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## Knowledge, Attitudes and Behaviors of Traditional Health Practices Among Cambodian Women (15-35 Years) Living In Massachusetts

Nan Dou  
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2018

# Knowledge, Attitudes and Behaviors of Traditional Health Practices Among Cambodian Women (15-35 Years) Living In Massachusetts

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**KNOWLEDGE, ATTITUDES AND BEHAVIORS OF TRADITIONAL HEALTH  
PRACTICES AMONG CAMBODIAN WOMEN (15-35 YEARS) LIVING IN  
MASSACHUSETTS**

Masters' Thesis Presented

by

NAN DOU

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
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**KNOWLEDGE, ATTITUDES AND BEHAVIORS OF TRADITIONAL HEALTH  
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## ABSTRACT

### KNOWLEDGE, ATTITUDES AND BEHAVIORS OF TRADITIONAL HEALTH PRACTICES AMONG CAMBODIAN WOMEN (15-35 YEARS) LIVING IN MASSACHUSETTS

MAY 2018

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Cambodian immigrants have become a large population group in the United States since late 1970s. Traditional health practices and alcohol consumption during pregnancy and lactation have both been associated with risks of maternal and child health in previous research. However, these associations have never been investigated in the Cambodian immigrant population. The mechanism for the potential interaction is that the traditional health practice, the use of *sraa t'nam*, which is an alcohol concoction usually consumed during postpartum period, may increase risks for both mothers and children. *Sraa t'nam* is the traditional alcohol and drinking alcohol during pregnancy and while lactation is not recommended. This study examined the knowledge, attitudes and behaviors of traditional health practices among Cambodian women aged between 15-35 years old living in Massachusetts. Health insurance, acculturation and food security scores were not independently associated with the dependent variable. The odds of 'ever used *sraa t'nam*' were higher (OR 1.67, CI 1.10, 2.51,  $p < 0.05$ ) with every one unit or one person increase in household size, after adjusting for covariates. Similarly, women with at least one child had a 4.54 odds (CI 1.24, 16.5) of reporting that they 'ever used *sraa*

*t'nam*' compared to women with no children ( $p<0.05$ ). U.S.-born women (OR 0.12, CI 0.02, 0.83,  $p<0.05$ ) and those with more than a high school education (OR 0.13, CI 0.02, 0.71,  $p<0.05$ ) had lower odds of having 'ever used *sraa t'nam*'. Age was independently associated with having 'ever used *sraa t'nam*' (OR 1.32, CI 1.01, 1.74,  $p<0.05$ ); for every year older, the odds of ever using *sraa t'nam* increased by 0.32 units. In summary, women who lived in larger households, had at least one child, were foreign-born, had less education, or were older in age had higher odds of reporting that they had 'ever used *sraa t'nam*'. Univariate analyses tested for associations between intention to breastfeed, age, smoking status, and intention to use *sraa t'nam*. Age was positively associated with the intention to breastfeed (OR=1.26,  $p<0.05$ ), and smoking was also positively associated with the intention to breastfeed (OR=4.81,  $p<0.05$ ).

## TABLE OF CONTENTS

	Page
ABSTRACT.....	III
LIST OF TABLES.....	VII
LIST OF FIGURES.....	VIII
CHAPTER	
1. INTRODUCTION .....	1
2. LITERATURE REVIEW.....	6
2.1 Physical and Mental Health Status of Cambodians in the U.S.....	6
2.1.1 Physical Health Status.....	6
2.1.2 Mental Health Status.....	7
2.1.3 Access to Health Care.....	8
2.2 Maternal and Child Health.....	9
2.2.1 Risk Factors.....	9
2.2.2 Food Insecurity among Mothers and Children.....	10
2.2.3 Alcohol Use during Pregnancy and while Breastfeeding.....	12
2.3 Acculturation and Traditional Health Practices.....	14
2.3.1 Definition and Measurement of Acculturation.....	14
2.3.2 Acculturation Stress.....	14
2.3.3 Traditional Health Practices.....	15
2.4 The Tradition of <i>Sraa T'nam</i> Use.....	15
2.5 Intention to breastfeeding.....	17
2.6 Theoretical framework.....	17
2.7 Conceptual framework.....	45
3. PURPOSE OF STUDY.....	47
4. METHODS.....	49
4.1 Community-Based Participatory Research.....	49
4.2 Recruitment.....	49
4.3 Sample.....	50
4.4 Training and Data Collection.....	50
4.5 Data Analysis.....	52
5. RESULTS.....	54

6. DISCUSSION AND CONCLUSION.....	61
BIBLIOGRAPHY.....	66



## LIST OF TABLES

Table	Page
2.1: Studies that examine factors associated with the use of traditional health practices.....	19
2.2: Studies examining factors associated with women's intention to breastfeed.....	39
5.1: Sample characteristics of Pregnant and Non-Pregnant Cambodian Women (15-35 y) living in Massachusetts (n=162).....	55
5.2: Odds ratios for associations between ever used <i>sraa t'nam</i> and socio-demographic, psychometric, food security variables among Cambodian (15-35 y) in Massachusetts (n=162).....	58
5.3: Logistic regression associations between intention to breastfeed and intention to use <i>sraa t'nam</i> after pregnancy among pregnant Cambodian women (15-35 y) in Massachusetts (n=56).....	60

## LIST OF FIGURES

Figure	Page
1. Conceptual framework for describing the associations between knowledge, attitudes and behaviors related to <i>sraa t'nam</i> and sociodemographic factors among Cambodian women ages 15-35 years living in Massachusetts.....	46

## CHAPTER 1

### INTRODUCTION

Immigrants have become the fastest growing population in the U.S (1). In 2015, the population of foreign-born individuals living in the U.S. was over 43 million, making up 13.4% of the nation's population (2). Refugees comprised approximately 3 million of the migrant population that has resettled in the U.S. since 1980 (3). Compared to other racial groups, Asians experienced the fastest growth rate in the U.S., estimated at 72% from 2000-2015 and resulting in a population of 20.4 million (2). Based on the 2010 U.S. Census, 28.6% of all foreign-born residents were from Asia and among these, more than 270,000 were of Cambodian decent (2).

Cambodian refugees in the U.S. were resettled primarily from refugee camps in Southeast Asia to the U.S. in the late 1970's to early 1990's (4). From 1975-1979, Cambodia went through an intense civil war, genocide, and internal displacement under the Khmer Rouge regime (5). Since the early 1980s, over 150,000 Cambodians have immigrated to the U.S. as refugees (4). Approximately 10% of all Cambodians in the U.S. reside in the Commonwealth of Massachusetts (9). The City of Lowell, MA, is home to the second largest population of Cambodians in the U.S. (9), claiming an estimated 23.5% of all foreign born residents (9). Most Cambodians live in the historically impoverished sections of Lowell, the Acre and Lower Highlands (9). Upon entry to the U.S., Cambodian refugees mostly had low-level agricultural skills, poor literacy in Khmer, limited or no English language proficiency, low educational attainment, poor health status, and had experienced significant trauma (6, 7, 8), many of which are risk factors for

long-term poor health outcomes (27).

The conditions facing women living in Cambodia are directly related to the health situation of Cambodian women living in the U.S. given the high number of foreign-born Asians in the U.S., and more specifically the exposures to poor health conditions in Cambodia that may impact the health outcomes of the large number of foreign-born Cambodian women in our study. Improving maternal and child health is a global priority (10), as well as a national priority in Cambodia (10). Each year, approximately 2,900 Cambodian women and girls die from pregnancy-related complications (11), a leading cause of death in the country (12), and around 58,000 to 87,000 women and girls suffer from pregnancy-related disabilities in Cambodia (11). Maternal mortality ratio is defined as the number of maternal deaths per 100,000 births during a specified time. In 2006, the maternal mortality ratio was 540 deaths per 100,000 births, compared to 11 deaths per 100,000 births in the United States in the same year (11). Although the efforts have been made to increase the availability of medical services, a majority of women in Cambodia still do not have access to high-quality and long-term reproductive health care (11). Barriers preventing Cambodian women from accessing health care include high medical costs, lack of transportation, limited availability of skilled health professionals and resources, discrimination, language barriers, and traditional beliefs (11). From the Cambodian Demographic and Health Survey, risk factors that negatively impact maternal and child health include young age at first birth, short birth intervals, high fertility rates, high levels of malnutrition, high rates of anemia, and high levels of malaria (13).

Prenatal care and post-partum care are critical periods to optimizing maternal and child health (10, 14, 15). Prenatal care, including iron-folate supplementations,

assessment of weight gain, and maternal and fetal care through monthly check-ups has been shown to improve maternal health (16), birth outcomes (17), and infant health (16, 17). Post-partum practices, such as breastfeeding, are protective of infant health and have long-term implications for child health (18). Breastfeeding is recommended as the optimal infant option by the World Health Organization (WHO) and the American Academy of Pediatrics (AAP) (19). However, the breastfeeding initiation rates among Cambodians in the U.S. have averaged 28% over the past 10 years (41) and there is a 4% decrease in breastfeeding rates for every year of residence in the U.S. among immigrants (41).

