Depression, Methamphetamine use, and Alcohol Consumption among Thai Youth in Chiang Mai Province:

The Exploration of Perceptions of Depression and Associations between Substance Use and Depressive Symptoms

by

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Abstract

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Background: Methamphetamine use and alcohol consumption have reached epidemic levels among rural Thai adolescents and young adults in Chiang Mai Province, Thailand. High levels of depressive symptoms often occur among individuals who abuse or who are dependent on methamphetamine and alcohol. An understanding of the nature of associations between these substances and depressive symptoms can advance understanding of prevention and treatment options among individuals most at risk. Understanding the nature of depression as perceived by this population and the individual and social correlates can inform culturally-appropriate interventions.

Methods: A mixed methods design was implemented and employed the use of a convergent parallel design to understand depressive symptoms and their correlates. Data obtained from a structured survey included information pertaining to lifetime and recent methamphetamine use, alcohol consumption, other illicit drugs, and depressive symptoms and was used for the epidemiological analyses. Primary variables of interest were lifetime and recent methamphetamine use, lifetime and recent alcohol consumption and depressive symptoms. In-depth interviews were conducted among 24 adolescent and young adult participants aged 14 - 24 from January – February 2013. Qualitative research was conducted to explore the perception of depression among Thai youth and potential factors responsible for the onset of depression in this population.

Results: Multivariate linear regression revealed statistically significant associations between recent methamphetamine use and CES-D scores. Multivariate logistic regression revealed significant associations between lifetime and recent methamphetamine use and high levels of

depressive symptoms. Multivariate linear and logistic regression models did not reveal statistically significant associations between lifetime/recent alcohol consumption and depressive symptoms. Explorations of symptoms of depression as perceived by respondents demonstrated similarities to Western cultures. Social antecedents were specific to the context of rural Chiang Mai. Substance use, abuse, and dependence were viewed as a way to self-medicate depressive symptoms.

Conclusions: Methamphetamine use, alcohol consumption, and depressive symptoms are prevalent among Thai adolescents and young adults in Chiang Mai. This research suggests that culturally-relevant and integrated interventions for depression, methamphetamine use, and alcohol consumption are needed in rural Chiang Mai Province.

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Introduction and Review of the Literature

1. Introduction

Methamphetamine use in rural, northern Thailand continues to be a significant public health problem among adolescents and young adults, reaching epidemic proportions in communities located within the Golden Triangle, the epicenter of methamphetamine manufacturing and distribution where Thailand borders Burma (Myanmar) and Laos (Figure 1). The use of methamphetamine has been identified by rural community members as a significant health and social problem. Specifically, methamphetamine use has been associated with poly-drug abuse and depression. Research concerning methamphetamine use and depression has been conducted among adolescents and young adults in urban areas of Thailand, and a significant body of research exists which supports the relationship between methamphetamine use and depression. However, efficacious treatment guidelines for comorbid depression and substance use remain unsupported by empirical evidence and no randomized clinical trials have been conducted in low- and middle-income countries.

Alcohol consumption remains a significant public health problem among adolescents and young adults residing in Thailand. While laws have been enacted to curtail underage drinking in Thailand by raising the legal drinking age from 18 to 20 and limiting alcohol availability, research conducted to evaluate the effectiveness of the law observed that the law did not reduce drinking among methamphetamine smokers 18 – 19 years of age. Furthermore, recent policies enacted by the Thai government have served to promote the free market which encourages and promotes sales of Thai alcoholic beverages. The culture within Thailand is one that promotes drinking, particularly among males. The ubiquitous nature of alcohol and the presence of several interpersonal, academic, occupational, and financial stressors in a rural, middle-income country such as Thailand may support the tendency to self-medicate with this substance.

To address methamphetamine use that has been identified by rural communities as a significant health problem among youth, a community-randomized community mobilization trial was implemented in Chiang Mai province in northern rural Thailand. There is a paucity of

information regarding depression among adolescents and young adults in northern rural Thailand, especially as it relates to methamphetamine use and alcohol consumption. Additionally, little is known regarding the meaning of depression, the experiences of depressive symptoms among Thai adolescents and young adults in northern rural Thailand, and the social antecedents specific to the context of these communities.

To address the need to achieve a comprehensive understanding of the nature of the relationship between depression and substance use, abuse, and dependence, as well as other social antecedents that many contribute to the onset of depression among Thai youth, we designed a parallel convergent mixed methods research study. The sole use of quantitative research would not be able to provide a deeper understanding of the culturally-influenced context that may impact the experiences of depression or the meanings of depression as perceived by Thai adolescents and young adults. Certainly social, economical, political, and cultural factors existing in rural Chiang Mai provide context within which individuals experience the course of depression, including individuals' relational interactions, emotive reactions, and consequences of depression. Attempt at a rich exploration of the context operating through the course of depression experienced by Thai youth has not, to our knowledge, been undertaken and additional qualitative research is needed to further explore potential social antecedents and correlates of depression and to modify models describing this process. The factors that will be explored include the timing, patterns, and consequences of substance use within the course of experiencing depression and the influence of peers, family, partners or spouses, and community members upon individuals' experiences of depression. The combination of quantitative and qualitative analyses will enable a compilation of information to describe the culture-specific components of depressive symptoms and their similarities and differences as expressed in Western populations. Such an understanding will provide empirical evidence that will enable resources to be directed to these communities, to capitalize on existing resources, and to design culturally-appropriate mental health care for Thai adolescents and young adults.

The research questions about depression incorporated an overall assessment of the contexts and processes shaping perceptions of depression and depressive symptoms among adolescents and young adults aged 14 - 24 in rural, Northern Thailand. The methods serve to provide a more comprehensive understanding of the proximate and distal factors that may be associated with the onset of depressive symptoms in this population; this approach also serves to corroborate evidence of subgroups that may be at a higher risk for depression and may need tailored treatment or prevention interventions.

A comprehensive approach warrants implementation and integration of epidemiological, clinical and qualitative research. The decision to employ grounded theory methodology is due to the nature of research questions, the primary focus of this research, the need to develop a middle-range theory to explain the meaning of depression and factors associated with the onset of depressive symptoms among this population residing in rural Chiang Mai, the researcher's own interests, and the needs of participants in this community mobilization trial. Equal weight was given to both qualitative and quantitative methods, and the point of interface, or the point at which the methods were mixed, was at the interpretive phase as opposed to the research design, data collection, or analysis phases. At this point of interface, categories, concepts, and themes discovered in qualitative research were compared to the epidemiological results describing the burden of depressive symptomatology and substance use and their associations (Figure 2). Epidemiological methods were used in order to understand the nature of the relationship between depressive symptoms, the dependent variable, and methamphetamine use in the first study, and between depressive symptoms and alcohol consumption in the second study (Figure 3). These first two quantitative studies attempted to answer questions related to the association between depressive symptoms and substance use at the individual level, whereas the third, qualitative research study attempted to understand the complex, culturally-specific social antecedents to depressive symptoms among youth residing in these communities.

1.1.1 Specific Aims

Aim 1. To estimate the prevalence of lifetime and recent methamphetamine use, the prevalence of high levels of depressive symptoms, and the prevalence of comorbid methamphetamine use and high levels of depressive symptoms. To assess the distribution of correlates of depressive symptoms across sociodemographic variables and to assess the association between methamphetamine use and high levels of depressive symptoms among Thai adolescents and young adults aged 14-29 years living in northern rural Thailand.

Aim 2. To examine the prevalence of lifetime and recent alcohol consumption and the prevalence of comorbid alcohol consumption and high levels of depressive symptoms. To assess the association between alcohol consumption and high levels of depressive symptoms among Thai adolescents and young adults aged 14-29 years living in northern rural Thailand.

Aim 3. To explore perceptions of depression and the social processes that potentially lead to depression among Thai adolescents and young adults aged 14-29 living in rural Chiang Mai province.

1.2 Research Context of Methamphetamine Use, Alcohol Consumption Behaviors, and Depressive Symptoms in Thailand

1.2.1 The Emergence and Recognition of Mental Health Disorders in Thailand: How Economic and Social Transitions Affect Mental Health and Subsequent Investment in Resources

Thailand is a constitutional monarchy with a population structure consisting of roughly equal proportions of men and women, and the age structure is such that individuals of working age (15-59 years old) constitute 65% of Thailand's population [1]. The social structure designates the family as the smallest social unit. Over time, the traditional Thai family structure has transformed in response to social and economic forces, changing from the traditional family structure consisting of extended family to smaller family units consisting of about 3.7 people per household in urban areas and an average of four in rural areas [1]. Global economic forces dictate that English is part of an increasingly larger role in Thai society, and Thailand places a heavy emphasis on education. As a result, the Thai government has instituted mandatory compulsory education for up to six years [1].

Compounding the stress on education is the emerging negative impact of the global market on Thailand. Factors such as high oil prices, floods in the northeastern regions, political uncertainty, lack of growth in agricultural prices and weak performance of the stock exchange after 2000 lead to an ever-widening gap between social classes and a lack of occupational opportunities for the educated [1]. The erosion of traditional Thai values, Thai belief systems, and Buddhist spirituality coupled with the increasing competition for wealth and power, chronic economic and occupational hardship, and low income have led to chronic stress and stress-related mental health disorders. Furthermore, populations in poverty in rural areas have been impacted the most. These societal and economic drivers and resulting reduction in the family unit has led, in part, to broken families, divorces, and strained parent-child relationships. The breakdown of

family relationships has resulted in the emergence of mental health disorders that especially adversely affect children, some of which are involved in abuse or currently growing up in welfare, involved in prostitution, or involved in the drug market [1].

Alcoholism and drug use also contribute substantially to Thailand's mental health burden. Survey results undertaken to quantify substance use in Thailand have suggested that 19% of males and 5% of females reportedly abuse alcohol, and those addicted to alcohol were reportedly more likely to suffer from depression and exhibit symptoms of stress [1]. Amphetamine abuse has emerged as a major public health problem in Thailand and have led to an increase in the occupation of psychiatric beds by individuals dependent on methamphetamine [1].

Completed suicide attempts in Thailand is also a major public health concern, and the Department of Mental Health, Ministry of Public Health in Thailand launched a number of intervention programs, including the promotion of awareness of suicidal behavior, education about warning signs indicating suicidal intentions, and a program to aid general practitioners in recognizing symptoms of depression after a rise in completed suicide rates which occurred after the economic crisis in Thailand in 1997 [2]. The suicide rates increased to 8.6 per 100,000 in 1999 and decreased to 7.1 per 100,000 in 2003, and rates were highest in the North from 1998 – 2003 at 21.2 per 100,000 for males and 6 per 100,000 for females [2]. Although Buddhist doctrine determines Thai social norms and values and states that a person cannot avoid suffering by committing suicide since he or she cannot escape the 'wheel of suffering,' certain factors in Thailand such as the use of alcohol to reduce stress and frequent conflicts with parents influence suicide attempts [2]. Furthermore, pesticides and herbicides that are widely available in rural areas are a common method used during suicide attempts; hanging was the most common method of attempting suicide and ranged from 53 – 60% whereas consuming herbicides or pesticides comprised 13 – 19% of suicide attempts from 1998 – 2003 in Thailand among individuals aged 15 to 65 years and older [2].

1.2.2 The History of Mental Health Care Programs and Policy in Thailand

In concert with social trends, economical trends, research, industry, and technology, mental health resources in Thailand have evolved and expanded. During the beginning of the "asylum period" in 1889, Thailand's first psychiatric hospital was established. During the "psychiatric hospital period" beginning in 1925, a medical doctor named Luang Wichian Baedyakhorn [1], trained in psychiatry in the United States and subsequently launched the first technical and personnel training programs for mental health in Thailand and sought to change public perceptions about mental health. During the "mental health period" beginning in 1942, psychiatric hospitals were failing to keep up with the demands on resources, which lead to the evolution of community-based mental health and the implementation of more efficient resources such as mobile psychiatric units to serve extend services to populations with less accessibility to services [1]. Modern practices and service provision have evolved to emphasize the integration into general health and into primary health care and finally public health promotion and prevention beginning in 1992. Concurrent to this new public health era, the Health Development Plan of Thailand's eighth National Economic and Social Development Plan set several goals and priorities for mental health, including reduction in incidence of mental health disorders, the development of quality standards, the encouragement of individual self-reliance, the encouragement of individual-level active health-seeking behavior and active participation in health care, the development and provision of technology to prevent individual-level mental health disorders, and education [1].

1.3 History and Context of Methamphetamine Production, Trafficking, Distribution, and Use in Thailand

Seven provinces comprise Northern Thailand and the Golden Triangle region bordering Burma and Laos. Cultivation and distribution of opium in this region accounts for about 40 –

60 % of global annual opium production [3]. The populations in Thailand that used and became dependent on opium were of the Northern hill tribes that consisted of ethnic minorities [4]. Once the Thai government enacted poppy eradication and crop substitution efforts, substance use among ethnic minorities in the region shifted from primarily smoking opium to injecting opium's end product, heroin [3].

Since 1996, the availability and use of methamphetamine (MA) in Thailand has escalated due to production in mobile laboratories managed by armed groups located within Burma and in conjunction with small scale, local production and distribution from within Thailand; large scale production in Thailand is impossible because of heavy Thai police presence dedicated to the goal of elimination of MA use [3, 5]. In 1989, the first recorded appearance of methamphetamine primarily from the Burmese market occurred, and distribution became widespread by 1993 [5]. By 2003, an estimated 3 million Thais or 5% of the population were reported to be addicted to methamphetamine [5]. Many populations within Thailand are involved in the MA trade, including more than thirty ethnic groups residing in the hills of northern Thailand involved in transporting MA across the border into Thailand after being approached by traffickers [5]. The evolution of the motives for using MA in Thailand initially involved using the drug to improve functionality in terms of increasing concentration and stamina in response to increasing pressure to perform occupational demands and expectations. The emergence of MA in Thailand in the 1960s was primarily among older adults, whose occupational roles were in agriculture, trucking, long-distance lorry driving, night shifts, and the fishing industry warranted ingestion of either the pill or liquid form, thus leading to MA being referred to as "ya-ma" or diligence pill [6, 7]. The development of MA abuse emerged among this population, leading the Thai government to implement strict regulations and subsequent growth of illicit trade. The trajectories of MA use then shifted towards serving as a recreational drug among adolescents and young adults in urban Thailand beginning in the mid-1990s in parallel to the rest of Southeast Asia [3, 8]. The ubiquity of MA among Thai adolescents and young adults, the perception about MA use being normative,

exposure to MA from peers, and individual-level factors such as curiosity, coping mechanisms, or functional needs led to the emergence of MA as a significant public health problem among this population [9]. MA then became commonly referred to by Thais as "ya-ba," or crazy pill, due to the recognition of its ability to induce psychosis and other psychological symptoms [6]. In contrast to opium use, MA use was predominant among ethnic Thais [10].

In response to the growing MA epidemic among Thai youth, the Thai government implemented prevention efforts and a media campaign [11]. When prevention efforts failed and MA trafficking continued unabated, the prime minister of Thailand, declared a state of emergency in February of 2001 that culminated in the formulation of substance abuse policy known as "The Law of the Land" [12] and a war on drugs in 2003 and 2008 [11]. Upon initiation of this "war on drugs" in 2003, the war had the unintended consequence of driving drug use underground, and injection drug users reported substitution of injecting heroin with smoking opiates or MA [13]; human rights violations occurred during these wars on drugs, and over 2,000 suspected drug users were killed while others were forced into compulsory treatment rather than risk arrest and incarceration [14]. An analysis of substance abuse trends before, during, and after the 2003 "war on drugs" provides evidence which suggest that abuse of alcohol and volatile substances may have replaced MA abuse [12]. As of 2011, the Thai government reported the continued public health burden of MA use. In 2011, there were 157,733 cases reported, which represented about 82% of all cases reported during that year and an increase in MA cases from just over 100,000 in 2007 [15].

Evidence of the MA epidemic among adolescent and young Thai adults provided by research and drug treatment facility admissions data, indicated that MA disproportionately affects younger age groups whereas older adults are admitted for dependence on heroin. A study conducted by Beyrer and colleagues from January 1999 – February 2000 observed that of admissions seeking treatment for drug dependence at the Northern Drug Dependence Treatment Center in Mae Rim, Thailand, approximately 51% of participants under twenty years of age

reported MA use whereas only approximately 4% of the same age group reported using opiates, the majority of participants 35 years and older reported opiate use [10]. In 1995, 14.5% of men attending STD clinics in Lamphun and Chiang Mai, Thailand reported a lifetime history of amphetamine use [8]. A retrospective descriptive analysis of inpatient drug addicts that were registered at Thanyarak Hospital, Thailand's largest drug treatment facility, demonstrated changing trends in inpatient cases whereby MA addiction increased from 0.4% to 51.5% and heroin addiction decreased from a peak of 92.4% to 38% from a period including October 1989 through September 1998 [16]. A history of lifetime MA use among students attending vocational schools in Chiang Rai, Thailand was reported by at least 41.3% and 19% of men and women, respectively [7]. In Bangkok, a school, community, and adolescents residing in other institutions, having a mean age of 15.5 ± 1.8 years, were surveyed in February 2001; this study revealed that 38% of respondents reported amphetamine use compared to about 10% of adolescents in the United States participating in a similar survey [17].

Qualitative research conducted among Thai youth to explore the motives for using MA discovered the drug was involved in improving functional roles and activities (i.e. housework for females, job-related for males), enhancing their sexual experiences in the context of seeking and using MA in response to underlying "thrill-seeking personalities," potentially increasing their risks for acquiring HIV [18, 19]. The most common route of administration of MA for recreational use among youth is by smoking the drug [7]. The context of MA cessation among youth in Chiang Mai has also helped to inform treatment and prevention efforts by discovering a multitude of individual, peer, familial, and environmental factors that normally interact to facilitate or hinder cessation (i.e. community MA-related stigma, family and significant other interventions, peer pressure, a series of negative consequences, interference with goals) [11]. The effects of Thailand's war on drugs resulted in driving the drug economy underground and did not reduce demand for MA [20]. As prices for MA increased, revenues from the sale of drugs also increased, and the drug economy became a viable, lucrative option for employment.

Involvement in Thailand's MA economy has been found to be predicted by recent incarceration, individual drug use, and drug use within social networks. These findings providing multiple points of intervention and signify a need to provide evidence-based rehabilitative treatment, harm reduction, and positive social and economic support to facilitate participation in the formal economy as opposed to criminalization of MA users, runners, and sellers resulting from Thailand's war on drugs [21]. Moreover, since MA and other drug use behaviors are determined by social norms, economic conditions, and cultural values, a focus on structural interventions such as community mobilization can facilitate individual-level behaviors that are positive for health [22-24].

Accessibility of drug treatment in Thailand is minimal. The department of Medical Services manages six regional drug treatment centers throughout Thailand [14]. The Northern Drug Treatment Center has about 275 beds which offer detoxification of limited duration (42 days) for approximately 12 million Thai citizens. Excluding the region around Bangkok, outpatient treatment services are generally inaccessible. Services consist of 85 methadone maintenance slots in Chiang Mai, the second largest province in Thailand, for the past several years, which renders cessation efforts ineffective for those who have failed detoxification. Furthermore, treatment of MA among Thai youth has largely been conducted through palliative treatment that is not supported by empirical evidence and wastes limited resources needed to treat injection drug users [14].

1.4 History and Context of Alcohol Consumption in Thailand

1.4.1   Historical Alcohol Consumption Trends and the Impact of Laws and Policies

Historically, alcohol consumption has not held a prominent role in Thai culture [25]. High levels of abstention and minimal alcohol consumption were the result of observing Buddhist

teachings. However, alcohol consumption in Thailand increased markedly from 1350 through

1767 due to the influence of the drinking practices of Chinese migrants and the ensuing

introduction of the distillation technique by these migrants for manufacturing spirits. After 1782,

alcohol consumption began to increase in Thai society as the proportion of Chinese migrants

increased to a quarter of the population. Since this period of increasing consumption, a number

of alcohol taxation, production, and distribution policies evolved in response to trends in alcohol

consumption. Thai policies on tax revenue in the 1900s evolved in response to decreasing

concession fees. The Excise Master system that was established to collect alcohol excise taxes

and suppress illegal production was replaced by a decentralized system for collecting taxes run by

each administrative region in 1909. This system emphasized rewarding local government leaders

who could increase revenue and decrease illegal alcohol production.

Recent efforts by the Thai government to increase revenue from alcohol production and

distribution involve a campaign aiming to introduce a free market whereby fees for the

production and distribution of fermented and distilled beverages in 1990 and 1999, respectively,

were eliminated, the argument being that the government did not want to inhibit the development

and growth of the alcohol industry. Current Thai alcohol taxation policies also exclude white and

traditional spirits. As a result, predictions indicate that consumption of these less heavily taxed

beverages is supposed to increase and surpass consumption of other fermented and distilled

spirits [25].

 In February, 2008, the Thai government issued the Alcoholic Beverage Control Act,

which established a set of laws to control alcohol consumption by curtailing alcohol sales to

certain establishments and during certain times, and aimed to prevent alcohol consumption

among youth under 20 years of age [26]. Research about the impact of these laws indicate that

underage drinking among high-risk, methamphetamine smoking Thai youth aged 18 or 19 years

continue to drink, to experience more days of drunkenness per drinking day than before the

implementation of the law, and are not aware of the law [27].

1.4.2   Current Alcohol Consumption Context in Thailand

Ethnographic work has been conducted to explore the drinking context, drinking behaviors, and the perceptions of drinking-related behaviors among individuals residing in one suburban village in a northeastern province of Thailand [28]. From an emic perspective, several key themes emerged which suggested the presence of an overall cultural acceptance of liberal alcohol consumption. According to informal interviews, several social and religious events held in the community were events in which drinking was expected, and drinking was also perceived as acceptable in daily life. For instance, alcohol consumption was perceived as acceptable during private or public parties or after work to establish or maintain social relationships or to relax after work. Because of the context of drinking, public health policy which aims to reduce alcohol consumption or provide education about the harmful consequences of problem drinking may conflict with cultural norms, rendering such policies as ineffective or challenging [28]. Indeed, rarely was drinking found to be viewed as a manifestation of distress. Overall, there is limited research about alcohol expectancies among Thais, but positive outcomes from drinking are perceived to outnumber negative consequences [28], except among practicing Buddhists [29].

1.4.3 Epidemiology of Problematic Alcohol Use in Thailand

In Thailand, as has been reported in most countries, the substance most often used was alcohol, and documented alcohol consumption has markedly increased in Thailand since 1990 [30]. However, in southern Thailand, an assessment of substance use trends from 2002 through 2004 observed a decrease in the prevalence of alcohol consumption within the past 30 days in both males and females in grades 7, 9, 11, and in year two of vocational schools [31]. The weighted prevalence of alcohol consumption within the past 30 days among males was 25.36%,

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24.21%, and 22.69% in 2002, 2003, and 2004, and weighted prevalence of alcohol consumption among females during the same time period was 13.61%, 12.05%, and 9.44% [31]. Another survey of Thai adolescents residing in Bangkok and attending school or residing in non-school institutions in 2001 reported a lifetime alcohol consumption prevalence of approximately 42% while about 56% described themselves as frequent drinkers (1 – 20 days in the 30 days prior to participation), and 2% were defined as heavy drinkers (>20 days within the past 30 days prior) [17]. In research conducted from 2007 – 2008, the prevalence of alcohol consumption within the past 12 months in a larger, nationally representative sample was 19.6% [32]. Furthermore, the prevalence of lifetime consumption was 30.5% among males and 18.2% among females, and the prevalence of consumption within the past 12 months was 25.5% among males and 14.5% among females, and the consumption of alcohol within the past 30 days was 19.6% among males and 9.9% among females [32]. Binge drinking was also a concern in this sample since more than 18% of males and 10% among females reportedly consumed more than nine drinks per drinking day within the past 30 days. Overall, approximately 6.7% of the Thai population aged 12 – 65 years of age can be described as hazardous drinkers, 0.9% as harmful drinkers, and 0.6% as alcohol-dependent during 2007 based on extrapolations from the National Household Survey for Substance and Alcohol Use; 63% of the Thai population consisted of lifetime abstainers, 79% were former drinkers, and 28.6% were current consumers [33].

1.4.4 Burden and Correlates of Depression in Thai Youth and the Need to Define Depression

Depression has also been a major public health problem in Thailand. The prevalence of depression among Thai children and adolescents has been reported to be approximately 3.7% [34, 35]. While research provides prevalence estimates of depression among children and adolescents in Thailand, there are relatively few studies describing the prevalence of depression among young adults residing in Thailand. There are no studies detailing the exploration of the culturally-bound

meaning and perceptions of depression among adolescents and young adults in Thailand and no research which examines the psychological and social processes throughout the depression experience among Thai adolescents or young adults. In other words, there are has been no explorations of culturally-bound social antecedents to depression that are tied to the historical, political, social, and economic contexts operating within rural Chiang Mai Province, Thailand within the Golden Triangle. There is no exploration of the consequences of depression among Thai youth specific to the natural history of depression or that explore emotive reactions to stressors or interactions between depressed individuals and other individuals or circumstances.

1.5 Literature Review of Methamphetamine Use: Drug Class, Associated Physical and Psychological Harms, Treatment, and Public Health Implications among Youth

1.5.1 Global Epidemiology of Amphetamine-type stimulants

While cannabis use comprises the majority of illicit drug abuse globally, abuse of cocaine and amphetamine-type stimulants (ATS) is the second most commonly abused drug depending on region; the annual global prevalence of ATS is 0.5% or an estimated 30 million people, compared to a prevalence of 2.5% of illicit cannabis use [36]. In Europe, the use of ATS is the second most common illicit drug abused, while cocaine abuse remains the second most common illicit drug abused in the Americas [36].

Global abuse of methamphetamine first appeared during World War II among U.S. and Japanese soldiers and pilots to increase stamina and alertness [37]. In this same review, methamphetamine supply and demand evolved in the United States in response to numerous governmental policies and laws developed to curtail distribution. Mexican drug markets and clandestine laboratories based in the American West that have been operating since the early 1960s where replaced in 2004 by small, local low-capacity laboratories as clandestine

laboratories in the West were seized; these local low-capacity laboratory were replaced by Mexican networks by 2008 as low capacity labs were seized [37]. Low-yield mobile laboratories, which produced even smaller amounts than smaller "mom-and-pop" laboratories, began to proliferate after 2008, thus signifying the reemergence of clandestine manufacturing. Additionally, federal laws that were implemented to suppress supply of methamphetamine, such as restricting access to precursors like pseudoephedrine, brought about unintended consequences such as creating an illicit market for the precursor and shifts in networks.

1.5.2 Physical, Psychological, and Behavioral Consequences of Methamphetamine Use

MA is a member of a drug class of psychostimulants that has demonstrated severe dependence liability. Specifically, MA is an N-methyl analogue of amphetamine, but is much more potent than amphetamine and induces its effects by stimulating dopamine and norepinephrine receptors [38, 39]. MA is associated with several other physical and psychological harms, including polydrug use, cardiovascular events, cerebrovascular events, blood-borne diseases such as HIV, HBV, and HCV through needle sharing, empirical, but inconclusive evidence citing risky sexual behaviors associated with non-injection MA use [3, 40], overdose, death, psychoses, violence, anxiety, depression, and suicidal ideation if depressive symptoms are severe [18, 39, 41-43]. MA produces acute symptoms, including elevation of blood pressure, pulse, respiration, and body temperature while physical responses to excessive doses include, but are not limited, to cerebral hemorrhage, stroke, coma, and death [39]. Moreover, dependence on methamphetamine is more likely to be associated with psychoses, violence, and depression [41-44].

1.5.3 Treatment of Methamphetamine Use and Implications

Currently, evaluation of potential suitable pharmacotherapy for treating MA use and dependence has yielded inconclusive evidence of any particular medication being efficacious, including antidepressants, antipsychotics, stimulants, serotonin 5-hydroxytryptamine-3 receptor antagonists, and gamma-aminobutyric acid class agents [38]. Brief cognitive-behavioral interventions and more complex therapy such as the Matrix Model and contingency management have been shown to support greater treatment retention and treatment completion prior to treatment discharge (Matrix model), but were not superior to treatment as usual approaches in terms of abstinence or reductions in MA use [45], and treatment using contingency management approaches showed superior results compared to standard cognitive-behavioral treatment [46, 47].

