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Adoption of Validated Screening Tools among Healthcare Providers in Screening for Alcohol Use among Pregnant Women and Women of Childbearing Age

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Abstract

Adoption of Validated Screening Tools among Healthcare Providers in Screening for Alcohol Use among Pregnant Women and Women of Childbearing Age

By Krista K. Proia

Background

Evidence-based screening recommendations have been developed including the use of validated screening tools and offer the most accurate way to assess alcohol consumption among women of childbearing age and pregnant women. This thesis delves further into the alcohol-use screening practices of healthcare providers by asking not only about the current practices they utilize but the perceived characteristics of these practices that influenced its adoption into practice and the barriers that are inhibiting the adoption of such screening tools guided by the Diffusion of Innovations.

Methods

The current study utilized a cross-sectional online survey design consisting of a convenience sample of healthcare providers employed by the Emory University Healthcare System. Statistical analyses were conducted using SPSS statistical package version 18.0. Descriptive statistics were calculated for all demographic variables. Logistic regressions and independent samples t-test analyses were computed to assess associations between healthcare provider characteristics and alcohol screening characteristics.

Results

A total of 49 completed surveys were returned for a response rate of 34%. The majority of respondents reported always advising abstinence from alcohol during pregnancy (52.3% with women of childbearing age and 89.2% with pregnant women, respectively). In screening women of childbearing age, the odds of utilizing a screening tool to assess “at-risk” drinking among respondents specializing in obstetrics/gynecology were decreased by a factor of 0.17 ($p=0.028$) and for physicians, the odds were increased by a factor of 10.29 ($p = 0.030$). In screening pregnant women, the odds of utilizing a screening tool to assess “at-risk” drinking for female respondents was increased by a factor of 12.57 ($p=0.019$) and for physicians the odds were increased by a factor of 13.82 ($p=0.014$). There was no significant association between innovative characteristic scores and type of alcohol-use screening tool utilized.

Discussion

Findings from this thesis research indicates that healthcare providers are not consistently following the evidence-based guidelines including utilizing a standardized screening tool specifically validated for use in women to assess “risk drinking”. Additional research further investigating other components of the Diffusion of Innovations is warranted in order to gain a better understanding of what factors increase the adoption rate of these screening guidelines into practice.

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Chapter I: Introduction and Theoretical Framework

Introduction

Fetal Alcohol Syndrome (FAS) is the leading preventable cause of mental retardation in the United States (Centers for Disease Control, 2005) . Caused by prenatal alcohol exposure, effects from FAS and Fetal Alcohol Spectrum Disorders (FASD) range from developmental and behavioral effects on the central nervous system, deficits in IQ or mental retardation, dysmorphology in facial features, low birth weight and height, and tissue damage affecting the brain, heart, and genitourinary tract (Brimacombe, Nayeem, Adubato, DeJoseph, & Zimmerman-Bier, 2008; Senturias, Asamoah, Allard, & Hersh, 2009). Without intervention, children with FAS/FASD can develop secondary disabilities including mental illness, substance abuse, school problems, and criminal involvement, to name a few (Senturias, et al., 2009). Previous literature has indicated that early intervention is imperative to combat issues from prenatal alcohol exposure to ensure optimal quality of life of individuals affected (Centers for Disease Control, 2005).

It is estimated that FAS occurs in approximately 0.5 to 2 per 1000 live births and that all FASD cases account for approximately 1-9 per 1000 live births (CDC, 1997, 2002). Lifetime costs from FAS/FASD are estimated from $1 million to $5 million per child (Senturias, et al., 2009). It has been widely reported that alcohol exposure can affect the fetus throughout the entire gestation of the pregnancy. Hence, there is currently no known safe amount of alcohol intake during pregnancy, thereby making abstinence imperative in the prevention of FAS/FASD (O'Leary, Heuzenroeder, Elliott, & Bower, 2007; Senturias, et al., 2009).

Federal warnings about the need to abstain from alcohol during pregnancy were first issued in 1984 (ACOG Committee Opinion, 2008). Currently, the Surgeon General, American College of Obstetricians and Gynecologists (ACOG), and the American Academy of Pediatrics (AAP) advise that women who are pregnant, planning on becoming pregnant, or who do not use effective contraception abstain from alcohol altogether (ACOG Committee Opinion, 2008; Bailey & Sokol, 2008). The rationale is that many women do not realize they are pregnant during their first trimester, a pivotal developmental period of the fetus (Bailey & Sokol, 2008; Barry, et al., 2009). Current dietary guidelines recommend that women in general should drink no more than 7 drinks per week and no more than 3 drinks on any given day (Barry, et al., 2009; Centers for Disease Control, 2005; Gerberding, Cordero, & Floyd, 2004). However, it is reported that more than half of all women of childbearing age (18-44 years of age) reported alcohol use in the past month (Barry, et al., 2009). It is estimated that 12.8% of pregnant women report any alcohol use with 2.7% reporting frequent drinking (more than 7 drinks per week) and 3.3% reporting binge drinking (five or more drinks per episode) (CDC, 2004, 2009). This prevalence is far from Healthy People's 2010 goal of 94% pregnancy alcohol abstinence and 100% elimination of binge drinking during pregnancy (Bailey & Sokol, 2008).

With these alarming rates it is imperative that healthcare providers screen for alcohol use among women of childbearing age and women who are pregnant. It is recommended that all women of childbearing age who report drinking above the current dietary guidelines and pregnant women who report drinking any alcohol, be further assessed for alcohol-related problems (ACOG Committee Opinion, 2008; Centers for

Disease Control, 2005; Gerberding, et al., 2004). Evidence-based screening recommendations have been developed including the use of validated screening tools which offer the most efficient and accurate way to assess alcohol consumption among this population (ACOG Committee Opinion, 2008; Bailey & Sokol, 2008; Barry, et al., 2009; O'Leary, et al., 2007). Combined with formal recommendations for assessing and intervening with pregnant women and women of childbearing age, these formal tools provide an option for detecting and preventing alcohol use in pregnant women as well as aid in the reduction and/or early diagnosis of FAS/FASD.

Current evidence-based screening recommendations. Current evidence-based recommendations in screening for alcohol use in women of childbearing age and/or women who are pregnant include: inquiring about the quantity and frequency of alcohol consumed, administration of formal validated screening tools, and if necessary, the administration of a Brief Intervention (BI) (ACOG Committee Opinion, 2008; Bailey & Sokol, 2008; Barry, et al., 2009; Gerberding, et al., 2004; Sarkar, et al., 2009).

Assessing alcohol quantity and frequency. The majority of the literature recommend that all healthcare providers ask about the quantity and frequency of alcohol use among all women of childbearing age and pregnant women which can be included as part of routine questioning regarding overall health and lifestyle. Women should be informed of the consequences of drinking over the recommended guidelines as well as drinking during pregnancy in a supportive and motivational manner (ACOG Committee Opinion, 2008; Centers for Disease Control, 2005; Sarkar, et al., 2009). If a woman of childbearing age reports consuming alcohol over the recommended guidelines or, a pregnant woman reports any alcohol use, the use of a validated screening tool to

determine whether a woman is “at-risk” for an alcohol-exposed pregnancy (AEP) is warranted (Sarkar, et al., 2009).

Standardized screening tools. Standardized alcohol-use screening tools that have been validated for use in women include the T-ACE (Tolerance, Annoyed, Cut-down, Eye Opener), the TWEAK (Tolerance, Worry, Eye-Opener, Amnesia, K(C)ut Down), and AUDIT (Alcohol Use Disorders Identification Test). These tools have shown to be effective in indentifying women who are at-risk for an AEP (Barry, et al., 2009; Chang, 2001, 2004/2005; Chang, Wilkins-Haug, Berman, & Goetz, 1999; Chang, et al., 1998; Russell, et al., 1994). It is suggested that a Brief Intervention in the physician’s office should follow screening, especially if a woman has screened positive for “at-risk drinking” on the standardized questionnaire. Brief Interventions have been shown to reduce alcohol intake among pregnant women who drink mild to moderate amounts of alcohol (ACOG Committee Opinion, 2008; Centers for Disease Control, 2005; Gerberding, et al., 2004; Sarkar, et al., 2009).

Brief intervention. The use of a Brief Intervention (BI) in the clinical setting for women who have a positive score on either the TWEAK, T-ACE, or any other alcohol screening questionnaire, is a good way to encourage women to modify their drinking habits (Chang, 2004/2005). The BI has been recommended as the first step for approaching people with mild-to-moderate alcohol problems as well as offer an opportunity to refer patients with heavy drinking problems for more in-depth assessment (Becker & Walton-Moss, 2001; Chang, 2004/2005). Brief Interventions are shown to be effective in prenatal populations as women who are pregnant or planning on becoming pregnant are generally motivated to change their behaviors and are receptive to BIs in the

clinical setting (Chang, 2004/2005). BIs can span from only a few minutes up to a few hours, are cost effective, and do not need to be administered by specialists in alcohol treatment, making it ideal for physicians, nurses, and social workers (Bailey & Sokol, 2008; Barry, et al., 2009; Becker & Walton-Moss, 2001). BIs are typically made up of the following six elements under the FRAMES acronym: Feedback of personal risk; Responsibility of personal control; Advice to change; Menu of ways to reduce or stop drinking; Empathetic counseling style; and Self-efficacy or optimism about cutting down or stopping drinking (Bailey & Sokol, 2008; Barry, et al., 2009; Becker & Walton-Moss, 2001). The use of a BI in clinical and community-based settings have shown to decrease the risk of an alcohol-exposed pregnancy making the use of a BI and the formal screening tools mentioned above an effective approach for assessing alcohol use among pregnant women and women of childbearing age (Chang, et al., 2005; Floyd, et al., 2007; Kennedy, Finkelstein, Hutchins, & Mahoney, 2004; The Project CHOICES Intervention Research Group, 2003). Consistent assessment and recording of alcohol use among women of childbearing age and pregnant women can aid in earlier identification of infants who have been exposed to alcohol and earlier implementation of an intervention to decrease the severity of the disabilities associated with Fetal Alcohol Syndrome and Fetal Alcohol Spectrum Disorders (FASD).

Despite these policies and protocols available, previous research on the screening practices for alcohol use indicates that physicians and other healthcare providers are not screening for alcohol use based on the recommendations above. Though past studies have found that overall, healthcare providers believed that all pregnant women should abstain from alcohol and recommend that no alcohol is safe during pregnancy to their patients,

they did not use a validated screening tool for detecting alcohol use among pregnant women and women of childbearing age (Brimacombe, et al., 2008; Diekman, et al., 2000; Nevin, Christopher, Nulman, Koren, & Einarson, 2002; Tough, Clarke, Hicks, & Clarren, 2005; Tough, Ediger, Hicks, & Clarke, 2008; Zoorob, Aliyu, & Hayes, 2010). Those healthcare providers who reported using a validated screening tool, reported using a tool that had not been validated for use in pregnant women thus indicating that validated screening tools are not widely disseminated or adopted across the healthcare system (D. A. Davis & Taylor-Vaisey, 1997; Diekman, et al., 2000; Nevin, et al., 2002).

