A MULTILEVEL ORDINAL LOGISTIC ANALYSIS OF ALCOHOL DRINKING AMONG POPULATION AGE 15-75 YEARS IN BURIRAM PROVINCE

NIPAPORN BUTSING

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF SCIENCE (BIOSTATISTICS)
FACULTY OF GRADUATE STUDIES
MAHIDOLUNIVERSITY
2012

Copyright © by Mahidol University

COPYRIGHT OF MAHIDOL UNIVERSITY

Thesis
entitled

A MULTILEVEL ORDINAL LOGISTIC ANALYSIS OF ALCOHOL DRINKING AMONG POPULATION AGE 15-75 YEARS IN BURIRAM PROVINCE

Nipaporn Butsing
Miss Nipaporn Butsing
Candidate

Assoc. Prof. Chaweewon Boonshuyar, M.S.P.H.
Major advisor

Assist. Prof. Natkamol Chansatitporn, Sc.D.
Co-advisor

Assoc. Prof. Oranut Pacheun, Dr.P.H.
Co-advisor

A. Mutchimwong
Asst. Prof. Auemphorn Mutchimwong, Ph.D.
Acting Dean
Faculty of Graduate Studies
Mahidol University

Natkamol Chansatitporn
Assist. Prof. Natkamol Chansatitporn, Sc.D.
Program Director
Master of Science Program in Biostatistics
Faculty of Public Health,
Mahidol University

Thesis
entitled

A MULTILEVEL ORDINAL LOGISTIC ANALYSIS OF ALCOHOL DRINKING AMONG POPULATION AGE 15-75 YEARS IN BURIRAM PROVINCE

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Science (Biostatistics)
on
October9, 2012

Nipaporn Butsing
Miss Nipaporn Butsing,
Candidate

Mr. Porntep Siriwanarangsun,
M.D., Ph.D.
Chair

Assoc. Prof. Chaweewon Boonshuyar,
M.S.P.H.
Member

O. Pacheun
Assoc. Prof. Oranut Pacheun, Dr.P.H.
Member

Natkamol Chansatitporn
Assist. Prof. Natkamol Chansatitporn,
Sc.D.
Member

A. Mutchimwong
Asst. Prof. Auemphorn Mutchimwong,
Ph.D.
Acting Dean
Faculty of Graduate Studies
Mahidol University

Assoc. Prof. Phitaya Charupoonplol,
M.D., Dip. Thai Board of Epidemiology
Dean
Faculty of Public Health
Mahidol University

ACKNOWLEDGEMENTS

This thesis would not have been possible without the help and support of many people. First of all, I am indebted to my external examiner Director-General of Department of Disease Control, Ministry of Public Health Dr. Porntep Siriwanarangsun, his inspiring and valuable advices, which helped me in putting all the thought processes in single piece.

I would like to express my appreciation and gratitude to Assoc. Prof. Chaweewon Boonshuyar, M.S.P.H my major advisor for her guidance invaluable advice, supervision, sharing experience and encouragements throughout this study. I also would like to express my deep appreciation and gratitude to my co-advisors, Assist. Prof. Natkamol Chansatitporn, Sc.D. and Assoc. Prof. Oranut Pacheun, Dr.P.H. for their kindness, encouragement, invaluable suggestion and constructivecomments throughout the whole process of this study.They are not only the best professors one could ever dream of working with; they are high principles and integrity.

I wish to express my deepest gratitude to my parents, my relatives for their infinite love, understanding and spiritual support. And thank you to all my friends for their support and sharing ideas. I also owe my sincere gratitude to Thai Health Promotion Foundation (ThaiHealth), International Health Policy Program (IHPP) and Center for Alcohol Studies (CAS), the principal funding agency, without those support I would not have been able to complete my endeavour.

Thanks is also owed to sub-district headmanvillage headman, sanitarians, school principals and entire respondents of Pakham district in Buriram Province who contributed in every way to make my thesis complete.

Nipaporn Butsing

Copyright by Mahidol University

A MULTILEVEL ORDINAL LOGISTIC ANALYSIS OF ALCOHOL DRINKING AMONG POPULATION AGE 15-75 YEARS IN BURIRAM PROVINCE

NIPAPORN BUTSING 5336147 PHBS/M

M.Sc. (BIOSTATISTICS)

THESIS ADVISORY COMMITTEE: CHAWEEWON BOONSHUYAR, M.S.P.H., NATKAMOL CHANSATITPORN, Sc.D., ORANUT PACHEUN, Dr.P.H.

ABSTRACT

This cross-sectional study aimed to identify the relationship between individual-level and village-level factors on alcohol drinking status among a population aged 15-75 years in Buriram province. A two-stage cluster sampling was applied to recruit 40 villages and 1,293 respondents in Pakham district into this study. Data were collected by interviewing, estimating drinking prevalence by weighted proportion based on the population distribution by age and sex of the study area, and using a multilevel ordinal logistic analysis for ordinal responses. The current drinking prevalence was 51.31% overall, with 71.87% among male and 30.79% among female. The results from multilevel analysis revealed that 19.2% of variation in drinking status was associated with different villages. The individual-level factors with fitted parallel lines assumption was sequentially added into the multilevel model: 1) self-efficacy-with low level of self-efficacy having a higher risk of drinking heaviercompared with high (OR 39.98, 95% CI: 22.94-69.68), 2) perceived risk on drinking -with moderate level of perceived risk more likely to drink heavier 14.83 times than at high level (95% CI: 6.15-36.87), 3) easy access to alcohol having a greater chance of drinking heavierthan uneasy access (OR 11.62, 95% CI: 3.47-38.90), 4) monthly income – with 15,000-20,000 Baht having more risk to drink heavier compared to higher than 20,000 (OR 2.68, 95% CI: 1.11-6.49), and 5) An unavailability of information on anti-drinking decrease 32.0% the odds for drinking. This study revealed that village-level factors were unrelated to drinking among those populations. A qualitative research is suggested to investigate individual factors associated with drinking as well as community and environmental factors.This study confirmed that village factors had no significant relationship to drinking among the population. Villages should keep the control-drinking policy strictly according the law of drinking control.Anti-drinking should be focused on the young generation to prevent them from becoming a new drinker.

KEY WORDS: MULTILEVEL ORDINAL LOGISTIC REGRESSION / ALCOHOL DRINKING / WEIGHTED PROPORTION

193 pages

การวิเคราะห์พหุระดับแบบลอจิสติคลำดับของการดื่มสุราในประชากรอายุ 15-75 ปี ในจังหวัดบุรีรัมย์
A MULTILEVEL ORDINAL LOGISTIC ANALYSIS OF ALCOHOL DRINKING AMONG POPULATION AGE 15-75 YEARS IN BURIRAM PROVINCE

นิภาพร บุตรสิงห์ 5336147 PHBS/M

วท.ม. (ชีวสถิติ)

คณะกรรมการที่ปรึกษาวิทยานิพนธ์: ฉวีวรรณ บุญสุยา, M.S.P.H., ณัฐกมล ชาญสาธิตพร, Sc.D., อรนุช ภาชื่น, Dr.P.H.

บทคัดย่อ

การวิจัยเชิงสำรวจแบบภาคตัดขวางมีวัตถุประสงค์เพื่อประเมินการดื่มสุราของประชากร อายุ 15-75 ปีจังหวัดบุรีรัมย์ ตลอดจนปัจจัยระดับบุคคลและระดับหมู่บ้านที่มีความสัมพันธ์กับการดื่มสุรา โดยสุ่มหมู่บ้านตัวอย่าง 40 หมู่บ้าน และประชากรตัวอย่างจำนวน 1,293 คน ด้วยวิธีการสุ่มตัวอย่างแบบกลุ่มสองขั้นตอน เก็บข้อมูลโดยการสัมภาษณ์ ศึกษาความชุกของการดื่มสุราโดยวิธีถ่วงน้ำหนักของจำนวนประชากรทั้งหมดในพื้นที่การศึกษาแยกตามเพศและกลุ่มอายุ และใช้การวิเคราะห์พหุระดับ ผลการศึกษาพบผู้ดื่มสุราในปัจจุบัน 51.3% ชาย 71.9% และหญิง 30.8% ลักษณะหมู่บ้านมีความผันแปรต่อการดื่มสุรา 19.2% ปัจจัยระดับบุคคลที่มีผลต่อการดื่มสุรา คือ ความรู้สึกมีคุณค่าในตนเองในระดับต่ำมีความเสี่ยงต่อการดื่มหนักขึ้นเป็น 39.98 เท่าเมื่อเทียบกับระดับสูง (95% CI: 22.94-69.68) การรับรู้ความเสี่ยงของการดื่มสุราในระดับปานกลางมีโอกาสดื่มหนักขึ้นกว่าระดับสูง 14.83 เท่า (95% CI: 6.15-36.87) ผู้ที่เข้าถึงสุราได้ง่ายมีโอกาสดื่มหนักขึ้นเป็น 11.62 เท่าของผู้ที่เข้าถึงยาก (95% CI: 3.47-38.90) ผู้ที่มีรายได้ 15,000-20,000 บาทต่อเดือนมีแนวโน้มที่จะดื่มหนักขึ้นกว่าผู้ที่มีรายได้มากกว่า 20,000 (OR 2.68, 95% CI: 1.11-6.49) ผู้ที่ดื่มสุราเข้าถึงข้อมูลการลด ละ เลิกสุรา มากกว่าผู้ที่ไม่ดื่มสุรา ในขณะที่ปัจจัยระดับหมู่บ้านในการศึกษานี้ ไม่มีผลต่อการดื่มสุรา อาจจำเป็นต้องทำการวิจัยเชิงคุณภาพเพิ่มเติม และถึงแม้ว่าปัจจัยระดับหมู่บ้านจะไม่มีผลต่อการดื่มสุรา แต่ยังคงต้องส่งเสริมการบังคับใช้กฎหมายเกี่ยวกับสุราอย่างเคร่งครัดและครอบคลุมถึงระดับหมู่บ้าน การป้องกันการดื่มสุราควรมุ่งเน้นไปที่เยาวชนเพื่อป้องกันการเกิดนักดื่มหน้าใหม่

Copyright © by Mahidol University

193 หน้า

CONTENTS

	Page
ACKNOWLEDGEMENTS	**iii**
ABSTRACT (ENGLISH)	**iv**
ABSTRACT (THAI)	**v**
LIST OF TABLES	**x**
LIST OF FIGURES	**xii**
CHAPTER I INTRODUCTION	**1**
1.1 Rationale and justification	1
1.2 Objectives	5
1.3 Research hypotheses	6
1.4 Variables	6
1.5 Operational definition	8
1.6 Conceptual framework	12
CHAPTER II LITERATURE REVIEW	**13**
2.1 Multilevel ordinal logistic regression model	13
2.2 Multilevel regression technique in health risk behaviors study	20
2.3 The PRECEDE-PROCEED framework	24
2.4 Fact about alcohol drinking	26
2.5 Strategies to reduce alcohol drinking	28
2.6 Alcohol drinking criteria	34
2.7 Factors related to drinking behaviors	35
2.7.1 Individual-level factors	35
2.7.2 Village-level factors	44
2.8 Summary of review literature	49

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright© by Chiang Mai University
All rights reserved

CONTENTS (cont.)

	Page
CHAPTER III METHODOLOGY	**50**
3.1 Study design	50
3.2 Population and sample	50
3.3 Inclusion and exclusion criteria	52
3.4 Data collection	53
3.4.1 Method of data collection	53
3.4.2 Research instrument	54
3.4.3 Quality of instrument	57
3.5 Ethical consideration	57
3.6 Data Processing	58
3.7 Data Analysis	59
3.7.1 Estimation of drinking prevalence	59
3.7.2 Descriptive statistics	63
3.7.3 Univariate ordinal logistic analysis	63
3.7.4 Multilevel ordinal logistic regression analysis	65
CHAPTER IV RESULTS	**69**
4.1 General characteristics of respondents	69
4.1.1 Drinking status	72
4.1.2 General characteristics of respondent and drinking status	77
4.1.3 Drinking pattern	88
4.1.4 Knowledge on drinking and its related factors	96
4.1.5 Perception on drinking and its related factors	100
4.1.6 Drinking refusal self-efficacy and its related factors	104

CONTENTS (cont.)

		Page
CHAPTER IV	**RESULTS(cont.)**	
	4.1.7 Accessibility to alcohol	109
	4.1.8 Availability of information on anti-drinking	114
	4.2 Characteristics of villages	118
	4.3 Univariate ordinal logistic regression analysis	122
	4.4 Multilevel ordinal logistic regression analysis	124
	4.4.1 Fitting null model	125
	4.4.2 Fitting model at individual-level variables	126
	4.4.3 Fitting model at village-level variables	131
	4.4.4 Cross level interaction in multilevel logistic regression	134
	4.4.5 Interpretation of the selected multilevel ordinal logistic model	134
CHAPTER V	**DISCUSSION**	**136**
	5.1 Sampling design and estimation	136
	5.2 Statistical analysis	138
	5.2.1 Ordinal logistic regression	138
	5.2.2 Multilevel ordinal logistic regression analysis	139
	5.3 Drinking prevalence	142
	5.4 Individual-level factors	144
	5.4.1 Predisposing factors	145
	5.4.2 Enabling factors	148
	5.4.3 Reinforcing factors	150
	5.5 Village-level factors	151

Copyright by Mahidol University

CONTENTS (cont.)

	Page
CHAPTER VI CONCLUSION AND RECOMMENDATIONS	**154**
6.1 Conclusion	154
6.2 Recommendations	157
6.2.1 Recommendation for further study	157
6.2.2 Recommendation for implementation of the findings	157
REFERENCES	**160**
APPENDICES	**171**
Appendix A Structured questionnaire for individual	172
Appendix B Structured questionnaire for village	180
Appendix C Structured questionnaire in Thai version	182
Appendix D Human subjects approval document	190
Appendix E The analysis of cross level interaction	192
BIOGRAPHY	**193**

Copyright by Mahidol University

LIST OF TABLES

Table		Page
3.1	Number of adults and villages in Buriram Province classified by type of village	52
3.2	Grouping criteria for knowledge, perceptions and drinking refusal self-efficacy	56
3.3	Age and sex distribution of sample included in this study	59
3.4	Age and sex distribution of 15-75 years old population in Pakham district	60
3.5	Age and sex distribution of 15-75 years population	60
3.6	Estimation of each drinking status and its sampling error	61
3.7	Variable coding for data analysis	64
4.1	Respondents participated in the study by age and sex	69
4.2	General characteristics of respondents by sex	70
4.3	Prevalence of drinking by age and sex	74
4.4	General characteristics respondents classified by drinking status	79
4.5	Friends of respondents classified by drinking status	84
4.6	Family of respondents classified by drinking status	86
4.7	Pattern of drinking among current drinkers and ex-drinkers	89
4.8	Pattern of drinking by sex	90
4.9	Drinking pattern of drinkers classified by sex	92
4.10	Attempt to quit drinking among current drinkers classified by sex	94
4.11	Level of knowledge on drinking of 1,293 respondents	96
4.12	Respondent characteristics and percent of level of knowledge on drinking	97
4.13	Knowledge on drinking of respondents in relation to current drinking status	99
4.14	Number and percentage distribution of level of perceptions on drinking among 1,293 respondents	100
4.15	Generalcharacteristics of respondents classified by level of perception	100
4.16	Perceptions of respondents classified by drinking status	103
4.17	Percentage of knowledge on drinking of 1,293 respondents classified by level of perception	104

LIST OF TABLES (cont.)

Table		Page
4.18	Number and percentage of drinking refusal self-efficacy level among 1,293 respondents	105
4.19	General characteristics of respondents classified by drinking refusal self-efficacylevel	106
4.20	Level of drinking refusal self-efficacy classified by drinking status	108
4.21	Accessibility to alcohol classified by sex	109
4.22	Accessibility to alcohol classified by drinking status	111
4.23	Availability of information on anti-drinking classified by sex	114
4.24	Availability of information on anti-drinking classified by drinking status	116
4.25	Number and percent of general characteristics of 40 villages	119
4.26	Univariate ordinal logistic regression model for drinking status at individual-level and village-level	123
4.27	Null model of multilevel ordinal logistic regression	126
4.28	Selection procedure of individual-level characteristics into the model	128
4.29	Model of Multilevel ordinal logistic regression for individual-level	131
4.30	Parameter estimates in multilevel ordinal logistic model	133
4.31	Odds ratio and 95% confidence interval of factor associated with current drinking status	135
5.1	Comparison the result of multilevel and conventional ordinal logistic regression on drinking status	142

Copyright by Mahidol University

LIST OF FIGURES

Figure		Page
1.1	Conceptual Framework	12
2.1	PRECEDE-PROCEED model	25
4.1	Prevalence of drinking by age and sex	73

Copyright by Mahidol University

CHAPTER I
INTRODUCTION

1.1 Rationale and Justification

The harmful use of alcohol is a global problem which compromises both individual and social development**.** It results in 2.5 million deaths each year [1]. Alcohol consumption is the world's third largest risk factor for disease and disability especially in middle-income countries. Alcohol is a causal factor in 60 types of diseases and injuries. It is not only harmful to drinker's health but also to other people who interact with drinkers. An intoxicated person can put people in harm's way by involving them in traffic accidents or any violent behavior. Harmful drinking can also be very costly to communities and societies [2]. Alcohol drinking causes several related diseases such as alcohol dependence, liver cirrhosis, cardiovascular diseases, cerebrovascular disease (stroke), cancers, and psychological problems [3, 4]. Globally, the first four causes of death attributed by alcohol were liver cirrhosis, road traffic accidents, other unintentional injuries and liver cancer [5]. Drinking is not only the cause of serious illness but also brings great economic and social losses, such as treatment expense. Alcohol consumption caused highly economics lost about 0.93 - 228.36 billion dollars a year [6].

World Health Organization (WHO) estimated that there were about 2 billion people that consume alcohol in the world and 76.3 million have disorders from taking alcohol beverages [7]. Drinking behavior is related with one's way of life, social activities and also imply to several meaning include historical dimension, political affairs, culture, commercial economy and health. Alcohol consumption can harm health as well as social relations, but the nature and the severity of the effects depend on both the amount of alcohol consumed over time, and the pattern of drinking [8].

Worldwide recorded per capita consumption has remained stable at around 4.3–4.7 liters of pure alcohol since 1990, including relative stability in all WHO regions. In developed countries such as Europe and America, which used to have a higher rate of alcoholic beverages consumed, now show decreasing drinking trend continuously, while in developing countries found increasing trend of alcohol consumed rate obviously. According to estimates of five-year trends in recorded adult per capita alcohol consumption (%) by WHO suggest a stable consumption trend in most of the regions, while an increase noted in the African Region and the South-East Asia Region is 25.3% and 68.3%, respectively[2].

Alcohol consumption in Thailand reduced from 37.42% in 2003 to 31.99 % in 2009. The trend seems to stable since in 2004 with an average about 31.57%[9]. In 2007 the Center for Alcohol Studies (CAS) reported the prevalence of drinking among those 15 years and over in Thailand was 30.0%[10]. Besides, the prevalence of drinking from 2001 to 2009 among males whose age 15 years and over was 77.62-84.85% which was about 5 times of females was 15.59-22.38%[9]. Many studies reported difference of gender and age as factors on drinking [11-13].

Beverages or alcohol drinking has a long history in human life [3]. Alcohol drinking in Thai society has a very long root history. It has been used to express appreciation and gratitude as offerings to supernatural beings or spirits to bring prosperity and to gain protection, to relieve fatigue after work. Some belief that a sip of alcohol increase appetite, help to sleep, increase energy, control blood pressure or reduce risk of cardiovascular disease[14, 15]. Some perceived on risk of alcohol consumption, such as oral and pharyngeal cancers, increasing blood pressure and LDL cholesterol, risk of cardio myopathy, pancreatitis, alcoholic hepatitis and liver cirrhosis[5, 16, 17]. Some people also use drinking as stress or anxiety relief[18]. Living in family or neighborhoods having more drinkers also increases the chance of consuming alcohol. Higher educated women were more likely to drink (OR = 1.27). Men and women with low socioeconomic status were also more likely to drink (OR= 1.14)[19]. In Thailand, alcohol drinking is causal factor in 5.8% of total burden or it is the second of all diseases burden. However, men have far greater rates of total burden

attributed to alcohol than women, 9.2% for men compared to 1.0% for women. The first burden attributed to alcohol in men is liver cirrhosis [20].

Researches on drinking consequences and defensive measures have been performed worldwide. The effectiveness of each measure has been evaluated. Those measures can reduce alcohol drinking among populations. A primary responsibility for formulating, implementing, monitoring and evaluating public policies to reduce alcohol drinking are essential, and have already performed in worldwide [21]. Even though, having alcohol public policy to control or limit alcohol consumption such as the liquor tax rates, time limitation to buy and sell alcohol beverages, availability or accessibility to youth, community-based prevention and anti-drinking campaigns but there are still many drinkers [22, 23].

Traffic and household accidents, and accident at the work place were alcohol-related problems [20]. A number of studies indicated that taking alcohol beverages within one hour before driving could increase risk of traffic accident [24, 25]. About 41.0% of traffic accidents during Songkran festival are caused by drinkers as compared to only about 17% during any other days. Ninety percent of injured people consumed alcohol before having an accident. They had blood alcohol concentration (BAC) more than 50 mg% with an average of BAC 224.2 mg% which was 4.5 times higher than limited by law [26].

Alcohol consumption causes harm far beyond the physical and psychological health of the drinker. It causes harm not only to the drinkers, but also to the well-being and health of others such as injuries from violence caused by an intoxicated assailant [27, 28]. Moreover, intoxicated people commit many crimes where the victims are unknown to the perpetrators, including homicide, robbery, sexual assault and property crimes. The well-being of others can also be affected by verbal threats, noise and nuisance from intoxicated people.

Copyright by Mahidol University

A substantial body of research examines the economic costs of alcohol consumption for society as a whole, including direct and indirect costs. Direct costs

include the cost of health care, law enforcement, criminal justice, and property loss due to traffic accident. Indirect costs comprise the cost of productivity loss due to unexpected mortality, reduced productivity from absenteeism and presenteeism. Alcohol consumption in Thailand costs 156,105 Million Baht or 1.99% of Gross Domestic Product (GDP), resulting in approximately 2,391 Baht per capita [29]. Indirect cost outweighs the direct cost. The largest cost attributable to alcohol consumption, 65.7% is productivity loss due to unexpected mortality and 30.1% due to reduced productivity.

The Northeast is the largest region of Thailand in terms of its area and population, but income per capita is lower than other regions. In 2007 the Center for Alcohol Studies (CAS) reported the prevalence of drinking among 15 years and over in Thailand was 30.0%. Prevalence of drinking among adolescent of the same age group in the Northeast was 35.4%, next to the northern region the highest among all regions, 39.0%.

Buriram is one of the provinces that a large number of populations drinking. It located in the Southern part of the Northeast of Thailand. It shares the border with Cambodia and another three provinces: Surin, Nakhonratchasima and Roi-et. The prevalence of drinking among age 15 years and over in this province was 37.8% which was the ranked 7th among the Northeast provinces and ranked 16th in the country as a whole as well as was regular drinkers rate ranked 2nd among the Northeast provinces and ranked 5th in the country as a whole, there were rate of regular drinkers to 36.1 percent and rate of heavy drinking to 24.2 percent [10].

According to a study, the preceding drinking behavior was caused by several factors. In accordance with perspective of Green and Kreuter (1999), who explained the factors of drinking behavior, there are three kinds of causes identified--Predisposing factors which is individual factor resulting from learning, experiences including socio-economic status caused beliefs or attitudes influence people behaviors' changing. Enabling factors are the factors that can support or suppress any behaviors including people' skills and the ability to gain resources required. Reinforcing factors are reinforcement in a kind of helping or supporting from other people or any mass

media influencing people behaviors' changing or anticipated as a consequence of drinking behavior [30]. These factors reinforce each other and affect behaviors of people. Moreover, these factors are nested in the differences of community as previous studies on the community level also related with drinking behavior including the characteristics, resources, organizations and activities of community [31-39]. For these reasons, we can apply PRECEDE-PROCEED Model of Green and Kreuter (1999) to study about the factors of drinking behavior. It offers specific guideline for priority setting. Which helps on more effectively use of resources and incorporates a multi-level evaluation. Therefore, knowing individual factors and community factors as related to drinking among adults is very important. It will help authorities on planning and implementing an intervention program on preventing people from drinking.

Multilevel modeling is a statistical method that recognizes a hierarchical structure of unit of analysis in which it is presented. Hierarchical refers to unit grouped at difference levels, for example adult grouped in a community level. The technique is used to determine how the structures affect the measure of interest. It provides better estimates than single level analysis[40]. The advantage of a multilevel model is that it is not only accommodates the hierarchical nature of data and corrects the estimated standard error to allow for clustering of observations within a unit [41-43], but it also allows the identifications of clustering in the outcome. Multilevel modeling is considerable variability in drinking at community level seen among adults which approach account for this source variation to obtain more precise estimates of the effect of adult characteristics in each community. At the same time, by including community level variables, it allows for estimation of the effect of community on drinking.

1.2 Objectives

General Objective

This study aims to identify the relationship between individual-level factors and village-level factors on alcohol drinking status of populations in Buriram province.

Specific Objectives

1. To identify alcohol drinking prevalence and alcohol drinking behavior of populations in Buriram province.

2. To describe individual-level factors which include predisposing factors, enabling factors and reinforcing factors on alcohol drinking of populations in Buriram province.

3. To describe village-level factors which comprise type of village, attending community empowerment program, language use, most common occupation, housing and selling liquor shop ratio, the level of village activities lead to drink and health promoting village program of populations in Buriram province.

4. To identify the relationship between individual-level factors and village-level factors on alcohol drinking status of populations in Buriram province.

1.3 Research hypotheses

1. There are relationships between individual-level: predisposing, enabling and reinforcing factors and drinking status of populations in Buriram province.

2. There are relationships between village-level: type of village, attending community empowerment program, language use, most common occupation, housing and selling liquor shop ratio, the level of village activities lead to drink and health promoting village program of populations in Buriram province.

3. There is an interaction between individual-level and village-level on drinking status of populations in Buriram province.

1.4 Variables

Dependent variable: Current drinking status as respondent answering in the Alcohol Use Disorders Identification Test (AUDIT) divided into5 ordered categories comprised of never drinking, ever drinking, mild drinking, moderate drinking and heavy drinking.

Independent variables comprised of individual-level factors and village-level factors.

Individual-level variables:

Based on the conceptual framework, individual-level comprised of:

1. **Predisposing factors which comprised of:**
   - 1.1 General characteristics of respondent:
     - Marital status
     - Cigarette smoking
   - 1.2 Knowledge on health effect and law of drinking
   - 1.3 Perceptions on drinking comprised of perceived severity and risk
   - 1.4 Drinking refusal self-efficacy
2. **Enabling factors which comprised of:**
   - 2.1 Socioeconomic status (SES)
   - 2.2 Accessibility to alcohol beverages and effect of alcohol price increasing.
   - 2.3 Availability of information on anti-drinking.
3. **Reinforcing factors which included:**
   - 3.1 Proportion of family member drink
   - 3.2 Proportion of friend drink

Village-level variables which comprised of:

1. Type of village
2. Community empowerment program
3. Language use
4. Most common occupation
5. Housing and selling liquor shop ratio
6. The level of village activities lead to drink
7. Health promoting village program

Copyright by Mahidol University

1.5 Operational definition

Populations refer to male or female whose age 15-75 years are currently living in all type of communities in Buriram province.

Alcohol is a colorless volatile flammable liquid, chemical formula is C_2H_5OH, synthesized or obtained by fermentation of sugars and starches and widely used. In this case is intoxicating beverages. It also called ethanol, ethyl alcohol, and grain alcohol.

Drinking behavior is behaviors associated with the ingesting of alcohol beverages; includes rhythmic patterns of drinking (time intervals – onset and duration) when having a situation motive or lead to drink which evaluate by questionnaire. This study demonstrate level of drinking by frequency, feature of drinking by volume or beverage containers, alcohol brands, outlets or retails buying alcohol beverages, the reason to drinking, cost of each drinking, time to drinking, place in which drinking and persons who drinking together.

Drinking status refers to status of drinking of population which is classified into 5 ordered categories by using the Alcohol Use Disorders Identification Test (AUDIT) score as the recommended cut-off of 8. It divide into 4 level; 0-7 are non-drinker or low risk drinker, 8-15 are moderate drinking, 16-19 are harmful drinking and greater than 20 are dependence drinking [44].

Individual-level variables refer to individual factors including predisposing factors, enabling factors and reinforcing factors.

Predisposing factors referred to characteristics of population that motivates behavior prior to alcohol drinking.

1. General characteristics of population are marital status and cigarette smoking.

Copyright by Mahidol University

2. Knowledge is the fact, information or skills acquired through experience or education about health risks and hazards of drinking and alcohol control law and policy.

3. Perception refers to the interpretation of the sensory stimuli based on memory that people has been seen and heard, which lead people to act accordingly with those feeling and beliefs. Then they will appraise the threat which will motivate them to intend to drink or not. The perception in this study is composed of :

3.1 Perceived severity of drinking refers to the population beliefs by evaluating the severity of the harmful effect of drinking on their body causing disease, illness, suffering, and disability or dying.

3.2 Perceived risk of alcohol drinking refers to probability to be disease and dangerous from drinking. It refers to perception of risk can be caused to people health and how much they fear their heath damaged by alcohol use.

4. Drinking refusal self-efficacy refers to person's belief in his/her own competence or self-confidence of population that their ability to refuse drinking alcohol beverages in varied situations, including persuasion from friends, family members and media.

Enabling factors are the factors that can support or suppress any behaviors including the environment characteristic, people' skills and the ability to gain resources required to attain drinking behavior. These factors comprise of socioeconomic status, accessibility and availability.

1. Socioeconomic status (SES) means income of population is enough to purchase alcohol beverages.

2. Accessibility to alcohol beverages means ability of population to purchase or obtain alcohol beverages which include effect of price increasing on drinking.

3. Availability of information on anti-drinking refers to protective factors, including information about effect of drinking, anti-drinking through media such as radio, television, internet, magazines and health warning messages that populations can access to.

Reinforcing factors are the rewards and feedback receives from others following adoption of drinking behavior, may encourage or discourage continuation of the behavior. It includes proportion of close friend and family member drink, drinking behavior of friend and family member either positively or negatively.

1. Proportion of friend drink refers to the ratio of close friend or co-workers who drink divide total number of close friend and co-workers or the motivation of friends that influence on the awareness, intention to drink or stop drinking.

2. Proportion of family member drink refers to proportion of drinker in the family or the ratio of family member who drink divide total number of family members who has an influence on drinking.

Village-level variables refer to village factors which includes type of village, attending community empowerment program, language use, most common occupation, housing and selling liquor shop ratio, the level of village activities lead to drink and health promoting village program.

Type of village refers to villages setting are municipal area and non-municipal area

Community empowerment program refer to the villages participation to strengthened community program by social participation such as socioeconomic development, health promotion and prevention of drug addiction including alcohol consumption

Language use refers to communal languages include Thai, Thai-Korat, Isan, Khmer and Kuy languages or mix languages in a village.

Most common occupation refers to type of occupation that population work most or the highest proportion of occupation in the village include rice farming, crop-farming, labor and commerce.

Housing and selling liquor shop ratio refers to alcohol outlet density or the ratio of liquor shop divide total number of households of that village. Whereas number of outlet or retail in each village in which people can access to alcohol beverages include grocery shop, convenience store, pub/bar, diner, herbal liquor' bistro (also called "Soomya dong"), and illicit distillery place.

The level of village activities lead to drink refers to a number of social activities and celebrations that usually have alcohol beverages in a year.

Health promoting village program refers to the policy of village about anti-drinking, public media campaigns, alcoholism recovery efforts, school education as well as health resources for access to the health information including media or documentary health in that village or sub-district health promoting hospital.

Copyright by Mahidol University

1.6 Conceptual Framework

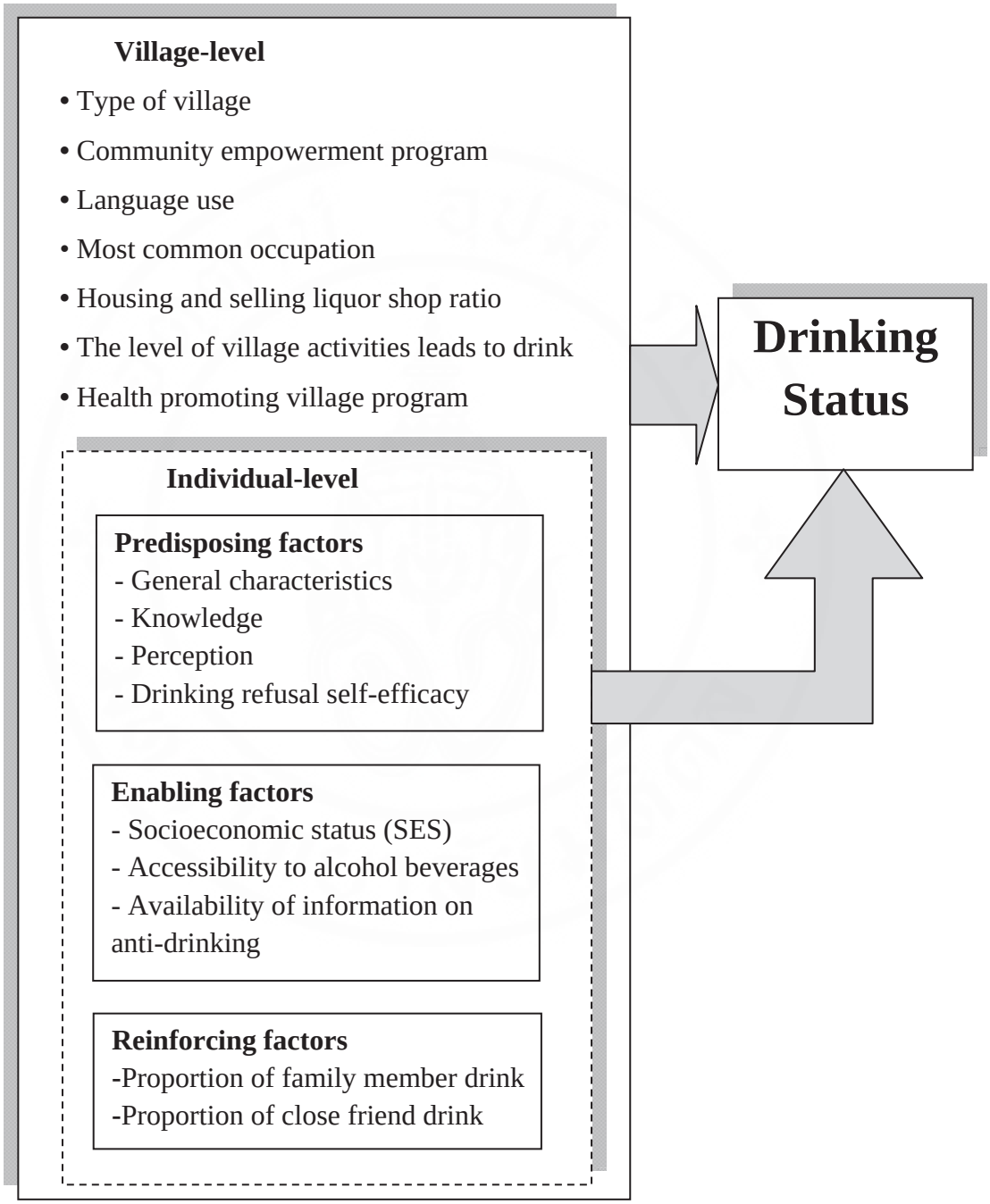


Figure 1.1: Conceptual Framework

Copyright by Mahidol University

CHAPTER II
LITERATURE REVIEW

Based on the proposed conceptual framework of a multilevel study as mentioned the relationship between individual-level and village-level on drinking of population, the PRECEDE-PROCEED model and factors influencing drinking among population age 15-75 years had been reviewed**.** Statistical approach for the analysis of this study was presented as following;

1. Multilevel ordinal logistic regression model
2. Multilevel regression technique in health risk behaviors study
3. PRECEDE-PROCEED model
4. Fact about drinking
5. Strategies to reduce alcohol drinking
6. Alcohol drinking criteria
7. Factors related to alcohol drinking behavior
8. Summary of review literatures

2.1 Multilevel ordinal logistic regressionmodel

The multilevel regression model is also known as hierarchical linear model, mixed-effect model or often are called random coefficient model because the regression coefficients may vary across group (higher-level). A multilevel study concerns the population with a hierarchical structure and the sample data are a sample from this hierarchical population. As a hierarchical data set, the multilevel modeling approach over other ways of handling hierarchical data to include explanatory variables at every level of analysis. The individuals and the social groups are conceptualized as a hierarchical system of individuals nested within groups, with individuals and groups defined at separate levels of this hierarchical system. Naturally, such systems can be observed at different hierarchical levels, and variables may be

defined at each level. This leads to research into the relationships between variables characterizing individuals and variables characterizing groups, a kind of research that is *multilevel research*. Therefore, the population in this research composes of villages and residents within these villages, and the sampling procedure precedes two stages: first, selecting a sample of villages and next taking sample of individuals within each village. For this approach, individuals are nested within villages, utilizing the performance of individuals, researchers realized that observation of respondents in the same village were not independent of each other [41].

Multilevel ordinal logistic regression model is developed for ordinal outcome data with logistic response functions. Using thresholds concept in which it is supposed that the observed ordered category is defined by the value of latent unobservable continuous response that follows a linear regression model consolidating random effects. An analysis of data set in which individuals are clustered or nested within villages is used to illustrate features of random-effects analysis of clustered ordinal outcome. Multilevel models are designed to analyze variables from different levels simultaneously, using a statistical model properly includes the various dependencies [41]. This study provided the ordinal outcome (i.e. never drinking, ever drinking, mild drinking, moderate drinking and heavy drinking). Very useful model for this type of data is multilevel ordinal logistic regression model, also called the multilevel ordinal logit model or the multilevel proportional odds model. With two levels (individuals nested in village or individuals as level 1 and villages as level 2), thus the equation of this study is two-level ordinal logistic regression model [45].

The intraclass correlation (ICC) is used to estimate the correlation between factors measured on individuals from the same villages, in which the average correlation between variables measured on individuals from the same villages will higher than from the difference villages. The intraclass correlation can also provide an assessment of the percentage of total variation that is attributable to between villages variation [46]. When the logistic model is applied then the residuals of level-1 are assumed to follow the standard logistic distribution (mean = 0 and variance $=\pi^2/3$). For ordinal logistic assuming normally distributed random-effects, the variance

represents the within-group variance of the underlying latent response tendency. In survey research has effect to estimate standard errors are known as the design effect (DEFF), which is the ratio of the actual variance of the variance from a simple random sample with the same size. Multilevel modeling corrects the estimated standard errors that tend to be underestimated due to clustering of observations within units and accommodates the hierarchical structure of the data [40].

The multilevel ordinal logistic regression model can be described as a base upon general multilevel regression analysis. The full multilevel regression model presumes that there is a hierarchical data set, with one dependent variable is measured at level-1 and explanatory factors at both level-1 and level-2. Conceptually the model can be viewed as a hierarchical system of regression equation [40, 41].

For ordinal logistic analysis, it has to meet with the assumption of proportional odds, which the proportional odds model assumes the same slope across all drinking levels. The assumption of proportional odds or called parallel regression lines assumption; when the structure is shifted, the slope of the regression lines does not exchange. The test of parallel lines regression of all significantly predicted variables was evaluated by using Wald test with p-value > 0.05 indicating that a set of predictive variables were not violated the assumption of parallel lines regression [41, 47].

In ordinal logistic regression, the event of interest is observing a particular score or less. All of the odds are of the form:

$$\theta_c = \text{prob}(\text{score} \leq c) \,/\, \text{prob}(\text{score} > c)$$

We can also write the equation as

$$\theta_c = \text{prob}(\text{score} \leq c) \,/\, (1 - \text{prob}(\text{score} \leq c)),$$

since the probability of a score greater than c is 1 – probability of a score less than or equal to c.

The ordinal logistic model for a single independent variable can be written as;

$$\text{Log}\,(\theta_c) = \alpha_c - \beta \text{X}$$

where c goes from 1 to the number of categories minus 1[48].

Copyright © by Mahidol University

In this study, there are five possible outcome categories (coded as 1,2,3,4 or 5) the following four cumulative logits are indicated by the model [49]:

$$log\left[\frac{P(Y_{ij} \leq 1)}{1 - P(Y_{ij} \leq 1)}\right] = log\left[\frac{P(Y_{ij} = 1)}{P(Y_{ij} = 2,3,4\ or\ 5)}\right]$$

$$log\left[\frac{P(Y_{ij} \leq 2)}{1 - P(Y_{ij} \leq 2)}\right] = log\left[\frac{P(Y_{ij} = 1\ or\ 2)}{P(Y_{ij} = 3,4\ or\ 5)}\right]$$

$$log\left[\frac{P(Y_{ij} \leq 3)}{1 - P(Y_{ij} \leq 3)}\right] = log\left[\frac{P(Y_{ij} = 1,2\ or\ 3)}{P(Y_{ij} = 4\ or\ 5)}\right]$$

$$log\left[\frac{P(Y_{ij} \leq 4)}{1 - P(Y_{ij} \leq 4)}\right] = log\left[\frac{P(Y_{ij} = 1,2,3\ or\ 4)}{P(Y_{ij} = 5)}\right]$$

Assume that we have data from j-groups, with number respondents n_j in each group. On the respondent level, we have outcome variables Y_{ij} which are ordered categories defined as $c = 1, \dots, C$, where C is the number of ordinal outcome categories.

The multilevel ordinal models can also be formulated as threshold models. The real line is divided by thresholds into C intervals, corresponding to the C ordinal categories. The first threshold is γ_1. Threshold γ_1 defines the upper bound of the interval corresponding to observed outcome 1. Similarly, observed outcome C. Threshold γ_c defines the boundary between the intervals corresponding to observed outcome $c - 1$ and c (for $c = 2, \dots, C - 1$). The latent outcome variable is denoted by y_{ij}^* and the observed categorical variable y_{ij} is related to y_{ij}^* by the 'threshold model' defined as follows [49];

$$y_{ij} = \begin{cases} 1 & if\ -\infty < y_{ij}^* \leq \gamma_1 \\ 2 & if\ \gamma_1 < y_{ij}^* \leq \gamma_2 \\ & \vdots \\ C & if\ \gamma_{c-1} < y_{ij}^* \leq +\infty \end{cases}$$

Copyright by Chiang Mai University

Consider the latent response variable y_{ij}^{*} for level-1 unit i in level-2 unit j and the observed categorical variable y_{ij} related to y_{ij}^{*}. The ordinal models can be described as follows;

$$y_{ij}^{*} = \theta_{ij} + \varepsilon_{ij}\ , \qquad (i = 1, \dots, n and j = 1, \dots, J)$$

Where

$$\theta_{ij} = \beta_{0j} + \sum_{p=1}^{P} \beta_p x_{pij} \qquad (p = 1, \dots, P)$$

θ_{ij} is the threshold j^{th} category, β_1 ... β_p are the regression coefficients, x_1 ... x_p are the predictor variables, and *p* is the number of predictors.

For $c = 1, \dots, C$. As ordinal response models often utilize cumulative comparisons of the ordinal outcome, define the cumulative response probabilities for the C categories of the ordinal outcome y_{ij} in which y_{ij} is probability of drinking of *i*-individual attending to the *j*-village as follows;

$$P_{ij(c)} = \Pr(y_{ij}^{*} \le c) = \sum_{k=1}^{c} p_{ij(k)} \qquad (c = 1, \dots, C)$$

The idea of cumulative probabilities leads naturally to the cumulative logit model

$$log\left[\frac{P_{ij(c)}}{1 - P_{ij(c)}}\right] = log\left[\frac{\Pr(y_{ij}^{*} \le c)}{\Pr(y_{ij}^{*} > c)}\right]$$

$$= \gamma_c + \theta_{ij} c = 1, \dots, C - 1$$

With *(C-1)* strictly increasing model thresholds $\gamma_c (i.e., \gamma_1 < \gamma_2 \dots < \gamma_{C-1})$[42].

Let y_{ij}^{*} denoted by y_{ij}

Thus explanatory variables and random intercepts the level-1 model becomes [41].

$$log\left[\frac{\Pr(y_{ij} \le c | X_{ij}, \beta_{0j})}{1 - Pr(y_{ij} \le c | X_{ij}, \beta_{0j})}\right] = \gamma_c + \left(\beta_{0j} + \sum_{p=1}^{P} \beta_p x_{pij}\right), \qquad \textit{Level-1 model}$$

where γ_c is the threshold parameter for category $c = 1, \dots, C - 1$.

Copyright by Mahidol University

Across all villages, the regression coefficients β_j have a distribution with some mean and variance. The next step in multilevel regression model is to predict the variation of regression coefficient by introducing variables at village-level, as follows;

$$\beta_{0j} = \gamma_{00} + \sum_{q=1}^{Q} \gamma_{0q} z_{qj} + u_{oj}\,, \quad u_{0j} \sim N(0, \sigma_{u_0}^2) \qquad \textit{Level-2 model}$$

and

$$\beta_{1j} = \gamma_{10} + \sum_{q=1}^{Q} \gamma_{1q} z_{qj} + u_{1j}\,, \quad u_{1j} \sim N(0, \sigma_{u_1}^2)$$

Where γ_{00}, γ_{10} are intercept, γ_{01}, γ_{11} are slope and u_{0j}, u_{1j} are random variables with parameters of $\beta_{0j}$and β_{1j} , respectively.

$$E(u_{0j}) = E(u_{1j}) = 0$$

$$Var(u_{0j}) = \sigma_{u_0}^2, Var(u_{1j}) = \sigma_{u_1}^2 \text{ and } Cov(u_{0j}, u_{1j}) = \sigma_{u_{01}}^2$$

The two-level ordinal logistic regression model can be written in the form

$$log\left[\frac{(\Pr(y_{ij} \le c)|X_{ij}, Z_j, u_{0j})}{(\Pr(y_{ij} > c)|X_{ij}, Z_j, u_{0j})}\right] = \overbrace{\gamma_c + (\gamma_{00} + \gamma_{10} X_{pij} + \gamma_{01} Z_j + \gamma_{11} X_{pij} Z_j}^{\text{Fixed part}} + \underbrace{u_{0j} + u_{1j} X_{pij})}_{\text{Randompart}}$$

The model which includes the intercept parameter γ_{00} and the threshold $\gamma_1$is not identifiable. Consider a simple intercept model without explanatory variable as follows;

$$log\left[\frac{\Pr(y_{ij} \le 1|u_{0j})}{1 - Pr(y_{ij} \le 1|u_{0j})}\right] = \gamma_1 + (\gamma_{00} + u_{0j}), \qquad \textit{Intercept model}$$

From the intercept model equation, it is apparent that parameters γ_1 and γ_{00} cannot be estimated separately and therefore those parameters are not identifiable. For identification, the first threshold γ_1 or the intercept γ_{00} may be fixed at zero [45].