Depressive symptoms are one of the most common manifestations among methamphetamine using and dependent patients, but much clinical research needs to be done to distinguish major depressive disorders from substance-induced symptoms that mimic major depression [48]. These methamphetamine-induced depressive symptoms occur because methamphetamine directly modifies monoamine regulation systems within the brain [48-50]. This has treatment implications, because, if left untreated, depression among methamphetamine users can reduce adherence to methamphetamine treatment, increase the propensity to relapse, and increase the risk of suicide [48]. Understanding the underlying mechanisms of monoamine regulation and the validity and reliability of clinical diagnostic tools is required to determine to what extent depression among methamphetamine users require treatment. To further complicate treatment, there currently are known effective pharmacological treatments for methamphetamine [51].

Epidemiological research is an important tool for understanding the relationship between MA use behaviors and depressive symptomatology. Prospective cohort studies that aim to describe this bidirectional relationship have rarely been conducted, particularly in low- or middle-

income countries. However, one longitudinal study conducted among young Thai adults aged 18 – 25 years residing in Chiang Mai described a relationship in which baseline depressive symptoms did not determine subsequent patterns of MA use [52]. In contrast, this same study observed that these patterns of MA were associated with subsequent depressive symptoms. These observations are supported by previous work conducted among gay and bisexual men in the United States, the only other longitudinal study, to our knowledge, that attempts to characterize the nature of this bidirectional relationship [53].

The relationship between MA use and ensuing depressive symptoms has implications for clinical and community-based care. Health care must focus on treating MA use to reduce or cease use of the drug in order to reduce depressive symptoms and prevent relapse [52]. Possibly, integration of mental health and substance use services can be done to achieve the best outcomes. This finding supports prior research which suggests treating for psychostimulant use aids in alleviating depressive symptoms and allowing for sustained cessation [53, 54] whereas other evidence which evaluates the effect of using antidepressants or drug pharmacotherapy to treat co-morbid psychostimulant or alcohol abuse and depressive symptoms has demonstrated either poorer outcomes in the treatment group or no difference between treatment and control groups ([55-65].

1.6 Alcohol, Harmful Alcohol Consumption, Alcohol Use Disorders and Dependency: Definitions, Behavioral and Physiological Effects

Ethyl alcohol is a colorless liquid obtained from grains by fermentation or distillation, and it is widely used for human consumption. It belongs in a class of substances called depressants because of its ability to depress the activity of the central nervous system (CNS) once it is absorbed into the blood via the lining of the stomach and intestines [66].   When consumed in social settings, expectancies about alcohol's effects in terms of increasing positive social

interactions or antisocial behaviors vary and are determined across cultures, within the same culture at different times, between abstainers, moderate drinkers, and heavy drinkers, and between men and women [67]. When taken in increasing quantities to the point of producing toxic effects, it is capable of interfering with a person's judgment, motor coordination, and concentration [66].

Alcohol abuse occurs when individuals drink large amounts and begin to rely on alcohol to accomplish goals in situations that would make then anxious. Eventually, excessive drinking begins to interfere with their social relationships, with their family, and with their career. Physiologically, heavy drinking can produce impairments in short term memory, attention skills, balance, and intellectual ability [66]. Alcohol dependence is characterized by withdrawal symptoms. Individuals who are dependent on alcohol build tolerance as their bodies develop mechanisms that attempt to restore normal functioning by reducing production of a neurotransmitter called γ-aminobutyric acid (GABA); GABA plays an important role in physiological changes resulting from alcohol consumption since alcohol molecules typically bind to GABA receptors [66]. GABA is responsible for signaling neurons to shut down, thus producing relaxation in the consumer. Once levels of GABA (and other neurotransmitters) have been reduced due to heavy drinking and dependence, tolerance develops so that increasing amounts of alcohol must be consumed to produce the desired effects. Withdrawal symptoms experienced by individuals who are dependent on alcohol are particularly severe. Delirium tremens occurs and consists of visual, auditory, and/or tactile hallucinations, disorientation, delirium, and seizures [66, 68].

Ample treatment for individuals undergoing withdrawal from alcohol includes the administration of benzodiazepines, which belong to another group of CNS depressants. Benzodiazepines, such as chlorodiazepoxide, belong to the sedative-hypnotic drug class, and are drugs which alcohol-dependent individuals display a high degree of cross-dependence.

Administration of such drugs typically eases withdrawal symptoms caused by alcohol so that withdrawal can be implemented safely [68].

Alcohol has been consumed in various cultures and populations in several different fermented and distilled forms for thousands of years. Various cultural, ethnic, and social factors interact among populations throughout the life course to determine the different patterns and volume of consumption across cultures [69]. Excessive volumes and patterns (i.e. binge drinking), in turn, determine numerous behavioral and physical effects. Harmful alcohol consumption, sometimes displaying dose-response effects, is recognized as one of the leading risk factors responsible for a substantial proportion of the incidence of both non-communicable and communicable diseases [68, 70-73].

The effects of heavy, harmful alcohol consumption have been researched extensively, and alcohol has been found to affect every organ system in the body [68]. Either directly or indirectly, alcohol or its primary metabolite, acetaldehyde, irritate and damage tissues throughout the body [68]. Chronic alcohol abusers are susceptible, for example, to alcoholic dementia and the accompanying degeneration of cognitive ability and function due to alcohol toxicity and subsequent brain tissue loss [68]. Additionally, several other non-communicable diseases have been directly attributable to alcohol, thus designating alcohol and a necessary cause, or have been a component cause of non-communicable diseases [70]. Harmful alcohol consumption or dependence is capable of producing serious liver disorders including hepatitis, and cirrhosis [68, 72, 73], cardiovascular disease, ischemic heart disease, cerebrovascular disease, hypertension, diabetes mellitus, and several types of cancers (esophageal, breast, laryngeal, liver, oropharyngeal, and prostate), among other non-communicable diseases [68, 72, 73]. Alcohol consumption has also been recognized as a risk factor that imparts susceptibility to communicable diseases leading to an increased incidence of tuberculosis and the modification of the outcomes of tuberculosis infection and treatment [71]. In Thailand, as has been observed in other countries, alcohol consumption is a major underlying cause of road traffic accidents, injuries, and fatalities [74].

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1.6.1 Measuring Harmful and Hazardous Alcohol Consumption

The Alcohol Use Disorders Identification Test (AUDIT) was designed to ascertain problematic alcohol consumption and to screen individuals for hazardous and harmful alcohol consumption, and it contains items which measure alcohol consumption patterns, drinking behavior, and related consequences [75]. The AUDIT was developed to screen for individuals displaying a range of behaviors on the alcohol consumption continuum, particularly individuals with less severe consumption behaviors [75, 76]. Therefore, the instrument is capable of detecting a larger proportion of individuals displaying varying levels of alcohol use disorders and serves as a screening tool to be implemented in primary care settings to identify individuals who demonstrate harmful and hazardous drinking before alcohol-dependence and related consequences have occurred. The AUDIT also facilitates epidemiological studies which aim to identify the prevalence and correlates of alcohol use disorders. The selection of items was carefully considered to contain valid measures acceptable to a wide range of cultures. The sensitivity of the combined alcohol-related domains ranges from 87 – 96% and the specificity ranges from 81 – 98% using a cut-off point of 8 whereas the sensitivity ranges from 67 – 91% and the specificity ranges from 95 – 100% using 10 as the cut-off point [75]. Several other instruments have been developed to screen or diagnose substance and mental conditions. These instruments include the following diagnostic tools: the Psychiatric Research Interview for Substance and Mental Disorders (PRISM) [77], the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS) [78], and the Michigan Alcoholism Screening Test [79]. However, AUDIT was specifically developed to describe the epidemiology of the spectrum of behaviors characteristic of alcohol use disorders in a general population across cultures.

1.6.2 Risk factors for Alcohol Consumption among Adolescents and Young Adults

The worldwide perception about adolescents and young adults is that they are generally healthy, and thus public health efforts rarely target these individuals. Yet adolescents and young adults belong to unique developmental stages within the life course framework. They are at an age where they are disproportionately at risk for alcohol-attributable disease and disability caused by neuropsychiatric illness, including unipolar depressive disorders. The impetus for understanding the risk factors and diseases that arise during adolescence pertains to the lifestyles that adolescents adopt and the potential for risky lifestyle factors to impact disability that persists into adulthood. From the perspective of affecting populations, failing to target adolescents and young adults has implications for adverse social and economic development [80].

Several factors have been assessed and found to be associated with alcohol consumption among adolescents, and were established as either protective factors or factors that placed adolescents at risk for consumption. Individual level factors that have demonstrated associations with consumption include age, grade point average, having an alcohol-dependent individual or problematic user in the family, living with someone other than their own parents, peer pressure, exposure to alcohol advertisements, and accessibility to alcohol consumption, whereas factors that were found to be protective include perceptions on drinking impacts on family and on moral values [32, 81]. Interestingly, an assessment of underlying modifying effects on alcohol consumption found that healthy self-regulation, dependent on personality, buffers the mood and behaviors that lead an individual to feel he or she does not need to consume alcohol in order to feel well [82]. The burgeoning MA epidemic among Thai adolescents and young adults reveals a picture whereby MA use has been predominately found among students and the unemployed and MA also constitutes a risk factor associated with heavy alcohol [10].

1.6.3 Global Burden of Alcohol Use and Depression: Morbidity and Mortality Estimates

Global exposure to alcohol, measured as adult per capita recorded and estimated unrecorded consumption varies by designated World Health Organization regions as well as by countries, indicating that parts of Western Europe, Eastern Europe, Asia, North America, South America, and Oceana have substantial burdens of alcohol consumption that differ from the global alcohol consumption average of 6.2 liters [70] of adult per capita consumption of 100% per ethanol (Figure 4). Estimates of the total amount of years of healthy life lost to both premature death and disability due to alcohol dependence, measured in DALYs, were 4.7% in the southeast Asian region compared with approximately 17% in the European region [70]. Estimates of the prevalence of alcohol consumption among adolescents in the United States demonstrate much more prevalent alcohol consumption than Thailand. Nationally representative estimates generated within the United States during 2010 - 2011 revealed that approximately 71% of adolescents attending grades 9 through 12 in U.S. public and private high schools have ever consumed alcohol [83] compared to 37% of students in Bangkok [17].

Alcohol consumption accounts for a substantial global proportion of injuries and chronic disease and is considered to be a major avoidable risk factor [70]. Alcohol use disorders are particularly disabling; more than 30 ICD-10 three- or four-digit codes include alcohol in their name, thus implicating harmful or dependent alcohol consumption as the necessary cause [70]. Diseases that result from harmful or dependent alcohol consumption include disorders arising during the perinatal period, mouth, esophageal, and oropharynx cancers, colon cancer, rectal cancer, breast cancer, liver cancer, other neoplasms, diabetes mellitus, alcohol-use disorders, unipolar depressive disorders, epilepsy, hypertension, ischemic heart disease, hemorrhagic stroke, liver cirrhosis, low birth weight, road traffic injuries and accidents, falls, drownings, poisonings, other unintentional and intentional injuries, self-inflicted injuries, and violence [70]. Neuropsychiatric disorders, mostly notably alcohol-use disorders, constitute the most substantial

proportion of the alcohol-attributable burden of disability and range from 30% - 38% for women and men [70]. Harmful/hazardous alcohol consumption and alcohol-dependence also contributed to significant societal and economical costs in high-income and middle-income countries, contributing to large proportions of health-care, law-enforcement, lost productivity and other costs.

In 2010, global estimations of the population aged 10 to 24 years were approximately 1.8 billion so that adolescents and young adults comprised 26% of the global population [84]. The proportion of DALYs among youth aged 10-24 years was 15.5% of the total DALY burden among the global population, contributing a total 236 million DALYs [80]. Approximately 94% of these DALYs were in low-income and middle-income countries, and 32% of DALYs were located within southeast Asia [80]. The major causes of the burden of disease among 24 year-olds were HIV, TB, and malaria, maternal conditions, other communicable diseases, neuropsychiatric disorders, other non-communicable diseases, and injuries, and DALYs differed by age group and by gender. Among individuals aged 15 – 19 and aged 20 – 24 in all regions, a large proportion of DALYs was due to neuropsychiatric disorders, being second [80] only to injuries (Figure 5). More specifically, unipolar depressive disorders were the single most important cause of DALYs among individuals aged 15 – 19 years and 20 – 24 years and ranged from 8 – 10 % of all DALYs [80]. Alcohol consumption also contributed a significant proportion of DALYs among individuals aged 15 – 19 years of age, representing 4% of all DALYs in this age group [80].

Depression ranks as 7th among diseases currently contributing the most DALYs to the global burden of disease in low-and-middle-income countries [85]. Depression has also been identified in the literature as a common comorbidity among individuals who consume alcohol, particularly unipolar major depression [86]. Previous studies among a Canadian adult population indicate that the prevalence of major depressive disorder among individuals who reported harmful alcohol consumption was about 7% and was about 9% among individuals who were dependent on

alcohol [87]. This study also found a 12-month prevalence of 12.3% harmful alcohol use and 5.8% prevalence of alcohol dependence among individuals who had a 12-month diagnosis of major depressive disorder [87]. Moreover, research has identified potential harmful consequences because suicidal ideation and having a suicide plan have been identified as correlates of current alcohol consumption among Thai men [88].

1.6.4 Treatment of Problematic Alcohol Use and Alcoholism

The development of new medications for the treatment of alcohol-dependent individuals in order to prevent relapse has undergone renewed interest because of the need to utilize medications that are more efficacious and less toxic. While disulfiram was approved as a deterrent medication, thus making alcohol consumption unpleasant, evidence of its efficacy has been limited [89]. Evaluations of other serotonergic and opioid antagonists, including naltrexone and acamprosate, demonstrate inconsistent and limited evidence of efficacy due to assessments in heterogonous populations, poor treatment compliance, or inadequate dosing. An agreement on effective dosages and durations of medication regimens needs to be established to inform treatment guidelines for alcohol-dependent patients. Moreover, many questions remained unanswered concerning the evaluations of new medications, the efficacy of treatment regimens among subgroups (i.e. adolescents and women), the efficacy of combining multiple medications or combining pharmacotherapy with psychotherapy, and the appropriateness of treating heavy drinkers [89].

1.6.5 Resources for Treatment of Problematic Use of Alcohol in Low and Middle-Income Countries

In middle-income countries, increasing trends of harmful and hazardous alcohol consumption and dependence are a result of the low rate of health care seeking, lack of accessible services, stigma, and low recognition of harmful alcohol use as a problem [90]. In Thailand, the assessment of psychiatric services demonstrated that alcohol and drug use was common, with a prevalence of 28.1% among patients diagnosed by a primary care physician [91]. Furthermore, the treatment of alcohol-dependent patients requires a complex set of components to initiate detoxification and to prevent relapse [92]. In fact, many alcohol-dependent patients continue to relapse despite multiple courses of treatment. Consequently, many evidence-based, high-quality interventions use a tremendous amount of resources, and these resources as well as context-specific evaluations of treatment and prevention services are not available in treatment settings of middle-income countries [91, 92].

1.7 Literature Review: Defining Depression, Prevalence of Depression, and Correlates

Mood disorders, including depression, differ from the normal responses to daily events and stressors. According to the culture of modern western culture and professional psychiatry, the moods of people with a mood disorder last for a prolonged duration of time and interfere with normal functions [66]. Depression is defined primarily by a low mood or negative affect, and most people with a mood disorder suffer only from depression, hence they are known as suffering from unipolar depression. Bipolar disorder, by contrast, consists of experiences of depression and mania, the exact opposite of depression and an inflated condition of euphoria, energy, and confidence [66]. Western, professional models dictate that the experience of depression differs vastly between individuals, but most people suffering from mild or severe forms experience

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emotional symptoms such as feelings of being "miserable" or "empty." Motivational symptoms

of depressed people entail lack of interest in pursuing usual daily activities. Behavioral

symptoms are comprised of individuals changing and becoming less active and physical

retardation. Physical symptoms are characterized by vague physical ailments like headaches,

general pain, and indigestion [66]. Cognitive symptoms are also experienced and consist of

feelings of low self-esteem, inappropriate guilt, and pessimism. Severe depression are

characterized by hallucinations and psychosis [93].

1.7.1 Prevalence of Depressive Symptoms and Disorders

Depression is becoming a growing, significant public health burden worldwide, and

approximately 10% of adolescents in Asian countries are subject to depression [94]. The

prevalence of depressive disorders demonstrates substantial variation across countries.

Individuals residing in Africa, Asia, North America, South America, the Middle East, Western

Europe, the Caribbean, and Australia report ranges from approximately 5% to 34%, depending on

the instruments used, the definition of depressive symptomatology, the time frame in which

symptoms are expressed, the cutoffs used, and the populations assessed [94-109].

Epidemiological studies conducted globally have observed prevalence rates of depression ranging

from 0.4% to 8.3% in adolescents and lifetime prevalence rates ranging from 15 to 20%,

comparable to lifetime estimates in adult populations [110].

Relatively little research has been conducted in Thailand to measure prevalence of

depressive symptoms among adolescents and young adults. The research that has described the

prevalence of these age groups in Thailand did not use a standardized approach to measurement

and used various scales to screen for depressive symptoms. The prevalence of high levels of

depressive symptoms in one study conducted in Chon Buri Province among adolescents aged 14

– 19 (range of dates of data collection not specified) was 21% using a cut-off score on the CES-D

of ≥ 22 and 43% using a cutoff score on the CES-D of ≥ 16 [34]. In the same study, measurement of high levels of depressive symptoms using the Reynolds Adolescent Depression Scale (RADS) described a prevalence ranging from 10 – 20% depending on the cut-off used.

1.7.2 Measuring Depressive Symptomatology

The Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure depressive symptomatology among the study population. This scale was developed to assess depressive symptomatology among general populations participating in epidemiological studies rather than to diagnose depression or to evaluate the severity of symptoms in response to treatment [111]. The purpose of the scale in epidemiological studies was to assess associations between high levels of depressive symptoms and variables among various population subgroups. The scale consists of 20 items designed to ascertain the current state of depressive symptomatology, and scores range from 0 to 60 with scores weighted for increasing frequency of experiencing symptoms during the week prior to interview. Principle components analysis of the 20 items yielded four components that can be interpreted as having the following four factors: depressed affect, positive affect, somatic symptoms and retarded activity, and interpersonal relations. The psychometric properties of the scale are adequate for measuring depressive symptomatology across differing populations in that they essentially had similar factor structures, adequate reliability, and adequate validity across demographic subgroups. Regarding validity, the scale demonstrated adequate construct validity and discriminant validity because the scale correlated moderately with similarly constructed scales and exhibited low correlations with unrelated measures (i.e. social functioning). Estimates of reliability were high and ranged from .77 to .92, and inter-item and item-scale correlations performed as expected when comparing correlations among general populations and patient samples.

There are several screening instruments or diagnostic interviews that have been validated, used in psychiatric epidemiological research, and which aim to identify individuals who may be at risk for depression or aim to diagnose depression. These instruments include the National Institute of Mental Health's Diagnostic Interview Schedule [112], the Epidemiologic Catchment Area Survey [113], and the Beck Depression Inventory [114]. The CES-D scale differs from these instruments in that it was developed to measure depressive symptomatology in general populations for the specific purpose of measuring the burden of depressive symptoms rather than to diagnose depression in a clinical setting, to estimate the rates of mental health service use, to examine factors that influence the development and maintenance of psychiatric disorders, or to measure severity of symptoms in response to treatment [111, 113].

1.7.3 Cultural Conceptualization of Depression

Empirical evidence exists which describes conceptualizations of depression among non-Western cultures. However, little is known about Thai-specific conceptualizations of depression. One qualitative study attempted to explore perceptions and causes of depression among elderly Thai immigrants residing in the United States as well as the coping behaviors they employed to aid in alleviating depressive symptoms [115]. In this study, several symptoms were identified by Thai elders, and these symptoms included a range of behavioral, cognitive, affective, somatic, and verbal symptoms such as feelings of guilt, worthlessness, and dissatisfaction, attempts at isolation, being quiet, or interacting with others aggressively, speaking in an angry tone of voice, and feeling pressure in the mind or heart, among other feelings and actions [115].

Indeed, empirical evidence for differences in lay perceptions of depression has been researched. An analysis of differences in beliefs about what constitutes depression conducted among middle-aged British Citizens, middle-aged Asian immigrants from the Indian subcontinent, young British citizens, and young Asian citizens who has assimilated into the culture in Great

Britain, demonstrated differences in beliefs among middle-aged Asian immigrants compared to other groups [116]. Relatively few studies attempt to conduct systematic cross-cultural comparisons that seek to understand if and how social and cultural factors affect psychopathology.

Research that has been conducted observed an emphasis placed on somatic symptoms to the detriment of mentioning psychological symptoms among Asians because stigma directed towards mental illness affects not only the afflicted, but also their families [115, 117, 118]. Other research has provided evidence to support not only cross-cultural differences in somatization, but also differences by characteristics of health care systems whereby patients are more likely to present with physical symptoms if they lacked an ongoing relationship with a primary care physician [119]. Interestingly, explanatory models of culture-bound views about the course of depression find that some non-Western cultures, while emphasizing somatic symptoms (i.e. a "sinking heart" in Punjabi cultures), integrate somatic symptoms with emotional and social symptoms; the meaning of a physical symptom, a "sinking heart," is inextricably tied to culturally-defined stressors such as a loss of honor or social failure and loss of control of one's emotions [120]. Other culture-bound causes of depression, such as those explained by members of Muslim cultures, included stressors originating from within the family, lack of social support, stressors induced by society, and marital conflicts [121]. Indeed, cross-cultural comparisons of how depression is perceived and the causes of depression support the notion that the definition of depression is culturally bound and the value of using western approaches such as the DSM- IV for assessment of mild and moderate depression is questionable when applied to all populations [122].

By applying a narrow framework that is based on Western and psychiatric professional culture, much of depressive phenomenology based in culture is missed [123]. Furthermore, the very definition of illness itself is defined within and given meaning by a set of values and beliefs established within culture [117]. Thus, applying a framework based on cultural differences can

provide a way to understand what depression means to a culture, what depressive symptoms are, culturally-based reactions to depression, prevention, and treatment.

Cultural conditioning plays a role in the differences in the expression of depression. In men, there is a tendency to mask depression. Depressed men do fulfill criteria specified in the DSM – IV by exhibiting the following most frequent symptoms: dysphoria, suicidal ideation, changes in normal appetite and sleep patterns, fatigue, diminished concentration, inappropriate guilt, physical retardation, and loss of interest in activities that were normally and previously enjoyed [124]. While the symptoms and course of depression are similar in men and women, the ways that depression is experienced differs. Masculine roles determine a course of depression whereby behaviors range from increased interpersonal discord, occupational problems and conflicts, and conflict in the expected accomplishments specific to gender roles [124]. Societal expectations of female roles determine a course of depression which differs from men and evidence provides support for women experiencing a greater strain as they juggle occupational, partnership, familial, and caregiver roles to both their children and aging parents, less tendency to master control of their environments, and a greater tendency to ruminate over the causes and consequences of depressive symptoms [125]. Men and women do have similar recurrences of depression, but 1-year point prevalence of depression is much higher in women than men beginning at 13 through 21 years of age [126].

Regarding correlates of depression, potential risk factors for depression can vary by culture and age. Elderly Thai who have immigrated to the United States report that changes in family structure and operations have reduced their status from one of leaders to one of caregivers of grandchildren. This devaluation has led to difficulties in family interactions associated with the development of depression among Thai elders as they try to cope with loss of relationships and difficulties encountered during their professional lives in the United States [115]. Macro and mezzo-level correlates such as cultural context and family dynamics contribute to shaping

depression among Asian youth, and familial social cohesion and family conflicts have been observed to shape depression and other mental health disorders among adolescents [127, 128].

1.7.4 Correlates of Depression and Associated Risks

Correlates of depression among adolescents and adults have been observed and include alcohol consumption and marital status among young adults and current smoking and chronic illness among adolescents [129].   A review of the correlates of early onset major depressive disorder (MDD), which is similar to adult onset but occurs prior to 21 years of age, established a set of factors that placed adolescents with depression at an increased risk for suicidal ideation, suicidal behaviors, tobacco use, and abuse of alcohol and illicit substances [110]. In Thailand, comparisons of behaviors among alcohol consumers and abstainers demonstrated a prevalence of 23.2% of alcohol consumers experiencing feelings of depression whereas only 10.9% of abstainers reported similar symptoms [32]. Depression among adolescents can cause a substantial amount of adverse psychosocial and academic outcomes, such as low self-esteem, family dysfunction, having a smaller social network, and low academic achievement [34, 110, 130]. Most importantly, depression has been linked to adolescent substance abuse [131].

Rumination, both a component of depression, and a cognitive risk factor, can be defined as focusing thought repeatedly on the meanings, causes, and consequences of depressive symptoms. This process is hypothesized to increase the severity and duration of such symptoms and supports the response styles theory of depression by explaining that the way in which individuals respond to depressive symptoms determines the severity and duration of these symptoms [132].

1.7.5 Global Impact of Depression on Health

Depression leads other psychiatric and chronic disorders in driving the loss of health-related quality of life (HRQoL), accounting for 55% of HRQoL lost in a Finnish population in 2000 - 2001 compared to the 5% loss driven by alcohol dependence [133]. In low- and middle-income countries, assessments of the contributions to disability by mental disorders using global and individual Sheehan Disability Score (SDS) scale ratings revealed that mental, rather than physical disorders, were driving disability and impacting individual SDS ratings in terms of social functioning, and that depression was a leading factor in the burden of mental disorders [134].

1.7.6 Treatment and Prevention of Depression in Adolescents

Treatment of unipolar depression is one of the most successfully treated psychological disorders [66]. Several approaches exist. The most often used tools of treatment are the psychological therapies and range from psychodynamic therapies, behavioral therapies, and cognitive therapy. Sociocultural approaches to treatment recognize how the mezzo-level social structure within which the depressed person lives generate the causes of depression as a result of the roles that these individuals are expected to fulfill [66]. Biological approaches include using antidepressants (MAO inhibitors, tricyclics, and selective serotonin reuptake inhibitors). Research has demonstrated the effectiveness of cognitive, cognitive-behavioral, interpersonal, and biological therapy [66]. Randomized trials conducted to evaluate the effectiveness of treating acute MDD among adolescents with the administration tricyclic antidepressants (TCA) and selective serotonin reuptake inhibitors (SSRIs) and psychosocial therapy such as cognitive behavioral therapy have yielded mixed results because of small sample sizes, short duration of administration, and the inclusion of patients with secondary depression [135].

1.8 Epidemiology of Dual Disorders: Prevalence and Risk Factors for Depressive Disorders

Concurrent with Alcohol Consumption, Methamphetamine Use, and other Comorbid

Substance Use and Depression

Epidemiological and clinical research has established the common concurrence of

substance use and affective disorders, and these comorbid conditions have public health

implications because the concurrency of substance use and affective disorders has been associated

with more severe symptoms and may persist for a longer amount of time compared to either

condition alone, leading to greater functional disability, shorter time to relapse of substance use,

and the more frequent use of health resources [136, 137]. Global estimates of comorbidity of

alcohol use disorders and depressive symptoms indicate that the prevalence is 32.3% in Canada

[136]. In the United States, the prevalence of major depression reported in the previous 12

months among respondents reporting a 12-month substance disorder in the National

Epidemiologic Survey for Alcohol and Related Conditions (NESARC) from 2001- 2002 was

15.15% whereas the prevalence of major depression reported within the past 12 months was

6.35% among respondents who reported no substance use [138]. The relationship between

comorbid alcohol use disorders and depression has been observed in both clinical and

epidemiological literature [139], and the etiology may be partially due to genetic factors [140-

142]. In Thailand, Suttajit and colleagues observed an increased odds of major depressive

disorder among individuals with alcohol use disorders compared to the general population in a

nationally representative sample, and women exhibited greater psychiatric comorbidity (OR 2.49,

95% CI 1.76 – 2.53 in men and OR 4.09, 95% 2.31, 7.26) [143].

Epidemiological research supports evidence for a "risk-factor" model whereby alcohol

consumption takes place to cope with pre-existing negative affective symptoms and suggests the

role of depressive symptoms as an etiological factor related to the development of alcohol

dependency [144]. Other research provides evidence that either disorder determines risk for

development of the other disorder [145] or that increasing severity of alcohol use disorder predicted the first incidence of depressive disorders [146]. Moreover, depending on the timing and temporal relationship of depression and substance dependence, the onset of major depressive disorders prior to the onset of dependence may determine the nature and course of substance dependence remission and relapse [147] and response to treatment with antidepressants [148].