Passed down from one generation to the next, traditional medicinal practices seek to promote optimal health and achieve balance (22). Traditional health practices are defined as the sum of knowledge; skills and practices based on different cultural beliefs, and are used in maintaining and improving physical, mental and physical health (22). Within Cambodian culture several traditional health practices are encouraged for the protection of maternal and child health (20, 21). *Sraa t'nam* (translation: wine medicine) is a traditional medicinal botanical and alcohol-based elixir that is prepared during pregnancy and consumed after childbirth within the Cambodian community (20). Consumption of *sraa t'nam* is believed to promote milk production, warm the mother's body, and help "clean" the reproductive system (20, 23). However, depending on frequency of consumption and alcohol concentration, consuming *sraa t'nam*, an alcohol-based elixir, during the antenatal and postnatal period has the potential to adversely affect maternal and infant health due to the concentration of alcohol in the elixir (42).

*Sraa t'nam* as the traditional alcohol concoction is usually consumed during

postpartum period (20). Consumption of alcohol during pregnancy is public health concern given that it is the leading cause of fetal alcohol syndrome disorders (FASD) and other adverse health outcomes (24, 25, 26), including spontaneous abortions (27), decreased birth weight (28), and increased risk of growth retardation in newborns (29). Alcohol intake was significantly related to infant IQ decrement and child hyperactivity or inattention at 81 months of age (30). Furthermore, 30% of newborns of heavy drinkers demonstrated microcephaly and multiple congenital anomalies compared to 9% among abstinent or moderate drinkers (31). Compared to the well-documented harmful effects of excessive alcohol consumption during pregnancy (32), the consequences of alcohol intake among breastfeeding mothers have been far less examined (33, 34). Some evidence points to concerns related to psychomotor delays in infants (35) and suppression of breastmilk production and inhibition of the milk ejection reflex (36, 37). Given increasing global rates of alcohol consumption and associated negative health impacts, the World Health Assembly endorsed an international strategy to address harmful alcohol use (38). This global strategy emphasizes the need for policies and interventions to reduce harmful alcohol use among women of childbearing age, as well as those who are pregnant and/or lactating (39).

Traditional health practices such as *sraa t'nam* use are not typically considered in health screenings by obstetric/gynecology practitioners and other medical providers in the U.S (40). Greater reliance on this and other traditional health practices may result from low acculturation rates and poor access to, utilization of, and/or negative experiences in the U.S. health system (30, 40). There is a fundamental gap in understanding the potential health risks and benefits of consuming *sraa t'nam* during

pregnancy and while breastfeeding among Cambodian women in the U.S. To our knowledge, *sraa t'nam* as a maternal health practice and its associations with socio-demographic factors, acculturation, and poverty indicators has not been previously examined in the literature. The purpose of this study was to explore the associations between socio-demographic factors and knowledge, attitudes and maternal health practices related to *sraa t'nam*, a traditional alcohol-based elixir, among Cambodian women in the U.S.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Physical and Mental Health Status of Cambodians in the U.S

##### 2.1.1 Physical Health Status

Refugees flee homeland environments due to political, economic, religious or environmental circumstances. Most refugees experience internal displacement and leave with limited supplies. Their health status is compromised by exposure to infectious diseases, unsanitary environments, malnutrition, and poor conditions for shelter (41, 42). Refugees often arrive in their host countries with higher rates of infectious and parasitic diseases such as tuberculosis (43, 44), malaria (45), hepatitis (46), and other diseases (47). Over time, refugees also experience higher rates of chronic diseases including cancer (48), diabetes (49, 50), and cardiovascular diseases (50, 51).

Chronic diseases are major health concerns in the U.S. Cambodian community (52). A study conducted in 2008 with 459 Cambodian, Vietnamese, Somali and Bosnian refugees revealed higher prevalence rates of hypertension (42% vs. 25.8%) and diabetes (15.5% vs. 8%) in these refugee populations compared to the general U.S. population 18 years of age or older (53, 54, 55). In Long Beach, California, home of the largest Cambodian community in the U.S., a significantly higher prevalence of diabetes, hypertension and hyperlipidemia was observed among Cambodians compared to the U.S. population (56). Marshall et al. (2016) reported that Cambodians diagnosed with hypertension or hyperlipidemia were less likely to have their blood pressure and total



cholesterol under control compared to other ethnic groups in the U.S (56). These findings were consistent with a study by Koch-Weser et al. (2006) on self-reported health among Cambodians living in Lowell, Massachusetts, which comprises the 2<sup>nd</sup> largest Cambodian population in the U.S (57).

### **2.1.2 Mental Health Status**

Cambodian refugees experienced significant and prolonged trauma due to adverse experiences during their civil war, including torture, witnessing genocide, separation from family, and significant loss of family members in Cambodia from 1970 to 1991 (58). Chan et al. (2004) reported that Cambodian refugees displayed the highest rates of post-traumatic stress disorder (PTSD) and depression with symptoms persisting for a longer periods of time compared to all other Southeast Asian refugee populations (58). PTSD is an established mental disorder that develops after experiencing trauma (59). The long-term effects of trauma are an important cause of the high prevalence of depression and other mental disorders observed among refugees and immigrants, which in turn raises serious public health concerns (58, 60).

Depression is a common but serious mental health disorder leading to symptoms that affect how people feel, think and function on a daily basis (59). It can occur at any life stage and affects around 5% of the global population (59); the rate is higher (6.9%) in the U.S., with an estimated 15.7 million American adults over age 18 experiencing depression (61). Women suffer from depression at higher rates than men (59). Major depression was reported by 51% and PTSD by 63% of Cambodian refugees resettled in the U.S. prior to 1993 (60). A more recent assessment by the Lowell Community Health

Center Reach 2010 project and the Cambodian Mutual Assistance Association (CMAA), found that 43% of Cambodian women, aged 30 to 65 years, self-reported indicators of depression (62).

Immigration (particularly for refugee families, or migrants from war torn countries) is a stressful process for most affected individuals (63, 64, 65). Compared to U.S.-born individuals, first-generation immigrants are at higher risk of mental health disorders (66). Among immigrants, the combination of self-imposed pressure from settling into a new country and the lack of communication skills increases risk for depression (67). The stressors resulting from racism and/or discrimination are also significant risk factors for depression in subsequent generations within immigrant families (68). These findings are supported by the immigrant paradox, which contends that subsequent generations of children born to immigrants experience poorer health, educational, and developmental outcomes (69). Portes et al. (2008) argues that the cultural context in which an individual's socialization takes place is a determinant of successful adaption to a new environment (70).

### **2.1.3 Access to Health Care**

Turcotte and Vidrine (2013) reported that maternal health indicators, such as low birth weight and late prenatal care, are higher in the Lowell Cambodian population, compared to the state average, furthermore an upward trend in infant mortality rates were observed in the same population, from 2006-2011 (71). Health disparities exist in different racial and ethnic groups in the U.S., influenced in part by poor access to quality health care services and structural racism (72). In 2012, the US Department of Health and

Human Services reported that immigrants had limited access to health care and health service programs due to several factors including literacy, cultural barriers, climates of mistrust, transportation and other logistical challenges (73). Data from the Center of Disease Control-funded Racial and Ethnic Approaches to Community Health (REACH) survey conducted in Lowell, MA, found that less than half of the Cambodian population aged 25 years or older ever reported having their blood cholesterol checked, while nearly 20% of Cambodians surveyed reported having high blood pressure (74). Another study reported that Cambodian women in Lowell, MA, had the lowest rate of adequate prenatal care of all Massachusetts women (75), indicating the potential for risks to maternal and child health.

## **2.2 Maternal and Child Health**

### **2.2.1 Risk Factors**

Maternal and child health (MCH) is a strong indicator of the overall population health of a country or region. It is also a top public health concern, consequently the U.S. Healthy People 2020 listed maternal, infant, and child health as one of the high-priority topics to be addressed in the U.S (76). Considering the range of factors influencing health outcomes within families, efforts to improve MCH in the U.S. requires a comprehensive understanding of social and cultural determinants of health (77).

A body of literature has shown that refugee women were one of the most vulnerable groups for poor MCH outcomes, with the perinatal period placing new mothers and their infants at even greater risk. Johnson et al. (2005) reported that Somali refugees in

Washington State suffered poorer maternal and infant health status compared to both Black and White populations in the U.S. (78). A recent review confirmed a series of cultural, socioeconomic and individual factors that relate to, and create barriers for immigrant women during the postpartum period in Canada (79). A 2010 study with twelve Sudanese women in Canada found that, due to difficulty in access to and utilization of maternity care services, traditional beliefs strongly impacted women's behaviors and perceptions during the perinatal period (80). The differences in social support between home- and host country may also play a role in health outcomes. Quintanilha et al. (2016) found that northeastern African women in Canada had limited access to emotional and instrumental support from the family and the community during pregnancy and postpartum (81). Food insecurity, which affects a high percentage of refugee and immigrant women (82), is also a risk factor for poor maternal and child health outcomes (83).

