# COMMUNICATION PRACTICES REGARDING ALCOHOL CONSUMPTION DURING PREGNANCY: A CROSS-SECTIONAL STUDY OF TEXAS MIDWIVES

Dissertation

by

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ABSTRACT

Overwhelming scientific evidence indicates that alcohol consumption during pregnancy could potentially produce multiple, damaging, alcohol-induced effects in the unborn child collectively known as fetal alcohol spectrum disorders (FASD). FASD is the leading non-genetic cause of preventable birth defects, developmental disabilities, and mental retardation in the United States. The purpose of this cross-sectional study, which targeted midwives from across Texas, was to examine factors, both personal and professional, impacting communication practices regarding prenatal alcohol consumption. Specifically, this study explored whether (1) midwives' knowledge on alcohol guidelines, (2) midwives' intent to disseminate alcohol abstinence messages to pregnant patients, and (3) midwives' personal alcohol use, influenced their communication practices. Overall, a majority of midwives (96%) were informed about unfavorable birth outcomes that occurred in FASD babies, as well as the U.S. Surgeon General's abstinence guidelines regarding prenatal alcohol use. However, approximately 17% of midwives provided advice that was not consistent with the Surgeon General's guidelines regarding prenatal alcohol use, and did not counsel abstinence from alcohol use while pregnant. Many (63%) midwives were unaware of common screening tools that could detect harmful drinking behaviors among pregnant women. Participants' overall knowledge was not strongly associated with midwives' communication practices. Among the sample of midwives in this investigation, subjective norms and attitude were strong predictors of participants' intent to disseminate accurate information on prenatal alcohol consumption. Overall, predictor variables explained a significant proportion of variance in participants' intention, $R^2 = 0.68$, $F$ (20, 27) = 2.88, $p = 0.006$. In addition, midwives' intent (coefficient = 0.34, $p = 0.013$), years of midwifery practice (coefficient = -0.11, $p = 0.037$), midwife professional group (coefficient = 2.58, $p = 0.036$) and average number of pregnant

patients seen per week (coefficient = 0.04, $p = 0.042$) were significant predictors of the frequency of communication. Also, participants' intention (coefficient = 0.10, $p = 0.041$), an Associate degree (coefficient = -1.92, $p = 0.034$) and a Doctoral degree (coefficient = -1.97, $p = 0.041$) were significant predictors of whether information was distributed. Midwives' personal alcohol use was not statistically associated with the actual distribution of information and/or the dissemination of accurate information. That said, midwives' personal alcohol use was associated with the frequency of communication on prenatal alcohol use during 2nd and 3rd trimesters, even when controlling for age, years of midwifery practice, and midwife professional group. Overall, midwives with non-risky drinking behavior demonstrated better communication practices compared to their counterparts meeting criteria for hazardous drinking.

# DEDICATION

To my beautiful daughters, Oreoluwa and Moyinoluwa, you can accomplish ANYTHING, BE BRAVE! Thank you for inspiring me to be better. I love you both.

# ACKNOWLEDGEMENTS

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To my father, Olufemi Olusanya, you are the best dad in the world. I hope I made you proud. Thanks to you and mum, Olubunmi Olusanya, for your encouragement and support. To the love of my life, Oluwafemi Adeniyi, thank you for your patience, understanding and love as I pursue my dreams. I couldn't have done this without you.

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TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

# CHAPTER I

## INTRODUCTION AND LITERATURE REVIEW

Despite decades of scientific evidence documenting teratogenic effects from fetal alcohol exposure (C. M. O'Leary et al., 2010a; C. M. O'Leary et al., 2010b; O'Leary et al., 2013; Riley, Infante, & Warren, 2011), women continue to drink alcohol during the prenatal period (Peadon et al., 2011). The median rate for alcohol use (≥ 1 drink in past 30 days) among non-pregnant women (18-44 years) is approximately 53.6%. From this cohort, 18% of women reported binge drinking (≥ 4 drinks on any one occasion in the past 30 days; Centers for Disease Control and Prevention, (CDC), 2012; Tan, Denny, Cheal, Sniezek, & Kanny, 2015). More than half of women (54%) planning to conceive within 12 months report alcohol consumption (≥ 1 drink within the past 30 days; Anderson, Ebrahim, Floyd, & Atrash, 2006). Moreover, approximately 10.2 % of pregnant women report drinking alcohol at least once within the past 30 days while 3.1 % engaged in binge drinking (≥ 4 drinks on any one occasion in the past 30 days; Tan et al., 2015). Highest prevalence rate for prenatal alcohol use is seen among women who are 35-44 years (14.3%), white (8.3%), college graduates (10%), and employed (9.6%; CDC, 2012).

Globally, it is estimated that 10% of the women in the overall population engage in prenatal alcohol consumption (Popova, Lange, Probst, Gmel, & Rehm, 2017). Approximately one in every 67 women, who drinks alcohol while pregnant, delivers a baby with the fetal alcohol syndrome (Popova et al., 2017). Globally, this equates to 119,000 babies born with fetal alcohol syndrome (FAS) each year. Babies born with FAS experience severe damaging effects on the developing brain exhibited as abnormal facial characteristics, delayed physical growth, cognitive deficits and behavioral problems. It is important to note that estimates of alcohol use prevalence rely significantly on self-report data obtained from women who engage in alcohol consumption.

Therefore, statistics reported could be subject to inconsistencies and biases. Prevalence estimates could be higher than what is currently depicted in scientific literature (Chang, McNamara, Orav, & Wilkins-Haug, 2006; Russell et al., 1994).

### *Alcohol Consumption in Pregnancy*

Overwhelming scientific evidence indicates that prenatal alcohol exposure could result in a vast spectrum of adverse consequences for the unborn child in the form of fetal alcohol spectrum disorders (FASD; Jacobson, Jacobson, Sokol, & Ager, 1998; Jacobson & Jacobson, 1999; C. M. O'Leary et al., 2010a; C. M. O'Leary et al., 2010b; O'LEARY et al., 2013; Riley, Infante, & Warren, 2011). As a result of these scholarly investigations, the United States (U.S.) issued its first abstinence message on prenatal alcohol use in 1981. The U.S. surgeon general's advisory on alcohol and pregnancy drafted recommendations asserting that no amount of prenatal alcohol intake was safe given that risk threshold levels of alcohol for irreparable damage on the fetus were mostly unknown ((General, 2005).

In 1996, fetal alcohol spectrum disorders (FASD) was described by the Institute of Medicine (IOM) as comprising 4 subsets of diagnoses: Fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related neuro-developmental disorder (ARND) and alcohol-related birth defects (ARBD; P. A. May et al., 2013; Stratton, Howe, & Battaglia, 1996). Fetal alcohol syndrome (FAS) is the most extreme form of fetal alcohol spectrum disorders (FASD) and the leading non-genetic cause of preventable birth defects, developmental disabilities, and mental retardation in the U.S. (Miranda, 2012). Apart from Down's syndrome, the prevalence of fetal alcohol syndrome (FAS) exceeds that of other genetic birth anomalies including anencephaly, spina bifida, and trisomy 18 (Popova et al., 2017). Fetal Alcohol Syndrome (FAS) was first

mentioned in scientific literature in 1973 and was characterized as birth defects ranging from permanent brain damage, congenital defects, prenatal or postnatal growth restriction, to characteristic facial dysmorphogenesis (Jones & Smith, 1973; Jones, Smith, Ulleland, & Streissguth, 1973). Fetal alcohol spectrum disorders (FASD) is 100% attributable to alcohol use during pregnancy (Mattson & Schoenfeld, 2001; Sampson et al., 1997). In addition to FASD and FAS, other unfavorable pregnancy outcomes are associated with prenatal alcohol consumption, such as stillbirth, spontaneous abortion, premature birth, intrauterine growth retardation and low birthweight (Popova et al., 2017).

***Prevalence Rates of FASD in Regions across the World***

Although preventable, fetal alcohol spectrum disorders (FASD) and fetal alcohol syndrome (FAS) continue to adversely affect millions of babies. Worldwide prevalence for FASD and FAS are estimated to be approximately 22.7 per 1000 (Roozen., et al 2016) and 14·6 per 10,000 live births respectively (Popova et al., 2017). In the U.S., prevalence rates are reported to be as high as 14 per 1,000 for both FAS and partial fetal alcohol syndrome (pFAS) combined and 6 per 1,000 for FAS (P. A. May et al., 2009; May et al., 2014). Conversely, prevalence rates for fetal alcohol syndrome (FAS) and partial fetal alcohol syndrome (PFAS) in regions of Italy are higher, ranging from 4.0 to 12.0 and 18.1 to 46.3 per 1000 children respectively (May et al., 2011). Estimates for fetal alcohol spectrum disorder (FASD) vary between 2.3% to 6.3% (May et al., 2011). In parts of France, FAS and FASD prevalence rates are 1.2 and 4.8 per 1000, respectively (Dehaene, 1991). Scientific evidence records the highest known prevalence rates of FAS and FASD to exist in Cape Provinces of South Africa (May et al., 2013). Specifically, approximately 59.3 to 91.0 per 1,000

babies born in the Western Cape Province South Africa, are determined to have fetal alcohol syndrome (FAS; May et al., 2013).

Estimating the exact prevalence of FASD or FAS is a difficult task to accomplish. This occurs as a result of underreporting from health professionals who lack awareness on the subject matter. Additionally, there is a scarcity of resources and trained experts to follow-up participants for long durations of time, assess totality of adverse outcomes in exposed children, as well as document accurately on quantity, timing and frequency of maternal alcohol use (Young, Giesbrecht, Eskin, Aliani, & Suh, 2014)

### *Public Health Impact of Prenatal Alcohol Consumption*

Alcohol is a teratogen, which interferes with the fetal neuro-development because of its ability to cross the placenta during pregnancy (Burd, Blair, & Dropps, 2012; Chan, Caprara, Blanchette, Klein, & Koren, 2004; Jones, Smith, Ulleland, & Streissguth, 1973). Pattern of alcohol consumption, as well as several maternal traits/factors, influence the severity of an infant's neuropsychological impairments and physical anomalies (May, Tabachnick & Gossage et al., 2013). Maternal traits that predispose babies to displaying alcohol-related birth defects following prenatal alcohol exposure include age, gravidity (total number of pregnant irrespective of pregnancy duration), parity (total number of pregnancies achieving ≥ 20 weeks' gestations), history of alcohol abuse, socio-economic status, nutritional deficiencies, poor prenatal care, smoking and drug use (Ismail, Buckley, Budacki, Jabbar, & Gallicano, 2010; P. A. May & Gossage, 2011). Maternal genetics also plays an influential role in determining fetal susceptibility to alcohol's teratogenic effects (Ismail et al., 2010; Shankar, Ronis, & Badger, 2007).

Multiple measures that define the pattern of prenatal alcohol consumption include quantity, frequency and timing of drinking (Maier & West, 2001; P. A. May & Gossage, 2011). Although scientific research has yet to identify the specific drinking behaviors that could trigger fetal alcohol spectrum disorders (FASD), available evidence shows that the risk of irreparable damage on fetal brain is greatest with high quantity, frequent maternal alcohol intake throughout pregnancy, including before pregnancy is confirmed (Young, Giesbrecht, Eskin, Aliani, & Suh, 2014). While consuming one alcoholic drink is clearly associated with less risk for the unborn fetus than five or more drinks, it is important to note that no universally "safe" level of prenatal alcohol consumption has been recorded in scientific literature (Montag, Clapp, Calac, Gorman, & Chambers, 2012; Reynolds, Valenzuela, Medina, & Wozniak, 2015; Waterman, Pruett, & Caughey, 2013). In addition, not all incidents of prenatal alcohol consumption will lead to babies developing fetal alcohol syndrome (FAS). As previously stated, about one in every 67 women who drank alcohol while pregnant delivered a baby with the FAS (Popova et al., 2017).

Individuals with FASD experience language, auditory, visual, developmental, cognitive, mental, and behavioral deficits (Popova et al., 2017). These co-morbidities are associated later in life with learning difficulties, substance abuse, mental health issues, confrontations with law enforcement, and inability to obtain and/or maintain employment (Streissguth, Barr, Kogan, & Bookstein, 1996), as well as delayed social or motor skills, impaired memory functioning and attention deficits (WHO, 2011). FASD is incurable and management is centered on early intervention through medical, mental, educational, and social support services that increase individual's overall quality of life. The overall annual cost estimates of Fetal Alcohol Syndrome (FAS) in productivity loss, life-long cost of medical care and rehabilitation in the United States is estimated to be over $4 billion (Carmichael-Olson et al., 2009; Lupton, Burd, & Harwood, 2004).

As a result of the potential harmful outcomes to the unborn child, alcohol consumption in pregnancy should be recognized as a significant and costly public health issue.

### *Preventing FASD through Healthcare Provider Assessment and Communication about Drinking during Pregnancy: Role of the Midwife*

Preventive measures are necessary in order to safeguard against unfavorable outcomes occurring from prenatal alcohol use. Midwives are instrumental in providing information to women on alcohol use in pregnancy (Payne et al., 2014; Roche, & Deehan, 2002). A women's healthcare provider plays a crucial role in encouraging her decision to abstain from alcohol prenatal alcohol consumption (Elek et al., 2013; Raymond, Beer, Glazebrook, & Sayal, 2009; O'Connor and Whaley, 2007; Floyd, O'Connor, Bertrand, and Sokol, 2006). Consequently, it is essential to assess how health professionals' intrapersonal factors - knowledge, intent to share information on prenatal alcohol drinking, beliefs etc., impact their communication practices regarding alcohol intake in pregnant patients. These communication practices include the following: (1) whether health providers assess drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal alcohol use occurs with pregnant women; and (3) whether information shared is accurate and/or reflects national health guidelines. This study seeks to examine the factors that influence communication practices among health practitioners, specifically midwives, regarding discussions on prenatal alcohol consumption.

Midwives could play a pivotal role in reducing alcohol drinking in pregnancy, and subsequently, the incidence of FASD and other health conditions that occur from prenatal exposure to alcohol (Payne et al., 2014; Roche, & Deehan, 2002). Evidence suggest midwives are uniquely qualified to promote alcohol abstinence in pregnancy since the information they share are

perceived to be trustworthy by their patients (O'Connor, & Whaley, 2007). Studies show that pregnant women consider information provided by their health professionals to be persuasive and influential in their health behavior decision-making (Raymond, Beer, Glazebrook, & Sayal, 2009). During antenatal visits, women see a wide range of healthcare providers (e.g., family physicians, obstetricians & gynecologist). However, the important role of midwives in patient-care, uniquely positions them in sharing information that could potentially avert the risk of alcohol exposure in unborn babies (McLeod et al., 2003). In comparison to other health professions, midwife-care practices are woman-centered, providing individualized care catering to each woman's emotional, social, physical and psychological needs. On the average, registered midwives spend at least four times the number of contact hours with their patient for a cost which is less than that of a physician-attended hospital (Anderson & Anderson, 1999). Prenatal care practitioners, such as midwives, are projected to play a key role in enhancing access to healthcare services (Institute of Medicine [IOM], 2011; Hastings-Tolsma et al., 2015). Over the last decade, trends in midwife-care practices have increased globally and in the United States (Declercq, 2012).

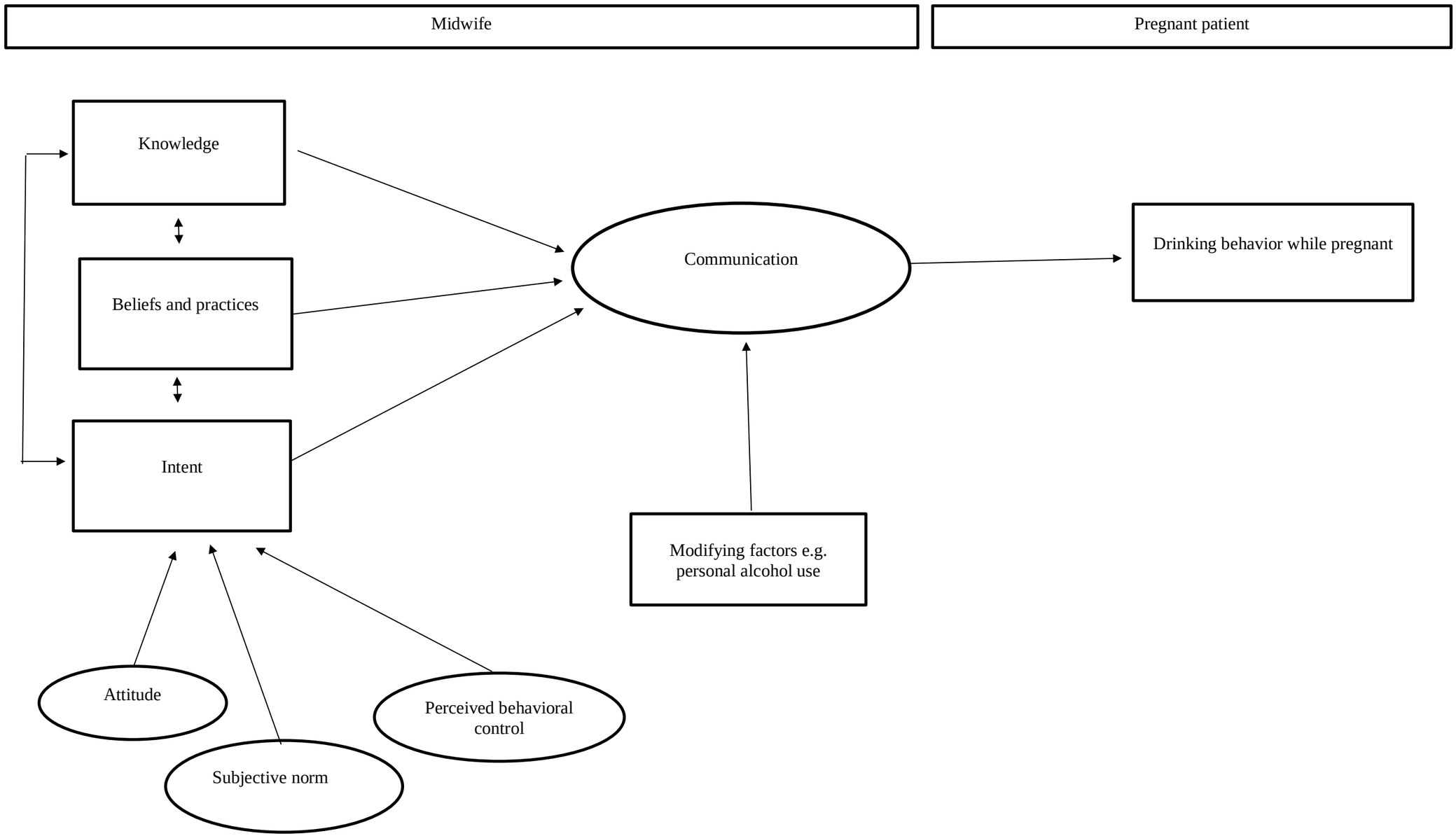
The information provided to a woman by her midwife, could potentially influence her decision to avoid alcohol during pregnancy (Elek et al., 2013; Raymond, Beer, Glazebrook, & Sayal, 2009; O'Connor and Whaley, 2007; Floyd, O'Connor, Bertrand, and Sokol, 2006). However, a number of factors such as knowledge, intent, attitude, practice and beliefs impact the information disseminated by midwives to their patients (Jones, Telenta, Shorten, & Johnson, 2011; Gilinsky, 2009). Previous studies have demonstrated that health professionals' knowledge, intent, attitude, practice and beliefs influence communications on prenatal alcohol use, treatment and referral of pregnant women with alcohol abuse to appropriate rehabilitation programs (Diekman et al., 2000; Gahagan et al., 2006).

### *Theoretical Grounding*

Majority of pregnant women perceive their healthcare professionals as a primary source for health information (Elek et al., 2013; Raymond, Beer, Glazebrook, & Sayal, 2009; Peadon et al., 2007). During prenatal visits, women expect their health providers to offer recommendations on alcohol use during pregnancy (Peadon et al., 2007). However, health practitioners do not always perceive themselves to be adequately prepared to address this concern because they have limited training and lack information/evidence (Elliott et al., 2006; Payne et al., 2005). Some midwives assert a lack of knowledge makes them unwilling to discuss the adverse effects of alcohol consumption during pregnancy (Jones, Telenta, Shorten, & Johnson, 2011). Health providers' knowledge on standardized alcohol use guidelines, validated alcohol screening instruments and risks of fetal alcohol exposure, is essential since this could ultimately determine whether this information is shared during clinical encounters (Watkins et al., 2012). Midwives acknowledge increased knowledge could help facilitate communication on the risks of alcohol use with pregnant patients (Holmqvist & Nilsen, 2010).

Scientific literature suggests health professionals do not always share alcohol abstinence messages, nor do they provide adequate education or effective counseling to pregnant women about the risks of fetal alcohol exposure (Waterman, Pruett, & Caughey, 2013; France et al., 2010; Elliott, Payne, Haan, and Bower, 2006; Payne et al., 2005; Logan et al., 2003). This study sought to comprehend the underlying determinants of midwives' adherence to communications on alcohol abstinence messages with pregnant patients. Studies conclude "intent" to communicate in the future could be used as a proximal measure for actual communication behavior among health professionals (Godin et al., 2008; Francis et al., 2004). Behavioral intent represents, "a person's

**Figure 1.1: Logic Model Adopted from the Theory of Planned Behavior. Adapted from "Attitudes, personality, and Behavior" by Ajzen, I., 1988, Milton Keynes, England: Open University Press**



motivation to perform a behavior" (Norman & Bell, 1999). Research has identified the significance of using Theory of Planned Behavior (TPB; Ajzen, 1988) to explain or predict intention and volitional behaviors (Norman & Bell, 1999). Refer to *Figure 1.1*. As a result, this study incorporated theoretical perspectives from Theory of Planned Behavior TPB (Ajzen, 1988) given these are widely adopted in studies examining behavioral intentions among health professionals (Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008; Grol et al., 2007). Behavioral intent to communicate on prenatal alcohol drinking among midwives was hypothesized to be directly influenced by three variables: attitude, subjective norm, and perceived behavioral control. Attitude is an individual's overall evaluation of a particular behavior. Subjective norm is a person's own estimate of the social pressure to perform, or not perform, the target behavior while perceived behavioral control (PBC) is the perception of the extent to which an individual feels he is able to endorse the target behavior (Francis et al., 2004). Among health professionals, the acquisition of knowledge regarding prenatal alcohol consumption does not always translate to discussing the risks of prenatal alcohol exposure (Elek et al., 2013). There is an erroneous belief that pregnant women are well-informed about the harmful effects of fetal alcohol exposure, and therefore, would abstain from alcohol consumption during pregnancy (France et al., 2010). In addition, health providers' clinical practices are undesirably affected by inadequate training (Gahagan et al., 2006), infrequent use of standardized clinical guidelines (Diekman et al., 2000; Gahagan et al., 2006) and the ambiguity in alcohol messages shared with pregnant women (Elek et al., 2013; Waterman, Pruett, & Caughey, 2013; Logan et al., 2003). Occasionally, women are encouraged by their midwives to engage in minimal to moderate alcohol consumption to relieve emotional stress during pregnancy (Crawford-Williams, Steen, Esterman, Fielder, & Mikocka-Walus, 2015). Pregnant

women also describe recommendations and messages from health professionals as inconsistent and confusing (Elek et al., 2013).