Despite some support from models which establish the emergence and persistence of alcohol use disorders, including dependence, as a way to self-medicate, the existing research literature contains inconclusive results about the distinction about the etiology and the underlying neurobiological mechanisms guiding and mediating the course of onset of major depressive disorders (MDD) independent of substance use and of substance-induced depressive disorders [49, 137, 149] or indicate that the relationship may be bidirectional, at least in terms of alcohol dependence and major depressive disorder [150]. The precipitation model is a one theoretical model which describes the etiological relationship between alcohol use disorders and depression as being the precipitation of depression in response to adaptation in the neurological pathways of the brain induced by alcohol or drug use [151]. Individuals classified as either having independent MDD concurrent with alcohol use disorders or as having substance-induced depressive disorder had similar clinical pathology and were more likely to have other psychiatric disorders, nicotine dependence, an Axis I diagnosis, or an Axis II diagnosis and reporting a higher number of DSM-IV MDD criteria than individuals classified as solely having MDD [137]. These similarities point to a similar underlying etiological framework and clinical course among those with either type of comorbidity. In this study, the lifetime prevalence of MDD was 7.41% whereas the prevalence of MDD co-occurring with alcohol use disorders was 5.82% and 0.26% among individuals having substance-induced depressive disorder [137].

1.8.1 Treatment of Comorbid Substance Abuse and Major Depressive Disorders

The concurrency of substance abuse and major depressive disorders occurs frequently [87], and the symptoms exhibited by patients with these concurrent conditions may be qualitatively different, more severe, more difficult to treat, and it is more difficult for patients to remain well once symptoms have dissipated [152, 153]. Common clinical practice dictates that one disorder is treated before the other because it is perceived that treating the primary disorder can often alleviate symptoms from the other disorder, or that the other disorder will be easier to treat once the primary disorder has been successfully treated [153]. Currently, numerous barriers for the treatment of substance abuse disorders exist for several reasons. Despite the established discussion implicating clinical practices that integrate treatment for both the comorbid substance abuse and major depressive disorder, physicians face barriers to adoption and implementation of the treatment of substance use disorders because of conflicting evidence that give health care professionals making the treatment decisions perceptions of the relatively little effectiveness of pharmaceuticals developed to treat substance abuse disorders [154]. Furthermore, there is little empirical evidence for the content of an effective psychosocial approach to treatment of substance use disorders or guidance for the implementation of psychosocial treatment concomitant to the administration of medication [155]. Regardless of whether integrated treatment was evaluated or not, however, there is little definitive empirical evidence which supports various regimens of pharmacotherapy or cognitive-behavioral interventions as facilitating efficacious and sustainable treatment outcomes for either substance use or depressive symptoms. There is no empirical evidence which allows for the establishment of clear treatment guidelines for individuals with comorbid substance or alcohol abuse and mood disorders, particularly in low- and middle-income countries and especially in rural areas with diminished access to resources [52, 58, 156-166]. Hindering treatment efforts is the clinical perception that prescribing pharmacological therapy to alcohol- or drug-dependent patients may cause

interactions between pharmaceuticals or may lead to overdose in these patients, and there

continues to patient-directed stigma expressed by physicians who believe taking medications will

induce further dependency on these pharmaceuticals [153, 155].

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Figure 1. The Golden Triangle Region of Southeast Asia
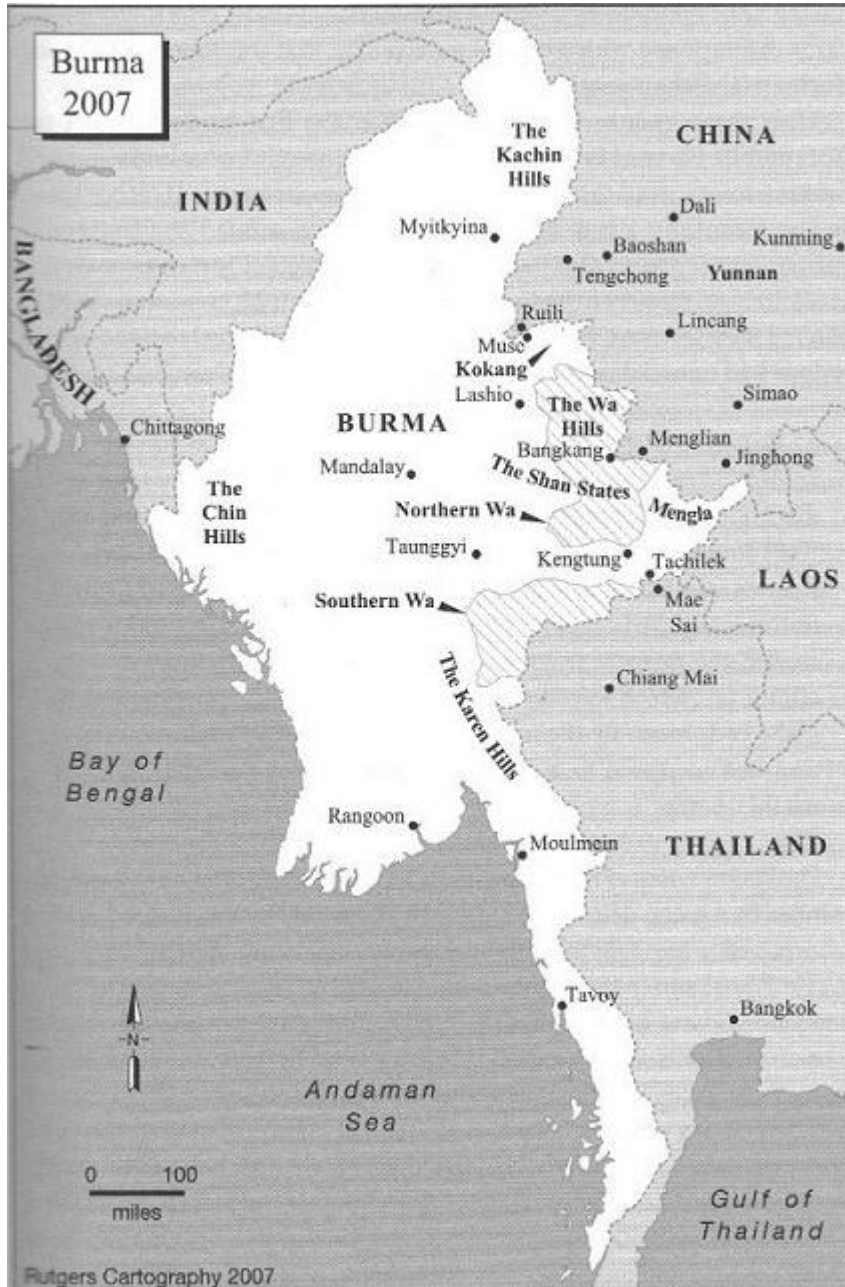
Figure 1. Map of the Golden Triangle region consisting of Chiang Mai Province of northern Thailand bordering Burma (Myanmar) and Lao.

(Adapted from: Chin, Ko-Lin. The Golden Triangle. Inside Southeast Asia's Drug Trade. 2009, Ithica, New York: Cornell University Press.)

Figure 2. **Diagram for Convergent Parallel Mixed Methods Design**

Figure 2. Diagram for Convergent Parallel Mixed Methods Design
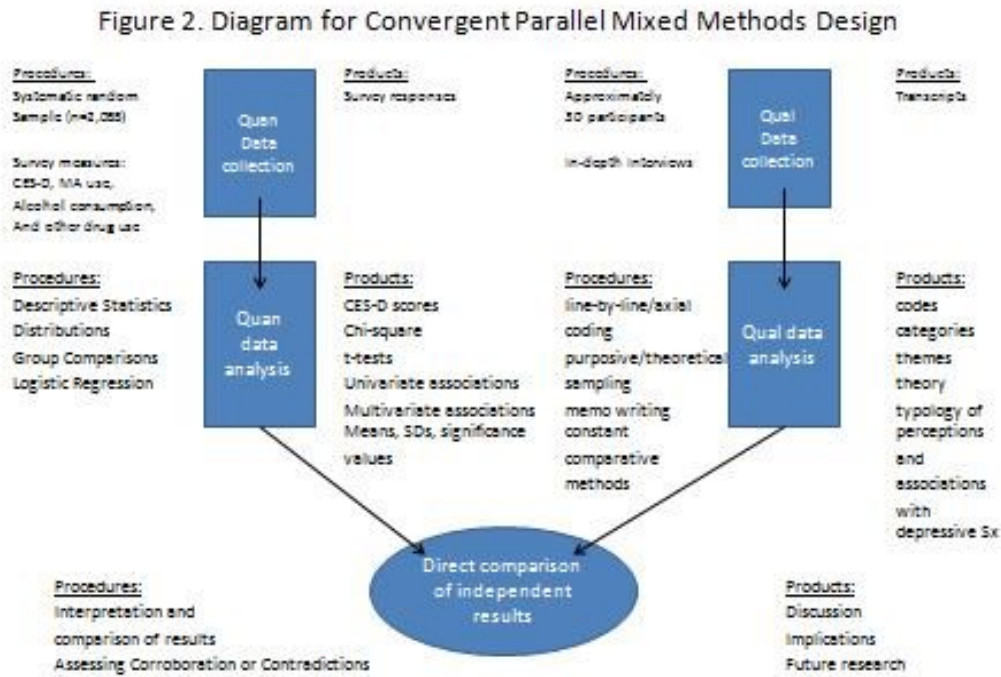
This figure represents a framework with which to view the integration and interpretation of results from a parallel-databases variant of the convergent design, a type of mixed methods research design. This design was chosen to answer our research questions by independently conducting quantitative and qualitative research at roughly the same time frame, integrating results at the level of interpretation after data analysis of each type of research. Results are summarized, synthesized, and interpreted at the level of discussion.

(Diagram adapted from Creswell, John W. and Plano Clark, Vicki L. *Designing and Conducting Mixed Methods Research*. 2nd edition. 2007, Thousand Oaks, California: Sage Publications, Inc.)

Figure 3. Conceptual framework of methamphetamine use, alcohol consumption, and depressive symptoms.
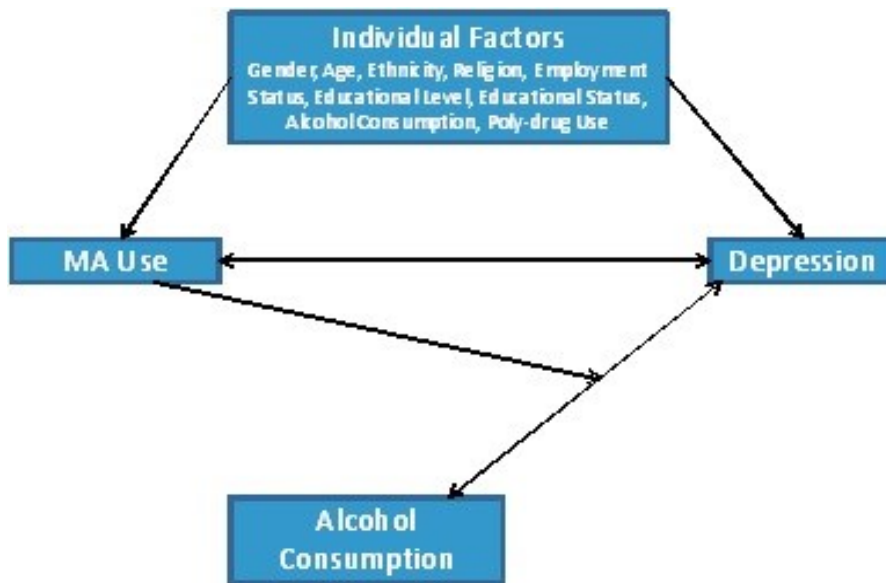
Figure 3. Individual-level factors indicate the hypothesized bi-directional relationship between depressive symptoms and methamphetamine use and the bi-directional relationship between depressive symptoms and alcohol consumption. Known confounders included gender, age, employment status, educational attainment, and poly-drug use. Other known confounders such as ethnicity and religion were not included in regression models because most of the population was comprised of Thai Buddhists. We also hypothesized that methamphetamine use would modify the relationship between alcohol consumption and depressive symptoms.

Figure 4. **Global Exposure to Alcohol**
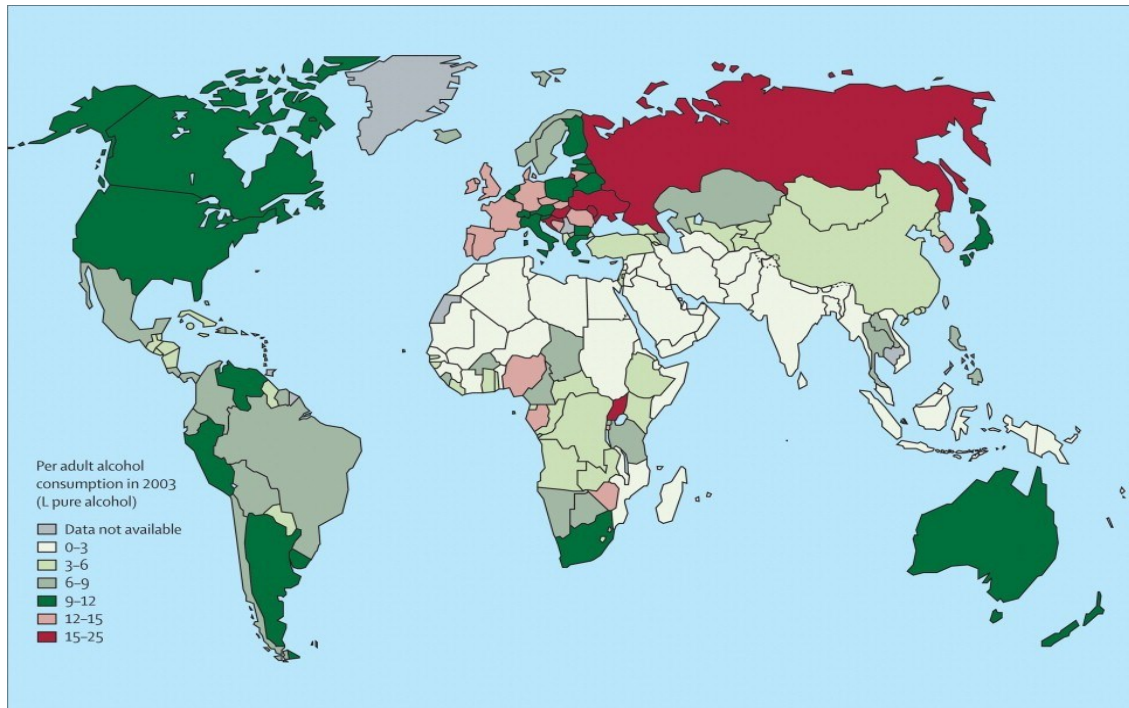
Figure 4 demonstrates country-by-country variation of per adult of recorded and unrecorded pure alcohol consumption in 2003. The exposure data were obtained from the World Health Organization (WHO) Global Status Report on Alcohol 2004 and the WHO Global Information System on Alcohol and Health. Recorded per adult capita pure alcohol consumption was obtained from government taxation records, industry publications about production and sales, and by the Food and Agriculture Organization. Methods used to measure and estimate unrecorded alcohol consumption varied. Primary sources of data for estimating unrecorded alcohol consumption included expert opinion and population surveys. The WHO Global Information System on Alcohol and Health is accessible at http://www.who.int/globalatlas/default.asp.

(Figure and Measurements adapted from Rehm J, Mathers C, Popova S, et al. Global Burden of Disease and Injury and Economic Cost Attributable to Alcohol Use and Alcohol-use Disorders. *Lancet.* June 2009; 373: 2223 – 33.)

Figure 5. The Major Risk Factors Contributing to Global Burden of Disability and Mortality per Region and by Gender in Adolescents and Young Adults per 1000 Population
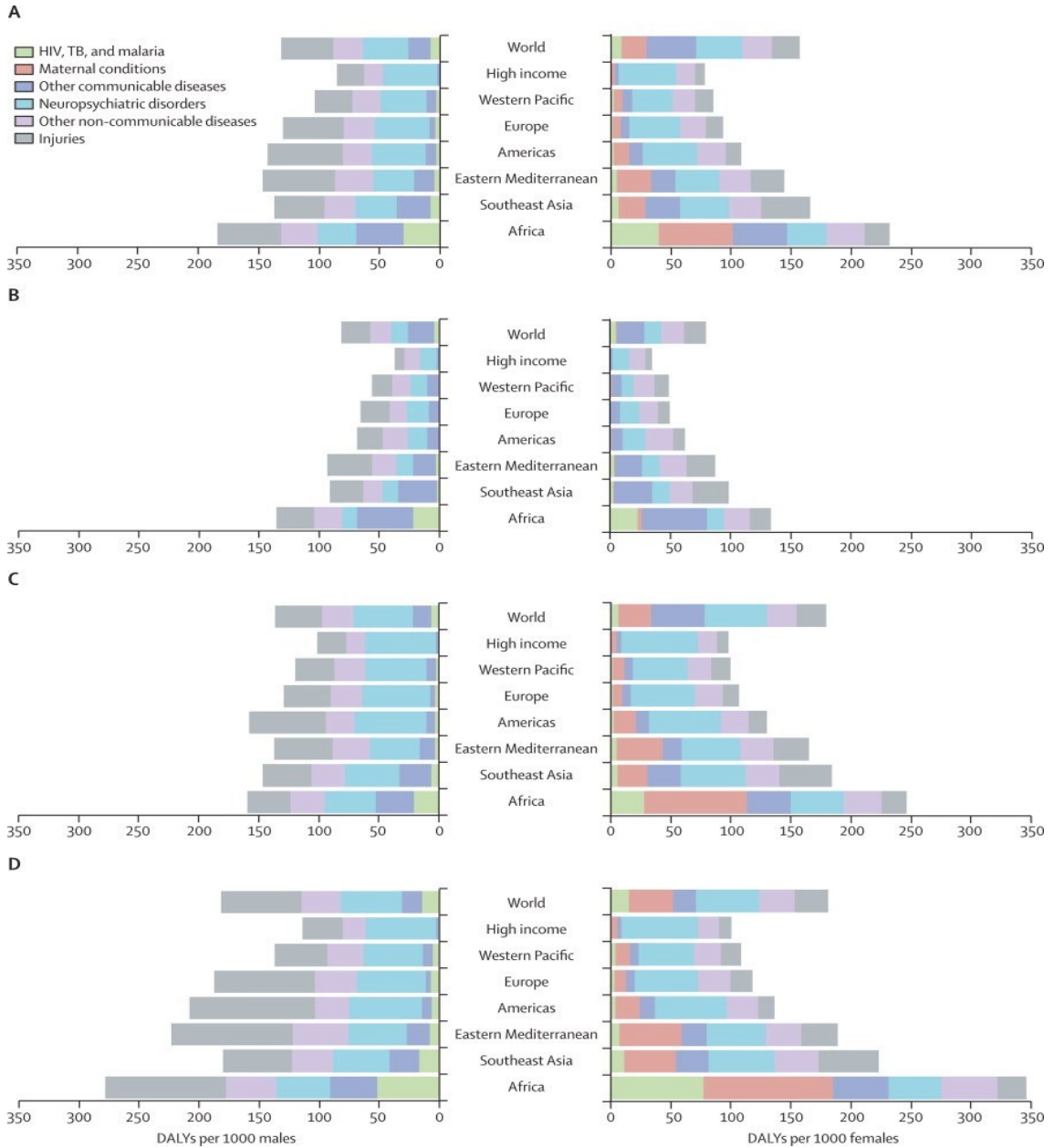
A demonstrates DALYs distributed among 10 – 24 year olds. B demonstrates DALYs distributed among 10 – 14 year olds. C demonstrates DALYs distributed among 15 – 19 year olds. D demonstrates DALYS distributed among 20 – 24 year olds. DALYs is a measure for disability adjusted life years, or the total years of healthy life lost to causes of disease.

(Figure 5 is adapted from Gore, FM, Bloem PJN, Patton GC, et al. Global Burden of Disease in Young People Aged 10 – 24 Years: A Systematic Analysis). *Lancet.* June 18, 2011; 377: 2093 – 2102.)

Chapter 2

Distribution and Correlates of Depressive Symptoms among Adolescents and Young Adults in Rural Northern Thailand

2.1 Abstract

Introduction: High levels of depressive symptoms often occur among individuals who abuse or who are dependent on methamphetamine, alcohol and other illicit substances. Understanding the nature of the relationship between depressive symptoms and methamphetamine use and identifying those most at risk can further understanding of prevention and treatment options for adolescents and young adults who use methamphetamine.

Methods: In 2011, structured surveys designed to capture data on demographics, socioeconomic variables, drug use behaviors and depressive symptoms were administered to adolescents and young adults aged 14-29 residing in rural areas of Chiang Mai province, Thailand. The primary independent variables of interest were lifetime and recent methamphetamine use. Chi-squared tests, t-tests, linear regression, and logistic regression were used to assess associations between methamphetamine use and depressive symptoms. Interactions between lifetime/recent methamphetamine use, gender, and depressive symptoms and interactions between methamphetamine use, polydrug use and depressive symptoms were evaluated.

Results: The prevalence of lifetime and recent methamphetamine use and high levels of depressive symptoms in the study sample was approximately 19%, 31%, and 9%, respectively. Crude bivariate regression models described significant associations between ever/recent methamphetamine use, age, gender, marital status, and depressive symptoms. Through multivariate modeling, associations between ever/recent methamphetamine use and depressive symptoms remained. Interactions were observed between methamphetamine use, gender and depression, but not with methamphetamine use, polydrug use, and depressive symptoms. Conclusions: There is a significant burden of high levels of depressive symptoms among methamphetamine using adolescents and young adults in rural areas of Chiang Mai Province,

Thailand. Providing access to treatment for rural residents and integrating treatment for mental

health care and substance abuse health services is warranted.

2.2 Introduction

Methamphetamine (MA) use is associated with severe psychological harms, including depression [1]. Depressive symptoms can occur during the period of MA use and also as a consequence of MA withdrawal [1] . Additionally, a substantial proportion of MA users report a lifetime history of depression [2-4]. A study of a sample of MA users conducted by Zweben et al. estimated that 68% of female MA users and 50% of male MA users reported a history of feeling depressed at some period during their lifetime [3]. Another study conducted among MA users entering treatment in Australia observed that 40% of study participants had a diagnosis of major depression within a year prior to admission, and another 44% met the criteria for major depression but were excluded because their depressive symptoms were attributed to drug dependence [5]. A cross-sectional, retrospective analysis of a sample of 301 amphetamine users in Australia examined the presence of depressive symptoms prior to and after the initiation of amphetamine use. Depressive symptoms were more commonly found after first using amphetamines than the subset who reported experiencing symptoms of depression prior to first use [2]. Among young adult Thai MA users aged 18-25 years, the prevalence of high levels of depressive symptoms was 35% at baseline prior to a randomized behavioral trial [6], although the temporal order could not be assessed.

While an association exists between MA use and depressive symptoms, the temporality of the relationship remains unclear. High levels of depressive symptoms could lead to the onset of MA use, depressive symptoms could occur as a result of MA use, depressive symptoms could be exacerbated by frequent MA use, or the relationship may be bidirectional [6]. Biomedical research has observed shared underlying dysfunctional neurochemical mechanisms among drug dependent individuals having concurrent symptoms of depression [7]. Understanding the biological mechanisms that underlie this relationship is relevant for addressing options for treatment, coping, and prevention of both MA dependence and depressive symptoms and is relevant for the integration of services that address the treatment and prevention of these

comorbid conditions, particularly in low- and middle-income countries where MA use is widespread.

Research has not provided consistent evidence of the efficacy of antidepressants in treating depression and drug dependence. Several randomized controlled trials conducted to evaluate the efficacy of pharmacotherapy as an adjunct to cognitive-behavioral therapy or stepped care to aid in drug cessation and alleviate depressive symptoms, have found treatment to be inconsistently efficacious in patients who had high levels of depressive symptoms as a primary mood disorder or depressive symptoms secondary to drug use among individuals who were dependent on or abused MA, cocaine or alcohol [8-18]. All of these trials have been conducted in urban areas of the United States, and involve small sample sizes that are insufficiently powered to detect differences in outcomes, whether evaluating selective serotonin reuptake inhibitors (SSRI), dopamine reuptake inhibitors, tricyclic antidepressants, or other antidepressants against placebo. Studies assessing the efficacy of treating depressive symptoms among MA-dependent users suggest some limited efficacy, particularly among certain subgroups (Table 3).

The nature of the relationship between depressive symptoms and MA use, abuse, and dependency and the prevalence of these comorbid conditions has public health implications for treatment and prevention that has received little attention in an international context. Thailand, which is currently experiencing an MA epidemic, warrants further attention in terms of prevention and treatment of these comorbid conditions [6]. The purpose of this study is to determine the prevalence of high levels of depressive symptoms and MA use among Thai adolescents and young adults residing in rural areas of Chiang Mai Province and to assess the association between MA use and depressive symptoms. We further describe the distribution and correlates of high levels of depressive symptoms according to sociodemographic characteristics and other behavioral risk factors.

2.3 Methods

This study uses data collected from a structured baseline survey collected prior to the start of a community-randomized community mobilization trial in six districts of rural Chiang Mai province, Thailand. Baseline data collection took place within a multistage, nested sampling design beginning at the district level and entailing systematic random sampling from a frame including sub-districts, households, and individuals.

2.3.1 Recruitment and Inclusion criteria

Household enumeration within each community was conducted, and households were randomly selected. Field staff obtained the number of age-relevant (14-29 years) members of the household and their genders, and obtained consent from the head of household to interview eligible members of the household. If more than one member of the household was eligible, one eligible member was randomly selected to participate in the study. This trial was approved by the Institutional Review Board (IRB) at Johns Hopkins Bloomberg School of Public Health, the Human Experimentation Committee at the Research Institute for Health Sciences, Chiang Mai University, and the IRB of the Ministry of Public Health in Thailand.

Eligible participants must have been between the ages of 14-29, provided proof of age, been actively recruited from a village that was selected for the study, intended to reside in Chiang Mai Province for the next year, and able to speak Thai. The sample available for analysis consisted of 2,055 adolescents and young adults who were actively recruited from participating communities at baseline. The response rate during recruitment procedures was over 90%.

2.3.2 Data Collection

The structured survey captured detailed information on sociodemographic characteristics, MA use, alcohol consumption, illicit drug use, sexual behaviors, and depressive symptoms. Socioeconomic and demographic data consisted of information about age, gender, employment status, education, religion, ethnicity, and marital status. Data about MA use, alcohol consumption, and other illicit drug behaviors consisted of reporting lifetime use, recent use, frequency, and amount of use.

2.3.3 Measures

Primary variable. Participants' patterns of MA use were defined as lifetime use if the participant reported ever using methamphetamines and defined as recent use if the participant reported using methamphetamines in the past three months. Additional measures of MA use included age of first use, frequency of use, and routes of administration (ingestion, smoking, injection). Frequency of use was categorized as never having recently used within the past three months, use of MA once a month or less, 2 - 3 times a month, about once a week, 2- 3 days a week, 4 - 6 days a week, or daily. Routes of administration were categorized as inhaled/smoked/snorted, ate/ingested, injected, or another mode of use.

Covariates. Potential confounders identified from the literature were measured and included age, gender, educational attainment, marital status, measures of lifetime alcohol consumption, recent alcohol consumption (reporting any recent alcohol consumption within the past 30 days), and the use of illicit drugs other than methamphetamines within the past three months prior to baseline [6]. Illicit drugs included reported recent use during the past three months of one or more of the following: ice, heroin, opium, valium, domicum, barbiturates, marijuana, ketamine, glue, and kratom. Measures of the highest educational level achieved

included reporting never having gone to school, or the participant's self-report of having completed primary school, secondary school, high school, vocational school, or of having earned a college degree.

Outcome variable. Depressive symptoms were measured using the Center for Epidemiological Studies Depression Scale (CES-D) [19]. The CES-D contains 20 items that measure self-reported symptoms of depression experienced within the past two weeks. Participants report the frequency of experiencing each item on a scale ranging from 0, indicating that they experience that symptom rarely or none of the time, and 3, indicating that they experience that symptom most or all of the time. Items are summarized during the statistical analysis to obtain a score capable of ranging from 0 to 60. A cutoff of ≥ 22 was used to define high levels of depressive symptoms among Thais as has been previously validated in Thailand [6, 20, 21].

2.3.4 Statistical Analysis

The prevalence of lifetime and recent MA use and the prevalence of high levels of depressive symptoms among adolescents and young adults in rural Chiang Mai were determined. Distributions of high levels of depressive symptoms were described according to gender, age, educational attainment, marital status, lifetime MA use, recent MA use, lifetime alcohol consumption, recent alcohol consumption, and recent use of illicit drugs other than MA.

