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KNOWLEDGE OF WOMEN OF CHILDBEARING AGE REGARDING PRECONCEPTION COUNSELING

by

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A Project
Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Science in Nursing, College of Nursing
and Health Sciences
Mississippi University for Women
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August 2019

Graduate Committee Approval

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fulfillment of the requirements for the Degree of

Master of Science in Nursing

Date August, 2019

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KNOWLEDGE OF WOMEN OF CHILDBEARING AGE REGARDING PRECONCEPTION COUNSELING

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Abstract

A knowledge deficit in women of childbearing age regarding preconception counseling leads to poor pregnancy and newborn outcomes. Within a primary care setting, there are many factors to assess regarding preconception counseling to help reduce knowledge deficits in women of childbearing age. This research study evaluated knowledge of women of childbearing age within a primary care setting in a rural area in a southeastern state of the United States regarding consumption of folic acid supplementation and the cessation of alcohol, cigarette and marijuana smoking, and illicit drug use. The relationship between patient demographics and the women's knowledge of preconception counseling was also evaluated in order to gain insight regarding the education needed for specific groups (Centers for Disease Control and Prevention [CDC], 2018).

Questions asked by the current research study included the following: are women of childbearing age knowledgeable about key components of preconception counseling and what demographic factors affect women of childbearing age in regard to knowledge of preconception counseling? Pender's Health Promotion Model (HPM) was used as a theoretical guideline for the research study. The research study used the HPM as a guide to develop a survey in order to assess the knowledge of preconception counseling in women of childbearing age.

The sample population consisted of females between the ages of 18 and 40 years. A survey was administered in four clinics in the southeastern region of the United States using a convenience sample. Data was collected from 238 patients from two primary care clinics and two women's health clinics. Responses were removed under two conditions: a participant below the age of 18 or above the age of 40 (or no age reported) ($n = 5$), or a participant who had previously had a tubal ligation or hysterectomy (n=12). A total sample size of $N = 221$ was used for subsequent analyses in the nonexperimental, quantitative research study.

Based on the results, there is a lack of knowledge regarding the use and importance of folic acid supplementation before and during pregnancy in the population studied. Participants were more knowledgeable about alcohol use, cigarette and marijuana smoking, and illicit drug use before and during pregnancy. The researchers concluded healthcare providers need to provide education on preconception counseling to all women of childbearing age.

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TABLE OF CONTENTS

LIST OF FIGURES

Figure

LIST OF TABLES

Table

LIST OF APPENDICES

Appendices

CHAPTER I

Dimensions of the Problem

Nearly half of all pregnancies in the United States are unintentional (Farahi & Zolotor, 2013). Preconception counseling is a vital health promotion concept important to all women of childbearing age. Preconception counseling is a broad topic covering a multitude of concerns related to the health of a woman in the time period before conception. Reeve et al. (2014) used a preconception counseling tool to identify women's preconception health needs, such as exercise, diet, immunizations, micronutrients, infectious disease screening, management of chronic conditions, addressing psycho-social issues, and reviewing socio-economic factors. Dunlop, Logue, Thorne, and Badal (2013) found improving health of a woman during the three to six months before conception drastically reduces complications and mortality rates of both the mother and newborn. The health improvements related to preconception health can be included in education and health promotion activities during primary care visits (Dunlop et al., 2013).

Background of the Problem

Dunlop et al. (2013) states the Centers for Disease Control and Prevention (CDC) acknowledges people within communities need to make changes in behaviors and attitudes toward the behaviors in order to improve preconception health. The focus of the research study was to assess the knowledge of women of childbearing age regarding women's health behaviors prior to conception in order to promote a healthy pregnancy and reduce morbidity and mortality of the newborn. Therefore, the results of the research

study offer a better understanding of areas of preconception counseling in which women need further education.

The researchers chose to study the knowledge of folic acid supplementation, alcohol use, tobacco and cannabis smoking cessation, and illicit drug use in women of childbearing age. Although there are various aspects of preconception counseling, Dunlop et al. (2013) determined folic acid, alcohol use, cigarette smoking, marijuana use, and illicit drug use are some of the most important topics related to childbearing. Women of childbearing age who do not take folic acid supplementation and use alcohol, cigarettes, or illicit drugs are at increased risk for health related complications during pregnancy. The behaviors could also greatly impact a newborn. One half to two thirds of neural tube defects (NTDs) could be prevented if folic acid was used prior to conception. However, only 23.8% of women of childbearing age are consuming the appropriate dose of folic acid daily. If every woman consumed folic acid daily, there would be an incredible reduction in infants born with neural tube defects. Consuming at least 400 micrograms (mcg) of folic acid daily, just one month before conception and during pregnancy, decreases the risk of neural tube defects in an infant by 50% to 70% (Cheng et al., 2018).

Cigarette smoking has many significant problems associated with poor pregnancy outcomes, including infertility, placenta previa, placental abruption, preterm birth, low birth weight, spontaneous abortion, stillbirth, sudden infant death syndrome (SIDS), and orofacial clefts (Polen et al., 2015). Cessation of cigarettes before conception is ideal, but research studies indicate smoking cessation even later in pregnancy improves pregnancy

outcomes, such as birth weight (Polen et al., 2015). According to a study by Polen et al. (2015), only 23% of women of childbearing age were considered to have adequate knowledge of the effects of smoking related to pregnancy outcomes. Therefore, education on the importance of smoking cessation is vital to achieve healthy outcomes in women of childbearing age.

Any cannabis use, alcohol consumption, or illicit drug use should be stopped prior to conception. The use of the substances are risk factors to an embryo's healthy development in the womb and can result in deformities, low birth weights, and possible withdrawal symptoms in the newborn (Centers for Disease Control and Prevention [CDC], 2018). Promoting healthy lifestyle habits, exercise, and a healthy diet are also vital to a women's preconception health and are important components of preconception counseling (Cheng et al., 2018). Although the researchers did not focus on the components of exercise and healthy diet for the research study, both diet and exercise would be important factors for future research studies.

Statement of the Problem

A knowledge deficit in women of childbearing age regarding preconception counseling leads to poor pregnancy and newborn outcomes (CDC, 2018).

Within a primary care setting, there are many factors to assess regarding preconception counseling to help reduce knowledge deficits in women of childbearing age. The research study evaluated the knowledge of women of childbearing age within two primary care clinics and two women's health clinics in a rural area in a southeastern state of the United States regarding the consumption of folic acid supplementation and

the cessation of alcohol, cigarette and marijuana smoking, and illicit drug use. The relationship between patient demographics and the women's knowledge of preconception counseling was also evaluated in order to gain insight on the education needed for specific groups (CDC, 2018).

Purpose of the Research Project

The purpose of the research is twofold. As 49% of all pregnancies in the United States are unplanned, women of childbearing age who have an unplanned pregnancy may not be in optimal health, which poses an increased risk for morbidity and mortality in the mother and newborn. Therefore, all women of childbearing age should receive preconception counseling to reduce preventable health risks (Farahi & Zolotor, 2013). For the purpose of the current research study, preconception counseling focuses on women consuming at least 400 mcg of folic acid daily, abstaining from alcohol and illicit drugs, and not smoking cigarettes or marijuana. The purpose of the current research study was to assess the knowledge of women of childbearing age regarding key components of preconception counseling and look at relationships between demographics and knowledge of preconception health care.

Significance of the Research Project

Due to the overwhelming number of unplanned pregnancies in the United States, a large amount of women and children are at risk for preventable health issues (Farahi & Zolotor, 2013). This raises concern there is a lack of knowledge in women of childbearing age regarding preconception counseling. There is a need to assess for knowledge deficits to decrease the risk for preventable health issues. Addressing

knowledge deficits related to key components of preconception counseling has significance in nursing, education, research, and practice.

Significance to nursing.

The significance of the research to nursing is the addition of general knowledge in identifying knowledge deficits in women of childbearing age related to key components of preconception counseling. The research will help nurses identify methods to plan and prepare education programs. Including preconception counseling in primary care providers' daily healthcare practice is significant to all levels of nursing to reduce preventable health risks in women of childbearing age. Advanced practice nurses (APNs) can use results of the research study to develop protocols and educational tools for women of childbearing age. Advanced practice nurses, as the primary care provider, should encourage folic acid supplementation and the cessation of alcohol, cigarettes, marijuana, and illicit drug use for all women of childbearing age (CDC, 2018). Healthcare providers should educate women of childbearing age on preconception counseling at each clinic visit.

Significance to education.

The research study is significant to education because of the importance of preconception counseling to prevent health risks. Healthcare providers can use the research to improve preconception counseling programs in clinics and to educate staff. Nursing faculty can also use results of the current research study to educate students about the importance of incorporating preconception counseling into practice. The primary goals were to assess knowledge deficits and determine if demographics impact

the level of knowledge of preconception counseling in women of childbearing age. The information can be used to design education programs and strengthen healthcare providers' approach to preconception counseling, which will promote the health of women and unborn babies.

Significance to research.

The significance to research is that the current research study provides a foundation from which to develop future studies. Although there are many studies about folic acid and the prevention of neural tube defects, there are few studies that address cessation of harmful substances in preconception care. Many women of childbearing age abstain from alcohol once pregnancy is recognized; however, the fetus, at this point is already exposed (Parackal, Parackal, & Harraway, 2012). Expanding nursing research in preconception counseling could reduce preventable health risks in childbearing women and the fetus. The results of the research study provided information regarding the knowledge of key components of preconception counseling in women of childbearing age in a rural area in the southeastern state of the United States.

Conceptual Framework

Pender's Health Promotion Model (HPM) guided the research study, which was conducted to assess the knowledge of women of childbearing age regarding preconception counseling. The HPM is a highly generalized middle range theory applicable to many different settings (Pender, 2011). The HPM is a theory promoting health and wellness as a positive state, not simply absence of disease. The HPM focuses on individuals obtaining higher levels of well-being, which is the goal of nursing care and

should be the goal of individuals. Pender (2011) states that for healthcare providers to achieve health and well-being in patients, individuals need to actively promote personal well-being. Individuals should also have the knowledge to be able to promote healthy behaviors in patients.

Preconception counseling is a type of health promotion aimed at educating women and identifying risk factors prior to pregnancy in order to increase positive newborn outcomes (Fowler & Jack, 2017). Concepts of the HPM that correlate with the research study include perceived benefits of action and prior related behavior (Alligood, 2014). The concept of prior related behavior implies that if women participate in health promoting behavior prior to pregnancy they are more likely to continue health promoting behaviors throughout pregnancy (Alligood, 2014). The prior related behavior concept gives relevance to determining the knowledge of preconception counseling in women of childbearing age. Research studies indicate health promoting behaviors, such as folic acid supplementation, decreases the risk of neural tube defects. Many birth defects, such as Fetal Alcohol Syndrome, mental retardation, low birth weight for gestational age, and death, are related to substance abuse, which gives relevance to determining a knowledge base in order to provide beneficial education (Berlin et al., 2017).

The Health Promotion Model provides a paradigm for creating instruments for measuring effectiveness of lifestyle changes and emphasizes the overall importance of individualized patient education (Alligood, 2014). The research study used the HPM as a guide to develop a survey in order to assess the knowledge of preconception counseling in women of childbearing age. The survey (Appendix A) incorporates demographic data,

including age, insurance type, education level, and pregnancy status, as well as eight true or false questions aimed at assessing the knowledge of preconception counseling in women of childbearing age.

When using the HPM to achieve health and well-being in patients, healthcare providers need to empower individuals to actively promote personal well-being. Patients need knowledge, taught by the healthcare provider, to promote healthy behaviors. In the research study, Pender's model is used to assess women's knowledge and how women optimize health during childbearing age. The research study evaluated if women of childbearing age are knowledgeable of key components of preconception counseling, such as folic acid supplementation and substance abuse cessation. The survey (Appendix A) for the research study looked at demographic factors and asked questions to assess women's knowledge of preconception counseling and encouraged women to adapt positive health behaviors. The concepts, assumptions, and theoretical assertions of Pender's health promotion model provides a strong foundation to guide the research of assessing the knowledge of preconception counseling in women of childbearing age.

Research Questions

1. Are women of childbearing age knowledgeable about key components of preconception counseling?
2. What demographic factors affect women of childbearing age in regard to knowledge of preconception counseling?

Definitions of Terms

Women of childbearing age.

Theoretical. Shabani, Omidi, Farmanbar, and Hamzegardeshi (2016) included, "women of reproductive age, age range of 18 to 40 years," (p. 2).

Operational. Females between the ages of 18 and 40 years, excluding women who cannot conceive.

Knowledgeable.

Theoretical. Having or showing knowledge or intelligence that comes from experience or education (Merriam Webster, 2018)

Operational. Correctly answering a minimum of nine out of 13 questions. The correct response to each question is one point. The incorrect response and "I don't know" equals zero points.

Key components.

Theoretical. One of the parts of something or an important piece of something (Merriam Webster, 2018)

Operational. Folic acid supplementation, alcohol use, smoking cessation, including use of tobacco products and cannabis, and illicit drug use

Preconception Counseling.

Theoretical. Patient education that helps a woman to make lifestyle changes before conception that will assist in promoting a healthy pregnancy and a healthy baby (Encyclopedia.com, 2006).

Operational. Education provided to women of childbearing age prior to

conceiving regarding proper care for a healthy pregnancy.

Demographic Factors

Theoretical. "Socioeconomic characteristics of a population expressed statistically, such as age, sex, education level, income level, marital status, occupation, religion, birth rate, death rate, average size of a family, average age at marriage." (BusinessDictionary.com, 2018).