The adoption of the Theory of Planned Behavior for this study was ultimately to evaluate whether health providers' intrapersonal characteristics (knowledge, intent, beliefs & practice; Diekman et al., 2000; Gahagan et al., 2006) and other modifying behavioral factors, such as personal alcohol use (Wells, Lewis, Leake et al.,1984) impact the information provided to pregnant women on alcohol drinking. Refer to *Figure 1.1*.

***Purpose of the Study***

In the United States, there is limited data about the influence of midwives' knowledge, attitude and practice on communication about alcohol with pregnant patients. This study examined the factors that influence communication practices among midwives regarding prenatal alcohol consumption. Specifically, the following research questions were explored:

1. a) Are midwives knowledgeable about:
   (i) Surgeon General's guidelines regarding alcohol consumption in pregnant women.
   (ii) potential outcomes seen in babies born to women who consumed alcohol during pregnancy
   (iii) common types of alcohol behavioral screening instruments used to assess for alcohol use in pregnant women
   b) Do the midwives' overall knowledge scores influence their communication practices?
2. a) What are underlying determinants that affect midwives' intent to adhere to standardized guidelines when sharing information on prenatal alcohol consumption?
   b) Do midwives' intent to disseminate information on prenatal drinking influence their communication practices?

3. Do midwives' personal alcohol consumption behaviors impact their communication practices regarding prenatal alcohol use? `

The current dissertation document consists of 5 distinct chapters. Chapter I will serve as the introduction while chapter V will represent the conclusion. Chapters II, III, & IV will each represent stand-alone, yet interconnected, research manuscripts. Specifically:

a. Chapter II will assess research question 1: (i.) midwives' knowledge about the Surgeon General's alcohol guidelines, alcohol screening instruments and outcomes in alcohol-exposed fetuses and (ii) how midwives' overall knowledge scores influence their communication practices?
b. Chapter III will examine research question 2: (i.) underlying determinants that affect midwives' intent to adhere to standardized guidelines when sharing information on prenatal alcohol consumption? and (ii.) how midwives' intent to disseminate information on prenatal drinking influence communication practices?
c. Chapter IV will examine research question 3 on whether midwives' personal alcohol consumption behaviors affect their communication practices

For research question 1, 2 & 3, the predictor variables were midwives' knowledge, intent and alcohol use respectively**.** For this study, the outcome behavior for midwives was "communication", which was defined as the dissemination of information on prenatal alcohol consumption based on clinical recommendations and guideline. Communication practices measured include the following: (1) whether health providers assess drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal alcohol use occurs with pregnant women; and (3) whether information shared is accurate and/or reflects national health

guidelines. Overall, this study determined how the predictor variables influenced midwives' communication practices on alcohol guidelines to pregnant women.

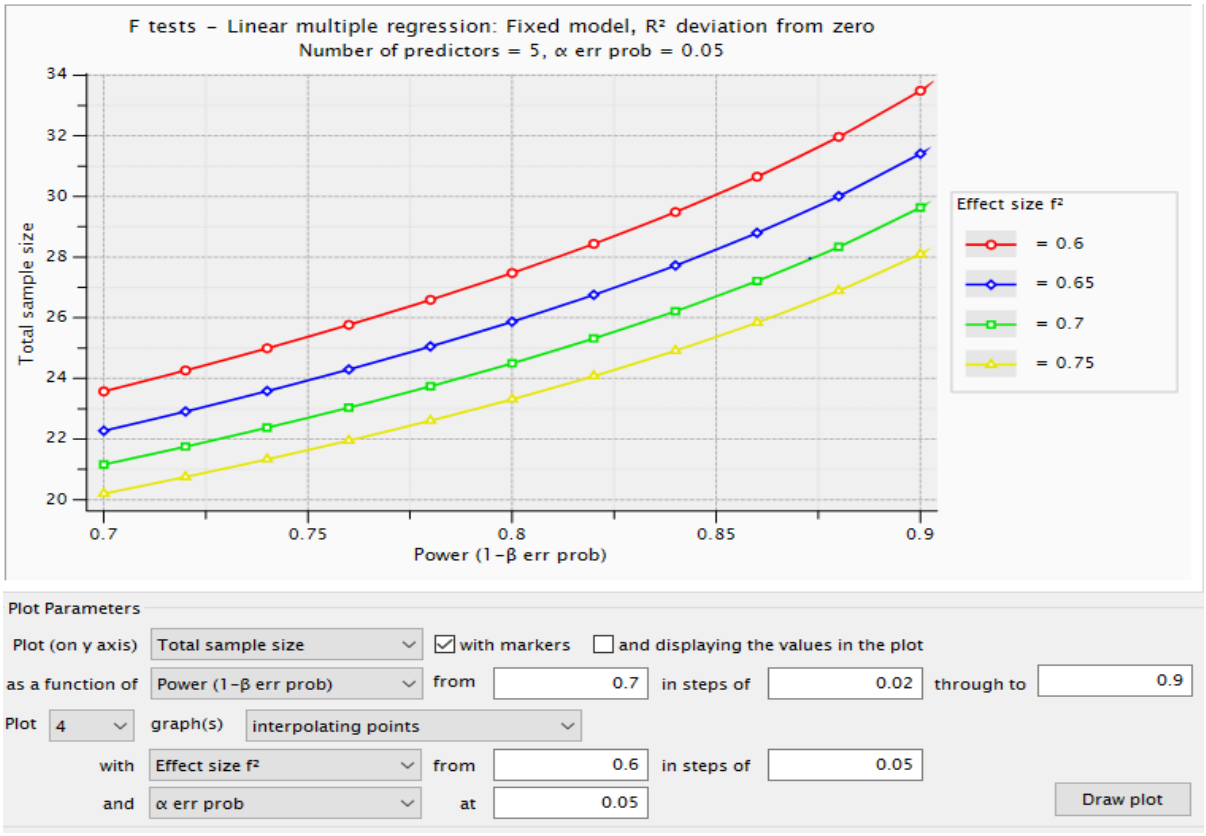
***Sample Size Calculation***

Sample size was calculated using the *priori analysis* on the G*power 3 statistical software (Faul, Erdfelder, Lang, & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009). According to *a priori power analyses*, the following statistical parameters are required to calculate the sample size: a predetermined significance level $\alpha$, the desired statistical power $1 - \beta$, and the population effect size (Cohen, 1988; Faul et al., 2007). Essentially, the *priori power analyses* should be used to computed the approximate sample size needed before a research study is embarked upon.

According to the Theory of Planned Behavior (TPB), individuals are motivated to perform a desired behavior if (1) their overall evaluation of the behavior is positive, (2) they perceive that others important to them would approve of their actions and (3) they are confident that they are able to perform desired behavior (Hausenblas, Carron, & Mack, 1997; Grant et al., 2015). These characterizations portray the following constructs respectively - attitude, subjective norm and perceived behavioral control. Research also concludes that intent was a proximal measure for behavior among clinicians and other health workers (Godin et al., 2008; Eccles et al., 2006; Francis et al., 2004). Studies indicate that health professionals' intrapersonal factors (knowledge, intent, attitude, subjective norms and PBC) influence clinical behavior during hospital encounters with patients (Diekman et al., 2000; Gahagan et al., 2006). A Meta-Analyses that statistically examined the predictive qualities of Theory of Planned Behavior (TPB) showed effect size relationship between TPB constructs and intention ranging between 0.63 to 0.71 (Sutton, 1998). This effect size is described as "medium" to "large" size where $small = 0.2$, $medium = 0.5$, and $large \geq 0.8$

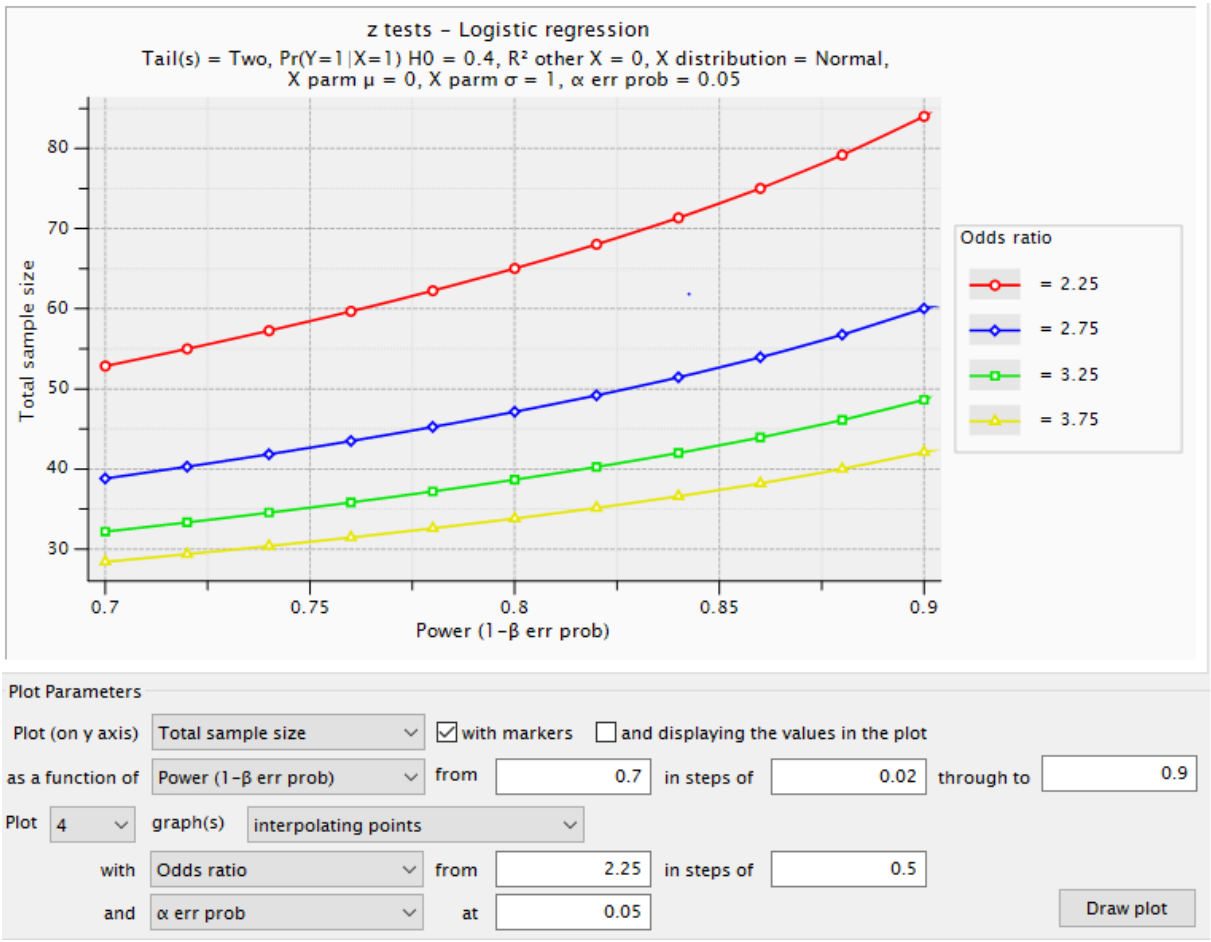
(Cohen, 1988). Based on this finding, this study used effect sizes ranging from 0.6 to 0.75 to compute potential sample sizes that would provide adequate power to assess the null hypothesis. In estimating the sample size, the initial step was to input the appropriate statistical test on the G*power software for analyzing data collected. For this study, the following statistical tests were utilized: (1) Linear regression (2) Logistic regression and (3) two-sample T-test. Choosing a suitable statistical test was subsequently followed by selection from the "type of power analysis" menu. Then, the input parameters were inserted in the lower left corner of the software window. Output parameters were obtained by clicking on the "calculate" button.

**Figure 1.2: The G*Power 3.0 Analysis Using the Linear Multiple Regression**



In *Figure 1.2*, the "Linear multiple regression" is specified as the statistical test that was used for analysis. Effect sizes ranging between 0.6–0.75 represent the 4 plots on the graph, and power varies from 0.7-0.9 as shown on the x-axis. The significance level α 0.05 remains constant. For effect sizes (0.6-0.75), significance level α 0.05 and power (0.7-0.9) on y-axis respectively, the sample size achieves specified values as seen on the x-axis ranging between 20-33 participants.

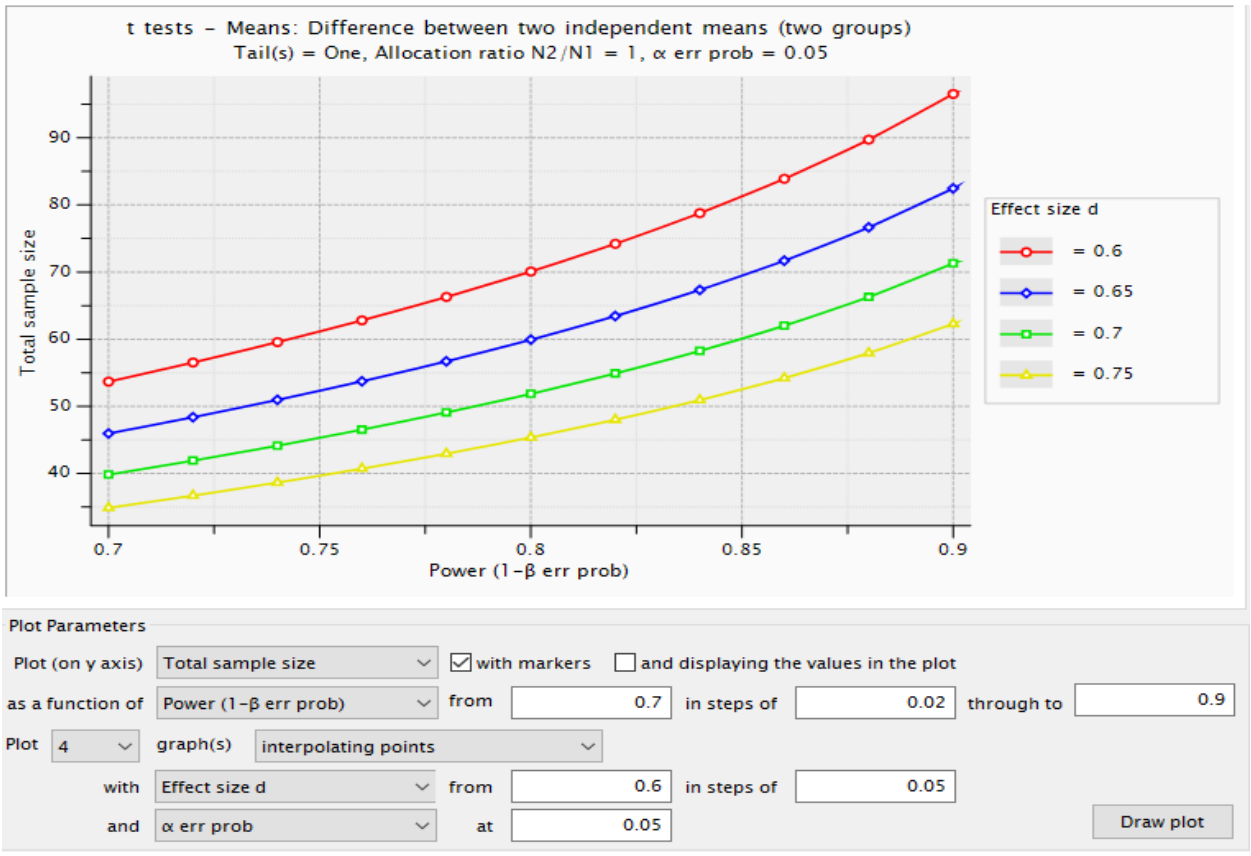
**Figure 1.3: The G*Power 3.0 Analysis Using the Logistic Regression**




In *Figure 1.3*, the "Logistic regression" is specified as the statistical test used for analysis. The odds ratio is represented by the 4 plots on the graph and ranges from 2.24 to 3.74. Power (1-β) varies between 0.7-0.9 are shown on the x-axis while the significance level α 0.05 remains

constant. The odds ratio is defined *OR:* = [ $p_2$/ (1- $p_2$)] / [ $p_1$/ (1- $p_1$)] (Faul et al., 2009). To detect effects of size $p_1$ = 0.4 and $p_2$ = 0.6, the compromise power analysis on the G*power software helps to compute this (Faul et al., 2009). In the effect size drawer, input "Pr (Y=1|X=1) H1" = 0.6, "Pr (Y=1 | X=1) H0" = 0.4. The "Calculate and transfer to main window" yields an odds ratio of 2.4 which it transfers to the main window for analysis where the "Tail(s)" = two, "β/α ratio" = 1, "X distribution" = normal, "X parm μ" = 0, and "X parm σ" = 1. For odds ratio (2.24–3.74), significance level α 0.05 and power (0.7-0.9) on y-axis respectively, the sample size achieves specified values as seen on the x-axis ranging between 28-85 participants.

**Figure 1.4: The G*Power 3.0 Analysis Using the T-Test**



In *Figure 1.4*, the "Two Sample T-test" is specified as the statistical test used for analysis. Effect sizes ranging 0.6–0.75 represent the 4 plots on the graph, with power varying between 0.7-0.9 are shown on the x-axis. The significance level α 0.05 remains constant. For a particular effect size (0.6-0.75), significance level α 0.05 and power (0.7-0.9) on y-axis respectively, the sample size achieves specified values as seen on the x-axis ranging between 35-95 participants.

This section sought to compute the minimum sample size of participants required to find an association between midwives' intrapersonal concepts and their communication practices on alcohol-related messages to pregnant women. Given the output parameters on the G*power software, this study utilized an effect size = 0.65. Thus, it was determined that a minimum of 70 midwives would be required to participate in this study to achieve power = 0.85 in a statistical test based on $\propto = 0.05$. According to previous studies, response rate among midwives was projected to be approximately 20% (Fullerton et al., 2015; Rompala, Cirino, Rosenberg, Fu, & Lambert, 2016). As a result, this study's goal was to administer surveys to a minimum of 350 midwives. However, invitation emails were sent to all 438 members from the Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) respectively.

# CHAPTER II

# COMMUNICATION PRACTICES AMONG TEXAS MIDWIVES: EXAMINING THE IMPLICATIONS OF INCREASED KNOWLEDGE ON STANDARDIZED ALCOHOL GUIDELINES AND SCREENING TOOLS

Irrefutable scientific evidence has indicated that intrapartum fetal alcohol exposure could potentially result in a continuum of syndromic anomalies seen in the unborn child. This group of associated symptoms, which include permanent brain damage, congenital defects, prenatal or postnatal growth restriction, and characteristic facial dysmorphogenesis, have been collectively identified as fetal alcohol spectrum disorders (FASD; Jacobson, Jacobson, Sokol, & Ager, 1998; Jacobson & Jacobson, 1999; C. M. O'Leary et al., 2010a; C. M. O'Leary et al., 2010b; O'LEARY et al., 2013; Riley, Infante, & Warren, 2011). Additionally, fetal alcohol spectrum disorders (FASD) is 100% attributable to prenatal alcohol consumption (American Academic of Pediatrics, 2000; Mattson & Schoenfeld, 2001; Sampson et al., 1997). Other complications that could occur in a pregnant woman engaging in alcohol consumption include stillbirth, spontaneous abortion, premature birth, intrauterine growth retardation and low birthweight (Popova et al., 2017). It is projected that global prevalence of Fetal Alcohol Spectrum Disorders (FASD) could increase in subsequent years as a result of increasing alcohol consumption among women of child bearing age (Thomas, 2012; WHOGlobal status report on alcohol and health 2014, 2014; Australian Bureau of Statistics, 2006).

## *Clinical Drinking Guidelines for Pregnant Women*

Despite the wealth of scientific literature on adverse neuro-developmental effects resulting from fetal alcohol exposure, the threshold (i.e., "unsafe level") that could cause fetal damage

remains a subject of controversy. For instance, some scientific studies document detrimental consequences at low levels of maternal alcohol use during pregnancy (Windham, Von Behren, Fenster, Schaefer, & Swan, 1997; Lundsberg, Bracken, & Saftlas, 1997); while other studies found little or no evidence of adverse outcomes at minimal levels of prenatal alcohol consumption (Colvin, Payne, Parsons, Kurinczuk, & Bower, 2007; Gaskins et al., 2015; Mamluk et al., 2017). Given the threshold level for harmful effects of alcohol on the fetus is scientifically unknown, the United States (U.S.) Surgeon General's advisory on alcohol and pregnancy have established guidelines asserting any level of alcohol consumption during pregnancy is unsafe for the fetus. The U.S.'s Surgeon General, National Institute on Alcohol Abuse and Alcoholism (NIAAA) and other medical society groups (e.g. The American Academy of Pediatrics) have all issued recommendations urging women to abstain from all forms of alcohol use while pregnant (General, 2005; Gunzerath, Faden, Zakhari et al., 2004).

While most countries have official guidelines unequivocally citing pregnant women should completely abstain from alcohol consumption, a number of countries advise minimizing alcohol use during pregnancy (O Leary, Heuzenroeder, Elliott, & Bower, 2007). For instance, Ireland, Singapore and South Africa propose "cutting down alcohol" among women trying to conceive (International Alliance for Responsible Drinking, (IARD), 2018). Until recently, the United Kingdom recommended that consumption of 1-2 units of alcohol once or twice a week served as low risk for pregnant women ( International Alliance for Responsible Drinking, (IARD), 2018; O Leary et al., 2007). Overall, there is no universally accepted and implemented recommendation regarding the drinking behaviors of pregnant mothers.

***Standardized Alcohol Screening Tools for Pregnant women***

Due to potential unfavorable outcomes resulting from any amount of fetal alcohol exposure, screening for maternal drinking behavior has become increasingly crucial to identifying babies at risk to allow for proper intervention. However, major difficulties are encountered by clinicians when assessing alcohol use during pregnancy. For instance, during alcohol screening interviews, some women are likely to modify their characterization of drinking habits because of shame and/or fear of scrutiny (Chang, 2001). Therefore, it is probable for women who engage in higher levels of perinatal alcohol drinking to underreport alcohol quantities consumed. In addition, some screening instruments, which were originally intended to assess for alcoholism - such as the Michigan Alcoholism Screening Test (MAST; Selzer, 1971) and the CAGE (Ewing, 1984) - are not ideal for general screening of alcohol consumption behaviors among pregnant women. Compared to MAST and CAGE, studies show that TACE and TWEAK are more efficient and sensitive in identifying alcohol use in pregnancy (Hankin & Sokol, 1995; Russell et al., 1996). The TACE is a 4-item questionnaire used to assess for risky drinking among pregnant patients (Sokol, Martier, & Ager, 1989)**.** An overall TACE score is assessed on a scale of 0-5 ( ≥ 2 points depicts pregnancy risk drinking). Like TACE, the TWEAK evaluates for alcohol use among the obstetric patient population. The TWEAK, which is a 5-item alcohol screening tool, incorporates questions from MAST, CAGE and TACE. The overall TWEAK score is assessed on a 7-point scale. A score of ≥ 2 points depicts pregnancy risk drinking (Chang, 2001). These instruments are easily administered through questionnaires or patient's interview.