Previous research has not assessed a theoretical reasoning behind why formal screening tools for assessing alcohol use among pregnant women and women of childbearing age have not been adopted into healthcare practices. Further, for those healthcare providers who do use a validated screening tool, even if it has not been validated in women, previous research has not investigated the characteristics of the standardized tool that these healthcare providers believe aided in the probability of its adoption into their practice. The use of the Theory of Diffusion of Innovations will aid in understanding the characteristics of "best-evidence practices" including validated screening tools, which have an influence on its adoption into practice, which is imperative in order to effectively disseminate these practices among healthcare providers (Rogers, 2003).

Diffusion of Innovations Theory

The Diffusion of Innovations (DOI) developed by Rogers (2003), is a "process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003). The rate at which an innovation is adopted

depends on certain factors including characteristics of the individual and the innovation as well as the context of the setting and the environment (Rogers, 2003). Characteristics of the individual include five adopter categories based on their innovativeness and include:

- Innovators - the first 2.5% of individuals who adopt an innovation. In the healthcare setting, healthcare innovators tend to be thought of as “mavericks” and are invested heavily in a specialized topic (Berwick, 2003; Rogers, 2002, 2003).
- Early Adopters – the next 13.5% of the individuals in a system to adopt an innovation. These individuals are also known as opinion leaders and are well connected socially and have the resources to try new things. Early adopters in the healthcare setting are usually chosen as elected leaders or representatives of a clinical group (Berwick, 2003; Rogers, 2003).
- Early Majority – the next 34% of individuals to adopt an innovation. Individuals in this category mainly learn from people they know, or rely on personal familiarity more than science before they decide to adopt or change. In the healthcare setting, healthcare providers in this category are more likely to try those innovations that meet their immediate goals rather than simply trying interesting ideas (Berwick, 2003; Rogers, 2002, 2003).
- Late Majority - the next 34% of individuals in a system to adopt an innovation. These individuals will adopt an innovation when it appears to be the new “status quo” and not before. In the healthcare setting, healthcare providers who

fall under this category adopt an innovation when it is considered the standard of practice (Berwick, 2003; Rogers, 2002, 2003).

- Laggards – the last 16% of individuals in a system to adopt an innovation. Individuals in this category choose to adopt an innovation by making choices that are wise and useful to the community or organization. Healthcare providers who fall under this category swear by the "tried and true" (Berwick, 2003; Rogers, 2002, 2003).

A major component of the DOI is the Decision Process and is the focus guiding this current research. The Decision Process of the DOI is the individual's mental processing in considering adopting a specific innovation (Rogers, 2002, 2003). According to this theory, five steps make-up the decision making process: (1) the individual acquires knowledge about the proposed change or new innovation; (2) the individual forms an attitude toward the proposed change or new innovation; (3) an individual makes a decision to adopt or reject the proposed change or new innovation; (4) the individual implements the proposed change or new innovation; and (5) the individual confirms his/her decision (Rogers, 2002, 2003). In forming an attitude toward a proposed change or new innovation the characteristics of an innovation are key in an innovation's rate of adoption (Rogers, 2003). Five innovative characteristics have been identified as influencing an individual's decision to adopt a new innovation:

- Relative Advantage – the degree to which an innovation is perceived as better than the idea preceding it. In the clinical setting, decisions about implementing "best-evidence" practices are driven by both the interests of the patient, clinician, and healthcare system (Rogers, 2003; Sanson-Fisher, 2004).

- Compatibility – the degree to which an innovation is perceived as being consistent with current values, past experiences, and needs of the potential adopter. In the clinical setting, an innovation must address an issue that clinicians and others perceive to be a current problem (Rogers, 2003; Sanson-Fisher, 2004).
- Complexity – the degree to which an innovation is perceived as difficult to understand or use. In the clinical setting, a clinical procedure is more likely to be adopted if it is simple and well defined (Rogers, 2003; Sanson-Fisher, 2004).
- Trialability – the degree to which an innovation can be experimented with. In the clinical setting, a clinical innovation that can be tested on a limited basis is more likely to be adopted because it allows clinicians to explore the implementation of the procedure and its acceptability among patients (Rogers, 2003; Sanson-Fisher, 2004).
- Observability – the degree to which the results of the innovation are visible to others. In the clinical setting, clinical innovations are more likely to be adopted if influential clinicians argue for and demonstrate the application of a new procedure or treatment approach (Rogers, 2003; Sanson-Fisher, 2004).

Innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations that do not exhibit these characteristics (Rogers, 2003). In addition, various contextual and managerial factors within an organization or social system have an influence on the rate of an innovation's adoption into practice. Systems

that have a culture of creativity and innovation, a flat hierarchal system, and strong leadership committed to effecting change are most likely to respond easily and quickly to new innovations (Berwick, 2003; Sanson-Fisher, 2004).

The DOI has been effectively used in various studies investigating the dissemination of clinical guidelines and preventive innovations as well as the perceptions of these innovations in various clinical settings (Cummings, Jaen, & Funch, 1984; Hansen, Olivarius, Beich, & Barfod, 1999; Rahimi, Timpka, Vimarlund, Uppugunduri, & Svensson, 2009). Previous studies which focused on the adoption of clinical guidelines other than alcohol screening, take into account the characteristics of the innovation in determining healthcare provider attitudes in choosing to adopt certain guidelines specifically, cancer screening guidelines (Cummings, et al., 1984; Rahimi, et al., 2009). These studies effectively determined the specific characteristics of the innovation as well as the personalities of the healthcare providers that played an important role in deciding to adopt a new clinical guideline.

Only one study has investigated alcohol-screening guidelines utilizing the Diffusion of Innovations Theory. Neushotz and Fitzpatrick (2008) investigated the rate of adoption of a Substance Brief Intervention (SBI) utilizing the CAGE alcohol-screening questionnaire. They also identified potential difficulties experienced by providers in achieving best evidence SBI practices in primary care facilities located at a major metropolitan hospital in New York City. Only 44% of physicians reported utilizing the CAGE questionnaire on a regular basis and rated perceived relative advantage, trialability, and observability of an SBI as low, while rating compatibility and complexity as high, explaining the low adoption rate (Neushotz & Fitzpatrick, 2008). Respondent

reported barriers toward adopting SBI practices included: lack of time to carry out an SBI, lack of clear and concise guidelines for SBI, lack of information regarding early stage drinking problems, and uncertainty about the justification for discussion regarding alcohol abuse (Neushotz & Fitzpatrick, 2008). Despite these findings, no study to date has examined these innovative characteristics as it pertains to healthcare providers screening for alcohol use among pregnant women and women of childbearing age.

Specific Aims and Hypotheses

Based on the previous research, the proposed thesis will focus on the decision process of the DOI in evaluating healthcare providers' rationale in adopting particular alcohol screening tools. Given the knowledge gap on the rationale for adoption of such screening tools, the decision process of the DOI, specifically the innovative characteristics and contextual factors that influence its rate of adoption into clinical practice are investigated in this thesis research (See Appendix I for a complete theoretical framework) (Rogers, 2003). By gaining a better idea of healthcare providers' attitudes toward their current screening practices by investigating what factors are considered when adopting a screening tool, further interventions can be developed in further disseminating these screening tools. Consistent use of validated screening tools will aid in the reduction and prevention of FAS/FASD by having alcohol use documented in medical charts as well as provide an opportunity for physicians to educate women on the adverse effects of alcohol use during pregnancy. Therefore, in order to better understand the current practices adopted in screening for alcohol use among pregnant women and women of childbearing age, primary aims and hypotheses of this research are as follows:

Aim 1: Investigate the current practices among healthcare providers in screening for alcohol use among pregnant women and women of childbearing age and whether practices differ by healthcare provider characteristics.

Hypothesis 1a: Healthcare providers who specialize in obstetrics and gynecology, are physicians, and spend on average more time with their patients at appointments, will be significantly more likely to always ask about personal alcohol use, always advise abstinence from alcohol during pregnancy, and always utilize motivational techniques to inquire about alcohol use with both women of childbearing age and pregnant women.

Hypothesis 1b: Healthcare providers, who specialize in obstetrics and gynecology and are physicians, will be significantly more likely to always utilize a screening tool to screen for alcohol use while those healthcare providers practicing medicine for a longer period will be significantly less likely to always utilize a screening tool to screen for alcohol use with pregnant women and women of childbearing age.

Aim 2: Investigate whether healthcare providers utilize a validated screening tool to screen for alcohol use among women of childbearing age and pregnant women and investigate the characteristics of these screening tools that have an influence on its adoption into practice guided by the Diffusion of Innovations Theory.

Hypothesis2a: Healthcare providers utilizing a screening tool will be more likely to utilize a screening tool not validated for use in pregnant women and women of childbearing age.

Hypothesis 2b: Innovative characteristic scores will be significantly lower among those who utilize the TWEAK and T-ACE screening tools versus those who utilize the CAGE screening tool.

Hypothesis 2c: Openness for innovation and improvement within one's clinical practice will be significantly higher among those who utilize a validated screening tool compared to those who rarely or never utilize a validated screening tool.

Aim 3: Explore the barriers preventing healthcare professionals from adopting a validated screening tool for alcohol use in pregnant women and women of childbearing age guided by the Diffusion of Innovations.

Chapter II: Review of the Literature

The focus of this thesis research is on the screening practices utilized and adopted among healthcare providers in screening for alcohol use among women of childbearing age and pregnant women. Specifically, this research investigates whether healthcare providers have adopted the use of a validated screening tool into their practice as well as investigates the perceived characteristics of these screening tools and the perceived barriers inhibiting adoption of these tools guided by the Diffusion of Innovations. Therefore, this literature review focuses on previous studies that have contributed to the validation of four screening tools: CAGE, AUDIT, T-ACE, and TWEAK, followed by more specific studies that have investigated the current screening practices among healthcare providers in screening for alcohol use among pregnant women and women of childbearing age.

Validated Screening Tools for Women of Childbearing Age and Pregnant Women

CAGE questionnaire. The CAGE questionnaire developed by Ewing and Rogue (1984) is the first short questionnaire developed to detect alcohol abuse/dependence and is the most widely used instrument. The CAGE acronym includes four yes/no items: 1) Have you ever felt that you ought to **C**ut down on your drinking? 2) Have people **A**nnoyed you by criticizing your drinking? 3) Have you ever felt bad or **G**uilty about your drinking? and 4) Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover (**E**ye-opener) (Ewing, 1984). Each affirmative answer is given a score of 1 and a total score of 2 or more is indicative of the presence of alcoholism (Ewing, 1984).

Though the CAGE questionnaire has been validated and has shown relatively good sensitivities and specificities in hospital, primary care, and ambulatory settings (sensitivities: 0.87, 0.71, 0.60 respectively and specificities: 0.77, 0.91. and 0.92 respectively), this screening tool was originally developed for men and has been less effective in identifying drinking problems among women (Dhalla & Kopeck, 2007; Sarkar, et al., 2009). In a review conduced by Dhalla and Kopec (2007), they found that the CAGE questionnaire had an average sensitivity of only 0.38 in white women with a slightly higher sensitivity in black female patients. In another study conducted by Aertgeerts and colleagues (2001), comparing the diagnostic accuracy of the CAGE and AUDIT (Alcohol Use Disorders Identification Test), the CAGE with a cut-point of 1 or more affirmative answers had a sensitivity of 62% and a specificity of 81% compared to the AUDIT with a sensitivity of 82% and specificity of 73%. In addition, the CAGE questionnaire showed lower diagnostic performance in female patients with a sensitivity

of only 54% (Aertgeerts, Buntinx, Ansoms, & Fevery, 2001). Despite these findings, the CAGE questionnaire remains the most widely used screening tool for assessing alcohol use in clinical populations.