Statistical comparisons of mean differences in CES-D scores between lifetime MA users and lifetime non-users and between recent MA users and non-users at baseline were estimated using Student's t-tests. Comparisons of the differences in proportions of individuals having certain sociodemographic characteristics, MA use behaviors, or other behavioral characteristics were made according to the presence of high levels of depressive symptoms and were estimated using chi-squared tests of association. High levels of depressive symptoms were categorized

according to an accepted, validated score of ≥ 22 for assessment of symptoms among Thai populations, and scores of the four positive items were reversed prior to generating total scores.

Bivariate linear and logistic regression was implemented to examine associations between lifetime and recent MA use, baseline CES-D scores and the proportion with high levels of depressive symptoms. Bivariate regression models were also conducted to assess associations between socio-demographic, behavioral measures and depressive symptoms. Variables that achieved a level of statistical significance of $p < 0.10$ and variables that have been identified in the literature as confounders were included in multivariate regression models. Interactions by gender and recent use of illicit drugs other than MA were incorporated into models to assess effect modification. Additional analyses involved accounting for clustering within communities and correlated data by implementing generalized estimating equations models with an exchangeable correlation structure and with robust standard errors. Statistical analyses were conducted using Stata Intercooled version 10.1 (StataCorp., College Station, Texas).

2.4 Results

There were 2,055 youth aged 14-29 years old who met the study inclusion criteria. Approximately 9% of the sample met criteria for exhibiting high levels of depressive symptoms, 19% reported ever having consumed MA, and 12% of lifetime MA users had high levels of depressive symptoms compared to 8% reporting no lifetime MA use. Furthermore, 31% of the sample met criteria for recent MA use. Among recent MA users, 16% had high levels of depressive symptoms compared with 10% reporting no recent use. The sample consisted primarily of young adults with a median age of 19, were single (77.7%), of Thai ethnicity (99.9%), and Buddhist (98.8%). The majority of participants (77%) reported living primarily at their parent's house during the past three months, completed a primary, secondary, or high school education (74.4%), were currently attending school (59%), and unemployed (56.2%).

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High levels of depressive symptoms were common among this population. The mean CES-D score estimated for the entire sample was 17.01 (S.D.: 6.39). The range of CES-D scores was from 0-57. The mean CES-D scores comparing adolescents and young adults who reported ever using MA (11.92, S.D.: 7.62) and those who reported never having used MA (10.44, S.D.: 7.36) were similar, but the difference between mean scores were statistically significant (p <0.001). The mean CES-D scores for recent MA users compared to non-recent users of MA within the past three months were 12.74 (S.D.: 7.99) and 11.53 (S.D.: 7.42), respectively, and there was no statistically significant difference (p=0.14). Higher levels of depressive symptoms were also more common among females, among young adults aged 18-29, and among married, currently widowed, divorced, or separated individuals (Table 1). The proportion of female MA users having high levels of depressive symptoms was substantially higher than for males, with 23% of females who reported ever using MA experiencing high levels of depressive symptoms compared to 9% of males. A greater proportion of males reported recent MA use. Approximately 30% of males report recent MA use compared to 7% of females.

Bivariate regression analyses revealed significant associations between lifetime and recent MA use and high levels of depressive symptoms, and between gender, age, marital status, and depressive symptoms (Table 2). Linear regression conducted to assess associations between mean CES-D scores and potential confounders demonstrated a significantly different mean CES-D score between males and females and similar associations were observed when comparing prevalence odds of high levels of depressive symptoms between males and females. Statistically significant associations were not observed when comparing groups who recently consumed alcohol with groups who did not according to levels of depressive symptoms using bivariate logistic regression. No other statistically significant associations were observed between sociodemographic or behavioral factors and depressive symptoms, including crude bivariate analyses conducted to assess associations between recent use of any of the illicit drugs.

Using multivariate linear regression (Table 3), no significant associations were observed between recent MA use and CES-D scores or between lifetime MA use and high levels of depressive symptoms using the recommended Thai cutoff after adjusting for age, gender, educational attainment, district, marital status, lifetime/recent illicit polydrug use, and lifetime/recent alcohol consumption. Multivariate linear and logistic regression, adjusting for potential confounders, demonstrated a significant association between lifetime MA use and depressive symptoms using a multivariate linear regression model and between recent MA use and high levels of depressive symptoms using a multivariate logistic regression model. Generalized estimating equations models generated similar regression coefficients (data not shown).

An assessment of effect modification between lifetime MA or recent MA use, gender, and depressive symptoms using linear regression models demonstrated significant interactions which suggested that females who ever used MA in their lifetime were subject to significantly higher levels of depressive symptoms than males ($p < 0.05$). There were no statistically significant interactions between gender, recent MA use, and depressive symptoms. An assessment of effect modification between lifetime or recent MA use, illicit polydrug use, and depressive symptoms using linear regression models revealed no statistically significant interactions

2.5 Discussion

In this study, the prevalence of high levels of depressive symptoms among adolescents and young adults was moderately high, suggesting that depression may be a significant health burden among adolescents and young adults residing in rural Chiang Mai. Approximately 9% of the sample had high levels of depressive symptoms, according to the recommended Thai cutoff of ≥ 22, and is lower than the prevalence of 21% observed in Thai adolescents aged 14 – 19 in Chon-

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Buri Province, but similar in prevalence to populations observed in Asian and Western countries (approximately 10%) and remarkably less than the 36% among adolescent populations in Eastern European countries [21] . High levels of depressive symptoms were more prevalent among females and, interestingly, less prevalent among participants who reported recent alcohol consumption.

There is relatively little epidemiological research that estimates the prevalence of depression or depressive symptoms among adolescents and young adults in Thailand. In previous research, the prevalence of depression among 812 Thai adolescents in schools in Chon Buri province, Thailand was similar in that the prevalence was 20% or 21%, depending on the scale used [21]. Illicit drug and alcohol use was not assessed among the Chon Buri students, and the contexts and factors influencing high levels of depressive symptoms may differ. Two studies undertaken among the Thai army assessed mental health history in 207 male and 6 female inpatients and 1,546 male and 183 female outpatients [22, 23], but was not conducted exclusively among young adults. The most common age range was among older adults aged 41-50 years and this subgroup comprised 27.8% of the sample. An assessment of mental disorders found in patient medical records of Thai army personnel admitted as inpatients at the Department of Psychiatry and Neurology at the Phramongkutklao Hospital in Bangkok in 2007 indicated that the prevalence of major depressive disorder was 3.3%, the prevalence of amphetamine dependence was 5.2%, and the prevalence of poly-drug dependence was 0.5% among inpatients [22]. Among outpatients, the prevalence of major depressive disorder was 10.75% [23]. Another study conducted among 331Thai nursing students, having a mean age of 20.6 years and predominately female (79%), described a prevalence of moderate depression (CES-D score of 16-22) of 31.5% and a prevalence of severe depression of 19.6%, defined as a CES-D scale score of ≥ 23 [24].

Approximately 12% of individuals who reported ever using MA had high levels of depressive symptoms. The prevalence of depression among MA users is less than estimates reported among others who use psychostimulants. Self-reports of lifetime rates of major

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depression was 30.5% among treatment-seeking cocaine users in the United States compared to self-reported major depression rates of 7% within communities from 1986 to 1988 [25, 26]. Differences in the prevalence may be due to differences in populations, context, methods, and data collection procedures. In the present study, a significant independent association between recent MA use and high levels of depressive symptoms was observed after adjusting for potential confounders.

There are possible explanations for observing this association. First, this population could possibly be suffering psychological sequelae as a consequence of chronic MA use and withdrawal. The nature of the relationship between MA use and depressive symptoms may result from adolescents and adults reporting the initiation of MA use at young ages. Approximately 19% of participants reported ever using MA in their lifetime. Almost 40% of participants who reported ever using MA reported initiating MA use at 15 years of age or younger, and one participant reporting using MA at as young as ten years of age. Initiation at young ages is consistent with the history of MA use and the ubiquitous nature of the drug in the Golden Triangle area of Thailand along the border of Burma since the mid-1990s. While chronic use could be related to depression, a crude bivariate analysis demonstrated that age of initiation was not shown to be associated with higher levels of depression. One explanation for this could be that more recent, acute MA use is also associated with the expression of depressive symptoms, and this relationship has been observed within this sample. This relationship has also been described in the literature [3].

Alternatively, adolescents and young adults could initiate MA use, or any other illicit drug, as an attempt to self-medicate an existing depression as a primary mood disorder or negative affective state [27]. The historical, social, economic, and political context existing within Thailand is such that there is a change to a more competitive, global market-driven economy that is replacing traditional family values and respect for elders; these changes may drive stress and subsequent depression among youth responsible for competing in the global

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economy [28]. Young adults may be self-medicating to improve mood. In a region where the

drug market renders MA to be widespread and inexpensive, economic stressors may lead to the

onset of depression, thus leading to widespread use of MA by young adults to self-medicate [29].

Furthermore, the ubiquity of the market for MA exposes adolescents and young adults to MA,

who may participate in the drug market to earn income and who may use MA due to this

exposure.

A third possible mechanism proposes that the relationship between MA and depression is

bidirectional. That is, existing states of depression could lead to widespread use of MA among

Thai youth; dysfunction in the affective and motivational aspects of depression resulting from

chronic drug use and withdrawal could possibly contribute to the maintenance of depression as

users continue to use drugs in higher amounts, more frequently, or by injecting to relieve

depressive symptoms that result from prolonged drug use [7]. However, one longitudinal

epidemiological study which assessed the temporality of MA use and depression among MA

users in Thailand described a relationship whereby depressive symptoms were a consequence of

MA use, but high levels of depressive symptoms were not predictive of MA cessation,

continuation of use, or relapse [6].

There are limitations inherent in this study. The study was cross-sectional and thus a

temporal relationship between MA use and high levels of depressive symptoms cannot be

established. In this study, approximately 19% of adolescents and young adults reporting ever

having used MA, but among this ever MA using subpopulation, 5% (n=20) report using MA

more than once a week and 68% report not having used MA within the past three months. There

could be underreporting of stigmatized behaviors such as illicit drug use or depressive symptoms.

Furthermore, misclassification could result from interviews being self-administered and

conducted using computer technology that may not be feasible to administer among rural

residents with limited education. However, previous research indicates that sensitive behaviors

reported by similar populations have been accurately reported using ACASI software, thereby increasing the internal validity of these results [30].

Despite limitations, this study presents several strengths that address public health implications. Specifically, relatively little research has been conducted in Thailand that quantifies the prevalence of high levels of depressive symptoms among adolescents and young adults, either in clinical samples or the general population. Little mental health or substance abuse research has been reported from Thailand. A joint assessment of Thailand's mental health care services by the Thai Ministry of Health and the World Health Organization specified that only 1% of health-related research conducted in Thailand and published in journals is mental health research [31]. To our knowledge, no assessment of the prevalence and correlates of high levels of depressive symptoms has been conducted in rural Chiang Mai along the border with Burma. This region is the epicenter of a MA epidemic, and there is a known association between MA use and depression. The assessment of individual-level risk factors that are associated with high levels of depressive symptoms provide information that could be used to target high risk groups and capitalize on existing resources in each participating community. Mental health and substance abuse care services in Thailand should be integrated to provide treatment of depressive symptoms and drug cessation among drug-dependent individuals, and existing resources in rural areas in Thailand should be used to reduce drug use and depressive symptoms among youth.

2.6 Acknowledgements

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Table 1. Distribution of high levels of depressive symptoms (CESD ≥ 22) according to sociodemographic characteristics, recent illicit drug and recent alcohol consumption.

Socio-demographic factor	Total Sample (n = 2,055) N (%)	Frequency, n (%)	p value χ 2
Gender			
Male	1,051	64 (6.1%)	< 0.001
Female	1,004	118 (11.8%)	
Age			
14-17	808	58 (7.2%)	< 0.05
18-29	1,247	124 (9.9%)	
Marital Status			
Single	1,597	127 (7.95%)	< 0.05
Living with partner	83	7 (8.4%)	
Currently married	348	42 (12.1%)	
Widowed, divorced, or separated	27	6 (22.2%)	
Highest Educational Level			
Primary, secondary, or high school	1,528	138 (9.0%)	NS
Vocational, college diploma or Bachelor degree	518	44 (8.5%)	
Employment Status			
Part-time/full-time/irregular work	900	88 (9.8%)	NS
Unemployed	1,155	94 (8.1%)	
Ever MA use			
No	1,661	136 (8.2%)	<0.05
Yes	394	46 (11.7%)	
Recent MA use [a]			< 0.10
No	270	26 (9.6%)	
Yes	124	20 (16.1%)	
Recent Alcohol consumption [b]			
No	558	46 (8.2%)	NS
Yes	943	85 (9.0%)	
Recent poly-drug use (other than MA)[a]			
No	1,976	177 (8.96%)	NS
Yes	79	5 (6.3%)	

[a] Indicates any recent use of any illicit substance other than MA within past three months.
[b] Indicates any recent consumption of any alcoholic beverage within the past thirty days.
NS indicates p value is not significant.

Table 2. Crude regression coefficients of the differences in average CES-D scores and crude prevalence odds for high levels of depressive symptoms among adolescents and young adults in northern rural Chiang Mai province, Thailand, 2011 (n=2,055).

Predictor Variables and Potential Confounders	Crude regression coefficients	Confidence interval	p value	Crude prevalence odds	Confidence interval	p value
Gender	2.30	1.76 – 2.85	**< 0.001**	2.05	1.50 - 2.82	**< 0.001**
Age	.3040	-0.35 – 0.96	0.36	1.43	1.03- 1.97	**< 0.05**
Highest [C] educational level	-0.35	-1.09 – 0.39	0.35	0.93	0.66 - 1.33	0.71
Marital Status	0.39	-0.09 – 0.71	0.13	1.58	1.13 – 2.21	<0.05
Lifetime alcohol consumption	0.76	0.04 - 1.48 - 0.04	< 0.05	.943	0.67 – 1.32	0.73
Recent [a d] alcohol consumption	0.05	-0.72 – 0.82	0.9	1.102	.076 – 1.60	0.61
Lifetime use of MA	1.47	0.66 – 2.29	< 0.001	1.48	1.04 – 2.11	< 0.05
Recent use [e] of MA	1.20	-0.42 – 2. 83	0.15	1.80	0.97 – 3.36	**0.06 †**
Recent [f] Polydrug Use	-0.87	-3.17 – 1.44	0.46	0.16	0.02 – 1.16	**0.07 †**

CES-D denotes the Center for Epidemiologic Studies Depression Scale (Radloff, 1977).

[a] Indicates a comparison of average CESD scores/high levels of depressive symptoms among recent consumers of any alcoholic beverage within the past 30 days and non-consumers.

[b] Indicates a comparison of average CESD score/high levels of depressive symptoms among recent users of any illicit drug within the past three months and non-users.

† Significant at p <0.10 level.

[C] = 2.046
[d] = 1, 051
[e] = 394
[f] = 381

Table 3. Adjusted prevalence ratios and regression coefficients derived from logistic and linear regression for (high levels of) depressive symptoms among adolescents and young adults in northern rural Thailand.

MA risk behavior	Adjusted Prevalence Odds Ratio (95% CI) [a]	Adjusted Regression Coefficient (95% CI) [a]
Lifetime MA use (n = 2,046)	1.63 (0.98, 2.70)	1.56 † (0.49, 2.63)
Recent MA use (n=265)	2.48 † (1.14, 5.40)	2.04 (- 0.004 – 4.08)

CES-D denotes the Center for Epidemiologic Studies Depression Scale (Radloff, 1977).

[a] Adjusted for gender, age, marital status, educational attainment, district, lifetime or recent polydrug use of any illicit drug other than MA use within the past three months, and lifetime or recent alcohol consumption of any beverage within the past 30 days. Lifetime measures of methamphetamine use, alcohol consumption, and polydrug use are included in the same model whereas recent substance use was included in a second model assessing the relationship between recent MA use and depressive symptoms.

† Indicates p value of < 0.05.

Chapter 3

Comorbid Alcohol Consumption and Depressive Symptoms in an Era of Evolving Thai Free Market Alcoholic Beverage Policy and Culture

3.1 Abstract

Background: Historical trends of alcohol consumption indicate increasing consumption as a response to evolving cultural influences and policies that shape the free market in Thailand. High levels of depressive symptoms have been identified as a consequence of alcohol use disorders, and major depressive disorders are common among individuals who abuse or who are dependent on alcohol. The prevalence of co-morbid alcohol use disorders and depression is usually estimated in high-income countries but has not been described in low-and middle-income countries such as Thailand.

Methods: Descriptive epidemiology was conducted to determine the prevalence of the spectrum of alcohol consumption, including lifetime consumption and recent consumption within the past 12 months and 30 days. Simple and multivariate regression modeling was performed to determine the independent association between lifetime and recent alcohol consumption and depressive symptoms, and between scores from the AUDIT screening instrument for potential alcohol use disorders and depressive symptoms. Results were compared to estimates obtained from generalized estimating equation models accounting for clustering of individuals by district. Secondary goals were to describe the prevalence of co-morbid alcohol consumption and high levels of depressive symptoms stratified by age (adolescents and young adults) and gender. Interactions between alcohol consumption, methamphetamine use, and depressive symptoms were assessed.

Results: The prevalence of lifetime alcohol consumption was 73%, and the prevalence of recent alcohol consumption was 90% and 63% within the past 12 months and 30 days, respectively. Young adults aged 18-29 reported higher lifetime and 30-day alcohol consumption compared to adolescents, and males consumed more alcohol than females. Multivariate linear regression modeling revealed no statistically significant association between lifetime and recent alcohol

consumption and depressive symptoms. Similar inferences were observed in multivariate logistic regression modeling, and recent alcohol consumption suggested a protective effect on high levels of depressive symptoms (12-month alcohol consumption (OR 0.72, CI 0.26, 1.971); 30-day alcohol consumption (OR 0.57, CI 0.3, 1.08)). There was no statistically significant interaction between alcohol consumption, methamphetamine use, and depressive symptoms.

Conclusions: Alcohol consumption and related behaviors did not correlate with high levels of depressive symptoms but suggested a protective effect on depressive symptomotology. Elucidation of the mechanisms underlying the complex relationship between the range of alcohol consumption behaviors and/or alcohol use disorders (AUD) and depression requires further assessments by clinical and epidemiological studies. The high prevalence of alcohol consumption and the co-morbidity between alcohol consumption and depressive symptoms have implications for treatment and prevention in rural areas of Chiang Mai Province, Thailand.

3.2 Introduction

Historical trends of alcohol consumption within Thailand reflect a convergence of Thai and Chinese migrant cultures, the implementation of national policies, and the evolution of the Thai "free market" [1]. Traditional Thai society observed Buddhist teachings, which emphasized abstention from alcohol. Beginning in 1350, Chinese migrants introduced their cultural alcohol consumption practices and distillation techniques within Thai society. More recently, a number of Thai policies have been enacted to support free market practices that are projected to lead to ever increasing per capita alcohol consumption. Moreover, the Alcoholic Beverage Control Act was implemented in Thailand to curtail underage drinking and reduce harmful consequences of drinking, but research has demonstrated that these laws have not been effective in reducing underage drinking [2]. All together, the impact of the enactment of these laws and policies and the lack of effective enforcement of the Alcoholic Beverage Control Act has implications for public health in Thailand.

Current socioeconomic data collected by the World Health Organization (WHO) indicate stable trends of adult per capita consumption of alcohol in Thailand from 2001 – 2005 and an average of 6.4 liters of recorded adult pure alcohol consumption per capita from 2003 – 2005, a substantial increase from the recorded adult per capita alcohol consumption of less than one liter reported in 1961 [3]. Comparisons of this amount and the estimated unrecorded adult alcohol consumption reveal a trend that entails much more alcohol consumption in Thailand compared with the rest of the WHO Southeast Asia region [3]. Global estimates of morbidity attributable to alcohol demonstrate that 33.6% of all disability-adjusted life years (DALYs) attributable to alcohol are among youth 15 – 29 years of age [4]. Further analyses of the main causes of the global estimates of DALYs stratified by gender indicate that alcohol use was the third leading cause of DALYs among males aged 15-19 years, contributing to 7.2% of total DALYs within this age group [5].

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The National Statistical Office of Thailand reported that, in 2007, the proportion of adolescents aged 15-19 residing throughout Thailand reporting alcohol consumption was almost 5% within the past 12 months, and 23% of young adults aged 20-29 reported consumption within the past 12 months [6]. Studies of current drinking trends indicated a prevalence of 12.17% among male high school students in central Thailand and one half of these current drinkers were 15-17 years of age [7]. Additional research indicates that among high school and vocational school students in Southern Thailand, the prevalence of consumption reported within the past 30 days was approximately 19%, 17%, and 15% in 2002, 2003, and 2004 [8]. In a cross-sectional survey administered to students in Bangkok and in 40 of 76 provinces, the prevalence of lifetime alcohol consumption among Thais was approximately 30% in boys and 18% in girls from 10 – 22 years of age; current alcohol consumption within the past 30 days among males and females was about 20% and 10%, respectively [9]. These trends are of concern since alcohol consumption, especially harmful and hazardous use and dependence, are responsible for several communicable and chronic diseases and contribute to a substantial proportion of road traffic accidents, injuries, and fatalities in Thailand. Thais that are between the ages of 10 – 39 comprise 70% of all road traffic injuries or fatalities reported to the Ministry of Public Health, and the Medical Institute for Accidents and Disasters observed that about one-third of deaths from accidents, or 18.5 deaths per 100,000 population, in Thailand were due to road traffic injuries [10].

Depressive symptoms have been identified as a consequence of harmful, hazardous and dependent alcohol consumption [4, 11, 12]. The National Epidemiologic Survey on Alcohol and Related Disorders (NESARC) reported a prevalence of major depressive disorder of approximately 21% among alcohol-dependents and 9% among alcohol abusers compared to 7% in the general population [11]. Currently, there is no consensus on evidenced-based treatment options for this population to guide adjunct pharmacological treatment for alcohol-dependent individuals who concurrently have moderately severe depressive symptoms, especially in low and

middle-income countries [13-24]. Furthermore, randomized clinical trials have not prioritized evaluations of the treatment of co-morbid alcohol use disorders and depression in adolescents.

The primary focus of this research will be to assess the prevalence of comorbid alcohol consumption and high levels of depressive symptoms and the association between lifetime/recent alcohol consumption and depressive symptoms. Secondary goals are quantifying the prevalence of ever, 12-month, and 30-day recent alcohol consumption within the past 12 months and 30 days prior to interview, aggregating all alcoholic beverage types consumed as reported by residents of rural Chiang Mai province aged 14-29 years of age, and to examine the interaction between alcohol consumption, methamphetamine (MA) use, and depressive symptoms among this population. Interactions will be assessed because MA use is highly prevalent and problematic in this region of Thailand, and the consequences of MA include the exacerbation of depressive symptoms.

3.3 Methods

This cross-sectional study utilized data collected from a structured baseline survey administered in 2011 prior to the initiation of a community-randomized community mobilization trial conducted within 10 rural communities in northern Chiang Mai province, Thailand. The primary purpose of the intervention was to reduce and prevent MA use. This research was approved by the Institutional Review Board (IRB) at Johns Hopkins Bloomberg School of Public Health, the Human Experimentation Committee at the Research Institute for Health Sciences, Chiang Mai University, and the IRB of the Ministry of Public Health in Thailand.

3.3.1 Data Collection

The structured survey captured information on socio-demographic characteristics, MA use, alcohol consumption, illicit drug use, and depressive symptoms. Sociodemographic items collected information about age, gender, employment status, educational attainment, living arrangements, ethnicity, religion, and marital status. Measures of alcohol consumption consisted of reporting lifetime use, recent use within the past 12 months and in the past 30 days, age at first use, the frequency of consumption within the past 12 months or 30 days, and amount consumed per drinking day. The Alcohol Use Disorders Identification Test (AUDIT) was adapted for use in this study and included as a screening instrument for the detection of potential harmful drinking [25].

3.3.2 Measures

Primary explanatory variable. Specific information about patterns of alcohol behaviors consisted of data collected about lifetime and recent alcohol consumption in the past 12 months and within the past 30 days prior to interview. The number of drinks consumed per drinking day was assessed using standard measures of alcoholic drinks, primarily measured using standard alcoholic beverage containers and locally understood terms. The measures included on the structured survey were the following: " pek/Kong/Tong," glass, can, "Gulk," "Ban," bottle, or other. Several items on the survey were adapted from AUDIT, which was developed and validated using data from six countries collected by the World Health Organization [25]. These nine items that comprise the adapted AUDIT screening instrument ask respondents about their alcohol consumption, related behavior, and consequences of drinking. A cutoff score of eight or more was used to identify individuals who possibly may participate in harmful or hazardous drinking.

Covariates. Socio-demographic information relevant to assessing potential confounders were age, gender, current employment status, educational attainment, living arrangements, and marital status. MA use consisted of measures of lifetime MA use and MA use within the past three months. Variables indicating any type of illicit drug use included reported lifetime use and recent use during the past three months of ice, heroin, opium, valium, domicum, barbiturates, marijuana, ketamine, glue, and kratom. For purposes of the statistical analyses, a binary variable of reported use of at least one of these illicit substances, other than MA, was created. Districts in Chiang Mai where data was collected included Chiang Dao, Doi Sa Ket, Mae Taeng, San Kam Paeng, San Sai, and Saraphi. Employment status was categorized as currently or not currently employed, and educational attainment was categorized into a binary variable indicating either primary, secondary or high school educational attainment or attainment of a vocational, college diploma, or Bachelor's degree.

Outcome variable. Depressive symptoms were measured by using the Center for Epidemiological Studies Depression Scale (CES-D) [26]. The CES-D contains 20 items that measure self-reported symptoms of depression experienced within the past two weeks, and summarized scores are capable of ranging from 0 to 60. A cutoff of ≥ 22 was used to define high levels of depressive symptoms among Thai adolescents and young adults and compared with the recommended cutoff of ≥ 16 as recommended when assessing prevalence in Western populations [26-28]. This cutoff of ≥ 22 has been previously validated in Thailand [29]. The scores of the four positive affect items were reversed and added to the total number of items comprising the CES-D scale.

3.3.3 Statistical Analysis

The prevalence of lifetime and recent alcohol consumption and comorbid alcohol consumption and high levels of depressive symptoms were assessed. Correlations of socio-

demographic and behavioral variables with alcohol consumption measures and high levels of depressive symptoms were evaluated to identify potential confounders for co-morbid alcohol consumption and high levels of depressive symptoms. Known confounders described in the literature were included in final multivariate regression models regardless of whether or not they reached statistical significance in unadjusted simple linear regression models or bivariate regression models.

Statistical comparisons of mean differences in average CES-D scores between lifetime alcohol consumers and abstainers and between 12-month and 30-day alcohol consumers and abstainers reported at baseline were estimated using Student's t-tests. Comparisons of the differences in proportions of high levels of depressive symptoms between consumers and abstainers assessed for lifetime, 12-month and 30-day consumption were estimated using Pearson's chi-squared tests of association. Alcohol consumption measures were aggregated to define consumption of at least one of any of the alcoholic beverage types in order to assess associations with depressive symptoms.

Simple linear regression modeling was implemented to examine associations between lifetime and recent alcohol consumption and CES-D scores. Bivariate logistic regression modeling was implemented to examine differences in the proportions reporting high levels of depressive symptoms among participants reporting lifetime, 12-month, and 30-day consumption and abstainers. Bivariate regression models were also conducted to assess potential confounders among socio-demographic and drug use variables in relation to co-morbid alcohol consumption and depressive symptoms to identify potential confounders to include in multivariate regression. Variables that achieved a level of statistical significance of $p < 0.10$ and variables that have been identified in the literature as confounders were included in multivariate regression models. Due to clustering of individuals by district, sensitivity analyses was performed by incorporating generalized estimating equations procedures as an extension of multivariate linear and logistic regression models using the "**xtgee**" command in Stata, assuming an exchangeable correlation

structure and clustered by district [30, 31]. Interactions of alcohol consumption, MA use, and high levels of depressive symptoms were incorporated into regression models to assess effect modification. Statistical analyses were conducted using Stata Intercooled version 10.1 (StataCorp., College Station, Texas).