Alcohol use during pregnancy and while breastfeeding can have adverse health effects on maternal and infant health. Lee et al. (2008) found that 63% of Laotian and Cambodian women, aged 15-87 years and living in the San Francisco Bay Area, reported alcohol consumption compared to 65% among males in the study, a national rate of 54.5% and a rate of 37.4% for all Asians in the U.S. (135). All these factors need to be considered in MCH programming for refugee and immigrant populations.

### **2.2.2 Food Insecurity among Mothers and Children**

Food insecurity, which affects a high percentage of refugee and immigrant women (84), is also a risk factor for poor MCH outcomes (85, 86, 87). Food insecurity is

defined as limited or uncertain access to sufficient nutritious and safe food or limited ability to access the foods (88). Based on NHANES data from 2005-2010, people who were food insecure were more likely to be younger, females, Hispanics, non-Hispanic black, unmarried, less educated and to live in households with children (84). A multi-state nutritional assessment program in the U.S. among over 2,000 low-income households with young children found that infants and toddlers from food-insecure families were more likely to be at developmental risk compared to those from food secure households (88).

Breastfeeding is a significant and important indicator of MCH outcomes (90). In a Canadian study, household food insecurity was found to be a determinant of breastfeeding initiation, however, severe food insecurity compromised maternal food intake and breastfeeding success (91). Food insecurity was also associated with poor health among children, and poorer developmental outcomes in their later lives (92, 93). Earlier studies have found statistically significant associations between low household food security and poor physical and mental health outcomes (94). Therefore, understanding health risks faced by women experiencing low household food security is critical to developing sound programs and policies to improve MCH outcomes.

Refugees and immigrants are particularly vulnerable to food insecurity given their poor socioeconomic status and limited social support than other higher income U.S.-born residents (95). Peterman et al. (2013) found that 16.7% percentage of Cambodian women aged 35-60 living in Lowell, MA, reported that their households were food insecure (96). This rate was 50% higher than the national rate and more than twice the rate of household food insecurity in Massachusetts for a comparable timeframe (97).

### **2.2.3 Alcohol Use During Pregnancy and While Breastfeeding**

Alcohol consumption during pregnancy and lactation is both a national and global public health concern (98). Alcohol use during pregnancy and while breastfeeding can have detrimental health effects on MCH, particularly among immigrants where prenatal care may be suboptimal (98). Consumption of alcohol during pregnancy is the leading cause of fetal alcohol syndrome disorders (FASD) and other adverse health outcomes (24, 25, 26). Fetal alcohol syndrome (FAS) is characterized by craniofacial malformations, neurological and motor deficits, intrauterine growth retardation, learning disabilities, and behavioral and social deficits (24). Alcohol consumption in pregnancy has been associated with spontaneous abortions (27), decreased birth weight (28), and increased risk of growth-retardation in newborns (29). Alcohol intake was significantly related to infant IQ decrement (30), child hyperactivity or inattention at 81 months of age (30), and 30% of newborns of heavy drinkers demonstrated microcephaly and multiple congenital anomalies compared to 9% of the abstinent or moderate drinkers (31).

From 1990 to 2011, 8 studies in 4 different countries (U.S., Norway, Australia, and New Zealand) reported that 36% to 83% of women that breastfed their infants had consumed alcohol (99). Compared to the well-documented harmful effects of excessive alcohol consumption during pregnancy (32), the consequences of alcohol intake among breastfeeding mothers have been far less examined (33, 34). Although the effects of alcohol use during lactation are not well established, some evidence points to concerns related to psychomotor delays in infants (35), suppression of breastmilk production and inhibition of the milk ejection reflex (36, 37).

An estimated 14.8% of pregnant (100) and 36% of breastfeeding (101) women in the U.S. reported drinking alcohol. In comparison, 23% of Cambodian women in the U.S. reported alcohol consumption during pregnancy (102), with an unknown prevalence of alcohol use among breastfeeding women in this community. Although refugee populations are found to have an increased risk for alcohol and substance use following trauma (103), Marshall et al. (2005) found no association between alcohol use disorder and trauma, depression, and PTSD among Cambodian refugees in the U.S (104). A five-year longitudinal study in Washington State among 147 Cambodian women and 155 Vietnamese women found the rate of alcohol use was low (26.8%) among this sample (105). Supporting these findings, D'Amico et al. (2007) found a very low percentage (2%) of Cambodian refugees in the U.S reported heavy drinking in the past 30 days (106). In contrast, Lee et al. (2008) found that the prevalence of alcohol consumption was 68% among Laotians and Cambodians in the San Francisco Bay Area, a rate that exceeds national rates for Asians (37.4%) and the general U.S. population (54.5%) (135). Lee et al. (2008) also found that alcohol consumption was normative and that respondents reported on the use and alcohol potency of herbal infusions typically used for medicinal purposes (135). Based on qualitative data, some underage drinkers of Southeast Asian heritage living in the San Francisco Bay area reported consuming 'herbs' or traditional alcohol-based herbal infusions if they wanted to get drunk (135). Further research is needed to investigate use of alcohol in refugee and immigrant populations, particularly among pregnant and lactating women. Furthermore, understanding the context for alcohol use is critical to prevention of alcohol use during this vulnerable period of the life course. Collins and McNair (2002) found that "women's drinking patterns are influenced by the

cultural norms and practices of the ethnic groups to which they belong, in addition to other environmental and biological factors” (136).

Given increasing global rates of alcohol consumption and associated negative health impacts, the World Health Assembly endorsed an international strategy to address harmful alcohol use (107). This global strategy emphasizes the need for policies and interventions to reduce harmful alcohol use among women of childbearing age, as well as those who are pregnant and/or lactating (107).

## **2.3 Acculturation and Traditional Health Practices**

### **2.3.1 Definition and Measurement of Acculturation**

Acculturation is defined as a multi-dimensional construct that describes the process by which immigrants adapt to a host country’s norms, values, and lifestyles, as well as maintain affiliation to their home country’s cultural practices (108). A number of indicators are used to measure acculturation, such as English language proficiency, nativity, length of time lived in the U.S., language preference, adherence to home country culture, and several acculturation scales measures for cultural behaviors and interactions (109). However, there is currently no standardized measure of acculturation.

### **2.3.2 Acculturative Stress**

The role of acculturation on immigrant physical and mental health is critical to understand. Low levels of acculturation may lead to isolation from the mainstream population, as well as increased stress and barriers to communicating with native-born residents. The “immigrant paradox” has been reported by several studies where



acculturated immigrants are more likely to interact with the larger society, and thus more likely to experience discrimination and have increased level of stress (110, 111).

Immigrants with higher acculturation scores have been found to experience poorer health than their less acculturated peers (111). However, less acculturated immigrants could also be at greater risk of physical and mental health problems due to limited economic and social support or opportunities (112, 113, 114).

### **2.3.3 Traditional Health Practices**

Acculturation influences traditional health practices (115), which are used to maintain and improve physical and mental health (116). Traditional health practices typically rely on practical experiences and observations passed from one generation to the next generation (117). The U.S. National Health Survey (2017) revealed that 38.3% of adults and 11.8% of children aged 17 years and under, reported use of herbal and other botanical traditional practices (118). A descriptive study of Cambodian women in the U.S. found that even though the participants had lived in the U.S for many years, 90% knew and practiced some traditional dietary habits including consumption of soup, *sraa t'nam*, black pepper, and ginger (119). Table 1 presents studies that examine factors associated with the use of traditional health practices.

### **2.4 The Tradition of *Sraa T'nam* Use**

*Sraa t'nam* (translation: wine medicine) is a traditional medicinal botanical and alcohol-based elixir that is often prepared during pregnancy and consumed after childbirth (120). Passed down from one generation to the next, traditional Cambodian

postpartum care practices, such as *sraa t'nam use*, seek to promote optimal health (121). In Cambodia, women are encouraged to practice postpartum care to optimize their health after childbirth (122). These practices include no expression of strong emotions or “thinking too much” (123), “roasting” on a bamboo bed (123), wearing warm clothes or being wrapped in blankets (124), restricted diet with “hot” foods served during this period (123), consumption of herbal infusions and *sraa t'nam* (123, 125), and other practices (126). It is believed that women who do not follow these postpartum practices may experience negative health consequences such as joint pain, headaches, premature aging, or infertility (125). These traditional practices are often performed over a set period of time (123). For example, women in Cambodia are encouraged to lie next to a hot fire or start “roasting” immediately after giving birth and continue doing this for at least one week (123). ‘Roasting’ is believed to keep the mother’s body warm, help her body regain balance, and to prevent blood clotting and hypertension (124). Similarly, hot foods and alcohol-based elixirs such as *sraa t'nam* are consumed to promote milk production, warm the mother’s body, and help ‘clean’ the reproductive system (123-126).

However, consuming *sraa t'nam* during the antenatal and postnatal period may also have adverse effects on maternal and infant health due to the alcohol content of the elixir. While *sraa t'nam* in Cambodia utilizes home-brewed rice wine as an extraction agent (135), vodka is typically used in *sraa t'nam* preparations in the U.S. (40, 135). Local service providers in the U.S. indicated that traditional preparation of herbal tonics in the Southeast Asian community typically involved home-brewed rice wine which is a ‘white’ alcohol (135). Since traditional rice wine is not readily available in the U.S., Southeast Asian refugees substituted vodka, gin or other ‘white’ liquors in their herbal infusions

(135). Traditional health practices, such as *sraa t'nam* use, are not typically considered in health screenings by medical providers in the U.S (127, 128). And greater reliance on *sraa t'nam* and other traditional health practices may result from poor access, utilization, and/or negative experiences in the U.S. healthcare system (127, 128).