Residuals of level 1 are assumed to be independent as following the standard logistic distribution, which has a mean of 0 and a variance of$\pi^2/3$. The intraclass correlation or ICC (ρ) is defined as the ratio of between villages' variance

and total variance. For this, one can make reference to the threshold concept and the underlying latent response tendency that determines the observed response. For the ordinal logistic model assuming normally distributed random-effects, the estimated intra-class correlation equals$\sigma_{u0}^2/(\sigma_{u0}^2 + \pi^2/3)$, where the latter term in the denominator represents the variance of the underlying latent response tendency [42].

Parameter estimates

The statistical theory behind the multilevel regression model is rather complicate. Base on the basis of the observed data, parameters of multilevel regression model that needed to estimate are regression coefficients and the variance components, which the Maximum Likelihood (ML) method is the most common method of estimating the parameters of multilevel regression model. The Maximum likelihood estimation provides estimates for the population parameters that maximize the probability of the actually observed data, given the model. Maximum likelihood estimation proceeds by maximizing a function called the likelihood function [41].

There are two different likelihood functions are used in the available software for multilevel regression modeling. One is full maximum likelihood (FML), which this method include both the regression coefficients and variance components in the likelihood function. Another estimation method is Restrictedmaximum likelihood (RML), which including only the variance components in the likelihood function in the first step, and the regression coefficients are estimated in a second step of estimation procedure. Since RML is more realistic because it estimates the variance components after removing the fixed effects from the model, then RML should, in theory, lead to better estimates [41].

The maximum likelihood procedure calculates a statistic called the *deviance* that indicates how well the model fits the data. The deviance is defined as -2ln(Likelihood), where Likelihood is the value of the likelihood function at convergence, and is the natural logarithm. In general, models with a lower deviance fit better than models with higher deviance. When two models are nested, means that a specific model can be derived from a more general model by removing parameters

from the general model. The difference of deviance for two nested models has a chi-square distribution; with degrees of freedom equal to the difference in the number of parameters estimated in the two models. Therefore, we can use chi-square test of the deviances to test whether the more complex model fits significantly better than the simpler model [41].

2.2 Multilevel Regression Technique in health risk behaviors study

Multilevel logistic regression was used to analyze a variation across community in Australia in assessing high-risk drinking in Victoria [33]. The outcome was experimental drinker who drank more than 20 drinks at least 12 times a year for males and more than 11 drinks at least 12 times a year for females. Community level variable were alcohol outlet density, remoteness. Individual level variables were personal and social environment characteristics. A total of 10,879 young Victorian drinkers and 3 postcode level variables were enrolled into analysis. Two models were constructed as following;

Model 1: single-level logistic model to examine the correlation of drinking and individual factors among adult between-person or within-group while allowing the model intercept to vary randomly between postcodes.

Model 2: included both individual and postcode-level predictors was structured to examine the direct effect of community-level, individual-level and contextual interactions between both level.

Result showed single-level logistic model and the three community-level variables, remoteness and outlet density were significant in the model had influence on drinking behavior. Young people living in nonmetropolitan areas found very high-risk drinking were 1.3 times of those living in major cities. Increased density of packaged liquor outlets was associated with increased prevalence of very high-risk drinking among the young people in this study. The density of the remaining licentious types was not associated with changes in the prevalence of very high-risk drinking. A log-likelihood test comparing model 2 to model 1 showed that the inclusion of the community-level predictors produced a significantly better model ($\chi^2 = 46.3$, $p < 0.001$).

One research in Taiwan assessed the direct effects of neighborhood-level characteristics and interactive effects of neighborhood-level characteristics and individual socioeconomic position on adult smoking and drinking, after consideration of individual-level characteristics neighborhood and individual effects on individual smoking and drinking was made by using multilevel binomial regression models [19]. Data on individual socio-demographic characteristics, smoking, and drinking were obtained from Taiwan Social Change Survey conducted in 1990, 1995, and 2000. The overall response rate was 67%. A total of 5,883 women and men aged over 20 living in 434 neighborhoods were interviewed. Participants' addresses were geocoded and linked with Taiwan census data for measuring neighborhood-level characteristics including neighborhood education, neighborhood concentration of elderly people, and neighborhood social disorganization. All analyses were conducted separately by gender. Four steps of modeling were constructed as following;

Model 1: to fit with neighborhood-level characteristics.

Model 2: to fit models with individual-level characteristics

Model 3: models included both neighborhood-level and the significant individual-level characteristics identified in the second model to assess whether neighborhood-level effects were explained by individual characteristics.

Model 4: two-way interaction terms of individual-level SES and separate neighborhood-level characteristic were added to the models to test whether the effects of neighborhood-level characteristics on smoking and drinking were modified by individual-level SES.

Result showed many interaction effects between neighborhood characteristics and individual socioeconomic status (SES) were found in multilevel analyses. Their results pointed out different neighborhood characteristics led to different interaction patterns. Such as, neighborhood education had a positive effect on smoking for low SES women, in contrast to a negative effect on smoking for high SES women. Neighborhood social disorganization has positive effects on drinking for low SES individuals, but not for high SES individuals. These interactive effects support the hypothesis of the double jeopardy theory, suggesting that living in neighborhoods with high social disorganization will intensify the effects of individual low SES. The

findings of this study show new evidence for the effects of neighborhood characteristics on individual smoking and drinking [19].

The attempt to identify difference among socio-economic features of a community influence people's health (e.g., depression and problem drinking) was made by using multilevel regression techniques on the pooled data of the Belgian Health Interview Survey 2001 and 2004 [31]. A total of 21,367 respondents and 589 municipalities were enrolled into analysis. With response rate of 61.4% at both individual level and household level. Household characteristics were assessed using a household questionnaire; individual characteristics were assessed by means of a verbal and a written questionnaire. Residential- area characteristics at the municipality level, unemployment rate is constructed by the ratio of the unemployed population. Dependent variables that were found in variation between municipalities were depression and problem drinking. Model1 considered only main effects on problem drinking reported significantly more depressive complaints compared to men (β = 0.039, s.e = 0.002, $p<0.001$) and results indicate that the unemployment rate is associated with both depression (β = 0.127, s.e = 0.046, $p < 0.005$) and problem drinking (β = 0.068, s.e = 0.020, $p<0.001$), Model2 considered both main and gender interaction effects on problem drinking show more problem drinking (β = -0.017, s.e = 0.001, $p<0.001$). As a result reveal that living in an area with high unemployment is more detrimental for women in terms of depression, but has the same impact on men and women when problem drinking is the outcome.

A multilevel modeling approach was used to examine the relationship of both individual level and community level access measures to youthful alcohol use in United States of America [50]. A total of 16,694 students, ages 16-17 in 92 communities in Oregon were enrolled into analysis. The outcome measures examined include 30-day frequency of alcohol use, binge drinking, use alcohol at school, and drinking and driving. As a community index of enforcement of minor in possession (MIP) laws, they computed the mean in each community on the 4-point response scale that they performed. Conceptually, the model evaluates the effect of both individual level (Level 1) and community level (Level 2) variables by simultaneously estimating

three combined regression equations. Community predictors were structural, alcohol availability and enforcement of possession laws. The multilevel model can be demonstrated as following;

At level 1;

$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{1ij}) + u_{ij}$$

Where Y_{ij} is the value of student i in community j on the outcome Y and Y_{ij} equal to logit, $\beta_{0j}$is the mean level of alcohol use in each community, $\beta_{1j}$is the relative use in each community of the (l = 1 to 5), X_{1ij} is commercial or social source predictors, and r_{ij} is random error term of level 1.

At level 2;

Each community's alcohol use mean (β_{0j}) and source slopes (β_{1j}) are modeled as a function of level 2 variables:

$$\beta_{0j} = \gamma_{00} + \gamma_{0w}(w_{0j}) + \gamma_{0z}(Year) + u_{0j}$$

and

$$\beta_{1j} = \gamma_{10} + \gamma_{1w}(w_{1j}) + u_{1j}$$

Where γ_{00} is the average intercept (average level of alcohol use frequency) across communities, and the γ_{10} are the average slopes (average relative use) of each of the sources, β_{1j} across communities. $w_j$are predictors of level 2, in this case, the estimated youth commercial access rate and level of MIP enforcement in each community; γ_{0z} is the secular rise or fall in 11th grade alcohol use over the two measurement time points (years), and u_{0j} and u_{1j} are the random error terms of level 2. The term γ_{0w} is the direct or main effect of community-level access rates and MIP enforcement on mean levels of alcohol use in youth. The terms γ_{1w} estimate the interactional effects of community access rates or MIP enforcement and the use of each of the l = 1 to 5 examined sources of alcohol. Considered the community effect, result showed that among all independent predictors at a community-level, the rate of illegal merchant sales in the communities directly related to all four alcohol-use outcomes. There was also evidence that communities with higher minor in possession law enforcement had lower rates of alcohol use and binge drinking. The use of various

sources in a community expanded and contracted somewhat depending on levels of access and enforcement.

2.3 The PRECEDE-PROCEED framework [30]

The PRECEDE-PROCEED are a conceptual framework for practice or planning model. It offers specific guideline for priority setting. Which help on more efficiently and effectively used of resources and incorporates a multi-level evaluation. It can be for monitoring and evaluation of any implementation programs including health. The PROCEDE was developed in 1970 by Green and Kreuter and PROCEED was added to the model in 1991, in recognition of the expansion of health education and need for health promotion interventions that go beyond traditional educational approaches to changing unhealthy behaviors.

PRECEDE is an acronym for **P**redisposing, **R**einforcing, and **E**nabling **C**onstructs in **E**ducational **D**iagnosis and **E**valuation which also generates specific objective and criteria for evaluation. It consists of five phases.

PROCEED is an acronym for **P**olicy, **R**egulatory, and **O**rganizational **C**onstructs in **E**ducational and **E**nvironmental **D**evelopment which guides the implementation and evaluation of the programs designed using. It is composed of four additional phases.

The PRECEDE-PROCEED consist of nine steps planning process are social assessment, epidemiological assessment, behavioral and environmental assessment, educational and organizational assessment, administrative and policy assessment, implementation, process evaluation, impact evaluation and outcome evaluation.

The conceptual framework for this study was based upon the fourth step which is educational and organizational assessment. This identifies factors that must be changed to initiate and sustain the process of behavioral and environmental change.

These factors are classified as predisposing, enabling and reinforcing factors and they will become the immediate targets or objectives of the program and the intervention.

Predisposing factors are any characteristics of a person or population that motivate behavior prior to the occurrence of that behavior, such as knowledge, attitudes, beliefs, values and perception that hinder motivation to change their behaviors.

*Enabling factors*includes the availability, accessibility, and affordability of health-care and community resources which facilitate the performance of an action.

*Reinforcing factors*includes the rewards and feedback receives from others following adoption of the behavior, may encourage or discourage continuation of the behavior [30].

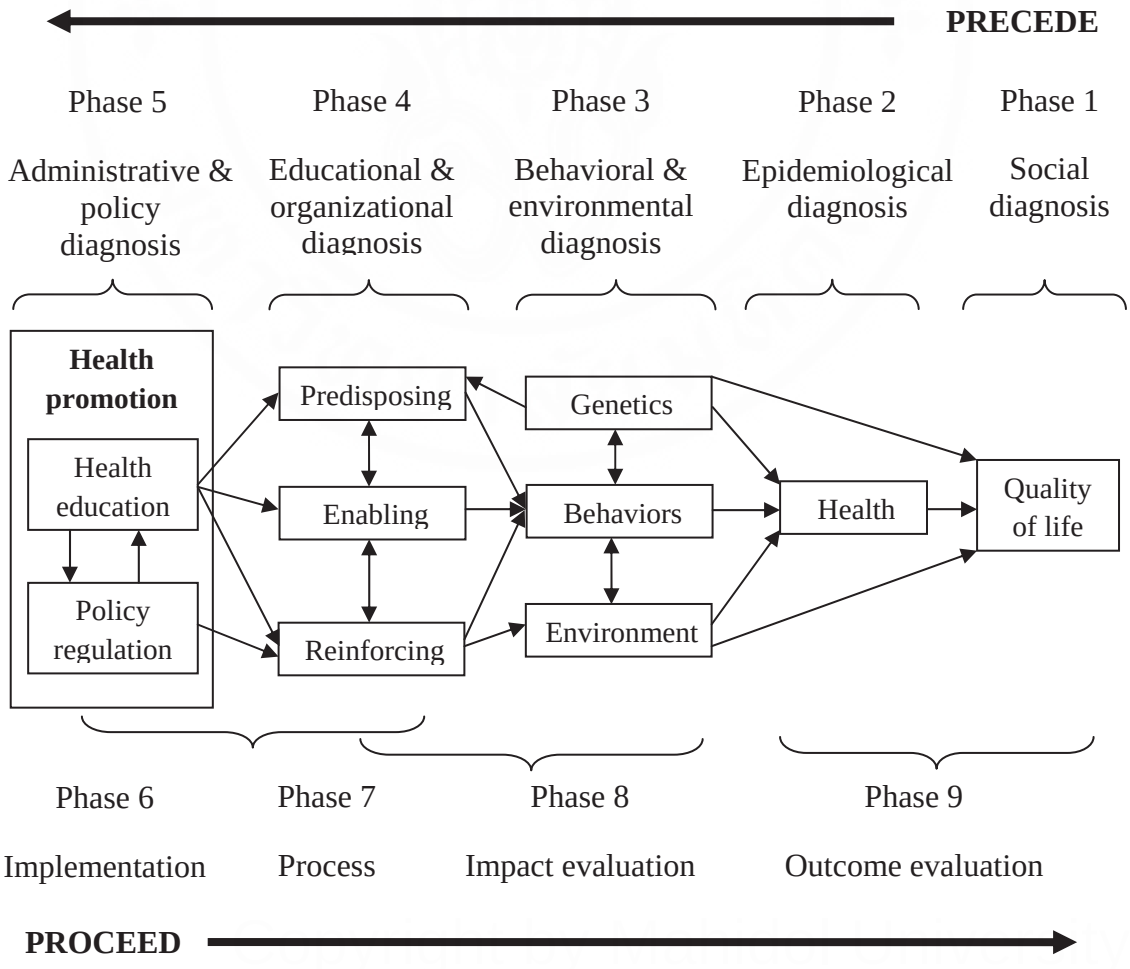


Figure 2.1: PRECEDE-PROCEED model

The PRECEDE-PROCEED model was helpful in developing an instrument to assess multilevel influences and in conducting the analyses. It is a participatory model, and it will both bring more and better ideas about the issues of study with involving the community and build community ownership of the intervention. The PRECEDE-PROCEED is permitting for adjustment and greater effectiveness. Moreover, the model allows the freedom to adapt the structure to whatever content and methods meet the needs of community.

2.4 Fact about alcohol drinking

Alcohol use is related to wide range of physical, mental and social harms. Most health professionals agree that alcohol affects practically every organ in the human body. Alcohol consumption was linked to more than 60 diseases [2]. Alcohol beverages are not common products, most people know about harm of drinking for a long time that drinking is problematic caused of health, social and economy including acute and chronic problem through 3 significant mechanisms are alcohol toxicity, affect central nervous system and addictive substance [51].

The link between alcohol consumption and consequences on the two main dimensions of alcohol consumption are average volume of consumption and patterns of drinking on the mediating mechanisms such as biochemical effects, intoxication, and dependence.

Direct biochemical effects of alcohol may influence chronic disease either in a beneficial (e.g., protection against blood clot formation of moderate consumption which is protective for coronary heart disease) or harmful way (e.g., toxic effects on acinar cells triggering pancreatic damage).

Intoxication is a powerful mediator mainly for acute outcomes, such as accidents, or intentional injuries or deaths, domestic conflict and violence.

Alcohol dependence is a powerful mechanism sustaining alcohol consumption and thus impacting on both chronic and acute consequences of alcohol, though it is also a consequence of drinking itself [2].

Alcohol is absorbed into drinker's bloodstream quickly. The absorption rate depends on the amount and type of food in drinker's stomach. For example, high-carbohydrate and high-fat foods lessen the absorption rates. A carbonated alcoholic drink, like champagne, will be absorbed faster than a non-carbonated drink. The effects of alcohol may appear within 10 minutes and peak at approximately 40 - 60 minutes. Alcohol stays in the bloodstream until it is broken down by the liver. If a person consumes alcohol at a faster rate than the liver can break it down, the blood alcohol level rises [52].

Many recent research projects have investigated whether these cancers are alcohol-related. Overall, evidence for a causal relationship between alcohol and cancer of the stomach, pancreas, colon, rectum, if any was found, was weak and inconclusive [53]. A recent meta-analysis assessing the link between alcohol and various types of cancer showed that statistically significant increases in risk existed for cancers of the stomach, colon, rectum and ovaries [2, 54].

Alcohol also increases the risks of diseases such as alcohol dependence, pancreatitis, cardio-cerebrovascular disease, cancer, hepatitis and liver cirrhosis. Moreover, falls, drowning, motor vehicle accidents, risky sex behaviors, unplanned or unwanted pregnancy, and sexually transmitted diseases (STDs), suicide and homicide and other accidents are also cause by alcohol drinking [5, 16, 17, 52].

The harm of alcohol drinking not only affects drinker but also affect others who have interaction with drinkers. Most of countries in the world concern with this problem and try to publicize people to know what harm cause of drinking, report number of morbidity and mortality that related-alcohol problems, campaign for reduce drinking and law enforcement about drinking. Furthermore, there are collaborating across countries around the world.

2.5 Strategies to reduce alcohol drinking

The global strategy to reduce use of alcohol

As the harmful of alcohol use has a serious impact on public health and also is one of the main risk factors for detrimental health globally. Alcohol can ruin the individual's lives, devastate families, and damage the structure of communities. The commitment to reduce alcohol use provided a great opportunity for promoting health and social well-being in global or national initiatives as the following: [21]

- Increasing global action and international cooperation.
- Ensuring intersectoral action by comprehensive action across numerous sectors.
- According appropriate attention, high priority of problem is given the attention it deserves.
- Balancing different interests which are production, distribution, marketing, economic and tax revenue for governments at different levels.
- Focusing on equity.
- Considering the context in recommending actions.
- Strengthening information. The WHO Global Information System on Alcohol and Health and integrated regional information systems provide the tools to monitor better progress made in reducing harmful use of alcohol at the global and regional levels.

The effective actions can reduce alcohol use in populations. A primary responsibility for formulating, implementing, monitoring and evaluating public policies to reduce alcohol drinking are essential and have already performed in most country worldwide. Moreover, sustained political commitment, effective coordination, sustainable funding and appropriate engagement of sub-national governments as well as from civil society and economic operators are also essential for success [21]. Furthermore, ministry of public health has a crucial role in bringing together the other ministries and stakeholders needed for effective policy design and implementation.

Copyright by Mahidol University

Effects of tax and price on alcohol drinking

Several studies found that the level of tax and price related to gross sales and consuming alcohol [55-58]. A meta-analysis conducted a systematic review of studies investigating associations between alcohol drinking and the effect of alcohol tax/price. They found 112 studies of alcohol tax/price effects that estimates of tax/price elasticity for different types of alcohol beverages were -0.46, -0.69 and -0.80 for beer, wine and spirits, respectively [58]. Tax/price also significantly affects to heavy drinking with elasticity reported -0.28. Moreover, tax/prices effects are large compare to other preventing programs or policies. However, this finding could not specify whether the negative relationship between tax/price effect and alcohol drinking is linear effect or not. If it is not a linear effect, it means alcohol drinking is decreased as an increasing tax/price just at an earlier stage, but it may not decline anymore when reaching at some points.

Although increasing price and tax of alcohol beverage lead to decrease drinking alcohol, but there are some drinkers altering to consume low-quality alcohol which having low price [59].

According to the study examines factors of alcohol prices and alcohol quality on alcohol drinking, using Swedish price and sales data provided by Systembolaget in 1984-1994. Effects of price on alcohol consumption were examined by using seemingly unrelated regression equations (SURE) to model the impacts of increasing price. It was found that drinkers respond to increasing price by altering their total drinking and by varying their brand choices. Besides, the net impacts of purposeful policy on price to reduce alcohol drinking will depend on how such policies affect the range of prices across beverage brands [59].

In the situation that government is not a single controller in retail trade of alcohol beverage. Increasing tax of alcohol is the basic tool of policy which changing alcohol price. However, increasing alcohol tax may not be adequate enough, because the manufacturers and retailers may use other ways to avoid such effect [59].

Social value on alcohol drinking

Even though alcohol drinking is private behavior and personality, but alcohol consequences are social problem and solving need to cooperate from every single part of societies [60].

Drinking behavior has a long history in human life, it is related with one's way of life, social activities and also imply to several meaning include historical dimension, political affairs, culture, commercial economy and health [3, 8]. Alcohol beverage is traditionally an accepted in most societies for a long time, almost every significant event in human lives is marked with some sort of ceremony or celebration, and almost all of these rituals or festivals, in most cultures, involve alcohol. Moreover, alcohol beverage is used to welcome visitors, and also imply to socioeconomic status of people in society. As drinkers gain only fraction of alcohol problem, and even if they know that alcohol can cause severe disease but it rather takes a long time to develop diseases and they do not consider to alcohol harms even to themselves or others. However, drinking continuously the drinker may become alcohol dependence finally.

As a result of study to confirm the structure of drinking motives among Hungarian adults, all drinking motives including enhancement, social, conformity and coping were significant and positivity related to the frequency of both drinking and drunkenness [61].

Alcohol advertising is one of the factor correlate to drinking behavior, especially among youths who eager to know and taste, and believe that drinking is symbol of growing up as adult. Most matter of alcohol advertising have presented in good aspects of alcohol product such as increasing enjoyment and smartness. Although there are warning massages on alcohol drinking, but such materials are rather small and hard to notice. A systematic review of seven cohort studies on over 13,000 participants evaluated the relationship between alcohol advertising and drinking behavior among youths. Follow-up youths at baseline non-drinkers shown that the greater they exposed to alcohol advertisements, the more chance to became

drinkers [62]. Amounts of exposure to alcohol advertising or promotional activities at baseline non-drinkers are also related to drinking behavior among youths at follow-up.

Alcohol has a long and deep root story in all societies, therefore solving this problem need to focus on changing social value and social belief combine with law enforcement and providing information on drinking harms.

Law enforcement on alcohol

The legal definition of an alcohol beverage is implied that setting the limit for when alcohol-related restrictions on production, spread, laws applying on sales and advertising.

Law and regulation on drinking are implemented throughout the country, but it is not fully enforced in all levels of the community i.e. national, regional, provincial, district, sub-district and village, and it was found that only some strategies or policies are effectiveness [2]. Several studies have shown the effect of alcohol policies on control an alcohol drinking [8, 21, 63]. Measures controlling the availability of alcohol include age limits for purchasing and drinking of alcohol, limits on alcohol buying and selling time, limits place for selling and drinking alcohol, and monopoly or licensing systems for alcohol distribution.

The study on restrictive measures of alcohol advertising and marketing among 119 countries, there were 6 categories of restrictive advertising consist of self-regulation, statutory legislation, combination of self-regulation and statutory legislation, a full ban on television advertising, having some controls and have no any control in the country [64]. Considering 119 countries of this study, 45 countries have restricted alcohol advertising on television, 21 countries have combined measures of self-regulation and statutory legislation, 17 countries have restricted by self-regulation, and only 7 countries have fully banned alcohol advertising or promoting on television. Considering restrictive advertising in Thailand, only statutory legislation was used to restrict alcohol advertising.

Thai government has used the legal measure as indicated in the Alcohol Product Control Act B.E. 2551 and the Protecting of the Health of Non-drinkers B.E. 2551 in controlling alcohol consumption[65], as the followings:

1. Prohibition of selling alcohol to young people below 20 years of agewhich is the important measure to limit the accessibility to alcohol beverages among adolescents, therefore, has enacted the Article 29 of the Alcohol Product Control Act B.E. 2551. The penalty of the person who acted against this Article is imprisoning for not more than 1 year or fining for not more than 20,000 Bath or both imprisoning and fining (Article 40).

Moreover, Article 27 of the act to protect child B.E.2546 determined that if whoever selling alcohol to young people below 18 years of age is imprisoning for not more than 3 month or fining for not more than 30,000 Bathor both imprisoning and fining (Article 39).

2. Prohibition of selling alcohol in an important areasuch as temple or observant activities places, health service places of government, official places, school and so on as the Article 31 of the Alcohol Product Control Act B.E. 2551. The penalty of the person who acted against this Article is imprisoning for not more than 6 months or fining for not more than 10,000 Bath or both imprisoning and fining (Article 42).

3. Permission time for alcohol advertisement only between 22.00 hours and 05.00 hourswhich beverages advertisement via television, radio, and various media has affected on drinking behavior. Thailand is one of countries that have strong law that covers prohibition of advertisement, sale promotion and receiving supports from alcohol manufactories.

4. Permission time for selling and buying alcoholic drinks only between 11.00-14.00 hours and 17.00-24.00 hours. The penalty of the person who acted against this Article is imprisoning for not more than 2 years or fining for not more than 4,000 Bath. According to this law in order to reduce amount of drinking and harm such

receiving cooperation in some places. For some places e.g. sub-district and village level, buy and sell alcohol regulation do not seem fulfill to the enforcement.

5. Prohibition of drunker not to drive. Those who disobey the rule by driving while they get drunk will have not more than one year of penalty or will be fined 5,000-20,000 Bath. For those who break the traffic law by driving while being drunk will have to do public work or service work for the society.This help on reducing a number of traffic-accident.

Moreover, the Ministry of Public Health and many health organizations such as Center for Alcohol Studies (CAS) campaign to stop and reduce drinking[65].Besides, there were drawing both memberships and leader of communities to participate with activities about drinking opposition. Furthermore, there is an announcement on stop drinking, no selling and buying any types of alcohol beverage in some important days e.g. Buddhist days such as Buddhist holy day or during Buddhist Lent. For some other important days such as Fathers' day, Mother's day, and election's day selling and buying alcohol are prohibited.

At present, Thai government has also changed in some social values such as there was used to drink alcohol beverage in blessing your royal highness in the past but not in present. Moreover, there are act to prohibit drinking alcohol beverage in religious ceremony and political activities. However, there are diverse cultures and traditions in Thai society, and most of activities always involve alcohol. Populations can easily access to alcohol. Therefore, alcohol drinking law need to be strictly enforced at all level of the communities, and anti-drinking strategies and policies have to be sustainable. Sustainable action requires a strong leadership and solid base of awareness, political will and commitment [21].

Copyright by Mahidol University

2.6 Alcohol drinking criteria

There were several sets of criteria were applied to provide information on drinking in previous study. The most popular criterions were Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) alcohol use disorders (AUD) and the Alcohol Use Disorder Identification Test (AUDIT).

The alcohol dependence criteria in DSM-IV are based on the concept of the Alcohol Dependence Syndrome (ADS), in which dependence was considered to be a combination of physiological and psychological processes. This criterion was assessed by questions related to specific symptoms occurring during the past 12 month [66]. A comparison study, measuring the effect of general characteristics and drinking status on the prevalence of DSM-IV alcohol use disorders by using data from the 2001 National Household Survey on Drug Abuse, which reported alcohol consumption as DSM-IV AUD criteria [66]. They found that alcohol hazardous use was the most criteria of prevalence on DSM-IV *alcohol abuse* and the most criteria of prevalence on DSM-IV *alcohol dependence* were tolerance and time spent obtaining alcohol. The ratios of abuse-to-dependence were consistent across groups of age and slightly higher among male than females (2.1: 1.6).

The study to evaluate the validity of scaling alcohol consumption, Rasch model analyses was used to examine properties of drinking status and symptom of alcohol use disorders among 3,382 treatment-seeking teenagers whose age 12-18 years. It was found that using only AUD symptoms or DSM-IV dependence diagnosis provided prediction of alcohol involvement after treatment was not good as combining AUD symptoms with alcohol use indices [67].

The Alcohol Use Disorder Identification Test (AUDIT) was developed by the World Health Organization (WHO) in order to identify persons with hazardous and harmful patterns of alcohol consumption. It was developed as screening instrument provided status of drinking among population which appropriate in survey study. A test-retest reliability study [68] indicated high reliability of 0.81 among 126 primary care patients over 6 weeks.

2.7 Factors related to drinking behaviors

Variables influencing the drinking behaviors base on the PRECEDE-PROCEED model were grouped into the domain. The factor of PRECEDE framework was an analysis of different factor that influence behaviors of individual, both internal and external factor, that tried to find the cause of behavior. These factors were divided into three group- predisposing factors, enabling factors, reinforcing factors. First, predisposing factor is fundamental factor that motivates individuals to express behaviors or develop satisfaction, resulting from learning and manifesting in the form of general characteristics, knowledge, value, etc. Enabling factor means resources necessary in expressing individuals to perform such behaviors. Finally, the reinforcing factor shows how much practices or self-care behaviors are supported. This conceptual theory has been investigated in various studies investigating factors influencing alcohol drinking at individual-level and community-level as follows;

2.7.1 Individual-level factors

Individual-level factors were divided into three group- predisposing factors, enabling factors, reinforcing factors.

Predisposing factors

Predisposing factors consisted of general characteristics (marital status and cigarette smoking), Personality and drinking motives, knowledge (knowledge on health effect and law), perceptions (perceived severity and perceived risk of drinking) and drinking refusal self-efficacy.

Marital status

Marital status were uncertain factor on alcohol drinking, it depend on area. Some study found non-married status had positive correlation on drinking but it is obviously in women almost no correlation in men. For example, the study from the US National Longitudinal Survey found significantly higher drinking in never married than married (OR= 1.70, 95%CI 1.37 to 2.12) [69]. A multilevel study in California cities showed significantly higher percentage with high alcohol consumption in non-married than married (p-value < 0.001) [37]. However, a study on alcohol

consumption in Uganda found significantly less drinking in never married than married (OR= 0.66, 95%CI 0.48 to 0.90) [70]. A study in China found strong relationship to drinking behavior when compared with never married (OR= 2.32, 95%CI 1.99 to 2.71 for divorce or separated and OR= 3.42, 95%CI 2.10 to 5.56 for married) [36]. The report in Thailand found higher drinking in single than couple similarly in both current drinking and heavy drinking, this correlation no difference by genders [71].

Cigarette smoking

A study on drinking related to brain infarction among adult in Japan. Data performed on 385 subjects who aged 40 years and over residing in a rural community. Current drinking statuses were categorized into three groups: non-drinkers, light drinkers (<7 drinks per week), and moderate drinkers (≥7 drinks per week). It was found that current smoking status was significantly correlated to alcohol drinking. Prevalence of drinkers among current smokers, 5.7%, 11.3% and 35.1% were non-drinkers, light drinkers and moderate drinkers, respectively [72]. A multilevel analysis of drinking behavior among 137 workgroups and 16 worksites in America revealed that drinking behavior was significantly correlated to smoking behavior. Smokers had higher risk of heavy drinking as compared to those who never smoke (OR 2.36 with 95% CI: 1.93-2.87) [73].

According to the study estimates the individual and joint prevalence of cigarette smoking and alcohol misuse in Thailand. A cross-sectional survey of 39,290 individuals aged 15 and over. Data performed among the Thai population aged 15 years and older, the prevalence of current smoking was 23.6% (95% CI: 22.8% to 24.4%).The strongest predictor of harmful or hazardous alcohol consumption in both sexes is current smoking, and likewise, the strongest predictor of current smoking is harmful or hazardous alcohol use. A male current smoker has more than two times the odds of being a harmful or hazardous alcohol user (OR 2.4 with 95%CI: 2.1-2.8), and vice versa. A female current smoker has six times the odds of being a harmful or hazardous alcohol user (OR 6.0 with 95% CI: 3.1-11.8), and vice versa [74].

A study among Thai youths age 15-24 in Kanchanaburi found that smoking had a very strong relationship to alcohol drinking. Prevalence of drinking increased from 5.1 percent among non-smoker to 39.8 percent among those smoke cigarette or youth who smoked alcohol were 4.7 times more likely to drink than youth who did not smoke cigarette. When youths start to drink they also start to smoke or drinking would be willing to another risk behaviors [75].

Knowledge

Knowledge on the consequence of alcohol used or alcohol drinking is related to drinking status. A systematic review have assessed school-based education and concluded that classroom-based education is not an effective intervention to reduce alcohol-related harm. However, some evidence suggests a positive effect on increased knowledge about alcohol and on improved alcohol-related attitudes could reduce alcohol drinking behavior [76]. According to the study among population age 15-60 years in South Africa, applying the three-stage cluster sampling randomly choosing 810 households with probability proportional to size from seven areas and 16 villages. The prevalence and severity of alcohol drinking was assessed by the AUDIT. In part of knowledge on alcohol drinking comprised 11 items, the prevalence of knowledge on alcohol drinking was not different between male and female. The result from stepwise linear regression analysis found that having better knowledge on alcohol was significantly related to less drink in female but it was not in male [77]. The National Drug Strategy Household Survey among population age 14 years or older in Australia was studied about knowledge on health effect on alcohol drinking, including both short-term and long-term effect. It was revealed that a higher level of knowledge is likely to decrease the incidence of drinking and having greater knowledge about the health risk from drinking was negatively associated with intentions to drink in the future [71].

Perceptions

As a public health perspective, harm reduction approaches to alcohol problems are based on the goal of reducing the harm to society arising from the production, marketing, and consumption of alcohol. Harm reduction offers a

pragmatic and compassionate approach to the prevention and treatment of problem drinking that shifts the focus away from alcohol use itself to the consequences of harmful drinking behavior. Perception of risk and severity on drinking are measured what the level of risk can be caused to people health and how much they fear their heath damaged by alcohol use. As the result of study in South Africa, it was shown that having high perceived severity and risk on alcohol use lead to decrease drinking behavior [77].

The previous study utilized an alcohol challenge paradigm to examine whether heavy social drinkers compared to light social drinkers, exhibit: greater tolerance in psychomotor task performance under the influence of alcohol and differential perceptions of the impairing effects of alcohol. Heavy drinkers were assessed as persons who regular consumed 10 or more drinks a week and light drinkers drank fewer than 6 drinks a week. The result revealed that heavy drinkers had lower self-perceived impairment compared to light drinkers [78].

According to community study in district level about drinking on changing way of community found that in the past people had drinking interim traditions and youths and women have no drunk but increasing drinking in today. Most of them accepted that drinking was common way that they drinking for relieved pains and aches or linkup with all kind of social activities. Most of communities perceived problems and effects on drinking but rather minimal realized about it [34]. Therefore, it is essential to provide problems and harm of alcohol drinking to communities and government in order that be aware about the consequence of drinking and search for the ways to reduce and stop drinking.

Drinking Refusal Self-Efficacy

Drinking refusal self-efficacy is one’s perceived ability to resist drinking in high-risk situations. As a result of multiple regression analyses indicated that Drinking refusal self-efficacy were significantly related to quantity of alcohol drinking in negative way [79]. Moreover, the risk factors (i.e. social influence) and protective factors such as social pressure, emotional relief and opportunistic drinking refusal self-

efficacy can predict both drinking initiation and cessation [80]. As multiple regression analyses found that depressive disorders were significantly related to reduced drinking refusal self-efficacy, then the analyses controlling for depressive symptoms shown that the lesser drinking refusal self-efficacy people had, the longer duration of drinking problem they were [81]. The factor analysis explored the factors of alcohol dependence in 385 volunteers from four psychiatric hospitals in Germany [82], the relation of client motivation to alcohol drinking and self-efficacy (comprised three factors; Taking steps, Recognition and Ambivalance). It was found that alcohol drinking was significantly related to taking steps of self-efficacy, the respondents having higher self-efficacy was likely to drink alcohol less than at lower self-efficacy.

Enabling factors

Enabling factors comprised of socioeconomic status (SES), accessibility to alcohol beverages and effect of increasing alcohol price, and availability of information on anti-drinking.

Socioeconomic status (SES)

Socioeconomic status consists of income and occupation. The study to quantify the association between socio-demographic characteristics and alcohol consumption among 3,265 Mozambicans aged 25-64 years found that current drinking was significantly more frequent in respondents with higher annual family income. For women who earned annual income higher than 1,500 USD were more likely to drink 2.42 times as compared to those earned 0-64 USD (95%CI: 1.12-5.22). For men earned higher than 1,500 USD had higher risk of drinking than those earned 0-64 USD (OR 2.58, 95%CI: 1.30-5.12) [83]. A cohort study in UK examined the associations between socioeconomic circumstances and drinking patterns, socioeconomic status was classified by using information collected at 7, 11, 16, 33 and 42 years. The result from analysis found that socioeconomic disadvantage across childhood and adulthood was consistently linked to midlife binge drinking. For instance, manual socioeconomic position (SEP) at ages 7, 11 and 16 were all associated with an increased risk of midlife binge drinking; each additional report was linked to a 16% increase in odds for midlife binge drinking. Otherwise neither adulthood nor childhood socioeconomic

measures were associated with heavy drinking. Lastly, adulthood socioeconomic disadvantage was consistently linked to increased risk of midlife drinking problem [84].

Another study in Russia examines binge drinking in relation to the respondents' economic situation. Based on interviews conducted with a stratified random sample of 1,190 Muscovites indicated that the probability of binge drinking was significantly greater for men with several kinds of economic problems, even when the other independent variables were controlled (OR 1.67, 95%CI: 1.06–2.63)[85]. The more who had experienced economic stress, the higher they drink alcohol beverages[86].

Accessibility to alcohol beverages

Nowadays, people are easy accessible to alcohol beverages because there are many ways to buy it such as convenience stores, department stores or get access to drink in pub, bars even in the restaurant. Although, there are effective restrictions on the availability of alcohol is the restriction of sales and consumption by people below a legal drinking age [87, 88]. Such restrictions may apply to alcohol purchased and consumed in the same place (on-premise) or alcohol purchased for consumption elsewhere (off-premise). From the 147 countries reporting on alcohol availability policies, 17 had no age restrictions for on-premise consumption. On-premise and off-premise restrictions tended to cluster at age 18 years [2].

A meta-analysis form 112 studies to examine relationships between measures of beverage alcohol tax or price levels and alcohol sales or self-reported drinking found a large literature establishes that increasing of alcohol beverage prices and taxes are related negatively to drink. It was found that the highly significant relationships (p-value < 0.001) between alcohol tax or price measures and alcohol intake (r = -0.17 for beer, -0.30 for wine, -0.29 for spirits and -0.44 for total alcohol). Price and tax also affects heavy drinking significantly but the magnitude of effect is smaller than effects on overall drinking [58].

In Thailand have law of limited time to sell alcohol beverages only between 11.00-14.00 hours and 17.00-24.00 hours [65]. However, people still drink by ignore the time they drink whenever that want to drink almost after work time with their friends, coworkers, family members even drink alone. Moreover, in context of Thai there are many ways to drink alcohol beverages such as home-made liquor in somewhere or some people, can buy spirits from bootlegger and retail shops that sell herbal liquor called “Soomya dong”. Most of people like to drink with their friends or relatives. There were only 11.9% of adult like to drink alone, about 91.4% of drinkers like to drink in evening or gloaming and they are off. However, there were populations about 3.6% had drunk before go to work in the morning or while having lunch. Moreover, current drinkers about 37.2% reported they often drink ignore occasion [71].

Advertisement of beverages is positively related to alcohol use. The longitudinal study examined the influence of alcohol advertising and promotions on the initiation of alcohol use. Data were classified as never drinkers at baseline comprised 1,080 persons. Participants who never drink reported high receptivity to alcohol marketing at baseline were 77% more likely to initiate drinking by follow-up than those were not receptive. Smaller increases in the odds of alcohol use at follow-up were associated with better recall and recognition of alcohol brand names at baseline. Otherwise, alcohol advertising and promotions are associated with the uptake of drinking [89].

Availability of information on anti-drinking

Many alcohol policy approaches (which usually are environmental strategies) have demonstrated evidence of potential effectiveness. Evidence has been collected for policies related to retail price, availability of alcohol, location and type of alcohol outlets including hours and days of sale, retail and social access to alcohol by young people, and enforcement and sanctions against high-risk alcohol use [90]. The policies which progressive increases in taxation of alcoholic beverages and restriction of the hours of sale in order to decrease alcohol availability could reduce alcohol-related deaths and other health problems [91]. Media advocacy as the purposeful use of

local news to support policy initiatives has become an increasingly popular tool in local efforts.

The influence of alcohol advertising and marketing in nine media categories: public service and national television, commercial and private television, national radio, local radio, printed newspapers and magazines, billboards, points of sale, cinemas and the Internet on drinking behaviors shown that people drinking increases during times when the alcohol industry steps up promotional activity. Point-of-sale advertising is associated with encouraging adult to drink, whereas established drinkers were most influenced by promotional offers. Youth were more influenced than adult by all advertising methods. If stores had no advertising, there wouldbe a relative 11.25% decline in puffers, while increasing thetypes of advertising in stores to include the 5 captured inour scale would result in a 10.86% increase in puffers. Some self-regulation occurs at regional rather than country level [2, 89]. Of all WHO member States, 30% reported having either a full or partial ban for one or more beverage type, 41% reported no regulation, and 5% indicated that product placements for at least one beverage category were self-regulated by the alcohol industry.

According to the study in Slovenia, as a result of the study with 45 professionals from different disciplines was conducted. There were 86 different ideas related to community activities were identified by consensus. Actions such as state monopolies, alcohol taxation, legislative restrictions on availability and purchase of alcohol, age-related restriction on sales, drink-driving laws, school-based alcohol education and media information campaigns are most likely to be achieved by consensus found that there are several community actions against drinking alcohol that could be acceptable for society can now be suggested [92].

Reinforcing factors

Reinforcing factor are proportion of family member drink and proportion of close friend drink.

Copyright by Mahidol University

Proportion of family member drink

Behaviors of family member or family environment are strongly associated with their lifestyle including drinking behavior also influence another to drink. According to the result from study about association of the family environment and young adult problem behavior by using a confirmatory factor analysis tested the hypothesized general family environment, family smoking environment, and family drinking environment and comorbid outcomes latent factors showed significant correlation of the family environment and problem behaviors. They had measured family drinking environment included parent and sibling drinking founded that family drinking environment significantly correlated with family smoking environment (r=0.39) and alcohol use disorder only (r=0.21). After analyzing with control variables of sex, socioeconomic status and ethnics, it still significantly correlated with those two behaviors [93].

Proportion of friend drink

Relationships with friend or co-workers are powerful in both positive and negative ways. Friend groups often are perceived as risk factors for harmful health behaviors because of their role as strong socio-cultural influences in the lives of adult in community. A study of the relationship between social contacts and binge drinking showed significantly increased drinking in women who regular contact with friends were higher drink two times more than women who little contact with friends (OR 2.28, 95%CI: 1.09–4.75)[85].

A study in Uganda conducted to examine association between social interaction and alcohol consumption found that evidence of an increasing trend of proportion of respondents and the more social interaction score they were, the higher alcohol they drink (OR 2.19, 95%CI: 1.22–3.95)[70].

According to the longitudinal follow-ups of a random sample among 1,993 adults was conducted to examine associations between individuals' drinking pattern and the drinking patterns of their social network members. They followed the cross-lagged model of the relationship between individual and network drinking patterns and

analyzing by using the EQS statistical program [94]. As a result, the respondent and network correlation matrix reveals that individual and network drinking patterns are significantly associated with each other and are significantly associated over time. The simple correlation between 1,989 respondent drinking and 1,993 network drinking (r = 0.394) was similar to that of 1,989 network drinking and 1,993 respondent drinking (r = 0.395). Therefore, the relationship between network and individual drinking behavior is reciprocal—individuals' drinking is associated with subsequent network drinking and network drinking is associated with subsequent individual drinking. Anyhow, the result can also called "network drinking" caused network members to drink [39].

2.7.2 Village-level factors

village-level factors namely type of village, attending community empowerment program, language use, most common occupation, housing and selling liquor shop ratio, the level of village activities lead to drink and health promoting village program.

Type of village

A comparative study between urban and rural area on alcohol drinking in China by interviewed3,543 urban and 4,294 rural dwellers aged 15-65 yearsfound that the prevalence of alcohol use was higher in the urban area (45.9%, 95% CI= 44.3-47.6) than in the rural area (39.6%, 95% CI= 38.2-41.0) with statistically significant difference ($\chi^2 = 32.14$, p-value < 0.001) while the rate of heavy drinking in rural area was 1.53 times of in urban area, with adjusted odds ratio was 1.77. They found that male was drink higher than female in both regions with OR 5.03 for urban area and OR 13.52 for rural area. In addition, the researcher discussed that the amount of alcohol use may under record in rural area because some people made alcohol beverages by themselves such as home- or underground-brewed rice and paddy wines. And at least differences of the two areas are part of levels of economic development and public health awareness, disparate customs, and cultural background as well as working environment[36].

Community empowerment program

The community empowerment program is committed to improving the lives provides rural communities with the knowledge and skills necessary to lead initiatives for social change in good sustainable way. It is strengthened community by social participation of each community such as socioeconomic development, health promotion and prevention of drug addiction including alcohol consumption [95]. A cross-sectional study in Sweden investigated the impact of social participation, trust, and the miniaturization of community on the risk of high alcohol consumption. A logistic regression analysis was used to examine the association between the social capital factors and high intake of alcohol above recommended levels (≥ 168 gram per week for men and ≥ 108 gram per week for women). They found that level of social participation was not significantly related to high alcohol consumption, but high social participation combine with low trust of community had significantly higher risks of drinking above recommended levels compared to the high social capital (high social participant/high trust) among men (OR 1.3, 95% CI: 1.1-1.6) but not among women [86].

Language use

According to Thai people communicate with regional speech difference along region. The significant reason is Thailand is enclave with three pays voisin that could influence with Thai languages or cultures seem to similarity. In context of Buriram province located in the southern part of the north eastern of Thailand. It shares the border with Cambodia. There are at least three regional speeches used to communicate such as Northeast dialect, Thai language and Khmer (Cambodian). These may affect alcohol drinking that needs additional study.

The study in Surin province was designed to examine clustering in drinking behavior by the different types of communal languages—Isan dialect' community, Khmer' community and Kuy' community. The result showed frequency of drinking behavior in small levels about 84.73% and 57.44% of respondents drank alcohol beverages, in Isan dialect' community found the highest alcohol drinking, the second was Khmer' community and the last was Kuy' community for 63.63%, 58.94% and 51.17%, respectively [34]. In Buriram also consist of communities alike in Surinas

well as have some are city communities using another language or some communities using mix languages (more than 2 languages in one community), these may influence on drinking behavior among communities.