3.4 Results

The baseline characteristics of the recruited participants have been reported previously (Chapter 2). Briefly, 51% are male, 47% are 14-18 years of age, 77% reside with their parents, 78% are single or never married, 57% completed primary or secondary school, 59% are currently attending school, 26% have been in school for 13 years or more, 56% are unemployed, 99% are Buddhist, and 99% are of Thai national origin. The distribution of socio-demographic and behavioral drug-use characteristics according to having high levels of depressive symptoms reveals statistically significant associations between gender and recent alcohol consumption and between gender and high levels of depressive symptoms (Table 4).

The prevalence of ever, 12-month and 30-day alcoholic beverage consumption in this sample was 73%, 90%, and 63%, respectively. Stratified by gender, the lifetime, 12-month, and 30-day prevalence of alcohol consumption was 84%, 96%, and 77% among males and 62%, 81%, and 63% among females. Greater proportions of young adults aged 18-29 reported ever having consumed alcohol, and greater proportions of young adults also reported consumption of at least one type of alcoholic beverage within the past 30 days prior to interview compared to adolescents 14-17 years of age.

The prevalence of high levels of depressive symptoms using the recommended Thai cutoff score of ≥ 22 was approximately 9% of the study population, and the mean score was 10.72 (SD: 7.43, range: 0 – 57, IQR: 5 - 15); the prevalence of high levels of depressive symptoms was approximately 23% using a cutoff of ≥ 16. The prevalence of high levels of

depressive symptoms, using the recommended Thai cutoff of $\geq$ 22, was approximately 9% among participants who reported lifetime and recent alcohol consumption (within past 12 months and past 30 days). Similar proportions of high levels of depressive symptoms were observed in abstainers and were 9%, 11% and 8% in abstainers assessed for ever, 12-month and 30-day alcohol consumption, respectively.   For the purposes of this study, subsequent analyses will use only $\geq$ 22 as the cutoff to assess associations between alcohol consumption behaviors and high levels of depressive symptoms.   An analysis of the proportion of participants exhibiting high levels of depressive symptoms and reported drug use behaviors stratified by age (adolescents aged 14 - 17 vs. young adults aged 18 – 29 years) revealed differences in reported illicit substance use behaviors, but not depressive symptoms or co-morbid MA use with high levels of depressive symptoms; however, there are age differences in the co-morbidity of alcohol use and higher levels of depressive symptoms whereby co-morbidity is higher in prevalence among young adults (Table 5). An assessment of co-morbidity stratified by gender revealed greater lifetime co-morbidity of alcohol consumption and depressive symptoms among females (18%) compared to males (13%), but similar proportions in current alcohol consumption co-morbidity (data not shown).

Analyses involving t-tests and Pearson's chi-square tests of association revealed no differences in the mean CESD scores or in the proportion of participants reporting high levels of depressive symptoms when comparing alcohol consumers and abstainers assessed for lifetime or current consumption. In linear regression modeling, no statistically significant associations were observed between lifetime or 12-month alcohol consumption and depressive symptoms (Table 6). However, an assessment of association between 30-day alcohol consumption and high levels of depressive symptoms suggested a protective effect until adjusted for potential confounders (Table 7). The multivariate models which adjusted for gender, age, living arrangements, educational attainment, marital status, lifetime or recent MA use, and lifetime or recent polydrug use, did not suggest a statistically significant association between high levels of depressive symptoms and

alcohol consumption. The relationship between lifetime, 12-month, and 30-day alcohol consumption and high levels of depressive symptoms were compared between recent MA users and non-MA users through models that assessed interaction. Similar assessments of interaction were undertaken using linear regression models. Lifetime and recent MA use did not modify the relationship between recent alcohol consumption and depressive symptoms. Sensitivity analyses were conduct so that results were compared to the results obtained by the implementation of the "xtgee" command in Stata to account for clustering by district; and inferences and p values were similar to results obtained by regression models. An additional analysis was conducted and incorporated scores from a modified AUDIT screening instrument into the regression models. These results were similar to regression models that only included alcohol consumption measures (data not shown).

Discussion

The lifetime, 12-month, and 30-day prevalence of alcohol consumption observed in this population was markedly higher than what has been previously observed in similar Thai populations in previous years. For instance, the prevalence of 12-month and 30-day alcohol consumption among a national sample of Thai high school and college students was approximately 26% and 15% among males and 20% and 10% among females in 2007 [9]. Lifetime prevalence was somewhat higher in the same sample and was approximately 31% and 18% in males and females, respectively [9]. Additional research which described alcohol consumption prevalence in a national sample of Thais aged 12-65 years in 2007 observed proportions of 12-month consumption ranging from 18% to 60% among males aged 12-19 and 20-24 years and 7% to 16% among females in corresponding age groups [32].

The higher prevalence of consumption seen in this present population might be particular to rural areas and to northern Chiang Mai province. The consumption patterns observed among

participants in this study could be due to local cultural practices which encourage consumption,

lack of recognition of alcohol dependency, the inability to recognize the need of treatment for

hazardous alcohol consumption, the ubiquitous nature of MA use and the related drug market and

thus related cultural norms about substance use, the replacement of MA use with alcohol

consumption, the absence of educational or vocational opportunities in these rural areas, the lack

of access of treatment and prevention resources in these rural areas, or a combination of these

reasons.

Additional analyses of alcohol consumption according to gender and age revealed

significant differences. More males reported alcohol consumption compared to females, and is

consistent with previous literature [33]. A greater proportion of young adults consume alcohol

compared to adolescents, and had greater co-morbid alcohol consumption and depressive

symptoms. This study supports the relationship between increasing prevalence of alcohol

consumption with age and suggests that prevention interventions must begin at targeting

adolescents before subclinical or less severe drinking and comorbid conditions lead to greater

morbidity in adulthood. The prevalence of co-morbidity in the entire sample was similar to the

prevalence found in populations in the United States [34] but lower than populations assessed in

Canada, primarily because the more severe alcohol disorders were assessed in the Canadian

population [33]. The public health implications for co-morbidity indicate that culturally and age-

appropriate treatment regimens must be developed for adolescents and young adults in Thailand.

In this present study, the associations observed suggest the role of alcohol consumption

as a protective factor for depressive symptoms. Previous literature consistently reports alcohol

consumption to be positively associated with depressive symptoms, although measurements and

concepts of alcohol consumption and dependency vary between studies [35]. The majority of

participants in this study, on average, drank minimally and infrequently whereas previous

literature describes frequent drinking, drinking to the point of drunkenness, or alcohol

dependence as being associated with depressive symptoms [9, 33, 36-38]. Because alcohol

consumption patterns of participants were observed to be relatively infrequent and reports of

amount per drinking day generally indicated less per drinking day consumption than what is seen

in the literature, the alcohol consumption behaviors practiced by these participants may be such

that it is not enough to induce depressive symptoms. Another situation could exist whereby

participants are consuming alcohol to self-medicate, which could modify or relieve their

perceived negative moods commonly observed during depression [33, 39]. However, a self-

medication theory would be supported by the development of alcohol-dependence or another

alcohol use disorder after prolonged attempts to relieve depressive symptoms, and harmful

drinking was not frequently observed in this population; alcohol dependency has been identified

as being responsible for the onset of depression [36].   It is reasonable to assume that a significant

positive association between alcohol consumption and depressive symptoms may be seen in a

patient sample where more severe alcohol use disorders are more likely to be seen. A third

reason may be that perhaps participants who report consuming alcohol may have better mental

health and thus may participate in social drinking practices much more than a depressed

individual would.

3.5.1 Limitations

This research has several limitations to consider. Because this is a cross-sectional study,

the causal, bidirectional relationship between alcohol consumption and depressive symptoms

cannot be discerned. There does not seem to be any overwhelming evidence which suggests that

harmful drinking causes the expression of depressive symptoms in this population. Some

regression models used to fit the data to describe the suggested effect of recent consumption on

the onset of depressive symptoms included recent MA use as a covariate, which limited the

sample to 392 participants. Therefore, we could have limited power to identify alcohol

consumption as a statistically significant explanatory variable associated with high levels of

depressive symptoms in our regression models. The covariates included in the regression models

explained only a minimal amount of the variation in the prevalence odds ratios estimated in

multivariate logistic regression models, and unmeasured confounding is a concern. The survey

also only included the CES-D scale to assess high levels of depressive symptoms. Other

psychiatric conditions not measured with the survey could confound the relationship between

alcohol consumption and depressive symptoms, although such conditions could be rare in this

population.   Several additional covariates that have been suggested in the literature include

genetic factors, family history of depression or alcoholism, and other social and physical,

environmental risk factors were not measured. Another reason for the lack of evidence of alcohol

use as a risk factor for high levels of depressive symptoms may be the inconsistencies of the time

frames in which alcohol use and depressive symptoms are measured. Finally, some items

representing symptoms of depression included on the CES-D scale may not be well understood or

endorsed by Thai youth.

3.5.2 Strengths

Despite limitations, this study has several strengths. This research furthers knowledge

regarding the prevalence of alcohol consumption and consumption trends in a rural area in

northern Thailand. This study's focus on a specific rural region of Thailand that is within the

epicenter of methamphetamine trafficking and other high-risk substance use enabled the

comparison of alcohol consumption trends to national surveys. This research facilitated

comparisons with other regions of Thailand where the interaction of social, cultural, and

economic factors interact with individual behaviors that may influence regional differences in

alcohol consumption trends. This research facilitated a comparison of the prevalence and patterns

of alcohol consumption and the relationships between alcohol consumption behaviors and

depressive symptoms among different age groups. Most importantly, this study was able to

document the prevalence of co-morbid alcohol consumption and depressive symptomotology in a community sample within rural Thailand. The prevalence of this co-morbid alcohol consumption and depression has rarely been described in a low- or middle-income country, and only once to my knowledge in Thailand [36]. This work also adds to the sparse amount of mental health research being conducted in Thailand and supports public health implications and practice by identifying high-risk subgroups that may be experiencing a heavy burden of alcohol consumption and depressive symptoms.

3.6 Acknowledgements

3.7 References

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Table 4. Distribution of high levels of depressive symptoms (CESD $\geq$ 22) according to sociodemographic characteristics, recent illicit drug use and recent alcohol consumption.

Socio-demographic factor	Total Sample (n = 2,055) N (%)	Frequency, n (%)	p value $\chi 2$
Gender			
Male	1,051	64 (6.09%)	P < 0.0001
Female	1,004	268 (11.76%)	
Age			
14-17	808	58 (7.17%)	p < 0.05
18-29	1,247	268 (9.94%)	
Marital Status [a]			
Single	1,597	127 (7.95%)	p < 0.05
Married	348	42 (12.07%)	
Educational Attainment [b]			
Primary, secondary, or high school	1,528	138 (9.03%)	NS
Vocational, college diploma or Bachelor degree	518	44 (8.49%)	
Employment Status			
Part-time/full-time/irregular work	900	88 (9.78%)	NS
Unemployed	1,155	94 (8.14%)	
Ever MA use			
No	1,661	136 (8.19%)	p < 0.05
Yes	394	46 (11.68%)	
Recent MA use [c]			
No	270	26 (9.63%)	p < 0.10
Yes	124	20 (16.13%)	
Recent Alcohol consumption [d]			
No	558	46 (8.24%)	NS
Yes	943	85 (9.01%)	
Recent poly-drug use (other than MA)			
No	1,976	177 (8.96%)	NS
Yes	79	5 (6.33%)	

Differences in proportions reporting high levels of depressive symptoms were assessed using chi-squared analyses.
[a] N = 1,945
[b] N = 2,046
[c] Indicates any recent use of MA within past three months (n = 394).
[d] Indicates any recent consumption of any alcoholic beverage within the past thirty days (n = 1,501).
NS indicates p value is not significant.

Table 5. The distribution of reported depressive symptomotology and risk behaviors stratified by age categorized as developmental stages.

Developmental Stage	Adolescents (14-17) n (%)	Young adults (18-29) n (%)	p – value
Classified as having high levels of depressive symptoms (n = 2,055)	58 (7.18%)	124 (9.94%)	**<0.05**
Ever MA use (n = 2,055)	66 (8.17%)	328 (26.3%)	**<0.001**
Recent MA use (past 12 months) (n = 394)	31 (46.97%)	93 (28.35%)	**<0.10**
Ever alcohol consumption (n = 2,055)	413 (51.11%)	1,088 (87.25%)	**<0.001**
12-month alcohol Consumption (n = 1,501)	383 (92.74%)	966 (88.79%)	**<0.1**
30-day alcohol consumption (n = 1501)	207 (50.12%)	736 (67.65%)	**<0.001**
History of sexual Behavior (n =2,046)	216 (26.9%)	1,002 (80.6%)	**<0.001**
Co-morbid lifetime MA use and high levels of depressive symptoms (n = 2,055)	7 (0.87%)	39 (3.13%)	**<0.001**
Co-morbid current MA use and high levels of depressive symptoms (n = 394)	5 (7.58%)	15 (4.57%)	0.311
Co-morbid lifetime alcohol consumption and high levels of depressive symptoms (n = 2,055))	30 (8.10%)	101 (3.71%)	**<0.001**
Co-morbid recent alcohol consumption and high levels of depressive symptoms (n = 1,501) [a]	20 (5.97%)	65 (4.84%)	<0.397

Differences in the prevalence of high levels of depressive symptoms by developmental stage involved exploratory analysis of proportion differences using contingency table methods involving calculation of odds ratios and evaluation of chi-square test statistics and p-values.

[a] Measures include recent alcohol consumption reported within the past 30 days prior to interview.

Table 6. Crude and adjusted regression coefficients derived from simple linear regression for the association between alcohol consumption and depressive symptom scores reported from adolescents and young adults in northern rural Thailand.

Alcohol Consumption	Crude Regression Coefficient (95% CI)	Adjusted Regression Coefficient (95% CI) [a]
Lifetime Alcohol Consumption (n = 2,055)	0.759 (0.035, 1.483)	0.982 (0.147, 1.817) [b]
12-month Alcohol consumption (n = 1, 501)	-0.196 (-1.436, 1.043)	1.362 (-2.403, 5.126) [c]
30-day Alcohol Consumption (n = 1,501)	0.049 (-0.725, 0.823)	-0.279 (-2.575, 2.016) [d]

CES-D denotes the Center for Epidemiologic Studies Depression Scale (Radloff, 1977).

[a] Adjusted for gender, age, district, educational attainment, marital status, living arrangements, lifetime or recent methamphetamine use, and lifetime or recent polydrug use other than methamphetamines. [b] n = 1,936 [c] n = 355 [d] n = 354

Table 7. Crude and adjusted prevalence ratios derived from logistic regression for the association between alcohol consumption and high levels of depressive symptoms among adolescents and young adults in northern rural Thailand.

Alcohol Consumption	Crude Prevalence Odds Ratio (95% CI)	Adjusted Prevalence Odds Ratio (95% CI) [a]
Lifetime Alcohol Consumption (n = 2,055)	0.943 (0.672, 1.324)	0.923 [b] (0.610, 1.398)
12-month Alcohol consumption (n = 1, 501)	0.792 (0.456, 1.376)	1.033 [c] (0.207, 5.152)
30-day Alcohol Consumption (n = 1,501)	1.103 (0.758, 1.324)	0.921 [c] (0.356, 2.390)

CES-D denotes the Center for Epidemiologic Studies Depression Scale (Radloff, 1977).

[a] Adjusted for gender, age, marital status, district, educational attainment, living arrangements, lifetime/recent polydrug use of any illicit drug other than MA use within the past three months, and lifetime/recent MA use within the past three months.
[b] n = 1,945
[c] n = 355

"Spiritlessly Lively": Using Grounded Theory Methodology to Understand Perceptions of Depression and Factors Shaping Depression among Adolescents and Young Adults Residing in Chiang Mai Province, Thailand

4.1 Abstract

Introduction: Beginning in 2001, assessments of the leading factors related to the global burden of disease and disability pointed towards unipolar depression as a major contributing factor to the burden and disability adjusted life years (DALYs) among adolescents and young adults ranging in age from 15 – 24 years. Explorations of how depression is constructed and perceived is lacking among Southeast Asian populations. Furthermore, social antecedents that potentially shape the onset of depression in these populations warrants further attention in order to inform culturally-appropriate interventions. Specific explorations of these processes among Thai adolescents and young adults in rural Chiang Mai Province deserve attention due to their close proximity to the illicit drug market and their rural environment.

Methods: Grounded theory methodology was implemented to generate a middle-range theory which served to carefully explore the social causes of depression among Thai adolescents and young adults from 14 – 24 years of age and to explore how this population perceives depression. Analysis involved line-by-line coding, axial coding, constant comparative methods, and memo writing to identify codes, concepts, and themes related to these processes.

Results: Potential social antecedents that were identified included interpersonal problems with close friends, peers, parents, relatives, community members, and partners or spouses. The nature of the relationship between substance use and depression was reciprocal. Thai participants reported observations of consuming alcohol or using illicit drugs to self-medicate and the development of depression after using substances as a result of fear of being stigmatized, disappointment with attempts to quit, and anxiety and depression pertaining to financing their habit. Symptoms of depression comprised emotional, cognitive, behavioral, and motivational characteristics.

Conclusions: Themes identified point to the need to develop culturally-appropriate interventions to assess depression among Thai youth and the need to develop and integrate educational programs and treatment and prevention interventions for substance use and depression among Thai adolescents and adults in rural Chiang Mai.

4.2 Introduction

In 2001, unipolar depressive disorders were the leading cause of years lived with disability (YLD) in low, middle, and high-income countries and the leading cause among both men and women, although the burden of depression was higher among females [1]. In 2004, unipolar depressive disorders were the leading cause of disability adjusted life years (DALYs) among adolescents 15 – 19 years of age, accounting for 11.7% of the DALYs among adolescent females and 9.9% among adolescent males [2]. The same study observed unipolar depressive disorders contributing to 9.9% of DALYs in females aged 20 – 24 years and 7.9% among males of the same age.

In general, the natural history of adolescent depression is poorly understood as are the differences that distinguish symptoms of depression that occur during adolescence from those that occur in adulthood. Early onset of Major Depressive Disorder (MDD) before or during 21 years of age is associated with substance use, poor psychosocial outcomes, poor academic outcomes, bipolar disorder, and suicide [3]. Early onset MDD has a similar clinical picture to adult MDD, but there are developmental differences. For example, melancholia, psychosis, and suicide attempts increase with age whereas symptoms occurring during childhood and adolescence include signs of irritability [3, 4]. Pharmacological and psychotherapeutic treatments have shown limited and mixed effectiveness in randomized trials, and more research is required to identify effective treatment regimens for acute depression, effective maintenance of depressive symptoms, and strategies for the prevention of recurring MDD among adolescents and adults [5].

Cross-cultural differences of depression embody concepts of culture and society, ethnicity, religion, beliefs, values, and customs which shape the presentation of mental illness [6]. A paucity of knowledge pertaining to the conceptualization of depression exists specific to adolescents and young adults in Southeast Asia. Moreover, little is known about the social factors in Southeast Asia that are thought to shape the onset of depression, the consequences of depression, and the methods that adolescents and young adults in this region employ to cope with

symptoms of depression. Accordingly, little is known about the perceptions of depression and the social and psychological processes that shape the onset of depression as they relate to adolescents and young adults in Thailand.

The social, economical, historical, and political context of rural, Chiang Mai province in Thailand, particularly in a region where illicit substances are manufactured, distributed, and used, can potentially contribute to shaping the onset and natural history of depression in this region. Maladaptive coping mechanisms are exacerbated by the ubiquitous nature of alcohol and methamphetamine in a rural region within the Golden Triangle area, a global region where a significant amount of methamphetamine is produced and distributed [7]. In terms applicable to this study, it is important to understand the experience of depression in adolescents and young adults as they react emotionally to socially-related stimuli (i.e. interpersonal conflicts and substance use), and to understand if these emotions are expressed and interpreted as constituting an illness labeled as depression. How Thai youth conceptualize depression is key to assessment within this population, given that lay persons are more likely to define illness, including it's causes, consequences, and effective treatment regimens, within the norms and beliefs established by their own culture [8-11]

Assessment with the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [12], which defines and encompasses a range of depressive symptoms presenting in individuals residing in a Western culture, may not necessarily be useful for assessing depression among Thais. Ultimately, research questions of this study are the following: 1) How is depression perceived by Thai adolescents and young adults?, 2) What individual-level and mezzo-level factors are associated with depression experienced in this population?, and 3) How can results be used to identify, treat, and prevent depression among Thai adolescents and young adults residing in rural, northern Thailand?

4.3 Methods

4.3.1 Research Methods Overview

The research questions about depression incorporated an overall assessment of the

contexts and processes shaping perceptions of depression and depressive symptoms among

adolescents and young adults aged 14 - 24 residing in rural, Northern Thailand. The methods

serve to provide a more comprehensive understanding of the proximate and distal factors that

may be associated with the onset of depressive symptoms in this population. This approach also

serves to corroborate evidence of subgroups that may be at a higher risk for depression and that

may need tailored treatment or preventative interventions.

Creswell discusses the following five different qualitative research methodologies [13]:

narrative research, phenomenology, grounded theory, ethnography, and case studies. The

decision to employ grounded theory methodology was due to the nature of research questions, the

primary focus of this research, the need to develop a middle-range theory to explain the meaning

of depression and factors associated with the onset of depressive symptoms among this

population, the researcher's own interests, and the needs of participants in these communities.

4.3.2 Qualitative Research Data Collection

Members of the field team conducted purposive sampling from January through

February, 2013 to obtain 24 in-depth interviews among adolescents and young adults, both male

and female, aged 14 – 24, residing in communities in all six districts who spoke Thai, and who

were participating in a community-randomized community mobilization trial designed to reduce

and prevent methamphetamine use in rural, Northern Chiang Mai.   Equal numbers of adolescents

aged 14 through 17 years and young adults aged 18-24 were selected. These communities where

data collection took place included the Saraphi, Sansai, Chiang Dao, Doi Saket, Mae Taeng, and San Khampaeng districts. An equal number of males and females were sampled. Data collection was conducted using a semi-structured in-depth interview field guide designed to collect information that will answer the proposed research questions (Appendix A.1). To craft questions, we referred to texts and research which described the variation in symptoms and components of depression, primarily the emotional, cognitive, behavioral, and motivational components of depression and the correlates of depression [3, 4, 14]. Prior to conducting in-depth interviews, the guide was pilot tested among four Thai youth to ensure validity. These four individuals were purposively selected based on their ability to provide articulate insights into their observations and experiences of youth exhibiting depressive symptoms and the situations potentially precipitating depression. Furthermore, these four youth were selected based on their willingness to participate, and included two males and two females, two adolescents 14 – 17 years of age and two young adults 18 – 24 years of age.

These participants responded to interview questions by offering their opinions, knowledge and observations related to each question. Participants were not necessarily diagnosed as having depression by a professional. Theoretical sampling to obtain results from other subgroups was not performed. Research was approved by the institutional review boards at Johns Hopkins University Bloomberg School of Public Health, the human experimentation committee at the Research Institute for Health Sciences of Chiang Mai University, and the Ministry of Health in Thailand. Additionally, a second component of the in-depth interview collected demographic data on age, gender, and the district in which the respondent resided. Interviews were taped, transcribed, and translated from Thai into English by field staff proficient in both Thai and English.

Trustworthiness of the data was accomplished during data collection by appointing only one interviewer to achieve a standardized exploration with the aid of the semi-structured interview questions. Interviews were translated from Thai to English and then back-translated

into Thai to determine if particular words and nuances from the Thai language were correctly transcribed. During data analysis, the researcher engaged in reflexivity exercises and memo writing to ensure reliability of coding and interpretations, assessing reliability by describing patterns, writing thick descriptions, documenting the dimensions of categories, and analyzing negative cases [15]. Trustworthiness of the results obtained during data analysis was achieved by implementing certain strategies, including multiple broad and close readings of the transcripts and searching for discrepancies.

4.3.3 Qualitative Methods Analysis

Recognizing that the complex psychological phenomena comprising depression are embedded within a complex web of social and cultural processes, a complex methodology is required to understand perceptions of depression constructed by Thai youth, and to understand their opinions and knowledge of the social factors potentially associated with depression. Therefore, grounded theory methodology was used to understand these processes. The analysis involved an inductive approach to develop an abstract, middle-range theory in which a series of actions and constructs could be condensed into a limited set of specific components, either components of depression or components describing specific categories of factors potentially related to the onset of depression in this rural region of Thailand. Three main procedures were used to generate this theory. These components consisted of the following: line-by-line coding, axial coding, and memo-writing [16]. Underlying grounded theory methodology is the implementation of constant comparative methods. This technique was implemented with careful attention to variation and used to compare, contrast, and connect categories and concepts within and across interviews in order to develop increasingly complex themes and an externally valid theory about depression and its correlates [17].

Transcripts were first reviewed in two stages by a single analyst. During the first stage, line-by-line coding was implemented for the first four transcripts. Subsequently, the remaining transcripts were coded according to these initial codes. Because new codes were added during the subsequent analysis, the first four transcripts were reviewed and recoded if data supported newly discovered concepts. A broad review of all interviews was conducted, and broad summaries of variations in depressive symptoms, negative cases, processes, interactions, and contexts were synthesized. Finally, further review of key concepts and subcategories was conducted to ensure coding of transcripts was consistent. Constant comparative methods were employed to compare and contrast categories, concepts, and themes. Axial coding was conducted to develop more complex themes whereby categories, concepts, and themes were linked, thus more accurately reflecting the realistic nature of complex phenomena.

To develop a middle-range theory about the symptoms of depression expressed in this population, the focus was oriented towards exploring typologies which supported variation in the components of depression. Once depression was explored, the focus shifted toward linking themes to each other and within a cultural and social context to explain the social processes that emerged to define the course of depression in this population, the concept of depression being the core component of this process.

4.4 Results

4.4.1 Overview

The sample consisted of one adolescent male, one adolescent female, one young male adult, and one young female adult from each of six districts (Table 8). The duration of all interviews with demographic information, ranged from 23 to 45 minutes. The age and duration of an interview of one participant was not recorded due to technical errors, but the interview was

analyzed because it included a rich, detailed description of perceptions of and factors related to depression.

An exploration of the social antecedents of depression ensued. Key to these social processes were the interpersonal relationships between Thai youth and their parents, family, close friends, peers, community members, and romantic partners or spouses. Social processes were further explored with regard to substance use, particularly alcohol consumption and methamphetamine use to manage depressive symptoms resulting from daily stressors arising from financial, academic, and interpersonal problems. In turn, participants described the reciprocal nature of the relationship between substance use and depression whereby depression occurred as a result of potential dependence and anxiety concerning drug-related stigma within their community

Several different properties and dimensions of depressive symptoms emerged during analysis. Perceptions of depression, the contingencies that shape the course of the experience, the consequences of depression, and potential implications for guiding treatment and prevention were provided in disucssions with these participants. The conceptualization of depression experienced by Thai youth was construed from opinions, experiences, and observations of their own experiences or their peers' feelings, thoughts, and behaviors, and entailed the following components of depression: 1) cognitive, 2) emotional, 3) behavioral, and 4) motivational symptoms. For the most part, these experiences shared symptoms observed among Western populations, although some social antecedents, reactions, and consequences were particular to this population.   An exploration of gender differences in the expression of depressive symptoms revealed different processes by which males and females emotionally react to stressors and problems.

4.4.2 *Causes of Depression*

Interpersonal relationships with friends, family, and romantic partners or spouses were important factors associated with the onset of depression. On numerous occasions, participants discussed the qualities of these relationships (i.e. degree of closeness) and the specific actions which took place which led to depression. The exploration of the impact of interpersonal actions primarily included misunderstandings, conflicts, and silence with close friends, parents, and partners/spouses. Conflicts and misunderstandings between family members and youth were cited as major factors influencing the course of depression among youth.

> Their family members are very sad and teenagers are also depressed because they are scolded without understanding that everything that their parents teach them is good. – Male, 17 years, San Khampaeng District

The quality of the relationship with a family member was of primary importance in determining the interactions that influenced symptoms of stress that led to depression. Notably, the quality of relationships between parents and youth determined the onset of these symptoms. Furthermore, if the parent was also depressed, the interactions with their children brought about the development of stress among their child.

> When I was young I had seen my mother symptoms. She started to blame me since I lost my notebook when I was in vocational school year 2. She had blames me over and over again, 3 days to 7 days all the time. She blamed me when I came back from school until I was stressed. Female, 18, Doi Saket District

During conflicts with parents, potential consequences involved the impact on the youth's self-esteem and happiness.