## 2.5 Intention to Breastfeeding

Breastfeeding is recommended to optimize maternal and child health by both WHO and the American Association of Pediatrics (137). The results from a cross-sectional analysis of the Cambodian Demographic Health Surveys from 2000, 2005 and 2010 revealed that the rates of exclusive breastfeeding and early initiation of breastfeeding has increased since 2000. Evidence indicates that intention to breastfeed is positively associated extended breastfeeding (129). Predictors of intention to breastfeed include previous breastfeeding experience, self-efficacy, breastfeeding knowledge and perceived social support (Table 2). Additional significant predictors of breastfeeding practice are maternal education level (129), number of household members (130), parity (131), maternal age (132), smoking (133), and maternal current work (134).

## 2.6 Theoretical Frameworks

### *Knowledge, Attitudes, and Behavior Model (KABM)*

The knowledge-attitude-behavior model (KABM), also known as knowledge-attitudes-skills behavior model, is a well-established theoretical model used in public health (138). The model proposes that knowledge accumulation and a change in attitudes can lead to behavior change (138). The model can be used to enhance the

knowledge and attitudes in order to facilitate behavior change (138).

### *Social Ecological Model(SEM)*

The social ecological model is a multi-level approach to assessing the influence of independent variables on an outcome of interest (139). The model includes five components and they are individual, interpersonal, organization, community, and policy. The model is used to examine the person-environmental interactions and is well-established in public health and nutrition research (139).

**Table 2.1.** Studies that examine factors associated with the use of traditional health practices.

Author/Year/Title	Predictors/Determinants	Findings
Rashrash M et al. (2017) Prevalence and Predictors of Herbal Medicine Use among Adults in the United States	<ul style="list-style-type: none"> <li>• Educational attainment</li> <li>• Medicine use</li> <li>• Chronic diseases</li> <li>• Age</li> </ul>	<p>“Factors associated with herbal supplement use include age older than 70, having a higher than a high school education, using prescription medications or over-the-counter (OTC) medications, and using a mail-order pharmacy. All disease states were associated significantly with herbal use. The most frequent conditions</p>

		<p>associated with herbal supplement use were a stroke (48.7%), cancer (43.1%), and arthritis (43.0%).</p> <p>Among herbal product users, factors that predicted use included having higher than school education, using OTC medications, using mail-order pharmacy, stroke, obesity, arthritis, and breathing problems.”</p>
<p>Duru CB et al. (2017)</p> <p>Health Care Seeking Behavior and Predictors of Cambined Orthodox and Traditional</p>	<ul style="list-style-type: none"> <li>• Educational attainment</li> <li>• Household income</li> <li>• Knowledge of health care</li> <li>• Attitudes towards seeking health care</li> </ul>	<p>“Results revealed that, while just more than half of the respondents</p>

<p>Health Care Utilization among Households in Communities in Owerri, Imo State, Nigeria</p>	<ul style="list-style-type: none"> <li>• Female</li> <li>• Traders</li> <li>• Polygamous families</li> </ul>	<p>(56.4%) had a moderate to good level of overall knowledge of health care, almost all of the respondents (96.2%) also had a moderate to good level of overall positive attitude towards seeking health care; with less than one third (29.4%) using combined orthodox and traditional health care treatments. Respondents who were female, traders and from households of</p>
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		<p>polygamous families were significantly more likely to use combined orthodox and traditional health care treatments (<math>p&lt;0.05</math>) while those with a tertiary level of education, from households with a professional as head, having private water closet toilets and earning a monthly income of more than 50,000 Naira (\$140) were significantly less likely to use combined orthodox and traditional</p>
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		health care treatments.”
Banda Y et al. (2007) Use of Traditional Medicine among Pregnant Women in Lusaka, Zambia	<ul style="list-style-type: none"> <li>• Alcohol drinking</li> <li>• Sex partners</li> <li>• Oral contraceptive use</li> </ul>	No demographic differences noted between users and non-users. “Women who reported use of traditional medicine were more likely to drink alcohol during pregnancy, have $\geq 2$ sex partners, engage in “dry sex,” initiate sex with their partner, report a previously treated sexually transmitted disease, and use contraception.”
NCCIH/NIH (2007) The Use of Complementary and Alternative Medicine in the	<ul style="list-style-type: none"> <li>• Female</li> <li>• Higher education levels</li> <li>• Higher incomes</li> </ul>	In the United States, approximately 38 percent of adults

U.S.		(about 4 in 10) and approximately 12 percent of children (about 1 in 9) are using some form of Complementary or Alternative Medicine.
Health Care-Seeking among Latino Immigrants: Blocked Access, Use of Traditional Medicine, and the Role of Religion	<ul style="list-style-type: none"> <li>• Barriers to health care</li> <li>• Concerns about immigration status.</li> </ul>	<p>Access barriers, speaking of long waits, rudeness, being hurried through the system without medical explanations, and expense problems.</p> <p>“By far, the most frequently expressed complaint (65%) concerned long waits; some complained that</p>

		<p>they had to wait between six and 12 hours for service. Rudeness once served and being hurried through without information was mentioned by 35%, language and communication problems by 41%, and expense problems by 51%. “Cultural alternatives as preferred treatment and coping strategies: In response to barriers to health access, we found that Latino immigrants work out alternative</p>
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		<p>strategies. Some begin with home remedies and other traditional medications, a course of action that is familiar and involves little risk. Others first seek mainstream care with doctors and clinics, but if unsuccessful in “cracking the system” turn to the alternative package of health care behaviors. We found that the alternatives mentioned most were herbal and home remedies</p>
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		purchased in <i>botánicas</i> and markets, use of folk healers, the use of doctors and/or medicines from Mexico, and the use of spiritual elements such as personal prayer.”
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<p>The Use of Traditional and Western Medicine Among Korean American Elderly</p>	<ul style="list-style-type: none"> <li>• Public health insurance</li> <li>• Lower rate of having a regular doctor</li> <li>• Lower rates of health care service</li> </ul>	<p>“The traditional medicine only group was more dependent on public health insurance than were the others, and none of those using only traditional medicine had private health insurance.</p> <p>Regarding the source of care, those using only traditional medicine had a lower rate (75%) of having a regular doctor than did the other two user groups (94% each). Therefore, the rate of having a regular medical</p>
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		<p>checkup in the traditional only and non-user groups was far below those reported in the other two user groups (13% and 12%, respectively, as compared to 61% and 66% of those using only Western medicine or both types of medicine). Those in the traditional medicine only (37.5%) and the non-user groups (18.2%) received a significantly lower rate of health care service, as compared to those using only Western</p>
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		medicine (72.7%) or both types of medicine (77.8%).”
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<p>The use of Traditional Medicine by Ghanaians in Canada</p>	<ul style="list-style-type: none"> <li>• Acculturation</li> <li>• Religion</li> </ul>	<p>“Research into health and health-care seeking behaviour amongst immigrant populations suggests that culturally-based behaviours change over time towards those prevalent in the host culture. Such acculturation of immigrant groups occurs as part of the interaction of immigrants with mainstream culture. 73% of the Ghanaian immigrants in Canada have a</p>
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		<p>positive attitude toward Ghanaian TRM. There is the need for health care providers and other stakeholders to be aware of the influence of religion on African immigrants during their acculturation process.</p>
<p>Buchwald D, Beals J, and Manson S. (2000) Use of Traditional Health Practices Among Native Americans in a Primary Care Setting</p>	<ul style="list-style-type: none"> <li>• Male</li> <li>• Education</li> <li>• Visiting friends/relatives on a reservation</li> <li>• Living the Native way of life and not the White way (acculturation)</li> <li>• Experiencing back pain</li> <li>• Having a physical injury inflicted by a family member</li> </ul>	<p>“Seventy percent of urban AI/AN patients in primary care often used traditional health practices; use was strongly associated with cultural affiliation. In bivariate analyses, use was</p>

		significantly associated with male gender, cultural affiliation, poor functional status, alcohol abuse, and trauma and, except for musculoskeletal pain, not with specific medical problems. The multiple logistic regression model for any use versus no use was significant ( $P \leq 0.001$ ). Being of male gender ( $P \leq 0.001$ ), having more than a high school education ( $P \leq 0.05$ ), visiting
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		<p>friends/relatives on a reservation (<math>P \leq 0.01</math>), living the Native way of life (<math>P \leq 0.001</math>) and not the white way (<math>P \leq 0.05</math>), experiencing back pain (<math>P \leq 0.01</math>), and having a physical injury inflicted by a family member (<math>P \leq 0.001</math>) were predictive of use.”</p>
<p>Traditional beliefs and practices among Mexican American immigrants with type II diabetes: A case study</p>	<ul style="list-style-type: none"> <li>• Cultural beliefs</li> </ul>	<p>“The Hispanic folk illness belief <i>susto</i> refers to an episode of severe fright, and Mexican American immigrants hold varying views on its relation to diabetes.</p>