AUDIT questionnaire. The World Health Organization in collaboration with primary health care facilities in countries around the world originally developed the Alcohol Use Disorders Identification Test (AUDIT) (Allen, Litten, Fertig, & Babor, 1997). This 10-item questionnaire assesses daily alcohol intake, frequency of consuming six or more drinks per drinking episode, and the ability to discriminate hazardous and harmful drinkers (Allen, et al., 1997). Each question is scored on a scale from 0-4 and summed to give a total score. A score of 8 is associated with problem drinking and a score of 13 is associated with alcohol dependence (Sarkar, et al., 2009). This screening tool has shown to be effective in primary care settings and equally appropriate for use in both males and females. However, in a critical review conducted by Allen and colleagues (1997), the effectiveness of the screening tool in males and females differed across studies with a sensitivity of 72% and specificity of 97% in females compared to a sensitivity of 93% and specificity of 80% in males in one study; while another study found sensitivities and specificities similar between males and females (sensitivities 92% vs. 100% and specificities 78% vs. 87%, respectively) (Allen, et al., 1997).

Despite these findings, research shows that the AUDIT is best for predicting lifetime alcohol diagnoses per the Diagnostic and Statistical Manual of Mental Disorders, Third Edition-Revised (DSM-III-R) as opposed to current drinking, the later of which is more appropriate to assess in order to determine the risk of an alcohol exposed pregnancy (Chang, et al., 1998; Sarkar, et al., 2009). In addition, the 10-item AUDIT is lengthy and

healthcare providers may not have the time to administer such a long questionnaire making the AUDIT a less feasible screening tool for use in pregnant women and women of childbearing age.

T-ACE questionnaire. The T-ACE (Tolerance, Annoyed, Cut down, Eye-opener) is adapted from the CAGE questionnaire and is the first validated screening questionnaire for risk drinking developed for pregnant women (Bailey & Sokol, 2008; Chang, 2004/2005; Sarkar, et al., 2009). The T-ACE is easily administered and can either be asked directly or included with other medical paperwork (Bailey & Sokol, 2008). This questionnaire has shown to be valuable and efficient for identifying a range of alcohol use including current prenatal alcohol consumption, pre-pregnancy risk drinking (more than 2 drinks per drinking day), and lifetime alcohol diagnoses (Chang, 2004/2005; Sarkar, et al., 2009).

A study conducted by Chang and colleagues (1998) administered the T-ACE questionnaire along with questions about stress, smoking, weight, and eating habits to women attending the obstetric practices of the Brigham Women's Hospital serving a diverse population in the Boston metropolitan area. A sample of 250 T-ACE positive and 100 T-ACE negative women were selected based on various exclusion criteria and willingness to participate further in a comprehensive assessment. The comprehensive assessment compared the T-ACE with other validated questionnaires including, the Alcohol Use Disorders Identification Test (AUDIT) and the Short Michigan Alcoholism Screening Test (S-MAST), as well as compared the participant's obstetric history, medical history, and obstetric staff assessment of alcohol and drug use (Chang, et al., 1998). The Tolerance question of 2 drinks or more on the T-ACE questionnaire was the

most sensitive in detecting lifetime alcohol diagnoses (88%), risk drinking (92%) and current drinking (89%) but it was less specific (Chang, et al., 1998). The T-ACE resulted in more sensitivity than medical staff assessment of alcohol consumption (89.2% vs. 20.0%) thus, making the T-ACE a useful tool for alcohol screening of women (Chang, et al., 1998).

TWEAK questionnaire. The TWEAK (Tolerance, Worry, Eye-opener, Amnesia, K(C)ut down) is another validated alcohol screening tool for use in pregnant women and women of childbearing age (Sarkar, et al., 2009). This five item questionnaire combines questions from other screening tools including MAST (Michigan Alcoholism Screening Test), CAGE, and T-ACE, and has shown to be effective in identifying pregnant women who are "at-risk drinkers" (Barry, et al., 2009; Sarkar, et al., 2009).

In a cross-sectional study conducted by Russell and colleagues (1994), a questionnaire was administered by trained interviewers to a sample of African American women of low socio-economic status when visiting a prenatal clinic in the Detroit area. The questionnaire consisted of the following alcohol screening tools: MAST, CAGE, T-ACE, TWEAK, and NET (Normal drinker, Eye-opener, and Tolerance). Pre-conceptional risk drinking and gestational age at screening were also assessed (Russell, et al., 1994). The tolerance question on the MAST, T-ACE, TWEAK, and NET were assessed using three different cut-points of 1 to 3 drinks (Russell, et al., 1994). Results indicated that the TWEAK was more sensitive than the T-ACE at all three cut points. At the recommended cut-point of 2 the TWEAK was significantly more sensitive than the T-ACE (79% compared with 70%; $p=0.002$) (Russell, et al., 1994). The receiver operating characteristics (ROC) curve for the TWEAK test (0.865) was larger compared to the

other screening tools. However, there was no major difference between the TWEAK (0.865) and T-ACE (0.840) (Russell, et al., 1994). This study demonstrates that the TWEAK is validated for use among minority populations which was lacking in other screening tools (Russell, et al., 1994).

In another study, Chang and colleagues (1999), administered the TWEAK questionnaire to the last 135 women assessed from the original 350 women completing the T-ACE questionnaire. The TWEAK questionnaire was compared with the AUDIT, S-MAST, T-ACE and medical records (Chang, et al., 1999). The TWEAK questionnaire (tolerance cut-point defined as > 2 drinks) had the greatest predictive ability for both lifetime Diagnostic and Statistical Manual (DSM-III-R) alcohol diagnoses (area under the curve =0.712) and risk drinking (area under the curve=0.787). The sensitivities and specificities for the TWEAK questionnaire included 84.1% and 25.0% for DSM-III-R lifetime diagnosis of alcohol, 92.3% and 28.9% for risk drinking, and 87.8% and 25.6% for current alcohol consumption (Chang, et al., 1999). For medical record assessment the sensitivities and specificities included 15.9% and 94.4% for DSM-III-R lifetime diagnosis of alcohol, 7.5% and 87.8% for risk drinking, and 22.4% and 96.5% for current alcohol consumption (Chang, et al., 1999). Overall, the TWEAK assessment was found to be the most sensitive screening tool while the medical record assessment was found to be most specific (Chang, et al., 1999).

In a critical review conducted by Bradley and colleagues (1998), past articles using one of the following six brief screening questionnaires: CAGE, Brief Michigan Alcoholism Screening Test (BMAST), T-ACE, TWEAK, NET, and AUDIT, were searched using MEDLINE from1966 to July 1997. Studies were limited to U.S. studies

and were included if they compared a brief alcohol screening questionnaire with an appropriate criterion standard for heavy alcohol abuse or dependence (Bradley, Boyd-Wickizer, Powell, & Burman, 1998). Thirteen articles met the inclusion criteria, which described 9 studies and evaluated 8 brief screening questionnaires. The CAGE, AUDIT, and TWEAK questionnaires were the optimal tests for identification of alcohol dependence in women. The CAGE, AUDIT, and TWEAK questionnaires were more sensitive for alcohol abuse in black women than in white women (Bradley, et al., 1998). The TWEAK questionnaire performed better than the CAGE and AUDIT questionnaires in white women. Overall, the TWEAK questionnaire appeared to be the optimal screening questionnaire for identifying women with heavy drinking or alcohol abuse and dependence (Bradley, et al., 1998).

Healthcare Provider Knowledge of Alcohol Screening Practices and FAS/FASD

Previous studies have looked at various components of healthcare provider knowledge regarding the need for alcohol-screening practices as well as knowledge of FAS/FASD in general. Diekman and colleagues (2000), used a cross-sectional study to assess the knowledge, attitudes, current clinical practices, and educational needs of obstetrician-gynecologists with respect to their patients' alcohol use during pregnancy. The survey was conducted by the ACOG and questionnaires were mailed to 800 randomly selected members who were actively providing obstetric services. Of the 800 physicians sampled, 604 physicians completed the questionnaire. [Of these 604 respondents, about one quarter reported using an alcohol screening questionnaire and the majority (64%) used the CAGE (Diekman, et al., 2000)]. Twenty percent of respondents reported that women should abstain from alcohol, while 13% were unsure about the

levels associated with adverse outcomes, and 4% reported that consumption of 8 or more drinks per week did not pose a risk to the developing fetus (Diekman, et al., 2000). Obstetrician-gynecologists were significantly more likely ($p<0.05$) to discuss adverse effects or advise abstinence or reduction of alcohol consumption only if a pregnant woman reported moderate alcohol use (Diekman, et al., 2000). Most respondents indicated that lack of time, patient sensitivity, and the need for additional training to enhance their ascertainment of skills, were all barriers toward the assessment of their patients' alcohol use (Diekman, et al., 2000).

Nevin and colleagues (2002) conducted a cross sectional survey of 103 family physicians randomly selected through the Canadian Medical Directory. Anonymous self-administered questionnaires were divided into three sections: demographics, ability to identify factors related to problem drinking in pregnancy and childbearing women, and asking about what tools they utilized for assessing alcohol use (Nevin, et al., 2002). A total of 75 surveys were returned for a 73% response rate. Approximately 74% of respondents reported having obtained a history of alcohol use during pregnancy and 61% reported having counseled women of childbearing age on the use of alcohol in general (Nevin, et al., 2002). Thirty-four percent of participants reported using the CAGE questionnaire to assess "risk-drinking" among female patients while the majority of respondents (66%) reported relying on self-reporting of alcohol use (Nevin, et al., 2002).

In a cross-sectional study conducted by Tough and colleagues (2005), family physicians, midwives, and obstetricians were randomly selected from membership distribution lists to assess the relationship between the provider's definition of moderate alcohol consumption and alcohol screening practices. Questionnaires consisted of four

parts: general knowledge, prevention issues, diagnostic issues, and practice information. A total of 1090 surveys were returned for a 35.0% response rate with 31.1% physicians, 41.7% obstetricians, and 63.5% midwives represented in the sample (Tough, et al., 2005). Approximately 90% of providers reported advising abstinence from alcohol during pregnancy, with midwives, those speaking French as a first language, and those with a university appointment significantly less likely to advise abstinence (all $p<0.05$) (Tough, et al., 2005). Furthermore, providers who did not report advising abstinence during pregnancy were significantly more likely to agree that women of childbearing age can drink in moderation (1-2 drinks per occasion) ($p=0.001$). Healthcare providers who defined moderate alcohol consumption as 4 or more occasions per week were significantly more likely to advise abstinence from alcohol during pregnancy ($p=0.02$) (Tough, et al., 2005).