Given the constellation of factors outlined above, it is pertinent to examine dissemination of standardized guidelines on alcohol abstinence and use of alcohol screening tools among pregnant patients. Specifically, the purpose of this study was to evaluate midwives' knowledge

about the Surgeon General's guidelines on prenatal alcohol consumption, commonly used alcohol screening instruments, and potential adverse outcomes in an alcohol-exposed fetus. Secondly, this study sought to determine how midwives' knowledge on alcohol guidelines and screening tools, influence communication practices on prenatal alcohol consumption.

## *Methods*

### Participants' Recruitment

Participants for this study were recruited from the Association of Texas Midwives (ATM) and Consortium of Texas certified Nurse Midwives (CTCNM). The Association of Texas Midwives (ATM) and Consortium of Texas certified Nurse Midwives (CTCNM) are Texas health professional organizations consisting of certified professional midwives (CPMs) and certified nurse midwives (CNMs) who work in a variety of settings such as clinics, hospitals, medical centers, birth centers, homes and their own private practices. Certified professional midwives (CPMs) are direct-entry midwives who have acquired training in the midwifery program. On the other hand, certified nurse midwives (CNMs) are registered nurses with a Bachelor's Degree and have completed a graduate level program in nurse-midwifery. Both CPMs and CNMs offer reproductive health services involving pregnancy, childbirth, and the postpartum period. However, certified nurse midwives (CNMs) provide additional services in family planning, prescriptive abilities and routine gynecological needs.

### Data Collection

All members (n = 438) from the Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) were invited to participate. Membership email-lists were obtained and used with approval from chapter presidents for both ATM and CTCNM.

Midwives were eligible to participate in this study if they had undergone training in the field of prenatal care, labor, delivery, and were affiliated with a midwife professional organization in Texas. To assess for face validity, content validity, clarity of questions, and ease of completion, the questionnaire was reviewed by experienced healthcare professionals. Survey questions were modified as required based on feedback. In the month of April 2018, a pilot study was conducted among randomly selected ATM (n = 20) and CTCNM (n = 25) members to determine clarity and ease of completion of the questionnaire. A total number of twelve (n = 12) midwives completed the pilot study questionnaire. These 12 participants were included in the final sample of respondents since no changes were made to the study methodology or questionnaire. Following the pilot study phase, invitation emails were sent to the rest of the ATM (n = 154) and CTCNM (n = 239) members in the month of May, 2018. In total, approximately 174 midwives (belonging to ATM) and 264 midwives (belonging to CTCNM) received invitation emails. Some of the invitation emails (n = 13) sent to participants were undeliverable. Altogether, seventy-seven (n = 77) midwives (including 12 participants from the pilot study) participated in this study. This represented a response rate of approximately 18% which was equivalent to those obtained from other research studies where data was obtained from midwives (Moniz et al., 2017; Fullerton et al., 2015; Rompala, Cirino, Rosenberg, Fu, & Lambert, 2016). Each participant who completed the survey questionnaire had the opportunity to enter a raffle draw to win a Fitbit Blaze Smart Fitness Watch.

The survey was distributed to study participants following Dillman's method for online questionnaires (Dillman, 2011). All participants had approximately 6 weeks to complete the online questionnaire. The initial solicitation and follow-up invitation emails were sent a week apart in order to garner an increased response rate. The follow-up email thanked midwives who had

completed the questionnaire and requested that non-responders fill out the online survey. A third email was sent to all ATM and CTCNM members during the 4th week of the 6-week period. As each participant completed the questionnaire, their response was automatically stored on the researcher's Texas A&M University Qualtrics account. After survey link deactivated, a downloadable Microsoft excel file containing participants' responses was imported into the STATA/IC 14.2 (64-bit) software for analysis. Data was subsequently cleaned and variables were labeled.

**Measures**

*Knowledge*

In order to assess for knowledge, a 12-item knowledge questionnaire was developed based on a review of scientific literature (Francis et al., 2004; Norman & Bell, 1999). The 12-item knowledge questionnaire evaluated: (1) knowledge of clinical guidelines regarding prenatal alcohol consumption; (2) knowledge on common screening instruments (i.e., T-ACE, TWEAK) used to assess alcohol consumption in pregnant women; and (3) knowledge of potential outcomes in babies exposed to alcohol in-utero. Correct responses were awarded 1 point while incorrect answers were coded as 0. Each participant's overall score was obtained by calculating the sum of the 12-item questions. Overall knowledge score ranged from 0 – 12 points, with higher scores indicating greater knowledge of prenatal alcohol-related guidelines, risks and outcomes. Overall knowledge score was treated as a continuous variable.

*Communication Practices*

While the predictor variable was knowledge, the outcome variables were communication practices measured as: (1) whether midwives assess drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal alcohol use occurs with pregnant women; and

(3) whether information shared is accurate and/or reflects national health guidelines. Outcome variables (1) and (3) had "yes or no" and "accurate or inaccurate" as possible response format respectively. Responses were coded: accurate = 1, inaccurate = 0 and yes = 1, no = 0, respectively. An example of question measuring whether midwives assessed drinking behavior (variable 1) was, "In each trimester, indicate whether you would ask a patient about her alcohol use during pregnancy? An example of question assessing whether information shared reflected national health guidelines (variable 3) was, "Which of the following best describes the advice you give a patient regarding alcohol use during pregnancy?

The question-items measuring frequency of midwives' communication about alcohol (variable 2) used a 5-point Likert scale (never, rarely, sometimes, often and always). An example of such question was, "How often would you ask a patient about her alcohol use during the following trimesters of her pregnancy?" The response format was scored: never = 1, always = 5. All outcome variables were categorical. Outcome variable (2) was treated as an ordinal categorical variable

**Data Analysis**

A Multiple Linear Regression was used to determine if the overall knowledge scores could be predicted based on participants' age, location for birth deliveries (birth centers, home etc.), midwife professional group (CPMs and CNMs), years of practice and average number of patients seen per week. The Multiple Logistic Regression was used to depict how variations in participants' overall knowledge scores impacted (1) whether midwives assess drinking behaviors in pregnant patients; (2) the frequency with which communication on prenatal alcohol use occurs with pregnant women; and (3) whether information shared is accurate and/or reflects national health

guidelines. An Ordered Logistic Regression was used to analyzed the ordinal outcome variable (2) and overall knowledge score.

## *Results*

### Participants' Demographics

Approximately 57% of the midwives who participated identified as a Certified Nurse Midwives (CNM). Another estimated 33% and 6% of midwives categorized themselves to be either Certified Professional Midwives (CPM) or Certified Midwives (CM), respectively. Nine-eight percent (98%) identified as female, and 89% of participants reported being white (non-Hispanic). With participants' age ranging between 26 to 76 years, mean age was determined to be 48.98 years (*SD* = 12.89). Average number of pregnant women seen by midwives per week was 29.36 (*SD* = 27.97). Approximately 20% of respondents had a bachelor's degree, half (50%) of the sample had acquired a master's degree, while 16% had a doctorate. Participants described their place of employment as: midwifery group practice (38%), physician group practice (15%) and hospital/medical center (15%). Approximately one third of participants (33%) worked in locations designated as Urban (not inner city), while 27% worked in a rural setting. Only forty-seven percent (47%) of midwives delivered babies in the hospital setting. The rest of the midwives took birth deliveries either at a birth center (37%) or a home (15%). The average years for midwifery practice among participants was 13.76 years (*SD* = 10.88) among participants. See *Table 2.1*.

**Table 2.1 – Participants' Demographics**

| | Percentages (%) |
|---|---|
| **Sub- categories** | |
| Certified nurse midwife | 57.14 |
| Certified midwife | 6.35 |
| Certified professional midwife | 33.33 |
| Other | 3.17 |
| **Racial group** | |
| White non-hispanic | 88.71 |
| Hispanic | 1.61 |
| Black/African American | 4.84 |
| American Indian/Alaska Native | 1.16 |
| **Age categories (years)** | |
| ≤ 35 | 15.87 |
| 36 – 45 | 26.98 |
| 46 – 55 | 19.05 |
| 56 – 65 | 25.40 |
| ≥ 66 | 12.70 |
| **Education** | |
| Diploma | 4.84 |
| Associate | 9.68 |
| Bachelor's | 19.35 |
| Master's | 50.00 |
| Doctorate | 16.13 |
| **Years of experience (years)** | |
| ≤ 5 | 36.67 |
| 6 – 15 | 21.67 |
| 16 – 25 | 28.33 |
| ≥ 26 | 13.33 |
| **Employment location** | |
| Urban inner city | 15.87 |
| Urban not inner city | 33.33 |
| Rural | 26.98 |
| Suburban | 23.81 |
| **Locations for birth delivery** | |
| Hospital | 37.33 |
| Birth center | 30.65 |
| Home | 32.00 |

**Participants' Performance on the Knowledge Questionnaire**

Majority of study participants (98%) who completed the knowledge questionnaire could accurately identify potential adverse outcomes seen in infants exposed to perinatal alcohol. See *Table 2.2*. These outcomes include learning disabilities, poor motor functions, delayed social skills, attention deficit, growth impairments and birth defects. In addition, approximately 94% of participants were knowledgeable about the Surgeon General's guideline regarding prenatal alcohol use stating that pregnant women or women planning to become pregnant should completely abstain from consuming alcohol. However, only 79% of midwives believed that any alcoholic drink was unsafe for the fetus during pregnancy. A majority of respondents (63%) did not know TACE and TWEAK were alcohol screening tools that could be used to assess alcohol consumption behaviors among pregnant women. Some midwives revealed that they considered alcohol to be safe in the 3rd trimester (15%) while a minor portion of midwives felt alcohol was safe throughout pregnancy (3%). Eighty-five percent (85%) of all study participants had overall knowledge scores ranging between 9 to 12. The mean overall knowledge scores for Certified Professional Midwives (CPMs) and Certified Nurse Midwives (CNMs) were ($M$ = 8.81, $SD$ =1.94; 95% CI: 7.93 – 9.70) and ($M$ = 10.00, $SD$ = 0.93; 95% CI: 9.70 – 10.30), respectively.

**Assessing Communication Practices among Participants**

Midwives' communication practices were measured as: (1) whether midwives assessed drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal alcohol use occurred with pregnant women; and (3) whether information shared was accurate and/or reflected national health guidelines. See *Table 2.4.*

## Table 2.2 – Midwives' Responses on the Knowledge Questionnaire

| Knowledge questions | CNM (%) | | CPM (%) | |
|---|---|---|---|---|
| **Which of the following could be a potential outcome seen in the baby of a patient who engages in prenatal alcohol use?** | **Yes** | **No** | **Yes** | **No** |
| a) Learning disabilities | 100.00 | 0.00 | 100.00 | 0.00 |
| b) Poor motor functions | 100.00 | 0.00 | 100.00 | 0.00 |
| c) Delayed social skills | 100.00 | 0.00 | 100.00 | 0.00 |
| d) Attention deficits | 100.00 | 0.00 | 100.00 | 0.00 |
| e) Growth impairments | 100.00 | 0.00 | 100.00 | 0.00 |
| f) Birth defects | 97.44 | 2.56 | 100.00 | 0.00 |
| g) Psychiatric disorder | 100.00 | 0.00 | 100.00 | 0.00 |
| **Which of the following statements corresponds most closely with the Surgeon General's guideline regarding prenatal alcohol use?** | **CNM (%)** | | **CPM (%)** | |
| a) Don't drink. But if you do, occasional consumption of alcohol is not harmful to the mother or fetus. | 0.00 | | 0.00 | |
| b) Pregnant women or women planning to become pregnant should completely abstain from consuming alcohol. | 95.00 | | 95.23 | |
| c) Consumption of 1-2 drink of alcohol once in a while during pregnancy is safe for the fetus. | 0.00 | | 0.00 | |
| d) Any alcohol consumption during pregnancy is considered safe for the fetus | 2.50 | | 0.00 | |
| e) I don't know the answer to this | 2.50 | | 4.76 | |
| **Which of the following is a useful alcohol screening instrument for pregnant women?** | | | | |
| a) TWEAK | 22.50 | | 10.00 | |
| b) T-ACE | 17.50 | | 5.00 | |
| c) PAGE | 0.00 | | 0.00 | |
| d) CAST | 7.50 | | 0.00 | |
| e) I don't know | 52.50 | | 85.00 | |
| **Which of the following trimesters of pregnancy do you consider prenatal alcohol use to be safe to fetus?** | | | | |
| a) 1st trimester only | | | | |
| b) 2nd trimester only | 0.00 | | 0.00 | |
| c) 3rd trimester only | 0.00 | | 0.00 | |
| d) 1st, 2nd and 3rd trimesters | 12.50 | | 23.80 | |
| e) I don't believe alcohol is safe during any trimester | 5.00 | | 0.00 | |
| | 82.50 | | 76.19 | |
| **How many alcohol drinks (per occasion) do you believe is safe for the fetus?** | | | | |
| a) 0 drink | 78.38 | | 80.95 | |
| b) 1 drink | 18.92 | | 19.05 | |
| c) 2 drinks | 2.70 | | 0.00 | |

**Table 2.3: Midwives' Overall Knowledge Scores**

| Overall Knowledge Scores | CPMs (%) | CNMs (%) |
|---|---|---|
| **0** | 0.00 | 0.00 |
| **1** | 0.00 | 0.00 |
| **2** | 0.00 | 0.00 |
| **3** | 4.76 | 0.00 |
| **4** | 0.00 | 0.00 |
| **5** | 0.00 | 0.00 |
| **6** | 9.52 | 0.00 |
| **7** | 9.52 | 2.50 |
| **8** | 0.00 | 2.50 |
| **9** | 23.81 | 17.50 |
| **10** | 47.62 | 50.00 |
| **11** | 4.76 | 25.00 |
| **12** | 0.00 | 2.50 |

In determining whether communication on prenatal alcohol consumption actually occurred, all midwives (100%) who participated reported that they would typically ask a patient about her alcohol use during her first prenatal visit. In contrast, only 37% and 39% of midwives say they would ask a patient about her alcohol use during the 2nd and 3rd trimesters of pregnancy respectively. Refer to *Table 2.4.* In assessing whether information disseminated was accurate, 83% of midwives indicate they would counsel their patient to totally abstain from alcohol while pregnant. This is in keeping with standardized alcohol guidelines in the United States. On the other hand, the remaining participants opted for recommendations that would either advice their patients to drink once in a while (8%) or take no more than 1 drink per day (8%). Refer to *Table 2.4.* In measuring frequency of communication, 64% of study participants stated that they "always" asked about prenatal alcohol consumption during 1st trimester visits. Seven-nine percent (79%) and 74%

## Table 2.4 – Midwives' Responses on Communication Practices

| Questions measuring Presence of Communication | CNM (%) | | CPM (%) | |
|---|---|---|---|---|
| **During a first prenatal visit, would you typically ask a patient about her alcohol use?** | **Yes** | **No** | **Yes** | **No** |
| | 100.00 | 0.00 | 100.00 | 0.00 |
| **In each trimester, indicate whether you would ask a patient about her alcohol use during pregnancy?** | | | | |
| a) Trimester 1 | 94.87 | 5.13 | 100.00 | 0.00 |
| b) Trimester 2 | 30.56 | 69.44 | 47.37 | 56.53 |
| c) Trimester 3 | 35.14 | 64.84 | 42.11 | 57.89 |

| Questions measuring Accuracy of Communication | CNM (%) | CPM (%) |
|---|---|---|
| **Which of the following best describes the advice you give a patient regarding her alcohol use during pregnancy?** | | |
| a) You should totally abstain from alcohol while pregnant. | 85.00 | 80.95 |
| b) Drink once in a while (a drink on festive occasion is alright). | 5.00 | 14.29 |
| c) Take 1 - 2 drinks every now and then | 0.00 | 0.00 |
| d) Don't drink. But if you do, take no more than 1 drink per day | 7.50 | 4.76 |
| e) No recommendations are given | 2.50 | 0.00 |

| Questions measuring Frequency of Communication | CNM (%) | | | | | CPM (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **How often would you ask a patient about her alcohol use during the following trimesters of her pregnancy?** | **Never** | **Rarely** | **Sometimes** | **Often** | **Always** | **Never** | **Rarely** | **Sometimes** | **Often** | **Always** |
| a) Trimester 1 | 2.50 | 7.50 | 10.00 | 25.00 | 55.00 | 0.00 | 4.76 | 14.29 | 4.76 | 76.19 |
| b) Trimester 2 | 10.00 | 40.00 | 35.00 | 7.50 | 7.50 | 9.52 | 42.86 | 14.29 | 19.05 | 14.29 |
| c) Trimester 3 | 15.38 | 41.03 | 23.08 | 11.11 | 11.11 | 9.52 | 38.10 | 19.05 | 19.05 | 14.29 |
| **How often would you discuss concerns about the following risk factors with your pregnant patients?** | | | | | | | | | | |
| a) Alcohol, drug or tobacco use during pregnancy | 2.50 | 7.50 | 17.50 | 10.00 | 62.50 | 0.00 | 4.76 | 9.52 | 14.29 | 71.43 |
| b) Partner's use of alcohol, drug or tobacco | 5.13 | 33.33 | 12.82 | 25.64 | 23.08 | 4.76 | 4.76 | 33.33 | 4.76 | 52.38 |
| c) Mental Health (e.g. depression, bipolar) | 0.00 | 2.50 | 7.50 | 25.00 | 65.00 | 0.00 | 0.00 | 4.76 | 23.81 | 71.43 |
| d) Chronic illnesses (e.g. HIV) | 0.00 | 0.00 | 17.95 | 23.08 | 58.97 | 0.00 | 19.04 | 4.76 | 4.76 | 71.43 |
| e) History of sexual abuse | 0.00 | 10.26 | 15.38 | 23.08 | 76.19 | 0.00 | 4.76 | 14.29 | 4.76 | 76.19 |
| f) Unemployment | 15.00 | 17.50 | 25.00 | 15.00 | 27.50 | 4.76 | 19.04 | 7.50 | 19.04 | 22.50 |

of midwives specified that they "sometimes", "rarely" or 'never" inquired about prenatal alcohol use during the 2nd and 3rd trimesters respectively. On the average, 62% of midwives affirmed that they "always" expressed as alcohol, drug or tobacco use; psychiatric illness (e.g. depression, bipolar); history of sexual abuse; unemployment and chronic illnesses (e.g. HIV). See *Table 2.4*

**Associations between Overall Knowledge Scores and Demographics**

The Multiple Linear Regression analysis examined the association between "overall knowledge score" and participants' age, gender, years of midwifery practice, highest academic degree, average number of patients seen per week, location of birth deliveries and midwife professional group (CNMs or CPMs). Overall, the model accounted for a statistically significant proportion of the variance associated with midwives' knowledge score" F (11, 42) = 2.59, p= 0.013, $R^2 = 0.404$. Home birth delivery, participants' level of education (Master's and Doctorate degrees) and midwife professional group were all statistically significant. Refer to *Table 2.5*

**Associations between Overall Knowledge Scores and Communication Practices**

Logistics Regression analysis investigated the relationship between participants' overall knowledge scores and communication practices while, accounting for possible confounding variables (age, years of practice and highest academic degree). Overall, during the 2nd trimesters of pregnancy, midwives who were (a) older in years (*OR* = 1.19, *p* = 0.013), (b) more experienced with years of practice (*OR* = 0.79, *p* = 0.013) and (3) working in an Urban (not inner city; *OR* = 0.01, *p* = 0.042) and Suburban areas (*OR* = 0.001, *p* = 0.005), were more likely to ask their patient about prenatal alcohol use. Refer to *Table 2.6.* As seen in *Table 2.7*, during the 3rd trimesters of pregnancy, midwives who were (a) older in years (*OR* = 1.20, *p* = 0.013), (b) more experienced with years of practice (*OR* = 0.80, *p* = 0.011) and (3) working in an Urban (not inner city; *OR* =.

**Table 2.5: Linear Regression on Overall Knowledge Scores and Participants' Demographics**

| | Coefficients | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Overall knowledge score | | | | |
| Participants' age | 0.02 | - 0.02 to 0.07 | 0.310 | 0.02 |
| Gender | 0.47 | - 2.37 to 3.30 | 0.735 | 1.39 |
| Years of midwifery practice | -0.01 | - 0.06 to 0.05 | 0.854 | 0.03 |
| Location for birth deliveries | | | | |
| Birth center | 0.18 | -1.02 to 1.39 | 0.759 | 0.59 |
| Home | -1.80 | -3.43 to -0.18 | **0.028** | 0.79 |
| Highest level of education | | | | |
| Associate | -1.54 | -3.74 to 0.65 | 0.158 | 1.07 |
| Bachelor's | -0.43 | -2.48 to 1.62 | 0.672 | 1.00 |
| Master's | -2.87 | -5.50 to -0.25 | **0.031** | 1.29 |
| Doctorate | -3.11 | -5.83 to -0.39 | **0.024** | 1.32 |
| Midwife professional group (CPM) | -2.93 | -479 to -1.06 | **0.003** | 0.92 |
| Average number of patients seen per week | -0.01 | -0.03 to 0.01 | 0.558 | 0.01 |

**Table 2.6: Logistic Regression on Presence of Communication in 2nd Trimester and Overall Knowledge Scores**

| | Odds ratio | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Actual distribution of information | | | | |
| Overall knowledge score | 3.01 | 0.70 to 13.03 | 0.140 | 2.25 |
| Participants' age | 1.19 | 1.04 to 1.37 | **0.013** | 0.08 |
| Years of midwifery practice | 0.79 | 0.65 to 0.95 | **0.013** | 0.08 |
| Location of birth deliveries | | | | |
| Birth center | 1.82 | 0.05 to 62.13 | 0.739 | 3.28 |
| Home | 0.01 | 8.61e-06 to 4.30 | 0.127 | 0.02 |
| Highest level of education | | | | |
| Associate | 3.79e-05 | 7.66e-10 to 1.88 | 0.065 | 2.09e-04 |
| Bachelor's | 4.58e-04 | 1.54e-10 to 13.59 | 0.143 | 2.40e-03 |
| Master's | 1.15e-04 | 1.25e-09 to 10.54 | 0.120 | 6.69e-04 |
| Midwife professional group (CPM) | 36.08 | 0.07 to 18502.24 | 0.260 | 114.88 |
| Employment location | | | | |
| Urban not inner city | 0.01 | 5.25e-05 to 0.83 | **0.042** | 0.02 |
| Rural | 0.03 | 5.35e-04 to 1.22 | 0.063 | 0.05 |
| Suburban | 8.93e-04 | 3.71e-06 to 0.21 | **0.012** | 2.50e-03 |

0.01, $p = 0.030$) and Suburban areas ($OR = 0.002$, $p = 0.014$), were more likely to ask their patient about prenatal alcohol use. In both 2nd and 3rd trimesters, the independent variables statistically

significantly predicted the outcome variable, chi-square = 25.42, p= 0.013, pseudoR-square =0.443 and chi-square =29.55, p=0.006, pseudoR-square = 0.452 respectively. Refer to *Tables 2.6 & 2.*7.