Operational. Demographic factors include age, insurance type, education level, ethnicity, and pregnancy status which includes the options of pregnant, not pregnant, attempting pregnancy within 6 months, not preventing pregnancy, past tubal ligation or hysterectomy.

Assumptions

For the purpose of the research study, the following assumptions were made:

1. The researchers assumed clinic office staff will offer all women, aged 18 through 40 years, the Preconception Counseling Knowledge Survey during the data collection period.
2. The researchers assumed women completing the survey were truthful with answers.
3. The researchers assumed participants know what folic acid is.
4. The demographic status of the participants is relevant to other southeastern areas of the United States.

CHAPTER II

Review of Literature

Optimal health of a woman of childbearing age, prior to conception, is a vital part of a newborn's health. Nearly half of all pregnancies in the United States are unplanned, and women of childbearing age are at a greater risk for having a newborn with birth defects (Farahi & Zolotor, 2013). Therefore, all women of childbearing age should receive preconception counseling to reduce preventable health risks (Farahi & Zolotor, 2013). Preconception counseling is a broad topic covering a multitude of concerns related to the health of a woman before conception. The purpose of this research study was to assess knowledge of women of childbearing age regarding key components of preconception counseling and to look at relationships between various demographics and knowledge. The key components the researchers studied included knowledge of folic acid supplementation, alcohol use, tobacco and cannabis smoking cessation, and illicit drug use in women of childbearing age. The researchers think knowledge of preconception counseling directs women's behaviors; therefore, results of the research study offer a better understanding of areas of preconception counseling where women need further education.

In order to conduct the research project, previous studies were analyzed to strengthen the study. The studies reviewed focused on key components of the current research study, including folic acid supplementation; alcohol, tobacco, and cannabis use; and illict drug abuse during preconception. Limitations and weaknesses were taken into consideration in order to improve the results of the research.

Study One

Shabani, Omidi, Farmanbar, and Hamzegardeshi (2016) conducted a study to evaluate results of preconception counseling. Researchers conducted a randomized, controlled clinical trial that included 104 women of childbearing age (Shabani, Omidi, Farmanbar, & Hamzegardeshi, 2016). To be included in the study, women must have had the desire to bear children, were 18 to 40 years of age, and were in good mental and physical health. The women were divided into an intervention group and a control group. The intervention group partook in an educational training session once a week for four weeks. The control group received no training (Shabani et al., 2016).

Researchers used sociodemographic and promoting lifestyle (HPLP-II) questionnaires to collect data and aid the study (Shabani et al., 2016). After completing the four week training, participants were again assessed. The intervention groups scored higher than the control group in areas including health responsibility, physical activity, and stress management (Shabani et al., 2016).

Researchers found the intervention group had significantly higher health promoting behaviors after prenatal training, and the control group had no notable difference (Shabani et al., 2016). In conclusion, researchers confirmed educating patients could improve health promoting practices in women of childbearing age (Shabani et al., 2016). The research gives great relevance to the current study because results demonstrated providing education improved health promoting practices.

Study Two

Dessie, Zeleke, Workie, and Berihun (2017) conducted a study to assess Ethiopian women's folic acid use and what factors are associated in the prevention of neural tube defects. The researchers stated that because the neural tube closes by the fourth week of pregnancy, regular folic acid supplementation must be consumed prior to conception (Dessie, Zeleke, Workie, & Berihun, 2017). Research in the area of health care can greatly impact the people of Ethiopia by decreasing financial burdens from medical expenses and increasing overall wellness (Dessie et al., 2017).

A cross-sectional study at Adama Hospital Medical College was conducted on women who were receiving antenatal care in the second and third trimester (Dessie et al., 2017). The sample size consisted of 422 pregnant women selected by a systematic random sampling method. Each participant gave responses to an interviewer administered questionnaire while in the waiting room of the Adama Hospital Medical College. The study took place in the year of 2014 in the months from August to November. The dependent variable to the study was folic acid intake in order to prevent neural tube defects. The independent variables were sociodemographic characteristics, pregnancy characteristics, and information about folic acid (Dessie et al., 2017).

Of the 422 pregnant women approached to fill out the questionnaire, 417 gave responses, giving the study a 98.8% response rate (Dessie et al., 2017). Among the pregnant women prescribed folic acid, 3.5% took folic acid before conception and 11.6% started taking folic acid in the first trimester. The most impressive statistic is that only eight participants of the 417 responders took folic acid as a preventative measure against

neural tube defects. In other words, only 1.92% of women used folic acid in the recommended time frame of one month prior to conception. Another result of importance is that 48% of women planning pregnancy did not discuss or consult with a physician before terminating birth control measures; therefore, there was no chance to discuss folic acid intake with a healthcare professional (Dessie et al., 2017).

One recommendation proposed was health care policy makers should screen women of childbearing age for folic acid supplementation and provide teaching of benefits of folic acid before conception and during pregnancy (Dessie et al., 2017). The article also discussed the need for training health care professionals regarding the importance of education for the whole community on starting preconception care for women planning to become pregnant. The authors go further and recommend performing education of folic acid and neural tube defects during premarital health exams (Dessie et al., 2017).

In conclusion, the study by Dessie et al. (2017) provided a strong foundation for preconception counseling as a research topic. The article provided an understanding of the knowledge base of women in the developing country of Ethiopia (Dessie et al., 2017). Although Ethiopia is a developing country, the research study by Dessie et al. (2017) was used to understand women of small rural towns in the southeastern region of the United States, and assumed there was a lack of knowledge with both populations. Promoting folic acid intake resulted in the promotion of a healthier mother, pregnancy, and baby. Dessie et al. (2017) recommended educating and starting preconception care for women planning to become pregnant. One goal of the current research study is to determine if

women of childbearing age have knowledge of folic acid supplementation in the southeastern region of the United States.

Study Three

Malek, Umberger, Makrides, and Zhou (2016) state the purpose of the study was to assess the knowledge base of folic acid and iodine intake during pregnancy to determine the cause of, or lack of, adherence, and gather the women's sources of information. Adherence to folic acid and iodine supplementation in Australia was studied because the authors claim there has never been a national study on the topic in Australia (Malek, Umberger, Makrides, & Zhou, 2016). The intent was to measure knowledge and adherence to folic acid and iodine supplementation prior to conception, determine associated characteristics of the women in regard to adherence, and discern women's favored source of information about pregnancy and nutrition (Malek et al., 2016).

The cross-sectional study was performed through an online survey, which was completed by 857 pregnant women in Australia (Malek et al., 2016). Women were able to participate in the survey if the women were between 18 to 49 years old, currently pregnant, literate in English, and not working in market research or in a nutritionally inclined field. The independent variables of the study were maternal age; education; income; living in the metropolitan area; planned pregnancy; first pregnancy; pre-pregnancy adherence to national physical activity guidelines; smoking status during pregnancy; alcohol consumption during pregnancy; and awareness of supplementation recommendations including dose, duration, and importance during preconception and

pregnancy. The dependent variable was the adherence to the folic acid and iodine supplementation recommendations for pregnant women (Malek et al., 2016).

Seventy five percent of participants were aware of the preventative attributes of folic acid and iodine (Malek et al., 2016). Only one in 10 women were able to name the recommended supplementation and duration of folic acid. Primary health care providers were the most common experts recommending nutritional supplementation. However, of the women who planned pregnancy, only 65% were advised of preconception supplements, and only 80% were advised of prenatal supplements. Two-thirds of participants discussed nutritional information with a primary care provider. Dietary supplements were taken one month before conception by 64% of participants, with an increase to 93% during the prenatal period. The adherence rate of women taking folic acid supplementation was found to be higher in women who planned pregnancy. In total, only one in five participants were compliant with recommended folic acid and iodine supplementation (Malek et al., 2016).

Malek et al. (2016) concluded primary health care providers are the preferred and most influential source of information regarding preconception counseling. Providers have a significant role in education of women of childbearing age in regard to folic acid supplementation prior to conception. Due to a considerable amount of pregnancies being unplanned, the researchers agreed further research is needed (Malek et al., 2016). The research offers a strong foundation for the topic of the current study. Knowing the knowledge base of women of childbearing age, regarding folic acid, is necessary for health care providers to know what topics of preconception counseling are most

important to teach to patients of childbearing age. The authors of the current research study agree with Malek et al. (2016) that more research is needed to determine ways to increase adherence of folic acid supplementation. The independent variables used by Malek et al. (2016) relevant to the current research study are age, education level, and knowledge of correct daily dose of folic acid supplementation. Much like the Malek et al. (2016) study, the authors of the research study looked at knowledge of folic acid prior to conception to determine the best way health care providers can educate women of childbearing age (Malek et al., 2016).

Study Four

Cheng, Mistry, Guoying, Zuckerman, Xiaubin, and Wang (2018) examined the Boston Birth Cohort in Boston Massachusetts on compliance of folic acid supplementation before conception and in each trimester of pregnancy and how many mothers have adequate blood folate levels. Cheng et al. (2018) saw there was little research on whether or not women of childbearing age were following the recommendations regarding folic acid supplementation prior to conception and throughout pregnancy. Many professional associations and panels, including the American Association of Pediatrics, Centers for Disease Control and Prevention, and United States Preventive Services Task Force, advise 400 to 800 mcg of folic acid both before and during pregnancy for every woman of childbearing age (Cheng et al., 2018). Folate intake can come from dietary intake or supplements. The main research problem the authors addressed is low levels of women consuming folic acid prior to conception.

The largest concern of public health regarding folate consumption are racial disparities of supplementation and neural tube defects (Cheng et al., 2018).

Mothers were eligible to participate in the study if the women only gave birth to one child, rather than multiples, at the Boston Medical Center (Cheng et al., 2018). A total of 7,612 women were included. The dependent variables of the study included age, education level, marital status, smoking status, alcohol consumption, parity, planned pregnancy, pregnancy body mass index, presence of hypertensive disorders, diabetes, and preterm birth. The dependent variables tested in the study were folic acid intake during preconception and each trimester and maternal plasma folate. The study occurred from 1999 to 2014. The various methods of data collection included a questionnaire interview with the mother one to three days after delivery. Serum folate was also collected one to three days after delivery and was measured with a kit using chemiluminescent immunoassay. The authors retrieved self reported heights and weights to calculate maternal body mass index. Information regarding hypertensive disorders and diabetes were retrieved through medical records (Cheng et al., 2018).

The study's primary independent variable was ethnicity (Cheng et al., 2018). The study had participation from people of many different socioeconomic backgrounds. Half the participants were African American and more than 25% were Hispanic. Data results found 64.4% of participants had a high school education or lower, 64.9% were single mothers, and 55.7% had more than one child. Caucasian mothers were less likely to have multiple children or be overweight but were more inclined to be smokers. The most outstanding result found in the study was only 4.3% of participants took daily prenatal

vitamins during the time prior to conception. The result was the same for all races included in the study. However, researchers found Caucasian mothers were more likely to take prenatal vitamins during pregnancy than African American or Hispanic mothers. Cheng et al. (2018) also found greater rates of folic acid deficiency were present in African Americans and Hispanics. Cheng et al. (2018) interpreted two major points from the results of the study. First, only 4.3% of women took prenatal vitamins six months prior to pregnancy. The statistic is much lower than the national average for the United States. Cheng et al. (2018) contributed the finding to the fact the women studied were of minority and low socioeconomic status. Second, the researchers found nearly one third of participants did not have adequate serum folate values, which could be contributed to the fact the majority did not have prenatal vitamins during the preconception period (Cheng et al., 2018).

Cheng et al. (2018) made two major implications at the end of the study. First, susceptible populations, in both the United States and other countries, do not always receive interventions via public health services (Cheng et al., 2018). Second, folic acid supplementation might not be universal, and the approach for folic acid supplementation may need to be individualized (Cheng et al., 2018).

Cheng et al. (2018) conducted a study that provided a strong foundation for the current study. The focus on vulnerable populations is similar to the current researchers' focus of the population in the southeastern region of the United States (Cheng et al., 2018). Much like the Cheng et al. (2018) study, the sample will include low-income and multiethnic groups.

Study Five

Crawford-Williams, Fielder, Mikocka-Walus, Esterman, and Steen (2016) conducted a two-armed, randomized, controlled trial to assess whether the implementation of a public health intervention would change the knowledge, attitudes, and behavior of the recipient. The hypothesis implied improving knowledge and changing attitudes has the potential to change health behavior (Crawford-Williams, Fielder, Mikocka-Walus, Esterman, & Steen, 2016). A group of 161 pregnant women over the age of 18 years and in the second trimester of pregnancy was selected. The group answered an initial questionnaire assessing knowledge, attitudes, and practices related to alcohol consumption during pregnancy (Crawford-Williams et al., 2016).

The primary outcome determined knowledge of health risks linked to drinking alcohol during pregnancy and the attitude associated with drinking during pregnancy (Crawford-Williams et al., 2016). After completing the questionnaire, the women were divided into two groups, an intervention group consisting of 82 women and a control group consisting of 79 women. The intervention group was given the public health intervention in the form of a "mocktail" booklet. The women were asked to read the booklet and share the information with the partner. The control group received standard antenatal care. Four weeks after giving birth, the same women were asked to complete a follow up questionnaire to measure the effectiveness of the public health intervention (Crawford-Williams et al., 2016).