> Sometimes my parents scolded me when I went back from school and doing nothing…and could not do what she does, not admirable like other's kid their kid is not good. Sometimes I felt offended by that. Female, 15 years, Mae Taeng District

More importantly, the presence of the quality of "warmth" was repeatedly mentioned as a buffer to the development of family conflicts and the subsequent development of depression among youth.

> There may not be a problem. Depression can be cut out because the family has warmth. If back ground or warmth in the family is good when there is any problem and three persons talk to each other there will be no depression. They need to tell and adjust it with each other. Since the family back ground is not good, children and parents don't get together. They might argue with each other. They might be stressed and depressed. – Female, 23 years, San Khampaeng District

Among friends and peers, conflicts and misunderstandings also played a major role in the potential onset of depressive symptoms. Being perceived as different resulted in social exclusion and development of depression. An exploration of interactions among depressed Thai youth and peers brought attention to one complex process of interaction regarding a depressed individual who may have projected feelings of low self-esteem or blame onto members of her peer group. Over time, peers tired of this depressed classmate's reaction towards them and her perception that they are not being sincere with her or are untrustworthy, and her negative interactions with peers may be exacerbated by her particular socialization process.

> She doesn't want to hang out with friends because she thinks that they fake to her while they try to be nice to her.   She is scared that everyone pretends to be nice to her even they try open to her sincerely but she perceived it in the different way. Now everyone doesn't like her and gets tired of her because she is too much….. I think her family might want her to mug up on studying and teach her that friendship has nothing. When we worked as a group, she wanted to do everything by herself and when we asked her to share some works, she asked us whether we were going to take advantage of her and we said no and when we gave her an easy job again she asked us whether we were insulting her ability so we didn't know what to do. We didn't know what she wanted. —Female, 17 years, San Kamphaeng District

When the type of relationship is a romantic relationship such as a girlfriend, boyfriend, spouse, or partner, then conflict, silence, separation, and heartbreak emerged as important themes. Some evidence existed pertaining to the level of commitment in a romantic relationship and the concomitant influence on the expression of depressive symptoms. The gravity of the particular event (i.e.separation) was determined by the age or maturity of the participant, and these factors determined the severity of depressive symptoms.

> Teenagers don't think much. They are depressed but not think as much as adults. Adults have more serious relationship when they broke up or stay apart, they feel like they are missing something and they need to find something else to replace. Female, 17 years, Doi Saket District

During explorations of the causes of depression with one participant, this participant brought about an insight about the process of interactions between a depressed adolescent and peers, stating that a depressed youth had to pretend to be happy when among peers. However, the participant stated that peers could still perceive the person was depressed.

> He was kind of lively with others, spiritlessly lively. – Female, young adult, Sansai District

4.4.3 Substance Use and Depression

Many of the Thai youth reported the use of alcohol in response to stressors in order to self-medicate; the use of illicit substances, including methamphetamines, was reported to a lesser extent. However, most participants recognized that using substances only temporarily relieved depressive symptoms or temporarily relieved ruminations about one's problems.

> Yes. For instance, my friend…his girlfriend broke up with him. He was urged from some friends in the classroom to go to drink alcohol. He went with them. I was surprised he did that because he had never drunk and gone with them before, why he had to do that. He cried continuously until stopped drinking. He cried like he wanted to release. In my opinion, it is like if he stops drinking, he will go back to think about his

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depression again that is why he has to drink till he gets
drunk and when he sobers he goes back to drink again,
like a cycle unstoppable until there will be someone
helps him to find the way out. Such that
he will really quit. – Male, 17 years, San Khampaeng
District

Most youth reported the use of alcohol and illicit substances to self-medicate frequently, but most

did not believe that the use of alcohol or illicit substances specifically caused depressive

symptoms to occur. Rather, depressive symptoms which occurred after consuming substances

were more likely due to fear of being stigmatized by family, friends, or the community or

disappointment or shame after numerous attempts to quit.

Yes, if we use substances and cannot quit and don't
know how to tell parents, we will be sad because we
don't know how to tell parents or friends, or may think
that we are hated by society. Male, 15 years,
Chiang Dao District

Use of methamphetamines, with its recognized severe dependence liability, also caused

depressive symptoms among youth who knew they were addicted or because they did not have

money to purchase methamphetamine. For the most part, youth did not believe that using

methamphetamines produced any direct symptoms of depression, but knew of its ability to

improve stamina and concentration. Some believed that using methamphetamines produced

feelings of euphoria and happiness rather than depression; one participant said that using

methamphetamine was like "being in heaven" and reported that sleeping pills, whisky, and other

alcoholic beverages were consumed to counteract sadness.   One participant did recognize the

ability of methamphetamines to directly cause depression.

Because of the drug effects and also craving… When
they have been craving for Yaba for a while they
become sad, the effects of the drugs can make them
depressed as well. There are various. –Female, 17
years, Doi Saket District

4.4.4 Themes Related to Perceptions of Depression and Accompanying Symptoms

A core set of symptoms were primarily feelings of sadness and cognitions such as

thinking aimlessly, leading to the enforcement of solitude (Figure 6). Participants described

varying dimensions of sadness, which included feeling numb, sad, world-weary, dull, having a

broken heart, and having a small heart. Negative mood also determined and influenced the nature

of interpersonal interactions. Feelings of loneliness were a striking feature of the

symptomotology. The term "spirit" or "spiritlessly lively" was occasionally used when

describing a process of interpersonal interactions.

Cognitive symptoms included feelings of hopelessness and disappointment potentially

leading to lack of motivation to do anything to change one's circumstances or course of action.

Additionally, self-blame and low self-esteem predominated in participants' statements. One

participant described how loss of a partner or boyfriend or girlfriend contributed to feelings of

worthlessness.

> They would think about themselves "What is bad in
> myself?" What they did wrong? Why the guy has to go?
> They would rather look at themselves….rather than
> blaming other people. -- Female, 17 years
> old, Doi Saket District

Behaviors characteristic of depressed persons occurred when individuals who

experienced symptoms interacted with others. The most frequent behaviors included isolating

oneself from others, being quiet, speech that was angry or "boisterous," or that involved scolding

others. Change was a frequently cited theme as individuals reacted to and recognized changes in

depressed persons. These interactions with others had a negative impact on interpersonal

relationships with family, friends, peers, and the community. One participant explained the

behavioral process of solitude, stating that withdrawal incorporates within a depressed person a

sense of retreating to the person's inner world rather than interacting with others. The process was complex and also involved motivational and cognitive symptoms.

> Don't want to go anywhere, want to be alone. Maybe isolated in the room, and dwelling on thinking and stressing out about the problem that makes us sad. Don't pay any attention to the environment. Don't care and don't talk to anyone. Female, 23 years, San Khampaeng District

Other participants described other ways behaving in addition to isolating oneself, such as acting out and expressing anger and committing acts which can be negative and entail violence.

> Yes, and in the worst cases, they make decision based on violence and don't use their conscience, sometimes they look for trouble, argue with other people, and destroy things in their house. They don't listen when they are prohibited by their parents. They also isolate themselves in the room. – Male, 17 years, San Kamphaeng District

Despite experiencing problematic situations and stressors which precipitated depressive symptoms, some participants demonstrated more positive ways of behaving to achieve more favorable opinions from others and to maintain relationships that they valued. This process served to curtail the severity of depressive symptoms or prevented severe symptoms from occurring and was a more positive way of coping or modifying the consequences of depression

> For me, if I wanted to draw my mom's attention, I just study hard for the best result. It might be different from others. Some might want to do nothing, but for me it's just different… I used to do it, like making loud noise or be upset with them. --Female, young adult, Sansai District

Finally, study participants explained how motivational symptoms comprised a part of how they conceptualized depression. At times, depressed youth demonstrated physical retardation in movement.

> Do things with absent-minded and slowly. – Female, 17 years, Doi Saket District

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One participant explored with the interviewer other motivational symptoms such as neglecting self-care or avoiding having anything to eat.

> But lately, I felt that he was kind of neglect of himself. His figure changed. As for his action, he would come to class late. Well, he rarely came to class. He used to be fat, but he's so skinny now. He didn't have his hair cut. He seemed not to take care of himself. His clothes were not washed or ironed. – Female, young adult, Sansai district

4.4.5 Gender Differences Influence the Course of Depression

Both male and female participants described the processes by which Thai men and women expressed and coped with symptoms of depression. Both genders held onto sadness, but coped in different ways. Men tended to hide sadness while women ruminated over feelings or problems or tried to consult with others. In one instance, a male participant coped with tragedy and loss by incorporating Buddhism and spirituality into his coping strategy. He described how he released the sadness over to a higher power in accord with Buddhist teachings, thus leading him to a state of acceptance and allowing him to receive a benefit from going to temple, and that benefit resulted in a process of becoming happier.

> Men may go to the temple, and think that it is fate and it must be circle of birth and death. Women tend to be sadder than men. –Female, 17 years, Doi Saket District

Discussions with participants enabled a construction of the processes of how men express sadness after losing a loved one. For men, loss is related to behaviors such as socializing with friends, participating in social alcohol consumption, or going to temple, whereas women were allowed to express emotions more than men and felt free to express those emotions, holding onto sadness for a longer duration than men. Men expressed aggression and anger rather than sadness, although some participants said men do cry depending on the severity of the situation. Depression was less noticeable in men.

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4.4.6 Coping

Lastly, Thai youth employed various coping strategies which mediated the onset or severity of depressive symptomotology. The most salient process was actions taken to consult with other peers, partners and relatives rather than parents, certain parents, or community members. For instance, one participant discussed how he preferred to consult with only his mother, whom he was closer with, rather than his father. In addition to his friends, his mother became another source to confide in. However, the participant chose not to confide in his mother during certain situations.

> My older relatives, my mother. But my mother doesn't
> tell my father because she knows…she is mom I am her
> kid .I have better relationship with her than my father. I
> am more close to her. – Male, 16 years, Sansai District

The value placed on consulting was due to having someone listen to their problematic situations, but also having someone to provide advice. Other coping mechanisms involved working, volunteering in the community, and religious practices. Regarding volunteering, participants felt that volunteering allowed them to replace feelings of depression with feelings of connection and importance (Appendix A.2).

4.5 **Discussion**

This research is the first study to explore the meaning given to depression by adolescents and young adults in Thailand and the first study to explore social antecedents to depression experienced by these age groups in a rural area of Chiang Mai, Thailand in close proximity to a major illicit drug manufacturing and distribution center. The supposed risk factors established within the cultural, social, economic, political, and historical context of northern Thailand were found to potentially determine the onset of stress and depression. Family-related conflicts and

misunderstandings were a significant source of stress and depression for most Thai youth, similar to evidence supporting the same source of depression among other populations [18]. A particularly relevant theme that influenced development of depression among youth was the lack of love and guidance discussed by several participants. Essentially, this lack of parental love and guidance led to the emergence of problematic situations and behaviors, including alcohol consumption and illicit substance abuse and the development of stress and depression, supporting evidence from prior research about the ecology of family and it's role on mental health and development of children and adolescents [19]. Other research has identified lack of love from parents or family cohesion and familial conflict as factors associated with depressive symptoms in an adolescent population residing in Hanover, Jamaica [20].

Consistent with previous research [21], social exclusion and perceived lack of social support by classmates was specified as a source which generated stress. There were numerous occasions where adolescents, within the context of a classroom or among peers or friends, were socially excluded for not conforming to friend's wishes or perceived norms. Experiencing such occasions, as sources of misunderstandings or of processes whereby the youth was made to feel different, led to depression. Another social process enacted among academic peers related to interpersonal problems rooted in an inability to trust classmates stemming perhaps from the individual's low self-esteem and prioritization of good academic performance at the expense of good interpersonal relationships. Lack of interpersonal trust at the individual level has been demonstrated to lead to the development of incident and long-term depression in one prospective study in South Korea [22].

Consuming alcohol and illicit drugs, like methamphetamines, to self-medicate and alleviate depressive symptoms was a major theme identified by youth. The act of self-medication to alleviate depressive symptoms or to avoid ruminating over problematic situations is a common coping mechanism for various populations, but other studies have not observed evidence of self-

medication with illicit substances [23, 24]. The process of self-medication was complex in that in most instances, depressed youth did not seek out substances. Rather, they were gradually introduced to drugs by friends. On rare occasions, youth spared little thought and acted impulsively when taking measures to buy and consume alcohol either with friends or when they were alone.

The majority of youth sampled explained how rampant alcohol consumption, tobacco use, and illicit drug use occurred within these communities specifically for the purpose of self-medicating in order to forget problems, stressors, and depressive symptoms, to make themselves happier, or because they had no one to consult with. Given that social support is instrumental in buffering the effects of depression among youth [25], the substitution of social support with drug use reflects a need to devote resources to effective treatment and prevention of both substance use and depression in these rural communities within Chiang Mai.

Data also pointed to onset of depressive symptoms after substance use. Youth indicated that use of alcohol and illicit substances had the potential to precipitate the onset of depressive symptoms within adolescents and young adults. The rationale behind this relationship was threefold. First, the majority of youth interviewed described a social process whereby youth who used drugs became subject to stressors and to depression stemming from concern about drug-related stigma from relatives and from the community. This speaks of the tremendous concern that youth have about being stigmatized about using drugs, and this stigmatization caused anxiety and sadness. Indeed, one participant responded by saying how Thai adults, such as her parents, viewed persons who used drugs; opinions were such that youth who used drugs were hated by society, thus describing the magnitude of drug-related stigma existing within these communities. Depressive symptoms, particularly feelings of guilt and low self-esteem, emerged when parents shunned their own children. The second and third most common reasons why depressive symptoms developed after illicit substance use was due to concerns about financing a drug habit

and having feelings of guilt about recognizing their addiction but being disappointed of their inability to quit. There was little evidence that youth recognized the depression resulting from dependence on alcohol and methamphetamines. There is evidence in Thailand that those with alcohol use disorders and those having both alcohol use disorders and having used illicit drugs are at greater odds of having major depressive disorder compared to the general population [26] and that depression is more likely to occur after methamphetamine use [23]. The lack of recognition of this process among a general population in this study warrants closer attention to exploring similar perceptions of depression and its antecedents among Thai youth who have been diagnosed with major depressive disorders with and without substance use disorders and targeted educational programs. All relevant processes and factors described by participants as being potentially involved in shaping the course of depression among Thai youth are summarized in a theoretical model (Figure 7).

The literature suggests that several depressive symptoms can be expressed by a person suffering from depression or major depressive disorders, and can include emotional, cognitive, behavioral, physical (somatic), and motivational symptoms [4, 12, 25]. Participants did mention behavioral, motivational, emotional, and cognitive symptoms, either through direct experience or through thoughts shared by others or behaviors observed among other friends or relatives. However, any mention of the description of physical symptoms was not discussed at all, as expected, particularly if there is empirical research which describe how cultural differences shape depression and how individuals belonging to Asian cultures emphasize physical symptoms [25].

One possible explanation for the absence of reporting somatic symptoms during interviews between staff and youth was the lack of awareness that physical symptoms play a role in defining depression, at least as a construct described in previous research conducted among both Western and non-Western populations [4, 11, 25, 27, 28]. Another explanation for the absence of these phenomena explored in interviews with participants could be due to familiarity

with Western-based definitions of depression through participation in this community mobilization trial since the Center for Epidemiologic Studies – Depression scale (CES-D) was included in the structured survey. Participation in this study or previous research may impact their awareness of the practice of emphasizing psychological symptoms and the downplaying of somatic symptoms which predominate in Western cultures [29]. This is a research study which allows Thai youth to provide opinions and perceptions of depression rather than emphasizing the primacy of physical symptoms to gain access to health care, and this may explain the absence of somatization [30]. Because of the harm that stigma against mental illness can invoke among Asian patients and their families, depressed individuals from Asian cultures have been known to emphasize vague somatic symptoms since this is more acceptable in these cultures, but this was not witnessed or recognized in this population; as a result, the absence of these behaviors requires further exploration [6, 8].

The broad array of symptoms which emerged during interviews was characteristic of symptoms described by individuals from Western cultures. While not definitive, awareness and recognition of the development of these symptoms among youth could warrant action for seeking treatment. In terms of prevention, educational initiatives could enhance awareness and reduce stigma. Such symptoms were not culturally-bound, but represent perhaps what could be perceived as a universal core set of symptoms [31]. However, social antecedents, environment, contingencies, and consequences were based on Thai culture. Indeed, evidence does point to models that are based on the interaction between culturally-bound qualities of social life and psychological universals [32]. In this case, that culturally-bound quality is rooted to the Buddhist religion, which provides the text with which Thais come to understand the nature of suffering (dukkha) and depression [32]. The role of Buddhism figured into the life of one male Thai in this study as he tried to understand and cope with suffering. As such, while the symptoms mentioned

may be representative of a universal core of depressive symptoms, how they are given meaning and experienced may differ among Thais.

Many participants emphasized what characterized a depressed person, either through their own experiences or observations of others, and stated that a depressed person usually it is someone who is a quiet person who rarely talks and who takes measures to isolate themselves from others. The data emphasized the emotional and cognitive components, and these symptoms formed the core set of symptoms of depression defined in the model (Figure 6). Feelings of sadness, loneliness, hopelessness, worry, worthlessness, desperation, and guilt prevailed in the interviews. The process of experiencing emotional symptoms such as sadness usually evolved when a participant had time to ruminate over problems occurring in their daily lives as well as the future when the depressed person is bored and is not participating in any occupational, academic, or recreational activity. Essentially, previous research has observed associations between high levels of rumination and past and recent depressive episodes [33].

Behavioral and motivational symptoms included crying, shouting, fighting, usually within the context of drinking alcohol, neglecting oneself, missing school, and also "acting out" (Appendix A.2). There is a dimension to this "acting out" behavior because some youth acted in productive ways to get positive attention, like studying harder, whereas others discussed hiding students' and teachers' belongings. Motivational symptoms mentioned during interviews pointed to what was viewed as paralysis. Participants described the process of the onset of motivational symptoms broadly as occurring because of feelings of hopelessness, and actions consisting of rumination or thinking aimlessly which ultimately led to feelings of not wanting to do anything or go anywhere or led to the inability to improve one's circumstances. Similar motivational symptoms have been described among western populations [4, 25, 29].

Concepts and themes about the role of cognitive symptoms emerged during interviews with participants. A commonly discussed psychological process was the cognitive process of rumination or of aimless thinking. Rumination is cited in the literature and defined as the passive and repetitive thought of the meaning, causes, and consequences of depressive symptoms which is involuntary and maladaptive, and evidence suggests that it is a risk factor for increasing the severity and duration of depressive symptoms through the elaboration of negative thoughts and increased attention on negative memories that can lead to dysfunction in the ability to concentrate [30, 33]. Furthermore, the themes relating to rumination found in the current study are supported by empirical evidence suggesting that rumination explains the proposed responsive styles theory of depression, the theory that explains how the way in which depressed persons respond to symptoms influences the duration and severity of their symptoms [33].

4.5.1 Limitations

The evidence provided in this study should be interpreted by keeping in mind the following limitations. Diagnosis of MDD or any form of depression was not a requirement for purposive sampling. Therefore, depictions of depression or its antecedents may not necessarily be valid. Furthermore, the ability to generalize these findings to other communities within Thailand, in Southeast Asia, or globally is limited. Despite pilot testing to determine if the questions were understood by Thai adolescents and young adults, it was evident that some participants did not understand some of the questions or probes of emerging themes. Additionally, some younger participants were unable to provide a sufficiently rich, detailed description of what they perceived depression to be or how social and environmental actions shaped the onset of depression. As a result, many questions remained, and we were unable to answer these questions or achieve saturation by conducting theoretical sampling among specific participants. Through theoretical sampling, it may have been possible to better explore themes by

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interviewing additional youth who have personally experienced depression or have consumed alcohol or illicit drugs heavily. Last, it was difficult separating from previously known knowledge and frameworks surrounding components and correlates of depression.

 4.5.2 Strengths

This study was conducted to address the knowledge gap concerning the perceptions and depictions of depression and its social antecedents experienced by Thais because there is a paucity of research which explores these psychological and social processes occurring among Thai adolescents and young adults. Explorations of the social processes, embedded within a culture with prevalent substance use, and thus having culture-bound expressions and consequences of depression among Thais in Chiang Mai, have not been explored.   Special attention to the physical and social environment of rural Chiang Mai within which depressive symptoms emerge among Thai youth achieved an improved understanding of how this processes occur and an improved understanding of the contingencies that further shape deviations from what can be perceived as normal behavior.   Consequently, the data will inform the identification of culturally-relevant interventions for prevention and treatment within this population and that possibly support the integration of services aimed at prevention and reduction of depressive symptom presenting with hazardous or harmful alcohol consumption or methamphetamine use among Thai adolescents and young adults.

4.5.3 Future Research Directions

Future research should explore additional questions among specific members of the population such as those diagnosed with MDD, a substance use disorder, or both. These questions should strive to further explore how socialization of males and females impacts psychological and social process related to depression. Testing hypotheses of established

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psychological models of depression is warranted to inform clinical practice in Thailand and to test

Western understandings of depression based on DSM-IV criteria [30]. Finally, comparisons of

the factor structure with other populations should be undertaken.

4.6 Acknowledgements

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Table 8. Characteristics of Participants Resulting from Purposive Sampling

District	Gender	Age
Chiang Dao		
	Male	15
	Female	16
	Male	24
	Female	23
Doi Saket		
	Male	16
	Female	17
	Male	18
	Female	18
Mae Taeng		
	Male	14
	Female	15
	Male	19
	Female	21
San Khampaeng		
	Male	17
	Female	17
	Male	21
	Female	23
Saraphi		
	Male	15
	Female	17
	Male	18
	Female	22
Sansai		
	Male	16
	Female	16
	Male	19
	Female	Unknown

Table 8. Through purposive sampling, 24 adolescents aged 14 – 17 and young adults aged 18 – 23 participated in in-depth interviews. Due to technical issues, the specific age and duration of interview was not recorded.

Figure 6. Model of the the emotional , cognitive, behavioral, and Motivational components of depression observed in interviews with participants.
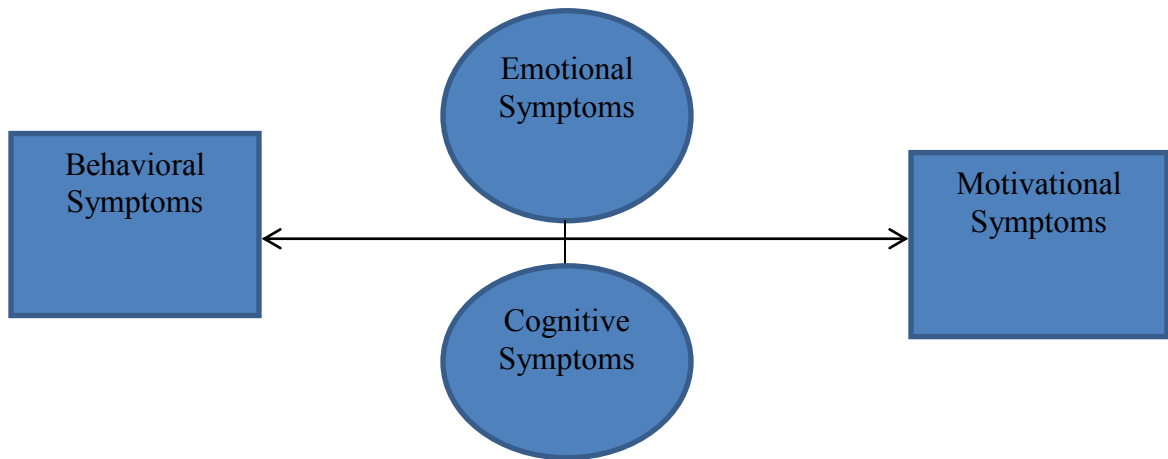
Figure 6. For ease of interpretation of the model, emotional and cognitive symptoms as the core and initial component that shaped or modified other components. Therefore, the arrow pointing from the construct of emotional symptoms pointed towards other constructs identified in discourse with participants. The rectangular figures are components of depression and properties of each component are indicated octagons. Each component is comprised of relevant symptoms ranging in duration and magnitude.

Figure 7. Model of the Social Antecedents Potentially Shaping Depression or Depressive Symptoms among Adolescent Thais and Young Thai Adults Residing in rural, Chiang Mai Province.
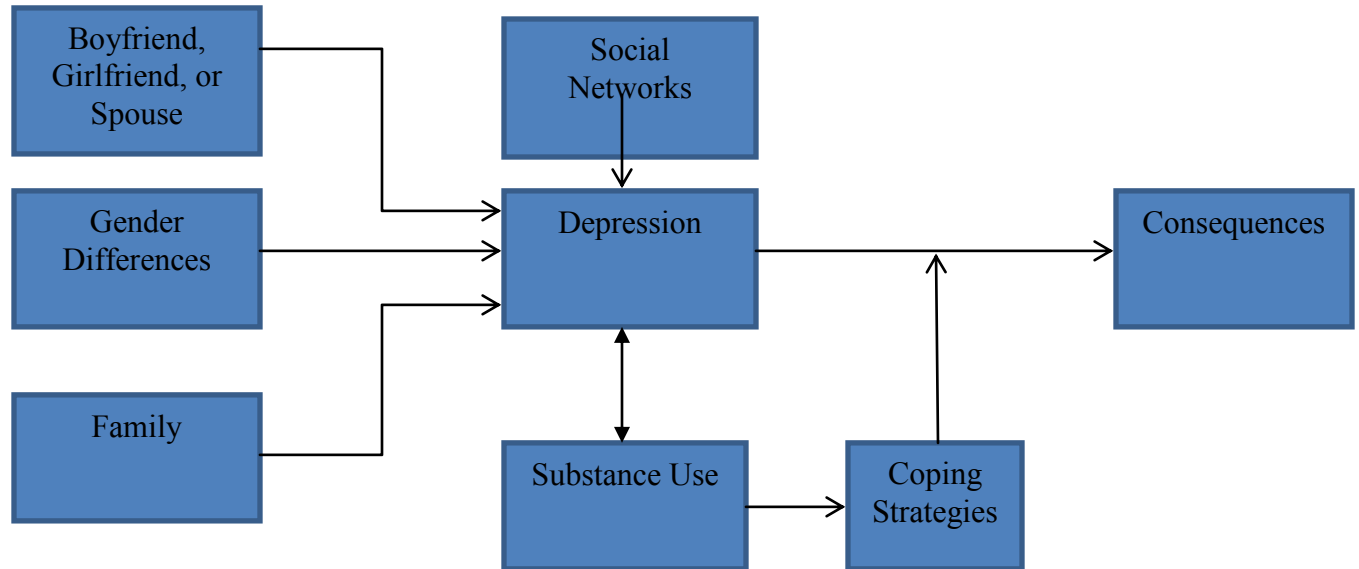
Figure 7. The processes described above are actions, interactions, and emotive responses embodied within a context that includes historical, economical, cultural, and political context in Chiang Mai Province and within communities in a rural environment in close proximity to centers of methamphetamine production and distribution. Gender responses are rooted in socialization processes according to Thai culture. Substance use is a maladaptive coping mechanism for the alleviation of depressive symptoms (consequences). Positive coping strategies include working, volunteering, consulting, and spiritual practices.

Chapter 5

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Summary and Public Health Implications

5.1 Summary

The use of methamphetamine, alcohol, and other illicit substances other than methamphetamines continues to be ubiquitous among adolescents and young adults in Thailand, particularly in the rural, northern province of Chiang Mai. Chiang Mai borders Burma and Laos and is part of the Golden Triangle, a region known for its history of opiate, heroin, and methamphetamine manufacturing and distribution [1, 2]. Methamphetamine use has reached epidemic proportions among youth in Thailand and is used recreationally in these age groups whereas heroin is predominately used by older adults [3]. The consequences of using methamphetamines involve significant physical and psychological morbidity and mortality, and depression is one of the most common correlates and consequences of methamphetamine use, abuse, and dependence [4, 5].

Our research revealed that lifetime and recent methamphetamine use still remains rampant among Thai youth. The reported lifetime use of methamphetamines by adolescents and young adults aged 14 – 29 in our study was 19%, and 31% of lifetime users reported recent use of methamphetamine within the past three months. The reported lifetime use of methamphetamine use surpassed reported lifetime marijuana use (17%), but did not surpass lifetime reported alcohol consumption (73%). All other reported lifetime use of other illicit substances, primarily ice, heroin, opium, valium, domicum, barbiturates, ketamine, ecstasy, glue, and kratom, was less prevalent, ranging from 0.63 – 3%. Comparisons of the prevalence of use indicate that methamphetamine use continues to be a significant public health problem in Thailand.