Most common occupation

A study about occupations that associated with alcohol drinking performed in China, comparative study regarding alcohol consumption between urban and rural. In urban found that official had drink 2.63 times (95%CI: 2.09-3.29), worker had drink 2.37 (95% CI: 2.03-2.76) and professional had drink 1.43 times ($p< 0.05$, 95%CI: 1.13-1.81) when compared with other occupations (including private business owner, student, retired, servers, and unemployed). For rural found that farmer had drink 1.48 times (95%CI: 1.21-1.82) and professional had drink 1.87 times (95%CI: 1.12-3.14) when compared with other occupations[36]. The National Household Survey for Substance and Alcohol Use (NHSSA) in Thai also reported occupation that having highly drinking for the first two are worker and craftsman similar in men and women [71].

Housing and selling liquor shop ratio

According to a multilevel analysis was conducted to discriminate possibilities on alcohol consumption between individual and neighborhood level. Data were performed by means of telephone interview surveys among 2,607 individuals residing in the 24 study census tracts were contacted [96]. The data were utilized by using hierarchical linear models to partition the variance into individual and census tract level components. Once the variance was partitioned, they attempted to explain the variance at each level by using individual and neighborhood level measures of alcohol-related outcomes as well as other covariates. As the ANOVA model revealed that most of the variance in individual drinking norms was at the individual level (83.5%) and 16.5% was explained at the census tract level. At the census tract level found that only the mean exposure to alcohol outlets variable was associated with drinking norms, mean exposure to alcohol outlets demonstrated a negative (β_c= -5.50 $\pm$ 2.37) relation with drinking norms. Mean distance to the closest alcohol outlet helped to explain 89.3% of the variance in individual drinking norms partitioned to the census tract level. This means that an individual’s age, race, sex, and education

explained 9.3% of the overall variance in individual drinking norms. In contrast, census tract variables dominated by the surrogate for alcohol outlet density, mean exposure to alcohol outlets, explained 14.7% of the overall variance in individual drinking norms. As the finding suggest that the effect of alcohol outlet density on alcohol-related outcomes functions through an effect at the neighborhood level rather than at the individual level. Problem drinkers tend to be grouped in neighborhoods, an effect predicted by alcohol outlet density.

A systemic review was performed to assess the effects of outlet density in communities on excessive alcohol consumption and related harms. They search yielded 6,442 articles, book, and conference abstracts, of which 5,645 were unique. After screening titles and assessing quality of execution and design suitability, 88 articles were included into the study. The result of the association between outlet density and population-level alcohol consumption, increased such density was associated with alcohol consumption increasingly. In addition, most of the studies in the review found that greater outlet density is related to increasing alcohol consumption and related harms. Moreover, it was found that the regulation of alcohol outlet density was correlated with the reduction of excessive drinking as well [97].

The level of community activities lead to drink

Thai society has opinion of drinking that is common occurrence which can be observable almost of party, social activities and celebrations usually have alcohol beverages thus making people who grow up in social character like this think that drinking is commonly. A studied about social activities that supported to drink found significantly different drinking behaviors among those social activities. The highest alcohol drinking behavior found in the middle level of social activities linked to drink, followed by the highest level of that kind of social activities and have minimal drinking in low level of those activities ($p < 0.05$) [34].

Another study was conducted to examine the impact of social participation, trust, and the miniaturization of community on the risk of high alcohol consumption. Those were divided into the four different social participation/trust combinations

(high/high = high social capital, high/low = the miniaturization of community, low/high = traditionalism, and low/low = low social capital). Data performed on 13,604 persons aged 18–80 years. As a result, after adjustments for age, country of origin, education, and economic stress in the multiple logistic regression analyses the odds ratios of high alcohol consumption above recommended levels showed significantly higher for the miniaturization of community category compared to the high social capital category among men. Men participants who were high social participation and low trust risk to high drinking (OR 1.3, 95%CI: 1.1–1.6)[86].

Health promoting village program

Prevention of alcohol problems at the community level across the world has typically utilized programs such as public media campaigns, alcoholism recovery efforts, and school education. For the most part, local prevention strategies have been program-based [90]. According to the Lahti Project of Finland was to decrease alcohol-related harm by increasing awareness of alcohol consequences and lowering high-risk drinking. The evaluation, utilizing data from Lahti and two comparison communities before and after the intervention, found that the project had increased local newspaper attention to alcohol issues, public perception of alcohol as a social problem, and knowledge of alcohol content and the limits for risky drinking. There was a decline in self-reported heavy drinking [90].

A large sample study includes 235,366 individuals (61% and 39% were women and men respectively) between the ages of 21 and 64 to examine the association of health promotion activities on heavy drinking. By established the three health promotion activities that pertain to behaviors during the previous year—reported a routine physical exam, a flu vaccine, or always using a seat belt when driving or riding in a car. Overall, the estimated marginal effects from probit models for heavy alcohol use are always significantly negative to health promoting activities; for routine physical exam (ρ = -0.041), flu vaccine (ρ = 0.029) and always wear seatbelt when driving (ρ = 0.064). In other words, heavy alcohol use is inversely associated with health promotion activities [98].

2.8 Summary of review literature

Summarized the important factors influencing drinking behaviors in adults or people from previous studies as follows:

1. Factors influencing drinking behaviors in adults at individual-level.

1.1) Predisposing factors:

- General characteristics; marital status, cigarette smoking
- Knowledge of drinking on health effect and law
- Perception on drinking which comprised of perceived severity and perceived risk on drinking
- Drinking refusal self-efficacy

1.2) Enabling factors:

- Socioeconomic status (SES)
- Accessibility to alcohol beverages and effect of increasing price on alcohol drinking
- Availability of information on anti-drinking

1.3) Reinforcing factors:

- Proportion of family member drink
- Proportion of friend drink

2. Factors influencing drinking behaviors in adults at village-level.

2.1) Type of village

2.2) Community empowerment program

2.3) Language use

2.4) Most common occupation

2.5) Housing and selling liquor shop ratio

2.6) The level of village activities lead to drink

2.7) Health promoting village program

Copyright by Mahidol University

CHAPTER III
METHODOLOGY

A multilevel ordinal logistic regression was used in this cross-sectional study, data collection by interviewing using structured questionnaire to identify determinants of drinking among population age 15-75 years in Buriram Province.

3.1 Study design

A cross-sectional descriptive study was conducted to measure individual-level factors including predisposing factors, enabling factors and reinforcing factors and village-level factors comprised of type of village, attending community empowerment program, language use, most common occupation, housing and selling liquor shop ratio, the level of village activities lead to drink and health promoting village program that may influence drinking among population in Buriram Province.

3.2 Population and sample

Population

Buriram comprises of 23 districts, 188 sub-districts and 2,546 villages. Pakham district was selected to be the study site due to its highest liquor tax in the last 3 fiscal years (2008-2010) of Buriram (10.9%, 12.1%, and 12.11% of total tax of each district) [99]. Residents and village leaders in all villages of Pakham District are population of this study. Pakham district comprises of 5 sub-districts and 77 villages with 47,582 populations. Its north is Nonsuwan and Nangrong districts, Lahansai and Nondindaeng districts of Buriram are on its east. On its south is Nondindaeng district of the same province and Sierng-sarng district of Nakorn-Ratchasima province. On its west is Sierng-sarng district of Nakorn-Ratchasima province.

Sample and sample size

Sample size for multilevel ordinal logistic study, also known as hierarchical linear modeling (HLM), Van der Leeden et al, Mok and Kreft proposed a trade-off sample sizes at different levels, a large number of clusters is more important than a large number of individuals per cluster for accuracy and high power. They recommended, with respect to the estimates of all parameters and their standard, it is necessary having a sample of groups at least 30 with at least 30 individuals per group [41, 100-102]. In addition, Mok suggested all estimates of fixed intercept and slope factors are within one standard the true value if the total sample size was more than 800 and there was less bias when a number of groups was greater than or equal to a number of individuals per group [102]. Such that, total number of 40 villages and at least 30 individuals per village were recruited into the study. Total 1,293 individuals living in Pakham district of Buriram Province were the sample of this study.

Sampling method

A two-stage cluster sampling was applied to recruit individuals into this study. The villages were classified as the located in municipal area and non-municipal area. Using the following sampling procedures:

Stage 1 Selection of 40 villages to represent all villages in Pakham district using sampling with probability proportional to size of the population of the village. The larger the village is, the more the chance of being selected. List of sampled villages was shown in Table 3.1.

Stage 2 Sampling target population in each sampled villages

Total of 4 males and 4 females of the following age group: 15-24, 25-44, 45-64 and 65-75 years were randomly selected to represent adults of the studied village. Total of at least 32 target populations (16 males and 16 females) from each village were included into this study.

Copyright by Mahidol University

Recruitment of individuals in each age group, list of all population by the mentioned age groups and sex was obtained, and then 4 of them were randomly recruited from that list using either simple random sampling.

Table 3.1 Number of adults and villages in Buriram Province classified by type of village

Type of village	Number of adults			Number of villages	
	Male	Female	Total	Total	Sample
Pakham	3,485	3,676	7,161	10	6
Municipal area	744	809	1,553	2	2
Non-municipal area	2,741	2,867	5,608	8	4
Thai-chareon	3,939	3,905	7,844	14	7
Municipal area	785	772	1,557	2	2
Non-municipal area	3,154	3,133	6,287	12	5
Nhongboue	3,827	3,949	7,776	12	7
Municipal area	872	915	1,787	3	2
Non-municipal area	2,955	3,034	5,989	9	5
Kokmamoung	7,147	7,092	14,239	22	10
Municipal area	1,305	1,271	2,576	4	3
Non-municipal area	5,842	5,821	11,663	18	7
Huthamnop	5,468	5,094	10,562	19	10
Municipal area	1,658	1,453	3,111	5	3
Non-municipal area	3,810	3,641	7,451	14	7
Total	23,866	23,716	47,582	77	40

3.3 Inclusion and Exclusion Criteria

3.3.1 Respondents representing individual level

Inclusion Criteria:

- Population whose age 15- 75 years old currently live in Pakham district
- Population who can communicate verbally, agreed to participate in this study and signed an informed consent

Exclusion Criteria:

- Population who refused to participate in the study
- Population who did not stay in the study village at the time of data collection
- Population who desired to stop answering question while interviewing

3.3.2 Village leader representing village level

Inclusion Criteria:

- Village leader who agreed to participate in this study and signed an informed consent

Exclusion Criteria:

- Village leader or his/her representative who refused to participate in the study
- Village leader or his/her representative who did not stay in the study village at the time of data collection
- Village leader or his/her representative who desired to stop answering question while interviewing

3.4 Data Collection

3.4.1 Method of data collection

Data were collected by interviewing using structured questionnaire, as constructed by the researcher based on the conceptual framework and operational definition of terms used as mentioned in previous chapter. Data were collected after getting permission from both village leader and the sampled individuals. For respondents whose age below 18 years, the consent were obtained from his/her guardian as well as his/herself before interviewing. The village leader, guardian and respondents were explained on the objectives and significance of the study as well as risk and benefit until they were clearly understandable. If they agree, asked them to sign the informed consent form. The samples who agreed to participate were interviewed and asked to answer questions accordingly.

The data collections were performed by researcher and 5 well trained research assistants who were students of Buriram Rajabhat University. They were trained on data collection procedures and using the questionnaire.

One day training to explain the purpose of this study and clarified the questionnaire item by item till everyone understood the meaning of each question. Role play was used to give chance to each of them to practice on interviewing. The interview procedures are:

- Introduce his/herself to the respondent and explain on the objectives and significance of the study as well as risk and benefit until they are clearly understandable. If they agree, asked them to sign the informed consent form and tell that the interviewing will take about 20 minutes long.
- Ask questions word for word as written and in order as written.
- Ask every question.
- Do not be biased, be good listener.
- Given enough time to respondent to answer each question.
- Inform the respondent that he/she has the right to skip not to answer any questions that he/she wants to or stop at any time he/she wants. Respondent will not be forced to answer.

3.4.2 Research instrument

Interview-structured survey questionnaires were developed and reviewed by thesis adviser and co-advisers. Questions were constructed based upon the PRECEDE-PROCEED Model. There were two sets of data collection forms, one for individuals and another for village leader or his/her representative, as shown in Appendix A and Appendix B.

Questionnaire for respondents or individual-level includes 6 parts as follows;

Part I: General characteristics

This part consisted of general characteristics of respondents i.e. age, sex, marital status, language, family history and cigarette smoking.

Part II: Drinking behaviors

This part consisted of drinking behaviors and pattern of drinking, which concluded current drinking status, age at start, reasons of start drinking, place and time of

drink, frequency and amount of alcohol drink per each time, brand and accessibility to alcohol beverages. However, intention to quit drinking among drinkers was also included. In addition, this research use the Alcohol Use Disorder Identification Test (AUDIT) was developed by the World Health Organization (WHO) in order to identify persons with hazardous and harmful patterns of alcohol consumption.

Status of drinking was classified into 5 levels with values of; never drinking, ever drinking, mild drinking, moderate drinking and heavy drinking. Three levels of drinking status were firstly assessed as never drinking, ever drinking and current drinking. Then the current drinkers were asked about their drinking behaviors, dividing into three levels of current drinking by using the Alcohol Use Disorders Identification Test (AUDIT) score recommended [44]. It was classified into three levels as the AUDIT scores; 1-7 were mild drinking, 8-16 were moderate drinking and greater than 16 were heavy drinking. Therefore the status of drinking were classified into 5 ordered categories are never drinking, ever drinking, mild drinking, moderate drinking and heavy drinking.

Part III: Availability of information and Accessibility to Alcohol

It was consisted of price and sources of alcohol beverages, opportunity lead to drink, availability of information about effect of drinking, anti-drinking through media, and health warning massages.

Part IV: Knowledge

This part comprised of drinking related diseases, addictive potential of drinking, effect of people who connect with drinkers and anti-drinking law.

Correct answer was assigned to one score and wrong or not answer was assigned to zero score to each item of each of knowledge part. Possible score for knowledge on related problem on health and anti-drinking law were 0-22 and 0-4, respectively. Therefore, the two parts of knowledge were divided into good, fair and poor as the criteria [103] presented in Table 3.2.

Part V: Perception

There were 11 items of 5-Likert scales was used to measure perception on drinking. It consisted of perceived severity (5 items) and perceived risk (6 items). Score 1-5 was assigned to the response from strongly disagree to strongly agree on severe and risky perceptions. Possible scores for perceived severity and perceived risk were 5-25 and 6-30, respectively. Then they were grouped into high, moderate and low as the criteria [104] presented in Table 3.2.

Part VI: Drinking Refusal Self-efficacy

There were 20 items of self-efficacy was assessed as predisposing factor. A sample item included emotional relief self-efficacy, social pressure self-efficacy and opportunistic drinking self-efficacy. The 5-Likert scales response was used to identify the ability to resist alcohol in various situations to each item. Score 1-5 was assigned to the response from not at all sure to absolutely sure. Possible score for drinking refusal self-efficacy was 20-100. Then they were grouped into high, moderate and low as criteria [105] presented in Table 3.2.

Table 3.2 Grouping criteria for knowledge, perceptions and drinking refusal self-efficacy

Grouping	Level of classified		
	Good/High	Fair/Moderate	Poor/Low
Knowledge			
Knowledge on health effect	≥ 21	14-20	≤ 13
Knowledge on law	≥ 4	3	≤ 2
Perceptions			
Perceived severity	≥ 16	10-15	< 10
Perceived risk	≥ 20	12-19	< 12
Drinking refusal self-efficacy	> 68	44-68	< 44

Questionnaire for village leader includes 16 items

There were 16 items asking the village leader to represent the village-level factors. It included type of village, attending community empowerment program, language use, most common occupation, housing and selling liquor shop ratio, the level of village activities lead to drink and health promoting village program.

3.4.3 Quality of Instrument

Validity of content and reliability were utilized to evaluate the quality of questionnaire. Two experts on behavioral science and alcohol drinking has validated for content validity. The pre-test among 30 individuals in Buriram Province, whose were not included into this study, were conducted for reliability analysis. The reliability of questionnaire was measured by using the Cronbach's coefficient of alpha.

$$r_\alpha = \frac{k}{k-1}\left[1 - \frac{\sum s_i^2}{s_t^2}\right]$$

where r_α = reliability coefficient

s_i^2 = variance of the score of the i^{th} item

i = 1,2,……., k; where k = total number of items

s_t^2 = variance of the total score

The revision of questionnaire was performed after pretest. The final version of data collection form was approved by thesis advisor and co-advisors before data collection in actuality. The Cronbach's coefficients of alpha were 0.721, 0.812 and 0.885 for knowledge, perception and self-efficacy, respectively.

3.5 Ethical Consideration

An approval of ethical clearance by The Faculty of Public Health, Mahidol University Ethic Committee for Human Research was obtained as the document proof number MUPH 2012-013 dated on January 30th 2012 (Appendix D). The study was risk free to the respondents. The confidentiality to the respondents' answer was kept as the first priority of this study.

For participants whose age below 18 years, the permission and informed consent from parents or guardians were obtained before data collection. An informed consent from village leader of each sample village was also obtained.

The study objective, background information, methods, benefits and risk of this study, confidentiality and the nature of the study as provided in information sheet were read and explained until the sampled respondents were clearly understood.

The respondents' decision whether they participated in this study or not was respected. The respondents could freely stop at any time while interviewing and they could skip the question that they did not want answer. Respondents could ask questions at any time if they want to.

All responses were completely kept anonymous. There was no chance to link with their names and their responses on the questionnaire. Identification numbers were used to specify the data collection form. All questionnaires were kept at a safe place that no one can access for. The primary investigator is the only one could access to questionnaires. After all responses were entered for data analysis, all questionnaires were destroyed. Any personal information of the respondents would never be mentioned in any report.

3.6 Data Processing

Data processing began developing data set, data entry, data cleaning, and data file management as follows;

Developing data set for analysis

The data of drinking behavior of individuals were examined and created a printed code book that described the term of data on risk factors and outcomes. The code book pointed where and how this data set can be accessed. Code book included the items variable name, variable description and variable value.

Data entry

EpiData 3.1 was used in data entry process to assure an accuracy of data during the data entry, a procedure called double entries was also performed.

Data cleaning

Data cleaning was started in field by data collectors. Data entry was managed in the field as the data was collected. The data was cleaning continuously after data entry, there were no identification-number duplication and each respondent and questionnaire has a unique code that consists of village code.

Data file management

The data was created to enable the multilevel analysis by merging two datasets (included data from individual and village questionnaires) from the survey together with the hierarchical structure. The individual identification and village identification were used for merging the two data sets. There were 1,293 samples of individual and 40 villages were merged for data analysis.

3.7 Data analysis

3.7.1 Estimation of drinking prevalence

According to the plan of collecting target population by the set age group and sex, total of 1,293 were recruited. Detailed of the samples by age group and sex was presented in Table 3.3.

Table 3.3 Age and sex distribution of sample included in this study

Age group in years	Total (T)		Male (M)		Female (F)	
	Number	Percent[1]	Number	Percent[2]	Number	Percent[2]
15-24	322	24.9	161	50.0	161	50.0
25-44	323	25.0	160	49.5	163	50.5
45-64	328	25.4	160	48.8	168	51.2
65-75	320	24.7	160	50.0	160	50.0
Total sample	1,293	100.0	641	49.6	652	50.4

[1] Percent from total 1,293 samples

[2] Percent of sex within each age group

Copyright by Mahidol University

Since the age and sex structure of the population in Pakham district was not the same as the sample obtained, to estimate drinking status of population proportion by age group and sex as shown in Table 3.4 was used to weight in order to represent the true prevalence of drinking of whole district. In this study, weights were calculated based on the population distribution of population whose age 15 to 75 years for both gender living in Pakham district of Buriram province according to reference population from 2011 census for Pakham district [106].

Table 3.4 Age and sex distribution of 15-75 years old population in Pakham district

Age group in years	Total (T)		Male (M)		Female (F)	
	Number	Percent	Number	Percent	Number	Percent
15-24	8,839	23.2	4,401	11.5	4,438	11.6
25-44	15,663	41.0	7,963	20.9	7,700	20.2
45-64	9,891	25.9	5,002	13.1	4,889	12.8
65-84	3,776	9.9	1,757	4.6	2,019	5.3
Total	38,169	100.0	19,123	50.1	19,046	49.9

According to number of population by age and sex distribution in study area shown in Table 3.4, it was defined as Table 3.5 to illustrate the structure of population.

Table 3.5 Age and sex distribution of 15-75 years population

Age group (i)		Number of population(j)		Total population by age group
		Male(1)	Female (2)	
15-24	(1)	P_{11}	P_{12}	$P_{1.}$
25-44	(2)	P_{21}	P_{22}	$P_{2.}$
45-64	(3)	P_{31}	P_{32}	$P_{3.}$
65-75	(4)	P_{41}	P_{42}	$P_{4.}$
Total by sex		$P_{.1}$	$P_{.2}$	$P_{..}$

*P_{ij} is number of population of i^{th} age group and j^{th} sex

Copyright by Mahidol University

Estimation of drinking prevalence and its variance by age and sex [107]

According to the sampling scheme used in this study, age and sex specific prevalence of drinking status can be obtained from the sample data set as defined in Table 3.6, where $\hat{p}_{ij} = \frac{\sum_{k=1}^{n} a_{ijk}}{\bar{m}n}$, where $\bar{m}$ = size per cluster, k=1,2,…,n and n = total number of cluster, and a_{ijk} = the number of drinking status of the i[th] age group and j[th] sex. Variance of $\hat{p}_{ij}$ is estimated by $\widehat{var}(\hat{p}_{ij}) = \frac{\sum_{k=1}^{n}(\hat{p}_{ijk}-\bar{p}_{ij})^2}{n(n-1)}$. Where $\hat{p}_{ijk}$ is prevalence of drinking of the i[th] age group and j[th] sex, $\bar{p}_{ij}$ is an average of the ij[th] of drinking prevalence. Sampling error of $\hat{p}_{ij}$ or s.e $(\hat{p}_{ij})$ is $\sqrt{\frac{\sum_{k=1}^{n}(\hat{p}_{ijk}-\bar{p}_{ij})^2}{n(n-1)}}$.

Table 3.6 Estimation of each drinking status and its sampling error

Age group (i)		Sample prevalence(j)		$\hat{p}_{i.}$
		Male(1)	Female(2)	
15-24	(1)	$\hat{p}_{11}$	$\hat{p}_{12}$	$\hat{p}_{1.}$
25-44	(2)	$\hat{p}_{21}$	$\hat{p}_{22}$	$\hat{p}_{2.}$
45-64	(3)	$\hat{p}_{31}$	$\hat{p}_{32}$	$\hat{p}_{3.}$
65-75	(4)	$\hat{p}_{41}$	$\hat{p}_{42}$	$\hat{p}_{4.}$
$\hat{p}_{.j}$		$\hat{p}_{.1}$	$\hat{p}_{.2}$	$\hat{p}$

Estimation of drinking status by age group and its error of estimation

According to the sampling scheme the sample size for male and female in each age group was the same, even though the true proportions of male and female in each age group were different, to obtain the drinking prevalence the proportion of male and female from total of each age group was used as the weighted factor.

$\hat{p}_{i.} = \sum_{j=1}^{2} \frac{P_{ij}}{P_{i.}} \hat{p}_{ij}$, where $\hat{p}_{ij}$ is prevalence of drinking status of the i[th] age group and j[th] sex$\hat{p}_{i.}$, is prevalence of drinking status of i[th] age group, $P_{i.}$ is number of population of i[th] age group and P_{ij} is number of population of i[th] age group and j[th] sex. Variance of

$\hat{p}_{i.}$ is estimated by $\widehat{var}(\hat{p}_{i.}) = \sum_{j=1}^{2}\left(\frac{P_{ij}}{P_{i.}}\right)^2 \widehat{var}(\hat{p}_{ij})$. Sampling error of $\hat{p}_{i.}$ or s.e $(\hat{p}_{i.})$ is $\sqrt{\sum_{j=1}^{2}\left(\frac{P_{ij}}{P_{i.}}\right)^2 \widehat{var}(\hat{p}_{ij})}$.

Estimation of drinking status by sex and its error of estimation

To estimate drinking prevalence of male and female, the proportion of male and female from total male and female population of each age group were used as the weighted factors respectively.

$\hat{p}_{.j} = \sum_{i=1}^{4}\frac{P_{ij}}{P_{.j}}\hat{p}_{ij}$, where $\hat{p}_{.j}$ is prevalence of drinking status of the j^{th} sex, j=1,2

$P_{.j}$ is number of population of the j^{th} sex, and P_{ij} and $\hat{p}_{ij}$ were defined as above. Variance of $\hat{p}_{.j}$ is estimated by $\widehat{var}(\hat{p}_{.j}) = \sum_{i=1}^{4}\left(\frac{P_{ij}}{P_{.j}}\right)^2 \widehat{var}(\hat{p}_{ij})$. Sampling error of $\hat{p}_{.j}$ or s.e $(\hat{p}_{.j})$ is $\sqrt{\sum_{j=1}^{2}\left(\frac{P_{ij}}{P_{.j}}\right)^2 \widehat{var}(\hat{p}_{ij})}$.

Estimation of overall drinking status and its error of estimation

To estimate overall drinking prevalence, proportion of each age group and sex from total population was used as the weighted factor.

$\hat{p} = \sum_{i=1}^{4}\sum_{j=1}^{2}\frac{P_{ij}}{P_{..}}\hat{p}_{ij}$, where $\hat{p}$ is prevalence of drinking status of overall, $P_{..}$ is total number of population, and P_{ij} and $\hat{p}_{ij}$ were defined as above. Variance of $\hat{p}$ is estimated by $\widehat{var}(\hat{p}) = \sum_{i=1}^{4}\sum_{j=1}^{2}\left(\frac{P_{ij}}{P_{..}}\right)^2 \widehat{var}(\hat{p}_{ij})$. Sampling error of $\hat{p}$ or s.e $(\hat{p})$ is $\sqrt{\sum_{i=1}^{4}\sum_{j=1}^{2}\left(\frac{P_{ij}}{P_{..}}\right)^2 \widehat{var}(\hat{p}_{ij})}$.

95% CI of the prevalence of drinking status can be obtain by the following formula

95% CI of $\theta = \hat{\theta} \pm 1.96\ s.e(\hat{\theta})$

where θ is true drinking prevalence, and $\hat{\theta}$ is an estimate of θ and $s.e(\hat{\theta})$ is the sampling error of an estimated values $\hat{\theta}$.

Statistical analysis

The first steps of the analysis were exploratory data analysis and cross tabulations, which facilitated the definitions of categorical variables. Respondents are located within villages creating a 2-level nested structure in which individuals (level-1) are nested within villages (level-2), multilevel ordinal logistic regression analyses was used to determine association between level-1 individual and level-2 village and drinking of respondents. The analysis was accomplished using the following statistics.

3.7.2 Descriptive statistics

Descriptive statistics was utilized in order to describe each variable in the conceptual framework base on type of variable. Mean, median, mode, standard deviation and percentage distribution was utilized for quantitative type of variable. Percent and mode was employed for qualitative type of variable. The prevalence of drinking status was weighted by age-sex distribution in study area to describe drinking behavior. The data of drinking behavior were examined to describe the characteristics of individual-level factors. At village-level was described the characteristics of village and the factors in village level related to drinking behavior of the respondents.

3.7.3 Univariate ordinal logistic analysis

Univariate ordinal logistic analysis for both individual-level factors and village-level factors was performed for the selection of variables into the multilevel ordinal logistic model. The traditional ordinal logistic regression was used to evaluate if they are considered as candidate variables for multivariate analysis in constructing the best model to predict status of drinking in population. The chi-squared test for trend is one of those that are suitable for selecting principal effects [108, 109]. The criteria at 0.35 level of p-value was used to identify candidate variables. Details for names and coding of the exploratory variable in ordinal logistic regression were presented in Table 3.7. In addition, all of exploratory variables had not been violated the proportional odds assumption or called parallel lines regression in which the detail showed in below.

Copyright by Mahidol University

Table 3.7 Variable coding for data analysis

Variable name	Variable coding		
Dependent variable			
Drinking status	1 = Never drinking*	2 = Ever drinking	3 = Mild drinking
	4 = Moderate drinking	5 = Heavy drinking	
Independent variable			
Individual-level			
Marital status	0 = Widow*	1 = Single	
	2 = Married and living together	3 = Married but living apart	
Cigarette smoking	0 = No*	1 = Yes	
Monthly income (in Bath)	0 = > 20,000*	1 = < 5,000	2 = 5,000-9,999
	3 = 10,000-14,999	4 = 15,000-19,999	
Knowledge on health effect	0 = Good*	1 = Poor	2 = Fair
Knowledge on law	0 = Good*	1 = Poor	2 = Fair
Perceived severity	0 = High*	1 = Low	2 = Moderate
Perceived risk	0 = High*	1 = Low	2 = Moderate
Self-efficacy	0 = High*	1 = Low	2 = Moderate
Accessibility to alcohol	0 = Uneasy*	1 = Easy	
Effect of increasing alcohol price	0 = Yes*	1 = No	
Availability of information on anti-drinking	0 = Yes*	1 = No	
Proportion of family member drink	Continuous variable		
Proportion of friend drink	Continuous variable		
Village-level			
Type of village	0 = Municipal*	1 = Non-municipal	
Community empowerment program	0 = Yes*	1 = No	
Language use	0 = Thai-Korat*	1 = Isan	
	2 = Mix language (Using more than 1 language)		
Most occupation	0 = Rice farming*	1 = Crop farming	2 = Labour
Housing and selling liquor shop ratio	0 = > 40 per shop*	1 = ≤ 40 per shop	
The level of village activities lead to drink	0 = Low*	1 = Moderate	2 = High
Health promoting village program	0 = Yes*	1 = No	

*reference group

Copyright by Mahidol University

3.7.4 Multilevel ordinal logistic regression analysis

Multilevel ordinal logistic regression with random intercept was accomplished to select the variable of individual and village as the following steps:

Variable selection

Individual- and village-level variables were selected into the model by using forward method. Forward selection started with an empty model, then the highest significantly associated to drinking status variable was firstly selected into the model. The other predictive variables were sequentially added into the model. After entering variable into the model, variable with p-value greater than 0.05 was excluded from the model. Then another variable was added and evaluated together with previously accepted predictors. The selection of variables procedure preceded until all variables had been evaluated and re-evaluated until the models reached at all variables were significantly provided to the model.

The likelihood ratio (LR) test was used to examine the goodness-of-fit of the model which indicating that the model be fit the observed data. The likelihood ratio test was used to compare pairs of nested models. It is commonly used null hypothesis approach, the likelihood of the more complex model compared to the likelihood of the simpler model or previous model, the complex model is chosen if it indicated that model fit improve when the likelihood of the more complex model is significantly greater than the simpler model (as judged by χ^2 statistic). The test statistics for likelihood ratio test can be expressed as;

$$G^2 = -2ln\left[\frac{likelihood\ for\ reduce\ model}{likelihood\ for\ full\ model}\right] = -2ln\left[\frac{L(R)}{L(F)}\right]$$

$$= -2[\ln L(R) - \ln L(F)]$$

Where $L(F)$ is value of the likelihood function of model with more variables or full model, $L(R)$ is value of the likelihood functions of model with reduce variables according to previous model. The larger values of G^2 or leads to conclusion of model improve. The probability distribution of the test statistic is approximately a chi-squared distribution with degree of freedom equal to number of parameters of full

model (p) minus number of parameters in reduce model (q). Then p-value can be used as the decision criteria: p-value =Pr($\chi^2_{(p-q)} > G^2$).

Multilevel ordinal logistic regression analysis

According to the hypothesis of this study, individual characteristics and village characteristics are jointly influence to drinking status. Since the individuals and villages are conceptualized as a hierarchical system in which individuals as the first level were nested within villages that as the second level. The higher-level units or villages were assumed to be independent. Analyzing the performance of individuals, researcher realized that observation of individuals in the same village not independent of each other [43].

The multilevel ordinal logistic regression analysis with random intercept was used to determine the association between individual- and village-level factors with current drinking status.

The two-level with five ordered responses of drinking status 1, 2, 3, 4 and 5 represent never drinking, ever drinking, mild drinking, moderate drinking and heavy drinking, respectively, the proportional odds model or cumulative logit models were identified to account for the risk of various drinking level. For c-1 levels of drinking status, the cumulative probability for the *c* categories was defined as:

$$P_{ijc} = \Pr(Y_{ij} \leq c) = \sum_{k=1}^{c} P_{ijk} \qquad c = 1,2,3,4,5$$

In which the cumulative probability for the *c* categories of drinking status of the i^{th} individual attending to the j^{th} village with individual-level exploratory variable X_{ij} and village-level explanatory variable Z_j. The multilevel ordinal logistic regression analysis was conducted as follows [40-43, 45, 49],

1. Test statistical assumptions for Ordinal Logistic Regression: The ordered dependent variable be used in ordinal logistic regression is variable can take account of the ordering is the use of cumulative odds, which 5 ordered categories. Then, there are four possible models and category comparisons that are possible. For

ordinal logistic analysis that proportional odds model assumes the same slope across all drinking levels. The test of parallel lines regression of all significantly predicted variables was evaluated by using Wald test with p-value > 0.05 indicating that a set of predictive variables were met the assumption of parallel lines regression, it can be retained in model for the further analysis.

2. A random intercept model (null model) at village-level Unconditional random-effect model with no independent variables was fitted to obtain total variation and baseline deviance. Intra-class correlation (ICC) and variance between villages were computed. The random intercept model was;

$$log\left[\frac{\Pr(y_{ij} \leq 1|u_{0j})}{1 - Pr(y_{ij} \leq 1|u_{0j})}\right] = \gamma_1 + (\gamma_{00} + u_{oj})$$

Where γ_1 is the threshold parameter at $c = 1$, γ_{00} is the regression intercept and u_{0j} is the random effect at village level.

From the above equation, parameter γ_1 and γ_{00} cannot be estimated separately, therefore the intercept γ_{00} was fixed to zero.

Intra-class correlation (ICC = ρ);

$$\rho = \frac{\sigma_{u0}^2}{\sigma_{u0}^2 + \sigma_{eij}^2},$$

Where σ_{u0}^2 is the variance of village level residual u_{0j}

$\sigma_{eij}^2 = \frac{\pi^2}{3} \approx 3.29$ is the variance of the underlying latent response tendency [42].

3. A random intercept model with explanatory variables of individual-level. Each of individual-level independent variables was entered into the model as fixed effect by two level ordinal logistic regressions. It was tested the significantly improved fitting-model after adding each variable into the model, by using the likelihood ratio test to evaluate the fit improve of model. Only significant variables that shown significantly improve fitting were retained in the model. The model was;

$$log\left[\frac{\left(\Pr\left(y_{ij} \leq c\right)|X_{ij}, u_{0j}\right)}{\left(\Pr\left(y_{ij} > c\right)|X_{ij}, u_{0j}\right)}\right] = \gamma_c + (\gamma_{00} + \gamma_{10}X_{pij} + u_{0j})$$

Where X_{pij} be the p explanatory variables at the individual level.

4. A random intercept model which including all individual-level and village-level variables, village-level independent variables were entering one at the time into the model as fixed effect by two level ordinal logistic regression. The model was;

$$log\left[\frac{\left(\Pr\left(y_{ij} \leq c\right)|X_{ij}, Z_j, u_{0j}\right)}{\left(\Pr\left(y_{ij} > c\right)|X_{ij}, Z_j, u_{0j}\right)}\right] = \gamma_c + (\gamma_{00} + \gamma_{10}X_{pij} + \gamma_{01}Z_{qj} + u_{0j})$$

Where Z_{qj} be the q explanatory variables at the village level.

Copyright by Mahidol University

CHAPTER IV
RESULTS

This interviewing cross-sectional study was conducted among 1,293 randomly selected populations whose aged 15 to 75 years from 40 randomly enrolled villages of Pakham district, Buriram province. The results were presented in four parts as the following:

4.1 General characteristics of respondents and drinking status
4.2 General characteristics of villages
4.3 Univariate ordinal logistic regression analysis
4.4 Multilevel ordinal logistic regression analysis

4.1 General characteristics of respondents

Total of 1,293 respondents were enrolled into the study. About one-fourth of the sample was recruited to each of the following aged group: 15-24, 25-44, 45-64 and 65-75 years. According to the sampling procedures used in this study, male to female ratio of each age group were similar (Table 4.1).

Table 4.1 Respondents participated in the study by age and sex

Age group in years	Total		Male		Female	
	Number	Percent[1]	Number	Percent[2]	Number	Percent[2]
Total	1,293	100.0	641	49.6	652	50.4
15-24	322	24.9	161	50.0	161	50.0
25-44	323	25.0	160	49.5	163	50.5
45-64	328	25.4	160	48.8	168	51.2
65-75	320	24.7	160	50.0	160	50.0
Mean ± SD (years)	44.9 ± 19.7		44.6 ± 19.9		45.2 ± 19.6	
Median (Min-Max)	45.0 (15-75) years		44.0 (15-75) years		45.0 (15-75) years	

[1] Percent from total 1,293 samples
[2] Percent of sex within each age group

Most of respondents were married and living together (70.4%), followed by single (20.6%). Male seemed to have more proportion of single than female (28.1% and 13.2% respectively). More than half of them graduated primary education (57.6%) followed by secondary education (27.9%), female was more educated than male. For occupation, 11.7% reported unemployed and about half was agriculture (54.6%), followed by labor (30.4%) and business owner (15.9%). Considering sex difference on unemployment status, there were two times female unemployment as compared to male. Half of them earned less than 5,000 Baht a month. Male earned more than female. Most of them informed that earnings were insufficient for their livings. Almost all of them stayed in their own house.

Health problems and perception to his/her own health were inquired, 32.5% informed of having health problem but 80.4% perceived that their current health status was at good level. About two-fifth of female reported on having health problem, while only one-fourth of male informed of having such problem. However males perceived their current health status better than female. Cigarette smoking was reported among 1.8% and 57.1% of female and male respectively as shown in Table 4.2.

Table 4.2 General characteristics of respondents by sex

Characteristics	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Total samples	1,293	100	641	49.6	652	50.4
Marital status						
Single	266	20.6	180	28.1	86	13.2
Married and living together	910	70.4	424	66.1	486	74.5
Married but living apart	11	0.9	4	0.6	486	74.5
Widowed	106	8.2	33	5.1	73	11.2
Educational attainment						
None education	57	4.4	11	1.7	46	7.1
Primary school	745	57.6	359	56.0	386	59.2
Secondary school	361	27.9	240	37.4	121	18.6
High school	98	7.6	14	2.2	84	12.9
Bachelor's degree and higher	32	2.5	17	2.7	15	2.3

Table 4.2 General characteristics of respondents by sex (cont.)

Characteristics	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Occupation*						
Unemployment	151	11.7	51	8.0	100	15.3
Housewife/Housekeeper	93	7.2	5	0.8	88	13.5
Student	99	7.7	50	7.8	49	7.5
Agriculture	706	54.6	384	59.9	322	49.4
Labor	393	30.4	254	39.6	139	21.3
Private's employee	12	0.9	8	1.2	4	0.6
Government officer	26	2.0	16	2.5	10	1.5
Business owner	205	15.9	103	16.1	102	15.6
Others	7	0.5	3	0.5	4	0.6
Monthly income						
0-4,999 Baht	660	51.0	295	46.0	365	56.0
5,000-9,999 Baht	424	32.8	231	36.0	193	29.6
10,000-14,999 Baht	141	10.9	79	12.3	62	9.5
15,000-19,999 Baht	30	2.3	16	2.5	14	2.1
≥ 20,000 Baht	38	2.9	20	3.1	18	2.8
Median (Min - Max)	4,000 (0 - 50,000)		5,000 (0 - 45,000)		4,000 (0 - 50,000)	
Sufficiency of income						
Insufficient	886	68.5	449	70.0	437	67.0
Sufficient	394	30.5	187	29.2	207	31.7
Sufficient with saving	13	1.0	5	0.8	8	1.2
Dwelling						
Own house	1,254	97.0	624	97.3	630	96.6
Relative's house	17	1.3	7	1.1	10	1.5
Rented House	22	1.7	10	1.6	12	1.8
Health problem						
No	873	67.5	481	75.0	392	60.1
Yes	420	32.5	160	25.0	260	39.9
Perceived on current health status						
Good	1,039	80.4	544	84.9	495	75.9
Fairly good	190	14.7	78	12.2	112	17.2
Fairly poor	61	4.7	19	3.0	42	6.4
Poor	61	4.7	0	0.0	3	0.5

*multiple responses

Copyright © by Mahidol University

Table 4.2 General characteristics of respondents by sex (cont.)

Characteristics	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Smoking status						
Non smoker	915	70.8	275	42.9	640	98.2
Regular smoker	344	26.6	334	52.1	10	1.5
Irregular smoker	34	2.6	32	5.0	2	0.3

4.1.1 Drinking status

Current drinking status was assessed. AUDIT set of questions was assessed among current drinkers to classify the level of drinking, and then the results were weighted to obtain the overall and age-sex prevalence of drinking using age and sex distribution of population age 15 to 75 years in 2011, Pakham district of Buriram province as the results shown in Table 4.3.

About half of 15-75 years were not the drinkers at present and 32.3% was never drink at all. The non-drinker females were about 2.5 times of the non-drinker males. About half were current drinkers, male was 2.3 times of female. Considering the drinking status among the current drinkers, 20.4% and 22.0% were at the mild and moderate level. 8.9% was the heavy drinker. Prevalence of mild level of drinking between male and female was almost the same. For the moderate level of drinking male was 5.0 times of the female of the same level. It was remarkable that male heavy drinker was 12.8 times of the female one.

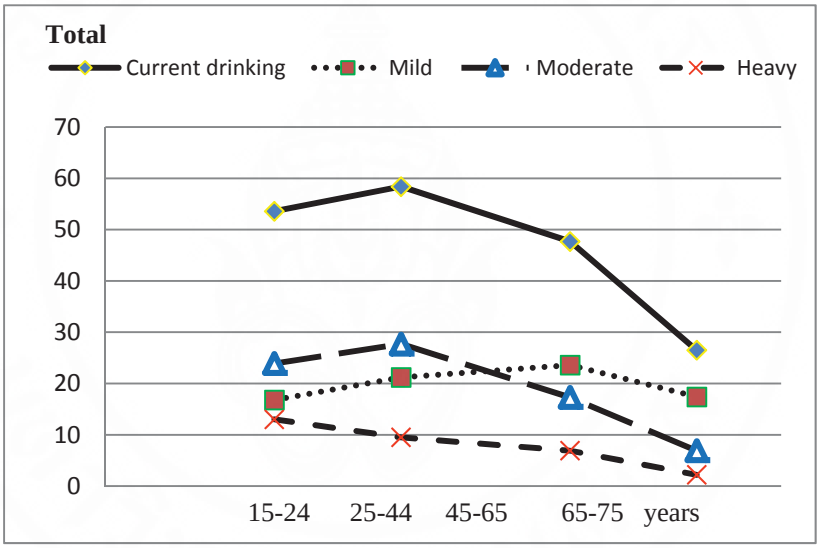
Considering drinking status by age, at least half of those age 15-64 years was the current drinker, and about one-fourth of 65-75 years consumed alcohol currently. Looking more closely to the level of drinking by age group, the highest prevalence of heavy drinking was found among 15-24 years of age (13.0%). The level of heavy drinking was decreasing as an increasing age.

Copyright by Mahidol University

As it was shown that there existed sex difference on level of alcohol drinking, about four-fifth of 15-24 males was a current drinker and one-fourth was

considered to be a heavy drinker. The heavy drinking was declined as an increasing the age.

Considering drinking prevalence for female, the prevalence of current drinking was the most common among 25-44 years (38.7%) and it was decreased as an increasing of age. For female whose age 15-24, 29.1% was the current drinker. It is remarkable that the prevalence of heavy drinker was rather stable (1.2%) from age 15-64 years, but it was increasing to 1.9% at the age of 65-75 years.



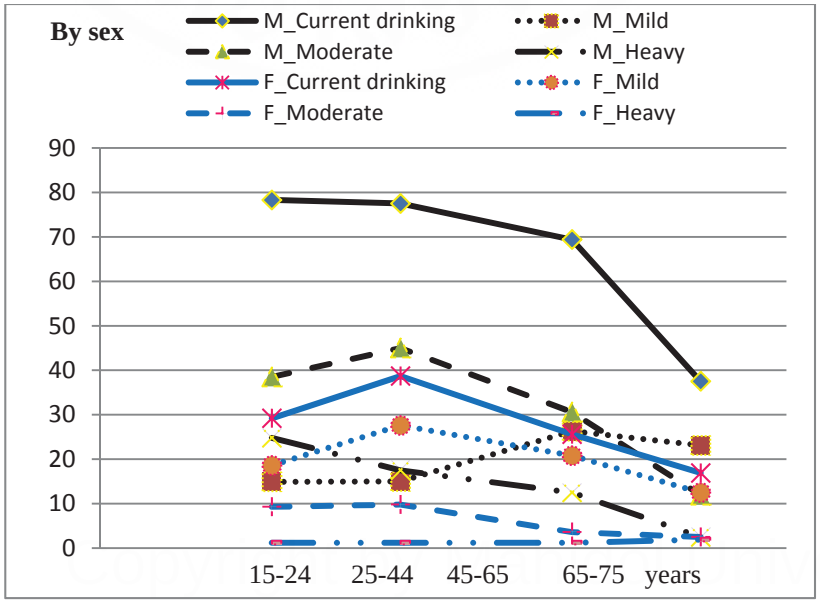


Figure 4.1: Prevalence of drinking by age and sex

Table 4.3 Prevalence of drinking by age and sex

*Percentages
Standard errors
(95% confidence intervals)

Age group in years	Sex	Never drinking	Ever drinking	*Current drinking*	Level of current drinking		
					Mild	Moderate	Heavy
Total		32.3	16.3	*51.4*	20.4	22.0	8.9
		20.8	16.2	*21.3*	20.4	18.1	9.4
		(3.31,86.94)	(0.72,84.04)	*(8.97,91.89)*	(0.78,89.31)	(1.49,84.12)	(0.40,70.77)
	Male	9.3	18.8	*71.9*	18.7	36.7	16.5
		10.5	17.7	*20.2*	19.1	28.0	17.3
		(0.33,76.31)	(0.93,85.19)	*(13.71,97.62)*	(0.70,88.25)	(2.00,94.27)	(0.61,86.49)
	Female	55.4	13.8	*30.8*	22.2	7.3	1.3
		31.6	16.0	*26.1*	23.6	9.0	1.7
		(3.43,97.75)	(0.38,87.11)	*(1.471,92.98)*	(0.64,92.66)	(0.20,75.52)	(0.03,33.79)
15-24		39.9	6.5	*53.6*	16.8	23.9	13.0
		23.4	7.8	*22.0*	18.2	20.4	12.8
		(4.20,90.92)	(0.20,70.99)	*(9.03,93.09)*	(0.54,88.18)	(1.37,87.63)	(0.64,77.71)
	Male	16.2	5.6	*78.3*	14.9	38.5	24.8
		17.5	6.7	*19.0*	16.4	30.2	24.3
		(1.34,72.79)	(0.44,44.02)	*(27.03,97.22)*	(1.25,70.78)	(4.46,89.36)	(2.28,82.39)
	Female	63.4	7.5	*29.2*	18.6	9.3	1.2
		30.3	9.5	*26.6*	21.6	11.7	1.7
		(10.77,96.12)	(0.48,57.16)	*(2.92,84.98)*	(1.24,80.72)	(0.61,63.37)	(0.08,16.49)

Table 4.3 Prevalence of drinking by age and sex (cont.)