**Table 2.7: Logistic Regression on Presence of Communication in 3rd Trimester and Overall Knowledge Scores**

| | Odds ratio | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Actual distribution of information | | | | |
| Overall knowledge score | 3.12 | 0.81 to 11.99 | 0.098 | 2.14 |
| Participants' age | 1.20 | 1.07 to 1.36 | **0.005** | 0.08 |
| Years of midwifery practice | 0.80 | 0.68 to 0.95 | **0.011** | 0.07 |
| Location of birth deliveries | | | | |
| Birth center | 1.50 | 0.05 to 47.89 | 0.818 | 2.65 |
| Home | 0.01 | 4.5e-05 to 2.86 | 0.112 | 0.03 |
| Highest level of education | | | | |
| Associate | 6.64e-05 | 1.94e-09 to 2.28 | 0.071 | 3.53e-04 |
| Bachelor's | 5.73e-04 | 2.82e-08 to 11.65 | 0.140 | 2.9e-03 |
| Master's | 2.54e-04 | 6.51e-09 to 9.91 | 0.125 | 1.37e-03 |
| Midwife professional group (CPM) | 27.78 | 0.15 to 5073.20 | 0.211 | 73.81 |
| Employment location | | | | |
| Urban not inner city | 6.76e-03 | 7.51e-05 to 0.61 | **0.030** | 0.02 |
| Rural | 0.03 | 7.38e-04 to 1.00 | 0.050 | 0.05 |
| Suburban | 1.86e-03 | 1.2e-05 to 0.29 | **0.014** | 4.78e-03 |

**Table 2.8: Logistic Regression between Use of Accurate Information and Knowledge Scores**

| | Odds ratio | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Participants' use of accurate information | | | | |
| Overall knowledge score | 1.50 | 0.79 to 2.83 | 0.212 | 0.49 |
| Participants' age | 1.13 | 1.01 to 1.27 | **0.041** | 0.07 |
| Years of midwifery practice | 0.93 | 0.80 to 1.07 | 0.293 | 0.07 |
| Location of birth deliveries | | | | |
| Birth center | 0.09 | 7.63e-03 to 1.00 | 0.050 | 0.11 |
| Home | 0.10 | 3.57e-03 to 2.95 | 0.184 | 0.18 |
| Midwife professional group (CPM) | 9.88 | 0.66 to 147.59 | 0.097 | 13.63 |

*Refer to Table 2.8*. Statistical interaction between overall knowledge score and accuracy of communication depicted that midwives who were older in age OR: 1.13 [p = 0.041 (95% CI: 1.01 – 1.27)] were more likely to disseminate accurate information based on standardized guidelines

regarding prenatal alcohol consumption. These variables statistically significantly predicted "accuracy of communication", chi-square = 13.13, p= 0.041, psuedoR-square = 0.267

**Table 2.9: Ordered Logistic Regression between Participants' Frequency of Communication in the 3rd Trimester and Knowledge Scores**

| | Coefficient | 95% CI | p value | Standard error |
|---|---|---|---|---|
| **Participants' frequency of communication** | | | | |
| Overall knowledge score | 0.09 | -0.42 to 0.61 | 0.735 | 0.26 |
| Participants' age | 0.14 | 0.05 to 0.23 | **0.002** | 0.05 |
| Years of midwifery practice | -0.18 | -0.29 to -0.07 | **0.001** | 0.06 |
| Location of birth deliveries | | | | |
| Birth center | 7.13 | 0.85 to 13.41 | **0.026** | 3.21 |
| Home | 3.48 | -2.86 to 9.81 | 0.282 | 3.23 |
| Highest level of education | | | | |
| Associate | -4.78 | -8.83 to -0.73 | **0.021** | 2.07 |
| Bachelor's | -4.13 | -7.99 to -0.27 | **0.036** | 1.97 |
| Master's | -5.34 | -10.34 to -0.35 | **0.036** | 2.55 |
| Doctorate | -6.11 | -11.09to -1.14 | **0.016** | 2.54 |
| Midwife professional group (CPM) | 2.45 | -1.01 to 5.91 | 0.165 | 1.76 |
| Employment location | | | | |
| Urban not inner city | -3.06 | -5.45 to -0.68 | **0.012** | 1.22 |
| Rural | -1.61 | -3.67 to 0.45 | 0.126 | 1.05 |
| Suburban | -3.67 | -6.28 to -1.06 | **0.006** | 1.33 |
| Primary employer | | | | |
| Educational institution | -0.86 | -3.90 to 2.18 | 0.579 | 1.55 |
| Federal government/military | -2.51 | -7.50 to 2.48 | 0.324 | 2.55 |
| Community health center | -27.02 | -16373.87 to 16319.82 | 0.997 | 8340.38 |
| Physician group practice | 0.74 | -1.47 to 2.95 | 0.512 | 1.13 |
| Midwifery group practice | -7.85 | -14.12 to -1.58 | **0.014** | 3.20 |
| State/local government | -5.23 | -10.13 to -0.33 | **0.036** | 2.50 |
| Other | -7.92 | -14.31 to -1.53 | **0.015** | 3.26 |

The Ordered Logistic Regression analysis showed that participants (1) who were older and (2) who participated in birth center deliveries were more likely to have an increased frequency of sharing information with pregnant patients about their alcohol use during the 2nd and 3rd trimester. Furthermore, years of midwifery practice, level of education, employment location and primary employer were significant predictors in the model. The predictor variables statistically significantly predicted the outcome variable, chi-square = 35.50, p= 0.018, pseudoR-square = 0.245. *Refer to Table 2.9*

***Discussion***

In order to prevent prenatal alcohol exposure and subsequently reduce the incidence of fetal alcohol spectrum disorders (FASD), the midwife's role is fundamental in fostering her patient's ability to abstain from alcohol use before conception and during pregnancy (Elek et al., 2013; Raymond, Beer, Glazebrook, & Sayal, 2009; O'Connor and Whaley, 2007; Floyd, O'Connor, Bertrand, and Sokol, 2006). Midwives are uniquely positioned to educate on and promote alcohol abstinence behavior among their pregnant patients (O'Connor, & Whaley, 2007). In previous investigations, however, some midwives concede that lack of information and knowledge may contribute to their reluctance to disseminate alcohol-related messages based on standardized guidelines (Jones, Telenta, Shorten, & Johnson, 2011).

In the current study, a majority of participants were informed about (1) the negative birth outcomes seen in babies with FASD, and (2) the U.S. Surgeon General's guidelines regarding prenatal alcohol use which encourages pregnant women to abstain from consuming alcohol. This is conceivably the result of years of training, education, and research targeted at informing health professionals about the risk of prenatal alcohol consumption. These findings highlight a disconnect between acquisition of knowledge on (a) prenatal alcohol risks, (b) associated health policies and midwives' assessment on communication regarding drinking while pregnant. Midwives, who were older, were more likely to (1) ask their patient about prenatal alcohol use (2) disseminate accurate information on prenatal alcohol consumption and (3) share with an increased frequency, the prenatal alcohol use information with pregnant patients.

About 85% of midwives had a high overall knowledge score ranging between 9-12 in the 12-item knowledge questionnaire; 70% of these individuals were Certified Nurse Midwives (CNMs) while 30% were Certified Professional Midwives (CPMs). In addition, the Linear

Regression analysis depicted a statistical significance between demographic variables (1) home birth delivery, (2) Bachelor's/Master's/Doctorate degree and participants' overall knowledge scores. Almost all midwives (97%) verbally obtained patients' alcohol use history and/or used a written questionnaire. Overall, more than half of midwives who participated (63%) were unaware of common alcohol screening tools that could assess harmful drinking habits among pregnant women. During screening, it is important to note that questions measuring only quantity and and/or frequency of drinking may fail to identify some women at risk of prenatal alcohol use (Bhuvaneswar, Chang, Epstein, & Stern, 2007; Chang, McNamara, Orav, & Wilkins-Haug, 2006). Moreover, while some pregnant women willingly divulge their drinking behavior to health professionals, others either refute or alter their alcohol use. Pregnant women's motives for this could be due to assumptions that small quantities of alcohol are non-significant or that they would be judged and scrutinized (Bhuvaneswar et al., 2007; Chang, 2001). TACE and TWEAK are simple, standardized screening questionnaires which facilitate a more systematic approach in assessing alcohol consumption during pregnancy (Bhuvaneswar et al., 2007; Chang, 2001). In addition, these alcohol instruments could inform midwives or otherwise, on how to tailor their alcohol-related communications. It takes less than one minute to administer the T-ACE.

As a means to reduce stress, some health providers have been cited as encouraging their pregnant patients to engage in minimal alcohol intake (Barbour, 1990). In this current investigation, approximately one in five midwives (17%) provided advice to pregnant women that was not consistent with the Surgeon General's guidelines regarding prenatal alcohol use. Specifically, these midwives counseled their pregnant patients to either drink once in a while or take no more than 1 drink per day. Concurrently, only 79% of midwives believed that zero (0) amount of alcohol consumption was safest for the fetus. Several midwives (18%) disclosed that

alcohol was safe during the 3rd trimester or throughout pregnancy. Sharing conflicting and inconsistent alcohol-related information could contribute to a woman's decision to drink prior to conception and/or during pregnancy. Moreover, sharing information that contradicts the national health guidelines could result in harm to either patient or the fetus. Therefore, it is imperative that messages distributed by midwives are backed by evidence-based research. Currently, there is no scientific record of a universally "safe" level of alcohol exposure to the fetus during the prenatal phase (Montag, Clapp, Calac, Gorman, & Chambers, 2012; Reynolds, Valenzuela, Medina, & Wozniak, 2015; Waterman, Pruett, & Caughey, 2013). As a result, numerous government agencies and medical society groups (e.g. The American Academy of Pediatrics) have issued recommendations urging expectant mothers to abstain from all forms of alcohol use (General, 2005; Gunzerath, Faden, Zakhari et al., 2004). The recommendations and guidelines are widely disseminated and available to the general public. Yet these alcohol policies may be viewed as erroneous and inconsequential when misleading information is shared by local health providers. Healthcare professionals are a major source of health information to a preponderance of pregnant women and could help to address the misconceptions in alcohol messages (Elek et al., 2013; Raymond, Beer, Glazebrook, & Sayal, 2009; Peadon et al., 2007).

Compared to the 1st trimester, there was a significant (60%) drop in the percentage of midwives who asked their patient about her alcohol use during the 2nd and 3rd trimesters. While this might be consistent with current clinical practice, pregnant women at risk for alcohol/drug/tobacco use, require more regular alcohol use assessment during all trimesters of pregnancy (Flynn, Marcus, Barry, & Blow, 2003). This is consistent with scientific studies which depict that fetal alcohol spectrum disorders (FASD) could occur throughout all trimesters of pregnancy following maternal alcohol consumption (Manning & Hoyme, 2007). About 62% of

midwives confirmed their practice of "always" expressing concerns over co-morbid maternal drug or tobacco use; psychiatric illness (e.g. depression, bipolar); history of sexual abuse; chronic illnesses (e.g. HIV). These maternal characteristics carry a heightened risk for prenatal alcohol use. (Bayatpour, Wells, & Holford, 1992; Kissin, Svikis, Moylan, Haug, & Stitzer, 2004).

A limitation of this study includes a low response rate of 18%. As a result, study findings may not be generalizable to all midwives in the United States. In addition, majority of midwives identified themselves to be white. As such, study outcomes from other racial groups may differ slightly from what has been reported.

Overall, this study suggests that medical professional organizations could do more to provide detailed, step-by-step, unambiguous guidelines on how to communicate about and systematically assess, prenatal alcohol drinking. Most importantly, some participating midwives self-reported sharing health behavior advice not consistent with the Surgeon General's guidelines and the stance of many medical entities. Further exploration is warranted on why some midwives continue to share conflicting alcohol messages despite existence of standardized guidelines backed by scientific research.

# CHAPTER III

# EXAMINING MIDWIVES' INTENT TO DISSEMINATE ALCOHOL ABSTINENCE MESSAGES ACCORDING TO STANDARDIZED GUIDELINES: A THEORY-BASED INVESTIGATION

Alcohol is a teratogenic substance because of its ability to traverse the placental barrier during pregnancy causing irreparable neuro-developmental damage, birth defects, intrauterine growth retardation and characteristic facial dysmorphogenesis to the fetus (Burd, Blair, & Dropps, 2012; Chan, Caprara, Blanchette, Klein, & Koren, 2004; Jones, Smith, Ulleland, & Streissguth, 1973). Due to the decreased amount of alcohol enzymes in a woman's stomach lining, her capacity to breakdown alcohol for easy excretion, is diminished when compared to her male counterparts (Greenfield & Sugarman, 2001). Accordingly, this accelerates the detrimental effects of alcohol on her end organs (e.g. liver, heart, placenta) and her fetus (if pregnant). Despite being exposed to the same amount of alcohol as its mother, the fetus is fatally vulnerable for longer periods because it has less alcohol enzymes. Concomitant maternal tobacco use could further worsen fetal alcohol exposure (Flynn et al., 2003). The constellation of symptoms seen in alcohol-exposed babies have been described by the Institute of Medicine (IOM) as Fetal alcohol spectrum disorders (FASD). Babies who are born with FASD are faced with lifelong physical and mental disabilities in the form of learning difficulties, delayed social or motor skills, impaired memory and attention deficits, as well as auditory, visual, cognitive, mental, and behavioral deficits (Popova et al., 2017). Additionally, alcohol consumption during pregnancy could precipitate spontaneous abortion, premature birth, and low birthweight (Burd, Roberts, Olson, & Odendaal, 2007; Popova et al., 2017).

In the United States, approximately half (53.6%) of all women in their reproductive age group (18-44 years) reported alcohol use (≥ 1 drink in past 30 days; Centers for Disease Control and Prevention, (CDC, 2012; Tan, Denny, Cheal, Sniezek, & Kanny, 2015). Concurrently, half of all pregnancies (50%) in the United States are unintended (Finer & Henshaw, 2006; Finer & Zolna, 2011). As a result of alcohol consumption, reproductive aged women (18-44 years) are at an increased risk of having unintended pregnancies due to unprotected and unplanned sexual intercourse (Peadon et al., 2007; Floyd, Decouflé, & Hungerford, 1999). When carrying unplanned pregnancies, some women may continue to drink alcohol during conception and/or after more than 6 weeks of gestation because they are oblivious of their pregnancy state (Finer & Henshaw, 2006; Finer & Zolna, 2011). As a result, their unborn babies are inadvertently exposed to the harmful consequences of alcohol (Raymond, Beer, Glazebrook, & Sayal, 2009; Floyd, Decouflé, & Hungerford, 1999).

Since there is no scientific evidence of a universally "safe" level of prenatal alcohol consumption, all women planning to conceive are recommended to avoid alcohol entirely. The United States' (U.S.) Surgeon General, National Institute on Alcohol Abuse and Alcoholism (NIAAA) and other medical society groups (e.g. The American Academy of Pediatrics) have all proposed guidelines advising pregnant women to abstain from alcohol use (General, 2005; Gunzerath, Faden, Zakhari et al., 2004). Pregnant women anticipate that their health providers would offer them reliable information backed by evidence-based research (Peadon et al., 2007). As a result, clinical practice guidelines are methodologically developed to provide concise instructions on how to offer health services that are based on best practices. However, scientific literature indicates health providers were not always prepared to share alcohol abstinence messages according to standardized guidelines, nor provide adequate education or effective counseling to

pregnant women regarding the risks of prenatal alcohol consumption (Waterman, Pruett, & Caughey, 2013; France et al., 2010; Elliott, Payne, Haan, and Bower, 2006; Payne et al., 2005; Logan et al., 2003). Recent studies continue to demonstrate the gaps that exists between evidence-based guidelines and health providers' real-world clinical practices (Cochrane et al., 2007; Gagliardi, Brouwers, Palda, Lemieux-Charles, & Grimshaw, 2011; Lugtenberg, Zegers-van Schaick, Westert, & Burgers, 2009). Consequently, understanding factors that determine midwives' communication behaviors regarding alcohol use during pregnancy could be crucial in optimizing care to both mother and her unborn child.

This study sought to (1) examine the underlying determinants that affect midwives' intent to communicate standardized alcohol abstinence guidelines on prenatal alcohol use, and (2) investigate whether midwives' intentions were associated with their communication practices.

### *Theoretical Framework*

A formal theoretical framework could facilitate the systematic examination of underlying determinants associated with midwives' behavior (Grimshaw, Eccles, Walker, & Thomas, 2002; Grol, Bosch, Hulscher, Eccles, & Wensing, 2007). The Theory of Planned Behavior (TPB) provides a conceptual basis with which to examine and understand voluntary behaviors among health professionals (Perkins et al., 2007; Norman & Bell, 1999). The Theory of Planned Behavior (TPB) contends that "intent" can be used as a proximal measure for determining behavior (Ajzen, 1988). Intent is the cornerstone for the TPB and represents "a person's motivation to perform a behavior" (Norman & Bell, 1999). Behavioral intent is evaluated based on the simple premise that individuals perform an acceptable behavior using existing information about that behavior while taking into account the consequences of their action. The intent to perform a particular behavior is

hypothesized to be directly influenced by three constructs: attitude, subjective norm, and perceived behavioral control (PBC). Attitude is an "individual's overall evaluation of a particular behavior". Subjective norm is a "person's own estimate of the social pressure to perform or not perform the target behavior". Perceived behavioral control (PBC) is the "perception of the extent to which an individual feels he is able to endorse the target behavior" (Francis et al., 2004). According to TPB, a more positive attitude, higher subjective norms and greater PBC exhibited by an individual towards a particular behavior should result in stronger intention to perform that behavior (Ajzen, 1988). Therefore, the integration of TPB to this study expounded on how midwives' intentions affect whether they share accurate information and/or clinical guidelines regarding prenatal alcohol consumption. The Theory of Planned Behavior (TPB) is widely adopted in studies examining health professionals' intent to perform a target behavior (Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008; Grol et al., 2007). Specifically, TPB has been adopted in studies attempting to determine the theoretical concepts that predict the dissemination of practice guidelines in a medical setting (Perkins et al., 2007).

## *Methods*

This was a cross-sectional study, which targeted midwives from across Texas. For this study, midwives were characterized as healthcare practitioners who had undergone training in the field of prenatal care, labor and delivery, and were affiliated with a midwife professional organization.

### Recruitment and Sample Selection

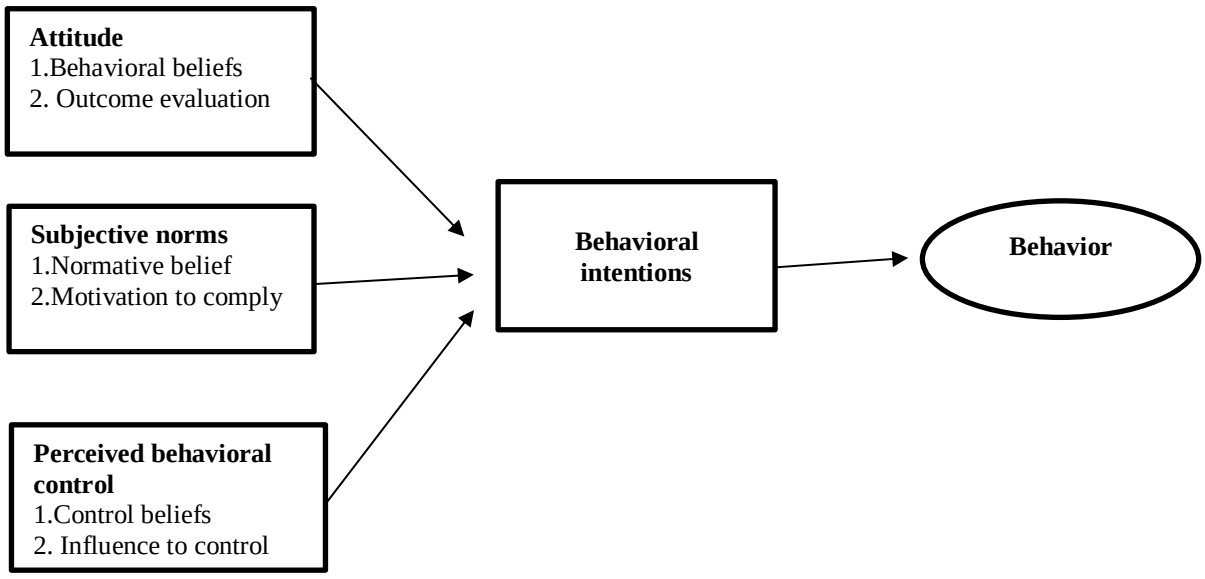
Potential study participants were recruited from the Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM). The Association of Texas

Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) are health professional organizations consisting of Certified Professional Midwives (CPMs) and Certified Nurse Midwives (CNMs) who work in a variety of settings such as clinics, hospitals, medical centers, birth centers, homes and their own private practices. Certified Professional Midwives (CPMs) are direct-entry midwives who have acquired training only in the midwifery program. On the contrary, Certified Nurse Midwives (CNMs) are registered nurses with a Bachelor's Degree who have completed a graduate level program in nurse-midwifery. Both Certified Nurse Midwives (CNMs) and Certified Professional Midwives (CPMs) offer reproductive health services involving pregnancy, childbirth, the postpartum period. However, Certified Nurse Midwives (CNMs) provide additional services in family planning, and routine gynecological needs. As at the time of the study, approximately 174 certified professional midwives (CPM) and 264 certified nurse midwives (CNMs) identified as members of Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) respectively. All 438 CPMs and CNMs in their respective professional organizations were contacted to participate in this study. Membership email-lists for both ATM and CTCNM were used with approval from each respective chapter presidents. Email-list for ATM was obtained from its website while that of CTCNM's was provided by its chapter president.

**Eligibility Criteria**

Midwives were eligible to participate in the study only if they had undergone training in the field of prenatal care, labor and delivery of a newborn and were affiliated with a midwife professional organization (ATM or CTCNM). Participants were not eligible to participate in this study if they failed to meet any of these criteria.

**Figure 3.1: Theory of Planned Behavior. Reprinted from "Attitudes, personality, and Behavior" by Ajzen, I., 1988, Milton Keynes, England: Open University Press.**




*Primary constructs include Attitude, Subjective Norms and PBC. Secondary constructs include (i) Behavioral Beliefs & Outcome Evaluation, (ii) Normative Beliefs & Motivation to Comply and (iii) Control Beliefs & Influence to Control.*

## Measures

Question-items which measured constructs from the Theory of Planned Behavior (TPB), were developed based on recommendations from a health-service research manual (Francis et al., 2004). The TPB constructs include attitude, subjective norm, and perceived behavioral control (PBC), which directly influence behavioral intentions, and subsequently actual behavior. Refer to *Figure 3.1*. For this study, predictor variables incorporated midwives' attitude, subjective norm, perceived behavioral control (PBC), and behavioral intent. Midwives' communication behavior served as the outcome variable.