The secondary outcome determined whether the couple abstained from drinking alcohol during pregnancy (Crawford-Williams et al., 2016). Forty-nine women from the

original intervention group and 47 women from the original control group completed the follow up questionnaire, for a total of 96 participants. Knowledge was measured as a continuous variable determined by the percentage of correct answers to 13 true/false/ unknown statements. The study determined participants of the intervention group were 30% more likely to refrain from consuming alcohol during pregnancy (Crawford-Williams et al., 2016).

The study by Crawford-Williams et al. (2016) provided a strong foundation for researchers of the current study by measuring knowledge related to a component of preconception counseling. Researchers of the current study also measured knowledge by calculating the percentage of correct responses to a questionnaire that consisted of true/ false/unknown statements. For the purposes of the current study, an intervention group was not examined and researchers did not limit questionnaires to pregnant females.

Study Six

Parackal, Parackal, and Harraway (2012) conducted a cross-sectional survey in New Zealand to assess women of childbearing age who drank alcohol prior to conception and the effects of drinking during pregnancy. Multiple research studies have shown an abundance of women who stop drinking upon pregnancy recognition; however, drinking in early pregnancy poses a risk to the developing fetus (Parackal, Parackal, & Harraway, 2012). The purpose of the study was to reduce consumption of alcohol in women who are childbearing age to decrease the risk of birth defects in the fetus (Parackal et al., 2012).

Data related to alcohol consumption prior to pregnancy in women of childbearing age is seldom collected and is nonexistent in New Zealand and the United Kingdom (Parackal et al., 2012). In the United States, studies related to the topic showed 45% of women consume alcohol prior to pregnancy while in childbearing age. Parackal et al. (2012) stated 40% to 50% of women have unplanned pregnancies, which puts the population at a greater risk for having a fetus with alcohol exposure related deficits. Researchers aimed to reduce the risk of alcohol exposure to the fetus in women of childbearing age who were sexually active (Parackal et al., 2012).

The study by Parackal et al. (2012) took place in New Zealand, between October and December, in 2005. The sample group consisted of 1,256 women, between the ages of 16 and 40 years, who were randomly chosen by using a random digit dialing method, which called random household numbers (Parackal et al., 2012). The method used to collect data was a web-assisted telephone interview system. Trained interviewers used a pretested questionnaire when collecting data from the sample group (Parackal et al., 2012).

Of 1,256 participants, 127 women were pregnant, 425 had been pregnant within five years of the survey, and 704 women had never experienced pregnancy (Parackal et al., 2012). Parackal et al. (2012) found 84% of the 127 pregnant women and 78% of the 425 previously pregnant women consumed alcohol prior to pregnancy. Data shows 50% of the 127 pregnant women and 37% of the 425 previously pregnant women consumed alcohol before pregnancy recognition. A similar study was conducted in the United States by Ethan et al. (2009), and some outcomes were the same when compared to the

study by Parackal et al. (2012), such as women who consumed alcohol during preconception but ceased alcohol consumption upon pregnancy recognition. Women with risky drinking behaviors were found to be 3.5 times more likely to expose the fetus to alcohol prior to recognizing pregnancy than women with non-risky drinking behaviors (Parackal et al., 2012).

Overall, Parackal et al. (2012) found over half the women of childbearing age in New Zealand consumed alcohol that posed a risk for fetal alcohol exposure during early pregnancy. The occurrence increased the risk of fetal alcohol related birth deficits (Parackal et al., 2012). Most of the women did cease alcohol consumption when recognizing pregnancy. Drinking patterns during preconception predict the risk of alcohol consumption during early pregnancy. The younger age group tended to have risky drinking habits and posed a greater risk for consuming alcohol during early stages of pregnancy. Based on the evidence in the study, the younger population was a higher priority to target for education and intervention to decrease the risk of exposing a fetus to alcohol during early stages of pregnancy. The study highlighted the urgent need for intervention to reduce the risk for alcohol-exposed pregnancies (Parackal et al., 2012).

Parackal et al. (2012) also provided a strong basis for the current study. The population studied was similar in age, although the current study targeted women between 18 and 40 years of age. Researchers of the current study measured knowledge of selected women regarding use of alcohol prior to and during pregnancy. Results of the current study highlight the need for increased education on the topic of alcohol consumption in the specified age group.

Study Seven

Polen, Sandhu, Honein, Green, Berkowitz, Pace, and Rasmussen (2015) performed a study to examine knowledge and attitudes of women of reproductive age and adults toward smoking cessation, smoking during pregnancy, and pregnancy outcomes affected by smoking. Polen et al. (2015) hoped the results would be a future guide to decrease the prevalence of smoking during pregnancy. The study used an annual postal mail survey called, "Porter Novelli 2008 Health-Styles Survey," which collected data on health-related knowledge and behavior (Polen et al., 2015). In 2008, the survey was distributed to adults, aged 18 years or older, in the United States. Four questions, focused on prenatal smoking and smoking cessation, were added to the survey. The first two questions assessed smoking status of the participant, if patients were considering becoming pregnant, and what messages from a doctor would influence smoking cessation. The other two questions assessed participants' knowledge of possible outcomes of smoking during pregnancy and if patients were aware of the health benefits of smoking cessation before and during pregnancy. A total of 7,000 surveys were distributed, and 5,399 were completed and returned. Data was post-stratified and weighted to the U.S. Census Current Population Survey to create a sample with a demographic analysis similar to the U.S. population. Time parameters in which data was collected were not addressed in the study (Polen et al., 2015).

Responses to the questions provided included five correct responses and one incorrect response as a distracter (Polen et al., 2015). A knowledge scale was created to analyze data and ranged from zero (no appropriate responses) to six (all appropriate

responses). The knowledge score distribution consisted of three categories: low knowledge (zero to two), moderate knowledge (three to four), and high knowledge (five to six). Descriptive statistics were used to assess the participants' attitudes in regard to messages from doctors that may influence women considering pregnancy to quit smoking (Polen et al., 2015).

Before post-stratification and weighting, 1,053 participants were women of reproductive age (18 to 44 years old), and 19% of participants were current smokers. After post-stratification and weighting, 1,437 were women of reproductive age and 180 were planning to become pregnant in the next year. Polen et al. (2015) studied the knowledge of the adverse effects of prenatal smoking on pregnancy outcomes. The adverse outcome associated with smoking during pregnancy most often recognized was, "smoking during pregnancy can cause the baby to be born too small or too early," (Polen et al., 2017, p. 152). Knowledge levels about smoking during pregnancy and potential adverse outcomes were analyzed, and only 784 participants, or 15%, had high knowledge. Among the rest of the participants, 3,133, or 58%, had moderate knowledge, and 1,483, or 27%, had low knowledge. Results indicated that the majority, up to 70%, of female smokers of reproductive age would quit smoking without any specific reasons from a doctor. The reasons of motivation to quit smoking most often reported were increased chances of having a baby born too early or too small, increased risk of miscarriage, and increased risk of a baby dying of SIDS. Only 5% of participants would not quit smoking for any reason (Polen et al., 2015).

Interestingly, more than 80% of all participants agreed quitting smoking before becoming pregnant improved the health of the unborn baby (Polen et al., 2015). In summary, high knowledge on the survey was associated with higher education level among women of reproductive age. Among all participants, only 23% had high knowledge of potential adverse pregnancy outcomes from smoking during pregnancy. Polen et al. (2015) recommended health care providers stress the importance of quitting smoking, even after the first trimester. Future research is needed to understand if increased knowledge among female smokers of reproductive age would actually result in smoking cessation behavior (Polen et al., 2015).

The study by Polen et al. (2015) tested knowledge of women of childbearing age, as well as adults, specifically on smoking before and during pregnancy and smoking cessation. The current study focused on multiple factors, along with smoking, that influenced pregnancy outcomes. The current study only tested women of childbearing age, between the ages of 18 and 40 years. Overall, the study by Polen et al. (2015) was applicable to the current study due to utilization of a survey to gauge knowledge.

Study Eight

Jarlenski, Tarr, Holland, Farrell, and Chang (2016) performed a qualitative study to identify where pregnant women were obtaining information regarding risks of using marijuana during pregnancy and how useful the researchers considered the information to be. Although there is data that proves marijuana is the most frequently used illicit drug among pregnant women, there is little data identifying where pregnant women go to acquire information about the risks of marijuana use during pregnancy (Jarlenski, Tarr,

Holland, Farrell, & Change, 2016). Researchers conducted semi-structured interviews of 26 pregnant women who were receiving prenatal care and were confirmed marijuana users (Jarlenski et al., 2016). The study was significant due to the possible influence information can have on knowledge and attitude, subsequently changing behavior.

Pender's Health Promotion Model and the concept of perceived benefits of action were used in the study (Jarlenski et al., 2016). Perceived benefit of action states people are more likely to engage in behavior if individuals anticipate beneficial results. The study showed pregnant women are more likely to engage in healthy behavior when the women are well-informed and expect a positive outcome (Jarlenski et al., 2016).

The setting of the study included five clinics in the Pittsburgh area (Jarlenski et al., 2016). The clinics were similar to clinics used in the current study, due to comparable socioeconomic demographics. The research by Jarlenski et al. (2016) identified four different themes, including sources of information about perinatal marijuana use, lack of information from health care providers and social workers, quality of information about perinatal marijuana use, and information about marijuana's effects on infant health (Jarlenski et al., 2016).

The most frequently reported sources of information were the internet and personal experience (Jarlenski et al., 2016). The lack of information received by health care providers and social workers, despite receiving prenatal care, may pose a significant problem related to the lack of health promotion in a vulnerable population. The women who tried to find information regarding risks of marijuana during pregnancy reported a lack of information, specifically related to the harm marijuana has on a fetus. The most

requested information from the group focused around effects marijuana has on a fetus and provider-to-patient conversations about risks associated with marijuana use during pregnancy (Jarlenski et al., 2016).

The research was pertinent to the current research study because similarly, Jarlenski et al. (2016) outlined a quantitative study in the form of a questionnaire. Due to comparable socioeconomic demographics of the Jarlenski et al. study, the setting can be compared to the current study. The Jarlenski et al. study also showed the strong correlation between provider education and health promoting behaviors.

Study Nine

Shabani, Omidi, Farmanbar, and Hamzegardeshi (2016) conducted a study to determine how effective prenatal training for women of reproductive age in different healthcare centers was on health-promoting behaviors. The study was conducted in healthcare centers in Sari, Iran (Shabani, Omidi, Farmanbar, & Hamzegardeshi, 2016). Two healthcare centers were selected, out of 21, based on homogenous socioeconomic variables. One healthcare center was the intervention setting, and the other was the control setting. The randomized control trial included women of reproductive age, aged 18 to 40 years, in physical and mental health with no systemic diseases, who lacked psychological disorders or drug abuse, possessed basic literacy, were residents of Sari, provided written informed consent, and had adequate time for completing questionnaires and participating in the study. Multistage sampling was used to select subjects based on available records and if women were willing to have a child. Fifty two women were chosen for each study group (Shabani et al., 2016).

After obtaining the permit from authorities, consent forms were collected from the women during the first meeting session, which was considered the introduction (Shabani et al., 2016). A 15-item sociodemographic questionnaire was used to collect data in the second session. The questionnaire included personal information, pregnancy history, age, educational level, and occupational status of the spouse. The Health Promoting Lifestyle (HPLP-II) questionnaire was used to collect data and measured frequency of applying health-promoting behaviors in six dimensions, including health responsibility, physical activity, nutrition, spiritual growth, stress management, and interpersonal relations. Shabani et al. (2016) determined the most significant training needs of the study groups, based on maximum, minimum, and mean scores of each dimension, were physical activity, stress management, and health responsibility. Women in the intervention group received pamphlets and educational packets and attended four training sessions once a week. Women in the intervention and control groups completed the HPLP-II questionnaire again one month after the intervention (Shabani et al., 2016).

Based on analysis of mean scores of the dimensions of health-promoting behaviors, the largest difference (p=0.006) between the intervention and control groups before training was in the physical activity dimension (Shabani et al., 2016). After prenatal training, both groups had significant differences in mean scores of health responsibility, physical activity, and stress management (p=0.000). The total mean score of health-promoting behaviors was higher after intervention in the intervention group compared to the control group. The researchers' findings showed critical need for proper stress management training in women to maintain balance and prevent stressful

conditions, which can affect pregnancies. Shabani et al. (2016) recognized the study did not consider different levels of physical activity, especially since physical exercise and sport activity play a big role in disease prevention. The researchers recommended application of results in health promotion planning to improve quality of maternal and fetal life. The study used Pender's Health Promotion Model to guide research. Although, in the current study, there is not an intervention to provide education to women; instead, women were tested on current knowledge and if the women had received prior health-promoting education (Shabani et al., 2016).

Study Ten

Poels, van Stel, Franx, and Koster (2017) performed a retrospective study to evaluate whether seeking information or consulting preconception care (PCC) to prepare for pregnancy is associated with preconception health promoting lifestyle changes. The researchers recognized the importance of studying information seeking behaviors of women preparing for pregnancy and how the behaviors affect PCC use (Poels, van Stel, Franx, & Koster, 2017). Poels et al. (2017) recruited participants from the community midwifery practice, in the Dutch municipality of Zeist, through questionnaires. The women must have given birth between January and September of 2013, excluding miscarriages or stillbirths. An email invitation was received by 455 women with the option to fill out the questionnaire online, by hard copy via mail, or by telephone. The questionnaire was developed by a team of experts, with minor changes being made on behalf of a group of pregnant women's suggestions after the women tested the questionnaire (Poels et al., 2017).