*Percentages
Standard errors
(95% confidence intervals)

Age group in years	Sex	Never drinking	Ever drinking	*Current drinking*	Level of current drinking		
					Mild	Moderate	Heavy
25-44		26.7	14.9	*58.4*	21.2	27.7	9.5
		20.0	16.0	*22.0*	20.9	21.2	10.3
		(2.10,86.08)	(0.52,85.37)	*(10.21,94.54)*	(0.83,89.63)	(1.99,87.84)	(0.38,74.44)
	Male	6.9	15.6	*77.5*	15.0	45.0	17.5
		8.2	17.2	*19.5*	16.6	31.2	18.9
		(0.53,50.33)	(1.28,72.61)	*(26.08,97.11)*	(1.22,71.59)	(5.90,91.43)	(1.45,75.37)
	Female	47.2	14.1	*38.7*	27.6	9.8	1.2
		32.7	16.1	*29.3*	27.2	11.7	1.6
		(5.81,92.86)	(1.08,71.23)	*(4.84,88.64)*	(2.33,85.92)	(0.74,61.53)	(0.09,14.74)
45-64		31.4	20.9	*47.7*	23.6	17.3	6.9
		19.6	20.8	*21.9*	22.8	15.8	7.7
		(3.52,85.19)	(0.80,89.64)	*(7.39,91.27)*	(0.91,91.16)	(0.96,81.74)	(0.27,67.46)
	Male	6.3	24.4	*69.4*	26.3	30.6	12.5
		7.4	23.7	*24.3*	24.8	27.2	13.9
		(0.51,46.48)	(2.30,81.5)	*(18.08,95.88)*	(2.54,82.94)	(3.16,85.64)	(1.06,65.61)
	Female	57.1	17.3	*25.6*	20.8	3.6	1.2
		32.5	19.8	*24.5*	23.1	4.6	1.6
		(8.22,95.20)	(1.22,77.92)	*(2.43,82.59)*	(1.49,82.04)	(0.24,36.07)	(0.08,15.27)

Table 4.3 Prevalence of drinking by age and sex (cont.)

*Percentages
Standard errors
(95% confidence intervals)

Age group in years	Sex	Never drinking	Ever drinking	*Current drinking*	Level of current drinking		
					Mild	Moderate	Heavy
65-75		40.3	33.3	*26.5*	17.4	6.9	2.2
		22.6	25.5	*20.8*	18.6	8.0	2.7
		(4.75,90.12)	(2.01,92.36)	*(1.82,87.52)*	(0.58,88.46)	(0.22,70.82)	(0.06,43.62)
	Male	11.9	50.6	*37.5*	23.1	11.9	2.5
		13.9	32.3	*28.4*	24.2	13.9	3.2
		(0.89,66.98)	(6.86,93.46)	*(4.83,87.65)*	(1.85,82.80)	(0.89,66.98)	(0.18,26.66)
	Female	65.0	18.1	*16.9*	12.5	2.5	1.9
		30.1	21.3	*17.5*	15.5	3.3	2.5
		(11.11,96.50)	(1.17,80.56)	*(1.58,71.98)*	(0.78,71.73)	(0.16,29.35)	(0.12,23.54)

4.1.2 General characteristics of respondent and drinking status

Dialect use for communication

There are5 local dialects use in Pakham district. They are Thai, Thai-Isan, Thai-Korat, Kuy and Khmer. Some of them can use only one dialect. About half can use two dialects. It is interesting that about one-tenth can communicate 3-5 different dialects. Considering drinking prevalence by dialects used, prevalence of current drinking among those who can speak two languages was the highest (55.4%), followed by three and one dialects, 52.3% and 46.3% respectively. Looking more closely to level of drinking among current drinkers, it was found that the more the number of dialects they were able to use was the lower the prevalence of heavy drinker.

For marital status in relation to alcohol drinking prevalence, prevalence of drinking currently among single person age 15-75 years was as high as 64.2%. For those non-single persons was lower than those single one (47.8%). However, prevalence of heavy drinker for single was about three times of the non-single, (18.9% and 6.2% respectively).

The drinking status by educational attainment, it was found that the higher the level of educational attainment was the more the prevalence of drinking currently. As it was found that 47.9%, 56.6% and 67.8% were current drinking among those attained primary school, secondary school and Bachelor’s degree and higher, respectively. Moreover, higher education attainment also had higher prevalence of heavy drinking. About one-tenth of those completed secondary and higher drank heavily.

For occupation in relation to drinking status, prevalence of current drink among those unemployed or dependent was 28.9%, which was the lowest as compared to those having job. About half of agriculture and 64.6% of labor were drinking currently. It should be noted that those who can earn monthly had higher prevalence of alcohol drinking than those who cannot. In regards to prevalence of heavy drinking, labor was the highest (16.7%), followed by government officer (14.5%), and private

employee (9.5%). It is interesting that 28.2% of unemployed had ever drunk and stop drinking at the time of study.

Monthly income and drinking status, prevalence of drinking was increased as an increasing of the income. For heavy drinking, it was also shown that the more they earned was the higher the prevalence of heavy drinking. Current drinking prevalence among those had insufficient income was slightly higher than those reported of having sufficient income (52.3% and 49.5% respectively). However, prevalence of heavy drinker for insufficient income group was about two times of the sufficient income group (10.9% and 5.2% respectively).

Perceived on their health and drinking status, prevalence of current drinking among those informed without health problem was higher than those having health problem (57.2% and 35.0% respectively). In addition, prevalence of heavy drinking among those perceived on having no health problem was about 4.5 times of those having problem on health. Prevalence of current drinking among those perceived that their health was at good and fairly good level was 54.9% and 33.5% respectively. Similarity, prevalence of heavy drinking was high among those perceiving good and fairly good on their health currently (9.5% and 7.1% respectively).

For cigarette smoking in relation to drinking status, prevalence of current drinking among smokers was 2.3 times of the non-smokers, and prevalence of heavy drinking among regular smoker, irregular smoker and non-smoker were 24.5%, 12.5% and 2.6% respectively. Detailed shown in Table 4.4.

Copyright by Mahidol University

Table 4.4 General characteristics respondents classified by drinking status

Languages use	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
One language	37.1	38.8	*(4.52, 89.47)*	14.9	*(0.63, 82.97)*	18.8	*(0.70, 88.32)*	16.1	*(1.06, 77.54)*	11.4	*(0.55, 74.90)*
Thai only	4.7	39.4	*(5.17, 88.59)*	11.7	*(0.46, 79.23)*	19.2	*(0.71, 88.78)*	19.3	*(1.16, 83.06)*	10.4	*(0.49, 73.37)*
Isan only	18.4	33.9	*(4.01, 86.27)*	15.6	*(0.70, 82.99)*	19.8	*(0.78, 88.66)*	19.1	*(1.29, 81.00)*	11.6	*(0.51, 76.93)*
Khmer only	0.0	100.0		0.0		0.0		0.0		0.0	
Thai-Korat only	14.0	44.9	*(4.85, 92.88)*	15.2	*(0.59, 84.32)*	17.3	*(0.59, 88.04)*	11.2	*(0.71, 68.94)*	11.5	*(0.62, 72.81)*
Two languages	52.7	27.9	*(2.53, 85.18)*	16.7	*(0.72, 84.8)*	22.0	*(0.86, 90.23)*	26.4	*(1.78, 87.67)*	7.0	*(0.28, 66.60)*
Thai and Isan	24.5	25.9	*(2.35, 83.51)*	15.8	*(0.65, 84.28)*	23.7	*(0.95, 90.96)*	28.8	*(1.99, 88.93)*	5.9	*(0.22, 63.60)*
Thai and Khmer	0.3	51.4	*(2.49, 97.76)*	0.0		0.0		0.0		48.6	*(2.24, 97.51)*
Thai and Thai-Korat	21.0	28.0	*(2.52, 85.36)*	17.0	*(0.74, 84.95)*	20.1	*(0.76, 89.21)*	27.5	*(1.94, 87.87)*	7.4	*(0.30, 67.52)*
Isan and Khmer	0.1	0.0		0.0		100.0		0.0		0.0	
Isan and Thai-Korat	5.4	37.5	*(2.99, 92.11)*	24.4	*(1.03, 90.90)*	23.8	*(0.83, 92.04)*	9.0	*(0.39, 71.20)*	5.4	*(0.21, 61.16)*
Khmer and Thai-Korat	1.5	22.8	*(3.47, 70.73)*	3.9	*(0.37, 30.98)*	11.4	*(0.39, 81.27)*	43.4	*(4.18, 93.08)*	18.6	*(0.66, 88.76)*
Three languages	8.4	27.5	*(3.09, 81.86)*	20.2	*(0.99, 86.49)*	19.8	*(0.77, 88.63)*	22.5	*(1.58, 84.02)*	10.1	*(0.45, 73.44)*
Thai, Kuy and Isan	0.1	100.0		0.0		0.0		0.0		0.0	
Thai, Isan and Khmer	0.8	20.9	*(1.10, 86.32)*	10.5	*(0.40, 77.54)*	24.7	*(1.26, 89.36)*	33.4	*(2.33, 91.33)*	10.5	*(0.33, 80.61)*
Thai, Isan and Thai-Korat	5.5	27.3	*(3.27, 80.71)*	18.0	*(0.85, 84.80)*	20.5	*(0.81, 89.05)*	23.1	*(1.65, 84.25)*	11.1	*(0.48, 76.57)*
Thai, Khmer and Thai-Korat	0.8	33.4	*(3.35, 87.86)*	29.7	*(1.37, 92.79)*	0.0		19.1	*(1.19, 82.24)*	17.8	*(1.02, 81.96)*
Kuy, Isan and Thai-Korat	0.1	100.0		0.0		0.0		0.0		0.0	
Isan, Khmer and Thai-Korat	1.1	14.9	*(1.11, 73.36)*	35.7	*(1.88, 94.15)*	31.1	*(1.13, 94.69)*	18.3	*(0.61, 89.19)*	0.0	
Four languages	1.7	52.2	*(5.72, 95.16)*	14.3	*(0.68, 80.15)*	10.8	*(0.27, 84.73)*	13.5	*(0.88, 73.13)*	9.3	*(0.39, 73.07)*
Thai, Kuy, Isan and Khmer	0.1	100.0		0.0		0.0		0.0		0.0	
Thai, Isan, Khmer and Thai-Korat	1.1	56.2	*(4.82, 97.01)*	20.0	*(0.94, 86.77)*	14.5	*(0.31, 90.18)*	6.6	*(0.46, 52.21)*	2.7	*(0.06, 54.36)*
Five languages	0.5	31.1	*(5.39, 78.17)*	5.7	*(0.54, 40.34)*	5.7	*(0.21, 63.69)*	31.6	*(2.10, 90.87)*	25.9	*(1.02, 92.20)*

Table 4.4 General characteristics respondents classified by drinking status (cont.)

Characteristics	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Marital status											
Single	21.6	28.9	*(2.87, 84.81)*	6.9	*(0.26, 67.96)*	15.3	*(0.53, 86.02)*	30.0	*(1.70, 91.41)*	18.9	*(0.82, 86.78)*
Non-single	78.4	33.3	*(3.33, 87.83)*	18.9	*(0.81, 86.89)*	21.8	*(0.84, 90.24)*	19.9	*(1.35, 81.75)*	6.2	*(0.25, 63.24)*
Married and living together	73.4	32.3	*(3.17, 87.40)*	18.7	*(0.80, 86.73)*	22.1	*(0.85, 90.35)*	20.5	*(1.38, 82.57)*	6.5	*(0.26, 64.88)*
Married but living apart	0.9	25.5	*(1.73, 86.95)*	25.7	*(1.06, 91.77)*	34.5	*(1.38, 95.20)*	14.3	*(1.37, 66.74)*	0.0	
Widowed	4.1	53.1	*(6.33, 95.00)*	22.0	*(0.89, 89.79)*	14.2	*(0.42, 86.62)*	10.0	*(0.57, 67.99)*	0.8	*(0.02, 28.14)*
Educational attainment											
None education	2.6	56.4	*(5.14, 96.85)*	23.6	*(0.88, 91.49)*	12.1	*(0.29, 86.89)*	6.7	*(0.34, 60.20)*	1.3	*(0.03, 37.64)*
Primary school	53.2	32.4	*(3.19, 87.40)*	19.8	*(0.90, 87.00)*	21.5	*(0.83, 89.94)*	18.7	*(1.16, 81.92)*	7.7	*(0.34, 67.49)*
Secondary school	41.0	30.9	*(3.22, 85.73)*	12.5	*(0.48, 80.92)*	19.2	*(0.73, 88.51)*	26.6	*(1.87, 87.31)*	10.8	*(0.47, 75.59)*
Bachelor's degree and higher	3.3	30.5	*(2.41, 88.60)*	1.8	*(0.18, 14.99)*	25.7	*(0.89, 93.08)*	31.5	*(1.68, 92.54)*	10.5	*(0.39, 78.07)*

*multiple responses

Table 4.4 General characteristics respondents classified by drinking status (cont.)

Characteristics	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Occupation											
No work	2.03	55.8	*(5.93, 96.20)*	15.3	*(0.65, 83.27)*	16.3	*(0.48, 88.81)*	9.2	*(0.49, 67.37)*	3.4	*(0.13, 48.57)*
Unemployment	6.6	48.2	*(4.35, 95.02)*	28.2	*(1.35, 91.86)*	8.9	*(0.22, 81.13)*	13.0	*(0.76, 74.41)*	1.6	*(0.04, 44.22)*
Housewife/Housekeeper	6.6	63.4	*(5.43, 98.13)*	14.4	*(0.42, 86.98)*	17.7	*(0.47, 90.72)*	2.2	*(0.05, 51.69)*	2.3	*(0.05, 52.44)*
Student	7.1	56.7	*(5.71, 96.58)*	2.0	*(0.05, 45.23)*	23.2	*(0.66, 93.27)*	13.1	*(0.66, 77.3)*	5.0	*(0.23, 55.11)*
Agriculture	57.2	28.0	*(2.74, 84.33)*	19.7	*(0.86, 87.35)*	20.9	*(0.82, 89.44)*	22.4	*(1.49, 84.74)*	8.9	*(0.38, 71.38)*
Labor	34.8	20.2	*(1.70, 78.76)*	15.2	*(0.64, 83.27)*	20.1	*(0.82, 88.45)*	27.9	*(1.73, 89.46)*	16.7	*(0.74, 84.30)*
Monthly wage	3.8	19.1	*(1.59, 77.45)*	4.4	*(0.14, 60.07)*	21.7	*(0.79, 90.53)*	44.1	*(3.23, 94.92)*	10.8	*(0.33, 81.61)*
Private's employee	1.4	24.7	*(3.08, 77.18)*	9.5	*(0.30, 78.67)*	18.5	*(0.72, 87.55)*	37.9	*(3.26, 91.70)*	9.5	*(0.32, 77.18)*
Government officer	2.4	14.9	*(1.06, 74.21)*	2.4	*(0.22, 22.23)*	22.5	*(0.79, 91.43)*	45.7	*(3.00, 95.80)*	14.5	*(0.42, 87.23)*
Business owner	18.5	26.1	*(2.41, 83.43)*	14.5	*(0.56, 83.54)*	26.5	*(1.08, 92.28)*	27.7	*(1.95, 88.08)*	5.2	*(0.19, 61.39)*
Other occupations	0.6	28.2	*(2.10, 87.77)*	0.0		33.7	*(1.04, 96.08)*	38.2	*(3.53, 91.23)*	0.0	
Level of income											
0-4,999 Baht	42.2	38.7	*(4.01, 90.54)*	18.1	*(0.90, 84.32)*	20.1	*(0.74, 89.55)*	15.3	*(0.92, 77.81)*	7.7	*(0.36, 65.75)*
5,000-9,999 Baht	38.4	26.0	*(2.49, 82.86)*	14.9	*(0.58, 83.93)*	21.9	*(0.86, 90.02)*	27.2	*(1.91, 87.74)*	10.1	*(0.43, 74.61)*
10,000-14,999 Baht	12.6	30.3	*(3.32, 84.65)*	17.8	*(0.66, 87.64)*	15.7	*(0.60, 85.06)*	25.3	*(1.78, 86.39)*	10.9	*(0.44, 77.20)*
≥ 15,000 Baht	6.8	32.0	*(2.90, 88.08)*	10.4	*(0.36, 78.94)*	22.7	*(0.85, 90.98)*	28.8	*(1.67, 90.59)*	6.0	*(0.24, 63.37)*
15,000-19,999 Baht	3.2	21.1	*(1.61, 81.35)*	8.1	*(0.24, 76.84)*	29.4	*(1.28, 93.01)*	31.1	*(1.62, 92.47)*	10.4	*(0.40, 76.85)*
≥ 20,000 Baht	3.6	41.5	*(4.48, 91.49)*	12.4	*(0.46, 81.37)*	16.9	*(0.56, 88.03)*	26.9	*(1.62, 89.15)*	2.2	*(0.08, 39.82)*
Median (Min - Max)	4,000 (0 - 50,000)	3,000 (0 -50,000)		3,000 (0 - 40,000)		5,000 (0 - 35,000)		5,000 (0 - 45,000)		6,000 (500 - 30,000)	

*multiple responses

Table 4.4 General characteristics respondents classified by drinking status (cont.)

Characteristics	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Sufficiency of income											
Insufficient	66.5	30.6	*(3.15, 85.67)*	17.1	*(0.77, 84.55)*	19.9	*(0.78, 88.74)*	21.5	*(1.39, 84.18)*	10.9	*(0.50, 74.96)*
Sufficient	32.4	35.7	*(3.55, 89.35)*	14.9	*(0.61, 83.11)*	21.1	*(0.76, 90.39)*	23.2	*(1.67, 84.24)*	5.2	*(0.21, 58.25)*
Sufficient with saving	1.2	35.6	*(3.61, 89.10)*	12.9	*(0.42, 83.81)*	27.6	*(1.17, 92.47)*	23.8	*(2.35, 80.23)*	0.0	
Dwelling											
Own house	96.2	32.5	*(3.38, 86.82)*	16.4	*(0.72, 84.06)*	20.1	*(0.77, 89.05)*	22.1	*(1.49, 84.22)*	9.0	*(0.40, 71.02)*
Relative's house	1.7	31.1	*(1.84, 91.54)*	18.2	*(0.81, 85.93)*	23.6	*(0.79, 92.25)*	15.1	*(0.72, 81.48)*	12.0	*(0.63, 74.80)*
Rented House	2.1	27.3	*(1.79, 88.60)*	11.5	*(0.32, 83.93)*	32.9	*(1.21, 95.15)*	24.9	*(2.15, 83.32)*	3.3	*(0.16, 42.26)*
Health problem											
No	73.9	30.5	*(3.04, 85.95)*	12.4	*(0.50, 79.94)*	19.8	*(0.76, 88.85)*	26.2	*(1.74, 87.63)*	11.2	*(0.48, 76.63)*
Yes	26.1	37.6	*(3.46, 90.99)*	27.4	*(1.32, 91.43)*	22.1	*(0.78, 91.14)*	10.4	*(0.62, 68.53)*	2.5	*(0.10, 38.95)*
Perceived on current health status											
Good	86.2	31.0	*(3.08, 86.40)*	14.1	*(0.58, 82.23)*	20.8	*(0.80, 89.54)*	24.6	*(1.66, 86.34)*	9.5	*(0.41, 72.60)*
Fairly good	10.6	40.5	*(4.13, 91.47)*	26.1	*(1.27, 90.63)*	20.0	*(0.71, 89.72)*	6.4	*(0.31, 59.82)*	7.1	*(0.32, 64.05)*
Fairly poor	3.1	38.6	*(2.70, 93.45)*	43.8	*(2.73, 95.58)*	12.5	*(0.34, 85.60)*	5.1	*(0.37, 44.28)*	0.0	
Poor	0.1	100.0		0.0		0.0		0.0		0.0	
Smoking status											
Non smoker	69.5	45.1	*(3.70, 94.62)*	17.3	*(0.66, 86.72)*	21.4	*(0.71, 91.19)*	13.6	*(0.78, 75.98)*	2.6	*(0.10, 39.97)*
Regular smoker	2.8	5.0	*(0.15, 64.66)*	5.9	*(0.30, 56.94)*	48.1	*(2.04, 97.63)*	28.4	*(0.81, 95.09)*	12.5	*(0.34, 85.59)*
Irregular smoker	27.7	3.0	*(0.24, 28.12)*	15.0	*(0.69, 81.69)*	15.1	*(0.51, 85.98)*	42.5	*(2.31, 95.86)*	24.5	*(0.87, 92.30)*

*multiple responses

Group of friends or friend who drink is another factor that may influence on alcohol drinking. Majority (86.7%) informed they had close friends and 73.9% among them were drinkers. Current drinking prevalence among those had close friends was obviously higher than those had none of the close friend (55.9% and 21.9% respectively). Furthermore, 64.6% and 12.0% were the prevalence of current drinking and heavy drinking among those having close friend drink. Considering proportion of friend drink, prevalence of drinking was increased as an increasing of proportion of friend drink and it was similar pattern in heavy drinking as shown in Table 4.5.

Copyright by Mahidol University

Table 4.5 Friends of respondents classified by drinking status

Characteristics	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Having close friends											
No	13.3	46.7	*(3.48, 95.52)*	31.4	*(1.59, 92.86)*	17.9	*(0.49, 90.62)*	3.7	*(0.13, 53.20)*	0.2	*(0.01, 11.78)*
Yes	86.7	30.1	*(3.07, 85.41)*	14.0	*(0.59, 81.75)*	20.8	*(0.81, 89.41)*	24.8	*(1.68, 86.45)*	10.2	*(0.44, 74.56)*
Close friends drink											
No	26.1	62.7	*(6.38, 97.63)*	23.3	*(0.95, 90.60)*	11.2	*(0.26, 85.95)*	2.7	*(0.09, 44.98)*	0.1	*(0.00, 7.21)*
Yes	73.9	21.6	*(1.83, 80.32)*	13.8	*(0.58, 81.63)*	23.7	*(0.98, 90.70)*	28.9	*(1.88, 89.6)*	12.0	*(0.49, 79.04)*
Proportion of friend drink											
None	26.1	62.7	*(6.38, 97.63)*	23.3	*(0.95, 90.60)*	11.2	*(0.26, 85.95)*	2.7	*(0.09, 44.98)*	0.1	*(0.00, 7.21)*
0.1-30.0%	4.4	52.1	*(3.37, 97.13)*	21.0	*(0.56, 92.71)*	23.4	*(0.76, 92.48)*	3.5	*(0.22, 36.70)*	0.0	
30.1-60.0%	21.1	37.6	*(2.94, 92.31)*	23.1	*(1.00, 89.93)*	24.0	*(0.85, 92.01)*	12.8	*(0.69, 75.52)*	2.5	*(0.10, 38.88)*
>60.0%	48.4	11.8	*(0.93, 65.67)*	9.1	*(0.35, 73.97)*	23.6	*(0.96, 90.79)*	38.2	*(2.36, 94.04)*	17.3	*(0.63, 87.36)*
Mean ± SD.	58.9±36.8	30.4±33.4		48.6±31.9		67.7±27.9		86.0±20.4		93.1±14.0	
Median(Min - Max)	63.1 (0 - 100)	20.0 (0 - 100)		50.0 (0 - 100)		70.0 (0 - 100)		100.0 (0 - 100)		100.0 (33.3 - 100)	

The relationship between family and drinking status, the prevalence of current drinking among those having drinker in their family were 53.0%. Family member of same blood lineage was more likely to influence alcohol drinking. 67.4%, 68.5% and 66.1% were prevalence of current drinking among those having father, mother and sibling were drinking respectively. Similarity, prevalence of heavy drinking was high among those having family drinker were father, mother and sibling (24.8%, 28.9% and 18.0% respectively). Proportion of male drinker in family did not seem to have any difference on alcohol drinking, but having female drinker in family tended to have more influence on current alcohol drinking (Table 4.6).

Copyright by Mahidol University

Table 4.6 Family of respondents classified by drinking status

Characteristics	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Having drinker in family											
No	42.5	29.6	*(3.13, 84.55)*	21.3	*(0.98, 88.09)*	18.2	*(0.68, 87.92)*	24.4	*(1.73, 85.44)*	6.6	*(0.25, 66.22)*
Yes	57.5	34.3	*(3.34, 88.78)*	12.7	*(0.52, 80.18)*	22.0	*(0.85, 90.33)*	20.3	*(1.28, 83.41)*	10.6	*(0.51, 73.57)*
Number of drinkers in family											
≤ 2 person(s)	84.7	33.0	*(3.34, 87.55)*	15.3	*(0.64, 83.40)*	22.1	*(0.86, 90.25)*	20.9	*(1.38, 83.20)*	8.7	*(0.42, 68.42)*
> 2 persons	15.3	25.0	*(2.71, 79.90)*	16.7	*(0.62, 86.49)*	16.5	*(0.63, 86.17)*	30.4	*(2.00, 90.34)*	11.4	*(0.43, 79.31)*
Members who drink*											
Father	15.3	25.6	*(2.40, 82.79)*	7.1	*(0.23, 71.45)*	14.5	*(0.50, 84.95)*	28.1	*(1.56, 90.58)*	24.8	*(1.17, 90.19)*
Mother	2.6	23.8	*(2.17, 81.54)*	7.7	*(0.30, 70.01)*	18.3	*(0.70, 87.69)*	21.3	*(1.03, 87.49)*	28.9	*(1.49, 91.63)*
Son/daughter	13.9	31.9	*(3.16, 87.03)*	20.0	*(0.90, 87.34)*	18.8	*(0.67, 88.82)*	23.8	*(1.34, 87.74)*	5.6	*(0.20, 63.23)*
Spouse	25.1	44.5	*(3.15, 95.19)*	13.5	*(0.41, 85.54)*	26.0	*(0.91, 93.08)*	12.9	*(0.69, 76.01)*	3.1	*(0.13, 43.64)*
Sibling	9.4	25.4	*(2.64, 81.05)*	8.5	*(0.32, 73.12)*	22.4	*(0.86, 90.52)*	25.7	*(1.56, 88.36)*	18.0	*(0.75, 86.40)*
Relative	5.1	34.8	*(3.39, 89.06)*	6.0	*(0.30, 57.69)*	28.0	*(1.06, 93.38)*	22.7	*(1.55, 84.55)*	8.5	*(0.37, 69.91)*
Son-/daughter-in-law	3.4	33.0	*(3.74, 86.16)*	19.1	*(0.70, 88.71)*	26.6	*(1.34, 90.64)*	11.3	*(0.47, 77.45)*	10.0	*(0.44, 73.47)*

*multiple responses

Table 4.6 Family of respondents classified by drinking status (cont.)

Characteristics	Total	Never drinking	Ever drinking	Mild drinking	Moderate drinking	Heavy drinking
	Percent	Percent *(95% CI)*	Percent *(95% CI)*	Percent *(95% CI)*	Percent *(95% CI)*	Percent *(95% CI)*
Proportion of family member drink						
None	42.5	29.6 *(3.13, 84.55)*	21.3 *(0.98, 88.09)*	18.2 *(0.68, 87.92)*	24.4 *(1.73, 85.44)*	6.6 *(0.25, 66.22)*
0.1-20.0%	15.7	29.1 *(2.89, 85.01)*	14.2 *(0.63, 81.11)*	26.5 *(1.16, 91.73)*	18.5 *(1.14, 81.82)*	11.7 *(0.65, 72.61)*
20.1-40.0%	29.9	33.0 *(3.21, 87.94)*	16.0 *(0.72, 83.30)*	19.2 *(0.73, 88.41)*	23.0 *(1.54, 85.12)*	8.8 *(0.49, 65.75)*
> 40.0%	12.0	27.5 *(3.08, 81.92)*	7.6 *(0.27, 71.33)*	20.9 *(0.85, 88.96)*	25.0 *(1.42,88.50)*	19.1 *(1.05, 83.95)*
Median (Min, Max)	25(9.1-100)	25 (9.1 - 100)	25 (14.3 - 66.7)	25 (9.1 - 75.0)	33.3 (12.5 - 80.0)	25.0 (10.0 - 75.0)
Proportion of male drink in family						
None	47.2	12.8 *(1.32, 61.73)*	16.0 *(0.71, 83.52)*	24.4 *(1.09, 90.44)*	31.1 *(1.88, 91.40)*	15.7 *(0.63, 84.41)*
0.1-20.0%	16.2	30.1 *(2.86, 86.30)*	12.1 *(0.55, 77.61)*	24.8 *(1.06, 90.99)*	20.7 *(1.28, 84.02)*	12.4 *(0.71, 73.64)*
20.1-40.0%	28.6	34.2 *(3.38, 88.56)*	16.4 *(0.74, 83.87)*	19.3 *(0.73, 88.54)*	20.8 *(1.32, 83.74)*	9.3 *(0.54, 66.00)*
> 40.0%	8.1	32.8 *(3.26, 87.56)*	6.3 *(0.18, 71.55)*	21.0 *(0.77, 90.10)*	23.6 *(1.35, 87.38)*	16.4 *(0.91, 80.67)*
Median (Min, Max)	25(0 - 100)	25.0 (0 - 100)	25.0 (0 - 66.7)	25.0 (0 - 75.0)	25.0 (0 - 80.0)	25.0 (0 - 50.0)
Proportion of female drink in family						
None	89.6	34.4 *(3.39, 88.68)*	14.2 *(0.61, 81.68)*	21.3 *(0.82, 89.85)*	20.0 *(1.26, 83.15)*	10.1 *(0.58, 68.24)*
0.1-20.0%	4.5	18.6 *(1.37,78.94)*	12.0 *(0.54, 77.31)*	17.9 *(0.80, 85.59)*	28.6 *(1.59, 90.87)*	22.8 *(1.19, 87.95)*
20.1-40.0%	5.4	13.9 *(1.69, 60.46)*	12.3 *(0.50, 79.76)*	27.9 *(1.23, 92.34)*	34.1 *(1.98, 92.99)*	11.8 *(0.47, 78.93)*
> 40.0%	0.6	14.3 *(0.45, 85.93)*	7.2 *(0.45, 57.10)*	14.3 *(0.56, 83.00)*	14.3 *(0.41, 87.04)*	50.0 *(4.34, 95.65)*
Median (Min, Max)	0 (0 - 66.7)	0 (0 - 50.0)	0 (0 - 50.0)	0 (0 - 50.0)	0 (0 - 50.0)	0 (0 - 66.7)

Fac. of Grad.Studies, Mahidol Univ.

4.1.3 Drinking pattern

Drinking pattern of current drinkers and ex-drinkers were illustrated as following.

Drinking pattern of current drinkers and ex-drinkers

The age start drinking was inquired among current drinkers and ex-drinkers; they started as young as 7 years and as old as 68 years. The age at start was rather wide. About 61.2% started drinking at the age of 15-24 years. The average age at start drinking was about 21.3 years with S.D 8.6 years.

Considering the type of alcohol beverage at first drink, the most common one was white spirits (46.7%), followed by beer (22.2%) and home-made liquor (11.8%). However, type of alcohol drank at first time for current drinker and ex-drinker were different, for current drinker it was white spirit and beer respectively and for ex-drinker it was white spirit and home-made liquor respectively. Some of them initiated with whiskey and medicated spirits, 4.4% and 2.7% respectively.

Reasons of drinking at first time, the most common reason were their friend's persuasion (85.0%), followed by self-experiment (55.0%), for enjoyment (50.1%) and for socialization (35.4%). However, some of them drinking to increase appetite, relaxing and relieving the pain as well. The most common person who's drinking with them at first time was friends (95.2%), followed by relative (43.6%) and sibling (6.6%). Besides, there were some of them drinking alone as well as with their parent, 2.6% and 0.8% respectively (Table 4.7).

Copyright by Mahidol University

Table 4.7 Pattern of drinking among current drinkers and ex-drinkers

Pattern of drinking	Total (n=848)		Current drinker (n=601)		Ex-drinker (n=247)	
	Number	Percent	Number	Percent	Number	Percent
Age at start of drinking (years)						
7-14	109	12.9	87	14.5	22	8.9
15-24	519	61.2	369	61.4	150	60.7
25-44	192	22.6	124	20.6	68	27.5
45-64	26	3.1	19	3.2	7	2.8
≥ 65	2	0.2	2	0.3	0	0.0
Mean ± SD	21.3±8.6		21.1±8.8		22.06±8.1	
Type of alcohol drinking at first time						
White spirit	396	46.7	298	49.6	98	39.7
Beer	188	22.2	161	26.8	27	10.9
Home-made liquor	100	11.8	47	7.8	53	21.5
Other types of beverage	64	7.5	30	5.0	34	13.8
Whiskey	37	4.4	28	4.7	9	3.6
Spy wine cooler	31	3.7	20	3.3	11	4.5
Medicated spirits	23	2.7	11	1.8	12	4.9
Wine	4	0.5	2	0.3	2	0.8
Cocktail	3	0.4	3	0.5	0	0.0
Chiang chun	2	0.2	1	0.2	1	0.4
Reason of drinking at first time*						
Friend's persuasion	721	85.0	529	88.0	192	77.7
Self-experiment	466	55.0	315	52.4	151	61.1
Drink for enjoyment	425	50.1	326	54.2	99	40.1
Sociability	300	35.4	226	37.6	74	30.0
To increase appetite	58	6.8	30	5.0	28	11.3
Family member drink	56	6.6	26	4.3	30	12.1
Relaxation	17	2.0	12	2.0	5	2.0
To relieve pain	10	1.2	9	1.5	1	0.4
Other motivations	6	0.7	3	0.5	3	1.2
Lonely	2	0.2	2	0.3	0	0.0

*multiple responses

Copyright by Mahidol University

Table 4.7 Pattern of drinking among current drinkers and ex-drinkers (cont.)

Pattern of drinking	Total (n=848)		Current drinker (n=601)		Ex-drinker (n=247)	
	Number	Percent	Number	Percent	Number	Percent
Cooperative person of drinking at first time*						
Friend	807	95.2	580	96.5	227	91.9
Relative	370	43.6	256	42.6	114	46.2
Sibling	56	6.6	36	6.0	20	8.1
Alone	22	2.6	14	2.3	8	3.2
Lover	11	1.3	7	1.2	4	1.6
Parent	7	0.8	0	0.0	7	2.8
Others	1	0.1	1	0.2	0	0.0

*multiple responses

Classifying age at start drinking by sex, male began drinking earlier than female, 84.0% and 53.2% of male and female started drinking at age below 25 years respectively. The most common type of alcohol at first drink for male was white spirits (46.7%), but female was beer (37.4%). Regarding reason of drinking, 88.0% and 77.7% of male and female was persuaded by friend respectively. It was also found that female drank with the reason of self-experiment more than male. The most common person whom they drinking with at first time was friend (Table 4.8).

Table 4.8 Pattern of drinking by sex

Pattern of drinking	Total (n=848)		Male (n=575)		Female (n=273)	
	Number	Percent	Number	Percent	Number	Percent
Age at start of drinking (years)						
7-14	109	12.9	96	16.7	13	4.8
15-24	519	61.2	387	67.3	132	48.4
25-44	192	22.6	88	15.3	104	38.1
45-64	26	3.1	4	0.7	22	8.1
> 65	2	0.2	0	0.0	2	0.7
Mean ± SD	21.3±8.6		19.0±5.9		26.2±11.0	

Copyright© by Chiang Mai University

Table 4.8 Pattern of drinking by sex (cont.)

Pattern of drinking	Total (n=848)		Male (n=575)		Female (n=273)	
	Number	Percent	Number	Percent	Number	Percent
Type of alcohol drinking at first time						
White spirit	396	46.7	320	55.7	76	27.8
Beer	188	22.2	86	15.0	102	37.4
Home-made liquor	100	11.8	91	15.8	9	3.3
Other types of beverage	64	7.5	49	8.5	15	5.5
Whiskey	37	4.4	20	3.5	17	6.2
Spy wine cooler	31	3.7	2	0.3	29	10.6
Medicated spirits	23	2.7	2	0.3	21	7.7
Wine	4	0.5	1	0.2	3	1.1
Cocktail	3	0.4	2	0.3	1	0.4
Chiang chun	2	0.2	2	0.3	0	0.0
Reason of drinking at first time*						
Friend's persuasion	721	85.0	516	89.7	205	75.1
Self-experiment	466	55.0	328	57.0	138	50.5
Drink for enjoyment	425	50.1	312	54.3	113	41.4
Sociability	300	35.4	201	35.0	99	36.3
To increase appetite	58	6.8	28	4.9	30	11.0
Family member drink	56	6.6	37	6.4	19	7.0
Relaxation	17	2.0	10	1.7	7	2.6
To relieve pain	10	1.2	3	0.5	7	2.6
Other motivations	6	0.7	2	0.3	4	1.5
Lonely	2	0.2	2	0.3	0	0.0
Cooperative person of drinking at first time*						
Alone	22	2.6	8	1.4	14	5.1
Friend	807	95.2	558	97.0	249	91.2
Lover	11	1.3	1	0.2	10	3.7
Parent	7	0.8	6	1.0	1	0.4
Sibling	56	6.6	29	5.0	27	9.9
Relative	370	43.6	241	41.9	129	47.3
Others	1	0.1	1	0.2	0	0.0

*multiple responses

Copyright by Mahidol Univ.

Drinking pattern of drinkers

Preference type of alcohol beverage was inquired among drinkers. About 48.6% and 32.8% informed white spirit and beer respectively. Male preferred white spirit (58.6%), but beer (45.4%) was rather common for female. Investigate further on reason of preference to those alcohol beverages, both male and female replied that it was easily to access 78.3% and 71.8% respectively. Some of them reported that it had good taste, good quality and low price. Advertisement, brand and image of product were also the reason of preference.

Time of drinking was also asked. The most common drinking time was after work or before dinner (85.7%), followed by 10.4% before breakfast. Friend's residence and own house were the most common places of drinking, 61.0% and 32.4% respectively. Friend (82.0%) was person the most common person they preferred to drink with. However, 7.0% preferred to drink with their relatives and 8.8% drink alone.

Amount of expense on alcohol drinking monthly, about half (49.3%) spent for drinking more than 500 Baht. Male (58.1%) spent more money for alcohol than female (30.8%). The median expense for alcohol drinking was 400 Baht a month as shown in Table 4.9.

Table 4.9 Drinking pattern of drinkers classified by sex

Pattern of drinking	Total (n=848)		Male (n=575)		Female (n=273)	
	Number	Percent	Number	Percent	Number	Percent
Preference type of alcohol beverage						
White spirit	412	48.6	337	58.6	75	27.5
Beer	278	32.8	154	26.8	124	45.4
Whiskey	68	8.0	45	7.8	23	8.4
Home-made liquor	33	3.9	27	4.7	6	2.2
Spy wine cooler	28	3.3	1	0.2	27	9.9
Medicated spirits	15	1.8	3	0.5	12	4.4
Other beverages	12	1.4	7	1.2	5	1.8
Wine	1	0.1	0	0.0	1	0.4
Chiang chun	1	0.1	1	0.2	0	0.0

Table 4.9 Drinking pattern of drinkers classified by sex(cont.)

Pattern of drinking	Total (n=848)		Male (n=575)		Female (n=273)	
	Number	Percent	Number	Percent	Number	Percent
Reason of preference						
Easy to buy	646	76.2	450	78.3	196	71.8
Frequent drink	101	11.9	68	11.8	33	12.1
Good taste	65	7.7	35	6.1	30	11.0
Good quality	17	2.0	13	2.3	4	1.5
Low price	5	0.6	3	0.5	2	0.7
Advertisement	3	0.4	2	0.3	1	0.4
Brand	2	0.2	1	0.2	1	0.4
Image of product	1	0.1	1	0.2	0	0.0
Other favorite reason	7	0.8	2	0.3	5	1.8
Preference time to drink						
Before dinner or after work	727	85.7	493	85.7	234	85.7
Before breakfast	88	10.4	67	11.7	21	7.7
During dinner	16	1.9	7	1.2	9	3.3
During lunch	6	0.7	3	0.5	3	1.1
Another time	6	0.7	2	0.3	4	1.5
Before lunch	3	0.4	3	0.5	0	0.0
During breakfast	2	0.2	0	0.0	2	0.7
Preference place to drink						
Friend’s house	517	61.0	346	60.2	171	62.6
Own house	275	32.4	197	34.3	78	28.6
Retail shop	37	4.4	20	3.5	17	6.2
Restaurant	8	0.9	4	0.7	4	1.5
Farmland	5	0.6	4	0.7	1	0.4
Village square	5	0.6	3	0.5	2	0.7
Rented house	1	0.1	1	0.2	0	0.0
Person whose you like to drinking with						
Friend	695	82.0	477	83.0	218	79.9
Alone	75	8.8	46	8.0	29	10.6
Relative	59	7.0	42	7.3	17	6.2
Family member	15	1.8	9	1.6	6	2.2
Lover	2	0.2	0	0.0	2	0.7
Singer or waiter	1	0.1	0	0.0	1	0.4
Others	1	0.1	1	0.2	0	0.0

Copyright © by Mahidol University

Table 4.9 Drinking pattern of drinkers classified by sex(cont.)

Pattern of drinking	Total (n=848)		Male (n=575)		Female (n=273)	
	Number	Percent	Number	Percent	Number	Percent
Expense of alcohol monthly						
< 500 Baht	430	50.7	241	41.9	189	69.2
≥ 500 Baht	418	49.3	334	58.1	84	30.8
Median (Min - Max)	400 (0 - 10,000)		500 (0 - 5,000)		300 (0 - 10,000)	

Attempt to quit among current drinkers, about 90.5% of the current drinkers had never attempted to quit at all and only 9.5% had ever such an attempt since they have been addicted to it and was not aware of its negative consequences. Reasons of those who had ever tried to quit but unable to quit successfully were friend's influence (80.7%), ability to control themselves (45.6%), psychological effects e.g. moody (21.1%) and increase stress (14.0%). Regarding advice to quit drinking, only 29.0% had ever received. Family member (78.7%) seemed to be the most important person followed by boyfriend/girlfriend (29.3%). Public health personnel, doctor/nurse, drinking cessation clinic, friend and monk also played roles on drinking among this group of population. 44.1% of the current drinkers reported that they are not intent to quit, 32.3% are not sure on quit drinking and only 23.6% had intention to quit by most of them plan to quit drinking within one to three years (Table 4.10).

Table 4.10 Attempt to quit drinking among current drinkers classified by sex

Pattern of drinking	Total (n=601)		Male (n=421)		Female (n=180)	
	Number	Percent	Number	Percent	Number	Percent
Attempt to quit						
No*	544	90.5	368	87.4	176	97.8
Drink as a habit	463	77.0	67	18.2	14	8.0
Surrounding people still drink	455	75.7	321	87.2	134	76.1
Other reasons	90	15.0	34	9.2	56	31.8
Not aware of negative penalty	37	6.2	28	7.6	9	5.1
Yes	57	9.5	53	12.6	4	2.2

*multiple responses

Table 4.10 Attempt to quit drinking among current drinkers classified by sex (cont.)

Pattern of drinking	Total (n=601)		Male (n=421)		Female (n=180)	
	Number	Percent	Number	Percent	Number	Percent
Number of quit attempts						
1	37	64.9	34	8.1	3	1.7
2	10	17.5	10	2.4	0	0.0
3	7	12.3	7	1.7	0	0.0
≥ 4	2	3.6	1	0.2	1	0.6
Median (Min - Max)	1 (1 - 11)		1 (1 - 10)		1 (1 - 11)	
Failure reason*						
Friends still drink	46	80.7	42	79.2	4	100.0
Not strong mind	26	45.6	23	43.4	3	75.0
Moody when quitted	12	21.1	10	18.9	2	50.0
Drinking decrease stress	8	14.0	8	15.1	0	0.0
Used as a habit	4	7.0	4	7.5	0	0.0
Others	6	10.5	6	11.3	0	0.0
Advice for quitting						
No	427	71.0	269	63.9	158	87.8
Yes	174	29.0	152	36.1	22	12.2
By whom*						
Family member	137	78.7	123	29.2	14	7.8
Lover	51	29.3	46	10.9	5	2.8
Public health personnel	23	13.2	16	3.8	7	3.9
Doctor/nurse	22	12.6	15	3.6	7	3.9
Friend	4	2.3	4	1.0	0	0.0
Monk	2	1.1	2	0.5	0	0.0
Drinking cessation clinic	1	0.6	1	0.2	0	0.0
Expecting to quit drinking in the future						
Not quit	265	44.1	190	45.1	75	41.7
Be not sure	194	32.3	123	29.2	71	39.4
Quit	142	23.6	108	25.7	34	18.9
Time limiting (years)						
1 - 3	88	14.6	69	16.4	19	10.6
4 - 6	30	5.0	24	5.7	6	3.3
> 6	24	4.0	15	3.6	9	5.0
Median (Min - Max)	1 (1 - 20)		1 (1 - 20)		1 (1 - 20)	

*multiple responses

Copyright © by Mahidol University

4.1.4 Knowledge on drinking and its related factors

Knowledge on drinking

Knowledge on consequence of drinking on health and drinking law was assessed. Majority (79.4%) was at the fair level, only 9.7% was at good level and 5.6% was at the poor level or at the level of needed to be improved. Knowledge on drinking law was much better than the knowledge of drinking on health effect. Only 4.4% was at good level of knowledge on health effect, while 89.9% was at good level on knowledge of drinking law (Table 4.11).