In another cross-sectional survey conducted by Tough and colleagues (2008), researchers aimed to determine if differences existed between rural and urban health care providers in knowledge of, attitudes about, and awareness of FASD and preconception counseling related to alcohol use. The questionnaire consisted of four parts including: general knowledge, prevention and diagnostic issues, and background information. Questionnaires were randomly mailed to a sample of Canadian providers selected from a mailing list of medical professional organizations. Of the 2101 respondents 1677 (79.8%) were urban health care providers while 424 (20.2%) were rural providers (Tough, et al., 2008). Rural providers were significantly less likely to believe it was the physician's role to manage problems in the area of alcohol abuse ($p<0.5$), but they were significantly more prepared to care for and access resources for pregnant women and birth mothers in

regards to alcohol use and dependence (p=0.011) (Tough, et al., 2008). The majority of providers (94%) recommended that no amount of alcohol be consumed during pregnancy. Once women were pregnant, survey responses of midwives, family physicians, and obstetricians indicated that rural providers were more likely than urban providers to use a standard tool for alcohol screening (p=0.008) (Tough, et al., 2008). Barriers to discussing alcohol use before conception/pregnancy included lack of time (58.4%), information not in a useful format (48.9%), and a belief that clients already had good information on alcohol use (31.4%) (Tough, et al., 2008).

Davis and colleagues (2008) conducted a needs assessment on the current practices of alcohol risk assessments of pregnant women and women of childbearing age by primary healthcare providers. The purpose of this needs assessment was to assess current practices of family physicians/general practitioners and nurse practitioners regarding risk assessment for alcohol use (P. Davis, Carr, & La, 2008). In addition, participants were asked about their learning and resource needs. General practitioners were selected from the College of Physicians and Surgeons (n=809) in Saskatchewan and nurse practitioners were selected through the Registered Nurses Association (n=67) (P. Davis, et al., 2008). All participants were mailed a survey consisting of the following topics: current practices regarding the frequency of alcohol use, discussing harmful drinking during pregnancy, advising abstinence from alcohol during pregnancy, using standardized screening tools and brief motivational techniques, and referring heavy/binge drinkers for treatment. These screening measures most closely resemble those recommended by the American College of Obstetricians and Gynecologists. A total of 386 surveys were returned for a response rate of 44.1% with 36.2% of respondents being

general practitioners and 61.2% being nurse practitioners (P. Davis, et al., 2008). Approximately 95.6% of physicians and 95.1% of nurse practitioners reported “always” or “sometimes” asking pregnant women about alcohol use (P. Davis, et al., 2008). Over half of respondents reported utilizing a standardized screening tool to assess alcohol use with 52.6% utilizing the CAGE questionnaire, 1.6% utilizing the TWEAK questionnaire, and 1.6% utilizing the T-ACE questionnaire in pregnant women (P. Davis, et al., 2008). Physicians who had been practicing medicine for 10 years or less were significantly more likely to report “always” or “sometimes” using a standardized screening tool to screen each pregnant woman for alcohol use compared to those healthcare providers who had practiced for 11 years or longer (52.4% vs. 34.9%) (χ^2=7.49, p<0.01) (P. Davis, et al., 2008). In addition 39.9% of physicians and 34.1% of nurse practitioners reported “rarely” or “never” using brief motivational techniques to engage pregnant women about their alcohol use. Physicians who had been practicing for more than 20 years were significantly more likely to engage women about their alcohol use compared to physicians who had been practicing medicine for a shorter duration (45.8%, χ2=10.03, p<0.02) (P. Davis, et al., 2008).

In another cross-sectional study conducted by Zoorob and colleagues (2010), researchers assessed the knowledge, skills, and practices of family medicine residency program directors and third-year family medicine clerkship directors in the United States. An anonymous 17-item survey was sent electronically to all family medicine residency directors who were on the 2008 membership list of the American Association of Family Medicine Residency Directors and Clerkship Directors of Family Medicine Departments. A total of 269 residency and clerkship directors responded, with the majority located in

urban areas of the Southeast and Midwest regions of the United States (Zoorob, et al., 2010). Among results regarding alcohol use in pregnant women, the majority of both pre-doctoral directors (94%) and residency directors (90%) reported that no amount of alcohol was safe (Zoorob, et al., 2010). The majority of pre-doctoral (90%) and residency directors (91%) also reported counseling all female patients of pregnancy age about alcohol use and its consequences during pregnancy (Zoorob, et al., 2010). However there were no significant findings on alcohol screening and counseling in this study.

In a cross-sectional study conducted by Anderson and colleagues (2010), fellows from the American College of Obstetricians and Gynecologists (ACOG) who are members of the Collaborative Ambulatory Research Network (CARN) were asked their opinions about the amount of alcohol that is safe to consume for both pregnant women and women of childbearing age, the relationship between FASDs and alcohol use during pregnancy, the screening tools they use, and how they manage women who report risk drinking (Anderson, et al., 2010). A total of 385 surveys were returned out of a total of 800 distributed for an overall response rate of 48.1%. However, 8 respondents were excluded because they reported that they were not currently practicing medicine for a total sample of 377 respondents (Anderson, et al., 2010). The majority of respondents (66.0%) reported that occasional consumption is not safe during any period of pregnancy while 24.0% and 27.3% viewing occasional alcohol consumption as safe during the second and third trimesters, respectively (Anderson, et al., 2010). Less than 10% of respondents reported using a validated screening tool, with the CAGE and T-ACE the most often used tools with pregnant women (34.1% and 42.9%, respectively) and women of childbearing age (46.3% and 31.7%, respectively) (Anderson, et al., 2010). Older oby-

gyns reported feeling significantly more unprepared to screen patients for risky or hazardous drinking compared to younger ob-gyns ($F(2,421) = 11.3$, $P < 0.001$) (Anderson, et al., 2010). Those who agreed that prenatal alcohol exposure is a significant risk factor for permanent brain damage were significantly more likely to indicate that occasional alcohol consumption during pregnancy is never safe ($\chi^2 = 17.0$, $P < 0.001$) (Anderson, et al., 2010).

Finally, in a longitudinal survey, the Northeast Regional Training Centers located in the New Jersey Medical School, delivered educational presentations to all New Jersey groups involved in the Northeast FAS educational program (Brimacombe, et al., 2008). The aim of the program was to provide an overall assessment of knowledge levels in the different groups of health care providers, as well as evaluate the basic impact of the presentations in a daylong workshop format (Brimacombe, et al., 2008). Topics included the history and foundations of FAS, screening and intervention of women, women and addiction, effects of alcohol on the developing embryo and fetus, diagnostic criteria for FAS, primary and secondary disabilities in individuals with FAS throughout the lifespan, treatment for individuals with FASD throughout the lifespan and related issues in FAS (Brimacombe, et al., 2008). Significant increases in knowledge were observed on several questions including the safe amount of alcohol during pregnancy ($p=0.001$) and whether screening women of child bearing age for alcohol consumption should be mandatory ($p=0.002$) (Brimacombe, et al., 2008). Issues related to screening and the characteristics related to FAS were not well known among counselors, therapists and clinicians. However, results from allied healthcare providers including physician assistants, dieticians, physical therapists, and occupational therapists, showed significant

improvement in knowledge of the amount of alcohol that is safe for pregnant women (p=0.018), the necessity for alcohol screening (p=0.001) and similar presentation of genetic symptoms (p=0.009) (Brimacombe, et al., 2008).

Limitations of Previous Research

Although screening tools have been developed to assist clinicians in accurately identifying women who consume alcohol during pregnancy, as can be seen from the previous literature, the majority of clinicians do not use formal screening tools for pregnancy alcohol consumption (Bailey & Sokol, 2008). Only four studies of healthcare provider screening practices investigated whether a formal screening tool was used (Anderson, et al., 2010; P. Davis, et al., 2008; Diekman, et al., 2000; Nevin, et al., 2002). Only one study reported that the majority of respondents utilized a screening tool specifically validated for use in women (Anderson, et al., 2010) Furthermore, previous research indicates that healthcare providers do not share a consensus on when screening is appropriate and how much alcohol is considered safe (Anderson, et al., 2010; Diekman, et al., 2000; Tough, et al., 2005). It is recommended that women of childbearing age should be assessed for alcohol consumption annually, and that pregnant women should be screened during each trimester, yet all of the previous research made no mention of this (ACOG Committee Opinion, 2008). No past literature assessed the reasoning behind why physicians decided to use the screening tool they reported or why no formal screening tool was adopted into their practice. A major limitation that was seen in all past literature reviewed was the lack of a health behavior theory to guide the questionnaire or intervention throughout the study.

By understanding the perceived characteristics of the usefulness of screening tools and the barriers inhibiting healthcare providers from adopting these screening tools, we can begin to understand the decision-making processes that influence the adoption of evidence-based practices regarding the screening for alcohol use among pregnant women and women of childbearing age. A better understanding of this process can ultimately provide valuable information that can improve upon these screening tools or how these evidence-based practices are disseminated into clinical practice. This current study delves further into this concept by asking healthcare providers not only about the current practices they utilize, but also the perceived characteristics of these practices that influenced its adoption into practice and the barriers that are inhibiting the adoption of such screening tools.

Chapter III: Methods

The current study utilized a cross-sectional survey design consisting of a convenience sample of physicians, physician assistants, and nurses currently employed by the Emory University Healthcare System specializing in primary care and/or obstetrics and gynecology. This web-based survey was administered online through use of an online survey tool, ©Survey Monkey™ (2011). This study was Exempt-Approved by the Institutional Review Board at Emory University (See Appendix II for IRB Approval Letter).

Study Sample

The target population included physicians, physician assistants, and nurses employed through the Emory Healthcare System specializing in one of the following areas: obstetrics and gynecology, women's health, primary care medicine, and internal

medicine. Eleven Emory Clinics were identified as meeting the specialty criteria. Inclusion criteria for participation in this study included the following: physician, physician assistant, and or nurse (including nurse practitioner and registered nurse); currently practicing at one of the eleven Emory Clinics identified as specializing in women's health (including obstetrics and gynecology) and/or primary care medicine (including internal medicine and family medicine); and currently practicing medicine on women of childbearing age (18-44 years) and/or women who are currently pregnant. Exclusion criteria included those healthcare professionals not meeting the inclusion criteria previously stated as well as those who did not have an email address on file in the Emory Healthcare distribution list where an electronic survey could be readily emailed.

Recruitment

Clinic administrators from each clinic identified were contacted and given a brief description of the study as well as asked whether their staff would be interested in completing an anonymous survey. All information obtained from contact with the clinic administrator was kept in an excel file on a locked computer where only the principal investigator (PI) had access. This excel file included: the name of the clinic; clinic location; person of contact and contact information (including telephone number and email address); number of physicians and nurses on staff; whether the clinic administrator was interested in distributing an anonymous survey to their staff; and any other notes regarding contact attempts (i.e., date of contact, whether a message was left, etc.) The information collected was kept confidential and was destroyed at the end of the study. No information was collected on prospective participants, as their survey responses were completely anonymous.

Three of the eleven clinic administrators contacted agreed to distribute an online survey to their clinical staff meeting the eligibility criteria via email. However, one of these clinic administrators could not be contacted when it came time to distribute the survey and thus their clinic was excluded from this study. One clinic administrator oversaw four of the Emory Clinics for a total of five clinics participating in this survey.