Depressive symptoms were problematic among those reporting lifetime and recent methamphetamine use, and remain a concern given that depression is known to be a part of the significant psychological sequelae among users of the drug. Among lifetime users, 12% reported high levels of depressive symptoms compared with 8% of the non-using sample, and 16% of recent users experienced high levels of depressive symptoms compared to 10% of non-recent users. Our findings demonstrated that reported methamphetamine use was positively associated

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with depressive symptoms. These observations suggest that users of methamphetamine may be more vulnerable or subject to experiencing depression compared to others who do not use the drug in this population. Furthermore, methamphetamine users may also be taking the drug to self-medicate and to cope with daily stressors or problematic situations.

Gender differences in levels of depressive symptoms were observed among methamphetamine users. While Thai males reported using the drug more often, female MA users experienced the greater burden of depressive symptoms. Overall, 23% of females in our study who reported lifetime use of methamphetamine also reported high levels of depressive symptoms whereas 9% of male MA users reported high levels of depressive symptoms. Further supporting the evidence was the statistically significant interaction among gender, methamphetamine use, and level of depressive symptoms when tested in our study. This observed relationship indicates that females may be more vulnerable to severe comorbidity or to severe depression induced by substance use.

Alcohol consumption was prevalent in this population. The prevalence of lifetime consumption was 73% among Thais 14 – 29 years of age. Approximately 90% reported consuming alcohol within the past 12 months and 63% reported alcohol consumption within the past 30 days. Alcohol consumption by young adults 18 – 29 years of age was more prevalent than among adolescents 14 – 17 years of age and more prevalent among males, regardless of age. The high burden of recent consumption, when compared to previous estimates ranging from 15% – 19% from similar age groups in other regions of Thailand, suggest that alcohol consumption is particularly problematic in northern, rural Thailand [6]. This high burden of consumption has widespread public health implications for the consequences of alcohol consumption, including physical complications and conditions (hypertension), suicide, and road traffic injuries and fatalities. Depression remains a significant, recognized consequence and correlate of alcohol consumption and of alcohol use disorders.

The higher burden in this rural region of Thailand may exist because the culture and conditions are possibly conducive to widespread consumption. The high prevalence may be due to boredom or frustration resulting from the lack of educational and occupational opportunities in this region or the lack of health care facilities and trained personnel equipped to treat depression, substance abuse, and dependence on substances. The local culture may approve of widespread alcohol consumption, and the presence of the methamphetamine market, in conjunction with a permissive drinking culture, may establish norms and beliefs within youth that drinking and substance use is socially acceptable by their peers. However, the high prevalence of drinking could be due to the presence of the Thai war on drugs or interventions aiming to reduce methamphetamine use among Thai youth. As a result, youth may be gradually replacing methamphetamine and other illicit drugs with alcohol. Furthermore, individuals in these communities may not recognize alcohol dependency and may not realize that treatment for hazardous alcohol consumption or alcohol dependency is necessary.

Additional analyses conducted to identify possible at-risk subgroups demonstrated the higher prevalence of drinking among males, but the higher comorbidity of depression and drinking among females. This observation suggests that while females may consume alcohol less than males, they are more susceptible to depression. However, whether the depression among females is substance-induced or independent is not known. Observations also demonstrated that a greater proportion of young adults 18 – 29 years of age reported consuming alcohol compared to adolescents. These findings suggest that the prevalence of drinking may be increasing with age. Thus, educational interventions must be targeted at adolescents before hazardous alcohol use or dependency develops at a later age.

Our findings are contrary to the associations observed in previous research. The associations observed in multivariate regression models suggest no association between alcohol consumption and depression or suggest protective effects in analyses. Since this research was conducted among a general population, rather than a clinical population, the presence of alcohol

use disorders and major depressive disorders may be rare. Consequently, associations may not be observed. The positive association between depressive symptoms and methamphetamine use in our population may reflect the high dependence liability of methamphetamine when compared to the relationship between alcohol consumption and depressive symptoms. Another explanation may be that youth are consuming alcohol to self-medicate. Such behaviors were actually reported by a number of youth during the process of in-depth interviews. In our interviews with youth during qualitative data collection procedures, discussions involved the processes whereby youth were participating in social drinking as a way to cope with stressors of daily life and depression. The fact that underage drinking is widespread in Thailand and that laws are not enforced supports the notion that alcohol is accessible to youth and may be commonly used for purposes of self-medication. The process of self-medication with alcohol may contribute to alleviating negative affect. On the other hand, the low prevalence of frequent and intense drinking characteristic of alcohol use disorders may indicate that this general population may indeed by healthy, and may participate in social drinking behaviors much more than individuals with poor mental health would. These processes were also explored in in-depth interviews, which will be discussed in detail next.

Our undertaking of qualitative research served to fill a knowledge gap regarding the need to explore how Thai adolescents and young adults 14 – 24 years of age perceive and construct the illness that western and professional psychiatric cultures label "depression." This work also served to provide theoretical knowledge about the social processes currently and potentially shaping the onset and natural history of depression experienced by Thai youth residing in rural northern Thailand within the Golden Triangle region. In turn, these social processes that precede depression are embedded within a cultural, historical, economical, and political context that also shape the course of depression experienced in this population, and our work began to inform theoretical knowledge of these complex phenomena.

The causes of depression that were most relevant to participants through their experiences and observations indicate that interpersonal problems with family, particularly parents, played an important role in inducing stress leading to depression or impacting the self-esteem of some participants, ultimately leading to depression. Conflict and misunderstandings with parents and relatives were specific situations that influenced depressive symptoms. Similarly, conflicts and misunderstandings between youth and close friends or peers produced stress and depression in academic or community settings. In contrast, silence, rather than conflict, influenced stress, anxiety, and depression when they type of relationship was with a spouse or romantic partner.

The nature of the relationship between substance use and depression was also explored and participants provided insights into the practice of self-medication, depression occurring after substance use, and substance-induced depression. Overall, widespread reporting of alcohol consumption to relieve stress and depressive symptoms was revealed during interviews with participants, particularly in a social setting. The use of methamphetamines to cope with depression was reported to a lesser extent as was the use of opiates and glue. In contrast, participants perceived methamphetamine use to be associated with feelings of euphoria and some participants seemed to demonstrate discomfort in talking about methamphetamine use either by denying use or discussing situations where people they were acquainted with used methamphetamines. Participants also demonstrated their own thought processes with regard to how depression can occur after substance use. For instance, most participants discussed how depression occurred as a result of feeling guilt about using illicit substances or partaking in frequent drinking knowing that these behaviors and the people associated with these behaviors were negatively judged by the community. Other insights brought to the attention of the interviewer were related to feelings of discouragement and disappointment resulting from the inability to quit problematic drug use. Only rarely did participants describe depression being induced directly from substance use.

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Finally, symptoms of depression were explored by participants in order to gain a deeper understanding of how these participants perceive and depict depression. Numerous thoughts, feelings, and behaviors thought to comprise depression were revealed during these interviews. The revelation of depressive symptoms that were similar to those seen in western cultures and in the professional literature fulfills the need to begin understanding how Thais define depression and how Thais recognize depression as an illness experienced by the individual as it relates to the social ills induced by drug use and the discord produced during interpersonal conflicts. Most symptoms were emotional and cognitive symptoms such as experiencing feelings of sadness and numbness indicative of emotional symptoms and feelings of guilt, hopelessness, and low self-esteem experienced by those having cognitive responses to depression. Ruminating, acting out, isolating oneself from others, neglecting self-care, and neglecting daily activities were frequently mentioned when asked to describe depression and reflect experiences of motivational and behavioral symptoms.

5.2 Public Health Implications

The high prevalence of ever, 12-month, and 30-day alcohol consumption among this population compared to other populations in Thailand suggest that consumption of alcohol is widespread and socially acceptable, especially among adolescents and young adults. Although alcohol consumption is not intense or frequent and there is a low prevalence of problematic alcohol consumption among this population, more education is needed to raise awareness of the consequences of hazardous drinking and to empower individuals to recognize symptoms and behaviors that suggest hazardous drinking and alcohol dependency and act to achieve more productive means of problem solving. This is essential given the lack of evidence for effective regulation and enforcement of laws enacted to prohibit drinking among underage Thai youth and the support of free market practices in Thailand [7]. Furthermore, rural areas in Thailand may

require trained healthcare personnel to effectively treat individuals who have comorbid alcohol dependency and depression. Just as important is the evidence provided by our research that methamphetamine use among Thai youth remains a significant health problem. Some participants discussing their opinions during in-depth interviewing believed that methamphetamine use is not capable of inducing depression after use. Rather they believe that methamphetamine produces feelings of euphoria, but were reluctant to tell staff what they knew about methamphetamine use and reluctant to admit use. Educational programs must target adolescents to inform this group of the severe dependence liability and severe consequences of methamphetamine use. The explorations of perceptions of depression and its social antecedents can be used to inform culturally-appropriate health care, programs, and policies. Such policies and programs can capitalize on existing resources and knowledge contained within the communities that participated in the community mobilization trial and encourage youth to participate in community volunteering programs or to participate in spiritual practices. Educational policies of Thailand currently require a minimum of educational attainment through twelfth grade [8] and compulsory education through twelfth grade is rapidly becoming the norm in rural areas of Thailand (personal communication, Celentano). As a result, educational opportunities may become more accessible and normative among Thai youth in these rural regions and facilitate coping strategies and provide youth with options other than participating in the drug market. Finally, policies may require support for recruiting and training more students in related professional competencies, such as medicine, nursing, public health, psychology, and psychiatry and support for providing students with incentives to practice in rural areas. Such training should also aim to integrate services in order to treat comorbid depression and substance use.

5.3 Future Research Directions

Regarding future directions, more research is needed to understand the underlying mechanisms which drive the relationship between methamphetamine use and depression and the relationship between alcohol use and depression. This requires the implementation of longitudinal cohort studies among both general and clinical populations to understand to the epidemiological and clinical factors associated with these comorbid conditions. Clearly, larger randomized clinical trials with sufficient power to detect differences between treatment and control arms should be implemented among individuals with comorbid substance use and depression who constitute a heterogonous population in terms of age and also implemented among adolescents to evaluate cognitive-behavioral and pharmacological treatments, either alone or adjunct to either treatment approach. Moreover, attention to evaluations in low- and middle-income countries through the implementation of randomized clinical trials in these countries should be conducted to determine culturally-relevant treatment regimens and provide empirical evidence to support treatment guidelines.

Additional qualitative research may be necessary to develop culturally-acceptable interventions that are appropriate for each developmental stage and thus tailored for male and female adolescents and for male and female young adults in Thailand. Additional questions remain unanswered after exploring concepts and themes that required theoretical sampling. For example, themes related to resilience may possibly be related to differences in how Thai youth may have responded to daily stressors and depressive symptoms. Furthermore, possible stigma may have emerged as a theme, although the concept was not explicit, and explorations of how stigma related to mental illness and substance abuse impacts interpersonal relations with family, friends, peers, and community members and health care seeking behaviors should be conducted. Improved planning and funding of mixed methods studies in terms of timing quantitative and qualitative data collection at roughly the same periods could help researchers better understand

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the nature of the relationship between substance use and depression we sought to understand with this study and to determine reasons for inconsistencies observed between different types of data. These inconsistencies relate to the relationships between alcohol consumption and depressive symptoms.

Abnormal psychological disorders are increasingly being recognized as a major contributor to the burden and disability brought about by noncommunicable diseases in low- and middle-income countries. Cross-cultural epidemiology and anthropological research can be implemented through collaborations of researchers across fields to further explore what construes depression, whether depression is perceived as an illness by various populations in Thailand, to examine the burden of depression or depressive symptoms, and to determine the associations between depressive symptoms and substance use and interpersonal factors.

5.4 Limitations

Several limitations are necessary to discuss. An awareness of these limitations cautions us to make decisive conclusions regarding the nature of the relationship between depressive symptoms and substance use or the nature of the relationship between depressive symptoms and interpersonal relationships. First, the epidemiological analyses conducted in chapters two and three were based on cross-sectional data. Therefore, the temporality of the relationship between depression and substance use could not be determined. The sample size became limited when trying to assess associations between recent substance use and depressive symptoms. While positive associations were observed between methamphetamine use and depressive symptoms, and was biological plausible, there was no possibility to determine if the nature of the relationship was such that depressive symptoms were independent of substance use, precipitated substance use, or whether depressive symptoms were substance-induced. Furthermore, a diagnosis of depression was not a part of inclusion criteria. Thus, weak associations between methamphetamine use or alcohol consumption and depressive symptoms may be due to the fact

that the study population is a general population with a small burden of mental illness. Testing hypothesis in a clinical sample where more severe illness is present could also inform hypothesis about these associations.

Limitations involved when undertaking the qualitative research were due to the small sample inherent in such research. By design, a theory can be inductively developed, but cannot be tested. Such testing requires appropriate development of surveys to test the theory among a larger population as the processes and theory developed may not be transferable to other populations in Thailand or in other low- or middle-income countries. The diagnosis of depression was not required to be included and to participate in in-depth interviewing and many of the youth who participated had reported abstaining from methamphetamine or admitted that they knew no one who had used methamphetamine. Therefore, any information obtained was based on opinions, experiences, and observations and not necessarily truth or knowledge. Despite pilot testing, some information may not be valid because actual research brought about a concern about whether the meanings of some questions were understood, particularly among younger participants. Validity could not be checked by following up with participants to determine if our constructions of what encompasses depression and its social, culturally-constructed antecedents were correct.

5.5 Strengths

Despite several limitations of relying on cross-sectional data to assess the association between substance use and depressive symptoms and of relying on qualitative research to begin to explore the nature and course of depression among this population, the use of a mixed methods research design enhances the strength of the research because both sets of strengths inherent in each type of research are integrated to provide a comprehensive picture of the burden and nature of depressive symptoms as it relates to substance use and interpersonal relationships.   By

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implementing the qualitative data collection and analyses, we have begun to add depth and context to the associations between methamphetamine use, alcohol consumption, and depressive symptoms. This research method enabled us to achieve a greater understanding of how and why depression may relate to substance use, and began to address limitations due to the inability to establish temporality between depressive symptoms and substance use. We have also begun to explore other social antecedents and the social processes which shape the onset of depressive symptoms among Thai youth residing in a rural area with ubiquitous substance use. These social processes that are related to substance use, daily stressors, and interpersonal relationships have not been explored among this population, nor has an exploration of how depression is perceived or what the construction of depression means to Thai youth. These qualitative approaches can be harnessed to inform and develop culturally appropriate treatment and prevention interventions, programs, and educational campaigns.

The quantitative research lends strength to the research by allowing for the deductive testing of the primary hypothesis in question. That is, we were able to test for the association between methamphetamine use and depressive symptoms and between alcohol consumption and depressive symptoms accounting for potential confounders. The fact that an association was found whereby depressive symptoms were positively associated with lifetime and recent use of methamphetamines in a large sample (n = 2,055) lends credibility to the plausibility whereby the association can be explained by self-medicating to cope with stressors and depression or the emergence of depressive symptoms as a product of acute intoxication or dependence. The large sample size of the study population provided a means to achieve sufficient power to detect differences in levels of depressive symptoms between lifetime users and abstainers from methamphetamine and alcohol.

When integrated with quantitative research, the different types of data can be used to inform health policy which advocates for the need for resources to be devoted to accessible mental health care facilities and personnel in these rural areas of Thailand as well as integration

of treatment regimens and preventive interventions for comorbid substance use and depression. Such interventions could alleviate the severity of depressive symptoms and morbidity involved in the natural course of substance use. These interventions could also prevent maladaptive coping mechanisms and adverse consequences, primarily mortality due to suicide and drug overdose. Most importantly, mental illness has rarely been researched in Thailand and in Southeast Asia, in general. Consequently, this research adds to the growing body of knowledge related to mental health in Thailand.

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Appendices
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Appendix A.1

**Preventing Rural Thai Substance Abuse and HIV through Community Mobilization
In-depth interview guide for exploring the understanding of depression among 14-
24 year olds**

Meanings given to depression: Main and follow up questions

1. What do you know about depression?   (Symptoms of depression could include feelings
    of sadness, despair, and hopelessness and could include behaviors such as withdrawing
    from social situations or poor interactions or relationships with others. Other symptoms
    could include being unable to concentrate, expressing feelings of worthlessness, or
    expressing feelings of guilt.)

    a. Follow up: How would you define depression?

    b. Follow up: What have you heard from others about depression?

2. What are some words you use to describe depression?

    a. Follow up: Can you explain what (i.e. "blue") means?

    b. Follow up: In what situations is that word used?

    c. Probe: Are there any other words that you use to describe depression?

3. How does a person act when they seem depressed?

4. What are the kinds of things a person would say that show that they are depressed?

5. What do you think are some of the thoughts a person who has expressed symptoms of
    depression would have?

Process and factors shaping/associated with depression

1. If you know someone who is depressed, could you tell me what situations or events caused them to express (in words or behavior) symptoms of depression? (Some examples of situations that could cause someone to express symptoms of depression could include loss of a loved one, poor relationships with a boyfriend or girlfriend, not being able to find work, or using drugs).

    a. Follow up: How could the influence of family relationships impact the expression of symptoms of depression among adolescents and young adults?

        Probe: Has the expression (in words or behavior) of depressive symptoms from a family member affected your relationship with that person?

        Probe: If so, how has the expression of depressive symptoms from a family member affected your relationship with your family member?

    b. Follow up: How could the influence relationships with a boyfriend/girlfriend impact the expression of symptoms of depression among adolescents and young adults?

        Probe: Has the expression of depressive symptoms from your boyfriend/girlfriend affected your relationship with that person?

        Probe: If so, how has the expression of depressive symptoms from your boyfriend/girlfriend affected your relationship with that person?

    c. Follow up: Are there any situations where men express symptoms of depression differently from women?

        Probe: Are there differences in what men and women say or how men and women behave?

        Probe: If there are differences, why do you think there are differences?

    d. What are the different symptoms of depression between males and females?

2. Do you think depression could influence drug or alcohol use?

    a. Follow up: Could you tell me, what situations or events could lead someone who is depressed to start using substances?

    b. Follow up: Could you tell me why someone who is depressed would start using substances?

3. Do you think substance use could influence depression?

a. Follow up: Could you tell me, what are the kinds of substances that could influence depression?

    Probe: Are there any differences between various kinds of substances? If there are differences, please provide details (type or pattern of depressive symptoms, severity, amount and time of use etc.)

b. Follow up: Can you tell me what you know about how yaba use is related to the expression of symptoms of depression?

    Probe: Are there any other ways that yaba use is related to the expression of symptoms of depression?

c. Follow up: Can you tell me what you know about how alcohol use is related to the expression of symptoms of depression?

    Probe: Are there any other ways that alcohol use is related to the expression of symptoms of depression?

Appendix A.2. Examples of the Qualitative Research Analytical Thought Process.

Identifying Properties of Depressive Symptoms and Dimensions of Properties

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Words used to describe each component

Cognitive Properties (Dimension: Magnitude; weak --> strong)
1. self-hate (perceived to be there)
2. Pessimism/hopelessness (related to "life is dark" in vivo code)
3. guilt/ self-blame
4. Oppressed
5. Possible hallucinations (strong magnitude, severity)
6. suicidal ideation
7. aimless thinking
8. Self-esteem ("moping" to me locates itself within feelings of inferiority, undesirability, and inadequate).
9. disappointment
10. Ruminating

Emotional Properties (General Dimension: Magnitude; weak --> moderate--> strong)
1. crying/sad/serious/moody (Dimension: cheerful --> numb --> spiritlessly lively" --> unhappy --> dejected ("spiritlessly happy" interaction with others (seems forced))
2. acting out/"wild" behavior (negatively or positively)
3. anger (at others)/irritated
4. Overwhelmed
5. loneliness
6. frustrated
7. Anxiety/worrying/overwhelmed (Dimension: Carefree --> anxious --> desperate); depends on how big or small the problem is!

Motivational Properties
1. being quiet (Dimension; quiet --> talkative ---> "boisterous") [There was a case of a talkative person, but he was drunk.].
2. Isolation from others / not going out to see friends, in public
3. "escaping" --- to a friend's house, using drugs, etc.
4. paralysis (product of hopelessness and pessimism) - not wanting to do anything, go anywhere, isolation
5. not eating
6. Unable to make decisions
7. neglecting appearance and hygiene

Dimensions of Depressive Symptoms Components
1. (It would be nice to have thought of asking about) duration of depression
2. Emotional: Seriousness, Sad --->Cheerful
3. Motivational: Being quiet, rarely talks ----talks frequently (frequency of talking)
4. Motivational: Isolation, remain alone ---> be alone for a short amount of time (duration)
5. Emotional, Anger or Irritation: Easily --> Barely (proneness to anger), Severity (content --> annoyed ---> angry --> furious)

Dimensions of Stress
1. Consistent --> Intermittent (duration and frequency of stress)

NOTE: Show relationship (bidirectional) between anxiety ('under tension') and depression in causes of depression model

Durations of depression: 2 years (no other exact durations mentioned)

Thought Process of Exploring Properties and Dimensions of Consequences of Depression and Methods Employed to Cope with Depression

Consequences
1. ability to solve problems one day at a time to obtain relatively problem-free life after depression (Dimensions = solving problems way --> failing miserably)
2. arrested (after fighting)
3. taken to psychiatric hospital (after drinking)
4. poor academic performance
5. feelings of being alone lead to social isolation which led to a downward spiral of exacerbating anxiety and depression due to lack of social support
6. fear of being misunderstood/feeling like the only person in community/environment like this

Coping Mechanisms
1. Religion (Buddhism, Christianity)/spirituality
2. thinking of relatives---responsibility and/or empathy for others to avoid suicide or cope with suicidal ideation
3. consulting ("leaning on friends" or social support)--depends on degree of closeness
4. makes efforts to be cheerful (to relate better to others, to decrease stigma through hiding sadness)
5. regarding family relations, letting go when relatives argue to preserve harmonious relationships to best of ability
6. turning to drugs and alcohol consumption and there are different consequences to this process depending on whether the individual is alone or with friends. Note that other reasons exist such as peer pressure, especially due to power imbalance and even children are susceptible and drinking or using drugs because it is social and being around others is how a depressed person copes OR as a way of getting attention from significant other or parents as a cry for help.
7. There is a typology of reasons for turning to alcohol and drugs that don't necessarily include alleviating stress since some (1_D_01) doesn't believe it is the case for him, but for others it could be).
8. working/school activities

For various people, the influence of family, of peers, and of partners existed on a continuum in terms of importance in the process of developing depression, and the impacts depended on the closeness of the relationship and how often the event occurred or the participant worried about it.

STRESS seems to be a central theme to the onset of depression.

NEED educational interventions to reduce peer pressure, especially as it relates to children.

STIGMA is present and hinders consultation, where depressed individuals fear stigma, fear and frustration at being misunderstood, and are lost regarding who to turn to. They can't make a decision.

There is evidence of the bidirectional relationship between drug use and depression, in 5_D_01.
Passages which support themes

Self-medication with Alcohol
Yes. For instance, my friend who came here with me a while ago, his girlfriend broke up with him. He was urged from some friends in the classroom to go to drink alcohol. He went with them. I was surprised he did that because he had never drunk and gone with them before, why he had to do that. He went to drink, got drunk, cried and gibbered and then cried again, drank and cried and gibbered just like that. He cried continuously until stopped drinking. He cried like he wanted to release. In my opinion, it is like if he stops drinking, he will go back to think about his depression again that is why he has to drink till he gets drunk and when he sobers he goes back to drink again, like a cycle unstoppable until there will be someone helps him to find the way out. Such that he will really quit. 4_D_04

Women would drink and get drunk with nonsense, don't listen to anyone and start to feel depressed again when they go home. When they are sober, the depression comes back. They might think about hurting themselves. 5_D_02

Teenagers are stressed and then go to use drugs and alcohol. Some of them may not be depressed or stressed but have some other problems that lead them to use drugs and alcohol 5_D_02

Yes, can help them**. S**ometimes they are stressed and go to drink to forget about depression. They spend time with friends and have fun, and on the next day, they start to think about the depression again. 6_D_04

Depression…there is a small number but there are 100-80% . Like there is a man who has depression symptoms that makes him addicted to drugs. " I drink, I am stressed, I am bored, I drink and smoke" he does that just to forget about things that causes him depressed and then he remembers about everything again on the next day so he doesn't forget things for real. 2_D_01

Self- Medication with Substances

When I used drugs and it still had effects on me, it [yaba] helped me to forget everything, kept me in privacy, like I was in our personal world…I didn't think about anything. It was our own world….I didn't think about anything… It was the same when drugs had no effect but I felt a little bit release. 4_D_01

I was told that a friend of my broken hearted friend urged him to try some drugs by telling him that the drugs would make him happy. He seduced him to use drugs and told him that it would make he feel better and forget about the stress, by that time my friend was not ready to think about anything so he tried everything that he was offered. 4_D_04

 I don't know much about it but from what I have heard from my friend, he told me that once his friend used drugs, he <u>suddenly</u> forgot about the woman who hurt him…It makes <u>momentarily</u> forget. It is like he doesn't know anybody.4_D_04

I: You had just talked about using them to forget things, did you mean using Yaba or alcohol?
P: It was Yaba from what I have seen in the movie.
I: I see, what is else that what you know?
P: Using Yaba, opium, sniffing glue.
2_D_01

Problems Resulting in Self-medication
I: I see, you don't know. When people are sad, what kinds of situations that make them decide to drink or use drugs when they have never used or drunk before?
P: When they have problems with their parents, when they don't understand each other, when everything gets worse, when they cannot finish school, or when they work and have bankrupt.
……….END

P: When they open stores and cannot really sell anything, have few customers and have to close out the businesses. Some people turn to use drugs, drink and smoke.
 2_D_01

The Development of Depression after MA Use

But in my opinion, I think it causes depression….The more they take it, the more they know its disadvantage but they still can't stop. 5_D_02
They don't know how to find it and do not have money to buy. So they are more depressed because they still want it. Because they can't stop…Want to use. Don't have money. They don't have drug to take. They are sad and depressed. But they have to take it.
Yes, if we use substances and cannot quit and don't know how to tell parents, we will be sad because we don't know how to tell parents or friends, or may think that we are hated by society.
1_D_01
……….END

I: On the other hand, listen to me carefully, can Yaba make drug users feel sad?

P: Yes.

I: Why?

P: Were scolded by his girlfriend about using Yaba, he used it too much after that didn't talk to anyone, stay alone and did everything alone by himself.

1_D_03

……….END

I: I see, from what you have seen, Can Yaba make users who have been using drugs for a certain period of time sad?

P: There is none.

I: None, what would they are going to be?

P: They work diligently when they use Yaba.

Yes, because using drugs and drinking alcohol are not good. Their family and people around Blame them from doing that and are not close to them like before. Some people don't give them a chance…1_D_04

……….END

I: I don't mean that. Can using drugs make some people feel sad?

P: Some people get crazy.

I: They get crazy and…

P: Some people are addicted to drugs. Drugs are expensive. It costs about 400-500 baht a tablet depends on what kind of drugs.

I: What kind of drug is it?

P: I don't know but they do sell them. Some people use horse pills, and when they see women they drag them to rape.

I: Um.

P: Some people get crazy. 2_D_01

……….END

People around them may be sad because in the past this person was not like that but now why he turns out to be drug and alcohol addicted. 2_D_01

……….END

I: Is there any other kind of drugs besides marijuana?

P: Yaba.

I: For the effects of Yaba, besides hallucination, Yaba also cause depression, right?

P: Yes.

 2_D_03

……….END

I: What kind of substances lead to depression?
P: Substances that make us depressed.
I: Yes, use them and feel depressed.
P: Drugs.
I: What kind of drugs?
P: Yaba
I: How much is yaba used can lead to depression?
P: Quite a lot.
I: Quite a lot, right?
P: Yes.
I: This is because of drug effect?
P: Because of the drug effects and also craving.
I: Um.
P: When they have been craving for Yaba for a while they become sad, the effects of the drugs can make them depressed as well. There are various.