Each questionnaire contained 66 questions divided into five sections (Poels et al., 2017). The sections were categorized by experiences with preconception care, needs for preconception care, lifestyle and risk factors, obstetrical history, and demographic characteristics. Questions were to be answered regarding the most recent pregnancy. Poels et al. (2017) defined preconception period as the period prior to pregnancy recognition. Information seeking behaviors and PCC were the two variables used to define pregnancy preparation. Two separate questions were asked to assess the variables. The four risk factors researchers assessed in the study were smoking and drinking cessation, folic acid intake, and healthier diet. After subtracting five cases from the 288 women because of incomplete questionnaires, 283 questionnaires qualified for the study (Poels et al., 2017).

The results of the study were displayed by demographic data and preconception risk factors (Poels et al., 2017). Most participants were of Dutch ethnicity, had higher education and income levels, and planned the pregnancy. The results included women's experiences during pregnancy preparation and showed that more women sought preconception health information individually. Of the 283 respondants, 68 women consulted a healthcare provider regarding conception. Folic acid use was started before recognition of pregnancy in 160 women and after recognition in 105 women. Prior to pregnancy recognition, 21 women quit smoking and 40 quit drinking; an additional 20 women quit smoking and 96 quitting drinking after recognition of pregnancy. The study showed an association between healthy lifestyle changes during preconception and preparing for pregnancy. In comparison to women who did not prepare for pregnancy,

women were more likely to quit drinking and start using folic acid prior to pregnancy recognition when the women acquired preconception health information independently. Smoking cessation was more likely if women consulted a healthcare provider (Poels et al., 2017).

The study suggests women can independently obtain information that will motivate lifestyle changes (Poels et al., 2017). However, information provided by a primary health care provider had an added impact on smoking cessation. Smoking cessation was influenced by preconception care, thereby proving some positive lifestyle changes correlated to information seeking. Poels et al. (2017) recommended offering a combination of preconception care and preconception health information. The researchers recommended the study be repeated using a larger, more diverse population. Social media and e-technology can be used to advertise preconception health information to the target population in future studies (Poels et al., 2017).

There are many factors pertaining to preconception care. During research for the current study, while assessing knowledge of women of childbearing age related to preconception care, researchers focused on four topics. The key topics of the study were related to use of folic acid supplementation and alcohol, tobacco, and illicit drug use during preconception care to reduce preventable health risks.

Overall, a review of research studies demonstrated the need for further research and education regarding preconception care in women of childbearing age. Women need to be more knowledgeable about how to provide self-care to prevent health related risks and harm to the unborn child. Folic acid has been proven to be effective in preventing

neural tube defects; however, several studies have shown women are not knowledgeable about folic acid and the need to consume folic acid during the preconception period. Most women stop consuming alcohol once pregnancy is recognized, but the fetus has already been exposed at that point.

A knowledge deficit in women regarding preconception care was identified in reviewing research studies. Therefore, more studies should be conducted to show the importance of healthcare providers providing preconception care to all women of childbearing age to help reduce preventable health risks.

CHAPTER III

Design and Methodology

Preconception counseling is a vital health promotion concept important to all women of childbearing age and is a broad term that covers a multitude of health concerns prior to conception. The researchers sought to evaluate knowledge of women of childbearing age regarding key components of preconception counseling and examine relationships between demographics and knowledge. The women's knowledge of folic acid supplementation and alcohol, cigarette, and illicit drug use were the primary topics of concern in the current research study. In this section, the design of the current research study will be reviewed. The setting for the research study, population. sample, methods of data collection, methods of data analysis, and other pertinent information related to the methodology of the research study will be explained.

Design

The research design was a nonexperimental, quantitative research study. A survey based on a preconception counseling questionnaire, used in the Polen et al. (2015) study, was created by the researchers and utilized. The survey (Appendix A) was administered in four clinics in the southeastern region of the United States using a convenience sample. Clinic staff was educated by researchers regarding the purpose of the research study, information collected from the survey, and what age groups were appropriate for the research study.

Setting

The research study took place in two primary care clinics and two women's health clinics in the southeastern region of the United States. Clinic A was a primary care clinic staffed by one family nurse practitioner, two registered nurses, two licensed practical nurses, and one secretary. The patients seen in Clinic A were pediatrics, adults, and geriatrics. The second clinic, Clinic B, was a primary care clinic staffed by one physician, one nurse practitioner, two nurses, and two secretaries. The population served in Clinic B included pediatrics, adolescents, adults and geriatrics. Clinic C was a women's health clinic. The population of Clinic C consisted of females receiving gynecology, obstetric, or family planning care. Clinic C was staffed by two full time and one part time obstetrician-gynecologist (OB-GYN) physician, one family nurse practitioner, three licensed practical nurses, two laboratory technicians, and four secretaries. Clinic C was located in a rural area and mostly served Medicaid patients. The final clinic, Clinic D, was a women's health clinic. The population of this clinic also consisted of females seeking gynecologic, obstetric, or family planning care. The clinic was staffed by two OB-GYNs, two nurses, a laboratory technician, a sonographer, two secretaries, and two office managers.

Population and Sample

The research study assessed knowledge of women of childbearing age regarding preconception counseling. Folic acid supplementation and alcohol, cigarette, and illicit drug use are important key components regarding the health of women of childbearing age; therefore, the population in the current research study consisted of women of

childbearing age, defined as women between the ages of 18 and 40 years. The research study took place in four clinics in the southeastern region of the United States. Each researcher contacted a clinic in the community, discussed the research study with the office manager and clinic providers, and requested to collect data in the clinic. A convenience sampling method was used to obtain the sample.

The goal was a sample of at least 300 women meeting the criteria of childbearing age who had the capability to become pregnant. A total of 238 surveys were collected. There were 38 surveys obtained from Clinic A, 46 surveys from Clinic B, 76 surveys from Clinic C, and 61 surveys from Clinic D.

Methods of Data Collection

Each member of the research study provided education to the secretaries, nurses, and providers at the four clinics to help select appropriate candidates for the research study. Clinic staff was educated by providing a summary of the research study. Staff were also instructed on which patients would be appropriate participants for the research study and to now administer the survey. Staff members were instructed to tell each participant to fill out the questionnaire and to return the survey back to the staff in the sealed manila envelope before leaving the clinic. Once the staff collected the surveys from each participant, the manila envelopes were placed in a box the researchers collected weekly until the end of the survey period.

After the researchers obtained Institutional Review Board approval (Appendix B), the researchers asked two primary care clinics and two women's health clinics in the southeastern region of the United States for consent (Appendix C) to conduct a survey of

women patients, between 18 and 40 years of age, to determine knowledge regarding the importance of preconception counseling. The survey consisted of demographic data, including age, race, education level, insurance, and pregnancy status, as well as 13 true/ false questions. Data were collected during normal business hours at participating clinics over an eight-week period during the months of March and April of 2019. After receiving permission from the clinic management, the data were collected under clinic staff supervision.

On each day of data collection, during patient check-in, the receptionist asked patients who met criteria if the patients were willing to complete a survey. The receptionist at each clinic informed participants the survey was related to a research study examining preconception counseling. To ensure anonymity, each participant was instructed not to include any identifying information on the survey. The participants were given a manila envelope containing a letter (Appendix D) to the participant, the survey, and a pencil. Before leaving the clinic, each participant was asked to return the survey in the sealed manila envelope. The researchers picked up completed surveys from each clinic once a week. The data was transferred to a password encrypted flash drive that was secured until sent for statistical analysis. Once the research study was complete, both the questionnaires and the USB flash drive were destroyed.

Methods of Data Analysis

The researchers analyzed data obtained from completed surveys. Data were first assessed to determine an appropriate candidate completed each survey. Participants with a history of hysterectomy or tubal ligation were excluded from the results. The

researchers then entered the data on an excel data collection worksheet. The results were listed by race, age group, and previous pregnancies. The information on the worksheet was given to a statistician for formal analysis. Percentages, a bar graph, and pie charts were used to present the results from the current research study to the participating healthcare providers at the clinics involved in the research study. The researchers' goal was to assess knowledge of women of childbearing age regarding key components of preconception counseling. Once results were obtained, researchers provided information to healthcare providers to assist in improving education on preconception counseling for women of childbearing age to reduce the risk of neural tube defects and other health concerns involving alcohol, cigarette, and illicit drug use. A statistical report on outcomes of the research study was given to healthcare providers. The healthcare providers were also given a copy of findings related to the particular clinic. The researchers anticipate the results will influence providers to provide more education on preconception counseling for women of childbearing age.

Summary

The researchers conducted a nonexperimental, quantitative research study. A survey, based on preconception counseling questionnaires used in other studies, was developed and utilized. The survey was administered in four clinics in the southeastern region of the United States using a convenience sample. Data were recorded on an excel data collection worksheet, created specifically for the research study by participating researchers. Patient confidentiality was maintained during the entire research process. Descriptive statistics were utilized to analyze data.

CHAPTER IV

Presentation of Findings

Due to the overwhelming number of unplanned pregnancies in the United States, a large amount of women and children are at risk for preventable health issues (Farahi & Zolotor, 2013). There is a lack of knowledge in women of childbearing age regarding preconception counseling. Therefore, there is a need to assess for knowledge deficits to decrease the risk for preventable health issues. The purpose of the current research study was to assess knowledge of women of childbearing age regarding key components of preconception counseling and examine relationships between demographics and knowledge of preconception health care. The following research questions were investigated:

1. Are women of childbearing age knowledgeable about key components of preconception counseling?
2. What demographic factors affect women of childbearing age regarding knowledge of preconception counseling?

Profile of Study Participants

The sample population consisted of females between the ages of 18 and 40 years. Data was collected from 238 patients across four clinics in the southeastern region of the United States. Responses were removed if a participant was below the age of 18 years, above the age of 40 years, or if no age was reported ($n = 5$); or if a participant had a tubal ligation or hysterectomy ($n = 12$). This remaining total sample size for subsequent analyses was $N = 221$. All four clinics that participated in the research study had

comparable numbers of participants; Clinic A had 17.2% (n = 38), Clinic B had 20.8% (n = 46), Clinic C had 34.4% (n = 76), and Clinic D had 27.6% (n = 61). Not all surveys were filled out completely. Partial responses were included in the analysis, and, as such, percentages may not add to 100% for each analysis.

Demographic data is shown in Figure 1 through Figure 5. Regarding insurance, the majority of participants reported having Medicaid or Medicare. A small percentage of participants had less than an 8th grade education, with the majority having a high school diploma/GED. The distribution of ethnicity by percentage is shown in Figure 3.

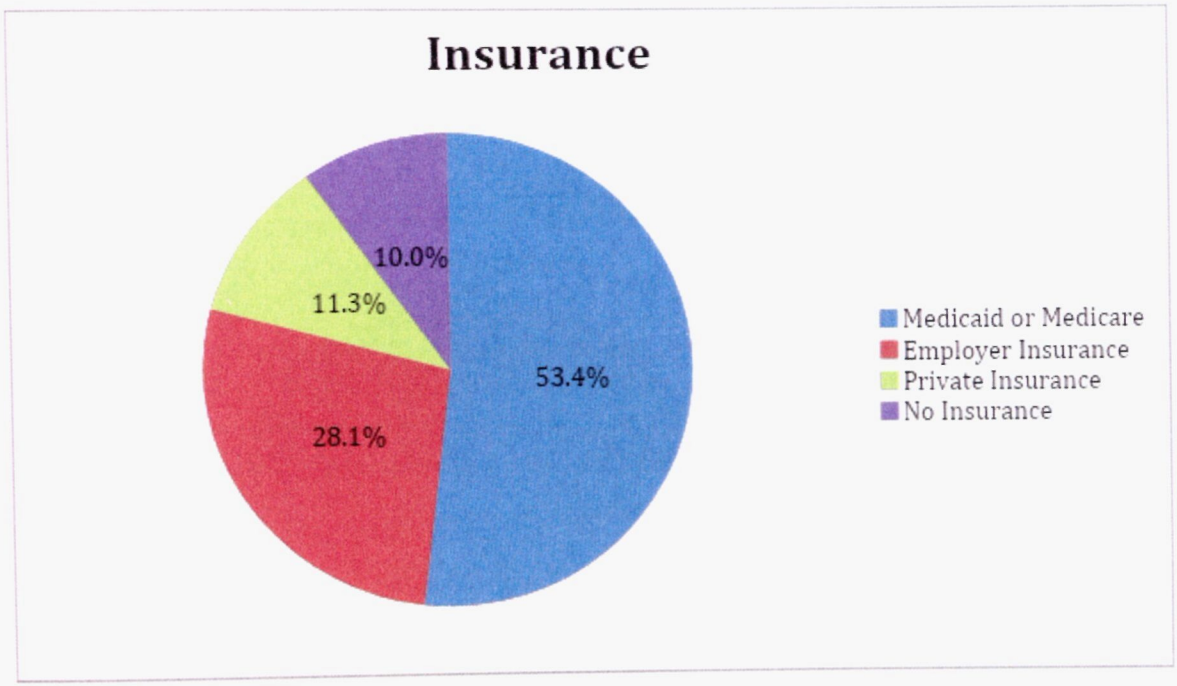


Figure 1. Insurance carrier of study participants.