Data Collection Procedures

The online survey was open for a total of six weeks from January 18, 2011 – March 1, 2011. One week before the survey opened, an email was sent to all clinic administrators who had agreed to participate in the study providing an overview of the survey process including: how long the survey would be open, who was eligible to participate, and a request to cc' the principal investigator of this study on all emails sent to clinic staff. This request enabled the PI to keep track of the total number of surveys distributed to calculate a response rate. An additional email drafted by the PI which provided a description of the study, eligibility criteria, and the estimated time it would take to complete the survey, was also attached in this email for clinic administrators to distribute to their clinical staff. An additional email was sent one-week later including a link to the online survey and was distributed to all clinical staff by the clinic administrators. The principal investigator was cc'd on all correspondence, which was saved on a locked computer for confidentiality purposes. Informed consent was obtained by reading the first page of the online survey providing the purpose of the survey, risks and benefits associated with participation, and how confidentiality of responses would be kept. Consent was obtained when participants clicked on the "Next" button to begin the

survey. Email reminders were sent to clinic administrators to distribute to their staff every two weeks. A total of 96 surveys were distributed from the clinic administrators.

During week four of the online survey, an additional 50 surveys were distributed directly from the principal investigator to all physicians who met eligibility criteria in an attempt to gain a larger response rate. These surveys were sent to physicians who did not work for one of the five Emory Clinics the survey was originally distributed to. Contact information for these healthcare providers was found on the Emory Healthcare website and is public record. A total of 146 surveys were distributed at the time the survey closed with 49 completed surveys returned for a response rate of 34%.

Measures

The survey instrument utilized for this study was adapted from two previous surveys. The first survey was the *Alcohol Risk Assessment Survey* developed and utilized by Davis and colleagues (2008), which assessed the practices and tools used in assessing alcohol use in women of childbearing age and pregnant women including how often these practices are utilized (P. Davis, et al., 2008). The second adapted survey was titled: *Appraisal of the "Healthy Heart Kit": Questionnaire for Physicians* and was created for use in a study investigating the factors that influenced the adoption of a Canadian Heart Health Kit (HHK) among physicians and was conceptually designed using Rogers' Diffusion of Innovations Theory (Scott, Plotnikoff, Karunamuni, Bize, & Rogers, 2008). These constructs specifically measured the perceived characteristics of the Heart Health Kit among physicians and how they influenced the adoption of the kit into their practice (Bize, Plotnikoff, Scott, Karunamuni, & Rogers, 2009; Scott, et al., 2008). Both instruments demonstrated good reliability and validity with the first survey developed by

a project advisory committee representative of a number of healthcare providers and extensively pilot-tested, and the second survey showing good internal-consistency reliability with the Likert Scales employed to measure the Diffusion of Innovations having an Cronbach's alpha of 0.92.

Skip patterns were employed throughout the current survey. Respondents who reported utilizing a screening tool to assess for alcohol use in pregnant women and women of childbearing age were asked to rate their agreement with the characteristics of the innovation while those who did not utilize a screening tool were not asked to do so. Furthermore, only those respondents who reported not utilizing a screening tool to assess for alcohol use were asked about the possible barriers inhibiting them from adopting a validated screening tool into their practice.

Since the survey utilized for this study consisted of two previously adapted surveys, the survey was administered to colleagues within the field of public health to assess the survey for content validity and to estimate the total time it took to complete the survey. One question was re-worded to provide further clarification and it was estimated that the survey took approximately five minutes to complete. In addition, inter-item reliability was analyzed for the following Diffusion of Innovations constructs: relative advantage, compatibility, complexity, observability, and trialability, and the openness for innovation fostered at the clinic. The variables measured in this study are described in more detail below:

Demographic variables. The demographic variables measured in this study included: sex, medical specialty currently practicing, setting of practice, current position at the practice, years spent practicing medicine, number of hours spent in patient care,

and duration of encounters with patients. All variables were categorical in nature where respondents could select the response that best described them.

Current screening practices among healthcare providers. Three questions assessed the current practices that respondents utilize when assessing for alcohol use among women of childbearing age and pregnant women. Respondents were asked to rate the frequency of how often they currently: ask about alcohol use ("I ask all women of childbearing age/pregnant women about their prenatal alcohol use"); discuss the harmful effects of alcohol during pregnancy ("I discuss the harmful effects of alcohol use during pregnancy with all women of childbearing age/pregnant women"); advise abstinence from alcohol during pregnancy ("I advise women of childbearing age/pregnant women to abstain from alcohol during pregnancy"); use a standardized screening tool ("I use a standardized screening tool to screen all women of childbearing age/pregnant women for alcohol use"); use brief motivational techniques ("I use brief motivational techniques to engage all women of childbearing age/pregnant women about their alcohol use"); and refer women who report heavy/binge drinking for treatment ("I refer all women of childbearing age/pregnant women who report heavy/binge alcohol use for treatment"). These categories were asked separately regarding women of childbearing age and women who are pregnant. The frequencies of these practices were measured on a 4-point scale ranging from "always" to "never". Two additional questions asked respondents to select the screening tool they primarily use to screen pregnant women and women of childbearing age. Screening tool options included: "TWEAK", "T-ACE", "CAGE", "Rarely or never use a standardized screening tool", or "other" tool specified by the respondent.

All current screening practice variables were recoded into dichotomous variables grouping “Always” into “Always” (always utilize this screening practice) and grouping “Sometimes”, “Rarely” and “Never” into “Not Always” (do not always utilize this screening practice). These variables were dichotomized in this fashion to gain a better picture of those physicians who “Always” screen for alcohol use in compliance with the recommended guidelines compared to those who do not screen for alcohol use on a consistent basis.

In addition, the screening tool primarily used was recoded into two separate variables. The first recode grouped “TWEAK, T-ACE, and CAGE” into “Yes” (use a screening tool) and recoded “Rarely or Never” into “No” (do not use a screening tool). If a respondent reported “other (please specify)” as the screening tool primarily used, their response was further assessed. If respondents did not specifically state an additional screening tool as their screening practice, their response was recoded into “Rarely or Never” since they did not report using a screening tool. To compare those healthcare providers who utilized a screening tool validated specifically for use in pregnant women and women of childbearing age versus a screening tool not specifically validated in women, this same variable was recoded combining “T-ACE and TWEAK” into “Uses a Validated Screening Tool” and CAGE into “Uses a Screening Tool not Validated” while setting “Rarely or Never use a screening tool” to missing.

Characteristics of the screening tool and clinic environment. Four questions measuring the constructs of the Diffusion of Innovations were utilized. The first question measured the characteristics of the innovation using a 5-point Likert scale asking how strongly the respondent agreed or disagreed with the statements assessing the following

constructs: Relative Advantage ("using the standardized screening tool is more effective than what I have used in the past"); Compatibility ("the standardized screening tool is useful", "the standardized screening tool is credible", and "the content of the standardized screening tool is compatible with my personal beliefs and values"); Complexity ("the content of the standardized screening tool is clear", the standardized screening tool is simple and easy to use", and "the content of the standardized screening tool is relevant"); Trialibility ("the standardized screening tool can be experimented without requiring extensive involvement" and "the standardized screening tool can be adapted or modified to suit my own needs"); and Observability ("the evidence regarding the impact of using the standardized screening tool on practices is available" and "the benefits of using the standardized screening tool with my patients is obvious/useful").

A total composite score was calculated for each construct by combining items asked for each individual construct. Higher scores indicated higher perceived relative advantage, compatibility, observability, and trialability of the screening tool utilized. Complexity was recoded so that a higher score indicated higher complexity (i.e. harder to understand/utilize). Reliability analyses were computed utilizing inter-item reliability for all constructs except relative advantage, which was measured using only one item. Overall, inter-item reliability was good for each of the constructs with a Cronbach's alpha of 0.87 for compatibility, 0.96 for complexity, 0.70 for observability, and 0.82 for trialability.

Two additional questions assessing the individual factors that may impact the adoption of a standardized screening tool into practice were assessed using a 9-point scale and included: "How much of the standardized screening tool is under your

control?" with response options ranging from "very little control" to "complete control"; and "How confident are you in using this standardized screening tool?" with response options ranging from "not at all confident" to "completely confident". Both items were dropped from analysis due to an extensive number of missing values for these items.

The final question using the constructs from the Diffusion of Innovations assessed the "Openness for Innovation" within various components of their practice. This was assessed using the item: "How would you qualify the openness to innovation and improvement fostered at each level (among physicians working in the practice, among the administrative staff, and among the paramedical staff) of your practice mentioned below?" Respondents were asked to indicate how much of a barrier or support there was among these levels in adopting clinical practices such as a standardized screening tool using a 5-point scale. A total score was calculated for the "Openness for Innovation" fostered within the clinic by combining the scores from the innovation fostered at each level. A higher score indicated higher support for innovation. Overall, inter-item reliability was good for this scale with a Cronbach's alpha of 0.73.

Barriers inhibiting the adoption of a standardized screening tool.

Respondents who reported rarely or never using a standardized screening tool to assess for alcohol use among their patients where asked about the barriers inhibiting them from doing so. Perceived barriers were assessed using the following question: "If you do not use a standardized screening tool on a regular basis in your practice, what are your reasons for not doing so?" This item was measured ordinally using a 5-point Likert scale ranging from "strongly agree" to "strongly disagree" with the following items: "no advantage to change from current practice"; "not a priority area for me"; "insufficient

time to implement"; "policies in my organization prevent changes"; "require more resources for implementation"; "not feasible in my normal daily work"; "anticipated non-compliance by patients"; "not relevant for my patients"; "lack of consensus among colleagues"; and "lack of knowledge in this particular area".

Statistical Analysis

Statistical analyses were conducted using SPSS statistical package version 18.0. Descriptive statistics were calculated for all demographic variables: sex, medical specialty currently practicing, setting of practice, current position at the practice, years spent practicing medicine, number of hours spent in patient care, and duration of encounters with patients. All demographic variables were treated as categorical variables except for duration of encounters with patients, which was treated as a continuous variable. Frequencies and percentages were calculated for all categorical demographic variables. Means, standard deviations, and skewness were calculated for evidence of a normal distribution and extreme outliers for all continuous variables.

Aim 1: Current screening practices among healthcare providers. To investigate current alcohol-use screening practices among healthcare providers, frequencies and percentages were calculated for all inquired screening practices including whether healthcare providers: ask about personal alcohol use, discuss the harmful effects of alcohol, advise abstinence from alcohol during pregnancy, use a standardized screening tool, utilize motivational techniques to inquire about alcohol use, and refer all women who report heavy/binge drinking for treatment. Current screening practices were treated as a dichotomized variable (Always utilize vs. Don't Always utilize).

To determine whether one's sex, specialty of practice, current role/title, and average duration spent with patients were predictive of whether respondents always ask about personal alcohol use, always advise abstinence, and always utilize motivational techniques; a logistic regression was performed with each outcome variable of interest. However, because some cells contained less than five responses the following variables were collapsed to allow for more meaningful data: specialty of practice ("obstetrics/gynecology" vs. "other specialty"); current role/title ("physician" vs. "other role/title"); and average duration spent with patients ("≤ 15 minutes" vs. "greater than 15 minutes"). A Hosmer and Lemeshow Test was computed to determine whether the model was a good fit. The alpha level was set at 0.05. All missing values and those who answered "N/A" were excluded from analysis though listwise deletion.