……….END

I: I see, you mean there are 2 situations. First, depression is caused by the effects of Yaba when people have been using it for a long time and second, depression is caused by spending money to buy Yaba, right?
P: Yes.
I: and then they have no money.
P: Yes. 2_D_04
……….END

My father smokes cigarettes. I used to ask my father why he smoked. He told me that he smoked because he was stressed so I think it helps him to forget about stress. 3_D_04
……….END

I: Do you think it is possible that someone use a substance to forget about stress and it makes this person addicted to it. Do you think when using it for a long time, it lead this person to depression?
P: I think this person will be depressed at the end.
I: Why?
P: I think he will be depressed when he realizes what he has done is wrong, when he has to die from me.
I: It is like after he uses it and he realizes the negative effect of it and he feels that
P: he should not use it. 3_D_04
……….END

I: How about the effects of substances, do they cause depression?
P: No, I don't think so.
I: You don't think so.
P: Yes, it may be like cannot live without it….withdrawal…..ha ha …stress. 3_D_04

……….END

I think so. 1. Suppose that people go to buy Yaba and it is too expensive so they take it and going to pay the money later. They are stressed after they have used it because they don't have enough money to pay and start to be scared that they will be murdered. They are stressed until they go to steal other people stuffs to sell and to get the money. Sometimes, they steal their parents' money but for people in general who try alcohol, they might release the feeling that has been accumulated from the past.

……….END

P: Effects of alcohol make people drunk and revive the past matters. They make people think a lot and drink continuously and depressed…We brought alcohol to drink up there. I and my friends drank and then from having a good mood, he started to feel depressed and talked about his girlfriend who broke up with him two years ago. The story came back suddenly. 3_D_04

……….END

P: It is possible if they use Marijuana for a long time with lots of amount, it can cause depression.

I: How much of Marijuana and for how long?
P: It is possible if they use lots of amount but I don't know how to explain.
I: You don't know how to explain but lots of amount, right?
P: If they use too much of marijuana, it can cause depression. 2_D_03
……….END

It makes some people accept their mistakes but for some people "it is fun for me to do That." Some people may think about themselves after they do it like they are well cultivated they should not have done that. They will have these kinds of feelings when they lose everything. They will know what sadness is. When they use drugs or drink, they have never thought about what is good or bad, only having fun. 2_D_01
……….END

They may be sad because when they have boy/girlfriends, they tell them to quit but they don't listen. When they leave them, they don't have anyone. 2_D_01

……….END

I: Suppose a teenage has a broken heart and go to use drugs, if his parents, friends and people in his society know about it, how will it affect him?
P: His parent may blame him and it may turn out to be a big issue that brings bad reputation to him and his family but it will not affect her friends much. Friends can warn him.
I: According to parents do not accept could make them depressed?
P: Yes.
 2_D_04
……….END

I: and they went to use drugs, on the other hand, does using drugs make people feel unhappy or sad?

P: Yes.

I: Use it and then…

P: Normally people who don't use drugs are not scared of anything, right?

I: Ar, ar…

P: But when they used drugs, they are afraid that one day police will come to arrest them, or will come to their house, assume that we also sell drugs.

I: Um….um.

P: Sell drugs to someone.

I: Um.

P: and then one day, this guy is arrested. Then we will afraid that this guy might put the blame on us.

I: I see.

P: Everywhere we go, we will feel unhappy. Normally, when we go out we are not afraid of crowded people.

I: Yes.

P: We aren't afraid.

I: Um..

P: But when we smoke, we are afraid to face with other people, don't want other people to see our face, just want to isolate ourselves from other people. 4_D_01

Stigma and Implications for Treatment and Prevention

These make children feel pressure. Some of them do not go to school. They spend time to go out. There are lots of teenagers are like that. The words that adults use are too harsh for children between 14-15 years old why they have to say such that. Even I am an adult when I listened to what they said, I sill wondered how the children were going to think. Some adults said " if you didn't study, you would be either drug addicted or imprisoner"
……….END

I: To do…

P: To against the words that the adults use to blame them and they will do things that they are prohibited to do.

I: Instead of helping the children to improve, the children are even worse.

P: It is like "Forbidden fruit is the sweetest". 1_D_04
………END

Some people are drunk and don't act like normal people anymore. Some people addicted to opium, some of them sniff glue, are skinny, and use knife to cut themselves. Some peoples have used drugs until they died. Some people are kick out of the house by their parents. "I let you born because I want you to be a good person not an asshole in this society" For example, my friend's uncle he was depressed as his parents pasted away; he sniffed glue. My friend's parents took him to get treatment. Now he should be better I guess. 2_D_01

Name: Broad Initial Summary of first four In-depth Interviews

6/28/2013 1:58 PM

Perceptions of Depression

There are several different properties and characteristics that emerge when the interviewer asks participants to describe their perceptions of depression and the contingencies that shape the course of the experience and the consequences and potential implications for guiding treatment.

Prior to conducting line-by-line coding of any interview, I drew a preliminary diagram that described what I expected the central component of depressive symptomotology would be given my prior review of the literature. I expected the central characteristic to be cognitive symptoms such as negative thoughts, mood, sadness, and feelings of hopelessness. These symptoms would drive and influence the onset of other components that comprise depression. For instance, I think feelings of hopelessness would lead to a lack of motivation to do anything to change one's circumstances or course of action or that feelings of sadness may lead to isolation and that this was also driven by fear of being stigmatized (a condition). These observations initially were given weight by the data contained in these first four interviews.

I also expected participants to describe depression holistically. That is, they did mention behavioral symptoms in addition to emotional and motivational symptoms. The description of physical symptoms was not discussed at all yet, as I expected, particularly from what I have read about cultural differences in the way that depression is expressed. A young Thai female adult (as do many participants) emphasizes what characterizes a depressed person is someone who is a

quiet person who rarely talks and who takes measures to isolate themself from others. There is some emphasis on the cognitive components or the feelings like feelings of sadness, loneliness, hopelessness, worry, worthlessness, desperation, and guilt. Moreover, the process of experiencing cognitive symptoms such as sadness comes about when a participant has time to think (no activity, boredom) or to ruminate over problems occurring in their daily lives as well as the future.

Behavioral symptoms included crying, shouting, fighting (in the context of drinking alcohol), neglecting oneself (poor hygiene, not eating, etc.), missing school, and also "acting out" (like hiding teachers' and students' belongings). There is a dimension to this "acting out" behavior because some acted in productive ways to get positive attention, like studying harder. There was a unique description given by one participant that referred to how a depressed individual may interact with others. This person was described as being "spiritlessly lively" which seemed to be that the person was pretending to be happy around others but it was possible to tell the person was pretending and was not "fully happy". Some had low grades which probably contributed to a cycle of depression and poor grades.

Some data that hint at cognitive symptoms include feelings of frustration. One participant describes it as "darkness."

There is some discussion on what I view as paralysis which participants describe as feelings of hopelessness. Much emphasis is also placed on what this young Thai female adult describes as being "under tension" which indicates to me that participants do correlate stress with depression, whether it be stress from family relationships, relationships with peers, financial strain, or relationships with boyfriends/girlfriends. A couple of participants expressed feelings of being worried and brought up sensitive topics themselves, such as suicide or suicidal ideation.

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Other circumstances or contingencies that I see shaping the course of the experience of depression include the fear of being stigmatized, especially perceived stigma from parents and peers. Fear of being misunderstood has been expressed by more than one participant as it led to poor relations with peers and social exclusion.

Regarding implications for treatment, many participants talked about consulting others and emphasized that they wanted someone to primarily listen to them and allow them to express themselves. Some also wanted to consult with others to listen and to help them solve their problems by offering solutions and advice. This interaction seemed to be important so that the depressed person did not feel alone was provided encouragement. One participant placed an emphasis on how a depressed person felt/was oppressed (dimensions ranging from expression to oppression of property: "consulting" -- in vivo code). Some valued participating in positive, productive activities like participating in school activities, work, and religious activities to cope with depression), which, in turn, helped them to improve social relationships with community members and feel a sense of worth.

Most participants agreed that there were no gender differences in how depression was expressed. On the other hand, some say there are gender differences, with females more likely to express emotions through crying and to turn to individuals they are close to for consultation whereas men usually drank alcohol or fought with other boys, but sometimes did cry.

One more interesting point discussed by a couple of participants was the change in that depressed person from being cheerful and talkative to sad and quiet, to someone that others have never seen before.

<u>Potential drivers of depression:</u>

Many participants discuss the importance of family relationships as drivers of depression.

For example:

P: We may have some problems. If we also have family problem, it will affect mind too.

This same participant also brings up an interesting point by saying that if there are problems within the family, the family has a "weak point" and "feel like we can't do any good things." To me, it means that it's as if this weak point is a point for intervention (would be good to ask further questions for elaboration later) and that the whole family may have some kind of motivational problem that keeps them from moving forward, whatever that may be. There are varying circumstances in which relatives are affected by a depressed family member. Sometimes, it has no effect and the family members have their own lives whereas in other families, the depressed individual has an effect on other family members (dimensions of effect). Note: If given the chance, I would conduct theoretical sampling to find out what conditions or contingencies are possibly producing varying effects (it may be in subsequent interviews). Overall, missing love and care from family (primarily parents and siblings) has an impact on driving depressive symptoms among Thai adolescents and young adults.

There are varying circumstances in which relationships with peers or boyfriend/girlfriends effect participants. The <u>change</u> from "normal" to a depressed state among boyfriends/girlfriends has an effect on participants that causes them to worry whereas outward <u>conflicts</u> with friends have more of a strong impact on the participant's depression and stress. Sometimes, blame is placed upon the depressed person by both parents and peers for being sad. One participant says that, to him, having conflicts with (close friends--close = dimension) friends has more of an effect on mental health, but it depends. In his own experiences, he himself is not affected conflicts with either

friends or girlfriends. He is not sad, but rather sympathetic (in the case of a girlfriend). I am starting to see a possible contingency occurring that would be worthwhile to explore. Furthermore, I think it would be an interesting "lens" with which to view and organize the data and extend the analysis further away from description to something more theoretical. This lens is not of gender differences in depression as one goes through the experience of depression from factors that could possibly bring about the onset of depression to the characteristics of depression to the consequences and treatments that modify the consequences. This has been explored extensively, at least in the quantitative literature that I have read. Rather, I think a preliminary viewpoint may be one of resilience. One participant described himself as being self-sufficient (he lived away from his parents at an early age) and interacts with others and with circumstances in a way that characterizes how an independent person would react. It may be worthwhile to explore further.

Regarding the relationship between substance use and depression, the majority of participants agree that drinking or using drugs occurs as a way to self-medicate or to "forget life's problems" (although for some the consequences were that alcohol consumption had no effect and they didn't forget) or because they have nobody to consult with so they drank or used drugs rather than depression being an acute, direct physical manifestation or withdrawal symptom after using drugs or drinking. In fact, they tend to think that a person who was depressed before using substances and remains depressed afterwards is due to fear of substance-related stigma from community members, worrying about inability to quit or letting oneself down when unable to quit, and being unable to participate in activities that help them to forget life's problems. This is in direct contrast to the epidemiological and clinical literature (including longitudinal studies) that finds depression occurring after MA use, alcohol consumption, and other drug use that is probably induced by the substance.

One participant says that using MA is not related to sadness, but happiness. It is supposed to be fun or tried out of curiosity, according to him, and that drinking alcohol, sometimes to the point of drunkenness is done when someone is sad. He does not think that MA or any other drug relates to use because someone is sad, but MA can induce sadness by way of its ability to induce concentration and boost stamina, allowing users to ruminate over unhappy thoughts/situations for long periods of time. Certain contexts occurred and interacted with the process of drug and alcohol use whereby using drugs or drinking alone was considered to induce thinking and was not fun and using or drinking with friends was considered to be fun. Data indicates that drugs, including MA, were introduced by friends, but alcohol was not necessarily introduced by friends, although partaking in either or both activities occurred among friends or alone. Some participants state that friends pressured them to use drugs. (One participant also begins to discuss other consequences of MA like psychosis and perhaps violence).

Self-medication with Substances

8/21/2013 4:29 PM

Previous passage and commentary from 2_D_01.

I: You don't really know, right? (Laugh) Do you think some people go to use drugs or drink
      alcohol when they are depressed?
P: Depression…there is a small number but there are 100-80% . Like there is a man who has
depression symptoms that makes him addicted to drugs. " I drink, I am stressed, I am bored, I

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drink and smoke" he does that just to forget about things that causes him depressed and then he remembers about everything again on the next day so he doesn't forget things for real.

This is a great example that is rich in detail about how depression could lead to drug use. She says it can stem from stress (anxiety) and boredom. Furthermore, the person she knows says is a man and regarding him says "depression symptoms that makes him addicted to drugs. "Makes" is a strong word and this also gives substances some kind of human quality whereby substances have power over another. Substances can enslave individuals who use them, affecting their quality of life. He takes drugs for the purpose of forgetting the tedium of daily life. But this help that drugs is supposed to provide is only on the surface. It is not real help that the individuals who turn to substances perceive to be of help. Again, it is a maladaptive way of coping with stress and depression. This has treatment implications.

Furthermore, it is not clear, but she does quantify the burden of drug use that occurs because people are depressed. Is it 100 people (not much) or 80 % (of the people she knows or the proportion within her community, as her best guess).

This person she knows and talks about drinks AND SMOKES. Is it just tobacco?

……….END

Previous passage and comments from 4_D_01.

P: When I used drugs and it still had effects on me, it helped me to forget everything, kept me in privacy, like I was in our personal world.

I: What kind of drugs were they?

P: Yaba, horse pills.

So this participant actually admitted to taking yaba. So how did it affect him? Why did he take

yaba? He says that when he used drugs, and when it still had what I assume to be pleasurable

effects on him, yaba helped him to forget "everything." What is "everything"? Does everything

include boredom, problems with family, academics, other situations that aren't typical of an

adolescent or young adult in Thailand, etc?

He lists some other noteworthy effects of yaba, saying it "kept me in privacy" ---what does that

phrase mean? He goes on to compare "kept me in privacy" to something more understandable

which is that it was "like I was in our personal world." This description is a little better, but still

not quite as clear as I would like. I think it means or it is referring to the fact that MA does cause

hallucinations and that was perhaps what he experienced. They aren't feelings of depression.

I: I see. When you used drugs, you forgot about things.
P: I didn't think about anything. It was our own world.
I: Um…
P: I didn't think about anything.

The participant says that using yaba had an effect on him whereby he wouldn't think about

anything (like problems or boredom). He would hallucinate. He repeats the phrase, I guess to

emphasize..."I didn't think about anything." (It would be interesting to hear how he said the

phrase the first time and how he repeated it each time --because i would want to know if he

repeated it because he regretted his past actions. I don't want to assume this because I don't

know).

……….END

I: Um
P: It was the same when drugs had no effect but I felt a little bit release.
I: Um
P: Yes.

This is another product of yaba use that he felt. He felt release. When I hear the word "release" I
usually assume he means that drug use released stress.

……….END

8/26/2013 6:19 PM

Previous passage and commentary from 4_D_04.

P: I was told that a friend of my broken hearted friend urged him to try some drugs by telling him that the drugs would make him happy. He seduced him to use drugs and told him that it would make he feel better and forget about the stress, by that time my friend was not ready to think about anything so he tried everything that he was offered.

I: He tried everything.

P: Yes.

Here is another example that is also rich in detail about the dangers inherent in making rash

decisions about initiating substance use in response to strongly negative emotional situations.

Because he was not in a right mind to begin a rational thought process that would enable him to

make logical decisions that would keep his health and well-being safe, he willingly let his friend

take control. His friend offered drugs that "seduced" him ...another way of saying that the

depressed person was powerless to stop being harmed. The depressed person willingly gave in

and gave his own power to his friend and let his friend entice him to try drugs.

………END

P: Yes.

I: Why do depressed people go to use drugs and drink alcohol? What drugs and alcohol helps them?

P: I don't know much about it but from what I have heard from my friend, he told me that once his friend used drugs, he <u>suddenly</u> forgot about the woman who hurt him.

I: So it helped him to forget.

P: It makes <u>momentarily</u> forget. It is like he doesn't know anybody.

I: I see.

P: I was confused from what he said.

I: Yes.

P: and also confused what I said

Momentarily = temporary

suddenly = happens immediately

Think of these DIMENSIONS

Coping, Religion, Work, and Volunteering

8/28/2013 1:40 PM

Commentary and passage from 6_D_01.

Religion

P: To pray and make merit, something like that.

I: Do you think they are helpful?

P: I don't know. I was so young at that time. But after follow the advice, my life was getting better. I was accepted at school. Teachers loved me and my friends accepted me.

What does make merit mean in Buddhism and its teachings? Does it mean do good deeds to create good karma? The consequences after following the monk's advice were positive relations with peers and teachers. He felt loved and accepted. His friends and peers began to accept him (his faults along with his positive qualities) because he was more helpful to them through making merit. One example was that when his mother was late picking him up. He stayed after school to help the teachers.

_____

WORKING TO AUGMENT COPING

P: It helps decreased the feeling, making me feel proud when compared with others who had no depression and still couldn't reach where I was.

He talks of how joining school activities (i.e. being a representative in a competition with other schools) decreased the magnitude of his symptoms. The result was twofold. His symptoms decreased and he felt a sense of pride (or did this sense of pride mediate, through this activity, his consequences and made depressive symptoms less severe. The sense of pride was from achieving this accomplishment even though others who weren't depressed haven't. He still felt at the beginning to be an outsider because of his symptoms. Then, he achieved this accomplishment. He felt that he had essentially climbed a higher mountain compared to a non-depressed person.

……….END

He still works for the community. He takes pride in this. He says it is good for the community. He feels good when people depend on him. He feels like he is worthy. He says working for the community has opened up his social ties and social network. He feels more confident to talk. He admits that it helped his "emotional condition" become better. So working and helping others is useful for both the community AND for him in terms of helping him relieve or reduce (or both) his depressive symptoms.

………END

8/28/2013 3:35 PM
Previous passage and commentary from 6_D_03.

P: On Sunday, they go to ride a bike at the municipality, when something come up youths
        are asked to help. Tomorrow there will be a soccer match, youth will go to help and the
        money from the activities will go to the temple.

I: I see, um..
P: Helping the community is better than drinking alcohol that makes people look down on
        us.
I: How did you feel when you helped the community?
P: It was good. Most of youth came to help. Some of them didn't come because they were
        busy and we knew that they were busy. We have to understand that some people might be
        busy.
I: So you mean that if we join other people to do the community activities, it will make us..
P: feel glad and happy. It is better than being stressed.
I: Does it help to reduce stress?
P: It helps a lot.
I: I see, that's all for the questions, thank you very much for the information, they are great.

This makes sense because helping others through community involvement provides a multitude

of benefits for the community AND you with only some of your time. It gives you a sense that

you are a part of a big world and there are others that are in need...some have a bigger cross to

carry than you. Sometimes giving to others in need also gives you a sense of joy, achievement,

and fulfillment. You are benefiting others (giving money to the temple) rather than harming

yourself in the case of drinking and using drugs. Doing good for others and taking care of others

makes us feel good about ourselves...like we are good people. Children make their parents happy

to see that their children are doing something good and productive rather than self-destructive, in

turn making the children happy that their parents are satisfied and proud of them. Last, children

who participate in the community feel like a part of the community and feel connected to that

something that is larger than them and they feel like they belong somewhere. In turn, the

community feels pride for the youth who serve them for the greater good. They like these

children and admire them, and it makes the children feel good about themselves to be respected,

liked and admired by the community.

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Curriculum Vitae

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Education

August 2008 – December, 2013	**Doctor of Public Health (DrPH), Epidemiology**, Department of Epidemiology **Johns Hopkins University Bloomberg School of Public Health**, Baltimore, Maryland **Dissertation**: Depression, Methamphetamine Use, and Alcohol Consumption among Thai Youth in Chiang Mai Province: The Exploration of Perceptions of Depression and Associations between Substance Use and Depressive Symptoms (Dr. David Celentano)

- Crafted a mixed methods study to accomplish research objectives and answer research questions related to describing the burden and correlates of depressive symptoms and to exploring perceptions of depression and the social and psychological processes shaping depression in this population
- Quantified burden of depressive symptoms and described correlates of high levels of depressive symptoms
- Developed an in-depth interview guide to explore how adolescents and young adults in Thailand perceived depression and to explore factors shaping depression with a focus on substance use

December 2002	**Master of Science in Public Health (MSPH), Parasitology** Tulane University School of Public Health and Tropical Medicine, New Orleans, Louisiana

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Education (continued)

August 2000   **Bachelor of Science, Medical Technology**

                                    Louisiana State University
                                    Health Sciences Center, New Orleans, Louisiana

February – August 2000   Clinical Practicum: Veterans Affairs Medical Center
                                    New Orleans, Louisiana

Professional and Public Health Experience

October 2011 – May 2012   **Public Health Applications for Student Experience
                                    (PHASE) Intern**
                                    Maryland Department of Hygiene and Mental Health
                                    (Dr. Katherine Feldman)
                                    Project: Geographic and Seasonal Characterization of
                                    Ticks in Maryland

                                    - Designed a surveillance database for ticks submitted
                                      by Maryland residents
                                    - Strengthened tick-borne disease surveillance efforts
                                      in Maryland
                                    - Conducted a literature search to understand tick
                                      ecology and epidemiology in Maryland
                                    - Mapped reported tick bites according to Maryland
                                      jurisdictions using ArcGIS
                                    - Presented results and public health implications to
                                      public health professionals and Johns Hopkins
                                      faculty

September 2010 – June 2011   **Research Data Analyst**

                                    Johns Hopkins University
                                    Bloomberg School of Public Health, Baltimore,
                                    Health Behavior and Society, Lighthouse Studies at Pier
                                    Point (Dr. Amy Knowlton)

                                    - Organized and managed database for ongoing
                                      research project
                                    - Constructed variables for Beacon Study, a
                                      prospective study which aims to examine how active
                                      drug use and social factors influence HAART
                                      medication adherence and virological outcomes

Professional and Public Health Experience (continued)

May 2011 – May 2012   **Qualitative Research Data Transcriber**
Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland
- Transcribed in-depth interviews of HIV positive adolescents

January 2006 – August 2008   **Clinical Laboratory Technologist**

Georgia Department of Human Resources, Georgia Public Health Laboratory, Parasitology Department, Decatur, Georgia

- Processed specimens including feces, urine, water, tissue, and blood in order to examine specimens for parasitic infections.
- Identified all eggs, larva, cysts, oocysts, and trophozoites of pathogenic and nonpathogenic parasites.
- Performed molecular diagnostic techniques including DNA extraction and Polymerase Chain Reaction (PCR) in order to detect and speciate malaria parasites.
- Assisted in the evaluation of Eco-fix and Protofix, alternative specimen collection containers for preserving parasites.
- Identified ectoparasites.

January 2006 – August 2008   **Clinical Laboratory Technologist**

- Maintained competency by completing monthly case studies submitted by the Division of Parasitic Diseases, Centers for Disease Control and Prevention.
- Performed quality control procedures and documented results of control specimens on quality control worksheets.

Professional and Public Health Experience (continued)

January 2004 – November 2005   **ASPH/CDC Research Fellow**

Centers for Disease Control and Prevention/Office of Chief Science Officer Immunization Safety Office, Atlanta, Georgia.
Vaccine Safety Monitoring and Research/Clinical Immunization Safety.
(Drs. Johns Iskander and Sean Shadomy)

- Conducted vaccine safety research and risk assessment on hepatitis B vaccines and hypersensitivity reactions.
- Provided support to a yellow fever vaccine safety working group by review and data entry of laboratory data and by obtaining supplemental/clinical information by conducting phone interviews.
- Coordinated CDC/FDA VAERS (Vaccine Adverse Event Reporting System) research agenda conference calls.
- Provided support to the VAERS group by entering data into an enhanced surveillance database for adverse events the occurred after administration of the newly licensed meningococcal polysaccharide diphtheria toxoid conjugate vaccine (Menactra).
- Assisted in conducting vaccine safety research and risk assessment of tetanus vaccines and pregnancy outcomes.

June 2001 – December 2003   **Medical Technologist**
Evening/Night Generalist
Veterans Affairs Medical Center, New Orleans, Louisiana.

- Conducted laboratory testing and body fluid analysis in the areas of hematology, clinical chemistry, and immunohematology.
- Performed supervisory duties in the absence of the evening/night supervisor.
- Performed daily quality control procedures on laboratory instrumentation and documented results of quality control.
- Conducted microbiology laboratory specimen processing and set-up procedures.

Professional and Public Health Experience (continued)

August 2000 – July 2001
Medical Technologist
Generalist
West Jefferson Medical Center
Marrero, Louisiana

- Performed laboratory testing and body fluid analysis in hematology and clinical chemistry laboratories.
- Performed daily and monthly quality control and maintenance procedures on laboratory instrumentation.

Publications and Presentations

Jones E, Bialosuknia S, **DiMiceli L**, Williams G, and Feldman K. Geographic and Seasonal Characterization of Tick Populations in Maryland using Tick Identification Data Collected by the Maryland Department of Agriculture (MDA). Council of State and Territorial Epidemiologists Annual Conference. June, 2013.

dos Santos H, Bandyopadhyay, Bandea R, Peralta JM, Ndubuisi M, Daniell C, **DiMiceli L**, Park M, and da Silva AJ. Development of 18S-Based Identification of Entamoeba Spp. in Stool Samples. American Society of Tropical Medicine and Hygiene 57th Annual Meeting. New Orleans, Louisiana. December 2008. (Poster)

DiMiceli L, Pool V, Kelso JM, Shadomy SV, and Iskander J. Anaphylaxis Following Recombinant Hepatitis B Vaccines in Yeast-Sensitive Individuals: Reports to VAERS.   8th Annual Conference on Vaccine Research. Baltimore, Maryland. May, 2005.

DiMiceli L, Pool V, Kelso JM, Shadomy SV, and Iskander J. Vaccination of Yeast Sensitive Individuals: Review of Safety Data in the U.S. Vaccine Adverse Event Reporting System. *Vaccine.* February 2006; 24 (6): 703-7.

Teaching Experience

September 2009 – October 2009
Teaching Assistant, Principles of Epidemiology (Dr. William Moss)
Johns Hopkins University Bloomberg School of Public Health,

Baltimore, Maryland.

- Led discussions of laboratory exercises for graduate students
- Held office hours, graded exams, graded homework assignments

Teaching Experience (continued)

August 2011 – December 2011   Tutor, Principles of Epidemiology

October 2010 – December 2010   Teaching Assistant, Epidemiology of Infectious Diseases
(Dr. Kenrad Nelson)

- Graded exams and held office hours by request
- Organized guest lecturer and student presentations
- Led a discussion pertaining to critique of an article describing viral infections of the CNS

January 2012 – May 2012   Teaching Assistant, Fundamentals of Epidemiology
(Dr. Darcy Phelan)
- Led discussions of laboratory exercises for undergraduate students
- Held office hours

March 2012 – May 2012   Teaching Assistant, Professional Epidemiology II
(Dr. Carlos Castillo-Salgado)

- Led discussions of laboratory exercises for graduate students
- Held office hours

March 2012 – May 2012   Teaching Assistant, Emerging Infections
(Dr. Kenrad Nelson)
- Organized and coordinated class sessions
- Evaluated student papers and presentations

Honors and Awards

Department of Epidemiology Admissions Scholarship and Partial Tuition Doctoral Scholarship

Johns Hopkins Bloomberg School of Public Health (August 2008 – May 2013)

Certificate in Health Disparities and Inequalities, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, May 2013

Certificate in Public Health Preparedness, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, April 2013

Certification in Public Health, National Board of Public Health Examiners, December 2012

Honors and Awards (continued)

Employee of the Month, Georgia Department of Human Resources, Georgia Public Health Laboratory, June, 2008.

President's List, Department of Medical Technology, Louisiana State University Health Sciences Center, May 1999 – August 2000.

Sigma Tau Delta International English Honor Society, Nicholls State University, April 1999.

Computer and Statistical Package Skills

- Stata
- ArcGIS
- Microsoft Office Suite – Word, Excel, PowerPoint, Access

Professional Memberships

American Society of Clinical Pathology (May 1999 – present)
American Public Health Association   (April 2010 – present)
Society for Epidemiologic Research   (April 2010 – present)
International AIDS Society   (March 2011 – present)

Activities

Volunteer, American Public Health Association (April, June 2011)
Student Assembly, Abstract Reviewer

Service Co-chair, Epidemiology Student Organization (August 2009 – May 2010)
Dream Academy
Johns Hopkins University, Bloomberg School of Public Health

Health Education Workshop Volunteer
Episcopal Refugee and Immigrant Center Alliance (ERICA)
Epidemiology Student Organization
Johns Hopkins University, Bloomberg School of Public Health

Student Mentor
Johns Hopkins University, School of Public Health (August 2011 – May 2012)
Epidemiology Student Organization

Dream Academy Mentor (January 2009 – May 2010)
Collington Square Elementary School

Baltimore City Health Department Needle Exchange Program (September 2012 – December 2012)
Outreach volunteer