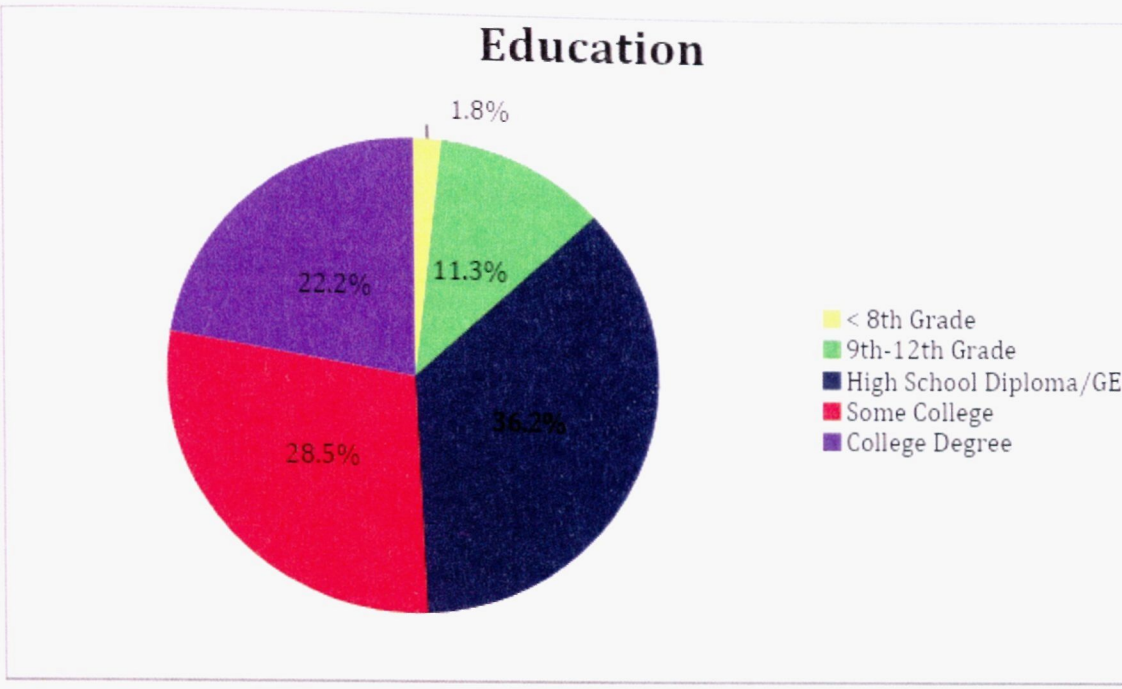


Figure 2. Education level of study participants.

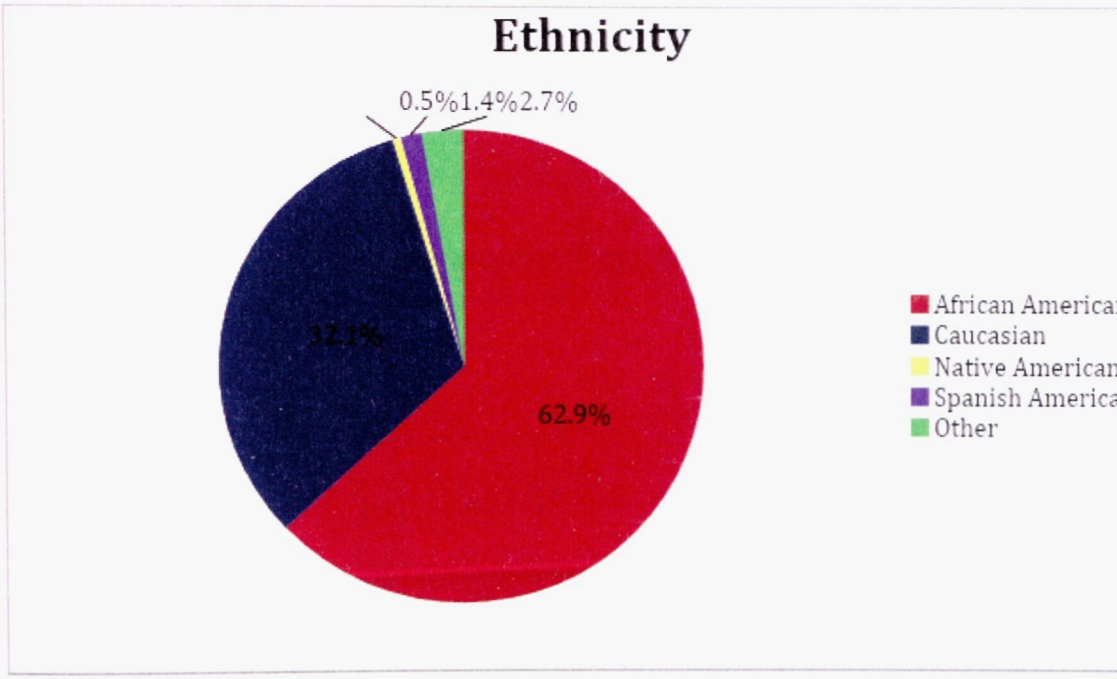
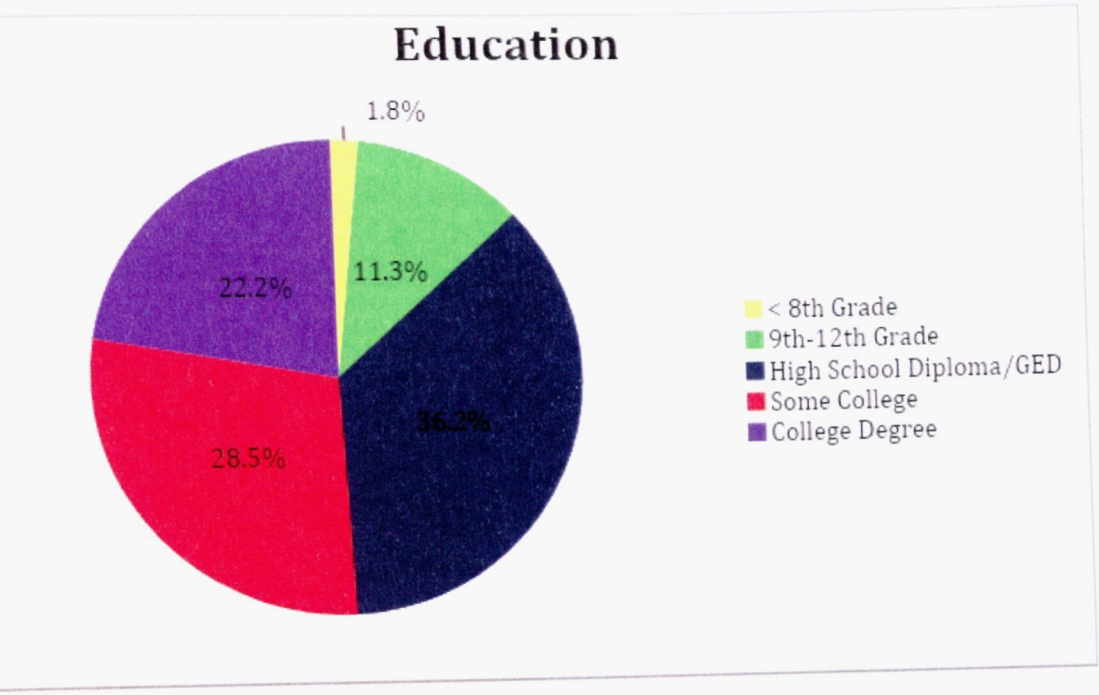
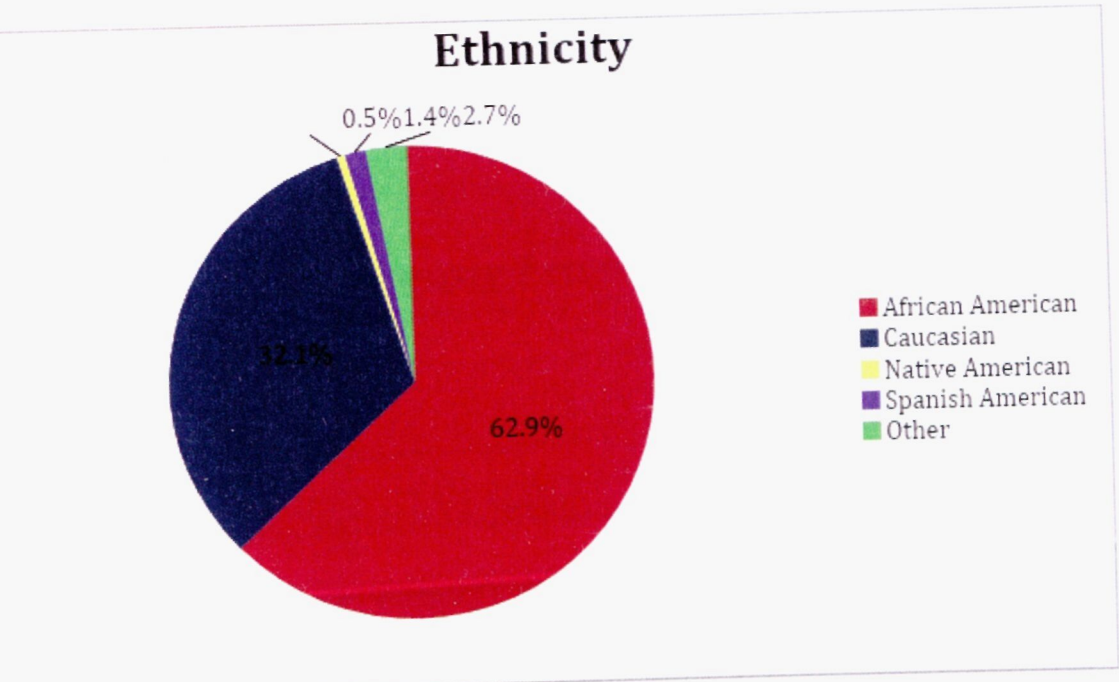


Figure 3. Ethnicity of study participants.



re 2. Education level of study participants.



gure 3. Ethnicity of study participants.

When asked to report pregnancy status, participants could select more than one response, and all responses were tallied. Figure 4 shows pregnancy status of participants. The majority of participants reported previous pregnancy, as shown in Figure 5.

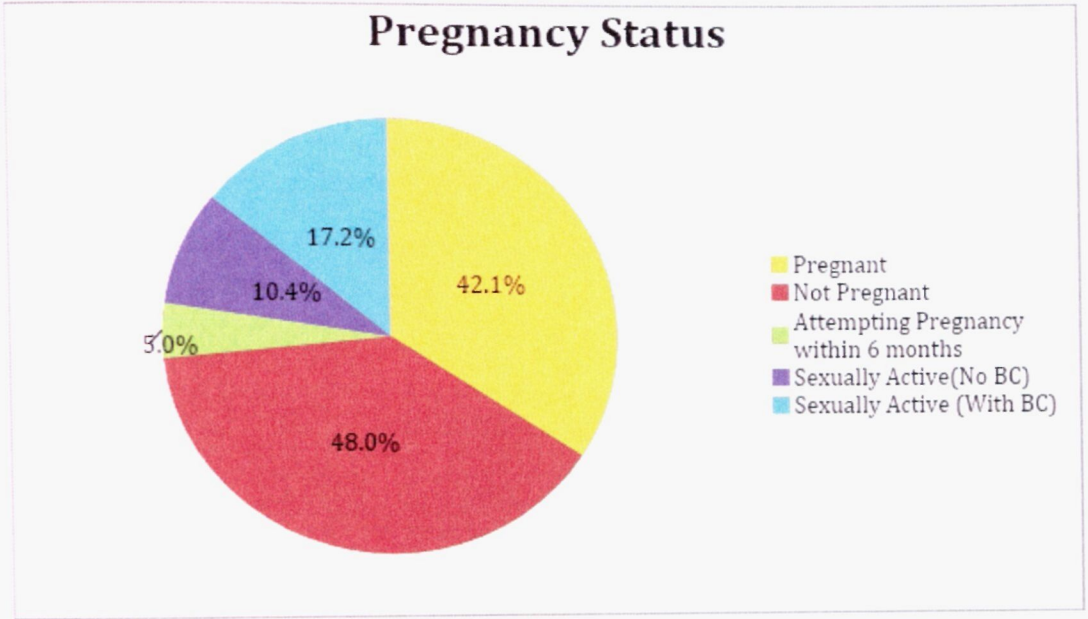


Figure 4. Pregnancy status of participants.

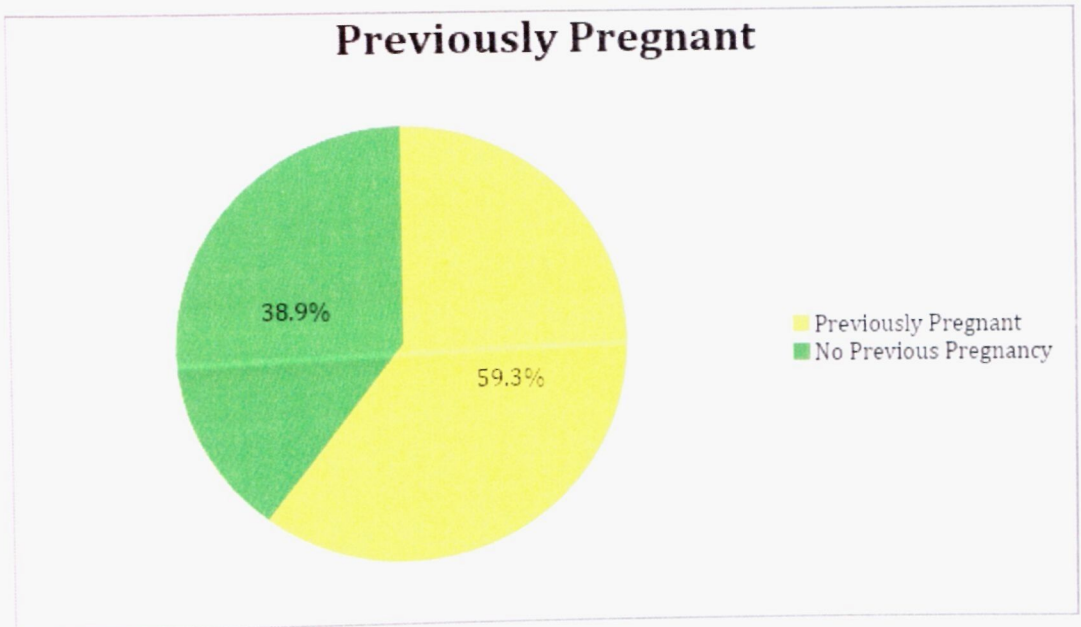


Figure 5. Previously pregnant status of participants.