*Measurement of Theory of Planned Behavior (TPB) Constructs*

According to Ajzen 1988, all predictors of TPB are measured either a.) directly or b.) indirectly (Ajzen, 1988). Using a set of response scales, each TPB construct was directly assessed

by asking participants about their overall attitude, subjective norms and perceived behavioral control (PBC), regarding their communication practices. On measuring indirect TPB constructs, Ajzen 1988, contends that performance of human behavior is influenced by three factors: (a) "beliefs about the likely outcomes of a behavior and the evaluation of these outcomes" – behavioral beliefs, (b) "beliefs about the normative expectations of others and the motivation to comply with these expectations" – normative beliefs, (c) and "beliefs about the presence of factors that may facilitate or impede performance of behavior" – control beliefs (Ajzen, 1988). As a result, indirect assessment of attitude was based on respondents' behavioral beliefs and outcome evaluation. Subjective norm was assessed based on respondents' normative belief and motivation to comply. While PBC was measured via respondents' control beliefs and influence. Refer to *Figure 3.1.*

*Direct Measurement of Midwives' Attitude*

In directly assessing midwives' attitude, one of the questions was, "Sharing information with my patient on the risk of prenatal alcohol use is ____" The response format for attitude questions utilized four differential scales of adjective pairs as answer choices: (1) harmful-beneficial, (2) unpleasant-pleasant, (3) bad practice-good practice, and (3) wrong thing to do-right thing to do. Response scale was coded from 1 to 7 with harmful = 1 and beneficial = 7, unpleasant = 1 and pleasant = 7 etc. Refer to *Table 3.1.* An overall attitude score was obtained by calculating the sum of the responses on the item-questions.

**Table 3.1: Direct Assessment of Attitude, Subjective Norm and PBC among Participants**

| | | Participants' Response (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | |
| **Attitude** | | | | | | | | | |
| Sharing information with my patient on the risk of prenatal alcohol use is: | **Harmful** | 0.00 | 0.00 | 0.00 | 0.00 | 7.94 | 11.11 | 80.95 | **Beneficial** |
| | **Unpleasant** | 1.56 | 6.25 | 7.81 | 37.50 | 21.88 | 14.06 | 10.94 | **Pleasant** |
| | **Bad practice** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.25 | 93.75 | **Good practice** |
| | **Wrong thing to do** | 0.00 | 0.00 | 0.00 | 1.56 | 0.00 | 4.69 | 93.75 | **Right thing to do** |
| **Subjective norm** | | | | | | | | | |
| a) My colleagues want me to share information on the risk of prenatal alcohol use with my patients | **Strongly disagree** | 1.56 | 1.56 | 1.56 | 17.19 | 20.31 | 14.06 | 43.75 | **Strongly agree** |
| b) I feel under social pressure to share information on the risk of alcohol use with my patients | **Strongly disagree** | 26.98 | 14.29 | 11.11 | 23.81 | 7.94 | 6.35 | 9.52 | **Strongly agree** |
| c) It is expected of me to share information on the risk of prenatal alcohol use with patients | **Strongly disagree** | 3.13 | 1.56 | 6.25 | 9.38 | 12.50 | 18.75 | 48.44 | **Strongly agree** |
| **Perceived Behavioral** | | | | | | | | | |
| a) I am confident that I can share information on the risk of prenatal alcohol use if I wanted to. | **Strongly disagree** | 0.00 | 1.56 | 0.00 | 1.56 | 4.69 | 15.63 | 76.56 | **Strongly agree** |
| b) For me, sharing information on the risk of prenatal alcohol use is easy | **Strongly disagree** | 1.56 | 1.56 | 7.81 | 6.25 | 17.19 | 23.44 | 42.19 | **Strongly agree** |
| c) Whether I share information on the risk of prenatal alcohol use is entirely up to me | **Strongly disagree** | 7.94 | 9.52 | 4.76 | 12.70 | 12.70 | 15.87 | 15.87 | **Strongly agree** |
| d) The decision to share information on prenatal alcohol use is beyond my control | **Strongly disagree** | 57.81 | 21.88 | 10.94 | 3.13 | 3.13 | 1.56 | 1.56 | **Strongly agree** |

**Table 3.2: Indirect Assessment of Attitude, Subjective Norm and PBC among Participants**

| | | Participants' Response (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Attitude** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | |
| **Attitude**<br>**Behavioral beliefs** | | | | | | | | | |
| a) If I share information that is based on clinical guidelines for prenatal alcohol use, I will feel I am doing something positive for my patient | **Unlikely** | 1.56 | 0.00 | 1.56 | 3.13 | 12.50 | 17.19 | 64.06 | **Likely** |
| b) If I discuss alcohol use in pregnancy, it will frighten or anger my patient | **Unlikely** | 55.56 | 22.22 | 7.94 | 9.52 | 3.17 | 1.56 | 0.00 | **Likely** |
| c) If I use the alcohol screening tool, I will detect prenatal alcohol use at an early stage in my patient. | **Unlikely** | 7.94 | 0.00 | 11.11 | 28.57 | 20.63 | 17.46 | 12.70 | **Likely** |
| **Outcome evaluation** | | | | | | | | | |
| a) Doing something positive for my patient is ____ | **Undesirable** | 0.00 | 0.00 | 0.00 | 0.00 | 1.59 | 3.17 | 95.24 | **Desirable** |
| b) Frightening or causing anger for my patient is ____ | **Undesirable** | 34.38 | 42.19 | 15.63 | 6.25 | 1.56 | 0.00 | 0.00 | **Desirable** |
| c) Detecting prenatal alcohol use at an early stage in my patient is ___ | **Undesirable** | 3.13 | 0.00 | 0.00 | 1.56 | 6.25 | 6.25 | 82.81 | **Desirable** |
| **Subjective norm**<br>**Normative beliefs** | | **-3** | **-2** | **-1** | **0** | **1** | **2** | **3** | |
| a) My patients think I ___ share information on the risk of prenatal alcohol use with them | **Should not** | 0.00 | 0.00 | 1.61 | 14.52 | 19.35 | 20.97 | 43.55 | **Should** |
| b) My colleagues (midwives) would ___ communications on prenatal alcohol use | **Disapprove** | 0.00 | 0.00 | 0.00 | 4.69 | 7.81 | 20.31 | 67.19 | **Approve** |
| c) My colleagues ___ share information on the risk of prenatal alcohol use with patients | **Do not** | 0.00 | 1.59 | 4.76 | 17.46 | 7.94 | 22.22 | 46.03 | **Do** |
| **Subjective norm**<br>**Motivation to Comply** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | |
| a) My patients' approval of my practice is important to me | **Not at all** | 1.56 | 0.00 | 1.56 | 6.25 | 17.19 | 32.81 | 40.63 | **Very much** |
| b) What my colleagues think I should do matters to me | **Not at all** | 4.69 | 1.56 | 0.00 | 14.06 | 26.56 | 39.06 | 14.06 | **Very much** |
| d) Doing what my other colleagues do is not important to me | **Not at all** | 11.11 | 23.81 | 15.87 | 28.57 | 12.70 | 6.35 | 1.56 | **Very much** |
| **Perceived Behavioral Control**<br>**Control beliefs** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | |
| a) When I am sharing information on the risk of prenatal alcohol use, I feel rushed | **Unlikely** | 28.57 | 17.46 | 11.11 | 14.29 | 19.05 | 3.17 | 6.35 | **Likely** |
| b) Communication on prenatal alcohol use is uncomfortable for my patients | **Unlikely** | 30.16 | 26.98 | 11.11 | 14.29 | 11.11 | 4.76 | 1.59 | **Likely** |
| **Perceived power to influence behavior**<br>a) During consultation, feeling rushed makes it ___ to share information on the risk of prenatal alcohol use | **difficult** | 34.38 | 18.75 | 28.13 | 15.63 | 1.56 | 0.00 | 1.56 | **Easier** |
| b) When communication on prenatal alcohol use is uncomfortable for my patients, I am ___ to share information on the risk of prenatal alcohol use | **Less likely** | 0.00 | 4.76 | 11.11 | 19.05 | 26.98 | 12.70 | 25.40 | **More likely** |

*Direct Measurement of Midwives' Subjective Norms and PBC*

Examples of subjective norms and PBC questions were, "I feel under social pressure to share information on the risk of alcohol use with my patients" and "I am confident that I can share information on the risk of prenatal alcohol use if I wanted to." respectively. Subjective norms and PBC, were also measured on a 7-point Likert scale. Response format was scored ranging 1 to 7 with strongly disagree= 1 and strongly agree= 7. Refer to *Table 3.1*. Participants' subjective norms and PBC overall scores were obtained by calculating the sum of the responses on the item-questions measuring these constructs respectively.

*Indirect Measurement of Attitude, Subjective Norms and PBC*

TPB constructs are difficult to directly observe. Therefore, attitude, subjective norm and PBC were also indirectly assessed using midwives' responses (Ajzen, 2002). Refer to *Table 3.2*. For each of the three major constructs of TPB, secondary constructs were applied, consisting of behavioral beliefs & outcome evaluations (attitude), normative beliefs & motivation to comply (subjective norm), and control beliefs & perceived power to influence behavior (PBC). Refer to *Figure 3.1*. Specifically, each behavioral belief and outcome evaluation score was multiplied to obtain an attitude score. All attitude scores were subsequently added to obtain an overall attitude score. Refer to the *Example 3.1*. Each normative belief and motivation to comply score was multiplied to get a subjective norm score. All subjective norm scores were summed up to arrive at an overall subjective norm score. Lastly, each control belief and perceived power to influence behavior score was multiplied and subsequently added to obtain an overall PBC score.

**Example 3.1: Calculation on Midwives' Overall Attitude Score**

For example, to calculate a respondent's overall attitude score, the following would be necessary:

A = (e x a) + (f x b) + (g x c)

Where A = participant's overall attitude score

Where a, b, & c represent behavioral beliefs

And e, f, & g represent outcome evaluation

The "x" represents multiplication, "+" represents addition

Lastly, (e x a), (f x b) and (g x c) are summed up to obtain the overall attitude score

Subjective norm and PBC were also indirectly assessed using this same principle. Using this approach, an overall score was obtained for each primary TPB construct. A positive (+) overall score on any of the TPB constructs implied that the respondent's attitude, subjective norm and PBC supported sharing information on prenatal alcohol consumption based on clinical guidelines. Likewise, a negative (-) overall score on each TPB construct depicted that participants' attitude, subjective norm and PBC were in opposition to disseminating standardized alcohol guidelines (Francis et al., 2004). The range of possible scores for each TPB construct is presented as seen in *Table 3.6*

*Intentions*

Question-items on behavioral intention assessed midwives' intent to communicate regulatory directives on alcohol consumption to pregnant patients. Intent was evaluated by asking participants the following, "If 10 patients were to present to you for the first time in the prenatal clinic, how many will you share information on prenatal alcohol use with?" Overall behavioral intention scores ranged from 0 to 10 among participants.

*Communication*

For this investigation, the outcome variable, communication practices were measured using following: (1) whether midwives assessed drinking behaviors in pregnant patients; (2) whether information shared was accurate and/or reflected national health guidelines and (3) the frequency in which communication on prenatal alcohol use occurred with pregnant women. Communication practices (1) & (2) had "yes or no" and "accurate or inaccurate" respectively as response format in the study questionnaire. Responses were coded, yes = 1, no = 0 and accurate = 1, inaccurate = 0. An example of question measuring whether midwives assessed drinking behavior (variable 1) was, "In each trimester, indicate whether you would ask a patient about her alcohol use during pregnancy? An example of question assessing whether information shared reflected national health guidelines (variable 2) was, "Which of the following best describes the advice you give a patient regarding alcohol use during pregnancy?

Question-items evaluating frequency of midwife communication about prenatal alcohol use (variable 3), was, "How often would you ask a patient about her alcohol use during the following trimesters of her pregnancy?" The response format was scored: never = 1, always = 5. All outcome variables, communication practices (1), (2) & (3), were treated as categorical for statistical analysis.

**Data Collection**

All members (n = 438) from the Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) were invited to participate. Membership email-lists were obtained and used with approval from chapter presidents for both ATM and CTCNM. To assess for face validity, content validity, clarity of questions, and ease of completion, the survey questionnaire was reviewed by experienced healthcare professionals (n = 5). Survey questions

were modified as required based on feedback. Subsequently, the questionnaire was pilot-tested among randomly selected midwives (n = 45) to determine clarity, specificity of directions and internal consistency. Studies recommend that at least 20 participants are reasonable for a pilot study (Cocks & Torgerson, 2013; Sandvik, Erikssen, Mowinckel, & Roedland, 1996).

The study questionnaire was administered via invitation emails to allow participants complete the online survey. The invitation email comprised of the following: an invitation to participate in the study, a web link providing access to the survey, and an information sheet which had been approved by the TAMU Institutional review board (IRB). The IRB-approved information sheet was available for review by respondents prior to accessing the survey on the Qualtrics software. Research suggests that online-based surveys serve as an attractive alternative to postal and telephone surveys for healthcare professionals (Braithwaite et al., 2003; Cook et al., 2009). This survey was distributed to study participants following the Dillman's method for online questionnaires (Dillman, 2011). Those invited to participate had approximately 6 weeks to complete the survey questionnaire. Each participant who completed the survey questionnaire had the opportunity to enter a raffle draw to win a Fitbit Blaze Smart Fitness Watch. The first and second invitation emails were sent a week apart in order to garner an increased response rate. The follow-up email thanked midwives who had completed the questionnaire and requested that non-responders complete online survey. A third email was sent to all participants during the 4$^{th}$ week of the 6-week period.

A pilot study was conducted among randomly selected ATM (n = 20) and CTCNM (n = 25) members to determine clarity and ease of completion of the questionnaire in the month of April 2018. A total number of twelve (n = 12) midwives completed the pilot study questionnaire. These 12 participants were included in the final sample of respondents since no changes were made to

the methodology or questionnaire. Following the pilot study phase, invitation emails were sent to the rest of the ATM (n = 154) and CTCNM (n = 239) members in the month of May, 2018. Overall, invitation emails were sent to 174 Association of Texas Midwives (ATM) members and 264 Consortium of Texas Certified Nurse Midwives (CTCNM) members respectively. Thirteen (n = 13) of the invitation emails sent to participants were undeliverable. Altogether, 77 midwives (including those completed the pilot questionnaire) participated in the study. This represented a response rate of approximately 18%. This response rate is synonymous to those obtained from other research studies where data was obtained from midwives (Fullerton et al., 2015; Rompala, Cirino, Rosenberg, Fu, & Lambert, 2016).

**Data Analysis**

Overall scores were obtained for the direct and indirect measures of Theory of Planned Behavior (TPB) constructs. Refer to *Table 3.6* for means and standard deviations on midwives' attitude, subjective norm and PBC. Cronbach Alpha was employed to assess internal consistency of scales associated with the measures of TPB constructs (i.e., attitude, subjective norms and PBC. Pearson Correlation assessed relationships between direct and indirect measures of each TPB constructs. A subsequent Multiple Linear Regression analysis examined statistical associations between: a) participants' intent b) direct measures of TPB constructs, c) indirect measures of TPB constructs and demographic characteristics. A Multiple Logistic Regression was used to examine relationships between midwives' intent and communication practices.

**Table 3.3 – Participants' Demographics**

| | Percentages (%) |
|---|---|
| **Sub- categories** | |
| Certified nurse midwife | 57.14 |
| Certified midwife | 6.35 |
| Certified professional midwife | 33.33 |
| Other | 3.17 |
| **Racial group** | |
| White non-hispanic | 88.71 |
| Hispanic | 1.61 |
| Black/African American | 4.84 |
| American Indian/Alaska Native | 1.16 |
| **Age categories (years)** | |
| ≤ 35 | 15.87 |
| 36 – 45 | 26.98 |
| 46 – 55 | 19.05 |
| 56 – 65 | 25.40 |
| ≥ 66 | 12.70 |
| **Education** | |
| Diploma | 4.84 |
| Associate | 9.68 |
| Bachelor's | 19.35 |
| Master's | 50.00 |
| Doctorate | 16.13 |
| **Years of experience (years)** | |
| ≤ 5 | 36.67 |
| 6 – 15 | 21.67 |
| 16 – 25 | 28.33 |
| ≥ 26 | 13.33 |
| **Employment location** | |
| Urban inner city | 15.87 |
| Urban not inner city | 33.33 |
| Rural | 26.98 |
| Suburban | 23.81 |
| **Locations for birth delivery** | |
| Hospital | 37.33 |
| Birth center | 30.65 |
| Home | 32.00 |

**Participants' Demographics**

Approximately 57% of the midwives who participated identified as a Certified Nurse Midwives (CNM). The remaining midwives categorized themselves as either Certified Professional Midwives (CPMs; 33%) or Certified Midwives (CMs; 6%). Nine-eight percent (98%) reported they were females and 89% identified as White (non-Hispanic). With participants' age ranging between 26 to 76 years, average age was 48.98 years (*SD* = 12.89). Average number of pregnant women seen by midwives per week was 29.36 (*SD* = 27.97). Half (50%) of the sample had acquired a master's degree, 16% had a doctorate while 20% had a bachelor's degree. Participants described their place of employment as follows: midwifery group practice (38%), physician group practice (15%) and hospital/medical center (15%). Thirty-three percent (33%) and 27% of respondents worked in locations designated as Urban (not inner city) and Rural areas respectively. Only forty-seven percent (47%) of midwives delivered babies in a hospital setting. The rest of the midwives took birth deliveries either at a birth center (37%) or a home (15%). The average years of midwifery practice among participants was 13.76 years (*SD* = 10.88) among participants. Refer to *Table 3.3*.

***Results***

Cronbach's alpha was conducted on each measure of attitude, subjective norm and PBC. The attitude, subjective norm, and PBC subscales had 4, 3, & 4 question-items respectively. The alpha coefficient for the test scale based on specified question-items was 0.800. Each question-item had an internal consistency coefficient of ≥ 0.70. Refer to *Table 3.4*. According to Nunnally and Berstein (1994), for a research in its preliminary stages, a "modest reliability of ≥ 0.70 will suffice" (Nunnally & Bernstein, 1994). *Table 3.5* depicts the correlation coefficient between direct

and indirect measures of attitude, norms and PBC. The correlation coefficients depicted a positive moderate strength of correlation between most direct and indirect measures of TPB constructs. Refer to *Table 3.5*. The mean, standard deviation, and possible range of values for (TPB) constructs are shown in *Table 3.6.*

**Table 3.4: Cronbach's Alpha for Direct and Indirect Measures of TPB Constructs**

| Item | Item-test correlation | alpha |
|---|---|---|
| Attitude 1 | 0.693 | 0.772 |
| Attitude 2 | 0.536 | 0.787 |
| Attitude 3 | 0.456 | 0.792 |
| Attitude 4 | 0.429 | 0.796 |
| | | |
| Norm 1 | 0.559 | 0.785 |
| Norm 2 | 0.286 | 0.806 |
| Norm 3 | 0.577 | 0.783 |
| | | |
| Control 1 | 0.765 | 0.765 |
| Control 2 | 0.350 | 0.802 |
| Control 3 | 0.213 | 0.811 |
| Control 4 | 0.691 | 0.772 |
| | | |
| Attitude ID | 0.603 | 0.780 |
| Norm ID | 0.662 | 0.778 |
| Control ID | 0.440 | 0.797 |
| Intent | 0.497 | 0.791 |
| | | |
| **Test scale** | | **0.800** |

**Table 3.5: Correlation Coefficients on TPB Constructs**

| | Attitude (D) | Norm (D) | Control (D) | Attitude (ID) | Norm (ID) | Control (ID) |
|---|---|---|---|---|---|---|
| Attitude (D) | – | | | | | |
| Norm (D) | 0.25 | – | | | | |
| Control (D) | 0.67*** | 0.32* | – | | | |
| Attitude (ID) | 0.43*** | 0.28* | 0.45*** | – | | |
| Norm (ID) | 0.30* | 0.29* | 0.60*** | 0.47*** | – | |
| Control (ID) | 0.20 | 0.16 | 0.35** | 0.08 | 0.28* | – |

| | Attitude 1 | Attitude 2 | Attitude 3 | Attitude 4 | Attitude (ID) |
|---|---|---|---|---|---|
| Attitude 1 | – | | | | |
| Attitude 2 | 0.29* | – | | | |
| Attitude 3 | 0.54*** | 0.20 | – | | |
| Attitude 4 | 0.27* | 0.25* | 0.25* | – | |
| Attitude (ID) | 0.41** | 0.25 | 0.29* | 0.38** | – |

| | Norm 1 | Norm 2 | Norm 3 | Norm (ID) |
|---|---|---|---|---|
| Norm 1 | – | | | |
| Norm 2 | 0.20 | – | | |
| Norm 3 | 0.50*** | 0.24 | – | |
| Norm (ID) | 0.14 | 0.18 | 0.32* | – |

| | Control 1 | Control 2 | Control ID |
|---|---|---|---|
| Control 1 | – | | |
| Control 2 | 0.60*** | – | |
| Control (ID) | 0.25* | 0.33** | – |

*Note. AttitudeID, NormID & ControlID are composite scores of indirect measures of attitude, subjective norms and PBC respectively. AttitudeD, NormD & ControlD are composite scores of direct measures. Attitude 1, Norm 1 etc. are indicators of the direct measures for attitude, subjective norms*

*p<0.05. **p<0.01. ***p<0.001

## Communication Practices among Participants

Midwives' communication practices were measured as: (1) whether midwives assessed drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal

alcohol use occurred with pregnant women; and (3) whether information shared was accurate and/or reflected national health guidelines. In determining whether communication on prenatal alcohol consumption actually occurred, all midwives (100%) who participated reported that they would typically ask a patient about her alcohol use during her first prenatal visit. In contrast, only 37% and 39% of midwives say they would ask a patient about her alcohol use during the 2nd and 3rd trimesters of pregnancy respectively. In assessing whether information disseminated was accurate, 83% of midwives indicate they would counsel their patient to totally abstain from alcohol while pregnant. This is in keeping with standardized alcohol guidelines in the United States. On the other hand, the remaining participants opted for recommendations that would either advice their patients to drink once in a while (8%) or take no more than 1 drink per day (8%).