		<p>Culturally and in the research, <i>susto</i> has also been linked with depression. <i>Sabila</i> (aloe vera) and <i>nopal</i> (prickly pear cactus) are herbal remedies that have had widespread, longstanding use in Mexican culture and while this is not the gold standard of research, it does provide ample evidence and a strong cultural belief that these therapies work. There is some</p>
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		evidence in the literature to support their efficacy as glucose-lowering agents, but lack of Food and Drug Administration (FDA) regulation, potential side effects, and a dearth of rigorous clinical trials preclude <i>aloe vera</i> and <i>nopal</i> from being recommended therapy.”
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<p>Between Two Worlds: The Use of Traditional and Western Health Services by Chinese Immigrants</p>	<ul style="list-style-type: none"> <li>• Self-medication</li> <li>• Low or medium rates of utilization of western and traditional health services</li> <li>• Travel to country of origin for care</li> </ul>	<p>“Results revealed several patterns of health-seeking and service utilization behaviors among the Chinese of Houston and Los Angeles. These included high rates of self-treatment and home remedies (balanced diets and other alternative medicines); medium rates of utilization of integrated Western and traditional health services, including travel to country of origin for care; and low rates of exclusive</p>
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		utilization of Western or traditional Chinese treatments.”
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**Table 2.2.** Studies examining factors associated with women’s intention to breastfeed.

<b>Author/Year/Title</b>	<b>Predictors/Determinants</b>	<b>Findings</b>
Amal K. et al. (2004) Predictors of Breastfeeding Intention Among Low-Income Women	<ul style="list-style-type: none"> <li>• Race/ethnicity</li> <li>• Educational attainment</li> <li>• Income level</li> <li>• Family size</li> <li>• Parity</li> <li>• Previous breastfeeding experiences</li> <li>• Breastfeeding knowledge</li> <li>• Self-efficacy</li> <li>• Perceived social support</li> </ul>	<p>Bivariate analyses showed that “women who intended to breastfeed were more often White and had at least some college education, higher income, a smaller family size, fewer children, and previous breastfeeding experience than women who did not intend to</p>

		<p>breastfeed.</p> <p>Intenders had higher levels of breastfeeding knowledge and self-efficacy and reported fewer barriers to breastfeeding than non-intenders.</p> <p>In multivariate logistic regression, fewer children, past breastfeeding experience, breastfeeding knowledge, self-efficacy, and perceived social support</p>
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		were independent predictors of breastfeeding intention.”
McInnes RJ (2001) Independent Predictors of Breastfeeding Intention in a Disadvantaged Population of Pregnant Women	<ul style="list-style-type: none"> <li>• Previous breastfeeding experience</li> <li>• Living with a partner</li> <li>• Smoking</li> <li>• Parity</li> <li>• Maternal age</li> </ul>	“All the factors were independently predictive of breastfeeding intention. These variables could be useful in identifying women at greatest risk of choosing not to breastfeed.”
Sasaki et al. (2009) Predictors of Exclusive Breast-Feeding in Early Infancy: A Survey Report from Phnom Penh, Cambodia	<ul style="list-style-type: none"> <li>• Lack of a maternal antenatal EBF plan</li> <li>• Working mothers</li> <li>• Lack of paternal attendance at breast-feeding classes</li> </ul>	Logistic regression analysis indicated “that the lack of a

		maternal antenatal EBF plan, working mothers, and lack of paternal attendance at breast-feeding classes have independently positive associations with cessation of EBF during the first 6 months of infant life.”
Straub B (2008) A Descriptive Study of Cambodian Refugee Infant Feeding Practices in the United States	<ul style="list-style-type: none"> <li>• Practice traditional Cambodian diet, or traditional Cambodian rituals, or both</li> <li>• Lived in the U.S. for many years</li> <li>• Milk supply</li> <li>• Return to work</li> </ul>	“All participants practiced either traditional Cambodian diet (pregnancy and postpartum diet including, <i>tnam sraa</i> , herbs

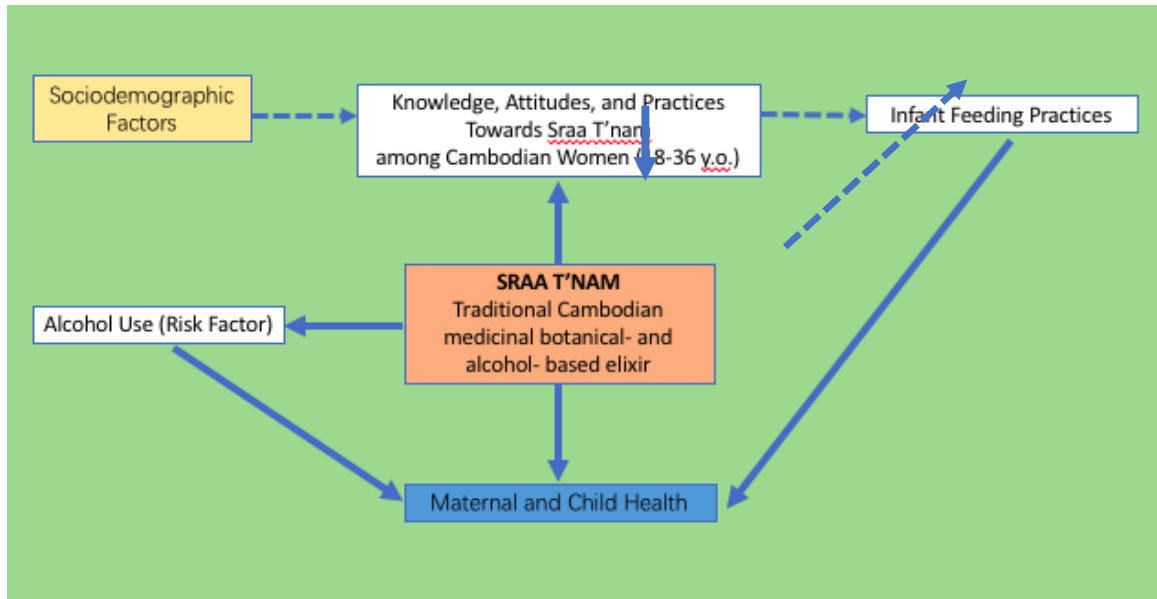
		<p>mixed with either wine or tea), traditional Cambodian rituals (like <i>spung</i>, a modified sauna) or both, despite having lived in the U.S. for many years. Perceived low milk supply and returning to work were the main reasons cited for partial breastfeeding and early cessation of breastfeeding.”</p>
<p>Senarath U (2010) Factors Associated with Nonexclusive breastfeeding in 5</p>	<ul style="list-style-type: none"> <li>• First-born infants (parity)</li> <li>• Working mothers</li> <li>• Maternal age</li> </ul>	<p>“Factors associated with non-EBF</p>

<p>east and southeast Asian countries: A multilevel analysis</p>	<ul style="list-style-type: none"> <li>• Maternal education</li> </ul>	<p>included first-born infants, working mothers, and higher maternal age. Communities with a higher proportion of wealthier households in Indonesia, trained delivery assistance in the Philippines, and poor maternal education in Vietnam/Cambodia were at greater risk for non-EBF.”</p>
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## 2.7 Conceptual Framework

The conceptual framework for this study incorporates the Social Ecological Model (SEM) and the Knowledge, Attitudes, and Behaviors Model (KABM). Knowledge and attitudes inform health behaviors, therefore understanding community perspectives in the context of cultural beliefs can advance health disparities research and guide practice in bridging these disparities. Sociodemographic factors can affect knowledge, attitudes and practices toward *sraa t'nam* among Cambodian women in the U.S. For example, women with lower education levels might be more likely to drink *sraa t'nam* due to cultural influences, exhibit greater adherence to traditional practices and/or lack knowledge of conventional health options. The knowledge, attitudes and practices related to traditional health behaviors might in turn influence infant feeding practices, an important indicator of MCH. *Sraa t'nam*, as a medicinal alcohol elixir, may be associated with greater alcohol use during pregnancy and while breastfeeding, thus posing a risk to maternal and child health. Conversely, consumption of *Sraa t'nam* may result in avoidance of breastfeeding or shorter duration due to concern over alcohol intake, particularly in elixirs that use high levels of vodka. Hence, there is a fundamental gap in understanding the potential health risks and benefits of consuming *sraa t'nam* during pregnancy and while breastfeeding among Cambodian women in the U.S. Furthermore, no studies have examined the association between the intention to consume *sraa t'nam* after birth and breastfeeding intention. Traditional health practices, like consumption of *sraa t'nam*, could pose barriers to breastfeeding in this population (140). To the best of our knowledge, determinants of knowledge, attitudes and practices related to *sraa t'nam* among women of Cambodian heritage living in the U.S. have not been investigated.

**Figure 1.** Conceptual framework for describing the associations between knowledge, attitudes and behaviors related to *sraa t'nam* and sociodemographic factors among Cambodian women ages 15-35 years living in Massachusetts.





