?

a) Penicillin V to treat acute tonsillitis

b) Amoxicillin to treat acute pharyngitis

c) Amoxicillin to treat acute otitis media

d) Erythromycin to treat acute sinusitis, if allergic to Penicillin

12) Which of the following is incorrect behavior for patient with upper respiratory tract infections?

a) When had a sore throat, Should take antibiotics to prevent more symptom.

b) If have low fever, runny nose and cough with purulent sputum. Should symptomatic treatment with paracetamol, drink more a worm water and rest.

c) When there is sore throat, runny nose, cough with excessive sputum should be treated symptomatically, if symptoms do not improve after 7 to 10 days should see a doctor.

d) High fever and cough with injected pharyng, should not take antibiotics immediately.

13) URI Patient with fever, cough and runny nose for 3 days. Before seeing you at PCU had purchased and take antibiotics by yourself, but the symptoms did not improve. How would you do?

a) Prescribing the same antibiotics to continuity for 7-10 days.
b) Increased dosage of the same antibiotics.
c) Change to a new antibiotic, because the old drug is ineffective.
d) Off antibiotics. Complete history, physical examination and symptomatic treatment.

14) The patient with common colds for 4 days, come to see you 2 days ago and received symptomatic treatment, the symptom was not improve. How will you treat this patient?

a) Complete history, physical examination and continue symptomatic treatment with understanding the progression of disease to patient.
b) Should prescribe antibiotics for prevent risk and harm of disease and prevent lawsuits.
c) For reduce dissatisfaction with the treatment of patients. Should complete physical examinations and prescribe antibiotics, although the patient's symptoms are caused by viral infection.
d) This patient should receive antibiotics, because the symptoms had not improved.

Part 3 **Opinions about upper respiratory tract infection and antibiotics prescription.**

SA = Strongly agree, A = Agree, N = Neutral, D = Disagree and SD = Strong disagree

Please put ✓ in the appropriate box after the following statements.

Statement	SA	A	N	D	SA
1. Prescribe the antibiotic first should be useful, because patient with viral infection may be followed by bacterial infection.					
2. If you do not dispensing antibiotics to URI patients, then the patient's condition will worsened and harmful rather than to provide antibiotics first.					
3. Antimicrobial resistance is negligible compared to the therapeutic effect treatment of antibiotics in upper respiratory tract infection (URI).					
4. I was worried that, if did not dispensing antibiotics to patients and their symptoms later worse. Although the patient is not suffering from any bacterial infection. I may also be sued.					
5. When prescribed antibiotics. I am not very concerned that patients will have drug allergy.					
6. Antibiotics used are less likely to get side effects.					
7. Antibiotics dispensing of health personnel largely affected to purchase antibiotics use of the people.					

<u>Part 4</u> Confident about the diagnosis and treatment of upper respiratory tract infection.

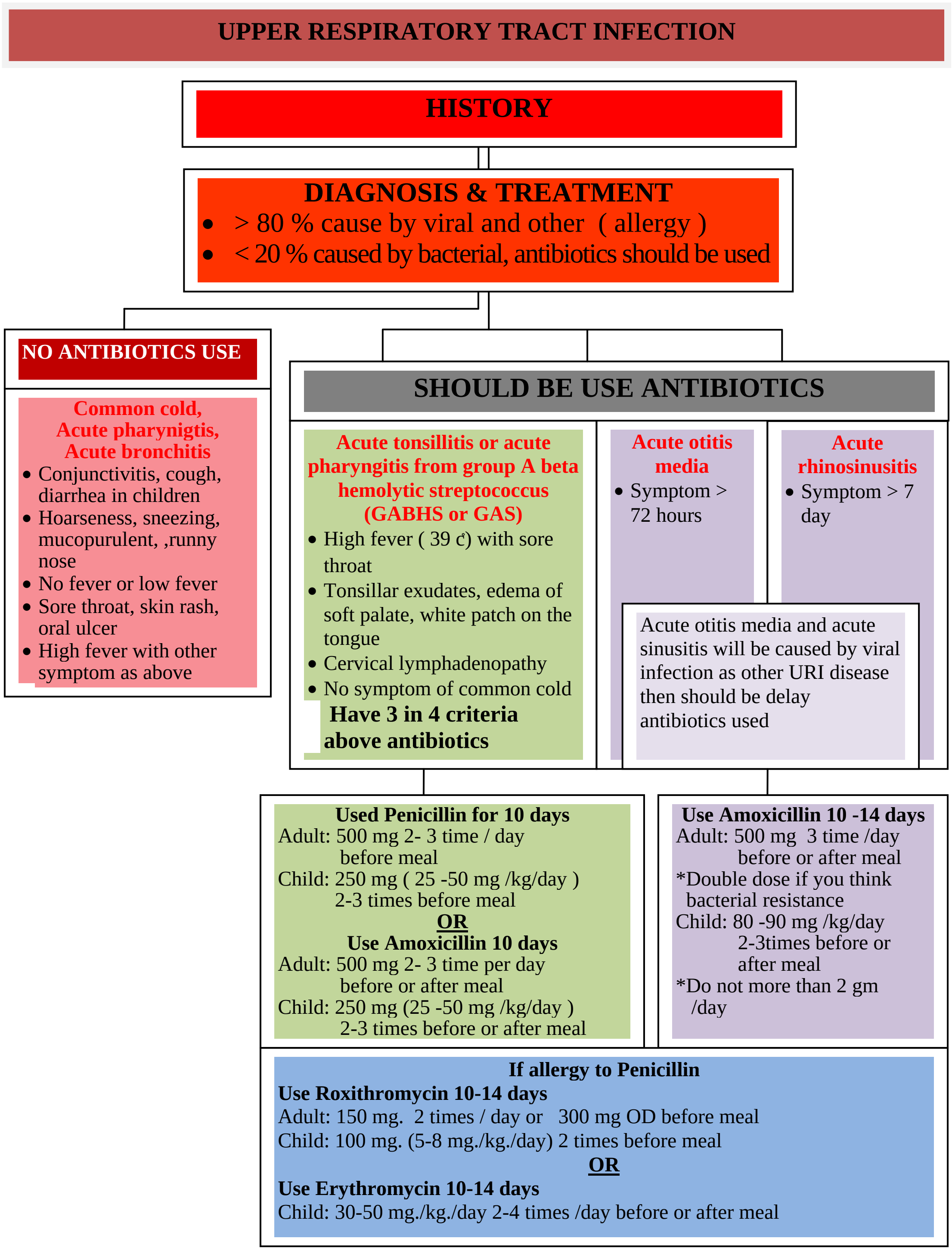
SC = Strongly confident, C = Confident, N = Not sure, NC = Not confident and SNC = Strongly not confident

Please put ✓ in the appropriate box after the following statements.

context	SC	C	N	NC	SNC
	5	**4**	**3**	**2**	**1**
1. I have confidence in the differential diagnosis of upper respiratory tract infections (URI) that is caused by a bacterial or viral infection.					
2. Treatment of patients with upper respiratory tract infection (URI) without antibiotics prescription is easier for me.					
3. When I treated URI patient without antibiotics, I have confident that I able explained the patients to understand why I am not prescribing antibiotics.					
4. I have confident that I can treat patients with upper respiratory tract infection (URI), without the use of antibiotics, although the patient may ask for them.					
5. I am confident that. The use of antibiotics to treat patients with upper respiratory tract infection (URI) with my prescription is rational use of antibiotics.					

APPENDIX B

CLINICAL PRACTICE GUIDLINE



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