Statistical Results

The knowledge of women of childbearing age regarding the consumption of folic acid supplementation and cessation of alcohol, cigarette and marijuana smoking and illicit drug use was evaluated through survey (Appendix A) results. Participants selected answers of true, false, or I don't know for a series of 13 statements about health and safety before and during pregnancy. To be considered knowledgeable is to correctly answer at least 9 out of 13 questions correctly. The percentage of responses to each item are shown in Table 1.

Table 1

Percentage of Responses by Survey Question

Question	True	False	Do Not Know
1	**63.8%**	26.7%	9.5%
2	**64.3%**	13.6%	22.2%
3	**44.3%**	10.4%	45.2%
4	**29.9%**	14.0%	55.7%
5	**37.6%**	16.7%	45.2%
6	18.6%	**67.9%**	13.6%
7	4.5%	**91.0%**	4.1%
8	14.9%	**71.9%**	13.1%
9	4.1%	**92.8%**	2.7%
10	5.4%	**79.2%**	15.4%
11	4.1%	**89.1%**	6.8%
12	4.1%	**86.4%**	9.5%
13	4.1%	**93.2%**	2.7%

Notes. $N = 221$. Shaded cells indicate correct answers.

The majority of participants answered questions one, two, and six through13 correctly. Questions three through five did not receive a majority correct response. In

fact, many participants did not know the answer to questions three through five. Questions three through five were related to the correct folic acid dosage and supplementation before and during pregnancy.

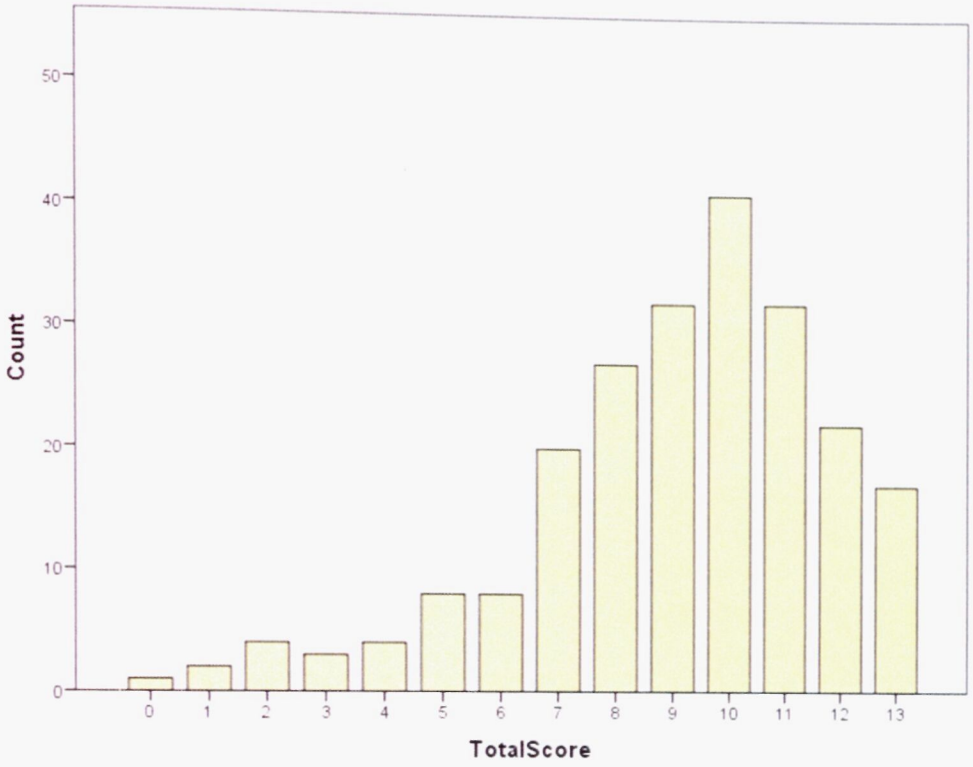


Figure 6. Histogram of participant scores on survey questions 1-13 ($N = 221$).

A histogram of scores is shown in Figure 6. The histogram represents the number of participants and total score received. Based on answers to survey questions, a score was calculated for each participant. The score represents the number of items the person answered correctly. The lowest possible value is zero, which would mean no correct answers were provided. The highest possible value is 13, which would reflect correct answers for all questions. The average score received by participants was 9.11, with a standard deviation of 2.660. To be considered knowledgeable is to correctly answer at least nine of 13 questions correctly. Approximately 66% of the 221 participants answered

nine or more of the 13 questions correctly. The results indicate the majority of women in the study were knowledgeable regarding preconception counseling.

The effect of demographics on the total score was analyzed. The results are summarized in Table 2. There were significant differences in participant scores based on two factors: education and being sexually active without birth control (Pregnancy Status 4). There were no significant differences in scores based on other demographic variables such as clinic, age, insurance, ethnicity, previous pregnancy, or other pregnancy statuses. A full report of total scores by various demographic variables is shown in Table 3.

Table 2

Tests of Significance (ANOVA) for Demographic Factors on Total Score

Demographic Variable	**F-Statistic**	**Significance (p-value)**
Clinic	0.457	0.713
Age	2.084	0.104
Insurance	2.214	0.088
Education	4.521	0.002
Ethnicity	1.247	0.292
Pregnancy Status 1 (Pregnant)	0.023	0.879
Pregnancy Status 2 (Not Pregnant)	0.252	0.616
Pregnancy Status 3 (Attempting Pregnancy)	0.338	0.562
Pregnancy Status 4 (Sexually Active No Birth Control)	10.315	0.002
Pregnancy Status 5 (Sexually Active With Birth Control)	0.574	0.450
Previously Pregnant	0.057	0.811

Note. $N = 221$

Table 3

Total Score Summary Statistics by Demographics

Demographic Variable	Sample Size	Mean	Standard Deviation
Age			
Age 1 (18-23)	69	7.67	2.726
Age 2 (24-29)	75	9.89	2.293
Age 3 (30-34)	40	9.90	2.182
Age 4 (35-40)	37	9.38	2.681
Insurance			
Insurance 1 (No Insurance)	22	7.32	3.198
Insurance 2 (Medicaid / Medicare)	118	8.58	2.566
Insurance 3 (Employer Insurance)	62	10.24	2.054
Insurance 4 (Private Insurance)	25	10.92	1.998
Education			
Education 1 (Less than 8th grade)	4	5.75	3.775
Education 2 (9th-12th grade)	25	7.60	2.550
Education 3 (High school diploma/GED)	80	8.26	2.666
Education 4 (Some college)	63	9.37	2.238
Education 5 (College degree)	49	11.22	1.462
Ethnicity			
Ethnicity 1 (African American)	139	8.72	2.711
Ethnicity 2 (Caucasian)	71	9.97	2.171
Ethnicity 3 (Native American)	1	12.00	n/a
Ethnicity 4 (Spanish American)	3	8.33	2.082
Ethnicity 5 (Other)	6	7.67	4.546
Pregnancy Status			
Pregnancy Status 1 (Pregnant)	93	9.23	2.207
Pregnancy Status 2 (Not Pregnant)	106	8.91	2.929
Pregnancy Status 3 (Attempting Pregnancy)	11	10.82	1.722
Pregnancy Status 4 (Sexually Active No Birth Control)	23	7.48	3.515
Pregnancy Status 5 (Sexually Active With Birth	38	9.21	2.970
Previously Pregnant 1 (Yes)	131	9.34	2.592
Previously Pregnant 2 (No)	86	8.79	2.791
Study Site			
Clinic A	38	9.37	2.954
Clinic B	46	8.41	3.030
Clinic C	76	9.36	2.290
Clinic D	61	9.18	2.572

Regarding education, scores were significantly higher for participants with a college degree ($M = 11.22$) compared to participants with less than an 8th grade education ($M = 5.75$). The other education levels had average scores between the following values: 9th through 12th grade (M=7.60), high school degree or GED (M = 8.26), and some college ($M = 9.37$). Regarding pregnancy status, those who reported being sexually active with no birth control (Pregnancy Status 4) had significantly lower scores ($M = 7.48$) than those who were attempting pregnancy (Pregnancy Status 3; M = 10.82).

While the effect of age was not statistically significant, there appears to be a practical difference in that younger participants had lower scores than other groups. While not statistically significant, participants with Medicare or Medicaid and no insurance were found to have lower scores than participants with private insurance. Caucasians were found to have higher scores than participants from other ethnicities.

Summary

The sample for the current research study included women of all ethnicities between the ages of 18 and 40 years who visited two primary care clinics and two women's health clinics in the southeastern region of the United States. The goal of the research study was to assess knowledge of women of childbearing age regarding key components of preconception counseling and examine relationships between demographics and knowledge of preconception health care. Responses were removed if the participant was below 18 years of age, above 40 years of age, or had a previous tubal ligation or hysterectomy, leaving a total sample of 221 participants. Most participants

were of African American ethnicity, followed by Caucasian. A majority of participants reported Medicaid or Medicare as the primary insurance. The majority of participants were from the 18 year to 23 year and 24 year 29 year age ranges. Questions three through five on the survey received a low percentage of correct responses. The questions involved information regarding folic acid supplementation. Based on the results, there is a lack of knowledge regarding the importance of folic acid supplementation before and during pregnancy. Participants were more knowledgeable about other items on the survey regarding alcohol use, cigarette and marijuana smoking, and illicit drug use before and during pregnancy.

CHAPTER V

Implications

Dunlop et al. (2013) found improving the health of a woman during the three to six months before conception drastically reduces complications and mortality of both the mother and newborn. Although there are various aspects of preconception counseling, Dunlop et al. (2013) determined folic acid supplementation, alcohol use, and cigarette and marijuana smoking are some of the most important topics related to childbearing. One-half to two-thirds of neural tube defects (NTDs) could be prevented if folic acid was used prior to conception. Significant pregnancy problems associated with cigarette smoking include infertility, placenta previa, placental abruption, preterm birth, low birth weight, spontaneous abortion, stillbirth, sudden infant death syndrome (SIDS) and orofacial clefts (Dunlop et al., 2013). Alcohol or marijuana use are risk factors to an embryo's healthy development in the womb and can result in deformities, low birth weight, and possible withdrawal symptoms in the newborn. When women receive preconception counseling, pregnancy risk factors decrease. Women of childbearing age who have an unplanned pregnancy may not be in optimal health, which poses an increased risk for morbidity and mortality in the mother and newborn.

The current researchers sought to assess knowledge levels of women of childbearing age in the southeastern region of the United States regarding key components of preconception counseling. The researchers also sought to assess how participants' demographic factors affect knowledge of preconception counseling. The researchers chose to study knowledge of folic acid supplementation, alcohol use,

cigarette and marijuana smoking cessation, and illicit drug use in women of childbearing age. A survey, found in Appendix A, was administered in four clinics in the southeastern region of the United States using a convenience sample. The population in the research study consisted of women of childbearing age, defined as women between the ages of 18 to 40 years, with a sample goal of at least 300 women. Data was collected over two months, analyzed by the researchers, and given to a statistician for formal analysis.

In this chapter, the findings of the current research study will be summarized, interpreted, and discussed. Limitations, conclusions, and implications will be discussed. Recommendations, based upon limitations, conclusions, and implications, will also be discussed for future clinical research studies.

Summary of the Findings

There were 238 surveys collected for the current research study. The sample population consisted of females between the ages of 18 and 40 years old. The samples were collected from four clinics in the southeastern region of the United States. Clinic A was a family health clinic where 38 surveys were collected. Clinic B was a family health clinic where 46 surveys were collected. Clinic C was a women's health clinic where 76 surveys were collected. Clinic D was a women's health clinic where 61 surveys were collected.

When demographics were analyzed, the majority of participants self reported as African American (63%, n =139) or Caucasian (32%, n = 71). The remaining 5% of the sample population included Native Americans, Spanish Americans, and others. Regarding education status, participants reported a high school diploma (36.2%, n = 80),

completed some college (28.5%, $n = 63$), or obtained a college degree (22.2%, $n = 49$). Regarding insurance status, participants reported having Medicaid or Medicare (53.4%, $n = 118$), private insurance (39.4%, $n = 87$), or no insurance (9.9%, $n = 22$). Pregnancy status of the participants was reported as pregnant (42.1%, $n = 93$) or not pregnant (48%, n = 106). Participants either reported a previous pregnancy (59.3%, $n = 131$) or reported no prior pregnancy (38.9%, $n = 86$), which indicated no statistical significance. Five percent of the surveys were excluded because the participants reported a past tubal ligation or hysterectomy.