## CHAPTER 3

### PURPOSE OF STUDY

This community-based participatory (CBPR) study investigated knowledge, attitudes, and practices related to the consumption of *sraa t'nam*, an alcohol-based elixir, among Cambodian women aged 15-35 years living in Massachusetts. Consumption of *sraa t'nam*, a traditional Cambodian elixir, is a maternal health practice that is not typically considered in antenatal and postnatal care. CBPR is an intrinsic approach that is effective in eliciting community perspectives within the context of their cultural experiences, particularly in hard-to-reach refugees/immigrant populations (141).

There is a fundamental gap in understanding the potential health risks and benefits of consuming *sraa t'nam* during pregnancy and while breastfeeding among Cambodian women in the U.S. Knowledge and attitudes inform health behaviors, therefore understanding these community perspectives can greatly improve research and guidance practice aimed at addressing health disparities. A CBPR study conducted by Pung (2003) found that 60% of Cambodian participants (n=35) in Rhode Island reported consuming *sraa t'nam* in the third trimester of their pregnancies and 89% reported doing so after childbirth. However, the associations between socio-demographic factors and knowledge, attitudes, and behaviors related to *sraa t'nam* were not examined in this small study. To the best of our knowledge, the awareness, attitudes and preferred applications of traditional health practices, including *sraa t'nam* consumption, has not been examined among women of Cambodian heritage.

The overall objective of the study is to investigate associations between

socio-demographic variables and knowledge, attitudes, and practices of *sraa t'nam* among Cambodian women at reproductive age. Derived from literature, the central hypothesis for this study postulates that women are more likely to consume *sraa t'nam* if they have lived in the U.S. for less than 10 years, have low food security status, are uninsured or underinsured, experience language barriers, are less educated and/or have lower acculturation scores. This hypothesis is based on previous research indicating an association between traditional health practices and socio-demographic factors (135).

We proposed three primary research questions for this study:

Research question 1: Is knowledge of *sraa t'nam* associated with socio-demographic characteristics, acculturation, or food security status among Cambodian women ages 15-35 years living in Massachusetts??

Research question 2: Are attitudes toward *sraa t'nam* associated with socio-demographic characteristics, acculturation, or food security status among Cambodian women ages 15-35 years living in Massachusetts?

Research question 3: Among the subsample of pregnant women in this study (n=56), is the intention to breastfeed associated with knowledge of *sraa t'nam*, attitudes regarding *sraa t'nam*, and/or the intention to consume *sraa t'nam* after childbirth?

## CHAPTER 4

### METHODS

#### 4.1 Community-Based Participatory Research (CBPR)

This study used a CBPR approach to work in an equitable partnership with the Cambodian communities of Lowell and Lynn, Massachusetts. This collaborative approach emphasizes participation from stakeholders in all phases of the research process and recognizes the unique strengths that each brings to research (141). In partnership with the Cambodian Mutual Assistance Association (CMAA) of Greater Lowell, Inc., the research team investigated the associations between sociodemographic factors and knowledge, attitudes, and practices related to *sraa t'nam* among Cambodian women ages 15-35 years in Massachusetts. The study was approved by the Human Subjects Review Board at the University of Massachusetts Amherst in Amherst, Massachusetts.

#### 4.2 Recruitment

Recruitment efforts included announcements on the local Cambodian television programs in Lowell, Lynn, and Revere; distribution of fliers at restaurants, grocery stores, beauty salons, community agencies, community centers, and local social service agencies; announcements of the study at English as a Second Language (ESOL) and GED classrooms; emails to service providers and community members; as well as face-to-face and word-of-mouth recruitment. Women who participated in the research team's previous studies were also invited to participate in this study.

### 4.3 Sample

Using a purposeful convenience sample, women of Cambodian heritage living in Massachusetts were recruited into the study. We employed a cross-sectional study design with a target sample of 200 Cambodian women ages 18-35 years. Convenience sampling is a non-probability sampling technique where subjects are selected because of their accessibility and proximity to the community agency which partners with the researcher (142). This sampling method is one of the most common tools used in community-based studies due to ease of recruitment (56). The participants (n=162) recruited into this study were between 15 and 35 years of age living in Lowell and Lynn, Massachusetts.

### 4.4 Training and Data Collection

The data collection team was trained on research methods, data collection procedures, Cambodian traditional medicine, cultural sensitivity, and CBPR methodology. Survey instruments were developed and tested in an earlier study. The research team, inclusive of trained community interviewers, administered surveys in English, Khmer, or bilingually. The survey was administered once to all women; each survey took between 1-1.5 hours to complete. Qualitative data consisted of one focus group conducted in 2011 with four Cambodian women in Lowell, MA. Quantitative data on demographics, dietary consumption, anthropometry, knowledge, attitudes, and practices, breastfeeding intention, alcohol and tobacco use, food security status, self-perceived health status, antenatal and postnatal care, acculturation, household size, composition of family members, and healthcare experiences were collected through surveys. Data was checked for completeness, as well as inconsistencies, and was double-entered on MS Access.

### Key Variables used in analysis

*Dependent variables:* knowledge of sraa t'nam, ever used sraa t'nam, intention to drink sraa t'nam after current pregnancy

*Independent variables:* age, household food security score, body mass index, acculturation, depression score, language, health insurance, marital status, educational attainment, country of birth, parity, and employment status.

#### **Socio-demographic variables:**

**Marital status** was categorized into never married/single, married, separated, divorced and widowed.

**Educational attainment** was self-reported and coded into four groups: less than high school, high school or GED, some college or higher, and other. Educational attainment was dichotomized into the group with  $\leq$  high school/GED/less or  $\geq$  some college.

**Country of birth** was dichotomous variable grouped as born in the U.S. (coded 1) and born outside the U.S. (coded 0).

**Length of stay** in the U.S. for women who were born outside the U.S. was self-reported and categorized as  $<10$  years (coded 0) and  $\geq 10$  years (coded 1).

**Food security status** was a continuous variable based on the cumulative number of responses to the six-item survey U.S. Food Security Module (62). This variable was further categorized into levels of high food security, low food security and very low food security status.

#### **Anthropometric variables:**

**Height** was measured in centimeters, with two measurements per women using a stadiometer. **Weight** was measured in kilograms, with two measurements per woman

using a standard scale. **Body mass index** was calculated using the formula weight (kg)/height (m<sup>2</sup>) and was analyzed as a continuous and categorical variable.

#### **Psychometric Variables:**

**Depression** was measured using the validated 14-item Harvard Program in Refugee Trauma's depression scale (97). The responses range from 1 to 4, with 1 representing not at all depressed, and 4 representing extremely depressed.

**Acculturation** was measured using a 10-question Psychological Acculturation Scale (PAS) was used with permission to measure acculturation in this Cambodian population (143). The responses range from 1 to 5, and were summed and divided by 10 for a final PAS score of 1 to 5. A score of 1 represented 'identifying entirely with Cambodian culture' and a score of 5 represented 'identifying entirely with American culture'. For subjects who answered 6-8 questions, the average of the non-missing items was used to calculate PAS. Subjects with fewer than 6 questions answered were omitted from analyses. PAS scores were divided into low (a score of 1 through 2.111) and high categories ( $\geq 2.125$ ).

#### **4.5 Data Analysis**

Data analysis was conducted using Stata, version 14.0, and SPSS version 25. General characteristics of the participants in the data is presented as means +/- standard deviation for continuous variables (BMI, age, food security raw score, depression, acculturation). Frequencies and percentages were calculated for categorical variables (marital status, educational attainment, health insurance status, length of residence in the U.S., food security status).

For descriptive statistics, Student's independent t-test was applied to continuous variables and Pearson's chi-square test was applied to categorical variables, with each of dependent variables: *sraa t'nam* knowledge, attitudes toward *sraa t'nam*, and intention to consume *sraa t'nam*. The level of significance was set at a p-value < 0.05. Univariate analysis was applied to each variable to determine associations between the dependent variable and each of the independent variables. Independent variables with statistically significant and p-trend values were selected for inclusion in multivariate analyses. Given the small sample size, independent variables with a univariate association at approximately the p=0.1 level of significance (*trending*) were selected for inclusion in multivariate analyses.

Bivariate analyses tested the associations between each of the dependent variables and socio-demographic, health and psychometric factors. In the subsample of pregnant women, we also examined the association between women's intention to breastfeed and their intention to consume *sraa t'nam* after childbirth. Multivariate analyses examined the associations between each of the dependent variables and psychometric factors, controlling for sociodemographic factors.