Table 4.11 Level of knowledge on drinking of 1,293 respondents

Knowledge	Good		Fair		Poor	
	Number	Percent	Number	Percent	Number	Percent
Total	195	9.7	1,026	79.4	72	5.6
Knowledge on health effect	57	4.4	1,143	88.4	93	7.2
Knowledge on law	1,162	89.9	124	9.6	7	0.5

Respondent characteristics in relation to knowledge on drinking

Knowledge of drinking on health effects and knowledge on drinking law were classified by respondent characteristics. The good level knowledge on consequence of drinking on health and drinking law seemed to decrease as an increasing of age but contradicted to an educational attainment and monthly income. Knowledge on health and drinking law of male and female were rather similar. Single respondent had better knowledge on drinking law but those married living apart seemed to have better knowledge on health effect of drinking, but knowledge on drinking law was not as good as others. Knowledge of an effect of alcohol consumption on health was similar between those with and without health problem, but knowledge on the law among those having no health problem was better than those having health problem. Considering current smoking status and the knowledge, the non-smokers had better knowledge on consequence of drinking than the smoker ones, but the knowledge on drinking law was not as good as the smoker. Having drinker in family did not seem to correlate with the knowledge on drinking but among those having more proportion of close friends drink seem to have better knowledge of health

effect on drinking. However knowledge on drinking law among those having close friends drink was better than having none as detailed shown in Table 4.12.

Table 4.12 Respondent characteristics and percent of level of knowledge on drinking

General characteristics	Total	Knowledge on health effect			Knowledge on law		
		Good	Fair	Poor	Good	Fair	Poor
Total samples	1,293	4.4	88.4	7.2	89.9	9.6	0.5
Age group in years							
15-24	322	5.0	83.9	11.2	96.6	3.1	0.3
25-44	323	4.6	90.1	5.3	97.5	2.5	0.0
45-64	328	4.3	89.9	5.8	86.0	13.4	0.6
65-75	320	3.8	89.7	6.6	79.4	19.4	1.3
Sex							
Male	641	4.7	87.7	7.6	92.4	7.3	0.3
Female	652	4.1	89.1	6.7	87.4	11.8	0.8
Educational attainment							
None education	57	1.8	87.7	10.5	78.9	19.3	1.8
Primary school	740	4.0	89.0	7.0	85.8	13.6	0.7
Secondary school	354	4.2	87.8	8.0	97.2	2.5	0.3
High school	21	8.2	88.8	3.1	96.9	3.1	0.0
Bachelor's degree and higher	31	9.4	81.3	9.4	100.0	0.0	0.0
Marital status							
Single	266	4.9	84.6	10.5	96.6	3.0	0.4
Married and living together	910	4.4	89.8	5.8	89.6	9.9	0.5
Married but living apart	11	18.2	72.7	9.1	63.6	27.3	9.1
Widowed	106	1.9	87.7	10.4	78.3	21.7	0.0
Monthly income							
0-4,999 Baht	660	3.8	87.9	8.3	84.4	14.7	0.9
5,000-9,999 Baht	424	4.0	90.6	5.4	95.3	4.5	0.2
10,000-14,999 Baht	141	5.0	87.2	7.8	95.0	5.0	0.0
15,000-19,999 Baht	30	10.0	86.7	3.3	100.0	0.0	0.0
≥ 20,000 Baht	38	13.2	78.9	7.9	97.4	2.6	0.0
Type of residence							
Own house	1,254	4.2	88.6	7.2	89.6	9.8	0.6
Relative's house	17	5.9	76.5	17.6	100.0	0.0	0.0
Rented House	22	13.6	86.4	0.0	95.5	4.5	0.0

Table 4.12 Respondent characteristics and percent of level of knowledge on drinking (cont.)

General characteristics	Total	Knowledge on health effect			Knowledge on law		
		Good	Fair	Poor	Good	Fair	Poor
Health problem							
No	873	4.4	88.2	7.4	92.6	7.0	0.5
Yes	420	4.5	88.8	6.7	84.3	15.0	0.7
Smoking status							
None smoker	915	4.8	88.1	7.1	88.9	10.5	0.7
Irregular smoker	34	0.0	82.4	17.6	97.1	2.9	0.0
Regular smoker	344	3.8	89.8	6.4	91.9	7.8	0.3
Proportion of family member drink							
None	569	4.9	88.8	6.3	88.0	11.4	0.5
0.1-20.0%	201	3.0	91.5	5.5	92.0	7.5	0.5
20.1-40.0%	377	4.2	85.7	10.1	91.8	7.7	0.5
> 40.0%	146	4.8	89.7	5.5	89.0	10.3	0.7
Having close friends							
No	211	7.1	91.0	1.9	71.1	27.5	1.4
Yes	1,082	3.9	87.9	8.3	93.5	6.1	0.4
Proportion of close friends drink							
None	412	2.9	89.1	8.0	82.5	16.5	1.0
0.1-30.0%	58	3.4	89.7	6.9	93.1	5.2	1.7
30.1-60.0%	277	4.7	89.5	5.8	93.9	6.1	0.0
> 60.0%	546	5.5	87.2	7.3	93.0	6.6	0.4

Knowledge on drinking and current drinking status

Considering knowledge on drinking in relation to current drinking status, the prevalence of current drinking seemed to be similar even in difference level of knowledge on drinking. But there was the difference of current drinking prevalence in knowledge on law, the better the knowledge on drinking law was the more the prevalence of current drinking. For prevalence heavy drinking, those at good and poor level of knowledge on health effect drank heavily more than those at the moderate level of knowledge, 9.1%, 10.4% and 8.8% respectively. In regards to the prevalence of heavy drinking by level of knowledge on drinking law, the better the knowledge on drinking law was the higher the heavy drinking prevalence (Table 4.13).

Table 4.13 Knowledge on drinking of respondents in relation to current drinking status

Knowledge	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Overall knowledge											
Good	15.8	31.4	*(3.37, 85.71)*	13.5	*(0.54, 81.75)*	18.0	*(0.69, 87.43)*	27.1	*(2.01, 87.09)*	10.0	*(0.41, 75.05)*
Fair	78.9	32.3	*(3.29, 86.96)*	17.3	*(0.78, 84.92)*	20.6	*(0.78, 89.46)*	21.3	*(1.41, 83.65)*	8.6	*(0.38, 69.82)*
Poor	5.3	35.9	*(3.19, 90.52)*	9.5	*(0.39, 73.51)*	25.4	*(0.98, 92.16)*	18.4	*(1.12, 81.83)*	10.7	*(0.55, 72.40)*
Knowledge on health effect											
Good	4.5	35.0	*(3.17, 89.86)*	16.6	*(0.68, 85.32)*	19.3	*(0.75, 88.39)*	19.9	*(1.26, 82.91)*	9.1	*(0.39, 72.03)*
Fair	88.6	31.9	*(3.27, 86.66)*	16.5	*(0.72, 84.22)*	20.7	*(0.79, 89.50)*	22.2	*(1.49, 84.23)*	8.8	*(0.39, 70.48)*
Poor	6.9	35.6	*(3.91, 88.23)*	14.0	*(0.61, 81.12)*	18.0	*(0.66, 87.82)*	22.1	*(1.55, 83.64)*	10.4	*(0.47, 73.91)*
Knowledge on law											
Good	92.5	31.9	*(3.29, 86.54)*	15.9	*(0.70, 83.66)*	20.6	*(0.79, 89.34)*	22.5	*(1.50, 84.66)*	9.1	*(0.40, 71.40)*
Fair	7.1	36.3	*(3.15, 90.86)*	21.7	*(0.90, 89.37)*	18.4	*(0.62, 89.09)*	17.2	*(1.18, 78.22)*	6.5	*(0.28, 63.24)*
Poor	0.3	69.9	*(6.22, 98.78)*	8.3	*(0.74, 52.01)*	21.9	*(0.40, 95.15)*	0.0		0.0	

4.1.5 Perception on drinking and its related factors

Perception on drinking

Perceived on severity and risk of drinking were measured and classified into 3 levels as illustrated in Table 4.14, and almost all of them or 98.3% and 98.4% were at the high level of perceived severity on drinking and perceived risk on drinking respectively.

Table 4.14 Number and percentage distribution of level of perceptions on drinking among 1,293 respondents

Perception on	High		Moderate		Low	
	Number	Percent	Number	Percent	Number	Percent
Severity	1,271	98.3	20	1.5	2	0.2
Risk	1,272	98.4	21	1.6	0	0.0

Respondent characteristics and perception on drinking

Perceived severity and perceived risk on alcohol drinking were classified by respondent characteristics. Since almost all of them were at high level of perception on severity and risk of alcohol consumption, therefore the characteristics of respondent did not seem to relate to both perceptions. Current smoking status, proportion of family members' and closed friends' drink were not associated to perceptions on both severity and risk of alcohol consumption (Table 4.15).

Table 4.15 Generalcharacteristics of respondents classified by level of perception

General characteristics	Total samples	Perceived severity			Perceived risk	
		High	Moderate	Low	High	Moderate
Total samples	1,293	98.3	1.5	0.2	98.4	1.6
Age group in years						
15-24	322	99.7	0.3	0.0	99.1	0.9
25-44	323	98.5	1.2	0.3	98.5	1.5
45-64	328	97.9	1.8	0.3	98.2	1.8
65-75	320	97.2	2.8	0.0	97.8	2.2

Table 4.15 Generalcharacteristics of respondent classified by level of perception (cont.)

General characteristics	Total samples	Perceived severity			Perceived risk	
		High	Moderate	Low	High	Moderate
Sex						
Male	641	98.0	1.9	0.2	97.5	2.5
Female	652	98.6	1.2	0.2	99.2	0.8
Educational attainment						
None education	57	98.2	1.8	0.0	100.0	0.0
Primary school	745	98.0	1.9	0.1	98.0	2.0
Secondary school	361	98.3	1.4	0.3	98.3	1.7
High school	98	100.0	0.0	0.0	100.0	0.0
Bachelor's degree and higher	32	100.0	0.0	0.0	100.0	0.0
Marital status						
Single	266	98.9	1.1	0.0	98.5	1.5
Married and living together	910	98.0	1.8	0.2	98.2	1.8
Married but living apart	11	100.0	0.0	0.0	100.0	0.0
Widow	106	99.1	0.9	0.0	99.1	0.9
Level of income						
0-4,999 Baht	660	98.2	1.7	0.2	98.3	1.7
5,000-9,999 Baht	424	99.1	0.9	0.0	98.6	1.4
10,000-14,999 Baht	141	95.7	3.5	0.7	97.2	2.8
15,000-19,999 Baht	30	100.0	0.0	0.0	100.0	0.0
20,000 Baht and over	38	100.0	0.0	0.0	100.0	0.0
Type of residence						
Own house	1,254	98.3	1.6	0.1	98.4	1.6
Relative's house	17	94.1	0.0	5.9	94.1	5.9
Rented House	22	100.0	0.0	0.0	100.0	0.0
Health problem						
No	873	99.1	0.8	0.1	98.6	1.4
Yes	420	96.7	3.1	0.2	97.9	2.1
Smoking status						
None smoke	915	98.8	1.0	0.2	99.0	1.0
Regular smoke	344	97.4	2.6	0.0	96.5	3.5
Irregular smoke	34	94.1	5.9	0.0	100.0	0.0

Copyright by Mahidol Univ.

Table 4.15 Generalcharacteristics of respondent classified by level of perception (cont.)

General characteristics	Total samples	Perceived severity			Perceived risk	
		High	Moderate	Low	High	Moderate
Having drinker in family						
No	569	98.4	1.4	0.2	98.2	1.8
Yes	724	98.2	1.7	0.1	98.5	1.5
Proportion of family member drink						
None	569	98.4	1.4	0.2	98.2	1.8
0.1-20.0%	201	96.5	3.0	0.5	98.5	1.5
20.1-40.0%	377	98.9	1.1	0.0	98.7	1.3
> 40.0%	146	98.6	1.4	0.0	97.9	2.1
Having close friends						
No	211	99.5	0.5	0.0	100.0	0.0
Yes	1,082	98.1	1.8	0.2	98.1	1.9
Close friends drink						
No	412	99.0	1.0	0.0	100.0	0.0
Yes	881	98.0	1.8	0.2	97.6	2.4
Proportion of friend drink						
None	412	99.0	1.0	0.0	100.0	0.0
0.1-30.0%	58	96.6	3.4	0.0	98.3	1.7
30.1-60.0%	277	97.8	1.8	0.4	98.6	1.4
> 60.0%	546	98.2	1.6	0.2	97.1	2.9

Perception on drinking and drinking status

The relationships between each dimension of drinking and drinking status were described in Table 4.16. Respondents who were at low and moderate levels of perceived severity on drinking and risk on drinking seemed to be the drinkers more than those who were at high level. In addition, prevalence of heavy drinking among those at low and moderate level of both perceptions was higher than those at high level.

Copyright by Mahidol University

Table 4.16 Perceptions of respondents classified by drinking status

Perceptions	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Perceived severity											
High	98.4	32.7	*(3.31, 87.28)*	16.3	*(0.72, 84.04)*	20.6	*(0.79, 89.51)*	22.2	*(1.51, 84.08)*	8.2	*(0.36, 68.76)*
Moderate	1.4	12.8	*(1.56, 57.71)*	12.0	*(0.29, 86.35)*	8.1	*(0.28, 73.02)*	16.5	*(0.41, 90.42)*	50.6	*(3.44, 96.72)*
Low	0.2	0.0		36.9	*(0.65, 98.12)*	0.0		0.0		63.1	*(1.88, 99.35)*
Perceived risk											
High	98.4	32.8	*(3.33, 87.38)*	16.5	*(0.73, 84.28)*	20.7	*(0.79, 89.53)*	21.8	*(1.48, 83.83)*	8.2	*(0.36, 68.57)*
Moderate	1.6	2.1	*(0.29, 13.49)*	2.1	*(0.05, 48.19)*	5.2	*(0.16, 64.51)*	36.8	*(0.91, 97.35)*	53.9	*(1.93, 98.58)*

Knowledge and perception

Knowledge of drinking on health effects and drinking law in relation to perception was depicted in Table 4.17. The respondents at good level of knowledge ofhealth consequences on drinking seemed to have a better perception on severity and risk, but those who were at poor level of knowledge on drinking law seemed to have low perception on severity of alcohol drinking than those who were at good level of knowledge on it.

Table 4.17 Percentage of knowledge on drinking of 1,293 respondents classified by level of perception

Perception	Total samples	Knowledge on health effect			Knowledge on law		
		Good	Fair	Poor	Good	Fair	Poor
Total	1,293	57	1,143	93	1,162	124	7
Perceived severity							
High	1,271	100.0	98.2	98.9	98.8	94.4	85.7
Moderate	20	0.0	1.7	1.1	1.0	5.6	14.3
Low	2	0.0	0.2	0.0	0.2	0.0	0.0
Perceived risk							
High	1,272	100.0	98.3	98.9	98.7	95.2	100.0
Moderate	21	0.0	1.7	1.1	1.3	4.8	0.0

4.1.6 Drinking refusal self-efficacy and its related factors

Drinking refusal self-efficacy

An ability of population to prevent his/herself from drinking was examined, and then classified into three levels: high, moderate and low self-efficacy. Only 4.2% was at the low level of self-efficacy and 77.3% was at the high level as shown in Table 4.18.

Copyright by Mahidol University

Table 4.18 Number and percentage of drinking refusal self-efficacy level among 1,293 respondents

Level of self-efficacy	Number	Percent
High	999	77.3
Moderate	240	18.6
Low	54	4.2

Respondent characteristics and drinking refusal self-efficacy

Self-efficacy or ability to refuse alcohol drinking was cross-classified by various characteristics of the respondent was illustrated in Table 4.19. It was found that the level of drinking refusal self-efficacy was increased as an increasing of age. Female was at better level of the self-efficacy than male (89.3% and 65.1% respectively). The higher the educational attainment was the lesser the proportion of ability to refuse. Regarding marital status, the high level of self-efficacy among those single was lower than those non-single respondents.

Monthly income and drinking refusal self-efficacy, the respondents who earned more a month seemed to have less ability on drinking refusal self-efficacy than those who earned less.

The respondent having health problem seemed to have level of drinking refusal self-efficacy more than those without health problem (88.6% and 71.8% respectively). Those who responded of being regular smokers, 52.0% were at high level as compared to the non-smoker that 87.3% was at high level of self-efficacy. It can be concluded that the non-smokers had ability to control themselves not to drink better than those who were smokers.

Having drinker in family did not seem to relate to drinking refusal self-efficacy. However, those who had more proportion of close friends being the drinker were at less level of self-efficacy. It can be concluded that the higher the ratio of close friends drink was the lesser the self-efficacy.

Table 4.19 General characteristics of respondents classified by drinking refusal self-efficacy level

General characteristics	Total samples	Percentage of self-efficacy		
		High	Moderate	Low
Total samples	1,293	77.3	18.6	4.2
Age group in years				
15-24	322	64.9	28.3	6.8
25-44	323	72.8	22.3	5.0
45-64	328	81.1	16.5	2.4
65-75	320	90.3	7.2	2.5
Sex				
Male	641	65.1	28.2	6.7
Female	652	89.3	9.0	1.7
Educational attainment				
None education	57	93.0	7.0	0.0
Primary school	745	80.5	15.6	3.9
Secondary school	361	65.9	28.0	6.1
High school	98	87.8	10.2	2.0
Bachelor's degree and higher	32	68.8	28.1	3.1
Marital status				
Single	266	55.6	35.7	8.6
Married and living together	910	81.6	15.1	3.3
Married but living apart	11	81.8	18.2	0.0
Widowed	106	93.4	5.7	0.9
Level of income				
< 5,000 Baht	660	81.2	14.7	4.1
5,000-9,999 Baht	424	69.1	25.7	5.2
10,000-14,999 Baht	141	80.9	15.6	3.5
15,000-19,999 Baht	30	76.7	23.3	0.0
≥ 20,000 Baht	38	86.8	13.2	0.0
Type of residence				
Own house	1,254	77.4	18.3	4.2
Relative's house	17	64.7	29.4	5.9
Rented House	22	77.3	22.7	0.0
Health problem				
Do not have	873	71.8	22.7	5.5
Have	420	88.6	10.0	1.4
Smoking status				
None smoke	915	87.3	10.8	1.9
Regular smoke	344	52.0	37.5	10.5
Irregular smoke	34	61.8	35.3	2.9

Table 4.19 General characteristics of respondents classified by drinking refusal self-efficacylevel(cont.)

General characteristics	Total samples	Percentage of self-efficacy		
		High	Moderate	Low
Having drinker in family				
No	569	78.7	18.3	3.0
Yes	724	76.1	18.8	5.1
Proportion of family member drink				
None	569	78.7	18.3	3.0
0.1-20.0%	201	79.1	15.9	5.0
20.1-40.0%	377	77.2	17.8	5.0
> 40.0%	146	69.2	25.3	5.5
Having close friends				
No	211	98.1	1.9	0.0
Yes	1,082	73.2	21.8	5.0
Close friends drink				
No	412	96.6	2.7	0.7
Yes	881	68.2	26.0	5.8
Proportion of friend drink				
None	412	96.6	2.7	0.7
0.1-30.0%	58	93.1	6.9	0.0
30.1-60.0%	277	82.7	16.2	1.1
> 60.0%	546	58.2	33.0	8.8

Drinking refusal self-efficacy and drinking status

Ability to control his/her self to refuse to drink in relation to the current drinking status was tabulated and presented in Table 4.20. It was remarkable that those having lower self-efficacy were more likely to be the current drinker than those at the high level of the self-efficacy, the prevalence of current drinking were 94.1%, 93.0% and 37.2% respectively. Likewise, the lesser the self-efficacy was the higher the prevalence of heavy drinking. It was interesting to note that those at high level of self-efficacy were able to quit drinking (21.0%) more than those at moderate and low level.

Copyright by Mahidol University

Table 4.20 Level of drinking refusal self-efficacy classified by drinking status

Self-efficacy	Total	Never drinking	Ever drinking	Mild drinking	Moderate drinking	Heavy drinking
	Percent	Percent *(95% CI)*	Percent *(95% CI)*	Percent *(95% CI)*	Percent *(95% CI)*	Percent *(95% CI)*
Self-efficacy						
High	74.6	41.8 *(4.04, 92.45)*	21.0 *(0.91, 88.56)*	19.3 *(0.66, 89.54)*	17.1 *(1.12, 78.80)*	0.9 *(0.04, 16.31)*
Moderate	20.8	4.1 *(0.39, 31.99)*	2.9 *(0.10, 48.48)*	28.0 *(1.10, 93.15)*	42.1 *(2.10, 96.08)*	22.9 *(0.72, 92.44)*
Low	4.5	5.9 *(0.36, 52.4)*	0.0	4.5 *(0.10, 70.06)*	12.2 *(0.27, 87.44)*	77.4 *(8.83, 99.18)*

4.1.7 Accessibility to alcohol

Accessibility to alcohol beverages, almost all of them (98.0%) informed that alcohol beverages was easy to access to since it was available everywhere nearby their residence and work place. It was interesting that some of respondents bought alcohol from illegal liquor or home-made liquor shop. However, only 0.7% reported of selling alcohol beverage according to the law permitted time.

Most of the respondents (89.1%) informed that an increasing price of alcohol beverage would not have any effect to their drinking, 86.1% confirmed continue buying even expensive and 18.7% response of buying in small portion liquor instead a bottle. However, only 10.1% informed that an increasing price had an effect on their drinking, 7.7% and 2.6% informed of decreasing and trying to quit drinking respectively (Table 4.21).

Table 4.21 Accessibility to alcohol classified by sex

Accessibility	Total (n=1,293)		Male (n=641)		Female (n=652)	
	Number	Percent	Number	Percent	Number	Percent
Accessibility to alcohol beverages						
Easy*	1,267	98.0	633	98.8	634	97.2
Having retail shop near home	1,016	78.6	500	78.0	516	79.1
Having several retail shops near home	791	61.2	395	61.6	396	60.7
Let someone buying	287	22.2	176	27.5	111	17.0
Having retail shop near work place	277	21.4	158	24.6	119	18.3
Never be refused to buy alcohol	253	19.6	177	27.6	76	11.7
Having several retail shops near work place	123	9.5	70	10.9	53	8.1
Other simple ways to get access to alcohol	30	2.3	16	2.5	14	2.1
Uneasy*	26	2.0	8	1.2	18	2.8
Far from home	20	1.5	6	0.9	14	2.1
Ever been refused buying	14	1.1	5	0.8	9	1.4
Other reasons	1	0.1	0	0.0	1	0.2

*multiple responses

Table 4.21 Accessibility to alcohol classified by sex (cont.)

Accessibility	Total (n=1,293)		Male (n=641)		Female (n=652)	
	Number	Percent	Number	Percent	Number	Percent
Buying places*						
Retail shop	1,293	100.0	641	100.0	652	100.0
Wholesale shop	91	7.0	51	8.0	40	6.1
Illegal liquor shop	2	0.2	1	0.2	1	0.2
Time to sell alcohol						
All the time	38	2.9	25	3.9	13	2.0
06.00-20.00	11	0.9	4	0.6	7	1.1
06.00-24.00	1,235	95.5	608	94.9	627	96.2
11.00-14.00 and 17.00-24.00	9	0.7	4	0.6	5	0.8
Increase the price have an effect on drinking						
No*	1,152	89.1	578	90.2	574	88.0
Buying even if it's expensive	1,113	86.1	563	87.8	550	84.4
Divided buying	242	18.7	147	22.9	95	14.6
Drink home-made liquor	4	0.3	1	0.2	3	0.5
Others	50	3.9	20	3.1	30	4.6
Yes*	141	10.9	63	9.8	78	12.0
Decreasing in drinking	100	7.7	43	6.7	57	8.7
Trying to quit drinking	33	2.6	17	2.7	16	2.5
Other effects	14	1.1	6	0.9	8	1.2

*multiple responses

Accessibility to alcohol and drinking status

The prevalence of current drinker among those easily access to alcohol beverage was 52.1% while among those informed un-easily access to alcohol was not current drinker. For access time to alcohol beverage, prevalence of current dinking among those could access to alcohol all the time was the highest (72.9%) and 35.3% were heavy drinking. An effect of increasing price of alcohol beverage and drinking status was examined. The prevalence of current drinking and heavy drinking among those informed increasing price had an effect on drinking were 49.4% and 6.8% respectively. Considering the prevalence of current and heavy drinking among those reported that increasing price had no effect on their drinking were 51.6% and 9.2% respectively (Table 4.22).

Table 4.22 Accessibility to alcohol classified by drinking status

Accessibility	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Accessibility to alcohol beverages											
Easy*	98.6	31.4	*(3.18, 86.49)*	16.5	*(0.72, 84.23)*	20.7	*(0.79, 89.47)*	22.4	*(1.51, 84.39)*	9.0	*(0.40, 71.16)*
Having retail shop near house	80.3	32.6	*(3.24, 87.46)*	16.7	*(0.72, 84.57)*	21.0	*(0.80, 89.68)*	20.4	*(1.33, 82.97)*	9.4	*(0.42, 71.53)*
Having several retail shops near house	62.9	32.4	*(3.43, 86.60)*	15.9	*(0.68, 83.87)*	19.1	*(0.71, 88.51)*	22.1	*(1.42, 84.84)*	10.6	*(0.48, 74.44)*
Let someone buying	24.0	16.0	*(1.48, 70.66)*	14.6	*(0.64, 81.99)*	26.1	*(1.16, 91.38)*	23.7	*(1.41, 87.02)*	19.7	*(0.91, 86.68)*
Having retail shop near work place	21.8	22.7	*(2.29, 78.55)*	17.5	*(0.75, 85.54)*	20.1	*(0.79, 88.82)*	32.3	*(2.60, 89.49)*	7.5	*(0.28, 70.37)*
Never been refused to buy alcohol	21.9	8.7	*(0.74, 54.83)*	14.5	*(0.56, 83.47)*	27.5	*(1.31, 91.51)*	29.6	*(1.67, 91.24)*	19.8	*(0.80, 88.23)*
Having several retail shops near work place	9.7	26.2	*(2.88, 80.86)*	9.7	*(0.44, 72.58)*	18.3	*(0.68, 87.95)*	33.6	*(2.02, 92.52)*	12.3	*(0.47, 80.54)*
Other simple ways to get access to alcohol	2.2	42.2	*(7.36, 87.00)*	17.8	*(0.92, 83.43)*	18.2	*(0.63, 88.57)*	21.9	*(1.69, 82.06)*	0.0	

*multiple responses

Table 4.22 Accessibility to alcohol classified by drinking status (cont.)

Accessibility	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Uneasy*	1.4	93.7	*(33.86, 99.77)*	6.3	*(0.23, 66.14)*	0.0		0.0		0.0	
Far from home	1.0	88.7	*(0.00, 100.0)*	11.3	*(0.00, 100.0)*	0.0		0.0		0.0	
Ever been refused buying	1.0	100.0		0.0		0.0		0.0		0.0	
Other reasons	0.0	100.0		0.0		0.0		0.0		0.0	
Buying places*											
Retail shop	100.0	32.1	*(3.16, 87.22)*	16.6	*(0.73, 84.30)*	20.6	*(0.78, 89.54)*	21.7	*(1.44, 84.05)*	9.0	*(0.40, 70.92)*
Wholesale shop	7.3	24.9	*(2.70, 79.79)*	18.9	*(0.76, 87.65)*	20.7	*(0.78, 89.61)*	22.6	*(1.46, 85.12)*	13.0	*(0.55, 79.97)*
Illegal liquor shop	0.1	71.5	*(6.50, 98.91)*	0.0		28.5	*(1.09, 93.50)*	0.0		0.0	
Time to sell alcohol											
All the time	3.6	22.9	*(3.22, 72.69)*	4.2	*(0.15, 55.36)*	11.3	*(0.39, 80.48)*	26.3	*(1.24, 91.02)*	35.3	*(1.78, 94.27)*
06.00-20.00	0.8	46.0	*(5.15, 93.03)*	0.0		34.0	*(1.20, 95.60)*	20.1	*(1.21, 83.76)*	0.0	
06.00-24.00	94.9	32.5	*(3.24, 87.38)*	16.9	*(0.74, 84.71)*	20.6	*(0.78, 89.45)*	22.1	*(1.50, 84.03)*	8.0	*(0.35, 68.06)*
11.00-14.00 and 17.00-24.00	0.6	41.2	*(3.59, 92.98)*	12.7	*(0.59, 77.98)*	33.4	*(0.98, 96.22)*	0.0		12.7	*(0.46, 81.88)*

*multiple responses

Table 4.22 Accessibility to alcohol classified by drinking status (cont.)

Accessibility	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Increase the price have an effect on drinking											
NO*	89.5	31.8	*(3.16, 86.99)*	16.6	*(0.73, 84.26)*	20.6	*(0.78, 89.45)*	21.9	*(1.47, 84.03)*	9.2	*(0.41, 71.33)*
Buying even if it's expensive	96.9	31.9	*(3.15, 87.07)*	16.6	*(0.73, 84.25)*	20.6	*(0.78, 89.52)*	21.6	*(1.45, 83.76)*	9.3	*(0.42, 71.67)*
Divided buying	20.2	29.7	*(3.34, 83.81)*	16.5	*(0.82, 82.38)*	12.5	*(0.42, 82.93)*	27.8	*(1.78, 89.09)*	13.5	*(0.55, 81.66)*
Drink home-made liquor	0.3	100.0		0.0		0.0		0.0		0.0	
Others	3.7	43.6	*(3.54, 94.22)*	18.9	*(0.86, 86.29)*	21.4	*(0.76, 90.57)*	16.1	*(0.60, 85.79)*	0.0	
Yes*	10.5	36.4	*(4.73, 86.78)*	14.2	*(0.60, 81.86)*	19.2	*(0.76, 88.08)*	23.5	*(1.66, 84.78)*	6.8	*(0.28, 65.33)*
Decreasing in drinking	66.7	36.9	*(5.80, 84.71)*	13.9	*(0.67, 79.56)*	19.2	*(1.01, 84.71)*	24.3	*(2.14, 82.53)*	5.7	*(0.23, 61.58)*
Trying to quit drinking	29.5	23.6	*(2.76, 76.97)*	14.5	*(0.56, 83.54)*	16.8	*(0.69, 85.27)*	33.2	*(3.00, 88.86)*	12.0	*(0.45, 80.70)*
Other effects	9.3	13.3	*(1.23, 65.21)*	21.3	*(0.76, 90.54)*	36.3	*(2.20, 93.52)*	29.1	*(1.43, 92.08)*	0.0	

*multiple responses

4.1.8 Availability of information on anti-drinking

For health warning messages, majority (89.4%) had ever seen the messages. They were inquired further about feeling when having seen the warning messages, most of respondents reported of having no any feeling to drink (60.6%), followed by un-wanted to drink. Considering quit drinking campaign, 91.3% had ever heard about it. The most common four sources of the anti-drinking campaign were television (89.1%), posters (40.1%), newspaper (36.5%) and radio (30.1%). Frequency of having seen the messages, about three-forth had ever seen once a week, about one-fourth once a month and only 5.4% once in every 2-3 months (Table 4.23).

Table 4.23 Availability of information on anti-drinking classified by sex

Availability	Total (n=1,293)		Male (n=641)		Female (n=652)	
	Number	Percent	Number	Percent	Number	Percent
Ever seen health warning poster						
No	137	10.6	70	10.9	67	10.3
Yes	1,156	89.4	571	89.1	585	89.7
Feeling about warning poster						
No feeling	701	60.6	430	75.3	271	46.3
Do not need drinking	386	33.4	98	17.2	288	49.2
Want to quit drinking	50	4.3	31	5.4	19	3.2
Quit drinking	19	1.6	12	2.1	7	1.2
Have you ever seen quit drinking campaign						
No	113	8.7	58	9.0	55	8.4
Yes	1,180	91.3	583	91.0	597	91.6
Source of anti-drinking campaign*						
Television	1,152	89.1	569	88.8	583	89.4
Poster or Brochure	519	40.1	228	35.6	291	44.6
Newspaper	472	36.5	246	38.4	226	34.7
Radio	389	30.1	188	29.3	201	30.8
Internet	67	5.2	27	4.2	40	6.1
Magazine	24	1.9	14	2.2	10	1.5
Other medias	8	0.6	2	0.3	6	0.9
Average times to see anti-drinking campaign						
Once a week	851	72.1	425	66.3	426	65.3
Once a month	266	22.5	131	20.4	135	20.7
More than 2-3 month	64	5.4	28	4.4	36	5.5

*multiple responses

Availability of information on anti-drinking and drinking status

Possibility to access to information on anti-drinking in relation to the current drinking status was depicted in Table 4.24. The prevalence of current drinking among those had seen the warning messages was higher than those had never seen the warning (52.3% and 40.1% respectively) but contradicted to the prevalence of heavy drinking (8.7% and 11.6% respectively). Even some of them informed that they want to quit drinking when having seen the warning messages but they still continue drinking. For those having no any feeling when they saw the warning, the prevalence of current drinking and heavy drinking were 69.3% and 12.7%. Having seen the quit drinking campaign seemed to have some relationship to heavy drinkers. For those never heard the quit drinking campaign drank heavily more than those ever heard the campaign (16.2% and 8.5% respectively). However, about half (52.2%) were the prevalence of current drinking among those ever heard the anti-drinking campaign. It can be concluded that having seen both health warning messages and anti-drinking campaign effect to heavy drinking not to current drinking.

Copyright by Mahidol University

Table 4.24 Availability of information on anti-drinking classified by drinking status

Availability	Total	Never drinking		Ever drinking		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Have you ever seen warning poster?											
No	7.4	42.0	*(5.82, 89.44)*	17.9	*(0.75, 86.25)*	9.2	*(0.34, 75.11)*	19.3	*(1.38, 80.22)*	11.6	*(0.56, 75.44)*
Yes	92.6	31.5	*(3.14, 86.74)*	16.2	*(0.71, 83.99)*	21.3	*(0.82, 89.87)*	22.3	*(1.49, 84.44)*	8.7	*(0.38, 70.37)*
Feeling about warning poster											
No feeling	61.9	14.9	*(1.26, 70.64)*	15.8	*(0.69, 83.56)*	24.7	*(1.06, 90.90)*	31.9	*(2.02, 91.43)*	12.7	*(0.49, 81.07)*
Do not need drinking	32.3	67.0	*(7.72, 98.01)*	17.3	*(0.59, 88.07)*	13.0	*(0.33, 87.19)*	2.1	*(0.09, 33.87)*	0.7	*(0.03, 12.24)*
Want to quit drinking	4.6	8.0	*(0.44, 63.44)*	11.0	*(0.31, 83.10)*	37.9	*(1.81, 95.28)*	30.6	*(1.67, 91.95)*	12.6	*(0.40, 83.81)*
Quit drinking	1.2	25.2	*(2.14, 83.86)*	60.0	*(6.50, 97.00)*	3.2	*(0.05, 67.68)*	11.6	*(0.82, 67.49)*	0.0	
Have you ever seen quit drinking campaign?											
No	5.9	42.6	*(5.68, 90.12)*	19.3	*(0.83, 87.34)*	9.9	*(0.37, 76.35)*	12.1	*(0.74, 71.77)*	16.2	*(0.85, 81.18)*
Yes	94.1	31.7	*(3.17, 86.76)*	16.1	*(0.70, 83.96)*	21.1	*(0.81, 89.75)*	22.7	*(1.53, 84.68)*	8.5	*(0.37, 69.73)*
Availability media*											
Television	98.1	31.6	*(3.13, 86.84)*	16.5	*(0.74, 84.01)*	21.1	*(0.81, 89.73)*	22.6	*(1.54, 84.53)*	8.3	*(0.35, 69.55)*
Poster or Brochure	45.1	37.0	*(3.63, 90.19)*	13.8	*(0.53, 82.70)*	24.0	*(0.93, 91.40)*	16.4	*(1.03, 78.75)*	8.7	*(0.40, 69.46)*
Newspaper	40.6	27.5	*(2.79, 83.41)*	17.0	*(0.76, 84.59)*	20.2	*(0.76, 89.32)*	28.8	*(2.10, 88.45)*	6.4	*(0.25, 65.33)*
Radio	32.5	35.3	*(3.63, 88.76)*	19.8	*(0.89, 87.25)*	19.9	*(0.74, 89.21)*	15.7	*(1.00, 77.43)*	9.4	*(0.41, 72.42)*
Internet	5.8	47.5	*(4.48, 94.58)*	3.5	*(0.10, 55.44)*	23.1	*(0.77, 92.09)*	15.1	*(0.62, 83.51)*	10.8	*(0.50, 74.56)*
Magazine	2.4	20.1	*(2.18, 73.89)*	8.3	*(0.23, 78.63)*	24.3	*(0.85, 92.32)*	29.5	*(1.70, 90.95)*	17.9	*(0.70, 87.10)*
Other medias	0.7	40.7	*(3.13, 93.56)*	12.4	*(0.58, 77.15)*	36.3	*(1.38, 95.90)*	10.7	*(0.88, 61.48)*	0.0	

*multiple responses

Table 4.24 Availability of information on anti-drinking classified by drinking status (cont.)

Availability	Total	Never drink		Ever drink		Mild drinking		Moderate drinking		Heavy drinking	
	Percent	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*	Percent	*(95% CI)*
Average times to see anti-drinking campaign											
None	5.8	43.5	*(5.81, 90.58)*	19.8	*(0.84,87.76)*	10.1	*(0.37, 76.93)*	12.4	*(0.78, 71.69)*	14.3	*(0.74, 78.69)*
More than 2-3 month	5.1	41.9	*(4.38, 91.89)*	6.7	*(0.23, 68.9)*	20.7	*(0.80, 89.36)*	17.0	*(0.99, 80.70)*	13.8	*(0.56, 81.79)*
Once a month	21.0	30.3	*(3.38, 84.36)*	16.1	*(0.69, 84.01)*	20.6	*(0.85, 88.71)*	21.5	*(1.47, 83.43)*	11.6	*(0.53, 76.35)*
Once a week	68.1	31.3	*(3.02, 86.94)*	16.8	*(0.74, 84.61)*	21.2	*(0.79, 90.07)*	23.4	*(1.56, 85.36)*	7.3	*(0.32, 66.00)*

4.2 Characteristics of villages

Total of 40 villages were randomly enrolled into the study. The whole structure of studied villages featured 38,169 population were 19,123 males and 19,046 females (50.1% and 49.9%, respectively) in 6 group of ages in years were less than 15, 15-24, 25-44, 45-64, 65-84 and 85 and over showed that most population were in early adulthood likely both males and females (33.1% and 32.0%) followed by middle adulthood (21.1% and 21.6%) and the smallest population were in elder which had similar pattern in all of studied villages.

A total of 40 villages were randomly enrolled at the first stage of PPS two-stage cluster sampling into study. Proportion of village located in non-municipal area was higher than municipal area (70.0% and 30.0%, respectively). There were 4 languages; Isan, Thai-Korat, Thai and Khmer use for communication in the studied district. Only 15 out of 40 villages use only one language for communication either Isan or Thai-Korat. The rest use two or more languages for communication among villagers. The most common two languages were Isan and Thai-Korat.

The most common occupation in village was rice farming, followed by crop farming and labor, 82.5%, 15.0% and 2.5% respectively.

Availability of alcohol in the village was also inquired from community leader and observed by the researcher, there existed shops selling beverages in all villages, at least 2 to 12 shops. Therefore the ratio of shops selling beverages to total households the village ranged from 1.1-6.4%. All villages informed that liquor was always available in wedding ceremony, New Year celebration and Songkran or water festival. Three activities that all villages reported of alcohol free were worship a deity, candle procession on Buddhist lent day and political election activities. Most of the villages, 87.5%, served alcohol in funeral ceremony, followed by the day whenever having a long weekend that people tended to celebrate continuously.

Copyright by Mahidol University

Health promoting village program has been promoted throughout the country. Anti-alcohol consumption, one component in drug addiction control is a part

of health promoting program implemented in the village. Supporting from any organization on anti-alcohol drinking campaign in the village was inquired from the community representative. About one third or 30.0% informed of receiving some support. About 37.5% of the villages responded of having an anti-drinking activity in the last one year. The most common source of information on effect of drinking and drinking law was poster/ announcement notice. Since majority are Buddhism, temples and monks played an important role on the success of quit drink.

Drinking status of village leader, 32.5% informed of never drink, 12.5% was regular drink and 42.5% was occasional drinking. However 12.5% reported of ever drink but has already quit. Although, village leaders have varied drinking status but all of them agree to support anti-drinking policy. Detailed shown in Table 4.25.

Table 4.25 Number and percent of general characteristics of 40 villages

Characteristics	Number	Percent
Type of village		
Municipal area	12	30.0
Non-municipal area	28	70.0
Language use		
Isan language	7	17.5
Thai-Korat language	8	20.0
Isan and Khmer language	2	5.0
Isan and Thai-Korat language	14	35.0
Khmer and Thai-Korat language	1	2.5
Thai, Isan and Thai-Korat language	2	5.0
Isan, Khmer and Thai-Korat language	6	15.0
Occupation		
Rice farming	33	82.5
Crop-farming	6	15.0
Labor	1	2.5

Copyright by Mahidol University

Table 4.25 Number and percent of general characteristics of 40 villages (cont.)

Characteristics	Number	Percent
Alcohol beverage shop		
2-4 shops	18	45.0
5-7 shops	15	37.5
8-10 shops	6	15.0
11-12 shops	1	2.5
Median (Min - Max)	5 (2 - 12)	
Housing and selling liquor shop ratio		
0-2.49%	19	47.5
2.5-4.49%	18	45.0
4.5% and over	3	7.5
Median (Min - Max)	2.53 (1.1 - 6.4)	
Village activities lead to drink		
Wedding ceremony	40	100.0
New year celebration	40	100.0
Songkran or water festival	40	100.0
Funeral	35	87.5
Long weekend	25	62.5
Worship a shrine of ancestor	23	57.5
Having visitors	22	55.0
Ordination ceremony	21	52.5
Community sport	16	40.0
LoiKrathong Day	13	32.5
Rocket festival	13	32.5
Religious ceremony	13	32.5
Working celebration	12	30.0
Seasonal festival	11	27.5
Other activities	10	25.0
Exorcise ceremony	4	10.0
Rite of spirits and the angels	2	5.0
Valentine's Day	1	2.5
Kathin ceremony	1	2.5
Worship a deity	0	0.0
Candle procession in Buddhist lent	0	0.0
Political election activities	0	0.0

Table 4.25 Number and percent of general characteristics of 40 villages (cont.)

Characteristics	Number	Percent
The level of village activities lead to drink		
4-6 activities	7	17.5
7-10 activities	24	60.0
11-16 activities	9	22.5
Median (Min - Max)	8 (4 - 16)	
Health promoting village program		
Sub-district Health Promoting Hospital		
Have	14	35.0
Do not have	26	65.0
The nearest distance; Mean (Min - Max)	2.6 (1.0 - 5.0)	
Community Empowerment Program		
Yes	18	45.0
No	22	55.0
Supportive help from other organization		
Have	12	30.0
Do not have	28	70.0
Quitting program		
Have	15	37.5
Do not have	25	62.5
Media of health effect and law		
Do not have	22	55.0
Have	18	45.0
Poster	9	50.0
Community radio and Poster	8	44.4
Community radio, Community magazine and Poster	1	5.6
Legislation on drinking		
Have	7	17.5
Do not have	33	82.5
Drinking status of village leader		
Never drink	13	32.5
Regular drink	5	12.5
Occasional drink	17	42.5
Ever drink	5	12.5
Attitude to support anti-drinking of village leader		
Yes	40	100.0

Copyright by Mahidol Univ.

4.3 Univariate ordinal logistic regression analysis

Univariate ordinal logistic regression analysis was performed to select variables of both individual-level and village-level into multilevel ordinal logistic model. Any variable which univariate test with p-value less than the criteria set as mentioned in previous chapter was considered as the model candidate. The results of univariate ordinal logistic regression model identifying the relationship between characteristics of respondent namely predisposing, enabling and reinforcing factors and current drinking status were presented in Table 4.3.1. Predisposing factors namely, marital status, cigarette smoking, perceived severity, perceived risk and self-efficacy were significantly correlated to current drinking status at p-values < 0.001 and knowledge on law was also significantly associated to current drinking status at p-value 0.015. All of enabling factors namely monthly income, accessibility to alcohol and availability of information on anti-drinking were significantly related to current drinking status at p-values <0.001 and the effect of alcohol price increasing was significantly related to current drinking status at p-value 0.151. Both reinforcing factors, proportion of family member and close friend drink were also associated to current drinking status. Therefore, all individual-level factors were considered to be included into the further multilevel analysis since all p-values were less than the criteria. All significant variables were tested for parallel regression assumption; it found that variables of marital status, cigarette and proportion of close friend drink had violated, therefore these three variables were excluded. The rest variables were evaluated the parallel regression again, it revealed a non-significant statistic in chi-square 26.92 with degree of freedom 21 and p-value 0.173 was identified.

Village-level variables included into this study were community empowerment program, language use, common occupation, housing-selling liquor shop ratio and health promoting village program. Univariate ordinal logistic analysis for each of the village-level factors and current drinking status of respondents was conducted as the result shown in Table 4.26. Village-level factors were selected for further multilevel analysis at p-value less than the criteria. However type of villageand the level of village activities lead to drink were the village factors omitted from further multilevel analysis.

Table 4.26 Univariate ordinal logistic regression model for drinking status at individual-level and village-level

Variables	$\hat{\beta}$	S.E($\hat{\beta}$)	$\widehat{OR}$	p-value	LR
Individual-level					
Predisposing factors					
Marital status (Widowed[§])				< 0.001	58.67
Single	1.63	0.22	5.12		
Married and living together	0.85	0.20	2.34		
Married but living apart	0.77	0.53	2.15		
Cigarette smoking (None smoke[§])				< 0.001	285.81
Irregular smoke	2.18	0.13	8.81		
Regular smoke	1.70	0.30	5.47		
Knowledge on health effect (Good[§])				0.728	0.63
Fair	0.17	0.24	1.18		
Poor	0.09	0.31	1.10		
Knowledge on law (Good[§])				0.015	5.87
Fair	-0.28	0.17	0.76		
Poor	-1.66	0.82	0.19		
Perceived severity (High[§])				< 0.001	13.06
Moderate	1.62	0.45	5.04		
Low	1.60	1.50	4.98		
Perceived risk (High[§])				< 0.001	37.84
Moderate	2.55	0.41	12.82		
Self-efficacy (High[§])				< 0.001	205.96
Moderate	0.23	0.31	1.25		
Low	3.68	0.28	39.48		
Enabling factors					
Monthly income (≥ 20,000[§])				< 0.001	24.75
0-4,999	-0.12	0.31	0.89		
5,000-9,999	0.58	0.31	1.79		
10,000-14,999	0.27	0.34	1.31		
15,000-19,999	0.84	0.44	2.33		
Accessibility to alcohol (Uneasy[§])				< 0.001	37.21
Easy	2.79	0.63	16.36		

[§]Reference group, LR =Likelihood ratio

Table 4.26 Univariate ordinal logistic regression model for drinking status at individual-level and village-level (cont.)