The average score of participants was 9.11, with a standard deviation of 2.660. There were significant differences in participant scores based on two factors: education and being sexually active while using no birth control (Pregnancy Status 4). For example, participants with a college degree scored significantly higher compared to individuals with an 8th grade education or less. Participants who reported being sexually active without the use of birth control scored lower on the survey. Furthermore, women with an 8th grade education level or less and women who are sexually active without a birth control method are at a higher risk of unplanned pregnancies and potential birth defects related to not consuming folic acid to prevent neural tube defects. Women with an 8th grade or lower education level and women who are sexually active without a birth control method are also at risk for birth defects related to consuming alcohol, illicit drugs, and tobacco prior to pregnancy recognition. While the participants' age was not statistically significant, there was a practical difference in that younger participants had lower scores than other age groups. Participants with private insurance had higher scores

than participants on Medicare or Medicaid or individuals without insurance. While Caucasians scored higher than African Americans, there were no significant statistical differences in scores related to ethnicity, clinic site, or whether or not the participant had been pregnant previously.

Discussion of Findings

Nearly half of all pregnancies in the United States are unplanned, placing women of childbearing age at a greater risk for having a newborn with birth defects. Literature reviewed by the current researchers indicated a deficit in knowledge of preconception care. Therefore, women of childbearing age should receive preconception counseling to reduce preventable health risks (Farahi & Zolotor, 2013).

The current researchers compared and contrasted results of the current research study with previous studies. Three studies regarding folic acid were reviewed by the current researchers. Dessie et al. (2017) assessed knowledge of women of childbearing age regarding folic acid in preconception care. The results of the Dessie et al. (2017) study showed 48.4% of women did consume folic acid in different stages of pregnancy; however, only 1.9% of women took folic acid prior to becoming pregnant.

Malek et al. (2016) sought to determine the women's knowledge of and adherence to recommendations for preconceptional folic acid and iodine supplementation. The results of the Malek et al. study showed there was a 27% adherence to folic acid supplementation prior to pregnancy. While adherence to supplementation was low, the study showed 90% of women were knowledgeable about folic acid supplementation dosage and the timing of consumption.

Cheng et al. (2018) conducted a study focused on a low-income population, which can be related to the setting of the current research study located in the southeastern region of the United States. The study focused on examining maternal folic acid supplementation and serum folate concentrations in the Boston Birth Cohort (Cheng et al., 2019). The results showed less than 5% of pregnant women started taking folic acid supplementation prior to becoming pregnant. In the current research study, regarding question 4 of the survey, the majority of participants answered incorrectly by answering "I Don't Know" (55.7%, $n = 123$) or "False" (14%, $n = 31$). Therefore, approximately 70% of participants were not knowledgeable of the recommended daily folic acid supplementation. Regarding question three of the survey, the majority of participants either answered "I Don't Know" (45.2%, $n = 100$) or "False" (10.4%, $n = 23$). Most participants were not knowledgeable (55.6%, $n = 123$); therefore, less than half of participants were knowledgeable (44.3%, $n = 98$) regarding consuming folic acid supplements before pregnancy, which lowers birth defects in newborns. The statistics correlate to the lack of knowledge about folic acid among women of childbearing age found in the previous research studies by Cheng et al. (2018), Dessie et al. (2017), and Male, et al. (2016), reviewed by the current researchers.

The researchers reviewed literature related to alcohol use during preconception. Two research studies addressing alcohol use during preconception, written by Crawford-Williams et al. (2016) and Parackal et al. (2012), were reviewed. The studies showed when participants were more knowledgeable about preventable health risks, attitudes and behaviors toward alcohol consumption during pregnancy significantly improved. In the

Parackal et al. (2012) study, one half of currently pregnant women and 37% of previously pregnant women reported they ceased alcohol consumption upon pregnancy recognition. The Crawford-Williams et al. (2016) study showed the mocktail booklet was effective in improving knowledge and changing attitudes of women regarding alcohol consumption in pregnancy. The current research study found participants were knowledgeable (71.9%, n = 159) about risk factors of consuming alcohol prior to pregnancy. Participants were also found to be knowledgeable (92.8%, n = 205) about risk factors associated with consuming alcohol during pregnancy. The results of the current research study do not indicate a knowledge deficit; therefore, current results are not as significant as previous studies reviewed. The finding could be related to the small sample size or short time frame in which data was collected.

The researchers of the current study reviewed literature pertaining to tobacco use during preconception care. The study conducted by Polen et al. (2015) showed more than 70% of women would stop smoking upon pregnancy recognition. In the current research study, researchers assessed knowledge of women of childbearing age regarding use of tobacco prior to and during pregnancy. The current research study results concluded women were knowledgeable (67.9%, n = 150) about abstaining from tobacco prior to pregnancy. Participants were also found knowledgeable (91.0%, n = 201) about not using tobacco while pregnant. The findings of the current research study have similar findings with the Polen et al. (2015) study regarding the importance of abstaining from tobacco use during preconception to avoid preventable health risks in the mother and fetus. Statistical findings were very similar.

Literature pertaining to marijuana use during preconception was reviewed. The study by Jarlenski et al. (2016) found that few women reported healthcare providers gave information regarding the harm of marijuana use on the fetus. The Jarlenski et al. (2016) study indicated the deficit in materials given to women who use marijuana during preconception and pregnancy resulted in a knowledge deficit. The study by Jarlenski et al. (2016) found that pregnant women are more likely to engage in healthy behavior when the women are well informed and expect a positive outcome. The Jarlenski et al. (2016) study indicated there was a knowledge deficit in women of childbearing age regarding marijuana use. A reason for the deficit is healthcare providers are not educating women on the harmful effects of marijuana use on a newborn. In the current research study, participants were asked if smoking marijuana prior to or during pregnancy was safe. The participants were knowledgeable (79.2%, $n = 175$) that smoking marijuana while trying to become pregnant was not safe. Participants were also knowledgeable (89.1%, $n = 197$) that smoking marijuana while pregnant was not safe. The results contrast from the Jarlenski et al. (2016) study. Possible explanations for the difference were the difference in location or demographic background of the women in the studies. An explanation of the increased knowledge found in participants is the increased accessibility of internet access and media, which promote awareness on the harmful effects of marijuana.

Finally, Poels et al. (2017) and Shabani et al. (2016) focused on the importance of educating, counseling, and providing training during the preconception care period to promote health and reduce the risk of preventable health concerns. In the Poels et al. (2017) study, researchers assessed whether actively preparing for pregnancy by women is

associated with lifestyle changes prior to pregnancy. The results indicated almost 60% of women acquired preconception information themselves and 25% consulted with a healthcare provider prior to conception. The women who sought information about preconception care, either independently or through a healthcare provider, were more likely to abstain from alcohol, consume folic acid, and improve diet. Shabani et al. (2016) conducted a study to evaluate results of preconception counseling. Sociodemographic questionnaires and the health promoting lifestyle (HPLP-II) questionnaire were used to collect data and aid the study. To collect data, questionnaires were also used in the current study. Shabani et al. (2016) confirmed educating patients could enhance health promoting behaviors in women of childbearing age. The study gives relevance to the current research by proving preconception education could improve health promoting practices, thereby reducing preventable health risks in newborns (Shabani et al., 2016). The current research study revealed the majority of participants were knowledgeable of key components of preconception counseling. On average, 9.11 was the median score per participant, which was higher than the current researchers anticipated.

After reviewing literature and comparing and contrasting results of the current research study, the current researchers identified the need for further research and education regarding preconception care in women of childbearing age. Maternal and infant health risks decrease as women become more knowledgeable about self-care to prevent health related risks that could potentially harm the fetus. Folic acid is effective in preventing neural tube defects; however, when reviewing literature, the studies show

women are not knowledgeable about benefits of folic acid, dose of folic acid that should be taken during and prior to pregnancy, and the timing of consuming folic acid. Literature proved most women stop consuming alcohol once pregnancy is recognized; however, the timing places the fetus at risk because the fetus has already been exposed. As knowledge deficits are exposed, further research and education is needed to help reduce preventable health risks for both the infant and mother. Once research results were obtained, researchers could then provide information to healthcare providers to assist in improving education on preconception counseling in women of childbearing age to reduce the risk of neural tube defects and other health related concerns regarding alcohol, cigarette, and illicit drug use. The researchers propose health care providers distribute education regarding the health risks related to folic acid supplementation, alcohol use, tobacco and cannabis smoking cessation, and illicit drug use to all women of childbearing age.

Limitations

Prior to data collection, there were several limitations identified by the researchers. Limitations were identified as small sample size, geographically limited data collection, use of convenience sampling, and short time frame of gathering data. A questionnaire, developed by the researchers, was used for data collection. The questionnaire was completed by women in rural clinics in the southeastern region of the United States. The population included two women's health clinics and two family practice clinics. Data was collected and analyzed from a sample of 221 completed questionnaires. The current research study was designed to assess knowledge of women

of childbearing age regarding key components of preconception counseling and examine relationships between demographics and knowledge of preconception health care.

The sample size of 221 completed questionnaires was relatively small, which potentially decreased reliability of generalizing results to the entire population. Repeating the research study with a larger sample size would be beneficial. A larger sample size, encompassing all regions of the United States, would more accurately represent the entire population of women of childbearing age. Another limitation was partially answered questionnaires were included in the analysis. In future studies, incomplete questionnaires should be excluded from the research study.

Another limitation known prior to data collection was the use of convenience sampling. Convenience sampling is the weakest form of data collection and often a starting point to lead to further research (Alligood, 2014). Because the current research study was geographically limited and did not encompass knowledge levels of women of childbearing age across the United States, a larger study including multiple geographical regions would give a better representation of knowledge levels of women of childbearing age regarding preconception counseling.

Conclusion

The purpose of the current research study was to assess knowledge of women of childbearing age regarding key components of preconception counseling and examine relationships between demographics and knowledge of preconception health care. The current research study evaluated the knowledge level of women of childbearing age regarding preconception counseling and focused on consuming at least 400 mcg of folic

acid daily, abstaining from alcohol and illicit drugs, and not smoking cigarettes or marijuana. There were a total of 238 surveys completed. Of the completed surveys, five were excluded due to the participant being either younger than 18 years of age or older than 40 years of age, and 12 were excluded due to the participant having a past tubal ligation or hysterectomy. Unfortunately, not all questionnaires were completed entirely, and partial responses were included in the results; therefore, percentages may not add to 100%. Analyses were performed using International Business Machines (IBM) statistical package for the social sciences (SPSS) software version 24.

The demographic factors were calculated based on research data. The participants self reported as African American (62.9%, $n = 139$), Caucasian (32.1%, $n = 71$), Native American (0.5%, $n = 1$), Spanish American (1.4%, $n = 3$), and other (2.7%, $n = 6$). Participants either reported a previous pregnancy (59.2%, $n = 131$) or reported as never being pregnant (38.9%, $n = 86$). Concerning pregnancy status, participants were currently pregnant (42.1%, $n = 93$), were not pregnant (48%, $n = 106$), were attempting pregnancy within six months (5%, $n = 11$), were sexually active with no birth control method (10.4%, $n = 23$), or were sexually active with a birth control method (17.2%, $n = 38$). Regarding medical insurance, participants reported having Medicare or Medicaid (53.4%, $n = 118$), private insurance (39.3%, $n = 87$), or no insurance (10%, $n = 22$). Evaluation of education level revealed participants had a high school diploma or GED (36.2%, $n = 80$), some college (28.5%, $n = 63$), a college degree (22.2%, $n = 49$), completed 9th through 11th grade (11.3%, $n = 25$), or had less than an 8th grade education level (1.8%, $n = 4$).

The survey, detailed in Appendix A, consisted of 13 questions regarding preconception counseling; focusing on consuming at least 400 mcg of folic acid daily, abstaining from alcohol and illicit drugs, and not smoking cigarettes or marijuana. The lowest possible value was zero and the highest possible value was 13. The participant's average score was 9.11, with a standard deviation of 2.660.

The effect of demographic factors on total score revealed there were significant differences in scores based on two factors, education and those who were sexually active with no birth control. Education showed a significant difference in participants with a college degree ($M = 11.22$) compared to those with less than an 8th grade education ($M = 5.75$). Those who reported being sexually active with no birth control had significantly lower scores ($M = 7.48$) than those who did not ($M = 9.30$). Age was not statistically significant; however, there was a practical difference in that younger participants were less knowledgeable than other groups.

Therefore, women of childbearing age with a college degree were more knowledgeable of preconception counseling. Most likely, women with a college degree are more educated; therefore, have better resources and better access to healthcare and healthcare education. Participants attempting pregnancy were also found to be more knowledgeable. One reason for increased knowledge is women planning pregnancy are more likely to research and plan for a healthy pregnancy. There was no significant difference in scores between primary care clinics and women's health clinics.

Implications and Recommendations

In the current research study, located in the southeastern United States, most women of childbearing age were aware pregnancy and folic acid supplementation should be discussed with a healthcare provider before becoming pregnant (64.3%, $n = 142$). The majority of women of childbearing age did not know the daily recommended dose of folic acid before or during pregnancy, nor if supplementation helps prevent birth defects. The majority of women of childbearing age were aware there are risks involved with smoking and using alcohol or illicit drugs during pregnancy. Although not statistically significant, participants from the two primary care clinics were just as knowledgeable about preconception care as those from the women's health clinics. The current study concluded the majority of participants were not knowledgeable regarding folic acid supplementation prior to conception or the appropriate dosage for women of childbearing age. Therefore, an educational opportunity for healthcare providers was identified regarding benefits of folic acid supplementation and the appropriate dosage for women of childbearing age. Placing posters in the waiting room and exam rooms may provide education and stimulate discussion on the topic of preconception counseling. The current research study provided areas of focus for education improvement in primary care and women's health clinics. The healthcare providers were provided results of the current research study related to the particular clinic.