## CHAPTER 5

### RESULTS

Individual summary characteristics are presented in Table 1. This study analyzed results from 161 Cambodian women, 15 to 35 years, living in Massachusetts. Thirty-four percent 34.2%, (n=56) of the sample was pregnant; 65.8% (n=106) was not pregnant at the time of data collection for the study. Significant differences were found between pregnant and non-pregnant status in language preferred for survey administration (35.71% pregnant vs. 11.32% non-pregnant women preferred to answer questions in Khmer,  $p<0.01$ ); 38.18% pregnant vs. 10.38% non-pregnant were married ( $p<0.01$ ); 37.5% pregnant vs. 68.9% non-pregnant were born in the U.S. ( $p<0.01$ ); 51.8% pregnant vs. 23.6% non-pregnant women had at least one child ( $p<0.01$ ); and 87.0% pregnant vs. 58.5% non-pregnant women that reported on work status were employed at the time of the survey ( $p<0.01$ ). The mean acculturation score for sample (n=154) was 2.6 (SD=0.63, range 1-4.2), with a significant mean difference observed across pregnancy status (2.4, SD=0.66 pregnant vs. 2.7, SD=0.57 non-pregnant,  $p<0.01$ ). No significant mean differences were observed between pregnancy status and depression scores, or pregnancy status and food security scores. In summary, although pregnant and non-pregnant women were similar in age, 24.5 years vs. 21.2 years, respectively, pregnant women were significantly more likely to prefer answering the survey questions in Khmer, be married, be foreign-born, have at least one child, and were less likely to be employed. Pregnant women were also more likely to have lower acculturation and depression scores, and less likely to be food insecure compared to the non-pregnant peers.



**Table 5.1.** Sample characteristics of Pregnant and Non-Pregnant Cambodian Women (15-35 y) living in Massachusetts (n=162)

<b>Characteristics</b>					
	<i>n</i> <sup>1</sup>	% of Total	Pregnant	Non-Pregna	<i>P</i> <sup>2</sup>
		%	%	%	
Overall	16	100	34.16	65.84	
Language					<0.0
Khmer	32	19.75	35.71	11.32	
English	12	73.46	55.36	83.02	
Both/Mix	9	5.56	5.26	5.66	
Health Insurance					
Yes	14	90.57	92.59	89.52	
No	15	9.43	7.41	10.48	
Marital Status					<0.0
Married	33	19.88	38.18	10.38	
Not married	12	80.12	61.82	89.62	
Educational Attainment					
Less than High School/GED	10	62.35	71.43	57.55	
Some College or Higher/Other	61	37.65	28.57	42.45	
Born In US					<0.0
Yes	94	58.02	37.5	68.87	
No	68	41.98	62.5	31.13	
Food Security					
Food Secure	87	58.78	66.67	55.66	
Food Insecure	61	41.22	33.33	44.34	
Parity					<0.0
Yes	54	66.67	51.79	100	
No	27	33.33	48.21	0	
Currently Employed					<0.0
Yes	82	63.57	86.96	58.49	
No	47	36.43	13.04	41.51	
	<b>n</b>	<b>Mean (SD)</b>	<b>Pregnant</b>	<b>Non-pregna</b>	<b><i>P</i><sup>3</sup></b>
			<b>Mean (SD)</b>		
Age	16	22.3 (4.6)	24.50 (3.9)	21.20	
Food security raw score	16	1.02	1.15	0.95	
BMI	16	24.5 (5.1)	24.50	24.60	
Acculturation	15	2.61	2.37	2.73	<0.0

Depression	15	1.66	1.61	1.68
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<sup>1</sup> Totals may differ due to missing data on some variables: language, parity, currently employed.

<sup>2</sup> Categorical variables, tests of statistical significance are based on two-tailed Pearson  $\chi^2$ ,  $p < 0.05$ ,  $p < 0.01$ .

<sup>3</sup> Continuous variables, tests of statistical significance are based on student t test,  $p < 0.05$ ,  $p < 0.01$ .

<sup>4</sup> Parity defined as having delivered birth of 1 or more kids

Multivariate logistic regression was used to test the associations between ‘ever used *sraa t’nam*’ and socio-demographic, psychometric, and food security variables (Table 2). After adjusting for age, educational attainment, acculturation, and food security raw score, the following variables were significantly associated with ‘ever used *sraa t’nam*’: number of household members, parity and birthplace. The first four models had R square values ranging from 0.08-0.15 suggesting that the models fit only a low variance of the data. However, the R square value in the full model was 0.26 demonstrating that the model explained 26% of the variability of the response data.

In Model 1, the variables included were having health insurance, age, educational attainment, acculturation and food security raw score. Having health insurance was not independently associated with ever using *sraa t’nam*, after controlling for age, educational attainment, acculturation, and food security score (OR 0.62, CI 0.17, 2.23,  $p=0.46$ ). Model 2 tested to see if ‘ever used *sraa t’nam*’ was associated with number of household members, all else equal. Women with more household members had 1.25 odds (CI 1.01, 1.55) of ever using *sraa t’nam* ( $p < 0.05$ ). Model 3 tested to see if ‘ever used *sraa t’nam*’ was associated with parity, all else equal. Parity was significantly associated with ever using *sraa t’nam* and those who had at least one child had 3.85 odds (CI 1.20, 12.37) of ever using *sraa t’nam* ( $p < 0.05$ ). Model 4 tested to see if country of birth was

associated with ever using *sraa t'nam*, all else equal. Women who were born in the U.S. had 0.13 (CI 0.04, 0.44) odds of ever using *sraa t'nam*, compared with those who were born outside of the U.S ( $p<0.05$ ). Across all four models, the covariates age, educational attainment, and acculturation were independent predictors of ever using *sraa t'nam* ( $p<0.05$ ), while food security score was not significantly associated with ever using *sraa t'nam*.

The full model for multivariate logistic regression predicting the odds of a woman reporting that she 'ever used *sraa t'nam*' (dependent variable) included eight independent variables. Health insurance, acculturation and food security scores were not independently associated with the dependent variable. The odds of 'ever used *sraa t'nam*' were higher (OR 1.67, CI 1.10, 2.51,  $p<0.05$ ) with every one unit or one person increase in household size, after adjusting for covariates. Similarly, women with at least one child had a 4.54 odds (CI 1.24, 16.5) of reporting that they 'ever used *sraa t'nam*' compared to women with no children ( $p<0.05$ ). U.S.-born women (OR 0.12, CI 0.02, 0.83,  $p<0.05$ ) and those with more than a high school education (OR 0.13, CI 0.02, 0.71,  $p<0.05$ ) had lower odds of having 'ever used *sraa t'nam*'. Age was independently associated with having 'ever used *sraa t'nam*' (OR 1.32, CI 1.01, 1.74,  $p<0.05$ ); for every year older, the odds of ever using *sraa t'nam* increased by 0.32 units. In summary, women who lived in larger households, had at least one child, were foreign-born, had less education, or were older in age had higher odds of reporting that they had 'ever used *sraa t'nam*'.

**Table 5.2.** Odds ratios for associations between ever used *sraa t'nam* and socio-demographic, psychometric, food security variables among Cambodian (15-35 y) in Massachusetts (n=162)<sup>1,2</sup>

Indicators	MODEL 1 (n= 140)		MODEL 2 (n= 141)		MODEL 3 (n= 74)		MODEL 4 (n= 141)		Full Model (n= 73)		Unadjusted Model	
	OR(CI)	P	OR(CI)	P	OR(CI)	P	OR(CI)	P	OR(CI)	P	OR(CI)	P
Health Insurance	0.62(0.17, 2.23)	0.46							2.36(0.29, 19.17)	0.42	0.50(0.17, 1.48)	0.21
Household members			1.25(1.01, 1.55)	<0.05					1.67(1.10, 2.51)	<0.05	1.10(0.92, 1.31)	0.28
Parity					3.85(1.20, 12.37)	<0.05			4.54(1.24, 16.54)	<0.05	4.90(1.78, 13.47)	<0.05
Born In US							0.13(0.04, 0.44)	<0.05	0.12(0.02, 0.83)	<0.05	0.46(0.24, 0.91)	<0.05
<b>Covariates</b>												
Age	1.16(1.05, 1.28)	<0.05	1.20(1.08, 1.33)	<0.05	1.00(0.86, 1.17)	0.98	1.33(1.16, 1.53)	<0.05	1.32(1.01, 1.74)	<0.05	1.08(1.01, 1.17)	<0.05
Educational attainment	0.41(0.18, 0.95)	<0.05	0.44(0.19, 1.01)	<0.05	0.35(0.09, 1.31)	0.12	0.34(0.14, 0.83)	<0.05	0.13(0.02, 0.71)	<0.05	0.78(0.40, 1.51)	0.47
Acculturation	2.74(1.38, 5.41)	<0.05	3.00(1.49, 6.06)	<0.05	1.99(0.77, 5.12)	0.15	1.77(0.83, 3.78)	0.14	1.66(1.10, 2.51)	0.39	1.53(0.89, 2.65)	0.13
Food security raw score	0.62(0.84, 1.46)	0.46	1.13(0.87, 1.48)	0.36	0.79(0.54, 1.16)	0.23	1.17(0.88, 1.54)	0.29	0.94(0.63, 1.40)	0.75	1.20(0.95, 1.52)	0.13

<sup>1</sup> Statistical significance assessed by P<0.05

<sup>2</sup> The unadjusted model presents coefficients for the bivariate associations between ever use *sraa t'nam* and each variable in the model.