Variables	$\hat{\beta}$	S.E($\hat{\beta}$)	$\widehat{OR}$	p-value	LR
Enabling factors (cont)					
Effect of increasing alcohol price (Yes[§])				0.151	2.06
No	0.23	0.16	1.26		
Availability of information on anti-drinking (Yes[§])				< 0.001	10.11
No	-0.53	0.17	0.60		
Reinforcing factors					
Proportion of family member drink	0.01	0.004	1.01	0.137	2.21
Proportion of close friend drink	0.04	0.002	1.04	< 0.001	358.47
Village-level					
Type of village (Municipal area[§])				0.630	0.23
Non-municipal area	0.05	0.11	1.05		
Community empowerment program (YES[§])				0.185	1.48
No	0.12	0.10	1.13		
Language use (Thai-Korat language[§])				0.346	0.54
Isan language	0.11	0.16	1.11		
Mix language (Using more than 1 language)	0.11	0.13	1.11		
Occupation (Rice farming[§])				0.043	4.08
Crop-farming	0.23	0.14	1.26		
Labor	0.39	0.30	1.48		
Housing and selling liquor shop ratio (> 40 per shop[§])				0.327	0.63
≤ 40 per shop	-0.08	0.10	0.92		
Level of village activities lead to drink (Low[§])				0.881	0.02
Moderate	-0.02	0.12	0.98		
High	-0.01	0.16	0.99		
Health promoting village program (YES[§])				0.300	1.07
No	0.11	0.10	1.11		

[§]Reference group, LR =Likelihood ratio

4.4 Multilevel ordinal logistic regression analysis

The result of multilevel ordinal logistic regression analysis with random intercept model to identify factors in both individual-and village-level which related to current drinking status of population was presented according to steps of analysis as

mentioned in previous chapter. There were 40 villages with 32-34 respondents per village. Total number of 1,293 respondents was included for this analysis.

4.4.1 Fitting null model(Model 1)

The fitting model process started with an empty model. The first multilevel ordinal logistic regression (Model 1) was fitted with no variables; this model provided an intra-class correlation (ICC) which was used to investigate village differences in individual drinking status. In this step,random variation between villages was significantly identified at p-value < 0.001. An estimated intra-class correlation (ρ) was 0.192 suggesting that 19.2% of the variability in drinking status of individuals lies among villages. The details were shown in Table 4.27.

Multilevel logistic model of null model (Model 1)

Level 1: $$log\left[\frac{\Pr(y_{ij}\leq c)}{\Pr(y_{ij}>c)}\right] = \gamma_c - \beta_{0j}$$

Level 2: $$\beta_{0j} = \gamma_{00} + u_{oj}$$

Therefore the multilevel ordinal logistic regression model of null model is

$$log\left[\frac{\Pr(y_{ij} \leq 1|u_{0j})}{1 - Pr(y_{ij} \leq 1|u_{0j})}\right] = \gamma_1 - (\gamma_{00} + u_{oj})$$

From this equation, parameters γ_1 and γ_{00} could not be estimated separately and therefore those parameters were not identifiable. For this reason, the intercept γ_{00} was fixed at zero.

Intra-class correlation (ICC = ρ);

$$\rho = \frac{\sigma_{u0}^2}{\sigma_{u0}^2+\sigma_{eij}^2}, \quad \text{where } \sigma_{eij}^2 = \frac{\pi^2}{3} = 3.29$$

Therefore $$\rho = \frac{0.782}{0.782 + 3.29} = 0.192$$

Copyright by Mahidol University

Table 4.27 Null model of multilevel ordinal logistic regression

Variables	$\hat{\beta}$	S.E	95%CI	p-value
Fixed effect				
Intercept	-2.47	0.04	-2.54, -2.39	< 0.001
Random effect				
$\sigma^2_{u_o}$	0.78	0.07	0.64,0.92	
-2Log likelihood	1,962.47			
Intra-class correlation	0.192			

4.4.2 Fitting model at individual-level variables (Model 2)

Model 2 demonstrated the effect of individual-level factors on drinking. Fitting model process began with an empty model and sequentially added the most predictive variable. The individual-level variable with the strongly significant LR test was determined as candidate variables for multilevel analysis in structuring the best model to predict drinking status. After the variables were entered to the model then individual-level factor with the p-value greater than 0.05 was excluded from the model. Then another individual-level factor was added and evaluated together with previously accepted predictor. The selection of individual-level factors procedure proceeded until all variables had been evaluated and re-evaluated until the models reached at all individual-level factors were significantly provided to the model, using likelihood ratio (LR) test to evaluate the model for each step as shown in Table 4.28.

The relationship between each of the individual-level characteristic and drinking status from univariate analysis as shown in Table 4.26, it shown that “self-efficacy” had the highest likelihood ratio value (LR). Therefore, self-efficacy was the first individual-level characteristics added to the model. After added this variable into the model, it was found a reduction of the intercept from null model. Then coefficient of self-efficacy was tested whether it was significantly different from zero or not. There existed a statistical significance (p-value < 0.001) of using self-efficacy to predict drinking status. Sequence of individual-level variables added into the model as considered from univariate ordinal logistic analysis of the relationship between each of

individual-level characteristics and drinking status (Table 4.26) were perceived risk on drinking, accessibility to alcohol and monthly income. At each sequence of individual-level variable selection, after adding that variable into the model, it was evaluated whether there was a significant improvement of model fit or not. That variable was retained in the model if p-value less than 0.05, as shown in step 1-4 (Table 4.28).

At step 5, perceived severity on drinking was added into the model, then it was tested a significant improved of likelihood ratio (LR). It was found that p-value was greater than 0.05, therefore this variable was excluded from the model.

At step 6, availability of information on anti-drinking was added into the model and it was also tested whether it should be retained in the model or not. Owing to p-value of this variable was 0.032; therefore this variable was retained in the model.

At step 7-9, knowledge on law, proportion of family member drink and an effect of increasing price of alcohol were added into the model. At each step, an evaluation on added each variable into the model was performed and found that there were non-significant improved of likelihood ratio (LR). Since p-values of these variables were greater than 0.05 therefore these variables were not retained in the model. In the final model, all excluded variables were confirmed by re-entering and re-evaluating again at each step. It was found that these variables were still not statistically predicted drinking status.

Copyright by Mahidol University

Table 4.28 Selection procedure of individual-level characteristics into the model

Variables	Step 0	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Final
Fix effect												
For thresholds:												
Cut1	0.64	0.56	0.54	-2.09	-2.03	-2.02	-1.99	-2.02	-2.06	-1.98	-1.98	-1.99
Cut2	-0.14	-0.26	-0.28	-2.94	-2.89	-2.88	-2.85	-2.88	-2.93	-2.84	-2.85	-2.85
Cut3	-1.01	-1.21	-1.26	-3.92	-3.89	-3.89	-3.86	-3.90	-3.94	-3.85	-3.86	-3.86
Cut4	-2.47	-3.04	-3.16	-5.83	-5.83	-5.82	-5.79	-5.83	-5.87	-5.78	-5.79	-5.79
Self-efficacy (High)												
Moderate		0.22	0.23	0.22	0.21	0.22	0.22	0.23	0.22	0.22	0.22	0.22
Low		3.68	3.72	3.70	3.68	3.68	3.69	3.68	3.68	3.69	3.69	3.69
Perceived risk (High)												
Moderate			2.72	2.69	2.71	2.64	2.70	2.71	2.71	2.70	2.59	2.70
Accessibility to alcohol (Uneasy)												
Easy				2.69	2.48	2.48	2.45	2.49	2.46	2.46	2.45	2.45
Monthly income (≥ 20,000)												
< 5,000					-0.10	-0.10	-0.05	-0.01	-0.04	-0.05	-0.05	-0.05
5,000-9,999					0.53	0.53	0.54	0.54	0.54	0.54	0.54	0.54
10,000-14,999					0.12	0.12	0.13	0.14	0.14	0.14	0.13	0.13
15,000-19,999					0.97	0.97	0.99	0.98	0.99	0.99	0.99	0.99
Perceived severity (High)												
Moderate						0.07	-	-	-	-	0.12	-
Low						0.97	-	-	-	-	1.20	-
Availability of information on anti-drinking (YES)												
No							-0.37	-0.38	-0.35	-0.37	-0.39	-0.37
Knowledge on law (Good)												
Fair								-1.45	-	-	-	-
Poor								-0.17	-	-	-	-
Proportion of family member drink									0.003	-	-	-
Effect of increasing alcohol price (YES)												
No										-0.02	-	-
Random effect												
Variance between village	0.78	0.54	0.40	0.47	0.45	0.45	0.41	0.42	0.43	0.42	0.43	0.41
Likelihood ratio		205.96	35.42	33.98	35.67	0.64	4.70	4.57	1.79	0.02	1.03	4.70
P-value		< 0.001	< 0.001	< 0.001	< 0.001	0.725	0.032	0.107	0.181	0.897	0.598	0.030

Individual-level factors significantly predict drinking status among those 15-75 years consisted of self-efficacy, perceived risk on drinking, accessibility to alcohol, monthly income and availability of information on anti-drinking (Table 4.29). The different between Model 2 and Model 1 (null model) was significantly improved fitting of model with Deviance 157.87 (p-value < 0.001). After adding all significant variables into the model, the unexplained variance decreased from 0.782 to 0.410. The intra-class correlation coefficient (ρ) was 0.113 which can be explained that 11.30% of variability in drinking status was lies at the differences among villages.

For *C* is five possible outcome categories (coded as 1,2,3,4 or 5)

In which 1 isnever drinking, 2 isever drinking, 3 is mild drinking, 4 is moderate drinking and 5 is heavy drinking

Multilevel ordinal logistic model of individual-level (Model 2)

Level 1: $$log\left[\frac{\Pr(y_{ij}\leq c|X_{ij},\beta_{0j})}{1-Pr(y_{ij}\leq c|X_{ij},\beta_{0j})}\right] = \gamma_c + \left(\beta_{0j} + \sum_{p=1}^{5}\beta_p\, x_{pij}\right)$$

Level 2: $$\beta_{0j} = \gamma_{00} + u_{oj}$$

The model was identifiable as long as the parameter γ_{00} set to zero.

Therefore the two-level ordinal logistic regression model can be written in the form:

$$log\left[\frac{\left(\Pr(y_{ij}\leq c)\,|X_{ij},\beta_j,u_{0j}\right)}{\left(\Pr(y_{ij}> c)\,|X_{ij},\beta_j,u_{0j}\right)}\right] = \gamma_c + (\sum_{p=1}^{5}\beta_p\, x_{pij} + u_{0j})$$

c = 1, 2, 3,4

Coding M1 = < 5,000, M2 = 5,000-9,999, M3 = 10,000-14,999, M4 = 15,000-19,999, and M5 = > 20,000 baht per month

self_m = self-efficacy at moderate level, self_l = self-efficacy at low level, per_m = perceived risk at moderate level, access = easy accessibility to alcohol, available_n = unavailable of information on anti-drinking

Copyright by Mahidol University

1th model: Heavy drink vs. (Moderate drink + Mild drink + Ever drink + Never drink)

$$log\left[\frac{(\Pr(y_{ij}\leq 4)|X_{ij},\beta_j,u_{0j})}{(\Pr(y_{ij}>4)|X_{ij},\beta_j,u_{0j})}\right]$$ =-1.99 + 0.22(self_m) + 3.69(self_l) + 2.71(per_m) + 2.46(access) - 0.05(M1) + 0.54(M2) + 0.14(M3) + 0.99(M4) – 0.38(available_n)

2nd model: (Heavy drink + Moderate drink) vs. (Mild drink + Ever drink + Never drink)

$$log\left[\frac{(\Pr(y_{ij}\leq 3)|X_{ij},\beta_j,u_{0j})}{(\Pr(y_{ij}>3)|X_{ij},\beta_j,u_{0j})}\right]$$ =-2.86 + 0.22(self_m) + 3.69(self_l) + 2.71(per_m) + 2.46(access) - 0.05(M1) + 0.54(M2) + 0.14(M3) + 0.99(M4) – 0.38(available_n)

3rd model: (Heavy drink + Moderate drink + Mild drink) vs. (Ever drink + Never drink)

$$log\left[\frac{(\Pr(y_{ij}\leq 2)|X_{ij},\beta_j,u_{0j})}{(\Pr(y_{ij}>2)|X_{ij},\beta_j,u_{0j})}\right]$$ =-3.87 + 0.22(self_m) + 3.69(self_l) + 2.71(per_m) + 2.46(access) - 0.05(M1) + 0.54(M2) + 0.14(M3) + 0.99(M4) – 0.38(available_n)

4th model: (Heavy drink + Moderate drink + Mild drink + Ever drink) vs. Never drink

$$log\left[\frac{(\Pr(y_{ij}\leq 1)|X_{ij},\beta_j,u_{0j})}{(\Pr(y_{ij}>1)|X_{ij},\beta_j,u_{0j})}\right]$$ =-5.80 + 0.22(self_m) + 3.69(self_l) + 2.71(per_m) + 2.46(access) - 0.05(M1) + 0.54(M2) + 0.14(M3) + 0.99(M4) – 0.38(available_n)

Intra-class correlation (ICC);

$$\rho = \frac{\sigma_{u0}^2}{\sigma_{u0}^2+\sigma_{eij}^2}, \quad \text{where } \sigma_{eij}^2 = \frac{\pi^2}{3} = 3.290$$

Therefore $$\rho = \frac{0.410}{0.410 + 3.290} = 0.113$$

Copyright by Mahidol University

Table 4.29 Model of Multilevel ordinal logistic regression for individual-level

Variables	$\widehat{\beta}$	S.E $(\widehat{\beta})$	p-value	$\widehat{OR}$	95% CI OR
Fixed effect					
For thresholds:					
Cut1	-1.99	0.69	0.004	-	-
Cut2	-2.86	0.69	<0.001	-	-
Cut3	-3.87	0.69	<0.001	-	
Cut4	-5.80	0.70	<0.001	-	-
Self-efficacy (High[§])					
Moderate	0.22	0.31	0.488	1.25	0.68-2.29
Low	3.69	0.28	<0.001	39.98	22.94-69.68
Perceived risk (High[§])					
Moderate	2.71	0.49	<0.001	14.83	6.15-36.87
Accessibility to alcohol (Uneasy[§])					
Easy	2.46	0.62	<0.001	11.62	3.47-38.90
Monthly income (≥ 20,000[§])					
< 5,000	-0.05	0.31	0.873	0.95	0.51-1.76
5,000-9,999	0.54	0.32	0.092	1.71	0.92-3.20
10,000-14,999	0.14	0.34	0.695	1.14	0.58-2.22
15,000-19,999	0.99	0.45	0.029	2.68	1.11-6.49
Availability of information on anti-drinking (YES[§])					
No	-0.38	0.17	0.032	0.68	0.49-0.97
Random effect					
$\sigma_{u_o}^2$	0.41	0.05			0.32-0.50
-2 Log Likelihood	1,804.60				
Intra-class correlation	0.111				

[§]Reference group

4.4.3 Fitting model at village-level variables (Model 3)

For model 3, it was sequentially added all significant village-level factors related to drinking status of 15-75 years from univariate ordinal logistic regression namely common occupation, community empowerment program, health promoting village program, housing-selling liquor shop ratio and language use as shown in Table 4.26. Model 2 with individual-level factors that significantly predicted their drinking was used as baseline model. After completing that process, model 3 manifests the

effect of both individual-level and village-level characteristics on drinking among those 15-75 years.

It was similar to the previous analysis that each of the village-level factors was tested whether it should be retained in the model or not. After each of variables was added into Model 3, none village characteristics were significantly related to drinking status among those 15-75 years. Since p-values of allvillage variables were greater than 0.05, therefore those variables were not retained in the model. All variables of village-level were added into Model 3 again for confirmation. The likelihood ratio test was performed to compare the fit of Model 2 contained only individual-level factors and Model 3 contained both individual-level factors and village-level factors, a non-significant change in -2Log likelihood (-2LL) 1.060 with degree of freedom 7 and p-value 0.983 was identified. The likelihood ratio test of fit statistics and non-significant estimating parameters of village-level indicated not to retain characteristics of village in the model.

As a result, Model 2 was the best model that can explain the relationship between a set of explanatory variables and current drinking status. A set of individual characteristics illustrated in Model 2 significantly related to drinking status were self-efficacy, perceived risk on drinking, accessibility to alcohol, monthly income and availability of information on anti-drinking. However, only an amount of money earned monthly for living 15,000 to 19,999 Baht of monthly income variable that significantly related to drinking status but other income groups were non-significantly related to drinking status (Table 4.30).

Copyright by Mahidol University

Table 4.30 Parameter estimates in multilevel ordinal logistic model

Effect	Estimated coefficient		
	Model 1	Model 2	Model 3
Fix effect			
For thresholds:			
Cut1	0.642	-1.992	-1.994
Cut2	-0.146	-2.853	-2.860
Cut3	-1.019	-3.860	-3.872
Cut4	-2.473	-5.791	-5.800
Individual-level			
Self-efficacy (High[§])			
Moderate		0.221[¥]	0.221[¥]
Low		3.693	3.695
Perceived risk (High[§])			
Moderate		2.702	2.712
Accessibility to alcohol (Uneasy[§])			
Easy		2.453	2.457
Monthly income (≥ 20,000[§])			
< 5,000		-0.045[¥]	-0.045[¥]
5,000-9,999		0.542[¥]	0.538[¥]
10,000-14,999		0.132[¥]	0.140[¥]
15,000-19,999		0.991	0.991
Availability of information on anti-drinking (Yes[§])			
No		-0.372	-0.378
Village-level			
Most common occupation (Rice farming[§])			
Crop-farming			0.183[¥]
Labor			0.334[¥]
Community empowerment program (Yes[§])			
No			0.052[¥]
Health promoting village program (Yes[§])			
No			0.117[¥]
Housing and selling liquor shop ratio (> 40 per shop[§])			
≤ 40 per shop			-0.061[¥]
Language use (Thai-Korat language[§])			
Isan language			0.113[¥]
Mix language (Using more than 1 language)			0.221[¥]
Random effect			
$\sigma_{u_o}^2$	0.782	0.410	0.398
Intra-class correlation (ICC)	0.192	0.113	0.108
-2 Log Likelihood	1,962.47	1,804.60	1,803.54

[§]Reference group, [¥] non-significant, $\sigma_{u_o}^2$ variance among villages

Copyright by Mahidol University

4.4.4 Cross-level interaction in multilevel logistic regression

Testing cross level interaction was the final step of model building. The initial orders cross level interaction of each variable were examined in the main effect model. All cross level interactions were investigated for statistical significance at p-value 0.05. Cross level interaction identified non statistical significant, therefore none of them were included in the final model. The analysis of cross level interaction was depicted in Appendix E.

4.4.5 Interpretation of the selected multilevel ordinal logistic model

According to Model 2, odds ratio of each individual-level factors and 95% confidence intervals were presented in Table 4.31. In this study,it can be seen that individual factors had more effect on current drinking status among population whose age 15-75 years than village characteristics. As mentioned in previous analysis that all exploratory variables fitted to the assumption of parallel regression, it means that odds ratio of each independent variable are constant in all the set of category responses. For those 15-75 years who were at low level of self-efficacy had higher risk of drinking heavier as compared to those at high level (OR 39.98 with 95% CI: 22.94-69.68). Those who were at moderate level of perceived risk on drinking were more likely to drink heavier 14.83 times than those at a high level of perceived risk (95% CI: 6.15-36.87). Heavy drinking among those who were easily access to alcohol beverages were 11.62 times than those who were uneasily to access to it (95% CI: 3.47-38.90). Considering monthly income, individuals who earned 15,000 - 20,000 Baht were more likely to drink heavier 2.68 times as compared to those earned higher than 20,000 Bath (95% CI: 1.11-6.49). However, other levels of monthly income were not statistically related to drinking status. An unavailability of information on anti-drinking decrease 32.0% in the odds for drinking (95% CI: 0.49-0.97).

Copyright by Mahidol University

Table 4.31 Odds ratio and 95% confidence interval of factor associated with current drinking status

Variables	$\hat{\beta}$	S.E($\hat{\beta}$)	$\widehat{OR}$	95% CI OR
For thresholds:				
Cut 1	-1.99	0.69	-	-
Cut 2	-2.86	0.69	-	-
Cut 3	-3.87	0.69	-	-
Cut 4	-5.80	0.70	-	-
Self-efficacy (High[§])				
Moderate	0.22	0.31	1.25	0.68-2.29
Low	3.69	0.28	39.98	22.94-69.68
Perceived risk (High[§])				
Moderate	2.71	0.49	14.83	6.15-36.87
Accessibility to alcohol (Uneasy[§])				
Easy	2.46	0.62	11.62	3.47-38.90
Monthly income (≥ 20,000[§])				
< 5,000	-0.05	0.31	0.95	0.51-1.76
5,000-9,999	0.54	0.32	1.71	0.92-3.20
10,000-14,999	0.14	0.34	1.14	0.58-2.22
15,000-19,999	0.99	0.45	2.68	1.11-6.49
Availability of information on anti-drinking (YES[§])				
No	-0.38	0.17	0.68	0.49-0.97

[§]reference group

Copyright by Mahidol University

CHAPTER V
DISCUSSION

Individual-level and village-level factors in relation to drinking status among population in Pakham district of Buriram province was analyzed using multilevel ordinal logistic regression. The discussion was presented in four perspectives; sampling design and estimation, statistical analysis, drinking prevalence and factors discussion. Factors discussion included village-level factors and individual-level factors, respectively.

5.1 Sampling design and estimation

A two-stage cluster sampling was applied to recruit villages and population into this study. An appointment was made with the community leader before data collection and the entire 40 sampled villages as planned in the first stage was included into the study. For the 2nd stage on recruiting 8-10 samples from each of the following age groups; 15-24, 25-44, 45-64 and 65-75 with an equal proportion of male to female. List of the population by age and sex of each age group currently living in the sampled village was obtained and systematic random sampling was applied to recruit samples into the study. Few samples were replaced using the nearby household. It should be noted that an approach to gain good participation from the sample subject was permission from the village headman to collect the data was not enough to approach the samples, and making the trustworthiness to villagers especially to the sample subjects. It is hard for those to tell or answer their private information to the stranger even if they were informed from the village leader previously, they are still curious and scared what researcher will do with their information. For this survey, researcher was accompanied by local people in the study district who was rather well known to most of the people in data collection. Through this approach, the data

obtained is more accurate and reliable as well as less objection on responding to the structure interview.

Five well-trained interviewers help on face-to-face interview to collect the data. Even though it was rather costly but advantages for any unclear questions, interviewee can ask till it was understandable before answering. Moreover, data collectors could observe body languages while interviewing and understand about general surroundings of study area included environment, background and setting as well. Each questionnaire was verified and edited before leaving the village. Through the mentioned procedures, good quality of data was obtained and the sampling procedure at the village level was strictly followed.

It can be said that age and sex stratification was used at the village level instead of using random sampling. As a result of using such sampling scheme especially at the 2^{nd} stage will provide an enough sample size for an estimation of age-sex prevalence of alcohol consumption. Using simple or systematic random sampling alone without age-sex stratification may affect to an estimation of such prevalence since the control of sample size of each age group and sex cannot be made before hand. Upon this sampling procedure, age and sex were controlled and both variables were not used in the ordinal multiple logistic regression.

Upon the mentioned sampling scheme, estimation of alcohol drinking prevalence can be used to represent age and sex for each of the following stratified age groups; 15-24, 25-44,45-64 and 65-75 of Pakham District. Prevalence of drinking for male, female and both sex of Pakham population age 15-75 years were estimated using age and sex distribution of the studied district from 2011 census [106].

In other word, proportion of age and sex among 15-75 years was used to obtain weighted prevalence of male, female, and both sex in this study according to the sampling scheme. Therefore, an estimation of the prevalence of drinking among village samples likely to be able to reflect the true rate of alcohol drinking in general.

The finding from this study seems to represent the rate of drinking in general of the study area [110].

The two-stage cluster sampling and stratified systematic random sampling was implemented to recruit samples into the study, it resulted in a rather large error of estimation prevalence of alcohol consumption among 15-75 years in Pakham district as well as age, sex, and age-sex prevalence of alcohol consumption in this study area. As a result of large error of estimation the drinking prevalence, it makes a rather wide range of confidence interval of the prevalence [110].

Sample size for multilevel ordinal logistic regression, a larger number of villages is more important than a large number of individual per village. Number of village is suggested to lie from 30-50 with size of sample per village is at least 30 [41, 100-102]. Total of 40 villages with 32-34 individuals age 15-75 years per village was recruited into this study as suggested.

5.2 Statistical analysis

5.2.1 Ordinal logistic regression

This cross-sectional study aimed to identify factors significantly predicted factors level of drinking status. There were 5 different levels of drinking status: never drinking, ever drinking, mild, moderate and heavy drinking. The proportional odds model or call cumulative logit model were identified to account for the risk of various drinking level. Using binary logistic regression causes loss detail of data on drinking level since drinking status was grouped into two levels: nondrinking and drinking. The ordinal logistic regression was applied as an extension of the binary logistic regression. Moreover, ordinal logistic regression showed the four possible models and category comparisons that are possible. The -2log likelihood (-2LL) change in deviance was used to examine model fit. A significant (p-value < 0.05) change in the -2LL statistic between the baseline model and the final model demonstrate that the predictors were jointly significant based on the likelihood ratio test. The model was

used to predict cumulative probabilities of each ordinal outcome therefore the ordinal with the higher score was determined as the predicted outcome compared with the lower ordered outcome.

For ordinal logistic analysis, proportional odds model assumes the same slope across all response levels. The test of parallel lines assumption of each variable was performed whether the proportional odds assumption was not violated. The proportional odds assumption for modeling category data suggests that the cut point specific odds ratios are homogeneous and this assumption was tested using Wald test to compare the estimated model with one set of coefficients for all categories to a model with a separate set of coefficients for each category [111]. It can be explained that violation of the main model assumption can lead to invalid results. They were five levels of the response outcome. As a result there were four lines to investigate for parallelism. Therefore, there is a higher chance to violate parallel assumption. Only if the assumption of proportional odds is reasonable, the proportional odds model should be applied, if not it should be accomplished by other techniques such as the generalized logits model [112]. Furthermore, pair comparison using multi-level binary logistic should be made. Since there was only one line, this method does not concern about the parallel assumption.

5.2.2 Multilevel ordinal logistic regression analysis

Drinking status measured on an ordinal scale and data were obtained through natural hierarchies such that individuals are nested within the villages that are influenced by the village. Therefore, multilevel models were useful for this type of data because a multilevel study concerns a population with a hierarchical. In this study, the higher-level units or villages were assumed to be independent. Analyzing the performance of individuals, researchers realized that observation of individuals in the same village were not independent of each other [113]. Multilevel analysis, an analysis that distinctly models the manner in which individuals are grouped within villages has several advantages [40-43]. First, multilevel analysis enables data analysts to obtain accurate statistical estimates of regression coefficients. Second, it provides the estimated standard errors that tend to be underestimated due to clustering of

observations within units and accommodates the hierarchical structure of the data. The average or intra-class correlation between variables measured on individuals in the same village will be higher than average correlation among variables measured from the different village. A strict the assumption of independence of the observations has to be met when using conventional regression analysis. If this assumption has been violated, the standard error estimates of conventional statistical test are underestimates, and the results lead to inaccurate conclusion. Thirdly, by allowing the use of covariates measured at any of the level of a hierarchy, it enables to explore the extent to which the differences in drinking status between villages are explainable by factors of village. However for zero frequency cells, an estimate of coefficients can be made but error of estimation may be rather large. For this study cross-tabulation between 5-level of drinking status and level of self-efficacy resulted in zero frequency in one cell of table, re-grouped of the level of either drinking status and self-efficacy was not made. Estimation of logistic coefficient can be made but its error was very large as can be seen from 95% CI of OR [109].

In this study, individual-level factors namely self-efficacy, perceived risk on drinking, accessibility to alcohol, monthly income and availability of information on anti-drinking are related to drinking. However, village-level factors were not found to be related to drinking status base upon the final model but it found that the variance of village-level explained the difference in village linked factors (ICC=0.113). The intra-class correlation points that village tend to perform at comparable levels, even though low intra-class correlation is less than 0.4 indicates relatively small variability among village [46]. The village-level factors in this study were not significantly predicting drinking status, due to homogeneity of sampled villages or village factors may not sufficient to eliminate the differences that exist among villages.

The intra-class correlation coefficient (ICC) is an indicator of how strongly residents in the same village resemble each other as compared with residents in other villages. It was estimated as the ratio of between village variance divided by the total of between village variance and within village variance. The ICC ranges between 0 and 1, if ICC equals to zero, indicating no village variation at all and if ICC equals to

one, indicating perfect variation is due to difference among villages. If ICC is trivial, there is no meaningful average difference among villages on the drinking status. While intra-class correlation shows less than 0.4, 0.4 to 0.75 and greater than 0.75 indicate relatively poor, good and excellent among village variations, respectively [46, 114].

In this study, individuals were nested within villages. The need for a hierarchical analysis depends partially on the size of the intra-class correlation. Therefore, the number of subjects need to detect significantly effects from multilevel analysis [114]. The intra-class correlation for this study was 0.113 indicated that 11.3 percent of the variability in drinking status lies among villages. This figure means that the assumption of independent observation in conventional linear regression model is no longer valid when dealing with cluster data like in this study in which individuals nested within village. It was improper to analyze cluster data because it may face with the problem of type I error increasing [114].

This study has confirmed that multilevel analysis is better than conventional analysis, since the -2 log likelihood (-2LL) of multilevel ordinal logistic regression model is lower than conventional ordinal logistic regression model as shown in Table 5.1 [115]. In addition, conventional ordinal logistic regression may artificially enlarge the amount of independent variables that incorrect when measuring the data at the high level of hierarchy. In other word, conventional logistic regression tended to increase the statistical significance for the effects of variables measured at the village-level compared to the level of significance indicated by the multilevel model [116]. Analyzing by ignoring the structure of the data lead to obtain the invalid result therefore it was advantageous to use multilevel models to approach data in research are frequently structured hierarchically.

Copyright by Mahidol University

Table 5.1 Comparison the result of multilevel and conventional ordinal logistic regression on drinking status

Variables	Multilevel ordinal logistic regression			Conventional ordinal logistic regression		
	$\hat{\beta}$	S.E	95%CI	$\hat{\beta}$	S.E	95%CI
Self-efficacy (High[§])						
Moderate	0.22	0.31	-0.38, 0.83	0.21	0.30	-0.37, 0.80
Low	3.69	0.28	3.14, 4.25	3.67	0.26	3.15, 4.17
Perceived risk (High[§])						
Moderate	2.71	0.49	1.82, 3.61	2.69	0.44	1.83, 3.55
Accessibility to alcohol (Uneasy[§])						
Easy	2.46	0.62	1.25, 3.67	2.45	0.59	1.27, 3.59
Monthly income in Baht ($\geq$ 20,000[§])						
< 5,000	-0.05	0.31	-0.66, 0.57	-0.04	0.31	-0.65, 0.58
5,000-9,999	0.54	0.32	-0.09, 1.16	0.53	0.32	-0.10, 1.16
10,000-14,999	0.14	0.34	-0.53, 0.81	0.13	0.33	-0.52, 0.78
15,000-19,999	0.99	0.45	0.10, 1.88	0.98	0.44	0.12, 1.84
Availability of information on anti-drinking (YES[§])						
No	-0.38	0.17	-0.72, -0.03	-0.37	0.16	-0.67, -0.05
-2 Log Likelihood	1,804.60			1,809.64		

[§] Reference group

5.3 Drinking prevalence

Prevalence of current drinking among 15-75 years of age living in Pakham district was 51.4%. The prevalence found in this study was higher than the report of current drinking among 15 years and over of the country, the northeastern region and of Buriram province, 30.0%, 35.4% and 37.8% respectively [10].The difference may be due to sampling method and estimation used in this study. The age and sex structure among 15-75 years population of Pakham district was used to weight prevalence of drinking according to the sampling scheme which the result obtained is much closer to the prevalence in the population than un-weighted prevalence [117]. The prevalence of heavy drinking using AUDIT found in this study was 8.9%. It was lower than the report of the northeastern and Buriram province (15.2% and 24.2% respectively) [10], in which defined heavy drinking as 50 grams of pure alcohol drink

at least once a week for 12 months continuously. It can be explained that the definition and measurement used are different.

The prevalence of alcohol dependence (AUDIT ≥ 8) from this study was 30.9% that was higher than the survey conducted among 15-60 years of Udorn-Thani Provincial Health Office, which was 12.2% [118]. It can be explained that the difference of sampling method and the method of data collection. Self administered was applied for the Udorn-Thani survey, may results in under estimation. According to the National Household Survey for Substance and Alcohol Use (NHSSA) reported drinking prevalence in various regions of Thailand, the prevalence of current drinking was highest in the north and northeastern region but not in the southern [119]. This may be explained that belief, religion and lifestyles of those resided in the southern are different from those living in the northeastern especially in Pakham district. Those living in the south are Muslim but those in Pakham are almost all Buddhism. The cultural and lifestyles seem to similar between the north and northeastern that alcohol drinking has a long history in these regions, it has been used to express appreciation and gratitude as offerings to supernatural beings or spirits to bring prosperity and to gain protection, to relieve fatigue after work. Some belief that a sip of alcohol increase appetite, help to sleep, increase energy, control blood pressure or reduce risk of cardiovascular disease [3, 13].

Considering the prevalence of alcohol consumption in South-East Asia Region were 21.7%. Moreover, the estimation of five-year trends in recorded adult per capita alcohol consumption (%) by WHO showed an increase noted in the South-East Asia Region was 68.3%, while the trend of alcohol consumption was stable in other region [2]. It can be explained that the legislation that attempt to control alcohol beverages availability is not fully enforced or is not effective. Thus, the drinking prevention program and provision of information on drinking should be introduced as much as possible. The difference of tools used to collect data can result in the difference of drinking prevalence in which some study collected the data by using self-administered questionnaire. The response to the question on amount, frequency and duration of drinking may be under reported.

The prevalence of current drinking by sex in this study, male was 2.3 times of female. Classified by level of current drinking, the prevalence of mild level of drinking between male and female was not different, but for the moderate level of drinking male was 5.0 times of female as well as male drink heavily was 12.8 times of the female. It was revealed from this study that males obviously drink more than female. Both quantity and frequency of drinking were more prevalent among males than females [2, 36, 69, 71, 73, 86, 120-122]. Considering drinking by age of this study, the highest prevalence of heavy drinking was found among 15-24 years of age (13.0%), and it was decreasing as an increasing age [19, 71, 86, 122]. However, the prevalence of female current drinkers was highest among age 25-44 years and it was declined as an increasing of age. Cultural and social norms in northeastern region of Thailand may contribute to the low drinking prevalence among females. Female drinking is not accepted in traditional norms, especially among young women. According to the report of the Australia National Drug Strategy Household Survey, the prevalence of current drinking male was 2-3 times of female among those 14 years and older. It is interesting that the prevalence of daily drinkers increased with age especially among those 60 years and older. The trend of daily drinking by age was rather similar between male and female [71]. This may be explained that the lifestyles and social norms in Australia may contribute to drink among elder since alcohol beverages including wine, beer, spirit and others. Sipping alcohol beverage before meal may increase appetite, help to sleep well. Some belief that regular small amount of alcohol intake help to control blood pressure as well as reduce risk of cardiovascular disease [14, 15].

5.4 Individual-level factors

Individual-level factors included into this study comprised predisposing factors, enabling factors and reinforcing factors. The following discussion was mainly based on final model of multilevel ordinal logistic analysis as well as univariate and descriptive analysis.

Copyright by Mahidol University

5.4.1 Predisposing factors

Considering drinking by marital status, prevalence of drinking currently among single was higher than the non-single persons in this study (64.2% and 47.8% respectively). Prevalence of heavy drinking for single was also higher than non-single, (18.9% and 6.2% respectively). It was revealed from this study that those single whose age 15-75 years are about 1.5 times more likely to drinking currently and about 3 times more likely to drinking heavily than non-single person of the same age group. Drinking was more prevalent among singles than non-singles [19, 36, 37, 69-71]. The most plausible reasons of decreasing drinking after married are an expectation of their spouse, high responsibility to family including expenses, having more activities with their family and less time to hangout. Likewise, the prevalence of stop drinking among non-single was three times of single. Moreover, it revealed from this study that marital status was significantly associated with drinking at p-value < 0.001, but it was not included in the multilevel ordinal logistic regression analysis because the assumption of parallel lines of this variable was violated.

It revealed from this study that cigarette smoking was significant risk of drinking. It could be used to predict drinking among those 15-75 years of age. The smokers were more likely to drink alcohol about 5 times higher than non-smokers. Drinking and smoking are highly correlated. The strongest predictor of alcohol consumption was smoking [72-74]. The association between cigarette smoking and alcohol drinking is likely to be attributable to multiple factors, including sensational seeking, impulsively, stress [123], as well as family and friend influences, social, economics, advertising and alcohol and tobacco availability are also joined with both initial and continued alcohol and tobacco use. Besides, alcohol and tobacco use were based on the effectiveness of control strategies as well. This finding is similar to the other studies [74, 123]. Patterns of alcohol drinking and cigarette smoking were concomitant among those 15-75 years old should be considered when planning preventing program to their behaviors. Even though this study revealed that cigarette smoking was significantly associated with alcohol drinking at p-value < 0.001, but it was not included in the multilevel ordinal logistic regression analysis because the assumption of parallel lines of this variable was violated.

Prevalence of current drinking at different level of knowledge was rather similar, but the prevalence of heavy drinking was highest among those 15-75 years at poor level on the consequences of drinking on their own health. Those age 15-24 years had better knowledge of the effect of drinking on health than other groups of age, and those having high educational attainment and high monthly income also had better such knowledge. Other individual characteristics including in this study seemed to have no relationship to the knowledge. Knowledge on the consequences of alcohol drinking on their own health should be emphasized. It is interesting that knowledge on drinking law among drinkers was better than non-drinkers. Knowledge on health effect was not associated to drinking status among those 15-75 years in this study but researcher found that knowledge on drinking law was associated to drinking among them. The finding supported that disseminating drinking hazard material, mandating health warning on alcohol containers or advertisement did not make stop or reduce drinking [71, 76, 77, 124]. It might be due to the reasons that in an environment in which many competing messages are received in the form of marketing and social norms supporting drinking, and in which alcohol is easily accessible, then it did not lead to sustained changes in behavior. Even though knowledge could not used to predict drinking status among those age 15-75 years in Pakham district, the information about the severely possible harm to both drinker and non-drinker may influence on making an informed decision to stop or not start drinking. Nevertheless, warning labels are important to help establish a social understanding that alcohol is a hazardous commodity, introduction of warning should be larger, more graphic and even using alternating messages such as stop drinking for important person or his/her beloved one in their life, these may affect to behavior.

Perception on alcohol consumption comprised perceived severity and risk on alcohol consumption. Since almost all of the respondents in this study were at high level of perception on severity and risk of alcohol consumption, therefore the characteristics of adult did not seem to relate to both perceptions. For those two perceptions on alcohol drinking, those at higher level of income and non-smokers seemed to have better perception on severity and risk of alcohol drinking. Considering relationship between knowledge on both health effect and law and perception on

severity and risk, it was found that those age 15-75 years who were high on knowledge having better perceived severity and risk. The finding confirmed that having high perceived severity and risk lead to decrease drinking [77, 78]. From the selection of individual-level factors significantly predicted drinking status among the study population, only perceived risk on alcohol drinking was included into the model. The lesser they perceived risk on alcohol drinking was the higher the risk of heavy drinking (OR 14.83 with 95% CI: 6.15-36.87). This finding is similar to the previous study which heavy drinkers reported lower self-perceived impairment compared to light drinkers [78]. Therefore, provide more information on alcohol consumption continuously to increase their perception on severity and risk of alcohol drinking enable to decrease drinking.

Most of communities perceived problems and effects on drinking but rather minimal realized about it [34]. Therefore, it is essential to provide problems and harm of alcohol drinking to communities and government in order that be aware about the consequence of drinking and search for the ways to reduce and stop drinking.

Self-efficacy to refuse drinking alcohol, 77.3% was at high level. The level of drinking refusal self-efficacy was increased as an increasing of age. This may be explained that the older had more experiences and maturities than the younger, it can influence to having high level of self-efficacy. Besides, elder may have deteriorated health and have chronic disease such as diabetes mellitus, hypertension, cardiovascular disease and so on that resulting in reduce or stop drinking among them [4, 125, 126]. The single had been at less level of refusal as compared to non-single. Considering sex, female had better refusing than male on this aspect. This may consider that life skill of female is better than male. Regarding the educational attainment, the higher educational school was the lesser the proportion of ability to refusing. This may be explained in term of social influence that those who were at high level of education having more sociability than those who were at low education, joining the party or meeting always having alcohol beverages. The respondents having problem on their health seemed to have better self-efficacy than those without health problem. This can be explained that those who already had problem on their health concern about

negative factors on health than those who are still healthy. Those who responded of being regular smokers, only 52.0% was at high level as compared to the non-smoker which 87.3% was at high level of self efficacy. It can be concluded that the non-smokers had ability to control themselves not to drink better than those who were smokers. Proportion of family members and closed friends drink are related to the level of drinking refusal self-efficacy. Variation of those characteristics correlated to self-efficacy should be emphasized when designing intervention programs on improving refusal self-efficacy. Self-efficacy provided positive consequence to alcohol drinking and it is the most important factor which influence to current and heavy drinking since it was the first individual-level factor being selected into the model. This finding was confirmed with other studies [81, 82]. Moreover, the risk factors (i.e. social influence) and protective factors such as social pressure, emotional relief and opportunistic drinking refusal self-efficacy can predict both drinking initiation and cessation [80]. Among those age 15-75 years not only need knowledge and motivation to change their behavior, but also a high level of confidence, percieved ability and perceived capability to resist doing negative behavior. In other hand, self-efficacy is significantly importan to prevent and stop drinking alcohol thus a drinking preventing and quitting programs should not only provide information about health risk drinking but also continuously making skill to resist drinking alcohol.

5.4.2 Enabling factors

The result of this study shown that alcohol beverages retails were available nearby residence and work place, since almost all of them (98.0%) reported that they can easily access to alcohol beverages everywhere they are. Moreover, some of them informed that they bought alcohol from illegal or home-made liqour shop. According to the law of limited time to sell alcohol beverages only between 11.00-14.00 hours and 17.00-24.00 hours [65]. Only 0.7% experienced of purchasing alcohol beverage according to the law permitted time. Retailers still ignore the permitted time. Besides, in context of Thailand as well as Pakham a district in Buriram province of the northeastern, there are many easy ways to drink alcohol such as home-made liquor in somewhere or some people, can buy spirits from bootlegger and retail shops that sell herbal liquor called “Soom ya dong”. Only 1.1% was refused when buying alcohol

beverages, since those ages below 20 years in this study were 12.7%. It can be explained that the restriction of sales and consumption by people below a legal drinking age are ineffective, this finding was confirmed with other studies [2, 88]. Above all, easily access to alcohol beverages demonstrated that the legislation which attempts to control alcohol availability is not fully enforced or is not effective.

Attitude on increasing price of alcohol beverage was inquired, about nine-tenth informed that an increasing price of alcohol beverage have no any effect to drinking and continue to drink even it was expensive and some of them response of buying in small portion instead bottle. Only 10.1% reported that an increasing price had an effect on their drinking. Considering the attitude of increasing price and drinking, the prevalence of heavy drinking among those informed increasing price had an effect on drinking was 1.35 times of those reported that increasing price had no effect on their drinking. This finding was consistent with other studies that heavy drinkers are hardly responsive to price variation or can say that a rise in alcohol prices leads to less alcohol consumption [55, 58, 76, 127]. However, it is contradicted to other studies that increasing price could not reduce heavy drinkers [128, 129]. It remains unclear whether increasing price of alcohol has an impact on reducing alcohol consumption. However, increase in price may prevent some from drinking and force some drinkers to quit or decrease drinking. The society will benefit not only from reduced drinkers, but also from decreased harm caused by drunken person.

Availability of information on anti-drinking is a protective factors of alcohol drinking, majority of the study population in Pakham had ever seen an anti-drinking campaign and warning messages. Television was the most common source of information. Drinker seemed to experience such information more than the non-drinker, it can be explained that non-drinker does not often involve in alcohol then they would ignore about it. Since this study was a cross-sectional survey, causes of drinking cannot be identified, but only factors associated to drinking [130]. Availability of anti-drinking was significantly related to drinking status in this study. Since almost all of them in village have ever seen an anti-drinking campaign from various sources throughout the years, homogeneous of this individual-level factor may

contribute to the findings. This finding is supported by previous studies [90, 92]. Although drinker obtained information on anti-drinking more than non-drinker but drinker still not stop drinking then providing all consumers with information about the effects of alcohol is needed. Moreover, the Thai Ministry of Public Health and other related organizations should be interested in developing awareness through several of media which may influence on changing drinking behavior. It is not only help drinker to quit drinking but also prevent initially drinking.

5.4.3 Reinforcing factors

About three-fifth of the population in Pakham district reported of having drinker in their family. Majority reported that they had 1-2 drinkers in their family and family member of the related blood was more likely to influence alcohol drinking currently and heavily. Proportion of family member drink did not have a difference on their drinking status. From the univariate analysis, the higher proportion of family member drink was not increased the chance of drinking. It can be explained that having drinker in family especially closed relatives influence their drinking behavior by ignoring the number of drinker in family. In other word, it is not important how many drinker in the family have, but only single drinker whose was closed relative can inflence to drinking alcohol. This finding can be described in term of family history drinking as supported by other studies [131, 132]. It can help to know that those who were at high risk to initiate drinking alcohol then the related person or organization should be aware to prevent dinking.

About three-forth reported of having closed friends drink. Having closed friend drink can influence on alcohol drinking as the finding in this study. The prevalence of current drinking among those having closed friends drink was 4.61 times of those having none of their closed friend drink. From univariate analysis, the higher proportion of closed friends drink was the more the chance of alcohol drinking. This factor was significantly predicted drinking status among those age 15-75 years. Closed friend have a great influence on making the decision to become a drinker and from he current study it was found that a 1 percent increase in the propotion of closed friend drink increases the odds of becoming drinkers nearly 4 percent. This result

confirm the findings from other studies, in which those who had friends drink were more likely to be a drinker [70, 85, 94]. In general, friends or even co-workers are powerful in both positive and negative health behaviors, whenever they get together they tend to do the same as the group member done. It does not matter, it is a positive or negative behavior. This finding suggests that friends can be used as an important resource to reduce drinking as mentioned that friend are also powerful in positive way. Therefore, instead of hanging out with friends but they are encouraged to join helpful activites such as a group handicraft, charity, or help addicted alcohol person in quit drinking program. It may be decreased drinking problem.