Based on results of the current research, the following recommendations are made:

- Increase the sample size to more accurately represent the population.

- Make the survey available for a longer period of time to increase the number of completed surveys and participants.
- Through patient education, increase public awareness of the importance of folic acid supplementation, tobacco and cannabis smoking cessation, and illicit drug use at any age.
- Replicate the current research on a larger scale with a larger population and geographical area to determine if knowledge of women of childbearing age is similar across the country or only a problem in one state.

References

Alligood, M. R. (2014). *Nursing theorists and their work* (8th ed.). St. Louis, MO: Mosby-Elsevier.

Berlin, I., Golmard, J. L., Jacob, N., Tanguy, M. L., & Heishman, S. J. (2017). Cigarette smoking during pregnancy: Do complete abstinence and low level cigarette smoking have similar impact on birth weight?. *Nicotine & Tobacco Research, 19*, 518-524.

Centers for Disease Control and Prevention. (2018). *Planning for pregnancy.* Retrieved from https://www.cdc.gov/preconception/planning.html

Cheng, T. L., Mistry, K. B., Wang, G., Zuckerman, B., & Wang, X. (2018). Folate nutrition status in mothers of the Boston birth cohort, sample of a US urban low-income population. *American Journal of Public Health, 108*, 799–807. https://doi.org/10.2105/AJPH.2018.304355

Crawford-Williams, F., Fielder, A., Mikocka-Walus, A., Esterman, A., & Steen, M. (2016). A public health intervention to change knowledge, attitudes and behavior regarding alcohol consumption in pregnancy. *Evidence Based Midwifery, 14*(1), 4-10.

Demographic factors. BusinessDictionary.com. Retrieved November 17, 2018, from http://www.businessdictionary.com/definition/demographic-factors.html

Dessie, M. A., Zeleke, E. G., Workie, S. B., & Berihun, A. W. (2017). Folic acid usage and associated factors in the prevention of neural tube defects among pregnant women in Ethiopia: Cross-sectional study. *BMC Pregnancy & Childbirth, 17*, 1–8. https://doi.org/10.1186/s12884-017-1506-2

Dunlop, A., Logue, K., Thorne, C., & Badal, H. (2013). Change in women's knowledge of general and personal preconception health risks following targeted brief counseling in publicly funded primary care settings. *American Journal of Health Promotion, 27*(3),S50-S57. doi:10.4278/ajhp.120116-QUAN-39.

Ethan, M. K., Ramadhani, T. A., Scheuerle, A. E., Canfield, M. A., Wyszynski, D. F., Druschel, C. M., & Romitti, P. A. (2009). Alcohol consumption by women before and during pregnancy. *Maternal and Child Health Journal, 13*, 274–285.

Farahi, N., & Zolotor, A. (2013). Recommendations for preconception counseling and care. *American Family Physician,* 88, 499-506. Retrieved from https:// www.aafp.org/afp/2013/1015/p499.html

Fowler, J. R., & Jack, B. W. (2017) Preconception counseling. In *StatPearls [Internet].* StatPearls Publishing. Retrieved from https://www.ncbi.nlm.nih.gov/ books/ NBK441880/

Jarkenski, M., Tarr, J. A., Holland, C. L., Farrell, D., & Chang, J. C. (2016). Pregnant women's access to information about perinatal marijuana use: A qualitative study. *Women's Health Issues, 26*, 452-459. doi: 10.1016/j.whi.2016.03.010

Malek, L., Umberger, W., Makrides, M., & Zhou, S. J. (2016). Poor adherence to folic acid and iodine supplement recommendations in preconception and pregnancy: a cross-sectional analysis. *Australian & New Zealand Journal of Public Health, 40*, 424-429. https://doi.org/10.1111/1753-6405.12552

Parackal, S. M., Parackal, M., K., & Harraway, J. A. (2012). Prevalence and correlates of drinking in early pregnancy among women who stopped drinking on pregnancy recognition. *Maternal and Child Health Journal, 17*, 520-529. doi:10.1007/s10995-012-1026-7

Pender, N. J. (2011). *Health Promotion Model manual.* Retrieved from https://deepblue.lib.umich.edu/bitstream/handle/2027.42/85350/HEALTH_PROMOTION_MANUAL_Rev_5-2011.pdf

Poels, M., Stel, H. F., Franx, A., & Koster, M. (2017). Actively preparing for pregnancy is associated with healthier lifestyle of women during the preconception period. *Midwifery, 50*, 228-234. https://doi.org/10.1016/j.midw.2017.04.015

Polen, K., Sandhu, P., Honein, M., Green, K., Berkowitz, J., Pace, J., & Rasmussen, S. (2015). Knowledge and attitudes of adults towards smoking in pregnancy: Results from the HealthStyles© 2008 Survey. *Maternal & Child Health Journal, 19*(1), 144–154. https://doi.org/10.1007/s10995-014-1505-0

Reeve, M. E., Charafeddine, L., Zhong, N., Padilla, C., Yunis, K., El Rafei, R., Alamiddine, K., Zhao, X., Jiang, X., & Howson, C. (2014). Preconception health assessment in China, Lebanon and the Philippines: Applicability to other countries. *Maternal & Child Health Journal*, *18*, 1066–1074. https://doi.org/10.1007/s10995-013-1334-6

Shabani, M., Omidi, S., Farmanbar, R., & Hamzegardeshi, Z. (2016). Effect of preconception counseling on health promoting behaviors of reproductive age women in Sari city. *Journal of Nursing & Midwifery Sciences*, *3*(2), 1–10. http://dx.doi.org/10.18869/acadpub.jnms.3.2.1

Appendix A

Preconception Counseling Knowledge Survey

We are MSN students at Mississippi University for Women performing a graduate research study assessing women's knowledge of preconception counseling. The survey is to help us to understand our patients' education needs. By completing this survey, you agree to participate in the study. You must be at least 18 years old to participate. This survey is voluntary and anonymous, and all answers will be kept confidential. Please do not provide your name or any other identifiers on the survey. You may withdraw from the study at any time until the study is submitted.

Please circle the appropriate box that corresponds with your answer. Please answer honestly and to the best of your ability without using any outside resources or help.

What is your current age?

18-23	24-29	30-34	35-40

What insurance do you have?

No insurance	Medicaid or Medicare	Employer insurance	Private Insurance

What education level have you completed?

Less than 8th grade	9th-12th grade	High School Diploma/GED	Some College	College Degree

What is your ethnicity?

African American	Caucasian	Native American	Spanish American	Other

What is your pregnancy status? (circle all that apply)

Pregnant	Not Pregnant	Attempting Pregnancy within 6 months	Sexually active with no birthcontrol method	Sexually active with birth control method	Past Tubal Ligation or Hysterectomy

Previously Pregnant

Yes	No

Please circle if you think the statement is true or false.

1. Women should discuss pregnancy with a health care provider before becoming pregnant.	True	False	I do not know
2. Folic acid supplements should be discussed with a woman before she becomes pregnant.	True	False	I do not know
3. Taking folic acid supplements before pregnancy can lower birth defects in newborns.	True	False	I do not know
4. Women should take at least 400 mcg of folic acid daily before becoming pregnant.	True	False	I do not know
5. Women should take at least 400 mcg of folic acid daily while pregnant.	True	False	I do not know
6. Women can smoke cigarettes before becoming pregnant without any risk.	True	False	I do not know
7. Women can smoke cigarettes while pregnant without any risk.	True	False	I do not know
8. Women can drink alcohol while trying to become pregnant without any risk.	True	False	I do not know
9. Women can drink alcohol while pregnant without any risk.	True	False	I do not know
10. Smoking marijuana or weed while trying to become pregnant is safe.	True	False	I do not know
11. Smoking marijuana or weed while pregnant is safe.	True	False	I do not know
12. Illegal or street drug use before becoming pregnant is safe.	True	False	I do not know
13. Illegal or street drug use while pregnant is safe.	True	False	I do not know

Appendix B

Institutional Review Board Approval

https://email.muw.edu/owa/WebReadyViewBody.aspx?t=att&ews...

The W Mississippi University for Women
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February 28, 2019

Terri Hamill, Ph.D.
Mississippi University for Women
College of Nursing and Health Sciences
1100 College Street, MUW-910
Columbus, MS 39701

Dear Dr. Hamill:

I am pleased to inform you that the members of the Institutional Review Board (IRB) have reviewed the following proposed research and have approved it as submitted:

Name of Study:	Knowledge of Women of Childbearing Age Regarding Preconception Counseling
Research Faculty/Advisor:	Terri Hamill
Investigators:	Shelby Jackson

I wish you much success in your research.

Sincerely,

Scott Tollison

Scott Tollison, Ph.D.
Interim Provost and Vice President for Academic Affairs

ST/tc

pc: Irene Pintado, Institutional Review Board Chairman

3/4/2019 11:27 AM

Appendix C

Letter of Consent

February 1, 2019

Mississippi University for Women
1100 College Street
Columbus, MS 39701

SUBJECT: Permission to Participate in a Research Project

To whom it may concern:

We are graduate students in the Family Nurse Practitioner program at Mississippi University for Women in Columbus, Mississippi. As a requirement of our program, we are conducting a study on the knowledge of preconception counseling among women of childbearing age. We will be collecting data via a quick survey of female patients, aged 18 to 40 years, on knowledge regarding preconception counseling. The students participating in this project are Allison Britt, Shelby Jackson, Jessica McGee and Jenna Pugh.

Your consent will allow us to collect data from your patients. Data will be collected by allowing your receptionist to distribute an anonymous survey to each female patient aged 18 to 40 years. The survey consists of questions that ask about pregnancy and the patient's knowledge of folic acid supplementation and substance abuse prior to and during conception. The questions could evoke some emotional discomfort. This has been explained in the informative letter that will be given to the participant. The participant is encouraged to talk to their healthcare provider about the survey questions if the survey makes them feel uncomfortable. The patient is also notified that she can withdraw from the research project at any time, and her participation is strictly voluntary. The survey is anonymous, and the participant will be given instructions to return the completed survey in a sealed envelope before returning the survey to the clinic receptionist. The four researchers will collect the surveys weekly and are the only ones allowed to open the sealed envelopes.

After data is collected from several clinics, we will analyze the data to gain an understanding of the current knowledge of preconception counseling among childbearing women. The information will help determine deficits in knowledge and plan further education. The results of the study will be made available to you upon completion. Your participation in the study is strictly voluntary and you may withdraw your consent and participation in this study at any time. If you need any additional information about the study or would like to speak to one of the researchers, please call Allison Britt, Shelby Jackson, Jessica McGee or Jenna Pugh. You may also contact the Chair of our research committee, Dr. Teresa Hamill at (662-312-7926.)

In addition, to withdraw from participating in this study at any time, please contact one of the researchers or committee chair.

Sincerely,

Allison Britt, RN, BSN, FNP Graduate Student

Shelby Jackson, RN, BSN, FNP Graduate Student

Jessica McGee, RN, BSN, FNP Graduate Student

Jenna Pugh, RN, BSN, FNP Graduate Student

I have read the above letter of consent and agree to the use of this clinic for the above mentioned research project. I understand that HIPPA regulations will be strictly followed and the confidentiality of each participant will be maintained. I also understand the compiled results of the study will be made available to me at the conclusion of the project.

_____ _____

Name, Title, Signature Date

Appendix D

Letter for Participation

Dear Participant,

We are a group of Family Nurse Practitioner students at MUW in Columbus, Mississippi. We are collecting data for our research project pertaining to the knowledge of preconception counseling in women of childbearing age.

Female patients, aged 18 to 40 years, will be asked to participate. If you agree to participate in our research, you will be asked to complete a short survey. The survey is anonymous so we ask that you do not write your name or any identifiable information on the survey to protect your privacy. The survey should take no longer than 5 to 10 minutes to complete. When you complete the survey, please place the survey in the envelope provided to you, seal the envelope, and return the sealed envelope to the clinic receptionist.

The survey is part of a student research project and is not included as part of your routine medical history.

There are questions on the survey that ask about your current pregnancy status or if you plan to become pregnant. There are also questions about substance abuse and the use of folic acid prior to pregnancy and during pregnancy. As these questions can evoke some emotional discomfort, we encourage you to speak to your healthcare provider with any questions or concerns you may have. Your participation in the study is strictly voluntary and you may withdraw at any time without any consequences.

If you do wish to participate in the study, your consent will be obtained by completing the survey. Your participation is greatly appreciated as the researchers collect data that will assist health professionals to better understand the knowledge of women of childbearing age on preconception counseling.

You must be a female, aged 18-40 years, to participate in this study.

A breach of confidentiality is always possible with a data collection research project. To protect your privacy and reduce the risk of breaching confidentiality, we ask that you do not put your name or any identifiable information on the survey or envelope. Please place the completed survey in the envelope provided to you, seal the envelope and return the envelope to the clinic receptionist. The researchers will collect the surveys from the clinics on a weekly basis.

The envelopes are to only be opened by the researchers of this study. If you have any questions or concerns, please feel free to contact the committee chair Dr. Terri Hamill, at 662-392-7323 or tjhamill@muw.edu.