<sup>3</sup>Model 1: having health insurance, age, educational attainment, acculturation, food security raw score

<sup>4</sup>Model 2: household members, age, educational attainment, acculturation, food security raw score

<sup>5</sup>Model 3: parity, age, educational attainment, acculturation, food security raw score

<sup>6</sup>Model 4: born in US, age, educational attainment, acculturation, food security raw score

<sup>7</sup>Full Model: having health insurance, household members, parity, born in US, age, educational attainment, acculturation, food security raw score

Univariate analyses tested for associations between intention to breastfeed, age, smoking status, and intention to use *sraa t'nam*. Age was positively associated with the intention to breastfeed (OR=1.26,  $p<0.05$ ), and smoking was also positively associated with the intention to breastfeed (OR=4.81,  $p<0.05$ ) (Table 3). In Model 1, age was independently associated with a woman's intention to breastfeed (OR 1.26, CI 1.04, 1.53,  $p<0.05$ ); for every year older, the odds of reporting an intention to breastfeed increased by 0.26 units ( $r^2=0.14$ ). In Model 2, 'ever smoked' was a significant predictor of breastfeeding intention; the odds of reporting an intention to breastfeed was higher for women who reported ever smoking compared to non-smokers (OR 4.81, CI 1.07, 21.6,  $p<0.05$ ,  $r^2=0.11$ ). The relationship between intention to breastfeed and intention to use *sraa t'nam* after pregnancy is shown in Table 3. After adjusting for age and smoking status, there was no statistically association observed between intention to breastfeed and intention to use *sraa t'nam* after current pregnancy (OR=1.82, CI 0.48, 14.09,  $p=0.48$ ;  $r^2=0.17$ ).

**Table 5.3.** Logistic regression associations between intention to breastfeed and intention to use *sraa t'nam* after pregnancy among pregnant Cambodian women (15-35 y) in Massachusetts (n=56)

Intention to Breastfeed	MODEL 1 (n= 51)		MODEL 2 (n= 51)		MODEL 3 (n= 51)		Full Model <sup>3</sup> (n= 53)	
	R <sup>2</sup> =0.14		R <sup>2</sup> =0.11		R <sup>2</sup> =0.17		R <sup>2</sup> =0.17	
Indicators	Odds ratio(CI)	P	Odds ratio(CI)	P	Odds ratio(CI)	P	Odds ratio(CI)	P
Age	1.26(1.04, 1.53)	<0.05					1.19(0.97, 1.47)	0.10
Ever Smoke			4.81(1.07, 21.62)	<0.05			2.61(0.48, 14.09)	0.26
Intention to Use <i>Sraa t'nam</i> after Pregnancy					2.22(0.48, 14.09)	0.29	1.82(0.35, 9.38)	0.48

<sup>1</sup> Statistical significance assessed at the  $P < 0.05$  level

<sup>2</sup> The unadjusted model presents coefficients for the bivariate associations between intention to breastfeeding and each variable in the model.

<sup>3</sup> The Full Model is conservative due to the small sample size.

## CHAPTER 6

### DISCUSSION

The purpose of our study was to determine the association between the traditional maternal health practice of *sraa t'nam* use and socio-demographic, psychometric, and food security variables in a sample of Cambodian women aged 15-35 years living in Massachusetts, and to examine the association between women's intention to use *sraa t'nam* and their intention to breastfeed. Our results suggested that Cambodian women who reported having at least one child,  $\leq$  high school education, being born outside the U.S., larger households, and/or who were older in age had higher odds of ever using *sraa t'nam*. Consistent with our findings, previous research on the prevalence and predictors of herbal medicinal use among adults in the United States revealed that age was positively associated with use of traditional herbal practices (144).

In a Canadian study, longer length of time in Canada was associated with a decline in overall health status among immigrants (145). Observed health disparities between immigrant and non-immigrant populations were predicted by age, income, gender, and home ownership status (145). Concerns of declining health status among immigrants in wealthy nations raises significant issues regarding access to healthcare for immigrants, potential discrimination in the health care system, and poor utilization of services (146). These issues have a historical and structural presence in the U.S. (146). Whitbeck et al. (2002) suggest that use of traditional practices among Native Americans, a population that has faced historical discrimination, genocide, and systematic racism, may act as an important and salient cultural buffer to the multiple adverse effects experienced as a

result of discrimination. The use of traditional health practices could potentially serve a protective role for refugees to the U.S., specifically Cambodians who survived war under the Khmer Rouge regime by using traditional medicines to prevent and treat illness and their descendants who face new challenges in the U.S. and benefit from the intergenerational sharing of such practices (147).

### **Traditional Health Practices: Use of *Sraa T'nam***

In our study, the odds of having ever used *sraa t'nam* were lower for women with some college or higher level of education. Jenkins et al. (1996) reported that Vietnamese community members in California with lower educational attainment, fewer years in the U.S., and limited English proficiency scored higher on the traditional health belief scale ( $p<0.05$ ). In contrast, Buchwald et al. (2000) found that having more than a high school education was positively associated with use of traditional health practices among Native Americans and Rashrash et al. (2017) reported that higher education levels were associated with traditional herbal supplement use in the U.S.

Lower acculturation scores, observed mostly among foreign-born women, were associated with higher odds of ever using *sraa t'nam* in univariate and bivariate analyses of study data, but not in multivariate models. Looking directly at country of birth, as a proxy for acculturation in our study, revealed that U.S.-born women were less likely than foreign-born women to report ever having used *sraa t'nam*. Unlike the acculturation index ( $p=0.39$ ), country of birth was a salient predictor of *sraa t'nam* use and expressed statistical significance across all multivariate models compared to the acculturation index. Supporting our findings, Buchwald et al. (2000) observed that lower acculturation was associated with use of traditional health practices among Native Americans. A Canadian



study examining predictors of traditional medicine use among Ghanaian immigrants found that individuals who were more acculturated had more positive attitudes toward Ghanaian traditional medicinal practices than those who were less acculturated (145).

Jenkins et al. (1996) examined traditional health practices among Vietnamese community members in the U.S. Marital status and poverty status were significant determinants of traditional health practices in this study (148). Jenkins et al. (1996) used household size as the basis for the poverty status indicator. Our study provides additional information about the positive association of household size and parity on traditional health practices in an immigrant and refugee population. Parity is related to household size and participants who had at least one child were more likely to report having 'ever used *sraa t'nam*'. Jenkins et al. (1996) recommended further investigation of traditional beliefs and practices as potential barriers to health care access and utilization of conventional health services by immigrants.

### **Intention to Breastfeed and Breastfeeding Initiation**

Smoking status is an established predictor of a woman's intention to breastfeed (133, 149). Our results are confirmed by McInnes et al. (2001) who found that smoking was an independent predictor of breastfeeding intention in a disadvantaged population of pregnant women in the United States. Similar to previous studies, older pregnant women were more likely to express an intention to breastfeed (149). Results from a study on non-exclusive breastfeeding (EBF) in five East and Southeast Asian countries in 2010 revealed that non-EBF was associated with higher maternal age (134). Women with higher maternal age were less likely to practice breastfeeding in study in all five countries, including Vietnam, Timor-Leste, Philippines, Indonesia, and Cambodia (134).

Our study did not find an association between intention to breastfeed and current work status, while the previous studies suggested that work status is a predictor of intention to breastfeed (150, 151). Staub et al (2008) suggested that women had low breastfeeding initiation rates when they were currently employed (150). The limitations of our study were the small sample size for pregnant women, followed by the low response rate on work status. As such, our study lacked sufficient power to detect significant associations between the variables of interest.

Education attainment emerged as a strong predictor of intention to breastfeed when controlling for covariates in other studies (152, 153). In a Brazilian study, Cesar (2015) reported that educational attainment was positively associated with the breastfeeding. Our study was not able to confirm an association between intention to breastfeed and educational attainment, partly due to the small sample size and low variance in education levels. Our findings may also result from differences in immigrant experiences for refugees versus other types of immigrants (153), as well as group differences by country of origin/heritage (153) or lived environment (152).

Straub et al. (2008) found that all nine Cambodian women in their U.S.-based study practiced traditional maternal health diets and/or rituals and all initiated breastfeeding.

However, we did not find an association between breastfeeding intention and intention to use *sraa t'nam*, with the small sample size being a primary limitation to our ability to fully examine the relationship between these variables. While no association was observed, barriers to breastfeeding initiation, including traditional health practices, which can either promote or disrupt maternal and child health, need to be carefully investigated. Earlier studies have indicated that Cambodians in the U.S. face significant

maternal and child health challenges, including LBW, high IMR, and the lowest breastfeeding rate among all groups in Massachusetts (154).

## CONCLUSION

Future studies need to examine the role of traditional health practices on maternal and child health outcomes. In particular, cross-national studies would provide critical data on immigrant and refugee health transitions from home country, refugee host country, to final resettlement host country. Understanding the how acculturation impacts traditional health practices can inform variations in knowledge, attitudes, and beliefs within and across refugee and immigrant groups in the U.S. *Sraa t'nam* as a traditional health practices poses a unique issue to maternal and child health due to its alcohol content. When situated in the larger context of acculturation, perceived access to and experiences with health care, health disparities, and discrimination, use of traditional maternal health practices may buffer stressors related to immigrant and minority experiences in the U.S.

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