5.5 Village-level factors

From multilevel ordinal logistic regression analysis, none of the village-level factors was included into the model. The following discussion was mainly based on univariate analysis.

Type of village in this study was grouped according to local administration as municipal and non-municipal areas. Drinking status among those resided in both areas were not significantly different. It can be said that type of village in this study was not influence to drinking status, since the socio-cultural context in Pakham seemed likely to similar even in the different setting. Most of villages of Pakham district were in rural environments, the anti-drinking policy and law enforcement may not fulfilled resulting in excessive drinking and crime as supported with the previous study [32]. To prevent from drinking heavily and consequence of drinking, drinking policy should be made in particular for rural community; especially for Pakham district.

The most common occupation in the village was not recruited into the multilevel ordinal logistic model. However from univariate analysis, crop-farming and labor seemed to drinking more than those in rice-farming villages. This finding can be explained that labor always work with their co-workers and drinking together after work or often that the employer give them alcohol beverages like a prize for good work and for support relationship. For crop-farming, most of their plants were rubber

tree and cassava which could make a lot of money such that these farmers can afford to purchase alcohol beverages.

Housing and selling liquor shop ratio considered as alcohol outlet density was not included into the multilevel ordinal logistic model. This finding is the same as previous study [96] but contradicted to other studies [37, 97] which reported that greater density of alcohol outlet is associated with increased alcohol consumption and related harms. Although hosing-liquor shop ratio was not significantly associated to drinking status among those age 15-75 years in this study, but if alcohol buying was inconvenient then the drinking was discontinuous and not enjoyable may be resulted in stop drinking. Therefore, the regulation of alcohol beverage density and strictly reinforced time to selling alcohol as legal permitted may be a useful public health tool for the reduction of excessive alcohol consumption and related harms as well.

Health promoting village program which has been promoted throughout the country, anti-alcohol consumption is a part of drug addiction in health promoting program implemented in the village. In this study reported about two-fifth of the villages responded of having an anti-drinking activity in the last one year. Health promoting village program was not included in the multilevel ordinal logistic model. This finding is contradicted to other studies [90, 98, 133] reported that current drinking and heavy drinking is inversely associated with health promotion activities. It may be explained that the health promotion activities in this study area may not enough to change drinking behavior of population. From talking with some local people, liquor was provided after the meeting on anti-drug used in some villages. The prevention and reduction of alcohol problem at village-level should support and increase the programs such as public media campaigns, alcoholism recovery efforts, school education and instruction of Sub-district Health Promoting Hospitals.

The community empowerment program provides rural communities with the knowledge and skills necessary to lead initiatives for social change in good sustainable way. It is strengthened community by social participation of each community such as socioeconomic development, health promotion and prevention of

drug addiction including alcohol consumption [95]. In this study, the factor of community empowerment program was not recruited into the multilevel ordinal logistic model. This finding was similar to previous study, [86] social participation was not associated with alcohol consumption. It may be explained that the question or investigation on this issue may not exactly specify on community empowerment program about drinking, but question only inquired that each village has implemented the community empowerment program or not. The answer “yes or no” may be too rough to be evaluated since the detail of activities in the community empowerment program may not include anti-drinking, but other activities else such as exercise or agricultural development. Such that, this may be the reason of community empowerment program was not associated to drinking. People especially in rural areas seemed to concern more on drugs prevention and earning for their living such as improvement of agricultural products, price of rice and cassava. However anti-alcohol drinking is less concerned in most of the village. Alcohol drinking may lead to use of illicit drugs. Moreover, alcohol can make drinker loose controlling themselves. As a result of drinking especially heavy drinking may cause and ability to perform on their jobs and cause health problem. If villagers including village leader and related organization put more emphasize on anti-drinking, it will make adjacent benefits such as reducing the chance to use illicit drugs and do the job more effectively resulting in increasing the productivity. All of the village headmen in this study informed that they agreed to support anti-drinking policy and it will be more powerful if village headman and their residents join the action of anti-drinking together.

In summary, village-level factors were not associated to drinking among those age 15-75 years in Pakham district, it does not mean that village context and village environment do not play an important role in drinking among those who 15-75 years of age. The village-level factors in this study may not fit enough to explain the variation of villages. Further modeling efforts could be focused on including additional school-level predictors to try and reduce this variability. Village should keep the reducing and quitting alcohol drinking policy according to alcohol control law.

CHAPTER VI
CONCLUSION AND RECOMMENDATAIONS

6.1 Conclusion

Total of 1,293 population aged 15-75 years with the same proportion of male and female in Pakham district was recruited into the study. Prevalence of drinking after being weighted by age and sex of the population aged 15-75 years resided in Pakham district, 51.3% were current drinkers. Considering level of drinking of drinking status, 20.4%, 22.0% and 8.9% were at mild, moderate and heavy respectively. Male were drinker more than female especially heavy drinker, male was 12.8 times of female. The highest of prevalence of heavy drinking were at aged 15-24 years (13.0%). Single persons had the higher prevalence of current drinking than non-single one (64.2% and 47.8% respectively). Heavy drinking among the single were about three times of the non-single. The higher the level of educational attainment was the more the prevalence of current drinking. Smokers were more likely to be drinkers. Closed friends and family members of the same blood lineage were more likely to influence to consume alcohol. An average age at start drinking was about 21.3 years and the most common type of alcohol beverage at first drink was white spirit (46.7%), followed by beer (22.2%). The most common reason of first drink (85.0%) was friend's persuasion. Knowledge on drinking laws was much better than the knowledge of drinking on health effects. Only 4.4% were at good level of knowledge on health effects, and 89.9% were at good level of knowledge on drinking laws. Heavy drinker had less knowledge of health consequences on drinking but had better knowledge on drinking laws. Perceived on severity and risk of alcohol consumption were similar, since 98.3% and 98.4% were at the high level of perceived severity and perceived risk on drinking respectively. The non-drinker was at a better perception on severity and risk of drinking than the drinker, especially heavy drinker. For self-efficacy, an ability to prevent him/her from drinking, only 4.2% were at the low level of drinking refusal self-efficacy and 77.3% were at the high level. Female had better self-efficacy than

male. Those who were at low self-efficacy were more likely to be the current drinker than those at the high level. Considering accessibility to alcohol beverages, a majority (98.0%) informed that alcohol beverages was easy to access to since it was available everywhere nearby their residence and work place. Only 0.7% responded of buying alcohol at the time permitted by law. Most of the respondents (89.1%) reported that an increasing price of alcohol beverage would not have any effect on their drinking. A majority (91.3%) had ever heard an anti-drinking campaign. The most common source of anti-drinking was television (89.1%). Only 9.5% of drinkers informed that they had ever attempted to quit drinking. The most common reason of unable to quit successfully were friend' influence (80.7%), followed by less ability to control themselves (45.6%). Family member (78.7%) were the most important person who advice them to quit drinking. Public health personnel, doctor/nurse, drinking cessation clinic, friend and monk also played roles on quit drinking to drinkers and ex-drinkers.

Among 40 villages recruited into this study, 70.0% of villages located in non-municipal area and the rest were municipal area. There were 4 languages; Isan, Thai, Thai-Korat and Khmer use for communication in the study district. The most common occupation in village was rice farming (82.5%), followed by crop farming (15.0%). All villages informed that liquor was always available in wedding ceremony, New Year celebration Songkran festival. There were three activities that all villages reported of alcohol free; worship a deity, candle procession on Buddhist lent day and political election activities. About 37.5% of the villages responded of having an anti-drinking activity in the last one year.

The multilevel analysis to investigate the association between individual and village factors and current drinking status, the model fitting process started with an empty model. This was the first multilevel ordinal logistic regression which was fitted with no variable; this model provided an intra-class correlation (ICC) indicating that 19.2% of the variability in drinking status of respondents lies among villages. Then a set of individual characteristics with strongly significant likelihood ratio (LR) and met the parallel lines assumption namely self-efficacy, perceived risk on drinking, accessibility to alcohol, monthly income and availability of information on anti-

drinking were included to the model. Then the effect of both individual-level and village-level characteristics on drinking was considered to be included for the further step. Village characteristics, namely common occupation, community empowerment program, health promoting village program, housing-selling liquor shop ratio and language use were tested whether they were significantly related to drinking status. None village-level characteristics were significantly related to drinking status, since p-values of these variables were greater than 0.05. Comparison of model fitting between the model contained only individual-level factors and the model contained both individual-level factors and village-level factors revealed a non-significant change in -2Log likelihood statistics 1.060 with degree of freedom 7 and p-value 0.983. The likelihood ratio test of fit statistics and non-significant estimating parameters of village-level suggested that not to retain characteristics of village in the model. Therefore, the model that can best explain the relationship between the set of exploratory variables and ordered responses of drinking status was the model contained only individual-level factors.

Odds ratio for each of individual-level factors and 95% confidence intervals shown individual factors had more effect on drinking status than village characteristics in this study. Since all exploratory variables fitted to the assumption of parallel regression, it means that odds ratio of each independent variable are equal in all the set of category responses. Among those who were at low level of self-efficacy had higher risk of drinking heavier as compared to those at high level (OR 39.98 with 95% CI: 22.94-69.68). Those who were at moderate level of perceived risk on drinking were likely to drink heavier 14.83 times than those at a high level of perceived risk (95% CI: 6.15-36.87). Heavy drinking among those who were easily access to alcohol beverages were drink heavier 11.62 times more than those who were uneasily to access to it (95% CI: 3.47-38.90). Considering monthly income, respondents who earned 15,000 - 20,000 Baht were more likely to drink heavily 2.68 times as compared with those earned higher than 20,000 Bath (OR 2.68 with 95% CI: 1.11-6.49). However, other levels of monthly income were not statistically related to drinking status. An unavailability of information on anti-drinking decrease 32.0% in the odds for heavy drinking (95% CI: 0.49-0.97).

6.2 Recommendations

6.2.1 Recommendation for further study

1) The result from multilevel ordinal logistic analysis shown that village-level factors recruited in this study were not able to predict alcohol drinking. Further prospective multilevel research is suggested to demonstrate a causal relationship between drinking behavior and social norms which may influence on drinking. Community empowerment and regulation on selling and alcohol drinking should be considered, e.g. level of law enforcement and restrictions on alcohol selling and drinking especially at the sub-district and village level, community-based program (e.g. education and information, media advocacy, counter advertising and health promotion).

2) Moreover, further research should be conducted to investigate an effect of sub-district, district and provincial level on drinking status.

3) Since multilevel ordinal logistic analysis based upon an assumption of proportional odds (parallel lines assumption among various levels of drinking status) some meaningful variables could not retained in the model. Generalized logits model is suggested for further study. Furthermore, pair comparison using multi-level binary logistic is also suggested. Since there was only one line, this method does not concern about the parallel assumption.

4) A qualitative research is suggested to investigate individual factors associated to drinking as well as community and environmental factors which may affect on implementation of drinking law and regulation especially at the village and sub-district levels. An in-depth interview and focus group discussion are suggested for a better understanding the contexture factors to explain the causal inference.

6.2.2 Recommendation for implementation of the findings

Although village factors of this study were not related to drinking status among population, but village should keep the control-drinking policy strictly according the law of drinking control. Law enforcement on limited time to purchase

alcohol beverages is only between 11.00-14.00 hours and 17.00-24.00 hours. This is one method to prevent binge drinking cause negative consequences. Law enforcement of prohibited of selling alcohol to youths below 20 years of age to prevent their initiative drinking that may change to be the drinker in the future. Accurate and adequate information on alcohol consequences are needed to support people change in drinking behavior. In addition, warning labels can help establish a social understanding that alcohol is a hazardous product. Drinking prevention program should not only provide such information but also providing where they can get help and advice for those who experiencing problems along with their families and friends.

Gender difference and alcohol drinking should be considered when designing and implementing drinking prevention or anti-drinking program.

Since self-efficacy and perceived risk on drinking were strongly related to alcohol drinking, community empowerment to realize on harmful of alcohol consumption, especially in adolescent. Anti-drinking should be focused on young generation to prevent them from becoming a new drinker. Life skills especially among young people who are both in formal and non-formal education should be strengthening.

As a result from research worldwide, there are preventive measures that have been implemented and evaluated their effectiveness on reducing alcohol drinking among populations. A primary responsibility for formulating, implementing, monitoring and evaluating public policies to reduce alcohol drinking have been performed in most country worldwide. Moreover, sustainable political commitment, effective coordination, sustainable funding and appropriate engagement of sub-national governments as well as from civil society and economic operators are also essential for success.

Public policies, raising tax or prices of alcohol are an effective mechanism for reducing alcohol problems. The government can use this measure without adding expenses. However, the government needs to have defensive measure in illicit distillery or illicit importation. This policy may influence to income tax, since a part of the country income is from liquor tax. Moreover, manufacturers of alcohol are also the

main sponsor of several activities and projects in the country which create the conflict of interest. Sponsorship that promotes alcohol beverages should be regulated. Any kind of promotions in connection with activities targeting young people must be banned or restricted. Furthermore, the law and regulation of permitted time, place and person on drinking have to be strictly enforced and strictly implemented at all levels included at the village level.

Even though increasing price and tax of alcohol beverage may lead to decrease drinking, but there are some drinkers altering to consume lower-quality alcohol which having lower price. Most people change to drink lower-quality alcohol with high degree or switch to consume lower-price brands to maintain their alcohol consumption. To reduce alcohol consumption effectively by using tax/price measure, therefore tax rate of low-cost alcohol beverages should be raised in higher proportion than high-cost brands combined with price posting regulation in order to protect beverage maker set too low price in some brands.

Raising tax/price policy may not effect to reduce alcohol consumption directly. Since consumer is rather ignorant to its price but fulfill their drinking needs instead. Therefore, policies to educate and inform people are needed in order to clearly understanding on alcohol consequences including harms and health problems. It may build up drinker’s consciousness to reduce and quit drinking; this policy will accomplish if authorities provide useful information, and promote campaigns and strategies to prevent drinking continuously.

Community is suggested to set up its own rule and regulation on selling and drinking alcohol beverages through participation of all members and stakeholders. Observations should be made to observe the success and failure of the community in drinking law and regulation. The success and less success communities should share their experience to others. For non-effective or less successful communities, further investigation should be made to identify factors influence to less effective program. Cultivation of conscious mind to change social value in using alcohol beverages involve in festivals, celebrations or rituals may be inquired.

REFERENCES

1. WHO. Alcohol facts. 2011 [cited 2011 15 May]; 2011 2 Feb:[Available from: http://www.who.int/mediacentre/factsheets/fs349/en/index.html.
2. WHO. Global status report on alcohol and health 2011 [cited 2011 15 May]; Availablefrom:http://www.who.int/substance_abuse/publications/global_alcohol_report/msbgsruprofiles.pdf.
3. Room R, Babor T, Rehm J. Alcohol and public health. Lancet. 2005;365(9458):519-30.
4. Rehm J, Room R, van den Brink W, Jacobi F. Alcohol use disorders in EU countries and Norway: An overview of the epidemiology. Eur Neuropsychopharm. 2005;15(4):377-88.
5. Schuckit MA. Alcohol-use disorders. Lancet. 2009;373(9662):492-501.
6. Thavorncharoensap M, Teerawattananon Y, Chaikledkeaw U, Lertpitakpong C, Yothasamut J, Thitiboonsuwan K, et al. Economic Impact of alcohol consumption: A systematic review 2007.
7. WHO. Global status report: Alcohol Policy. 2004,Geneva: World Health organization.
8. Babor TF, Raul C, Sally C, Griffith E, Norman G, Kathryn G, et al. Alcohol: No Ordinary Commodity - Research and Public Policy. New York: Oxford University Press; 2003.
9. National Statistical Office, Ministry of Information and Communication Technology: The Cigarette Smoking and Alcoholic Drinking Behavior Survey. 2003-2009.
10. Wattanaporn K, Neramitpitagkul P, Jongprasertying P, Thammarungsi T. Thailand Alcohol Report 2007. Nonthaburi: Center for Alcohol Studies(CAS)2007.
11. Chartier KG, Hesselbrock MN, Hesselbrock VM. Alcohol problems in young adults transitioning from adolescence to adulthood: The association with race and gender. Addict Behav. 2011;36(3):167-74.
12. Kerr-Corrêa F, Igami TZ, Hiroce V, Tucci AM. Patterns of alcohol use between genders: A cross-cultural evaluation. J Affect Disord. 2007;102(1-3):265-75.

13. Zamboanga BL, Raffaelli M, Horton NJ. Acculturation status and heavy alcohol use among Mexican American college students: Investigating the moderating role of gender. Addict Behav. 2006;31(12):2188-98.

14. Rehm J, Giesbrecht N, Patra J, Roerecke M. Estimating chronic disease deaths and hospitalizations due to alcohol use in Canada in 2002: implications for policy and prevention strategies. Prev Chronic Dis [serial online] 2006 Oct [date cited];2006;Availablefrom:http://psylux.psych.tudresden.de/i2/klinische/publikationen/literatur/435m.pdf.

15. Ishikawa J, Kario K, Morinari M, Hoshide S, Eguchi K, Ishikawa S, et al. Regular alcohol drinking masks morning hypertension in well-controlled hypertensives: the Jichi morning hypertension research (J-MORE) study. Am J Hypertens. 2004;17(5, Supplement 1):S45-S45.

16. Tramacere I, Negri E, Bagnardi V, Garavello W, Rota M, Scotti L, et al. A meta-analysis of alcohol drinking and oral and pharyngeal cancers. Part 1: Overall results and dose-risk relation. Oral Oncol. 2010;46(7):497-503.

17. Vikram P. Alcohol Use and Mental Health in Developing Countries. Ann Epidemiol. 2007;17(5, Supplement):S87-S92.

18. DeMartini KS, Carey KB. The role of anxiety sensitivity and drinking motives in predicting alcohol use: A critical review. Clin Psychol Rev. 2011;31(1):169-77.

19. Chuang Y-C, Li Y-S, Wu Y-H, Chao HJ. A multilevel analysis of neighborhood and individual effects on individual smoking and drinking in Taiwan. BMC Public Health. 2007;151(7):1-10.

20. Bundhamcharoen K. Burden attributable to alcohol. In The First National Conference on Alcohol Consumption and Related Problems in Thailand: Center for Alcohol Studies (CAS)2005.

21. World Health Organization (WHO). Global strategy to reduce the harmful use of alcohol. 2010.

22. Komro KA, Toomey TL. Strategies to Prevent Underage Drinking. N ational Institut on Alcohol Abuse and Alcoholism [cited 2002 Aug]: Available from: http://pubs.niaaa.nih.gov/publications/arh26-1/5-14.htm.

23. Center for Alcohol Studies. Reviewed literature and analyzed research directions on regulation of alcoholic beverage in Thailand B.E 2493-2550. Nontaburi2008.

24. Kasantikul V, Ouellet JV, Smith T, Sirathranont J, Panichabhongse V. The role of alcohol in Thailand motorcycle crashes. Accid Anal Prev. 2005;37(2):357-66.
25. Sirathranont J, Kasantikul V. Mortality and injury from motorcycle collisions in Phetchaburi Province. J Med Assoc Thai. 2003;86(2): 97-102.
26. Neramitpitakul P, Thammarungsi T. Alcohol and Injury during festival: A case study from severe injuried patient in Songkran' festival in B.E 2553. Center for Alcohol Study and International Health Policy Program Thailand. 2010[cited 2011 15 July]; Available from: http://cas.or.th/index.php/.
27. Laslett A-M, Catalano P, Chikritzhs T, Dale C, Doran C, Ferris J, et al. The range and magnitude of alcohol's harm to others. AER Centre for Alcohol Policy Research, Turning Point Alcohol and Drug Centre, Eastern Health. 2010.
28. Room R, Jernigan D, Carlini-Marlatt B, Gureje O, Mäkelä K, Marshall M, et al. Alcohol in developing societies: a public health approach. Helsinki: Finnish Foundation for Alcohol Studies; 2002.
29. Thavorncharoensap M, Teerawattananon Y, Chaikledkeaw U, Lertpitakpong C, Yothasamut J, Thitiboonsuwan K, et al. A study on costs of social, health and economic consequences of alcohol consumption in Thailand : Health Intervention and Technology Assessment Program. 2008.
30. Green LW, Kreuter MW. Health Promotion Planning an Educational and Ecological Approach. (3 rd ed.). California: May-field Publishing Company; 1999.
31. Praag LV, Bracke P, Christiaens W, Levecque K, Pattyn E. Mental health in a gendered context: Gendered community effect on depression and problem drinking. Health & Place. 2009;15(4):990-8.
32. Valentine G, Holloway S, Knell C, Jayne M. Drinking places: Young people and cultures of alcohol consumption in rural environments. J Rural Stud. 2008;24(1):28-40.
33. Livingston M, Laslett A-M, Dietze P. Individual and community correlates of young people's high-risk drinking in Victoria, Australia. Drug Alcohol Depend. 2008;98(3):241-8.
34. Kaunkong B. Factors on drinking behavior of adolesent: A case study of Tatum district in Surin province. Center for Alcohol Studies(CAS). 2008.

35. Ham LS, Bonin M, Hope DA. The role of drinking motives in social anxiety and alcohol use. J Anxiety Disord. 2007;21(8):991-1003.

36. Zhou X, Su Z, Deng H, Xiang X, Chen H, Hao W. A comparative survey on alcohol and tobacco use in urban and rural populations in the Huaihua District of Hunan Province, China. Alcohol. 2006;39(2):87-96.

37. Pollack CE, Cubbin C, Ahn D, Winkleby M. Neighbourhood deprivation and alcohol consumption: does the availability of alcohol play a role? Int J Epidemiol. 2005 34(4):772-80.

38. Blomgren J, Martikainen P, Mäkelä P, Valkonen T. The effects of regional characteristics on alcohol-related mortality—a register-based multilevel analysis of 1.1 million men. Soc Sci Med. 2004;58(12):2523-35.

39. Bullers S, Cooper ML, Russell M. Social network drinking and adult alcohol involvement: A longitudinal exploration of the direction of influence. Addict Behav.26(2):181-99.

40. Goldstein H. Multilevel statistical models. London: Arnold,a number of the Hodder Headline Group; 2003.

41. Hox JJ. Multilevel analysis techniques and applications (second edition). New York: Routledge; 2010.

42. Hedeker D. Multilevel Models for Ordinal and Nominal Variables. In: Meijer JdLaE, editor. Handbook of Multilevel Analysis. New York2008.

43. Twisk JWR. Applied Multilevel Analysis. New York: Practical guides to Biostatistics and Epidemiology; 2006.

44. Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. The Alcohol Use Disorders Identification Test, Dependence DoMHaS;2001.

45. Berridge D. Multilevel Models for Ordered Categorical Variables. [cited 2011 15Aug];Availableafrom:http://redress.lancs.ac.uk/resources/Berridge_Damon/Multilevel_Models_for_Ordered_Categorical_Variables/notes.pdf.

46. Rosner B. Fundamentals of biostatistics. fith edition ed. United States of America: Brooks/Cole .2000.

47. McCullagh P. Regression Models for Ordinal Data. Journal of Rayol Statistical Society Series B (Methadological). 1980;42(2):109-42.

48. Agresti A. Analysis of Ordinal Categorical Data. Second ed: John Wiley & Sons; 2010.

49. Hedeker D, Mermelstein RJ. Analysis of longitudinal substance use outcomes using ordinal random-effects regression models. Addiction. 2000;95(11s3):381–94.

50. Dent CW, Grube JW, Biglan A. Community level alcohol availability and enforcement of possession laws as predictors of youth drinking. Prev Med. 2005;40(3):355-62.

51. Rehm J, Room R, Graham K, Monteiro M, Gmel G, Sempos CT. The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: an overview. Addiction. 2003 Sep;98(9):1209-28.

52. Whitlock EP, Polen MR, Green CA, Orleans T, Klein J. Behavioral Counseling Interventions in Primary Care To Reduce Risky/Harmful Alcohol Use by Adults: A Summary of the Evidence for the U.S. Preventive Services Task Force. Ann Intern Med. 2004;140(7):557-68.

53. Pöschl G, Seitz HK. Alcohol and Cancer. Alcohol Alcohol. 2004;39(3):155-65.

54. Bagnardi V, Blangiardo M, Vecchia CL, Corrao G. Alcohol consumption and the risk of cancer: a meta-analysis. Alcohol Res Health. 2001;25(4):263-70.

55. Gallet CA. The demand for alcohol: a meta-analysis of elasticities. Aust J Agr Resour Ec. 2007;51(2):121-35.

56. Chaloupka FJ, Grossman M, Saffer H. The effects of price on alcohol consumption and alcohol-related problems. Alcohol Res Health. 2002;26(1):22-34.

57. Fogarty J. The nature of the demand for alcohol: understanding elasticity. British Food Journal. 2006;108(4):316 - 32.

58. Wagenaar AC, Salois MJ, Komro KA. Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. Addiction. 2009;104(2):179-90.

59. Gruenewald PJ, Ponicki WR, Holder HD, Romelsjö A. Alcohol Prices, Beverage Quality, and the Demand for Alcohol: Quality Substitutions and Price Elasticities. Alcohol Clin Exp Res. 2006;30(1):96-105.

60. Coker JK, Borders LD. An Analysis of Environment and Social Factors Affecting Adolescent Problem Drinking. J Counsel Dev. 2001;79(2):200-8.

61. Nemeth Z, Kuntsche E, Urban R, Farkas J, Demetrovics Z. Why do festival goers drink? Assessment of drinking motives using the DMQ-R SF in a recreational setting. Drug Alcohol Rev. 2011;30(1):40-6.

62. Smith LA, Foxcroft DR. The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: A systematic review of prospective cohort studies. BMC Public Health. 2009;9:51-62.

63. Chisholm D, Rehm J, Van OM, Monterio M. Reducing the global burden of hazardous alcohol use: a comparative cost-effectiveness analysis. J Stud Alcohol. 2004;65(6):782-93.

64. International Center for Alcohol Policies. ICAP Reports 9. january 2001; Available from: http://www.icap.org.

65. Sornpisarn B, Keawmongkuhun J. Alcohol drinking by law. Bangkok: Center for Alcohol Studies2007.

66. Harford TC, Grant BF, Yi HY, Chen CM. Patterns of DSM-IV Alcohol Abuse and Dependence Criteria Among Adolescents and Adults: Results From the 2001 National Household Survey on Drug Abuse. Alcohol Clin Exp Res. 2005;29(5):810-28.

67. Hoeppner BB, Kahler CW, Jackson KM. Evaluating the validity and utility of scaling alcohol consumption indices alongside AUD symptoms in treatment-seeking adolescents. Drug Alcohol Depend. 2011;115(3):196-204.

68. Daeppen JB, Yersin B, Landry U, Pécoud A, Decrey H. Reliability and Validity of the Alcohol Use Disorders Identification Test (AUDIT) Imbedded Within a General Health Risk Screening Questionnaire: Results of a Survey in 332 Primary Care Patients. Alcohol Clin Exp Res. 2000;24(5):659-65.

69. Mossakowski KN. Is the duration of poverty and unemployment a risk factor for heavy drinking? Soc Sci Med. 2008;67(6):947-55.

70. Tumwesigye NM, Kasirye R, Nansubuga E. Is social interaction associated with alcohol consumption in Uganda? Drug Alcohol Depend. 2009;103(1-2):9-15.

71. The Administrative Committee for Substance Abuse Research Network (ACSAN) of the Office of Narcotics Control Board (ONCB). The National Household Survey for Substance and Alcohol Use (NHSSA); Ministry of Justice.2007.

72. Fukuda K, Yuzuriha T, Kinukawa N, Murakawa R, Takashima Y, Uchino A, et al. Alcohol intake and quantitative MRI findings among community dwelling Japanese subjects. J Neurol Sci. 2009;278(1-2):30-4.

73. Barrientos-Gutierrez T, Gimeno D, Mangione TW, Harrist RB, Amick BC. Drinking social norms and drinking behaviours: a multilevel analysis of 137 workgroups in 16 worksites. Occup Environ Med. 2007;64(9):602-8.

74. Aekplakorn W, Hogan MC, Tiptaradol S, Wibulpolprasert S, Punyaratabandhu P, Lim SS. Tobacco and hazardous or harmful alcohol use in Thailand: Joint prevalence and associations with socioeconomic factors. Addict Behav. 2008;33(4):503-14.

75. Khumsuwan K. The factors related smoking of Thai youth in Kanchanaburi DSS during 2003 to 2004 Bangkok: Mahidol University; 2007.

76. Anderson P, Chisholm D, Fuhr DC. Effectiveness and cost-eff ectiveness of policies and programmes to reduce the harm caused by alcohol. Lancet 2009;373(9682):2234–46.

77. Peltzer K, Seoka P. Prevalence and perception of alcohol use in a rural community in South Africa: a pre intervention survey. Human Sciences Research Council. 2004.

78. Brumback T, Cao D, King A. Effects of alcohol on psychomotor performance and perceived impairment in heavy binge social drinkers. Drug Alcohol Depend. 2007;91(1):10-7.

79. Oei TPS, Burrow T. Alcohol expectancy and drinking refusal self-efficacy: A test of specificity theory. Addict Behav. 2000;25(4):499-507.

80. Oei TPS, Hasking PA, Young RM. Drinking refusal self-efficacy questionnaire-revised (DRSEQ-R): a new factor structure with confirmatory factor analysis. Drug Alcohol Depend. 2005;78(3):297-307.

81. Schomerus G, Corrigan PW, Klauer T, Kuwert P, Freyberger HJ, Lucht M. Self-stigma in alcohol dependence: Consequences for drinking-refusal self-efficacy. Drug Alcohol Depend. 2011;114(1):12-7.

82. Demmel R, Beck B, Richter D, Reker T. Readiness to Change in a Clinical Sample of Problem Drinkers: Relation to Alcohol Use, Self-Efficacy, and Treatment Outcome. Eur Addict Res. 2004;10(3):133-8.

83. Padrão P, Damasceno A, Silva-Matos C, Laszczyńska O, Prista A, Gouveia L, et al. Alcohol consumption in Mozambique: Regular consumption, weekly pattern and binge drinking. Drug Alcohol Depend. 2011;115(1-2):87-93.

84. Caldwell TM, Rodgers B, Clark C, Jefferis BJMH, Stansfeld SA, Power C. Lifecourse socioeconomic predictors of midlife drinking patterns, problems and abstention: Findings from the 1958 British Birth Cohort Study. Drug Alcohol Depend. 2008;95(3):269-78.

85. Jukkala T, Mäkinen IH, Kislitsyna O, Ferlander S, Vågerö D. Economic strain, social relations, gender, and binge drinking in Moscow. Soc Sci Med. 2008;66(3):663-74.

86. Lindström M. Social capital, the miniaturization of community and high alcohol consumption: a population-based study. Alcohol Alcohol. 2005.

87. Cole JC, Goudie AJ, Field M, Loverseed AC, Charlton S, Sumnall HR. The effects of perceived quality on the behavioural economics of alcohol, amphetamine, cannabis, cocaine, and ecstasy purchases. Drug Alcohol Depend. 2008;94(1-3):183-90.

88. Wagenaar AC, Toomey TL. Effects of minimum drinking age laws: review and analyses of the literature from 1960 to 2000. J Stud Alcohol Suppl. 2002;14:206-25.

89. Henriksen L, Feighery EC, Schleicher NC, Fortmann SP. Receptivity to Alcohol Marketing Predicts Initiation of Alcohol Use. J Adolesc Health. 2008;42(1):28-35.

90. Holder H. Community Action From an International Perspective. In: Müller R,Klingemann H, editors. From Science to Action? 100 Years Later — Alcohol Policies Revisited: Springer Netherlands; 2004. p. 101-12.

91. Leon DA, McCambridge J. Liver cirrhosis mortality rates in Britain from 1950 to 2002: an analysis of routine data. Lancet.367(9504):52-6.

92. Susič TP, Švab I, Kolšek M. Community actions against alcohol drinking in Slovenia – a Delphi study. Drug Alcohol Depend. 2006;83(3):255-61.

93. Bailey JA, Hill KG, Meacham MC, Young SE, Hawkins JD. Strategies for characterizing complex phenotypes and environments: General and specific family environmental predictors of young adult tobacco dependence, alcohol use disorder, and co-occurring problems. Drug Alcohol Depend. 2011;118(2–3):444-51.

94. Bentler PM. EOS: structural equations program manual. BMDP Statistical Software. 1989.

95. Keawhawong T. Strenghten community empowerment program and civil society. Khan-Kean;2000.

96. Scribner RA, Cohe DA, Fisher W. Evidence of a Structural Effect Density: A Multilevel for Alcohol Outlet Analysis. Alcohol Clin Exp Res. 2000;24(2):188-95.

97. Campbell CA, Hahn RA, Elder R, Brewer R, Chattopadhyay S, Fielding J, et al. The Effectiveness of Limiting Alcohol Outlet Density As a Means of Reducing Excessive Alcohol Consumption and Alcohol-Related Harms. Am J Prev Med. 2009;37(6):556-69.

98. Ettner SL, French MT, Popovici I. Heavy drinking and health promotion activities. Soc Sci Med. 2010;71(1):134-42.

99. Excise department. Annual budget report of municipality in Buriram province. Buriram2010.

100. Moineddin R, Matheson FI, Glazier RH. A simulation study of sample size for multilevel logistic regression models. BMC Med Res. 2007;7(34):1-10.

101. Maas C, Hox J. Sufficient Sample Sizes for Multilevel Modeling. Methodology: Eur J Res Methods. 2005;1:85-91.

102. Mok M. Sample Size Requirements for 2-level Designs in Educational Research. Multilevel Modelling Newsletter. 1995;7(2):11-5.

103. Altindag DT, Cannonier C, Mocan NH. The impact of education on health knowledge. Elsevier. 2010;30(5):792-812.

104. Gustin JL, Simons JS. Perceptions of level of intoxication and risk related to drinking and driving. Addict Behav. 2008;33(4):605-15.

105. AlMarri TSK, Oei TPS, AbRahman RM. Validation of the drinking refusal self-efficacy questionnaire in Arab and Asian samples. Addict Behav. 2009;34(9):776-8.

106. Buriram Provincial Health Office. Population report of Buriram Province. 31 Jan 2012.

107. Lemeshow S, Hosmer DW, Klar J, Lwanga SK. Adequacy of Sample Size in Health Studies. Massachusetts: World Health Organization; 1990.

108. Liu I, Agresti A. The analysis of ordered categorical data:an overview and a survey of recent developments. Journal of the Spanish Society of Statistics and Operations Research. 2005;14(1):1-73.

109. David W. Hosmer, Lemeshow S. Applied Logistic Regression. second ed. Massachusetts;2000.

110. Sturgis P. Analysing Complex Survey Data: Clustering, Stratification and Weights. Soc Res. 2004(43).

111. Norris CM, Ghali WA, Saunders LD, Brant R, Galbraith D, Faris P, et al. Ordinal regression model and the linear regression model were superior to the logistic regression models. J Clin Epidemiol. 2006;59(5):448-56.

112. Fu L, Simpson DG. Conditional risk models for ordinal response data: simultaneous logistic regression analysis and generalized score tests. J Stat Plan Infer. 2002;108(1–2):201-17.

113. Twisk JWR .Applied multilevel analysis. United States of America: Cambride 2006.

114. Tabachnick BG, Fidell LS. Using Multivariate Statisics. fifth edition ed. United States of America;2007.

115. Moerbeek M, van Breukelen GJP, Berger MPF. A comparison between traditional methods and multilevel regression for the analysis of multicenter intervention studies. J Clin Epidemiol. 2003;56(4):341-50.

116. Austin PC, Tu JV, Alter DA. Comparing hierarchical modeling with traditional logistic regression analysis among patients hospitalized with acute myocardial infarction: Should we be analyzing cardiovascular outcomes data differently? Am Heart J. 2003;145(1):27-35.

117. Gelman A, Little TC. Improving on Probability Weighting for Household Size. Public Opin Quart. 1998;62(3):398-404.

118. Soongkhang S. The behavior of alcohol drinkers among population in Udon Thani Province. Udon Thani Public Health Provincial Office. 2009.

119. Center for Alcohol Studies(CAS). Alcohol consume situation. Nonthaburi2007.

120. Boyle A, Wee N, Harris R, Tompkins A, Soper M, Porter C. Alcohol-related emergency department attendances: is preloading a risk factor? Cross-sectional survey. Int J Emerg Med. 2010;3(3):151-5.

121. Paileeklee S. Economic loss of alcohol consumption: A study in KhonKhan province2009.
122. Livingston M, Room R. Variations by age and sex in alcohol-related problematic behaviour per drinking volume and heavier drinking occasion. Drug Alcohol Depend. 2009;101(3):169-75.
123. Little HJ. Behavioral Mechanisms Underlying the Link between Smoking and Drinking. Alcohol Res Health. 2000;24(4):215-24.
124. Moss AC, Dyer KR, Albery IP. Knowledge of drinking guidelines does not equal sensible drinking. Lancet. 2009;374(9697):1242.
125. Schectman JM, Nadkarni MM, Voss JD. The Association Between Diabetes Metabolic Control and Drug Adherence in an Indigent Population. Diabetes Care. 2002 June 1, 2002;25(6):1015-21.
126. Booth GL, Kapral MK, Fung K, Tu JV. Relation between age and cardiovascular disease in men and women with diabetes compared with non-diabetic people: a population-based retrospective cohort study. Lancet.368(9529):29-36.
127. Alan Brennan, Daragh O'Reilly, Robin Purshouse, Taylor K. Independent review of the effects of alcohol pricing and promotion: ScHARR University of Sheffield2008.
128. Ayyagari P, Deb P, Fletcher J, Gallo WT, Sindelar JL. Sin taxes: Do heterogeneous responses undercut their value? National Bureau of Economic Research. 2009.
129. Standard Eurobarometer 67. Public opinion in the European union2007.
130. Mann CJ. Observational research methods. Research design II: cohort, cross sectional, and case-control studies. Emerg Med J 2003;20(1):54-60.
131. LaBrie JW, Kenney SR, Lac A, Migliuri SF. Differential drinking patterns of family history positive and family history negative first semester college females. Addict Behav. 2009;34(2):190-6.
132. Conway KP, Swendsen JD, Merikangas KR. Alcohol expectancies, alcohol consumption, and problem drinking: The moderating role of family history. Addict Behav. 2003;28(5):823-36.
133. Hingson R, McGovern T, Howland J, Heeren T, Winter M, Zakocs R. Reducing alcohol-impaired driving in massachusetts: The saving lives program Am J Public Health. 1997;86(6):791–7.

APPENDICES

Copyright by Mahidol University

APPENDIX A

STRUCTURED QESTIONNAIRE FOR INDIVIDUAL

ID……..

Drinking behavior among population age 15-75 years in Buriram province

Instruction: Please tick ✓ in ❒ or ❍ prior to phrase or fill in the blank

Village_____District_____Buriram province

Part 1: General information

1. Age…….years old

2. Gender ❒ Male ❒ Female

3. Language use (multiple responses)
   ❍ Thai language ❍ Thai-Korat language ❍ Isan language
   ❍ Kuy language ❍ Khmer language ❍ Other (specify) _____

4. Education attainment
   ❒ None education ❒ Primary school ❒ Secondary school/Vocational certificate
   ❒ Diploma/High vocational certificate ❒ Bachelor's degree
   ❒ Other (specify) _____

5. Marital status
   ❒ Single ❒ Married and living together ❒ Widowed
   ❒ Divorced ❒ Married but living apart

6. What are you currently occupation? (multiple responses)
   ❍ Unemployment ❍ Housewife/Housekeeper ❍ Student
   ❍ Agriculture ❍ Labor ❍ Private's employee
   ❍ Government officer ❍ Business owner ❍ Other (specify) _____

7. Your total income…….baht/month

8. Is your income sufficiency?
   ❒ Sufficient with saving ❒ Sufficient ❒ Insufficient

9. Where is place of your living currently?
   ❒ Own house ❒ Relative's house ❒ Rented house ❒ Other (specify) _____

10. Do you have health problem?
   ❒ No ❒ Yes (specify) _____

11. What is your attitude on your currently health status?
❒ Good ❒ Fairly good ❒ Fairly poor ❒ Poor

12. Do you smoking cigarette?
❒ No smoke ❒ Regular smoke ❒ Irregular smoke

13. Do you have any closed friend?
❒ No ❒ Yes ⇨ How many? ….....persons
⇨ How many of them drink? ….....… persons

14. How many people are currently living with you? ……persons
Male……..persons Female……persons

15. Any of those who are currently living with you are drinker?
❒ None ❒ Yes ⇨ How many? ……..persons (excluded yourself)
❒ Male drinker……..persons ❒ Female drinker…….persons

16. Please specify sex, age, relationship and drinking frequency of who are currently drinkers in your family

Number	Sex	Age(years)	Your' relationship	Frequency of drinking**
1	M/F			1 2 3 4
2	M/F			1 2 3 4
3	M/F			1 2 3 4
4	M/F			1 2 3 4
5	M/F			1 2 3 4

**Frequency of drinking 1= Monthly or less 2= 2-4 times a month
3= 2-3 times a week 4= 4 or more times a week

Part 2: Alcohol drinking behavior

1. Do you drink?
❒ Never drink **(goes to part 3)**
❒ Ever drink
❒ Currently drink

2. Age at start of drinking……years old

3. What is type of alcohol beverage at first drink?
❒ White spirit ❒ Home-made liquor ❒ Beer ❒ Whiskey
❒ Wine ❒ Spy and wine cooler ❒ Cocktail ❒ Chiang chun
❒ Medicated spirit ❒ Other (specify) _____

4. What were reasons of drinking at first time? (multiple responses)

❍ Friend's persuasion ❍ Family member drinks ❍ Drink for enjoyment
❍ Lonely ❍ Relaxation ❍ To relive pain
❍ Sociability ❍ To increase appetite ❍ Self experiment
❍ Other (specify) _____

5. Who are you drinking with at first time?

❍ Alone ❍ Friend/co-workers ❍ Lover/Wife/Husband
❍ Parent ❍ Sibling ❍ Relative
❍ Other (specify) _____

For those ever drink, go to question 19 ***

AUDIT (6-15)

6. How often do you have a drink containing alcohol?

❒ Monthly or less ❒ 2 to 4 times a month
❒ 2 to 3 times a week ❒ 4 or more times a week

7. How drinks containing alcohol do you have on a typical day when you are drinking?

❒ 1 or 2 ❒ 3 or 4 ❒ 5 or 6 ❒ 7, 8, or 9 ❒ 10 or more

8. How often do you have six or more drinks on one occasion?

❒ Never ❒ Less than monthly ❒ Monthly ❒ Weekly ❒ Daily or almost daily

9. How often during the last year have you found that you were not able to stop drinking once you had started?

❒ Never ❒ Less than monthly ❒ Monthly ❒ Weekly ❒ Daily or almost daily

10. How often during the last year have you failed to do what was normally expected from you because of drinking?

❒ Never ❒ Less than monthly ❒ Monthly ❒ Weekly ❒ Daily or almost daily

11. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

❒ Never ❒ Less than monthly ❒ Monthly ❒ Weekly ❒ Daily or almost daily

12. How often during the last year have you had a feeling of guilt or remorse after drinking?

❒ Never ❒ Less than monthly ❒ Monthly ❒ Weekly ❒ Daily or almost daily

13. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

❒ Never ❒ Less than monthly ❒ Monthly ❒ Weekly ❒ Daily or almost daily

14. Have you or someone else been injured as a result of your drinking?

❒ No ❒ Yes, but not in the last year ❒ Yes, during the last year

15. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down?
❒ No ❒ Yes, but not in the last year ❒ Yes, during the last year

16. Have you ever attempted to quit drinking?
❒ Never ⇨ What were reasons of never? (multiple responses)
○ Not aware of negative penalty
○ Friends or surrounding people still drink
○ Drink as a habit
○ Other (specify) _____
❒ Ever ⇨ How many times have you ever attempted? ……times
⇨ What were reasons for unsuccessful quit? (multiple responses)
○ Not strong mind ○ Used as a habit
○ Moody when quit ○ Drinking decrease stress
○ Friends or surrounding people still drink
○ On-going advertisements
○ Other (specify) _____

17. Have you ever received any advice or help for quit drinking?
❒ No
❒ Yes ⇨ By whom? (multiple responses)
○ Friends ○ Girlfriend/Boyfriend
○ Family's member ○ Doctor/Nurse
○ Public health personnel ○ Drinking-cessation clinic
○ Other (specify) _____

18. Will you expect to quit drinking in the future?
❒ Quit ⇨ When? Within…….years……..months
❒ Not quit
❒ Uncertain

***

19. Which were the first 3 types of alcohol beverage that you prefer drinking? (identify as 1, 2, 3 ordinal)
…..White spirit ….. Whiskey ….. Home-made liquor
….. Beer ….. Wine ….. Spy wine cooler
….. Medicated spirits ….. Chiang chun …..Other (specify) _____

20. Which were the first 3 reasons of preference those types of alcohol beverage? (identify as 1, 2, 3 ordinal)
…..Good taste ….. Low price ….. Easy to buy
…..Good quality ….. Frequent drink …..Advertisement
…..Brand …..Image of product …..Other (specify) _____

21. How much amount of money you spend for buying alcohol monthly?...…...…Baht

22. Which were the first 3 of your preference time to drink? (identify as 1, 2, 3 ordinal)
    …..Before breakfast ….. During breakfast
    …..Before lunch ….. During lunch
    …..Before dinner/after work ….. During dinner
    …..Other (specify) _____

23. Which were the first 3 of your preference place to drink? (identify as 1, 2, 3 ordinal)
    ….. Own house ….. Friend's house ….. Retail shop ….. Rented house
    ….. Farmland ….. Restaurant ….. Village square ….. Other (specify) ____

24. Who were the first 3 persons whose you like to drinking with? (identify as 1, 2, 3 ordinal)
    ….. Alone ….. Friend ….. Girlfriend/Boyfriend
    ….. Family member ….. Relative ….. Singer or waiter
    ….. Other (specify) _____

25. Which were the first 3 occasions of your drinking? (identify as 1, 2, 3 ordinal)
    ….. Traditions such as New Year, Songkran or water festival, Rocket festival, and etc
    ….. Village activities such as wedding ceremony, ordination ceremony, funeral, and etc
    ….. Village worships such as worship a shrine of ancestor, rite of exorcise, and etc
    ….. Political activities such as political election period
    ….. Working celebration
    ….. Having visitors
    ….. Long weekend
    ….. Other (specify) _____

Part 3: Accessibility to alcohol

1. Where were you can buy alcohol? (multiple responses)
    ○ Retail shop
    ○ Wholesale shop
    ○ Illegal liquor shop
    ○ Other (specify) _____

2. Is it easy for you to access to alcohol?
    ❒ Yes ⇨ What are reasons of easy access? (multiple responses)
        ○ Having retail shop nearby house, not too far to walk
        ○ Having retail shop nearby work place, not too far to walk
        ○ Having several retail shops nearby house
        ○ Having several retail shops nearby work place
        ○ Let someone buy, no need to go to buy by your own
        ○ Easy to go to buy by your own, never been refused to buy alcohol
        ○ Other (specify) _____
    ❒ No ⇨ What are reasons of uneasy access? (multiple responses)
        ○ There is no alcohol shop nearby house/residence
        ○ There is no alcohol shop nearby work place
        ○ Difficult to go to buy by your own, ever been to refused to buy alcohol
        ○ Other (specify) _____

3. What time that you can buy alcohol?
❒ All the time ❒ 06.00-20.00
❒ 06.00-24.00 ❒ 11.00-14.00 and 17.00-24.00

4. Do you think that increasing in alcohol price have an effect on drinking?
❒ Yes ⇨ How does it affects? (multiple responses)
O Decreasing in drinking
O Trying to quit drinking
O Other (specify) _____
❒ No ⇨ Why does it not affect?
O Still buying even if it's expensive
O Buy in a glass of drink instead
O Change to drink home-made liquor
O Other (specify)_____

5. Have you ever seen health warning poster on drinking?
❒ No
❒ Yes ⇨ How do you feel when seeing it?
❒ Impassive ❒ Do not want to drink
❒ Want to quit drinking ❒ Quit drinking

6. Have you ever seen quit drinking campaign?
❒ No
❒ Yes ⇨ Which media you have ever seen? (multiple responses)
O Magazine O Radio O Television
O Internet O Newspaper O Poster/Brochure
O Other (specify) _____

7. How often that you have ever seen campaign of anti-drinking and danger of drinking?
❒ Once a week ❒ Once a month
❒ More than 2-3 months per time ❒ Never seen

Part 4: Knowledge on drinking

1. What are signs and symptoms of alcohol dependence? (multiple responses)
O Agitation O Shivering hands O Get moody easily O Hallucination
O Insomnia O Like eating desert O Other (specify) _____

2. What are symptoms of drunken? (multiple responses)
O Slurred speech O Blur vision O Stagger O Nausea/Vomiting
O Be hungry O Get angry easily O Intermittent amnesia O Other (specify) ____

3. What diseases are related with drinking? (multiple responses)
O Gastritis O Cirrhosis O Hypertension
O Lung cancer O Psychosis O Depressive disorder
O Alcoholism O Cardiovascular disease O Other (specify) _____

4. How does alcohol drinking effects to drinker? (multiple responses)
   - ○ Broken family ○ Quarrel ○ Lose one's task
   - ○ Waste money ○ Relationship problem ○ Be arrested while drunken
   - ○ Other (specify) _____

5. In Alcohol Control Act, what age is prohibited for selling of alcohol?
   - ❒ Below 17 years ❒ Below 18 years ❒ Below 19 years ❒ Below 20 years

6. Which places are prohibited to selling and buying alcohol? (multiple responses)
   - ○ Official place ○ School ○ Temple ○ Other (specify)_____

Part 5: Perceptions about drinking

Instruction: Please tick ✓ in ❒ that correspond to respondent's opinion

No	Statement	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Perceived severity on drinking						
1	Alcohol can cause death	❒	❒	❒	❒	❒
2	Alcoholic diseases are incurable	❒	❒	❒	❒	❒
3	Drinking cause family violence	❒	❒	❒	❒	❒
4	Drinking cause brain hemorrhage	❒	❒	❒	❒	❒
5	Alcoholic hallucinosis harm to life	❒	❒	❒	❒	❒
Perceived risk on drinking						
6	Drinking cause break down health	❒	❒	❒	❒	❒
7	Drinking decrease ability to work	❒	❒	❒	❒	❒
8	Drinking risk family problem	❒	❒	❒	❒	❒
9	Drinking cause lose one's mind	❒	❒	❒	❒	❒
10	Drinking cause traffic accident	❒	❒	❒	❒	❒
11	Drinker is disgusting person	❒	❒	❒	❒	❒

Copyright by Mahidol University

Part 6: Drinking refusal Self-efficacy

Instruction: Please tick ✓ in ❒ that correspond to respondent's opinion that they may drink

No	Statement	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
1	When I am in agony because of stopping or withdrawing from alcohol	❒	❒	❒	❒	❒
2	When I have a headache	❒	❒	❒	❒	❒
3	When I am feeling depressed	❒	❒	❒	❒	❒
4	When I am on vacation and want to relax	❒	❒	❒	❒	❒
5	When I am concerned about someone	❒	❒	❒	❒	❒
6	When I am so worried	❒	❒	❒	❒	❒
7	When I have the urge to try just one drink	❒	❒	❒	❒	❒
8	When I am being offered a drink in a social situation	❒	❒	❒	❒	❒
9	When I would like to drink	❒	❒	❒	❒	❒
10	When I want to test my willpower over drinking	❒	❒	❒	❒	❒
11	When I am feeling a physical need or craving for alcohol	❒	❒	❒	❒	❒
12	When I am physically tired	❒	❒	❒	❒	❒
13	When I am experiencing some physical health or injury	❒	❒	❒	❒	❒
14	When I feel like blowing up because of frustration	❒	❒	❒	❒	❒
15	When I see others drinking	❒	❒	❒	❒	❒
16	When I sense everything is going wrong for me	❒	❒	❒	❒	❒
17	When people I used to drink with encourage me to drink	❒	❒	❒	❒	❒
18	When I am feeling angry inside	❒	❒	❒	❒	❒
19	When I experience an urge or impulse to take a drink that catches me unprepared	❒	❒	❒	❒	❒
20	When I am excited or celebrating with others	❒	❒	❒	❒	❒

APPENDIX B

STRUCTURED QUESTIONNAIRE FOR VILLAGE

No. of questionnaire……..