To determine whether sex, specialty of practice, role/title, and years practicing medicine were predictive of whether healthcare providers utilize screening tools to assess for alcohol use compared to those who do not, a logistic regression was performed. However, because some cells contained less than five responses the collapsed variables mentioned above were utilized. In addition the variable "years practicing medicine" was also collapsed into "≤20 years" and "greater than 20 years". A Hosmer and Lemeshow Test was run to determine whether the model was a good fit. The alpha level was set at 0.05 and all missing values were excluded from the analysis through listwise deletion.

Aim 2: Adoption of a validated screening tool. To investigate whether healthcare providers utilize a screening tool specifically validated for use in women of childbearing age and pregnant women frequencies and percentages were tabulated. The

screening tool utilized was treated as a dichotomous variable (CAGE vs. TWEAK/T-ACE).

To investigate whether those healthcare providers who utilize the CAGE questionnaire rated innovative characteristics significantly higher than those who utilize the TWEAK/T-ACE questionnaire, means, standard deviations, and skewness were calculated for all innovative characteristics in order to assess for normal distributions. These characteristics included: relative advantage, compatibility, complexity, observability, and trialability. Independent samples t-tests were computed to identify relationships between relative advantage and the screening tool utilized; compatibility and the screening tool utilized; complexity and the screening tool utilized; observability and the screening tool utilized; and trialability and the screening tool utilized for use in all pregnant women. The alpha level was set at 0.05 and all missing values were excluded through listwise deletion. An independent samples t-test could not be repeated assessing the innovative characteristics and screening tool utilized in women of childbearing age. The small number of healthcare providers reporting that they utilize the TWEAK/T-ACE (n=1) did not allow for a statistical test to be computed.

To investigate the openness for innovation fostered within one's clinical setting and how this influenced whether healthcare providers adopted a screening tool for assessing alcohol use, descriptive statistics were tabulated for openness for innovation fostered including means, standard deviations, and skewness to assess for normality. A logistic regression was computed to assess whether the openness for innovation fostered within one's clinical practice was predictive of whether healthcare providers utilize a screening tool to assess alcohol use compared to those who do not utilize a screening

tool. The alpha level was set at 0.05. All missing values were excluded through listwise deletion.

Aim 3: Barriers inhibiting the adoption of an alcohol-use screening tool. To explore the barriers inhibiting healthcare providers from adopting screening tools for assessing alcohol use in women of childbearing age and pregnant women, frequency tables were tabulated to give an overall picture of barriers reported. Reported barriers were treated as categorical variables and frequencies and percentages were calculated.

Chapter IV: Results

Demographics

A total of 49 completed surveys were returned out of a total of 146 distributed for an overall response rate of 34%. Table 1 shows the demographic characteristics of all respondents. The majority of respondents were female (79.6%), specialized in obstetrics/gynecology (49.0%), reported working in a clinic associated with an acute care/tertiary care center (34.7%), reported being a physician (67.3%), practiced medicine for more than 20 years (38.3%), reported spending approximately 20 to 40 hours per week in patient care (45.8%), and on average spent approximately 16-20 minutes with their patients during appointments (40.8%).

Table 1: Demographic Characteristics of Respondents

Characteristic	% (N)
Sex	
Female	79.6 (39)
Male	20.4 (10)
Specialty	
Obstetrics/Gynecology	49.0 (24)
Family Medicine	32.7 (16)
Internal Medicine	16.3 (8)
Other	2.0 (1)
Setting of Practice	

Outpatient/Walk-in Clinic	24.5 (12)
Solo Practice	0
Group Practice < 4 Physicians	0
Group Practice ≥ 4 Physicians	32.7 (16)
Clinic associated with a tertiary care/acute care setting	34.7 (17)
Other	8.2 (4)
Current Role/Title	
Physician	67.3 (33)
Physician Assistant	4.1 (2)
Nurse Practitioner	10.2 (5)
Registered Nurse	12.2 (6)
Other	6.1 (3)
Years Practicing Medicine	
5 years or less	8.5 (4)
6-10 years	21.3 (10)
11-20 years	31.9 (15)
More than 20 years	38.3 (18)
Number of Hours Spent in Patient Care	
< 20 hours	16.7 (8)
20 to 40 hours	45.8 (22)
> 40 hours	37.5 (18)
Average Duration Spent with Each Patient	
0-5 minutes	2.0 (1)
6-11 minutes	10.2 (5)
11-15 minutes	20.4 (10)
16-20 minutes	40.8 (20)
21-25 minutes	12.2 (6)
26-30 minutes	10.2 (5)
> 30 minutes	4.1 (2)

Aim 1: Current Screening Practices among Healthcare Providers

Table 2 shows the current screening practices utilized by respondents in screening for alcohol use among both women of childbearing age and pregnant women. The majority of respondents reported always asking about personal alcohol use with women of childbearing age (60.5%) as well as among pregnant women (89.2%). In addition, the majority of respondents reported always advising abstinence from alcohol during

pregnancy when screening women of childbearing age (52.3%) as well as when screening pregnant women (89.2%).

Overall, the majority of respondents always discussed the harmful effects of alcohol use during pregnancy with pregnant women (75.7%). However, this was not the case with women of childbearing age in which only 20.9% of respondents reported always discussing the harmful effects of alcohol use during pregnancy. In addition, the majority of respondents reported always referring pregnant women who reported heavy/binge drinking for treatment (71.9%) but not when screening women of childbearing age (41.5%).

Table 2: Current Screening Practices for Assessing Alcohol Use Among Women of Childbearing Age and Pregnant Women

Variable	Women of Childbearing Age %(N)	Pregnant Women %(N)
Ask about personal alcohol use		
Always	60.5 (26)	89.2 (33)
Not Always	39.5 (17)	10.8 (4)
Discuss the harmful effects of alcohol		
Always	20.9 (9)	75.7 (28)
Not Always	79.1 (34)	24.3 (9)
Advise abstinence from alcohol during pregnancy		
Always	52.3 (23)	89.2 (33)
Not Always	47.7 (21)	10.8 (4)
Use a standardized screening tool to screen all women for alcohol use		
Always	31.0 (13)	27.3 (9)
Not Always	69.0 (29)	72.7 (24)
Use motivational techniques to engage women about alcohol use		
Always	7.1 (3)	30.3 (10)
Not Always	79.6 (39)	69.7 (23)
Refer women who report binge/heavy drinking for treatment		
Always	41.5 (17)	71.9 (23)
Not Always	58.5 (24)	28.1 (9)

The majority of respondents did not report always utilizing a standardized screening tool with only 31.0% reporting always using a standardized screening tool when screening women of childbearing age and only 27.3% reporting always using a standardized screening tool when screening pregnant women. The majority of respondents did not report always utilizing motivational techniques to engage women about their alcohol use in both women of childbearing age (7.1%) and pregnant women (30.3%).

Table 3 shows the results from the logistic regression equations investigating whether sex, specialty, role, and duration spent with patients were predictive of whether respondents always asked about personal alcohol use in both women of childbearing age and pregnant women. None of the logistic regression equations was significant indicating: that those specializing in obstetrics and gynecology were not more likely to always ask about personal alcohol use compared to respondents in other specialties; females were not more likely to always ask about personal alcohol use compared to male respondents; physicians were not more likely to always ask about personal alcohol use compared to those with other roles/titles; and those who spent more than 15 minutes with their patients at appointments were not more likely to always ask about personal alcohol use compared to those respondents who spent less than or equal to 15 minutes with patients during appointments. Results were not significant when screening both women of childbearing age and pregnant women. In addition, meaningful data could not be provided when investigating the association of asking about personal alcohol use and duration of time spent with patients due to the low sample size.

Table 3: Logistic Regression Analyses Indicating an Association Between Asking about Personal Alcohol Use and Healthcare Provider Characteristics

	Women of childbearing age (n=41)		Pregnant women (n=36)	
Healthcare Professional Characteristic	OR	95% CI	OR	95%CI
Sex				
Female	3.74	0.67 – 20.88	0.42	0.01 – 15.18
Specialty				
Obstetrics/Gynecology	2.42	0.48 – 12.20	6.49	0.19 – 217.1
Role/Title				
Physician	7.28	0.87 – 60.84	0.52	0.03 – 11.26
Duration Spent with Patients				
> 15 minutes	2.09	0.32 – 13.73	1.75E9	0.00 - .

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

Table 4 shows the results from the logistic regression equations investigating whether sex, specialty of practice, role/title, and duration spent with patients were predictive of whether respondents always advise abstinence from alcohol during pregnancy. None of the results was significant indicating: that female respondents were not significantly more likely to always advise abstinence from alcohol during pregnancy compared to male respondents; those specializing in obstetrics/gynecology were not significantly more likely to always advise abstinence from alcohol during pregnancy compared to those practicing medicine in other specialties; physicians were not significantly more likely to always advise abstinence from alcohol during pregnancy compared to respondents with other roles/title, and healthcare providers spending more than 15 minutes with their patients during appointments were not significantly more likely to always advise abstinence from alcohol during pregnancy compared to those respondents who spent less time with their patients during appointments. Results were not significant when screening either women of childbearing age or pregnant women.

Table 4: Logistic Regression Analyses Indicating an Association Between Advising Abstinence During Pregnancy and Healthcare Provider Characteristics

	Women of childbearing age (n=41)		Pregnant women (n=36)	
Healthcare Professional Characteristic	OR	95% CI	OR	95%CI
Sex				
Female	1.10	0.23 – 5.21	1.22	0.08 – 18.26
Specialty				
Obstetrics/Gynecology	1.61	0.40 – 6.52	0.59	0.04 – 9.01
Role/Title				
Physician	0.15	0.02 – 1.24	0.54	0.03 – 8.55
Duration Spent with Patients				
> 15 minutes	1.65	0.32 – 8.83	7.28	0.54 – 97.47

*$p < 0.05$
** $p < 0.01$
*** $p < 0.001$

Table 5 shows the results from the logistic regression equations investigating whether sex, specialty, role/title, and duration spent with patients were predictive of whether respondents always utilized motivational techniques to engage women about their personal alcohol use. None of the results was significant indicating: that female respondents were not significantly more likely to always utilize motivational techniques compared to male respondents; those specializing in obstetrics/gynecology were not significantly more likely to utilize motivational techniques compared to those practicing medicine in other specialties, physicians were not significantly more likely to always utilize motivational techniques compared to respondents with other roles/titles, and respondents who spend greater than 15 minutes with patients during appointments were not significantly more likely to always utilize motivational techniques compared to respondents who spend 15 or fewer minutes with their patients. In addition, meaningful data could not be provided for many of the variables due to the small sample size.