**Table 3.6: Descriptive Statistics on Overall Attitude, Subjective Norm and PBC Scores**

| | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|
| Attitude (D) | 25.19 | 1.93 | 19 | 28 |
| Norm (D) | 14.81 | 3.64 | 3 | 21 |
| Control (D) | 12.38 | 2.10 | 3 | 14 |
| Intent | 8.70 | 3.00 | 0 | 10 |
| Attitude (ID) | 26.97 | 9.64 | -2 | 41 |
| Norm (ID) | 30.79 | 11.79 | -3 | 49 |
| Control (ID) | -2.90 | 9.03 | -23 | 15 |

***Note. AttitudeID, NormID & ControlID are overall scores for indirect measures of attitude, subjective norms and PBC respectively. AttitudeD, NormD & ControlD are overall scores for direct measures of attitude, subjective norms and PBC.***

**Table 3.7: Correlates of Intent to Share Accurate Information on Prenatal Alcohol Use (Multiple Regression)**

| | Standardized coefficient | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Intention | | | | |
| Attitude (ID) | - 0.02 | - 0.15 to 0.12 | 0.807 | 0.06 |
| Norm (ID) | - 0.18 | - 0.27 to - 0.09 | **0.000** | 0.04 |
| Control (ID) | 0.02 | - 0.08 to 0.12 | 0.676 | 0.05 |
| Attitude 1 | 0.37 | -1.76 to 2.49 | 0.723 | 1.03 |
| Attitude 2 | 0.12 | - 0.52 to 0.76 | 0.698 | 0.31 |
| Attitude 3 | 5.56 | 0.60 to 10.54 | **0.029** | 2.42 |
| Attitude 4 | - 0.53 | - 2.74 to 1.68 | 0.626 | 1.08 |
| Norm 1 | -0.13 | -0.75 to 0.49 | 0.667 | 0.30 |
| Norm 2 | 0.19 | - 0.21 to 0.60 | 0.338 | 0.20 |
| Norm 3 | 0.84 | 0.33 to 1.36 | **0.002** | 0.25 |
| Control 2 | 0.00 | - 0.90 to 0.91 | 0.995 | 0.44 |
| Gender | 4.46 | - 0.91 to 9.82 | 0.100 | 2.62 |
| Age | 0.07 | - 0.02 to 0.17 | 0.140 | 0.05 |
| Highest level of education | | | | |
| Associate | 1.84 | - 2.35 to 6.03 | 0.376 | 2.04 |
| Bachelors | 0.15 | - 3.85 to 4.16 | 0.938 | 1.95 |
| Masters | - 3.87 | - 8.46 to 0.71 | 0.094 | 2.23 |
| Doctorate | - 3.51 | - 9.16 to 2.14 | 0.213 | 2.75 |
| Location for birth deliveries | | | | |
| Birth center | - 5.28 | - 7.56 to -3.00 | **0.000** | 1.11 |
| Home | - 2.76 | - 6.28 to 0.94 | 0.141 | 1.76 |
| Years of midwifery practice | - 0.03 | - 0.14 to 0.08 | 0.559 | 0.05 |

***Note: AttitudeID, NormID & ControlID are composite scores of indirect measures of attitude, subjective norms and PBC respectively. Attitude 1, Norm 1, Control2 are indicators of the direct measures of attitude, subjective norms and PBC respectively.***

***p values < 0.05 are indicated in bold.***

**Table 3.8: Correlates on Participants' Use of Accurate Information on Prenatal Alcohol Use (Logistic Regression)**

| | Odds ratio | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Participants' use of accurate information | | | | |
| Intention | 0.54 | 0.27 to 1.11 | 0.092 | 0.20 |
| Participants' age | 1.25 | 1.06 to 1.49 | **0.010** | 0.11 |
| Years of midwifery practice (years) | | | | |
| 6 to 15 | 0.05 | 1.70e-03 to 1.33 | 0.073 | 0.08 |
| 16 to 25 | 0.16 | 2.45e-03 to 11.09 | 0.401 | 0.35 |
| ≥ 26 | 3.93e-03 | 1.21e-05 to 1.27 | 0.060 | 0.01 |
| Location for birth deliveries | | | | |
| Birth center | 5.60e-03 | 3.90e-05 to 0.80 | **0.041** | 0.01 |
| Home | 3.02e-03 | 1.39e-05 to 0.66 | **0.035** | 0.01 |
| Midwife professional group (CPM) | 78.20 | 1.71 to 3582.42 | **0.025** | 152.59 |
| Average number of patients seen per week | 0.98 | 0.90 to 1.07 | 0.643 | 0.04 |

***p values < 0.05 are indicated in bold.***

**Table 3.9: Correlates on Participants' Frequency of Communication on Prenatal Alcohol Use (Linear Regression)**

| | Coefficients | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Participants' frequency of communication | | | | |
| Intention | 0.34 | 0.07 to 0.60 | **0.013** | 0.13 |
| Participants' age | 0.06 | - 0.03 to 0.14 | 0.174 | 0.04 |
| Years of midwifery practice | -0.11 | -0.22 to -0.01 | **0.037** | 0.05 |
| Location for birth deliveries | | | | |
| Birth center | 0.07 | - 2.36 to 2.51 | 0.951 | 1.21 |
| Home | -1.05 | - 4.05 to 1.95 | 0.485 | 1.49 |
| Midwife professional group (CPM) | 2.58 | 0.18 to 4.97 | **0.036** | 1.19 |
| Average number of patients seen per week | 0.04 | 1.50e-03 to 0.08 | **0.042** | 0.02 |

***p values < 0.05 are indicated in bold.***

**Table 3.10: Correlates on Whether Participants Distributed Information on Prenatal Alcohol Use (Linear Regression)**

| | Coefficients | 95% CI | p value | Standard error |
|---|---|---|---|---|
| Actual distribution of information | | | | |
| Intention | 0.10 | 4.32e-03 to 0.19 | **0.041** | 0.05 |
| Participants' age | 0.02 | -0.01 to 0.14 | 0.854 | 0.01 |
| Highest level of education | | | | |
| Associate | -1.92 | -3.70 to -0.15 | **0.034** | 0.88 |
| Bachelors | -0.80 | -2.42 to 0.83 | 0.327 | 0.80 |
| Masters | -1.23 | -2.96 to 0.50 | 0.159 | 0.86 |
| Doctorate | -1.97 | -3.85 to -0.09 | **0.041** | 0.93 |
| Location for birth deliveries | | | | |
| Birth center | 0.36 | -0.42 to 1.14 | 0.356 | 0.38 |
| Home | -0.48 | -1.56 to 0.61 | 0.380 | 0.54 |
| Average number of patients seen per week | 1.17e-03 | -0.01 to 01 | 0.166 | 0.01 |
| Place of employment | | | | |
| Urban not inner city | -0.33 | -1.30 to 0.64 | 0.496 | 0.48 |
| Rural | -0.55 | -1.38 to 0.28 | 0.190 | 0.41 |
| Suburban | -0.80 | -1.71 to 0.17 | 0.102 | 0.48 |

***p values < 0.05 are indicated in bold. Participants' actual distribution of information is synonymous to the "presence of communication" categorical outcome variable***

*Aim 1: Intention and Indicators for TPB*

The mean behavioral intention scores for Certified Professional Midwives (CPMs) and Certified Nurse Midwives (CNMs) were ($M$ = 8.71, $SD$ =3.12; 95% CI: 7.30 – 10.13) and ($M$ = 8.60, $SD$ = 3.05; 95% CI: 7.62 – 9.58) respectively. The Two-sample T-test result indicate that there was no significant difference in mean intention score between CPMs and CNMs, $t(59) = -0.138$, $p$-value = 0.555. *Table 3.7* depicts the correlates of intent to share information on prenatal alcohol use based on standardized guidelines while adjusting for participants' gender, age, level of education, location for birth deliveries and years of midwifery practice. In *Table 3.7,* the following significantly predicted participants' intention to disseminate accurate information on prenatal alcohol consumption: (1) indirect overall measure for subjective norm (Norm ID; coefficient = -0.18, $p < 0.001$), (2) indicator for direct measures of subjective norm which specifically asked, "It is expected of me that I communicate with pregnant women on prenatal alcohol consumption". Response format: strongly disagree= 1 and strongly agree= 7 (Norm 3; coefficient = 0.84, $p = 0.00$ (3) indicator for direct measures for attitude which specifically asked, "Disseminating information on alcohol consumption to a pregnant woman is ____. Response format: bad practice = 1 and good practice = 7 (Attitude 3; coefficient = 5.56, $p = 0.029$). Refer to *Table 3.5* and (4) delivery of babies at birth centers, (coefficient = -5.28, $p < 0.001$). Predictor variables explained a significant proportion of variance in participants' intention, $R^2 = 0.68$, $F(20, 27) = 2.88$, $p = 0.006$. Refer to *Table 3.7*

*Aim 2: Intention and the Indicators for Communication Practices*

In *Table 3.8,* using Multiple Logistic Regression, the model accounted for a statistically significant proportion of the variance associated with participants' use of accurate information when counseling women on prenatal alcohol drinking: LR chi2 = 20.78, p= 0.014, psuedo$R^2$ =

0.424. The following were significantly associated with midwives' use of accurate information: participants' age (OR = 1.25, $p$ = 0.010), delivering babies at birth center (OR = 5.60e-03, $p$ = 0.041) and home (OR = 3.02e-03, $p$ = 0.035), and midwife professional group (OR = 78.20, $p$ = 0.025).

As shown in *Table 3.9*, using Regression Linear Analysis, it was found that midwives' frequency of communication was significantly associated with midwives' intention (coefficient = 0.34, $p$ = 0.013), years of midwifery practice (coefficient = -0.11, $p$ = 0.037), midwife professional group (coefficient = 2.58, $p$ = 0.036) and average number of pregnant patients seen per week (coefficient = 0.04, $p$ = 0.042). The overall model fit was $R^2$ = 0.29, $F$ (7, 46) = 2.71, $p$ = 0.019.

In *Table 3.10*, the Multiple Linear Regression analysis indicated that there was collective significant effect between participants' actual distribution of information and intention, $R^2$ = 0.39, $F$ (12, 39) = 2.71, $p$ = 0.046. The individual predictors were examined and showed that participants' intention (coefficient = 0.10, $p$ = 0.041), an Associate degree (coefficient = -1.92, $p$ = 0.034) and a Doctoral degree (coefficient = -1.97, $p$ = 0.041) were significant predictors in the model.

***Discussion***

Globally, approximately 10% of the women in the general population drink alcohol during pregnancy (Popova et al., 2017). In the United States, over half of women (54%) planning to conceive reported drinking alcohol at least once within the last 30 days (CDC, 2012; Tan, Denny, Cheal, Sniezek, & Kanny, 2015). In addition, 10 % of pregnant women reported alcohol use ( ≥ 1 drink) within the past 30 days (Tan et al., 2015). Worldwide estimates for FASD and FAS are reported to be 22.7 per 1000 (Roozen., et al 2016) and 14·6 per 10,000 live births respectively

(Popova et al., 2017). Despite being 100% preventable, millions of babies continue to suffer adversely from fetal alcohol spectrum disorders (FASD). By disseminating information based on standardized guidelines, midwives could significantly promote abstinence in pregnant women, thereby reducing incidence of FASD.

The current study explored the underlying factors associated with midwives' intent to share alcohol abstinence messages that are based on current clinical guidelines. Midwives who reported a positive attitude, and higher subjective norm had greater intent to use standardized guidelines when distributing information on prenatal alcohol use. A direct measure of subjective norm which asked the following, "It is expected of me to share information on the risk of prenatal alcohol use with patients?", was strongly associated with midwives' intention. In other words, midwives who perceived that it was an expectation for communications on prenatal alcohol abstinence to occur, were more likely to incorporate this into their practice. Consequently, practice guidelines and regulatory directives ought to clearly outline "expectations" for effective dissemination of evidence-based information on prenatal alcohol use by midwives. In addition to promoting social norms that increase uptake of clinical guidelines, facilitating positive attitudes among midwives towards adopting U.S.'s Surgeon General alcohol directives, could ultimately help spread information which deters pregnant women from drinking alcohol.

Midwives in this sample who took deliveries at birth centers had a low intent to share information according the standardized guidelines. While it is unclear why this relationship emerged and beyond the scope of this investigation to determine why, it could suggest that midwives who work in certain settings differ in their perceived scope of practice. In other words, depending on where they practice, some midwives may expect other health care providers to discuss alcohol guidelines. Future investigations into differences across care settings are

warranted. Perceived behavioral control (PBC) was not found to be associated with midwives' intent to distribute information according to clinical guidelines. Altogether, midwives' attitude was shown to have the strongest effect of all significant predictors from the TPB-related constructs.

This study also examined whether midwives' intent was associated with their communication practices. In particular, communication was measured as (1) whether midwives assessed drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal alcohol use occurred with pregnant women; and (3) whether information shared was accurate and/or reflected national health guidelines. Midwives' intent to share information based on guidelines was significantly associated with communication practices on (a) whether midwives assessed drinking behaviors in pregnant patients, and (b) frequency with which they shared information on prenatal alcohol use. Midwives who had greater intent were more likely to communicate alcohol abstinence messages more frequently compared to those with lower intentions. Participants who (a) were older in age, (b) took deliveries at home or birth centers, and (c) belonged to midwife professional groups, were more likely to share information that was accurate and based on standardized guidelines. Years of midwifery practice, midwife professional group and average number of pregnant patients seen per week were found to be associated with the frequency midwives shared information regarding prenatal alcohol use.

Several limitations should be considered in unison with these findings. In particular, the sample consisted of midwives affiliated with two professional groups who self-selected to participate. In addition to having a low response rate, the demographic make-up of the sample may not reflect that of all practicing midwives in Texas. Notwithstanding these limitations, this investigation highlighted intention as a key factor in influencing the communication practices among midwives. In particular, findings support the notion that efforts aimed at fostering positive

attitude, and promoting higher social norms, among midwives could positively affect their prenatal drinking communication practices. Moreover, these efforts could help establish midwives as central figures in disseminating prenatal alcohol advice. Simply stated, in their professional and educational programs, midwives should continuously be reminded about the importance of implementing prenatal alcohol guidelines through communications that are reliable and based on scientific evidence.

# CHAPTER IV

# DOES PERSONAL ALCOHOL CONSUMPTION IMPACT DISSEMINATION OF PRENATAL DRINKING GUIDELINES: A CASE STUDY AMONG TEXAS MIDWIVES

## *Introduction*

Prenatal alcohol use (≥ 1 drink within the past 30 days) continues to constitute a profound public health concern with prevalence estimates as high as 10.2 % among pregnant women in the United States (Tan et al., 2015). Alcohol-exposed pregnancies could lead to a continuum of teratogenic effects in the fetus collectively known as fetal alcohol spectrum disorders (FASD; Barbour, 1990; Burd, Roberts, Olson, & Odendaal, 2007; Jones & Smith, 1973; Manning & Hoyme, 2007). Babies who are born with FASD often exhibit alcohol-induced birth defects, irreparable brain damage, prenatal or postnatal growth restriction, and characteristic facial dysmorphogenesis (Jones & Smith, 1973). Other devastating lifelong implications that occur from fetal alcohol exposure include mental health issues, neurocognitive deficits, memory impairments, substance abuse, confrontations with law enforcement, and inability to obtain and/or maintain employment (Streissguth, Barr, Kogan, & Bookstein, 1996). Maternal factors impact the variations linked to severity of FASD in babies (Young, Giesbrecht, Eskin, Aliani, & Suh, 2014). Nutritional deficiencies, poor prenatal care, pattern of alcohol consumption, frequency/timing of alcohol use, socio-economic status, tobacco/drug use, as well as maternal age, gravidity, and parity, all play an influential role in determining fetal susceptibility to alcohol's adverse outcomes (Ismail, Buckley, Budacki, Jabbar, & Gallicano, 2010; P. A. May & Gossage, 2011). The Institute of Medicine (IOM) has categorized FASD into 4 subsets of diagnoses: Fetal alcohol syndrome (FAS), alcohol-related neuro-developmental disorder (ARND), partial fetal alcohol syndrome (pFAS), and alcohol-related birth defects (ARBD; P. A. May et al., 2013; Stratton, Howe, & Battaglia, 1996).

In the United States (U.S.), fetal alcohol syndrome (FAS) is recognized as the most severe form of FASD, as well as the foremost, non-heritable cause of avoidable birth defects and mental retardation (Miranda, 2012).

During pregnancy, a woman's prenatal care provider is uniquely positioned to influence her decision to abstain from alcohol consumption (Elek et al., 2013; Raymond, Beer, Glazebrook, & Sayal, 2009; O'Connor and Whaley, 2007; Floyd, O'Connor, Bertrand, and Sokol, 2006). As a result, women's prenatal visits offer the ideal opportunity for health providers to assess drinking behaviors, identify problematic alcohol use disorders, and ultimately refer for appropriate intervention. Moreover, these visits serve as a crucial time in which abstinence during current pregnancy and prior to future conceptions, should be emphasized. During prenatal visits, a wide range of healthcare professionals provide care to the pregnant woman. Midwives, in particular, are uniquely situated to disseminate alcohol abstinence messages since they are perceived to be trustworthy by their pregnant patients (O'Connor, & Whaley, 2007).

While there is no scientific record of an alcohol threshold during pregnancy (i.e., "unsafe level") in pregnancy, evidence show that chronic, frequent and heavy alcohol exposure is more likely to result in fetal damage as opposed to moderate, acute drinking (Young, Giesbrecht, Eskin, Aliani, & Suh, 2014). In addition, alcohol-induced effects are most disruptive within 3 – 8 weeks of conception (early stage of 1$^{st}$ trimester), but also extend beyond the 1$^{st}$ trimester and throughout pregnancy (Young, Giesbrecht, Eskin, Aliani, & Suh, 2014). As a result, recommendations issued by the U.S.'s Surgeon General, National Institute on Alcohol Abuse and Alcoholism (NIAAA) and other medical society groups (e.g. The American Academy of Pediatrics) urge pregnant women to abstain from alcohol consumption (General, 2005; Gunzerath, Faden, Zakhari et al., 2004). However, despite existing standardized guidelines, health providers occasionally share

messages with pregnant women which are confusing and not consistent with the national guidelines (Elek et al., 2013). To relieve emotional stress, some pregnant women are advised to engage in minimal to moderate alcohol use by their midwives (Crawford-Williams, Steen, Esterman, Fielder, & Mikocka-Walus, 2015).

Given (a) the influential role health care providers, such as midwives, have on the health behaviors of pregnant patients, (b) the authoritative information source health care providers are perceived to be, and (c) the conflicting messages pregnant women receive regarding prenatal alcohol consumption, investigation into factors that may impact why a health professional would deviate from national public health policy would be impactful. Currently, there is a dearth of studies examining whether personal alcohol use among health care providers, such as midwives, would impact information disseminated to pregnant patients. This seems an oversight considering alcohol use disorders among health professionals can impair the ability to deliver quality services, jeopardize clinical decision-making skills, affect interpersonal functioning, and ultimately lead to adverse outcomes in patients (Grant et al., 2015; Rehm et al., 2009). Additionally, among individuals who misuse alcohol, this pattern of heavy drinking has been shown to potentially lead to psychologic and co-morbid health disorders (Fiellin, Reid, & O'connor, 2000a; Rehm, 2011). While the prevalence for alcohol use disorders among midwives is unknown, previous studies contend substance use disorders among health professionals is estimated to be similar to that of the general population (Domino et al., 2005; Trinkoff & Storr, 1998). This study seeks to explore whether personal alcohol use influence the type and manner of information on prenatal alcohol drinking midwives provide to pregnant patients.

## *Methods*

This was a cross-sectional study, which targeted midwives from across the state of Texas. For this study, midwives were characterized as healthcare practitioners who had undergone training in the field of prenatal care, labor and delivery, and were affiliated with a midwife professional organization.

### Recruitment and Sample Selection

Potential study participants were recruited from the Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM). The Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) are health professional organizations consisting of Certified Professional Midwives (CPMs) and Certified Nurse Midwives (CNMs) who work in a variety of settings such as clinics, hospitals, medical centers, birth centers, homes and their own private practices, across the state of Texas. Certified Professional Midwives (CPMs) are direct-entry midwives who have acquired training only in the midwifery program. On the other hand, Certified Nurse Midwives (CNMs) are registered nurses with a Bachelor's Degree and have completed a graduate level program in nurse-midwifery. Both Certified Nurse Midwives (CNMs) and Certified Professional Midwives (CPMs) offer reproductive health services involving pregnancy, childbirth, the postpartum period. However, Certified Nurse Midwives (CNMs) provide additional services in family planning, and routine gynecological needs. In contrast to some states where direct-entry midwifery is considered illegal, Texas is inclusive of all midwives irrespective of their educational route. As at the time of the study, approximately 174 certified professional midwives (CPM) and 264 certified nurse midwives (CNMs) identified as members of Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) respectively. All 438 CPMs and CNMs in their

respective professional organizations were contacted to participate in this study. Membership email-lists for both ATM and CTCNM were used with approval from each respective chapter presidents. Email-list for ATM was obtained from its website while that of CTCNM's was provided by its chapter president.

**Eligibility Criteria**

Midwives were eligible to participate in the study only if they had undergone training in the field of prenatal care, labor and delivery of a newborn and were affiliated with a midwife professional organization (ATM or CTCNM). Participants were not eligible to participate in this study if they failed to meet any of these criteria.

**Measures**

*Personal Alcohol Use*

The Alcohol Use Disorder Identification Test, version C (AUDIT-C) is a 3-item alcohol screening tool used to evaluate for hazardous drinking behavior. Each question-item is worth a maximum of 4 points. The overall AUDIT-C score is assessed on a scale of 0 to12. The three questions included on the AUDIT-C are: (1) How often do you have a drink containing alcohol, (2) How many standard drinks containing alcohol do you have on a typical day, and (3) How often do you have six or more drinks on one occasion? Each AUDIT-C question has 5 answer choices (a, b, c, d & e respectively). Points assigned for answer choices are as follows: a = 0 points, b = 1 point, c = 2 points, d = 3 points, e = 4 points. Higher AUDIT-C scores are indicative of increasing risk associated with drinking behaviors. Scores $\geq$ 4 (men) and $\geq$ 3 (women) are indicators of hazardous drinking (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998; Fiellin et al., 2000). Since all participants in the study (98%) were females, except for one person who identified as transgender, an overall AUDIT-C score of $\geq$ 3 was used to indicate "hazardous drinking". Using

the cut-off of ≥ 3, the overall AUDIT-C scores among participants were dichotomized into non-risky and risky drinking.

*Communication Practices*

For this investigation, the outcome variable was defined as the dissemination of information on prenatal alcohol consumption based on clinical recommendations and guidelines. Communication practices were measured using following: (1) whether midwives assessed drinking behaviors in pregnant patients, (2) whether information shared was accurate and/or reflected national health guidelines, and (3) the frequency in which communication on prenatal alcohol use occurred with pregnant women. Communication practices (1) & (2) had "yes or no" and "accurate or inaccurate" respectively as their response format in the study questionnaire. Responses were coded, yes = 1, no = 0 and accurate = 1, inaccurate = 0. An example of yes-no question was, "In each trimester, indicate whether you would ask a patient about her alcohol use during pregnancy? An example of accurate-inaccurate question was, "Which of the following best describes the advice you give a patient regarding alcohol use during pregnancy? Question-items evaluating frequency of communication/Communication practice (3), used a 5-point Likert scale. An example of such questions was, "How often would you ask a patient about her alcohol use during the following trimesters of her pregnancy?" The response format was scored: never = 1, always = 5. All outcome variables were treated as categorical for statistical analysis.

**Data Collection**

The study questionnaire was administered via invitation emails to allow participants complete the online survey. The invitation email comprised of the following components: an invitation to participate in the study, a web link providing access to the survey, and an information sheet which had been approved by the TAMU Institutional review board (IRB). The IRB-approved

information sheet was available for review by respondents prior to accessing the survey on the Qualtrics software. This study questionnaire was administered online using the Qualtrics software. Qualtrics is a secure internet software utilized for collecting and analyzing data. Research suggests that online-based surveys serve as an attractive alternative to postal and telephone surveys for healthcare professionals (Braithwaite et al., 2003; Cook et al., 2009). The survey was distributed to study participants following the Dillman's method for online questionnaires (Dillman, 2011). Those invited to participate had approximately 6 weeks to complete the survey questionnaire. Each participant who completed the survey questionnaire had the opportunity to enter a raffle draw to win a Fitbit Blaze Smart Fitness Watch. The first and second invitation emails were sent a week apart in order to garner an increased response rate. The follow-up email thanked midwives who had completed the questionnaire and requested that non-responders fill out the online survey. A third email was sent to all participants during the $4^{th}$ week of the 6-week period.