General information of villages in Pakham district of Buriram Province

Instruction: Please tick ✓ in ❒ or ❍ prior to phrase or fill in the blank where it is appropriate

Village name _____Sub-district_____ Pakham district Buriram Province

1. Total number of household in village ……households

2. Totals population in village ……persons

3. Numbers of population in village by age and sex

Age (years)	Male	Female
< 15		
15-24		
25-44		
45-64		
65-84		
≥ 85		
Total		

4. What languages are used in your village? (multiple responses)
❍ Thai language ❍ Thai-Korat language ❍ Isan language
❍ Kuy language ❍ Khmer language ❍ Other (specify) _____

5. What is the most common occupation in your village?
❒ Rice farming ❒ Crop-farming ❒ Labor
❒ Merchant ❒ Other (specify) _____

6. How many shops are selling alcohol in your village? .....shops

7. Is there temple in your village?
❒ Have ❒ No have (please specify the distance of nearest temple…...Kilometers)

8. Is there hospital or Sub-district Health Promoting Hospital in your village?
❒ Have ❒ No have (please specify the distance of nearest one……Kilometers)

9. Is your village participating community empowerment program?
❒ Yes ❒ No

10. Is your village gained supporting about anti-drinking from any organization?
❒ No ❒ Yes (specify) _____

11. In the last year, is your village have anti-drinking activities or not?
❒ No ❒ Yes (specify) 1 _____ 2 _____
3 _____ 4 _____

12. Is there media of health effect and law about drinking in your village?
❒ No ❒ Yes ⇨ Which kind of media? (multiple responses)
O Community radio O Poster O CD/Video
O Community magazine O Other (specify) _____

13. Is there providing the law and regulation on drinking in the last year?
❒ Yes ❒ No

14. What activities in the village which lead to drink? (multiple responses)
O Wedding ceremony O New year celebration O Songkran or water festival
O Funeral O Long weekend O Worship a shrine of ancestor
O Having visitors O Ordination ceremony O Community sport
O Loy Krathong day O Rocket festival O Religious ceremony
O Working celebration O Season festival O Exorcise ceremony
O Rite of spirits and angle O Valentine's Day O Kathin ceremony
O Worship a deity O Candle procession in Buddhist lent
O Political election activities Total……..…activities

15. What is drinking status of village leader?
❒ Never drink ❒ Ever drink ❒ Occasional drink ❒ Regular drink

16. Is village leader supported to anti-drinking or not?
❒ Yes ❒ No ❒ Uncertain

Copyright by Mahidol University

APPENDIX C

STRUCTURED QUESTIONNAIRE IN THAI VERSION

แบบสัมภาษณ์โครงการวิจัย
เรื่อง "ปัจจัยที่มีอิทธิพลต่อการดื่มสุรา จังหวัดบุรีรัมย์"

คำชี้แจง ให้ผู้สัมภาษณ์สอบถามพฤติกรรมการดื่มสุราของผู้ใหญ่ที่ถูกสัมภาษณ์และกาเครื่องหมาย ✓ลงในช่องหรือเติมข้อความที่ผู้ใหญ่ตอบ

ส่วนที่ 1 ข้อมูลทั่วไป

หมู่บ้าน_____**ตำบล**_____**อำเภอปะคำ จังหวัดบุรีรัมย์**

1. **อายุ**.....ปีเต็ม
2. **เพศ** ❒ ชาย ❒ หญิง
3. **ภาษาที่ใช้ในการสื่อสาร** (ตอบได้มากกว่า 1 ข้อ)
   ❍ ไทย ❍ ส่วย ❍ ลาว ❍ เขมร ❍ ไทยโคราช ❍ อื่นๆ(ระบุ)_____
4. **การศึกษาสูงสุด**
   ❒ ไม่ได้เรียน ❒ ประถมศึกษา ❒ มัธยมศึกษา/ปวช.
   ❒ อนุปริญญา/ปวส. ❒ ปริญญาตรี ❒ อื่นๆ (ระบุ) _____
5. **สถานภาพสมรสของท่าน**
   ❒ โสด ❒ คู่ ❒ หม้าย ❒ หย่า ❒ แยกกันอยู่
6. **ท่านประกอบอาชีพอะไรบ้าง** (ตอบได้มากกว่า 1 ข้อ)
   ❍ เกษตรกรรม เช่น ทำนา ทำไร่ ทำสวน เลี้ยงสัตว์ ❍ รับจ้างแรงงาน
   ❍ รับจ้างทั่วไป ❍ กิจการส่วนตัว/ค้าขาย ❍ พนักงานบริษัทเอกชน
   ❍ รับราชการ/รัฐวิสาหกิจ ❍ นักเรียน/นักศึกษา ❍ แม่บ้าน
   ❍ ว่างงาน/ไม่มีงานทำ ❍ อื่นๆ (ระบุ) _____
7. **รายได้ต่อเดือนของท่าน**.....บาท
8. **ความพอเพียงของรายได้**
   ❒ ไม่เพียงพอ ❒ เพียงพอ ❒ มีเหลือเก็บ
9. **ลักษณะที่อยู่อาศัย**
   ❒ บ้านตัวเอง ❒ บ้านญาติ ❒ บ้านเช่า ❒ อื่นๆ (ระบุ) _____
10. **ท่านมีปัญหาสุขภาพหรือไม่**
    ❒ ไม่มี ❒ มี (โปรดระบุ)_____
11. **ท่านคิดว่าสุขภาพของท่านเป็นเช่นไรในปัจจุบัน**
    ❒ ดี ❒ ค่อนข้างดี ❒ พอใช้ ❒ไม่ค่อยดี ❒ ไม่ดีเลย
12. **ท่านสูบบุหรี่หรือไม่**
    ❒ ไม่สูบ ❒ สูบทุกวัน ❒ สูบนานๆครั้ง
13. **จำนวนเพื่อนสนิทรวม**.....คน **เป็นผู้ที่ดื่มสุรา**.....คน
14. **จำนวนสมาชิกทั้งหมดในครอบครัวรวม**.....**คน** ชาย.....คน หญิง.....คน
15. **มีสมาชิกในครอบครัวดื่มสุราหรือไม่**
    ❒ ไม่มี ❒ มี **ระบุ รวม**.....**คน** ชาย.....คน หญิง.....คน

16. ***โปรดระบุเพศ อายุ ความสัมพันธ์กับท่าน และความถี่ในการดื่มของบุคคลที่พักอาศัยในบ้านเดียวกับท่าน***

คนที่	เพศ	อายุ(ปี)	ความสัมพันธ์กับท่าน	ถ้าดื่ม โปรดระบุความถี่**
1	ช / ญ			1 2 3 4
2	ช / ญ			1 2 3 4
3	ช / ญ			1 2 3 4
4	ช / ญ			1 2 3 4
5	ช / ญ			1 2 3 4

**ความถี่ในการดื่ม 1= เดือนละครั้งหรือน้อยกว่า 2= 2-4 ครั้งต่อเดือน
3= 2-3 ครั้งต่อสัปดาห์ 4= 4 ครั้งหรือมากกว่า ต่อสัปดาห์

ส่วนที่ 2 พฤติกรรมการดื่มเครื่องดื่มแอลกอฮอล์

1. **ท่านดื่มสุราหรือไม่ในปัจจุบัน**
   - ❒ ดื่ม
   - ❒ เคยดื่มแต่เลิกแล้วในปัจจุบัน
   - ❒ ไม่เคยดื่มเลย

สำหรับผู้ที่ไม่เคยดื่มสุรา*ข้ามไปตอบส่วนที่ 3*

2. **ท่านดื่มสุราครั้งแรกเมื่ออายุ**.....**ปี**

3. **ชนิดของเครื่องดื่มที่มีแอลกอฮอล์ที่ท่านดื่มครั้งแรก**
   - ❒ เหล้าขาว ❒ เหล้าสี เช่น แม่โขง แสงโสม ❒ เหล้าต้ม ❒ เหล้าดองยา
   - ❒ เบียร์ ❒ น้ำผลไม้ที่ผสมแอลกอฮอล์ ❒ เซี่ยงชุน ❒ สปายไวน์คูลเลอร์
   - ❒ไวน์ ❒ อื่นๆ (ระบุ) _____

4. **ท่านดื่มสุราครั้งแรกเพราะอะไร *(ตอบได้มากกว่า1 ข้อ)***
   - ❍ เพื่อนชักชวน ❍ คนในครอบครัวดื่ม ❍ เพื่อความสนุกสนาน ❍ ช่วยคลายเครียด
   - ❍ เหงา ❍ เพื่อให้เข้ากับสังคม ❍ ช่วยเพิ่มความอยากอาหาร
   - ❍ อยากดื่มเอง ❍ คลายอาการปวดเมื่อย ❍ อื่นๆ (ระบุ) _____

5. **ผู้ที่ท่านดื่มเครื่องดื่มที่มีแอลกอฮอล์ด้วยครั้งแรกคือ *(ตอบได้มากกว่า1 ข้อ)***
   - ❍ ดื่มคนเดียว ❍ เพื่อน/เพื่อนร่วมงาน ❍ คนรัก/ภรรยา ❍ พ่อ/แม่
   - ❍ พี่ / น้อง ❍ญาติ ❍ อื่นๆ (ระบุ) _____

สำหรับผู้ที่ดื่มในปัจจุบันให้ถามคำถามข้อที่ 6-18
สำหรับผู้ที่เคยดื่มแต่เลิกแล้วให้ข้ามไปที่ข้อ 19***

6. **ท่านดื่มบ่อยแค่ไหน**
   - ❒ เดือนละครั้งหรือน้อยกว่า ❒ 2-4 ครั้งต่อเดือน
   - ❒ 2-3 ครั้งต่อสัปดาห์ ❒ 4 ครั้งหรือมากกว่า ต่อสัปดาห์

7. **ท่านดื่มปริมาณเท่าใดในแต่ละครั้ง**
   - ❒ น้อยกว่า 1 เป๊ก/กั๊ก ❒ 1-2 เป๊ก/กั๊ก ❒ มากกว่า 2 เป๊ก/กั๊ก-3 เป๊ก/กั๊ก
   - ❒ มากกว่า 3 เป๊ก/กั๊ก-4 เป๊ก/กั๊ก ❒ มากกว่า 4 เป๊ก/กั๊ก

8. **ท่านดื่มเบียร์** 4 **กระป๋อง** ($1\frac{1}{2}$ **ขวดใหญ่**) **หรือเหล้า** 3 **เป๊กขึ้นไป บ่อยเพียงใด**

❒ ไม่เคยเลย ❒ น้อยกว่าเดือนละครั้ง ❒ เดือนละครั้ง
❒ สัปดาห์ละครั้ง ❒ ทุกวัน/เกือบทุกวัน

9. ***ในรอบปีที่ผ่านมา*** **บ่อยเพียงใด เมื่อเริ่มดื่มไปแล้วท่านไม่สามารถหยุดดื่มได้**

❒ ไม่เคยเลย ❒ น้อยกว่าเดือนละครั้ง ❒ เดือนละครั้ง
❒ สัปดาห์ละครั้ง ❒ ทุกวัน/เกือบทุกวัน

10. ***ในรอบปีที่ผ่านมา*** **ท่านดื่มจนเสียงานบ่อยเพียงใด**

❒ ไม่เคยเลย ❒ น้อยกว่าเดือนละครั้ง ❒ เดือนละครั้ง
❒ สัปดาห์ละครั้ง ❒ ทุกวัน/เกือบทุกวัน

11. ***ในรอบปีที่ผ่านมา*** **ท่านต้องดื่มทันทีในตอนเช้าเพื่อที่จะได้ดำเนินชีวิตตามปกติ หรือถอนอาการเมาค้าง บ่อยเพียงใด**

❒ ไม่เคยเลย ❒ น้อยกว่าเดือนละครั้ง ❒ เดือนละครั้ง
❒ สัปดาห์ละครั้ง ❒ ทุกวัน/เกือบทุกวัน

12. ***ในรอบปีที่ผ่านมา*** **ท่านรู้สึกผิดหลังจากที่ดื่ม บ่อยเพียงใด**

❒ ไม่เคยเลย ❒ น้อยกว่าเดือนละครั้ง ❒ เดือนละครั้ง
❒ สัปดาห์ละครั้ง ❒ ทุกวัน/เกือบทุกวัน

13. ***ในรอบปีที่ผ่านมา*** **ภายหลังดื่มแล้วท่านไม่สามารถจำได้ว่าเกิดอะไรขึ้น บ่อยเพียงใด**

❒ ไม่เคยเลย ❒ น้อยกว่าเดือนละครั้ง ❒ เดือนละครั้ง
❒ สัปดาห์ละครั้ง ❒ ทุกวัน/เกือบทุกวัน

14. **ท่านเคยทำให้บุคคลอื่นหรือตัวท่านเองได้รับบาดเจ็บจากการดื่มของท่านหรือไม่ (ทะเลาะเบาะแว้ง อุบัติเหตุ เป็นต้น)**

❒ ไม่เคยเลย ❒ เคยแต่นานกว่า 1 ปีมาแล้ว ❒ เคยใน 1 ปีที่ผ่านมา

15. **เคยมีใครมาขอให้ท่านลดการดื่มลงหรือไม่**

❒ ไม่เคยเลย ❒ เคยแต่นานกว่า 1 ปีมาแล้ว ❒ เคยใน 1 ปีที่ผ่านมา

16. **ท่านเคยพยายามเลิกดื่มสุราหรือไม่**

❒ ไม่เคย ➲➲ โปรดระบุเหตุผล (*ตอบได้มากกว่า 1 ข้อ*)
○ ไม่เห็นโทษของการดื่มสุรา ○ เพื่อนหรือผู้ใกล้ชิดยังดื่มอยู่
○ ดื่มจนเคยชิน ○ อื่นๆ (ระบุ)_____

❒ เคย ➲➲ เคยพยายามมา .....ครั้ง
➲➲ โปรดระบุเหตุผลที่ไม่สามารถเลิกได้ (*ตอบได้มากกว่า 1 ข้อ*)
○ มีจิตใจไม่เข้มแข็ง ○ ดื่มจนเคยชิน
○ เมื่อเลิกดื่มแล้วใจคอหงุดหงิด ○ การดื่มทำให้ลดความเครียด
○ เพื่อนหรือผู้ใกล้ชิดยังดื่มอยู่ ○ ยังมีสื่อโฆษณาให้เห็นอยู่
○ อื่นๆ (ระบุ)_____

17. **ท่านเคยได้รับคำแนะนำหรือความช่วยเหลือในการ ลด ละ เลิกดื่มสุราหรือไม่**

❒ ไม่เคย
❒ เคย ➲➲ เคยได้รับจากใครบ้าง (*ตอบได้มากกว่า 1 ข้อ*)
○ เพื่อน ○ แฟน ○ คนในครอบครัว
○ แพทย์/พยาบาล ○ อาสาสมัครสถานีอนามัย
○ คลินิกเลิกเหล้า ○ อื่นๆ (ระบุ)_____

18. **ในอนาคตท่านคิดว่าจะเลิกดื่มสุราหรือไม่**
- ❒ เลิกดื่ม ➲➲ คิดว่าจะเลิกดื่มสุราเมื่อใด ภายใน.....ปี.....เดือน
- ❒ ไม่เลิกดื่ม
- ❒ ไม่แน่ใจ

* * *

19. **เครื่องดื่มแอลกอฮอล์ท่านชอบดื่ม** 3 **ลำดับแรกมีอะไรบ้าง** (**ให้ระบุลำดับ** 1,2,3 **ที่ดื่มบ่อย**)

.....เหล้าขาว .....เหล้าสี เช่น แม่โขง แสงโสม .....เหล้าต้ม .....เบียร์
.....ยาดองเหล้า .....ไวน์ .....สปายไวน์คูลเลอร์ .....เชี่ยงชุน
.....น้ำผลไม้ที่ผสมแอลกอฮอล์ .....อื่นๆ (ระบุ) _____

20. **เหตุผลที่ท่านชอบดื่มสุราชนิดนั้น** 3 **ลำดับแรกมี** (**เรียงลำดับ** 1,2,3 **ตามเหตุผลที่ดื่ม**)

.....รสชาติดี .....ราคาถูก .....หาซื้อง่าย/สะดวก
.....คุณภาพดี .....เคยดื่มเป็นประจำ .....โฆษณา
.....ยี่ห้อ .....สีสันภาพลักษณ์สินค้า .....อื่นๆ (ระบุ)_____

21. **ค่าใช้จ่ายในการดื่มสุราในแต่ละเดือนโดยเฉลี่ย**.....**บาท**

22. **โดยปกติท่านดื่มเวลาใด โปรดระบุเวลาที่ดื่ม** 3 **ลำดับแรกโดยเรียง** 1,2,3 **ตามเวลาที่ดื่ม**

.....ก่อนอาหารเช้า .....ตอนรับประทานอาหารเช้า
.....ก่อนอาหารกลางวัน .....ตอนรับประทานอาหารกลางวัน
.....ก่อนอาหารเย็น/หลังเลิกงาน .....ตอนรับประทานอาหารเย็น
.....อื่นๆ (ระบุ)_____

23. **ปกติท่านมักดื่มสุราที่ไหนบ้าง** 3 **ลำดับแรก** (**เรียงลำดับ** 1,2,3 **ตามสถานที่ที่ดื่ม**)

.....บ้านตนเอง .....บ้านเพื่อน .....ร้านค้าที่ซื้อสุรา
.....บ้านเช่า/บ้านพัก .....ไร่/นา .....ร้านอาหาร
.....ตามสี่แยกหมู่บ้าน/ที่สาธารณะ/จุดรวมกลุ่มตามหมู่บ้าน .....อื่นๆ (ระบุ)_____

24. **ปกติท่านมักดื่มสุรากับใครบ้าง** 3 **ลำดับแรก** (**เรียงลำดับ** 1,2,3 **ตามบุคคลที่ดื่ม**)

.....คนเดียว .....เพื่อน .....คนรัก .....ครอบครัว
.....ญาติ .....นักร้อง/เด็กเสิร์ฟ .....อื่นๆ (ระบุ)_____

25. **ท่านดื่มในโอกาสใดบ้าง** (**เรียงลำดับ** 1,2,3 **ตามโอกาสที่ดื่ม** 3 **ลำดับแรก**)

.....ประเพณีต่างๆ เช่น บุญบั้งไฟ ลอยกระทง สงกรานต์ ปีใหม่ ฯลฯ
.....กิจกรรมชุมชน เช่น งานแต่งงาน ขึ้นบ้านใหม่ งานแข่งขันกีฬา งานฌาปนกิจศพ งานบวช งานบุญต่างๆ ฯลฯ
.....พิธีกรรมในชุมชน เช่น พิธีไหว้ผีปู่ย่า สะเดาะเคราะห์ แห่นางแมว รำแม่มด รำผีฟ้า
.....กิจกรรมทางการเมือง เช่น ช่วงเลือกตั้งต่างๆ
.....ฉลองความยินดี
.....มีญาติมาเยี่ยม
.....ท่องเที่ยวพักผ่อนในสถานที่ต่างๆ/วันหยุดยาวหลายวัน
.....อื่นๆ (ระบุ) _____

ส่วนที่ 3 การเข้าถึง

1. **ในชุมชนของท่านสามารถซื้อสุรามาจากที่ใด** (**ตอบได้มากกว่า** 1 **ข้อ**)

- ○ ร้านขายของชำ/ปลีก อื่นๆ
- ○ ร้านขายของส่ง
- ○ ซุ้มขายเหล้า
- ○ อื่นๆ (ระบุ)_____

Scanned by Mahidol University

2. **ท่านคิดว่าสามารถหาซื้อสุราได้ยากหรือง่าย**

❒ ง่าย ➲➲ เนื่องจาก *(ตอบได้มากกว่า 1 ข้อ)*

- ○ มีร้านขายสุราอยู่ใกล้ **บริเวณบ้าน / ที่พัก** เดินไม่ไกลนัก
- ○ มีร้านขายสุราอยู่ใกล้ **ที่ทำงาน** เดินไม่ไกลนัก
- ○ มีร้านขายสุราหลายร้านอยู่ใกล้ **บริเวณบ้าน / ที่พัก**
- ○ มีร้านขายสุราหลายร้านอยู่ใกล้ **ที่ทำงาน**
- ○ ฝากผู้อื่นซื้อ ไม่ต้องไปซื้อเอง
- ○ ไปซื้อด้วยตนเองไม่ลำบาก เนื่องจากไม่เคยถูกปฏิเสธการขาย
- ○ อื่นๆ (ระบุ)_____

❒ ยาก ➲➲ เนื่องจาก *(ตอบได้มากกว่า 1 ข้อ)*

- ○ ร้านขายสุราอยู่ไกล **บริเวณบ้าน / ที่พัก**
- ○ ร้านขายสุราอยู่ไกล **บริเวณที่ทำงาน**
- ○ ไปซื้อด้วยตนเองลำบาก เนื่องจากเคยถูกปฏิเสธการขาย
- ○ อื่นๆ (ระบุ)_____

3. **ช่วงเวลาใดที่ร้านค้าในชุมชนหรือสถานที่ใกล้เคียงเปิดจำหน่ายสุราบ้าง**

❒ ตลอดเวลา (24 ชั่วโมง) ❒ 06.00-20.00 น.
❒ 06.00-24.00 น. ❒ 11.00-14.00 น. และ 17.00-24.00

4. **ท่านคิดว่าการขึ้นราคาสุราในปัจจุบันมีผลต่อการดื่มสุราหรือไม่**

❒ มีผล ➲➲ โปรดระบุเหตุผล *(ตอบได้มากกว่า 1 ข้อ)*

○ ลดการดื่มสุราลง ○ พยายามเลิกดื่มสุรา ○ อื่นๆ (ระบุ)_____

❒ ไม่มีผล ➲➲ โปรดระบุเหตุผล *(ตอบได้มากกว่า 1 ข้อ)*

○ เปลี่ยนไปดื่มสุราแบบอื่น เช่น สุราเถื่อน สุราต้มเอง
○ แพงเท่าไรก็ซื้อ ○ ซื้อเป็นก๊ก/เป็กแทน ○ อื่นๆ (ระบุ)_____

5. **ท่านเคยเห็นภาพหรือโปสเตอร์คำเตือนเกี่ยวกับสุราหรือไม่**

❒ ไม่เคย
❒ เคย➲➲ เมื่อเห็นแล้วรู้สึกอย่างไร

❒ไม่รู้สึกอะไร ❒ไม่อยากดื่มสุรา ❒อยากเลิกดื่มสุรา ❒เลิกดื่มสุรา

6. **ท่านเคยได้ยินหรือเห็นการรณรงค์เพื่อการไม่ดื่มสุราและพิษภัยของสุรา หรือไม่**

❒ ไม่เคย
❒ เคย ➲➲ โดยสื่อใดบ้าง *(ตอบได้มากกว่า 1 ข้อ)*

○ นิตยสาร ○ วิทยุ ○ โทรทัศน์ ○ อินเตอร์เน็ต ○ หนังสือพิมพ์
○ โปสเตอร์/แผ่นพับ/ใบปลิว ○ อื่นๆ (ระบุ)_____

7. **ท่านเคยได้ยินหรือเห็นการรณรงค์เพื่อการไม่ดื่มสุราและพิษภัยของสุราโดยเฉลี่ยบ่อยแค่ไหน**

❒ อาทิตย์ละครั้ง ❒ เดือนละครั้ง ❒ มากกว่า 2-3 เดือนต่อครั้ง ❒ ไม่เคยพบเลย

ส่วนที่ 4 ความรู้เกี่ยวกับสุรา

1. **อาการใดบ้างที่แสดงถึงการติดสุรา *(ตอบได้มากกว่า 1 ข้อ)***

○ กระสับกระส่าย ○ นอนไม่หลับ ○ เกิดภาพหลอน ○ มีอาการมือสั่น
○ มีอารมณ์หงุดหงิดง่าย ○ ชอบกินของหวาน ○ อื่นๆ (ระบุ)_____

2. **อาการใดบ้างที่แสดงถึงการเมาสุรา *(ตอบได้มากกว่า 1 ข้อ)***

○ พูดไม่ชัด ○ ทรงตัวลำบาก ○ สายตาพร่ามัว ○ คลื่นไส้อาเจียน
○ หิวข้าว ○ หงุดหงิดง่าย ○ มีอาการหลงลืมเป็นระยะ ○ อื่นๆ (ระบุ)_____

3. **สุราก่อให้เกิดโรคใดได้บ้าง** ***(ตอบได้มากกว่า 1 ข้อ)***

○ โรคกระเพาะอาหาร ○ โรคตับแข็ง ○ โรคความดันโลหิตสูง
○ โรคมะเร็งปอด ○ โรคพิษสุราเรื้อรัง ○ โรคหัวใจและหลอดเลือด
○ โรคจิตประสาท ○ โรคซึมเศร้า ○ อื่นๆ (ระบุ)_____

4. **การดื่มสุราส่งผลกระทบใดต่อตัวผู้ดื่ม** ***(ตอบได้มากกว่า 1 ข้อ)***

○ ครอบครัวแตกแยก ○ เกิดการทะเลาะวิวาท ○ เสียการเสียงาน
○ สูญเสียเงินทอง ○ มีปัญหาด้านสัมพันธภาพกับผู้อื่น
○ ถูกจับขณะมึนเมา ○ อื่นๆ (ระบุ)_____

5. **พรบ.ควบคุมเครื่องดื่มแอลกอฮอล์ ห้ามขายแลกเปลี่ยนสุราให้แก่บุคคลที่อายุต่ำกว่าเท่าใด**

❒ 17 ปี ❒ 18 ปี ❒ 19 ปี ❒ 20 ปี

6. **สถานที่ใดต่อไปนี้กฎหมายกำหนดเป็นสถานที่ห้ามขายและดื่มสุรา (ตอบได้มากกว่า 1 ข้อ)**

○ สถานที่ราชการ ○ โรงเรียน ○ วัด ○ ร้านอาหาร ○ อื่นๆ (ระบุ)_____

ส่วนที่ 5 การรับรู้เกี่ยวกับสุรา

ข้อ	ข้อความ	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
การรับรู้ต่อความรุนแรง						
1	สารพิษในสุราเป็นสาเหตุให้ผู้ที่ดื่มเสียชีวิตได้	❒	❒	❒	❒	❒
2	โรคที่เกิดจากสุราไม่สามารถรักษาให้หายได้	❒	❒	❒	❒	❒
3	การดื่มสุราเป็นสาเหตุหนึ่งที่ทำให้เกิดความรุนแรงในครอบครัว	❒	❒	❒	❒	❒
4	การดื่มสุราทำให้หลอดเลือดในสมองแตก	❒	❒	❒	❒	❒
5	การดื่มสุราทำให้เกิดอาการประสาทหลอนเป็นอันตรายต่อชีวิตทั้งของตนเองและผู้อื่น	❒	❒	❒	❒	❒
การรับรู้ต่อความเสี่ยง						
6	การดื่มสุราทำให้สุขภาพเสื่อมโทรม	❒	❒	❒	❒	❒
7	การดื่มสุราทำให้ประสิทธิภาพในการทำงานลดลง	❒	❒	❒	❒	❒
8	การดื่มสุราเสี่ยงต่อการเกิดปัญหาครอบครัว	❒	❒	❒	❒	❒
9	การดื่มสุราทำให้ขาดสติและทำผิดกฎหมายโดยไม่รู้ตัว	❒	❒	❒	❒	❒
10	การดื่มสุรามีโอกาสเกิดอุบัติเหตุจากการขับขี่มากกว่าผู้ที่ไม่ดื่ม	❒	❒	❒	❒	❒
11	การดื่มสุราทำให้สังคมรังเกียจ	❒	❒	❒	❒	❒

ส่วนที่ 6 ความคาดหวังในความสามารถของตนเองในการป้องกันการดื่มสุรา

ข้อ	ข้อความ	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
1	ท่านจะดื่มสุราเมื่อท่านรู้สึกทรมานเนื่องจากการหยุดหรือเลิกดื่มสุรา	❐	❐	❐	❐	❐
2	ท่านจะดื่มสุราเมื่อท่านมีอาการปวดศีรษะ	❐	❐	❐	❐	❐
3	ท่านจะดื่มสุราเมื่อท่านรู้สึกหดหู่	❐	❐	❐	❐	❐
4	ท่านจะดื่มสุราเมื่อท่านอยู่ในช่วงวันหยุดพักผ่อน	❐	❐	❐	❐	❐
5	ท่านจะดื่มสุราเมื่อนึกถึงใครบางคน	❐	❐	❐	❐	❐
6	ท่านจะดื่มสุราเมื่อท่านรู้สึกกังวลมากๆ	❐	❐	❐	❐	❐
7	ท่านจะดื่มสุราเมื่อท่านถูกกระตุ้นให้ดื่ม	❐	❐	❐	❐	❐
8	ท่านจะดื่มเมื่อท่านไปงานเลี้ยง/งานบุญ/งานต่างๆ	❐	❐	❐	❐	❐
9	ท่านจะดื่มสุราเมื่อท่านนึกอยากดื่ม	❐	❐	❐	❐	❐
10	ท่านดื่มเมื่อท่านต้องการทดสอบความตั้งใจในการเลิกดื่ม	❐	❐	❐	❐	❐
11	ท่านจะดื่มสุรา เมื่อท่านรู้สึกว่าร่างกายของท่านต้องการหรืออยากสุรามาก	❐	❐	❐	❐	❐
12	เมื่อท่านรู้สึกอ่อนเพลียเมื่อยล้า ท่านจะดื่มสุรา	❐	❐	❐	❐	❐
13	ท่านจะดื่มสุราเมื่อร่างกายของท่านบาดเจ็บหรือมีอาการปวด	❐	❐	❐	❐	❐
14	เมื่อท่านรู้สึกอึดอัดใจ ท่านจะดื่มสุรา	❐	❐	❐	❐	❐
15	ท่านจะดื่มเมื่อเห็นคนอื่นดื่ม	❐	❐	❐	❐	❐
16	ท่านจะดื่มสุราเมื่อท่านรู้สึกว่ากำลังจะมีสิ่งที่ไม่ดีเกิดขึ้นกับตัวท่าน	❐	❐	❐	❐	❐
17	ท่านจะดื่มเมื่อคนที่ท่านเคยดื่มด้วยชักชวนให้ท่านดื่ม	❐	❐	❐	❐	❐
18	ท่านจะดื่มสุราเมื่อท่านรู้สึกโกรธอยู่ภายในใจ	❐	❐	❐	❐	❐
19	เมื่อท่านอยู่ในภาวะที่เร่งรีบและถูกกระตุ้นให้ดื่มโดยไม่ทันตั้งตัว ท่านจะดื่ม	❐	❐	❐	❐	❐
20	ท่านจะดื่มเมื่อไปร่วมแสดงความยินดีกับผู้อื่น	❐	❐	❐	❐	❐

แบบสอบถาม
ข้อมูลพื้นฐานของชุมชนในจังหวัดบุรีรัมย์

คำชี้แจง...กรุณาเขียนเครื่องหมาย✓ ลงใน ❒ หน้าข้อความ หรือ เติมข้อความลงในช่องว่าง

ชื่อชุมชน.....ตำบล.....อำเภอปะคำ จังหวัดบุรีรัมย์

1. จำนวนครอบครัวในชุมชน.....หลังคาเรือน
2. จำนวนสมาชิกทั้งหมดในชุมชน.....คน
3. จำนวนสมาชิกในแต่ละช่วงอายุ

ช่วงอายุ(ปี)	ชาย	หญิง
< 15		
15-24		
25-44		
45-64		
65-84		
≥ 85		
รวม		

4. ภาษาที่ใช้สื่อสารในชุมชน(ตอบได้มากกว่า 1)
   ❍ ไทย ❍ ลาว ❍ ส่วย ❍ เขมร ❍ ไทยโคราช ❍ อื่นๆ (ระบุ)_____
5. อาชีพส่วนใหญ่ของคนในชุมชน
   ❒ ทำไร่ทำสวน ❒ ทำนา ❒ แรงงานรับจ้าง ❒ ค้าขาย ❒ อื่นๆ(ระบุ)_____
6. จำนวนร้านค้าที่สามารถซื้อขายสุราทุกประเภท.....ร้าน
7. ในชุมชนของท่านมีวัดหรือไม่ ❒ มี ❒ ไม่มี (โปรดระบุวัดที่ใกล้ที่สุด.....กิโลเมตร)
8. ในชุมชนของท่านมีโรงพยาบาลหรือสถานีอนามัยหรือไม่
   ❒ มี ❒ ไม่มี (โปรดระบุสถานที่ใกล้ที่สุด.....กิโลเมตร)
9. ชุมชนของท่านได้เข้าร่วมโครงการชุมชนเข้มแข็งหรือไม่
   ❒ เข้าร่วม ❒ ไม่เข้าร่วม
10. ชุมชนของท่านได้รับความช่วยเหลือจากองค์กรต่างๆเกี่ยวกับการรณรงค์เพื่อลด ละ เลิกการดื่มสุราหรือไม่
    ❒ ไม่มี ❒ มี(ระบุ)_____
11. *ใน 1 ปีที่ผ่านมา* ชุมชนของท่านมีการจัดกิจกรรมเพื่อสนับสนุนการ ลด ละ เลิกดื่มสุราหรือไม่
    ❒ ไม่มี ❒ มี(ระบุ) 1_____ 2_____
    3_____ 4_____
12. สื่อที่ให้ความรู้เกี่ยวกับผลเสียของสุราและกฎหมายเกี่ยวกับสุรา
    ❒ ไม่มี
    ❒ มี ➲➲ โปรดระบุ *(ตอบได้มากกว่า 1 ข้อ)*
    ❍ เสียงตามสาย ❍ ซีดี/วีดีโอ ❍ วารสาร ❍ ป้ายประกาศ ❍ อื่นๆ(ระบุ)____
13. ใน 1 ปีที่ผ่านมาชุมชนของท่านมีการให้ความรู้เกี่ยวกับกฎหมายของการห้ามดื่มสุราหรือไม่
    ❒ มี ❒ ไม่มี
14. กิจกรรมใดต่อไปนี้ที่เอื้อต่อการดื่มสุราในชุมชน *(ตอบได้มากกว่า 1 ข้อ)*
    ❍ งานแข่งขันกีฬา ❍ ฉลองวันสำเร็จของงาน ❍ วันหยุดยาวหลายวัน ❍ มีญาติมาเยี่ยม
    ❍ วันลอยกระทง ❍ วันวาเลนไทน์ ❍ งานแต่งงาน ❍ งานบวช
    ❍ งานบุญบั้งไฟ ❍ งานแห่เทียนเข้าพรรษา ❍ งานฌาปนกิจศพ ❍ งานกฐิน
    ❍ งานไหว้ศาลปะกำ ❍ งานวันสาร์ท ❍ เซ่นไหว้เจ้าปู่ ปู่ตา ❍ ทำบุญต่างๆ
    ❍ สะเดาะเคราะห์ ❍ งานปีใหม่ ❍ ช่วงเลือกตั้งต่างๆ ❍ งานสงกรานต์
    ❍ รำผีฟ้า รำแถน รำแม่มด ❍ อื่นๆ (ระบุ)_____
    รวม.....กิจกรรม
15. ผู้นำชุมชน/ผู้นำทางด้านสุขภาพ ดื่มสุราหรือไม่
    ❒ ไม่ดื่ม ❒ ดื่มเป็นประจำ ❒ ดื่มบ้างตามงานหรือประเพณีต่างๆ ❒ เคยดื่ม
16. ผู้นำชุมชน/ผู้นำทางด้านสุขภาพ สนับสนุนเกี่ยวกับการลด ละ เลิกสุราหรือไม่
    ❒ สนับสนุน ❒ ไม่สนับสนุน ❒ ไม่แน่ใจ

APPENDIX D

HUMAN SUBJECTS APPROVAL DOCUMENT

Certificate of Approval
Ethical Review Committee for Human Research
Faculty of Public Health, Mahidol University

COA. No. MUPH 2012-013

Protocol Title :	A MULTILEVEL ANALYSIS OF ALCOHOL DRINKING AMONG ADULTS IN BURIRAM PROVINCE
Protocol No. :	214/2554
Principal Investigator :	Miss Nipaporn Butsing
Affiliation :	Master of Science Program in Biostatistics Faculty of Public Health, Mahidol University
Approval Includes :	1. Project proposal 2. Information sheet 3. Informed consent form 4. Data collection form/Program or Activity plan
Date of Approval :	30 January 2012
Date of Expiration :	29 January 2013

The aforementioned project have been reviewed and approved according to the Declaration of Helsinki by Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University.

S. Nanthamm

(Assoc. Prof. Sutham Nanthamongkolchai)
Chairman of Ethical Review Committee for Human Research

(Assoc. Prof. Phitaya Charupoonphol)
Dean of Faculty of Public Health

420/1 Rajvithi Road, Bangkok, Thailand 10400.
Tel. (662) 3548543-9 ext. 1127, 7404 Fax. (662) 6409854

Copyright by Mahidol University

APPROVAL OF AMENDMENT

Approval of Amendment
Ethical Review Committee for Human Research
Faculty of Public Health, Mahidol University

Protocol Title :	A MULTILEVEL ANALYSIS OF ALCOHOL DRINKING AMONG ADULTS IN BURIRAM PROVINCE
Protocol No. :	214/2554
Principal Investigator :	Miss Nipaporn Butsing
Type of Document :	**Protocol Amendment** 1) Protocol Title Change to A MULTILEVEL ORDINAL LOGISTIC ANALYSIS OF ALCOHOL DRINKING AMONG POPULATION AGE 15-75 YEARS IN BURIRAM PROVINCE
Date of Approval :	2 October 2012

The aforementioned project have been reviewed and approved according to the Declaration of Helsinki by Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University.

S. Nanthamongkolchai

(Assoc. Prof. Sutham Nanthamongkolchai)
Chairman of Ethical Review Committee for Human Research

Copyright by Mahidol University

420/1 Rajvithi Road, Bangkok, Thailand 10400.
Tel. (662) 3548543-9 ext. 1127, 7404 Fax. (662) 6409854

APPENDIX E

THE ANALYSIS OF CROSS LEVEL INTERACTION

Table E Result of cross-level interaction testing in multilevel logistic regression

Interaction term	2LL	LR	d.f	p-value
Main effect only	1,803.54			
Most common occupation*Self-efficacy	1,802.34	1.76	1	0.185
Most common occupation*Perceived risk	1,801.60	3.25	1	0.072
Most common occupation*Accessibility to alcohol	1,800.78	1.12	1	0.223
Most common occupation*Monthly income	1,802.84	0.75	1	0.385
Most common occupation*Availability of information on anti-drinking	1,802.31	1.81	1	0.178
Community empowerment program*Self-efficacy	1,800.93	2.10	1	0.091
Community empowerment program*Perceived risk	1,803.69	1.58	1	0.208
Community empowerment program*Accessibility to alcohol	1,804.19	0.57	1	0.451
Community empowerment program*Monthly income	1,800.77	2.42	1	0.060
Community empowerment program*Availability of information on anti-drinking	1,804.42	0.13	1	0.718
Health promoting village program*Self-efficacy	1,804.00	0.01	1	0.919
Health promoting village program*Perceived risk	1,802.68	2.65	1	0.104
Health promoting village program*Accessibility to alcohol	1,804.00	0.01	1	0.911
Health promoting village program*Monthly income	1,803.92	0.16	1	0.691
Health promoting village program*Availability of information on anti-drinking	1,803.93	0.14	1	0.705
Housing and selling liquor shop ratio*Self-efficacy	1,802.88	3.10	1	0.078
Housing and selling liquor shop ratio*Perceived risk	1,804.39	0.07	1	0.79
Housing and selling liquor shop ratio*Accessibility to alcohol	1,803.64	1.58	1	0.208
Housing and selling liquor shop ratio*Monthly income	1,802.33	3.21	1	0.050
Housing and selling liquor shop ratio*Availability of information on anti-drinking	1,804.26	0.35	1	0.554
Language use *Self-efficacy	1,803.16	0.04	1	0.849
Language use *Perceived risk	1,802.91	0.54	1	0.462
Language use *Accessibility to alcohol	1,803.14	0.58	1	0.408
Language use *Monthly income	1,802.84	0.68	1	0.409
Language use *Availability of information on anti-drinking	1,802.62	1.13	1	0.288

-2LL= -2 Log-likelihood, LR= Likelihood ratio test

BIOGRAPHY

NAME	Miss Nipaporn Butsing
DATE OF BIRTH	3 January 1985
PLACE OF BIRTH	Buriram, Thailand
INSTITUTIONS ATTENDED	Mahidol University, 2007 Bachelor of Nursing Science Mahidol University, 2012: Master of Science (Biostatistics)
RESEARCH GRANTS	This thesis / dissertation is partially supported by Thai Health Promotion Foundation (ThaiHealth), International Health Policy Program (IHPP) and Center for Alcohol Studies (CAS)
HOME ADDRESS	188, Thaworn, Chaloem Phra Kiat, Buriram, Thailand
EMPLOYMENT ADDRESS	Division of adult and aging nursing, Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand Position: Teacher's Assistant E-mail: nanok048@hotmail.com

Copyright © by Mahidol University