Table 5: Logistic Regression Analyses Indicating an Association Between Using Motivational Techniques and Healthcare Provider Characteristics

	Women of childbearing age (n=40)		Pregnant women (n=32)	
Healthcare Professional Characteristic	OR	95% CI	OR	95%CI
Sex				
Female	2.74E7	0.00 - .	1.83	0.16 – 20.93
Specialty				
Obstetrics/Gynecology	1.57E8	0.00 - .	0.65	0.12 – 3.40
Role/Title				
Physician	0.250	0.01 – 8.56	0.43	0.05 – 3.40
Duration Spent with Patients				
> 15 minutes	0.00	0.00 - .	2.88	0.35 – 23.99

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

Table 6 provides descriptive statistics regarding the type of standardized screening tool utilized when detecting “at-risk” drinking among both women of childbearing age and pregnant women. As seen in the table responses are fairly evenly split between those who rarely or never use a standardized screening tool (44.2% in women of childbearing age and 42.2% in pregnant women) and those who utilize the CAGE screening tool (53.5% in women of childbearing age and 44.4% in pregnant women). In addition, only one respondent reported utilizing a screening tool specifically validated for use in women (i.e., T-ACE and/or TWEAK) when screening for “at-risk” drinking in women of childbearing age and only three respondents reported utilizing a screening tool specifically validated for use in women when screening for “at-risk” drinking in pregnant women.

Table 6: Type of Alcohol-Use Screening Tools Utilized by Healthcare Providers

Screening Tool	Women of Childbearing Age %(N)	Pregnant Women %(N)
CAGE	53.5 (23)	44.4 (20)
TWEAK	0	4.4 (2)
T-ACE	2.3 (1)	2.2 (1)
Rarely or Never Use a Screening Tool	44.2 (19)	42.2 (19)

Table 7 shows the results from the logistic regression equations investigating whether sex, specialty of practice, role/title, and total years practicing medicine were predictive of whether respondents utilize a standardized screening tool when assessing "at-risk" drinking among women of childbearing age and pregnant women. In screening women of childbearing age, the odds of utilizing a screening tool to assess "at-risk" drinking for respondents specializing in obstetrics/gynecology was decreased by a factor of 0.17 (CI: 0.03-0.83; p=0.028) compared to those specializing in other types of medicine. In addition, for physicians, the odds of utilizing a screening tool to assess "at-risk" drinking among women of childbearing age was increased by a factor of 10.29 (CI: 1.25-84.65; p = 0.030) compared to those in other healthcare roles.

In screening pregnant women, the odds of utilizing a screening tool to assess "at-risk" drinking for female respondents was increased by a factor of 12.57 (CI: 1.52-104.05; p=0.019) compared to male respondents. For physicians, the odds of utilizing a screening tool to assess "at-risk" drinking in pregnant women was increased by a factor of 13.82 (CI: 1.71-111.41; p=0.014) compared to those in other healthcare roles.

Table 7: Logistic Regression Analyses Indicating an Association Between Utilizing an Alcohol Use Screening Tool and Healthcare Provider Characteristics

	Women of childbearing age (n=41)		Pregnant women (n=40)	
Healthcare Professional Characteristic	OR	95% CI	OR	95%CI
Sex				
Female	1.94	0.33 – 11.43	12.56*	1.52 – 104.03
Specialty				
Obstetrics/Gynecology	0.17*	0.03 – 0.83	0.24	0.04 – 1.35
Role/Title				
Physician	10.29*	1.25 – 84.65	13.82*	1.71 – 111.41
Total Years Practicing Medicine				
≥ 20 years	0.72	0.26 – 3.21	0.64	0.13 – 3.13

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

Aim 2: Adoption of a Validated Screening Tool

Table 8 shows the average innovative characteristic scores among respondents who reported utilizing a standardized screening tool to assess "at-risk drinking" among women of childbearing age and pregnant women. Overall, the innovative characteristic scores were ranked highly with higher scores representing stronger agreement with the innovative characteristic. Relative advantage had an average of 3.46 (out of 5 possible points), compatibility had an average of 12.00 (out of 15 possible points), observability had an average of 7.54 and trialability had an average of 7.04 (both out of 10 possible points). Respondents on average rated the complexity of the screening tool as low (i.e., not complex or hard to use) with an average score of 5.79 out of 15 points possible.

Table 8: Average Innovative Characteristics Scores (n=24)

Variable	Mean (SD)	Min.	Max.
Relative Advantage*	3.46 (0.93)	1.00	5.00
Complexity**	5.79 (2.08)	3.00	12.00
Compatibility**	12.00 (1.98)	7.00	15.00
Observability***	7.54 (1.35)	4.00	10.00
Trialability***	7.04 (1.76)	2.00	10.00

* Total score possible: 5
**Total score possible: 15
***Total score possible: 10

Table 9 shows the results from the independent samples t-test investigating whether respondents who utilized the CAGE questionnaire rated the innovative characteristics of the screening tool significantly higher than those who utilized either the TWEAK or T-ACE questionnaire. None of the results was significant indicating that respondents who reported utilizing the CAGE questionnaire to assess "at-risk" drinking among pregnant women did not rank any of the innovative characteristics significantly higher compared to those who reported using the TWEAK or T-ACE questionnaire.

Table 9: Independent Samples T-Test Indicating Associations Between Innovative Characteristics and Utilizing a Screening Tool Validated Specifically for Pregnant Women

	TWEAK/T-ACE (n=17)		CAGE (n=2)			
	N	Mean (SD)	N	Mean (SD)	df	t-test
Relative Advantage	2	3.00 (0.00)	17	3.65 (1.06)	17	0.844
Complexity	2	7.50 (2.12)	17	5.41 (2.18)	17	-1.283
Compatibility	2	10.50 (2.12)	17	12.35 (2.09)	17	1.185
Observability	2	7.00 (1.41)	17	7.65 (1.46)	17	0.596
Trialability	2	7.00 (1.41)	17	7.35 (1.93)	17	0.247

*$p < 0.05$
** $p < 0.01$

Table 10 shows the results from the logistic regression equations investigating whether the openness for innovation fostered within one's clinical practice was predictive of whether respondents reported utilizing a standardized screening tool among both

women of childbearing age and pregnant women compared to those who reported rarely or never utilizing a standardized screening tool. Results were not significant for both women of childbearing age and pregnant women indicating that there was no significant association between openness for innovation fostered within one's clinical practice and whether or not they reported utilizing a standardized screening tool to assess "risk-drinking".

Table 10: Logistic Regression Analyses Indicating an Association Between Utilizing an Alcohol Use Screening Tool and Openness for Innovation Fostered

	Women of childbearing age (n=41)		Pregnant women (n=38)	
Variable	OR	95% CI	OR	95%CI
Openness for Innovation	1.02	0.72 – 1.45	1.25	0.87 – 1.79

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

Aim 3: Barriers Inhibiting Healthcare Providers from Adopting an Alcohol-Use Screening Tool

Table 11 shows the inquired barriers and the perceived agreeability on whether these barriers played a role in inhibiting healthcare providers from adopting an alcohol use-screening tool into their practice. On average, respondents reported that these barriers were not issues that were inhibiting them from adopting a screening tool to assess for alcohol use, with an average score of 2.00 or disagree. Insufficient time to implement (mean: 3.07), not feasible in my normal daily work (mean: 3.00) and knowledge in this particular area (mean: 3.20), were the only barriers that respondents reported neither agreeing nor disagreeing that these barriers inhibited them from adopting an alcohol-use screening tool into their clinical practice.

Table 11: Barriers Inhibiting Healthcare Providers from Adopting an Alcohol Use Screening Tool in their Practice

Variable	N	Mean (SD)	Min.	Max.
No advantage to change from current practice	14	2.79 (1.31)	1.00	5.00
Not a priority area for me	14	2.57 (0.85)	1.00	4.00
Insufficient time to implement	14	3.07 (1.07)	1.00	4.00
Policies in my organization prevent change	14	2.21(0.80)	1.00	3.00
Require more resources for implementation	14	2.64 (1.15)	1.00	4.00
Not feasible in my normal daily work	14	3.00 (1.11)	1.00	4.00
Anticipated non-compliance from patients	14	2.21 (0.58)	1.00	3.00
Not relevant for my patients	14	2.64 (1.22)	1.00	5.00
Lack of consensus amongst colleagues	14	2.43 (0.85)	1.00	4.00
Lack of knowledge in this particular area	15	3.20 (1.08)	1.00	5.00

Chapter V: Discussion

Based upon the results of this thesis research the majority of healthcare providers surveyed inquire about alcohol use and advise abstinence from alcohol during pregnancy in both women of childbearing age and pregnant women. Approximately 50% of respondents reported that they advised abstinence from alcohol during pregnancy to women of childbearing age and over 80% of respondents reported advising abstinence to pregnant women. This parallels with findings from the previous literature, which indicated on average that approximately 90% of healthcare providers advised abstinence with Diekman and colleagues (2000) reporting that respondents only advised abstinence if a woman reported moderate drinking (Diekman, et al., 2000; Tough, et al., 2005; Tough, et al., 2008; Zoorob, et al., 2010).

Few respondents reported that they always utilized motivational techniques to engage women about their current alcohol use consistent with a Brief Intervention and included in the current recommended guidelines for screening women of childbearing age

and pregnant women for alcohol use. Approximately half of the healthcare providers responded that they utilized a standardized screening tool when assessing “at-risk” drinking among women, which is higher than what previous research has found. Respondents specializing in obstetrics and gynecology and physicians were significantly more likely to utilize an alcohol-use screening tool when screening women of childbearing age. Furthermore, female healthcare providers and physicians were significantly more likely to utilize an alcohol-use screening tool when screening pregnant women. Previous studies have found that years practicing medicine was predictive of utilizing an alcohol-use screening tool (P. Davis, et al., 2008)

However, the majority of respondents reported utilizing the CAGE questionnaire (53.5% in women of childbearing age and 44.4% in pregnant women) compared to the TWEAK or T-ACE, the later of which are recommended specifically for use in women. This finding parallels previous research in which Diekman and colleagues (2000) reported that only 20% of obstetricians/gynecologists surveyed utilized a standardized screening tool with 64% utilizing the CAGE questionnaire, a questionnaire originally validated for use in men and shown to be less effective in identifying “at-risk” drinking in women (Dhalla & Kopeck, 2007; Diekman, et al., 2000; Sarkar, et al., 2009). Furthermore, Nevin and colleagues (2002) reported that 34% of family physicians surveyed utilized the CAGE and Davis and colleagues (2008) reported that 52.6% of healthcare providers surveyed reported utilizing the CAGE questionnaire.

The innovative characteristics of the standardized screening tool utilized were rated fairly highly among respondents as is expected according to the Decision Process of the Diffusion of Innovations which stipulates that those innovations with high perceived

innovative characteristics are more likely to be adopted into practice (Rogers, 2002, 2003). This concept is also a possible explanation for why healthcare providers continue to utilize the CAGE questionnaire while the TWEAK and T-ACE questionnaire continue to have a low adoption rate. Previous research has shown that perceived relative advantage was the most important predictor of the rate of adoption of innovations (Neushotz & Fitzpatrick, 2008). Because respondents from this current research rated the relative advantage of the CAGE questionnaire highly, healthcare providers may find no additional benefit in adopting a newer screening tool.