To assess for face validity, content validity, clarity of questions, and ease of completion, the survey questionnaire was reviewed by experienced healthcare professionals (n = 5). Survey questions were modified as required based on feedback. Survey questionnaire was subsequently pilot-tested among randomly selected midwives (n = 45) to determine clarity, specificity of directions and internal consistency. Studies recommend that at least 20 participants are reasonable for a pilot study (Cocks & Torgerson, 2013; Sandvik, Erikssen, Mowinckel, & Roedland, 1996). Overall, invitation emails were sent to 174 Association of Texas Midwives (ATM) members and 264 Consortium of Texas Certified Nurse Midwives (CTCNM) members. Thirteen (n = 13) of the invitation emails sent to participants were undeliverable. Altogether, seventy-seven (n = 77) midwives participated in the study. This represented a response rate of approximately 18%. This response rate is synonymous to those obtained from other research studies where data was obtained

from midwives (Fullerton et al., 2015; Rompala, Cirino, Rosenberg, Fu, & Lambert, 2016). Out of 77 midwives who participated, about 40 completed the AUDIT-C screening questionnaire.

**Data Analysis**

A Linear Regression was used to assess the relationship between overall continuous AUDIT-C scores and demographic variables. A Logistic Regression analysis was used to examine associations between the participants' AUDIT-C scores and categorical outcome variables on communication practices.

**Participants' Demographics**

More than half of the midwives (57%) who participated identified as a Certified Nurse Midwives (CNM). Another estimated 33% and 6% of midwives categorized themselves to be either Certified Professional Midwives (CPMs) or Certified Midwives (CMs) respectively. Majority of study participants, reported they were females (98%) and White (non-Hispanic; 89%) respectively. With participants' age ranging between 26 to 76 years, mean age among midwives was 48.98 years (*SD* = 12.89). Average number of pregnant women seen by midwives per week was 29.36 (*SD* = 27.97). Half (50%) of the study sample had acquired a master's degree, 16% had a doctorate while 20% had a bachelor's degree. Participants described their places of employment to be as follows: midwifery group practice (38%), physician group practice (15%) and hospital/medical center (15%). Thirty-three percent (33%) and 27% of respondents worked in

**Table 4.1 – Participants' Demographics**

| | Percentage (%) of Respondents | |
|---|---|---|
| **Demographics** | **AUDIT-C scores < 3** | **AUDIT-C scores ≥ 3** |
| **Midwife professional group** | | |
| Certified nurse midwife | 59.26 | 40.74 |
| Certified professional midwife | 72.73 | 27.27 |
| **Gender** | | |
| Female | 61.54 | 38.46 |
| Transgender | 100.00 | 0.00 |
| **Racial group** | | |
| White non-hispanic | 61.11 | 38.80 |
| Black/African American | 100.00 | 0.00 |
| Other | 100.00 | 0.00 |
| **Age categories (years)** | | |
| ≤ 35 | 57.14 | 42.86 |
| 36 – 45 | 58.33 | 41.67 |
| 46 – 55 | 50.00 | 50.00 |
| 56 – 65 | 87.50 | 14.29 |
| ≥ 66 | 60.00 | 40.00 |
| **Education** | | |
| Diploma | 50.00 | 50.00 |
| Associate | 50.00 | 50.00 |
| Bachelor's | 75.00 | 25.00 |
| Master's | 68.42 | 31.57 |
| Doctorate | 50.00 | 50.00 |
| **Years of experience (years)** | | |
| ≤ 5 | 61.54 | 38.46 |
| 6 – 15 | 66.67 | 33.33 |
| 16 – 25 | 60.00 | 40.00 |
| ≥ 26 | 50.00 | 50.00 |
| **Employment location** | | |
| Urban inner city | 42.86 | 57.14 |
| Urban not inner city | 64.29 | 35.71 |
| Rural | 70.00 | 30.00 |
| Suburban | 66.67 | 33.33 |
| **Locations for birth delivery** | | |
| Hospital | 61.90 | 38.10 |
| Birth center | 63.64 | 36.36 |
| Home | 71.43 | 28.57 |

locations designated as Urban (not inner city) and Rural areas respectively. Only forty-seven percent (47%) of midwives delivered babies in the hospital setting. The rest of the midwives took birth deliveries either at a birth center (37%) or a home (15%). The average years of midwifery practice among participants was 13.76 years (*SD* = 10.88) among participants.

## *Results*

### Midwives Responses on the AUDIT-C Alcohol Screening Questionnaire

The prevalence of alcohol use alcohol use among participants was summarized against participants' demographics in *Table 4.1.* Approximately 6 out of 10 midwives (62.5%) engaged in non-risky drinking, as defined by AUDIT-C scores < 3. The remaining midwives had AUDIT-C scores that would classify them as hazardous drinking. See *Table 4.2* for midwives' responses to the AUDIT-C questionnaire.

**Table 4.2: Midwives' Overall AUDIT-C Scores**

| AUDIT-C Alcohol Screening Questionnaire | Percentage (no.) of Responses |
|---|---|
| **How often do you have a drink containing alcohol?** | |
| a) Never | 12.70 (8) |
| b) Monthly or less | 36.51 (23) |
| c) 2-4 times a month | 30.16 (19) |
| d) 2-3 times a week | 14.29 (9) |
| e) 4 or more times a week | 6.35 (4) |
| **How many standard drinks containing alcohol do you have on a typical day?** | |
| a) 1 or 2 | 97.50 (39) |
| b) 3 or 4 | 2.50 (1) |
| c) 5 or 6 | 0.00 (0) |
| d) 7 to 9 | 0.00 (0) |
| e) 10 or more | 0.00 (0) |
| **How often do you have six or more drinks on one occasion?** | |
| a) Never | 85.71 (54) |
| b) Less than monthly | 9.52 (6) |
| c) Monthly | 4.76 (3) |
| d) Weekly | 0.00 (0) |
| e) Daily or almost daily | 0.00 (0) |

**Midwives Responses on the Communication Questionnaire**

This study assessed midwives' communication practices by measuring the following: (1) whether midwives assessed drinking behaviors in pregnant patients; (2) the frequency in which communication on prenatal alcohol use occurred with pregnant women; and (3) whether information shared was accurate and/or reflected national health guidelines. Refer to *Table 4.3*. All midwives (100%) who participated reported that they would typically ask a patient about her alcohol use during her first prenatal visit. In contrast, only 37% and 39% of midwives say they would ask a patient about her alcohol use during the 2nd and 3rd trimesters of pregnancy respectively.

In assessing whether information disseminated was accurate, 83% of midwives indicated they would counsel their patient to totally abstain from alcohol while pregnant, which is in keeping with national guidelines in the United States. On the other hand, the remaining participants opted for recommendations that would either advice their patients to drink once in a while (8%) or take no more than 1 drink per day (8%). In measuring frequency of communication, 64% of study participants stated that they "always" asked about prenatal alcohol consumption during 1st trimester visits. Seven-nine percent (79%) and 74% of midwives specified that they "sometimes", "rarely" or 'never" inquired about prenatal alcohol use during the 2nd and 3rd trimesters respectively. Refer to *Table 4.3*

## Table 4.3: Midwives' Responses on Communication Practices

| Questions measuring Presence of Communication | CNMs (%) | | CPMs (%) | |
|---|---|---|---|---|
| **During a first prenatal visit, would you typically ask a patient about her alcohol use?** | **Yes** 100.00 | **No** 0.00 | **Yes** 100.00 | **No** 0.00 |
| **In each trimester, indicate whether you would ask a patient about her alcohol use during pregnancy?** | | | | |
| d) Trimester 1 | 94.87 | 5.13 | 100.00 | 0.00 |
| e) Trimester 2 | 30.56 | 69.44 | 47.37 | 56.53 |
| f) Trimester 3 | 35.14 | 64.84 | 42.11 | 57.89 |

| Questions measuring Accuracy of Communication | CNMs (%) | CPMs (%) |
|---|---|---|
| **Which of the following best describes the advice you give a patient regarding her alcohol use during pregnancy?** | | |
| f) You should totally abstain from alcohol while pregnant. | 85.00 | 80.95 |
| g) Drink once in a while (a drink on festive occasion is alright). | 5.00 | 14.29 |
| | 0.00 | 0.00 |
| h) Take 1 - 2 drinks every now and then | 7.50 | 4.76 |
| i) Don't drink. But if you do, take no more than 1 drink per day | 2.50 | 0.00 |
| j) No recommendations are given | | |

| Questions measuring Frequency of Communication | CNMs (%) | | | | | CPMs (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **How often would you ask a patient about her alcohol use during the following trimesters of her pregnancy?** | **Never** | **Rarely** | **Sometimes** | **Often** | **Always** | **Never** | **Rarely** | **Sometimes** | **Often** | **Always** |
| e) Trimester 1 | 2.50 | 7.50 | 10.00 | 25.00 | 55.00 | 0.00 | 4.76 | 14.29 | 4.76 | 76.19 |
| f) Trimester 2 | 10.00 | 40.00 | 35.00 | 7.50 | 7.50 | 9.52 | 42.86 | 14.29 | 19.05 | 14.29 |
| g) Trimester 3 | 15.38 | 41.03 | 23.08 | 11.11 | 11.11 | 9.52 | 38.10 | 19.05 | 19.05 | 14.29 |
| **How often would you discuss concerns about the following risk factors with your pregnant patients?** | | | | | | | | | | |
| g) Alcohol, drug or tobacco use during pregnancy | 2.50 | 7.50 | 17.50 | 10.00 | 62.50 | 0.00 | 4.76 | 9.52 | 14.29 | 71.43 |
| h) Partner's use of alcohol, drug or tobacco | 5.13 | 33.33 | 12.82 | 25.64 | 23.08 | 4.76 | 4.76 | 33.33 | 4.76 | 52.38 |
| i) Mental Health (e.g. depression, bipolar) | 0.00 | 2.50 | 7.50 | 25.00 | 65.00 | 0.00 | 0.00 | 4.76 | 23.81 | 71.43 |
| j) Chronic illnesses (e.g. HIV) | 0.00 | 0.00 | 17.95 | 23.08 | 58.97 | 0.00 | 19.04 | 4.76 | 4.76 | 71.43 |
| k) History of sexual abuse | 0.00 | 10.26 | 15.38 | 23.08 | 76.19 | 0.00 | 4.76 | 14.29 | 4.76 | 76.19 |
| l) Unemployment | 15.00 | 17.50 | 25.00 | 15.00 | 27.50 | 4.76 | 19.04 | 7.50 | 19.04 | 22.50 |

**Statistical Results on Participants' Use of Alcohol and Communication Practices**

*Table 4.4* depicts midwives' overall AUDIT-C scores and communication practices. In all 3 trimesters of pregnancy, midwives who engaged in non "risky" drinking behaviors were more likely to (1) assess drinking behaviors in pregnant patients; (2) communicate often or frequently on prenatal alcohol use with pregnant women; and (3) share information that is accurate and/or reflects national health guidelines.

**Table 4.4: Midwives' Overall AUDIT-C Scores Based on their Communication Practices**

| | Percentage (no.) of Respondents | |
|---|---|---|
| **Communication Practices** | **AUDIT-C scores < 3** | **AUDIT-C scores ≥ 3** |
| **1.) Actual distribution of information** | | |
| **1st trimester** | 67.57 (25) | 32.43 (12) |
| Yes | 0.00 (0) | 100.00 (2) |
| No | | |
| **2nd trimester** | 90.00 (9) | 10.00 (1) |
| Yes | 52.00 (13) | 48.00 (12) |
| No | | |
| **3rd trimester** | 92.31 (12) | 7.69 (1) |
| Yes | 47.83 (11) | 52.17 (12) |
| No | | |
| **2.) Frequency of communication** | | |
| **1st trimester** | | |
| Frequently/often | 69.70 (23) | 30.30 (10) |
| Sometimes/rarely/never | 28.57 (2) | 71.43 (5) |
| **2nd trimester** | | |
| Frequently/often | 83.33 (5) | 16.67 (1) |
| Sometimes/rarely/never | 58.82 (20) | 41.18 (14) |
| **3rd trimester** | | |
| Frequently/often | 88.89 (8) | 11.11 (1) |
| Sometimes/rarely/never | 53.33 (16) | 46.67 (14) |
| **3.) Accuracy of communication** | | |
| Accurate | 62.50 (20) | 37.50 (12) |
| Inaccurate | 62.50 (5) | 37.50 (3) |

*AUDIT-C score is assessed on a scale of 0 to12. Overall scores of ≥ 4 (for men) and ≥ 3 (for women) indicate risky drinking.*

In *Table 4.5,* a Logistic Regression was run to assess whether midwives' personal alcohol use influenced the information based on alcohol guidelines was distributed to pregnant women during the 2nd and 3rd trimesters of pregnancies. Midwives' age, years of midwifery practice and midwife professional group (CPMs and CNMs) were significantly associated with sharing information based on clinical guidelines. Midwives' personal alcohol use did not significantly predict whether they disseminated information to the pregnant patients during the 2nd and 3rd trimesters. These predictor variables predicted participants' sharing of information based on clinical guidelines; $R^2 = 0.27$, chi-square= 10.80, $p = 0.056$ for the 2nd trimester and $R^2 = 0.35$, chi-square= 15.35, $p = 0.009$ for the 3rd trimester. Refer to *Table 4.6.*

**Table 4.5: Logistic Regression on Overall AUDIT-C Scores and Actual Distribution of Information during the 2nd Trimester and 3rd Trimester (N =32)**

| | 2nd Trimester | | 3rd Trimester | |
|---|---|---|---|---|
| | **Odds ratio** | **p value** | **Odds ratio** | **p value** |
| Actual distribution of information | | | | |
| Participants' alcohol use | 1.26 | 0.510 | 1.10 | 0.788 |
| Participants' age | 1.22 | **0.019** | 1.27 | **0.009** |
| Years of midwifery practice | 0.84 | **0.049** | 0.83 | **0.036** |
| Midwife professional group (CPM) | 30.71 | **0.032** | 29.82 | **0.036** |
| Average number of patients seen/ week | 1.00 | 0.854 | 1.01 | 0.785 |

Concurrently, an ordered Logistic Regression analysis was applied to examine the effects of midwives' personal alcohol use on the frequency of sharing information based on alcohol guidelines during the 2nd and 3rd trimesters. Refer to *Table 4.6*. Midwives' personal alcohol use, age, years of midwifery practice, and midwife professional groups were significantly associated distribution of information on prenatal alcohol use during 2nd and 3rd trimesters. Results of the Ordered Logistic Regression indicate that there was a significant association between the predictor

variables: $R^2 = 0.17$, chi-square= 17.29, $p = 0.004$ for the 2nd trimester and $R^2 = 0.16$, chi-square= 16.22, $p = 0.006$ for the 3rd trimester.

**Table 4.6: Logistic Regression on Overall AUDIT-C Scores and Frequency of Communication during the 2nd Trimester and 3rd Trimester**

| | 2nd Trimester | | 3rd Trimester | |
|---|---|---|---|---|
| | **Coef.** | **p value** | **Coef.** | **p value** |
| Frequency of communication | | | | |
| Participants' alcohol use | 0.76 | **0.018** | 0.63 | **0.039** |
| Participants' age | 0.18 | **0.001** | 0.18 | **0.001** |
| Years of midwifery practice | -0.20 | **0.002** | -0.19 | **0.002** |
| Midwife professional group (CPM) | 4.05 | **0.001** | 3.77 | **0.001** |
| Average number of patients seen/ week | 0.04 | **0.035** | 0.04 | 0.058 |

The Logistic Regression Analysis was used to test if midwives' personal alcohol use was significantly related with whether communications which occurred on prenatal alcohol use were accurate. The results of regression indicated that participants' alcohol use did not significantly predict the dissemination of accurate information. Refer to *Table 4.7*. In addition, there were no significant associations between the predictor variables; $R^2 = 0.15$, chi-square= 5.86, $p = 0.320$

**Table 4.7: Logistic Regression on Overall AUDIT-C Scores and Accuracy of Information**

| | **Odds ratio** | **95% CI** | **p value** | **Standard error** |
|---|---|---|---|---|
| Accuracy of information | | | | |
| Participants' alcohol use | 1.55 | 0.62 to 3.88 | 0.347 | 0.73 |
| Participants' age | 1.08 | 0.94 to 1.25 | 0.258 | 0.08 |
| Years of midwifery practice | 0.98 | 0.83 to 1.15 | 0.761 | 0.08 |
| Midwife professional group (CPM) | 0.72 | 0.04 to 12.51 | 0.821 | 1.05 |
| Average number of patients seen/ week | 1.02 | 0.96 to 1.07 | 0.552 | 0.03 |

***Discussion***

To the best of our knowledge, this is one of the few studies seeking to examine the relationship between midwife personal alcohol use and their communication practices regarding prenatal alcohol consumption. Using the AUDIT-C alcohol screening tool, this cross-sectional study determined that 38% of midwives met the criteria established for hazardous drinking (AUDIT-C scores ≥ 3). Overall, the frequency with which midwives communicated with pregnant patients based on standardized alcohol guidelines, was strongly associated to personal alcohol use. In other words, midwives who engaged in non-risky drinking behavior were more likely to provide recommendations in line with national health standards more often/frequently. However, accuracy of communication and whether communication actually occurred with pregnant patients based on standardized alcohol guidelines, were not found to be strongly associated to personal alcohol use. That said, every midwife who indicated they did not distribute information about prenatal alcohol use with patients during the first trimester met criteria for hazardous drinking.

These findings provide support for a number of studies which contend a health providers' personal psychological and physical wellbeing impacts the quality of care provided to patients (Buhl, Oreskovich, Meredith, Campbell, & DuPont, 2011; Domino et al., 2005; Frank, Segura, Shen, & Oberg, 2010). Although treatable, a majority of health professionals with alcohol use disorders do not seek treatment due to fears of social stigma and false beliefs that treatment is ineffective (Keyes et al., 2010; Yoast, Wilford, & Hayashi, 2008). While no respondents in the current investigation registered AUIDIT-C scores that would be indicative of an alcohol use disorder, several were classified as hazardous drinkers. Future investigations should employ alcohol use disorder screening tools to tease out the relationship between midwife communication

practices and personal alcohol consumption. Comprehensive programs that change perceptions about treatment efficacy and mental health stigma should continue to target all health providers.

Several factors should be considered in unison with the findings outlined herein. One limitation for this study is the low response rate. While the response rate achieved in this investigation is similar to other studies on midwives, study findings may not be generalizable to all midwives in Texas and/or the United States. Secondly, self-report responses on the alcohol behavior items may not accurately estimate, and or reflect, actual alcohol use behaviors. Additionally, AUDIT-C scores for the entire sample could not be calculated. Specifically, the question-item "How many standard drinks containing alcohol do you have on a typical day?" had a 33% reduction in participants' response rate when compared to the other 2 questions on the alcohol screening tool. Only 40 midwives provided a response to this question-item, as opposed to the other 2 screening questions which each had about 63 responses from participants. As a result of this, there was a significant reduction in the number of overall AUDIT-C scores obtained for statistical analysis. While it is unclear what caused this decline in response, evidence suggests that when suitable screening instruments are used, participants are able to provide honest responses on their alcohol use behaviors (Fiellin, Reid, & O'connor, 2000b; Oreskovich et al., 2012). Some of the advantageous characteristics of the AUDIT-C alcohol screening tool are its brevity and simplicity. The percentage decline in response rate to this one question-item could have been due to this very reason – a number of study participants, who had never consumed alcohol might have left the question blank since there was no answer choice for zero (0) drink. In addition, some other participants might have been reluctant to reveal the number of drinks they had on a typical day.

Notwithstanding these limitations, study findings indicate midwives with non-risky drinking behavior, demonstrate better communication practices, compared to their counterparts

with AUDIT-C scores ≥ 3. Overall, these findings highlight the need to stress the importance of communication practices about alcohol use in midwife training and continuing education programs. Ensuring that alcohol use is continuously assessed and discussed across all trimesters of a pregnancy is important to the health and wellbeing of both the mother and child. Additionally, efforts to reinforce the communication of national prenatal alcohol use guidelines are warranted.

# CHAPTER V

# CONCLUSION

The purpose of this study was to examine the factors that influence communication practices among midwives regarding prenatal alcohol consumption. Specifically, the following research questions were explored:

- a) Were midwives knowledgeable about:

  (i) the Surgeon General's guidelines regarding alcohol consumption in pregnant women.

  (ii) potential outcomes in the babies of women who consumed alcohol during pregnancy

  (iii) types of validated screening instruments (T-ACE, TWEAK) used to assess alcohol consumption in pregnant women

  b) Did the midwives' overall knowledge scores influence their communication practices?

- a) What was the midwife's intent regarding dissemination of prenatal alcohol information in the clinical setting?

  b) Did midwives' intent to disseminate information on prenatal drinking influence their communication practices?

- Did the midwives' personal alcohol consumption behaviors influence their communication practices regarding prenatal alcohol use? `

This was a cross-sectional study, which targeted midwives from across the state of Texas. Participants were recruited from the Association of Texas Midwives (ATM) and Consortium of Texas Certified Nurse Midwives (CTCNM) which are health professional organizations consisting of certified professional midwives (CPMs) and certified nurse midwives (CNMs) respectively. All 438 CPMs and CNMs in their respective professional organizations were contacted to participate in this study. Altogether, seventy-seven (n = 77) midwives (including 12 participants from the pilot

study) participated in the investigation. This response rate (18%) achieved was comparable to other research studies where data was obtained from midwives (Moniz et al., 2017)

A Majority of midwives (85%) included in this investigation had a high overall knowledge score (9 - 12) in the 12-item questionnaire regarding FASD and the impact of alcohol on a fetus. Most participants (96%) were informed about (1) the negative birth outcomes seen in babies with FASD, and (2) the U.S. Surgeon General's guideline regarding prenatal alcohol use, which encourages pregnant women to abstain from consuming alcohol. Despite being knowledgeable about national prenatal alcohol use guidelines, one out of five (17%) midwives provided advice to pregnant women that was not consistent with the Surgeon General's guidelines regarding prenatal alcohol use. Many midwives (63%) were unaware of common alcohol screening tools (i.e., TACE, TWEAK) that could assess for harmful drinking habits among pregnant women. Participants' overall knowledge score was not statistically associated with midwives' communication practices.

Using the constructs from the Theory of Planned Behavior (TPB; Ajzen, 1988), this study evaluated whether midwives' attitude, subjective norms and perceived behavioral control (PBC) influenced communication practices among midwives. In particular, subjective norms and attitude were strong predictors of participants' intent to disseminate accurate information on prenatal alcohol consumption. Overall, predictor variables explained a significant proportion of variance in participants' intention, $R^2 = 0.68$, $F$ (20, 27) = 2.88, $p = 0.006$. In addition, participants' intention (coefficient = 0.34, $p = 0.013$), years of midwifery practice (coefficient = -0.11, $p = 0.037$), midwife professional group (coefficient = 2.58, $p = 0.036$) and average number of pregnant patients seen per week (coefficient = 0.04, $p = 0.042$) were significant predictors of frequency of communication. Also, participants' intention (coefficient = 0.10, $p = 0.041$), an Associate degree

(coefficient = -1.92, $p$ = 0.034) and a Doctoral degree (coefficient = -1.97, $p$ = 0.041) were significant predictors in the actual distribution of information.

Midwives' personal alcohol use was not statistically associated with the actual distribution of information and/or the dissemination of accurate information. That said, midwives' personal alcohol use was associated with the frequency of communication on prenatal alcohol use during 2nd and 3rd trimesters, even when controlling for age, years of midwifery practice, and midwife professional group. Overall, midwives with non-risky drinking behavior demonstrated better communication practices compared to their counterparts with AUDIT-C scores $\geq 3$.

Despite the limitations associated with this investigation, such as the low response rate, and the sample only reflecting a convenience sample of mostly White Texas midwives, several important implications are highlighted herein. In particular, there are several key takeaways for midwife training and continuing education programs. First, midwives should continuously be reminded about the importance of implementing prenatal alcohol guidelines through communications that are reliable and based on scientific evidence. Second, fostering positive attitude, and promoting higher social norms, among midwives could also directly influence their prenatal alcohol communication and establish them as an influential figure in disseminating prenatal alcohol advice. Finally, ensuring that midwives are trained to continuously assess and discuss alcohol use across all trimesters of a pregnancy will result in positive outcomes to the health and wellbeing of both the mother and child.

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APPENDIX A

## Study questionnaire distributed to ATM and CTCNM midwives

**Please complete this questionnaire carefully. The information obtained from your response could be beneficial in encouraging best practices and evidence-based care among midwives; while also promoting maternal and infant health. Note that this questionnaire has 4 sections. For this study questionnaire, alcohol use is defined as ≥ 1 drink in past 30 days.**

### SECTION 1

**Q1a.** Have you undergone training in the field of prenatal care, labor and delivery of a newborn?

- ❍ Yes
- ❍ No

**Q1b.** Do you offer services that involve (but are not limited to) prenatal care, childbirth, postpartum care and family planning?

- ❍ Yes
- ❍ No

**Q2.** What is the average number of pregnant women you offer services to in a typical week?
_____ number of pregnant women seen per week.

### SECTION 2

**Using the multiple-choice answers below, select the one(s) that best describes your response(s) to each of the following statements.**

**Q3a.** What is the method of screening for alcohol use in your pregnant patients? (Check all the answers that apply)

- ❑ Physician verbally obtains history from patient
- ❑ Midwife verbally obtains history from patient
- ❑ Patient completes a written questionnaire
- ❑ Clinician uses a validated alcohol screening instrument (e.g. TWEAK)
- ❑ No screening is done to assess for alcohol use
- ❑ Biological markers are used to assess for alcohol use

**Q3b.** When do you typically screen your pregnant patients for alcohol use? (Check all the answers that apply)

- ❑ Alcohol screening is done during 1st trimester
- ❑ Alcohol use is screened during 2$^{nd}$trimester
- ❑ Alcohol use is screened during 3$^{rd}$ trimester
- ❑ Screening is done once during the patient's initial prenatal visit

- ❑ Alcohol use screening is done periodically during pregnancy
- ❑ No screening is done to assess for alcohol use

**Q4.** Which of the following could be a potential outcome seen in the baby of a patient who engages in prenatal alcohol use? (Select an answer for each item)

| | Yes | No | Don't know |
|---|---|---|---|
| Learning disabilities | ❍ | ❍ | ❍ |
| Poor motor functions. | ❍ | ❍ | ❍ |
| Delayed social skills | ❍ | ❍ | ❍ |
| Attention deficits | ❍ | ❍ | ❍ |
| Growth impairments | ❍ | ❍ | ❍ |
| Birth defects/malformations | ❍ | ❍ | ❍ |
| Psychiatric (DSM V) disorder | | | |

**Q5.** Which of the following statements corresponds most closely with the Surgeon General's guideline regarding prenatal alcohol use? (Choose one correct answer)

- ❍ Don't drink. But if you do, occasional consumption of alcohol (e.g. 1 drink per day or less) during pregnancy is not harmful to the mother or fetus.
- ❍ Pregnant women or women planning to become pregnant should completely abstain from consuming alcohol.
- ❍ Consumption of 1-2 drink of alcohol once in a while during pregnancy (e.g. on festive occasion) is safe for the fetus.
- ❍ Any alcohol consumption during pregnancy is considered safe for the fetus
- ❍ I don't know the answer to this

**Q6a**. Which of the following is a useful alcohol screening instrument for pregnant women? (Check all the answers that apply).

- ❑ TWEAK
- ❑ T-ACE
- ❑ PAGE
- ❑ CAST
- ❑ I don't know

**Q6b**. During which of the following trimesters of pregnancy do you consider prenatal alcohol use to be safe to the fetus?

- ❑ 1st trimester only
- ❑ 2nd trimester only
- ❑ 3rd trimester only
- ❑ 1st, 2nd and 3rd trimesters

❑ I don't believe alcohol is safe during any trimester

**Using the scale below, select the response that best aligns with your beliefs about the following statements.**

**Q7a.** Pregnant women or women planning to become pregnant should completely abstain from drinking alcohol.

❍ Very true
❍ True
❍ Somewhat true
❍ Somewhat untrue
❍ Untrue
❍ Very Untrue

**Q7b**. Occasional consumption of alcohol (e.g. 1 drink per day or less) during pregnancy is not harmful to the fetus.

❍ Very true
❍ True
❍ Somewhat true
❍ Somewhat untrue
❍ Untrue
❍ Very Untrue

**Q7c.** Consumption of 1-2 drink of alcohol once in a while during pregnancy (e.g. on festive occasion) is safe for the fetus.

❍ Very true
❍ True
❍ Somewhat true
❍ Somewhat untrue
❍ Untrue
❍ Very Untrue

**Q7d.** Any level of alcohol consumption during pregnancy is considered safe for the fetus.

❍ Very true
❍ True
❍ Somewhat true
❍ Somewhat untrue
❍ Untrue
❍ Very Untrue

**Q8**. How many alcohol drinks (per occasion) do you believe is safe for the fetus? (Click on the drop box list to select answer).

❍ 1 drink
❍ 2 drinks

- ❍ 3 drinks
- ❍ 4 drinks
- ❍ 5 drinks
- ❍ 6 drinks
- ❍ 7 drinks
- ❍ 8 drinks
- ❍ 9 drinks
- ❍ 10+ drinks
- ❍ 0 drink
- ❍ I don't know

**Q9a.** During a first prenatal visit, would you typically ask a patient about her alcohol use?

- ❍ Yes
- ❍ No

**9b**. In each trimester, indicate whether you would ask a patient about her alcohol use during pregnancy? (Select an answer for each item)

| | Yes | No |
|---|---|---|
| Trimester 1 | ❍ | ❍ |
| Trimester 2 | ❍ | ❍ |
| Trimester 3 | ❍ | ❍ |

**Q10.** Which of the following best describes the advice you give a patient regarding her alcohol use during pregnancy?

- ❍ You should totally abstain from alcohol while pregnant.
- ❍ Drink once in a while (a drink on festive occasion is alright).
- ❍ Take 1 - 2 drinks every now and then
- ❍ Don't drink. But if you do, take no more than 1 drink per day
- ❍ No recommendations are given

**Q11. How often would you ask a patient about her alcohol use during the following trimesters of her pregnancy? (Indicate using the response scale below)**

| | Never | Rarely | Sometimes | Often | Always |
|---|---|---|---|---|---|
| 1st trimester | ❍ | ❍ | ❍ | ❍ | ❍ |
| 2nd trimester | ❍ | ❍ | ❍ | ❍ | ❍ |
| 3rd trimester | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q12**. **How often would you discuss concerns about the following risk factors with your pregnant patients? (Indicate using the response scale below)**

| | Never | Rarely | Sometimes | Often | Always |
|---|---|---|---|---|---|
| Alcohol, drug or tobacco use during pregnancy | ❍ | ❍ | ❍ | ❍ | ❍ |
| Partner's use of alcohol, drug or tobacco | ❍ | ❍ | ❍ | ❍ | ❍ |
| Mental Health (e.g. depression, bipolar) | ❍ | ❍ | ❍ | ❍ | ❍ |
| Unemployment | ❍ | ❍ | ❍ | ❍ | ❍ |
| Chronic illnesses (e.g. HIV) History of sexual abuse | ❍ | ❍ | ❍ | ❍ | ❍ |

**Q13**. What actions do you take after identifying a pregnant patient who drinks alcohol? (Check all that apply)

- ❑ Offer counseling on alcohol abstinence
- ❑ Offer counseling on alcohol reduction
- ❑ Discuss the adverse effects of alcohol use during pregnancy
- ❑ Refer patient to detoxification treatment
- ❑ Refer to the psychiatrist for professional counseling on comorbid mental illness
- ❑ Offer coordinated follow-up care
- ❑ No action is taken

**Q14.** Outline whether you agree that the following issues impact your ability to discuss a patient's prenatal alcohol consumption. (**Indicate using the response scale below)**

| | Strongly Agree | Agree | Neither Agree nor Disagree | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| Time restraint during patient consultation | ❍ | ❍ | ❍ | ❍ | ❍ |
| Patient sensitivity | ❍ | ❍ | ❍ | ❍ | ❍ |
| Clinician's need for additional trainings | ❍ | ❍ | ❍ | ❍ | ❍ |
| Inadequate information on referral resources Unclear guidelines on prenatal alcohol use | ❍ | ❍ | ❍ | ❍ | ❍ |
| Ambiguity in written informational materials | ❍ | ❍ | ❍ | ❍ | ❍ |

## SECTION 3

**For this section, select the response the response that best describes your intent to share information on prenatal alcohol use.**

**Q15.** If 10 patients were to present to you for the first time in the prenatal clinic, how many will you share information on prenatal alcohol use with? (Click on the drop box list to select your answer).

***0 1 2 3 4 5 6 7 8 9 10***

**Using the response scales below, complete this statement with the answer that best describes your situation.**

**Q16**. Sharing information with my patient on the risk of prenatal alcohol use is:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Harmful | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Beneficial |
| Unpleasant | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Pleasant |
| Bad practice | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Good practice |
| Wrong thing to do | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Right thing to do |

**Q17a. For the questions below, select a response on the rating scale of 1-7, where 1 is "unlikely" and 7 is "likely".**

| Question format | Response format |
|---|---|
| 1. If I share information that is based on clinical guidelines for prenatal alcohol use, I will feel I am doing something positive for my patient | Unlikely 1 2 3 4 5 6 7 Likely |
| 2. If I discuss alcohol use in pregnancy, it will frighten or anger my patient | Unlikely 1 2 3 4 5 6 7 Likely |
| 3. If I use the alcohol screening tool, I will detect prenatal alcohol use at an early stage in my patient. | Unlikely 1 2 3 4 5 6 7 Likely |

**Q17b. For the questions below, select a response on the rating scale of 1-7 where 1 is "extremely undesirable" and 7 is "extremely desirable".**

| Question format | Response format |
|---|---|
| 1.Doing something positive for my patient is: | Extremely -3 -2 -1 0 +1 +2 +3 Extremely Undesirable Desirable |
| 2. Frightening or causing anger for my patient is: | Extremely -3 -2 -1 0 +1 +2 +3 Extremely Undesirable Desirable |
| 3. Detecting prenatal alcohol use at an early stage in my patient is: | Extremely -3 -2 -1 0 +1 +2 +3 Extremely Undesirable Desirable |

**For the questions below, select a response on the rating scale of 1-7 where 1 is "strongly disagree" and 7 is "strongly agree".**

**Q18.**

| Question format | Response format |
|---|---|
| 1.My colleagues want me to share information on the risk of prenatal alcohol use with my patients | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |
| 2. I feel under social pressure to share information on the risk of alcohol use with my patients | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |
| 3. It is expected of me to share information on the risk of prenatal alcohol use with patients | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |

**Q19a**.

**Using the scales below, complete the following statements with the response that best describes your situation.**

| Question format | Response format |
|---|---|
| 1. My patients think I: | should not -3 -2 -1 0 +1 +2 +3 should<br>*share information on the risk of prenatal alcohol use with them* |
| 2. My colleagues (midwives) would: | disapprove -3 -2 -1 0 +1 +2 +3 approve<br>*communications on prenatal alcohol use* |
| 3. My colleagues: | do not -3 -2 -1 0 +1 +2 +3 do<br>*share information on the risk of prenatal alcohol use with patients* |

**Q19b.**

**For the questions below, select a response on the rating scale of 1-7 where 1 is "not at all" and 7 is "very much".**

| Question format | Response format |
|---|---|
| 1.My patients' approval of my practice is important to me | Not at all 1 2 3 4 5 6 7 Very much |
| 2.What my colleagues think I should do matters to me | Not at all 1 2 3 4 5 6 7 Very much |
| 3. Doing what my other colleagues do is not important to me | Not at all 1 2 3 4 5 6 7 Very much |

**Q20.**

**For the questions below, select a response on the rating scale of 1-7 where 1 is "strongly disagree" and 7 is "strongly agree".**

| Question format | Response format |
|---|---|
| 1. I am confident that I can share information on the risk of prenatal alcohol use if I wanted to. | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |
| 2. For me, sharing information on the risk of prenatal alcohol use is easy | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |
| 3. Whether I share information on the risk of prenatal alcohol use is entirely up to me | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |
| 4. The decision to share information on prenatal alcohol use is beyond my control | Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree |

**Q21a.**
**For the questions below, select a response on the rating scale of 1-7, where 1 is "unlikely" and 7 is "likely".**

| Question format | Response format |
|---|---|
| 1. When I am sharing information on the risk of prenatal alcohol use, I feel rushed. | Unlikely 1 2 3 4 5 6 7 Likely |
| 2. Communication on prenatal alcohol use is uncomfortable for my patients | Unlikely 1 2 3 4 5 6 7 Likely |

**Q21b.**
**Using the scales below, complete the following statements with the response that best describes your situation.**

| Question format | Response format |
|---|---|
| 1.During consultation, feeling rushed makes it | difficult -3 -2 -1 0 +1 +2 +3 easier<br>*to share information on the risk of prenatal alcohol use* |
| 2. When communication on prenatal alcohol use is uncomfortable for my patients, I am | Less likely -3 -2 -1 0 +1 +2 +3 more likely<br>*to share information on the risk of prenatal alcohol use* |

## SECTION 4

**For this section, provide your response in an open-ended format. This will be useful for obtaining a deeper understanding of your views and behavior.**

**Q22:**
A pregnant patient confides in you that she drinks alcohol. She then asks you to tell her a "safe" level of alcohol consumption that won't cause harm to her unborn fetus. How would you respond to this patient?

## SECTION 5

**Please provide answers to the following demographic and alcohol screening questions. Remember that your participation is voluntary and you have the choice to stop participating at any time.**

Which of these sub-categories do you belong to?
- ❍ Certified Nurse Midwife
- ❍ Certified Midwife
- ❍ Certified Professional Midwife
- ❍ Licensed Midwife
- ❍ Student
- ❍ Other _____

What is your gender?
- ❍ Male
- ❍ Female
- ❍ Transgender
- ❍ Other

- ❍ I prefer not to answer

With what racial group do you identify with?

- ❍ White Non-Hispanic
- ❍ Hispanic/Latina
- ❍ Black/African American
- ❍ Asian
- ❍ American Indian/Alaska Native
- ❍ Native Hawaiian/Pacific Islander
- ❍ Other _____

What is your age?

What is your highest academic degree?
- ❍ Diploma
- ❍ Associate
- ❍ Bachelor's
- ❍ Master's
- ❍ Doctorate

Who is your primary employer?
- ❍ Hospital/Medical Center
- ❍ Educational Institution
- ❍ Federal Government/Military
- ❍ Community Health Center
- ❍ Physician group practice (Preferred Provider Organization)
- ❍ Midwifery group practice (Preferred Provider Organization)
- ❍ State/Local Government
- ❍ Other

Where do you consider your employment to be located?
- ❍ Urban inner city
- ❍ Urban not inner city
- ❍ Rural
- ❍ Suburban

In which of these locations do you deliver your newborns? (Check all that apply)
- ❍ Hospital
- ❍ Birth center
- ❍ Home

How many years have you been in the midwifery-practice?

How often do you have a drink containing alcohol?
- ❍ Never
- ❍ Monthly or less
- ❍ 2-4 times a month

- ❍ 2-3 times a week
- ❍ 4 or more times a week

How many standard drinks containing alcohol do you have on a typical day?

- ❍ 1 or 2
- ❍ 3 or 4
- ❍ 5 or 6
- ❍ 7 to 9
- ❍ 10 or more

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

- ❍ Never
- ❍ Less than monthly
- ❍ Monthly
- ❍ Weekly
- ❍ Daily or almost daily

APPENDIX B

# TEXAS A&M UNIVERSITY HUMAN RESEARCH PROTECTION PROGRAM INFORMATION SHEET

Project Title: Factors that Influence Communication Practices Regarding Alcohol Consumption in Pregnancy: A Cross-sectional Study of American Nurse-Midwives

**You are invited to take part in a research study being conducted by Adam Barry and Olufunto Olusanya, researchers from the College of Education and Human Development, Texas A&M University. The information in this form is provided to help you decide whether or not to take part. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have. You may choose to withdraw from the study at any time without penalty. NOTE: If you are employed then it is your responsibility to work with your employer regarding work leave for participation in this study if during work hours.**

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**Why Is This Study Being Done?**
The purpose of this study is to specifically examine the factors that influence dissemination of information among midwives regarding prenatal alcohol consumption.

**Why Am I Being Asked To Be In This Study?**
You are being asked to be in this study because you are health care practitioner who has undergone training in the field of prenatal care, labor and delivery. You also provide care for pregnant women during prenatal clinic visits or hospital admissions.

**How Many People Will Be Asked To Be In This Study?**
Approximately 3,000 participants will be invited to participate in this study from across United States.

**What Are the Alternatives to being in this study?**
The alternative to being in the study is not to participate.

**What Will I Be Asked To Do In This Study?**

You will be asked to complete an online survey questionnaire. The completion of the questionnaire would last approximately 15 minutes. You will be asked to provide information based on your knowledge, practice, attitude and communication with pregnant women in regards to alcohol consumption during pregnancy. The survey will also include demographic and alcohol screening questions.

**Are There Any Risks To Me?**
The things that you will be doing are no more than risks than you would come across in everyday life. Although the researchers have tried to avoid risks, you may feel that some questions that are asked of you will be stressful or upsetting. You do not have to answer anything you do not want to. In the event that you experience emotional distress during the survey, you may stop at any time, and if you choose, we can provide you contact information for a mental health professional.

**Are There Any Benefits To Me?**
The direct benefit to you by being in this study is you will have the opportunity to assess how your dissemination of information on alcohol, knowledge, practice and attitude influence drinking behavior among pregnant women. Study findings could encourage best practices and evidence-based care among prenatal care practitioners.

**Will There Be Any Costs To Me?**
Aside from your time, there are no costs for taking part in the study.

**Will I Be Paid To Be In This Study?**
You will not receive any monetary payment for being in this study. However, you will be compensated by having the opportunity to enter in a raffle draw to win an Apple Watch Series 3.

**Will Information From This Study Be Kept Private?**
The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Adam Barry and Olufunto Olusanya will have access to the records. Information about you will be stored in locked file cabinet; computer files protected with a password. This consent form will be filed securely in an official area.

People who have access to your information include the principal investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Research Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

Information about you and related to this study will be kept confidential to the extent permitted or required by law.

**Who may I Contact for More Information?**

You may contact the Principal Investigator, Adam Barry, Ph.D, to tell him about a concern or complaint about this research at 979-862-2964 or aebarry@tamu.edu. You may also contact the Protocol Director, Olufunto A. Olusanya, M.P.H; M.B.B.S at 979-204-8013 or iou_2@tamu.edu.

For questions about your rights as a research participant, to provide input regarding research, or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Research Protection Program (HRPP) by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@tamu.edu. The informed consent form and all study materials should include the IRB number, approval date, and expiration date. Please contact the HRPP if they do not.

**What if I Change My Mind About Participating?**
Your participation in this research is voluntary, and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no effect on your relationship with Texas A&M University, etc.

Any new information discovered about the study will be provided to you. This information could affect your willingness to continue your participation.

**Please make sure you have thoroughly read and understood all the information provided to you. By completing this survey, you are giving permission for the investigator to use your information. By clicking the "Go to Survey" link below, you are confirming your voluntary compliance with the details of this study outlined above. After clicking, the link below you will automatically be taken to the study questionnaire. You may print this page for your personal records**

Thank you.

Olufunto A. Olusanya, M.P.H; M.B.B.S

APPENDIX C

INVITATION EMAIL

Howdy,

My name is Olufunto Olusanya. I am a 4th year doctoral candidate at the Texas A&M University pursuing a Doctor of Philosophy in Health. I am sending this email to invite you to participate in a Texas A&M Research Study (ID number: IRB2017-0200D)

The title of my research study is*," Factors that Influence Communication Practices Regarding Alcohol Consumption in Pregnancy: A Cross-sectional Study of Texas Midwives*" This study has been approved by the Texas A&M Institutional Review Board (TAMU IRB) with identification number IRB2017-0200D.

Alcohol can have damaging effects on the developing fetus resulting in the leading non-genetic cause of preventable birth defects and mental retardation in the United States. Midwives are instrumental in providing information to women on alcohol use during pregnancy. The information provided by the midwife could potentially influence a woman's decision to avoid alcohol during pregnancy. This study will examine the factors that influence the dissemination of information among midwives regarding prenatal alcohol consumption.

The results of this study could be beneficial in promoting maternal health, reducing infant morbidity and mortality. Study findings could also encourage best practices and evidence- based care among prenatal care practitioners.

The invitation email includes a link to the survey questionnaire, an information sheet, and a downloadable survey questionnaire. If an individual decides to participate

1. He/she will be asked to complete the online survey questionnaire.
2. The questionnaire will ask participant to provide information based on communication with pregnant women in regards to alcohol consumption during pregnancy.
3. Completing the questionnaire should take approximately 15 minutes

I would really appreciate your assistance. By participating in this study, you will have an opportunity to enter a raffle draw to win an Apple Watch Series 3. At the end of the study, an executive summary of the findings will be shared with all study participants.

For any questions or concerns, you may contact my academic advisor, Adam Barry, Ph.D., at 979-862-2964 or aebarry@tamu.edu. You may also contact me at 613-413-1513 or iou_2@tamu.edu.

If you wish to participate in this research study, the survey questionnaire and information sheet can be found in the link: https://www.qualtrics.com/

Please make sure that you thoroughly read and understand all the information provided to you in the information sheet. By clicking the "*Go to Survey questionnaire*" link, you are confirming your voluntary compliance with the details of this study. Then, you will automatically be taken to the study questionnaire.

Thank you for all your help and time.

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