The Diffusion of Innovations also stipulates that those social systems that have a culture for creativity and innovation are more likely to be open to implementing new innovations. However, the openness for innovation fostered within one's clinical practice was rated highly for those respondents who reported utilizing a standardized screening tool as well as those who reported never or rarely utilizing a standardized screening tool and no significant difference was found between them. A possible explanation for this unanticipated finding is the fact that the sample surveyed for this research study are employed in an academic setting with a heavy emphasis on research. Respondents associated with a research-based institution may be more open towards innovative procedures such as incorporating screening guidelines into their practice.

Finally, the reported barriers that may inhibit the adoption of validated alcohol-use screening tools were on average not applicable to these respondents as many indicated that they disagreed that the barriers listed were issues inhibiting the adoption of an alcohol use-screening tool. The barriers utilized for this research were guided by the Diffusion of Innovations and have shown to be possible explanations as to why

healthcare providers do not adopt certain innovations (Rogers, 2002, 2003). The fact that the majority of respondents in this study felt that these barriers did not apply to them indicates that there may be other underlying factors that may influence the adoption of innovations into clinical practice.

Strengths and Limitations

No research study is without limitations. The small sample size of this study limited the ability to perform more powerful statistical analyses. In addition, due to the small sample size it was difficult to determine whether differences existed between medical specialties and current roles/title in regards to the screening practices utilized in detecting alcohol use among women of childbearing age and pregnant women. The cross-sectional design of this study did not allow for determination of causation only whether associations existed between variables. Over 70% of the respondents were female and thus not representative of all healthcare providers. Furthermore, the current sample included healthcare providers who work for one major institution, which makes up a small subset of healthcare facilities in the metro-Atlanta area. Thus, results cannot be generalizable beyond this area.

In addition, the low response rate of this study (34%) may have introduced response bias as participants more knowledgeable in alcohol-use screening procedures among women of childbearing age and pregnant women may be more likely to participate in this study compared to those who are less knowledgeable in this area. Furthermore, the sample surveyed consisted of healthcare providers employed at a major research-based academic institution and thus may be more knowledgeable in the most advanced screening procedures compared to healthcare facilities at other locations.

Finally, alcohol use during pregnancy remains a stigmatized behavior and social desirability may have played a role in the responses of healthcare providers.

However, this thesis research is not without its strengths. This thesis study is the first to date that utilized a health behavior theory to explain why healthcare providers are utilizing the standardized screening tool that they do, as well as helping to explain a reason why some healthcare providers do not utilize a standardized screening tool recommended by current evidence-based guidelines for screening for alcohol use among women of childbearing age and pregnant women. In addition, this thesis research went beyond investigating the screening practices among healthcare providers by also investigating the specific characteristics of these screening practices as well as the environmental and contextual factors within the healthcare setting, that may have had an influence on the decision to adopt or not adopt a standardized alcohol-use screening tool into their practice. It is imperative for future researchers to investigate these characteristics further in order to encourage consistent screening for alcohol use among women of childbearing age and pregnant women in compliance with the recommended evidence-based guidelines.

Implications for Future Research

Based on the current findings from this study and taking into consideration the strengths and limitations, more research is needed investigating how to put clinical guidelines and recommendations regarding alcohol use screening in women into practice. Approximately half of respondents in this study did not utilize a standardized screening tool to assess “at-risk” drinking in women of childbearing age and pregnant women and those that did, utilized the CAGE questionnaire which has shown to be less effective in

identifying “at-risk” drinking in women. More research is needed focusing on healthcare providers in order to determine what other factors encourage the use alcohol screening guidelines. In addition, more research needs to be conducted on emphasizing the relative advantage of the TWEAK and T-ACE questionnaires in order to increase their rate of adoption into clinical practice.

The unexpected findings in regards to the possible barriers inhibiting healthcare providers from adopting a standardized screening tool indicate that there may be other underlying factors besides those consistent with the Diffusion of Innovations that have an influence on the rate of adoption into clinical practice. A possible barrier that has not been extensively explored is the reimbursement cost from insurance companies for such preventive screening procedures. Lack of insurance reimbursement for alcohol use screening practices may contribute to the low adoption rate of standardized screening tools. Future research utilizing qualitative methods should explore these possible factors further especially with the impending Patient Protection and Affordable Care Act.

Finally, more research utilizing a health behavior theory would be valuable especially when trying to explain human behavior. The Diffusion of Innovations is a complex theory containing a multitude of factors and additional research utilizing other factors from this theory including the characteristics of the individual (i.e., investigating adopter categories) need to be investigated. Additional research utilizing a longitudinal design guided by the Diffusion of Innovations is also warranted. Previous research indicates that it takes 17 years on average for approximately 14% of research findings to be included in physician practice (Glasgow, Marcus, Bull, & Wilson, 2004). Longitudinal

studies can provide more insight on the impact that changes in organizational structure can have on adopting evidence-based alcohol screening into practice.

Conclusion

Evidence-based recommendations including the use of validated screening tools for screening for alcohol use among women of childbearing age and pregnant women are available. These recommendations aid healthcare providers in detecting "risk-drinking" among this population, which provide an opportunity for healthcare providers to counsel women on the harmful effects of alcohol use during pregnancy (ACOG Committee Opinion, 2008; Barry, et al., 2009; Gerberding, et al., 2004; Sarkar, et al., 2009). However, findings from this thesis research indicates that though healthcare providers are asking both women of childbearing age and pregnant women about their personal alcohol use as well as advising abstinence from all alcohol during pregnancy, they are not consistently following the evidence-based guidelines including the use of motivational techniques to engage women about their personal alcohol use. Furthermore, respondents are not utilizing a standardized screening tool that has been specifically validated for use in women to assess "at-risk" drinking.

Additional research further investigating other components of the Diffusion of Innovations is warranted in order to gain a better understanding on what factors increase the adoption rate of these screening guidelines into practice. Consistent screening for alcohol use among women of childbearing age and pregnant women will allow for better record keeping of alcohol use before and during pregnancy, which will reduce the likelihood of an alcohol-exposed pregnancy or aid in the earlier detection of Fetal Alcohol Syndrome and Fetal Alcohol Spectrum Disorders among offspring. The earlier

detection and diagnosis of these birth defects will allow for the proper treatment and services to be provided at an earlier age thus improving their quality of life.

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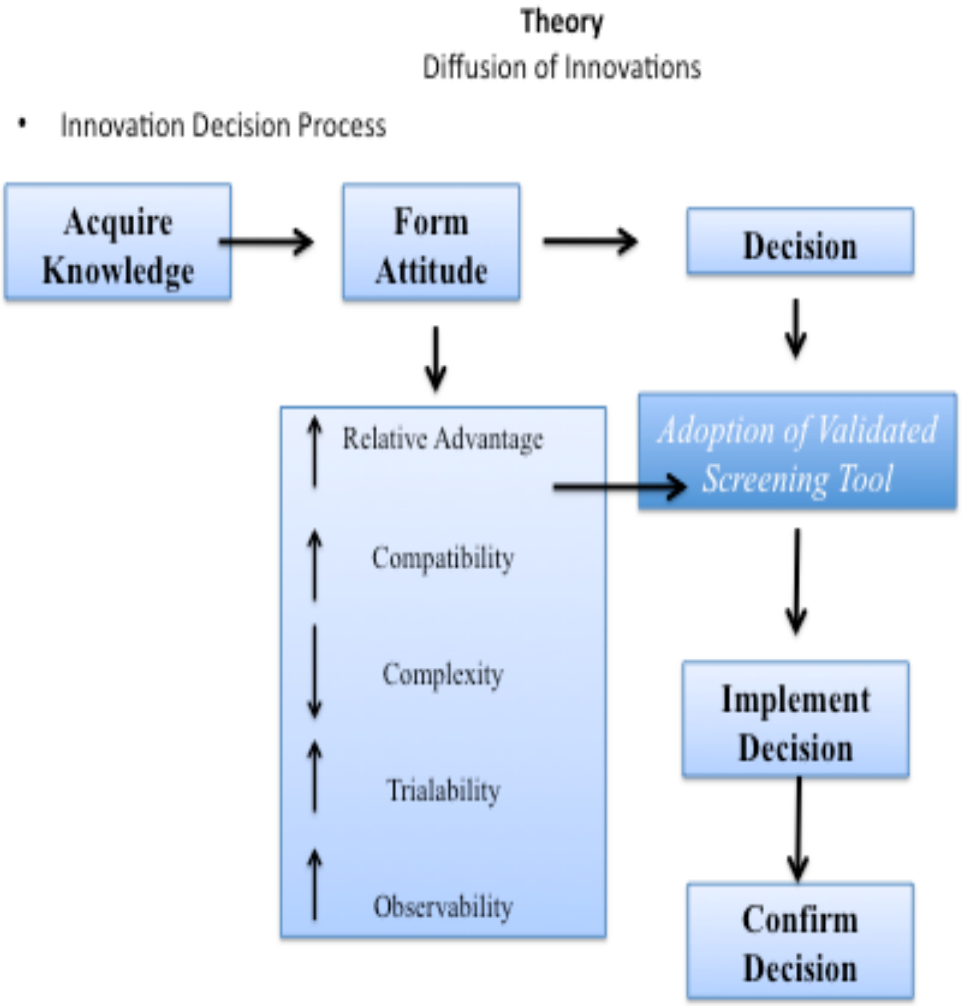
Appendix I: Theoretical Framework



Adapted From: Rogers, E.M. (2003). *Diffusion of Innovations* (5thed.). New York Free Press

Appendix II: IRB Approval Letter

EMORY UNIVERSITY

Institutional Review Board

TO: Krista Proia
Principal Investigator

CC:

Fershteyn	Zarina	Psychiatry - Main
Smith	Iris	Behavioral Science
Windle	Michael	Behavioral Science

DATE: December 15, 2010

RE: **Notification of Exemption Determination**

IRB00047854

Adoption of Validated Screening Tools among Healthcare Professionals in Screening for Alcohol use among Pregnant Women and Women of Childbearing Age

Thank you for submitting an application in eIRB. We reviewed the application and determined on **12/15/2010** that it meets the criteria for exemption under 45 CFR 46.101(b)(2) and thus is exempt from further IRB review.

This determination is valid indefinitely unless something changes substantively in the project that affects our analysis. The PI is responsible for contacting the IRB for clarification about any substantive changes in the project. Therefore, please do notify us if you plan to:

- Add a cohort of children to a survey or interview project, or to a study involving the observation of public behavior in which the investigators are participating.
- Change the study design so that the project no longer meets the exempt categories (e.g., adding a medical intervention or accessing identifiable and potentially damaging data)
- Make any other kind of change that does not appear in the list below.

Please do not notify us of the following kinds of changes:

- Change in personnel, except for the PI
- Change in location
- Change in number of subjects to be enrolled or age range for adults
- Changes in wording or formatting of data collection instruments that have no substantive impact on the study design

For more information about the exemption categories, please see our Policies & Procedures at www.irb.emory.edu. In future correspondence about this study, please refer to the IRB file number, the name of the Principal Investigator, and the study title. Thank you.

Sincerely,
Rebecca Rousselle, CIP
Lead Research Protocol Analyst
This letter has been digitally signed

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