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Preconception Health Knowledge among Undergraduate Women

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Preconception Health Knowledge among Undergraduate Women

By

Ashley M. Paulsen

A Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

In

Community Health

Minnesota State University, Mankato

Mankato, Minnesota

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Ashley Paulsen

This thesis has been examined and approved by the following members of the student's committee.

Dr. Autumn Hamilton

Dr. Judith Luebke

Dr. Joseph Visker

Abstract

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Preconception health is a woman's health before she becomes pregnant. It means knowing and understanding how preexisting health conditions and risk factors could affect a woman or her unborn child if she becomes pregnant (Office on Women's Health, 2010). This study examined undergraduate students' knowledge of recommended preconception health practices. A paper survey was distributed to general education classes in health, sociology, and family consumer science. This 33-item survey assessed demographics, barriers to practicing recommended preconception health behaviors, and knowledge of preconception health practices. Analyses included frequencies, independent t-test, and ANOVA.

Respondents had a mean score of 42.85 (2.68) on the knowledge section of the survey; indicating that respondents had a high level of knowledge regarding preconception health practices and information.

Respondents' knowledge scores were statistically correlated with their preconception health practices and behaviors ($r=.176$, $p=.000$). As knowledge scores increased, preconception health practice and behaviors scores also increased. When analyzing participants' current health behaviors as they relate to preconception health, it was found that most students are engaging in healthy behaviors.

The greatest reported barrier to practicing recommended preconception health behavior was lack of knowledge, with 49.2% of participants stating this as a difficulty. Cost was the second highest rated barrier at 35.8%.

Education is important for healthy pregnancies. Further research should include males as subject samples to see how the knowledge and information gaps compare. Preconception health is not a topic specific to women, and research including both genders could benefit everyone on the health care continuum.

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Chapter One: Statement of the Problem

Introduction

Preconception health is a woman's health before she becomes pregnant. It means knowing and understanding how preexisting health conditions and risk factors could affect a woman or her unborn child if she becomes pregnant (Office on Women's Health, 2010). This thesis focuses on preconception health and care. Although preconception health concerns men and women, this thesis will focus on the women's perspective.

A variety of risk behaviors and exposures affect the developing fetus, and the greatest effects occur in early pregnancy, when a woman may not know she is pregnant. "Alcohol or drug exposure, lack of essential vitamins, and workplace hazards during early pregnancy can result in adverse pregnancy outcomes for the mother and child" (American Academy of Family Physicians, 2006, para. 4).

Social determinants of women's health, such as low income or minority status can also play a role in adverse pregnancy outcomes. For example, socioeconomic status can affect access to health care, exposures in the environment, and health behaviors.

Every year, approximately 28,000 infants die during the first year of life (American Academy of Family Physicians, 2006). Despite advances in medical and prenatal care, about 1 in 8 babies are born too early (Office on Women's Health, 2010). Generally a preterm birth is listed on the baby's birth certificate; however there are no guidelines that include a follow-up plan for women with this risk predictor.

Progress in the United States to improve pregnancy outcomes has slowed dramatically, in part because of inconsistent delivery and implementation of interventions "before pregnancy to

detect, treat, and help women modify behaviors, health conditions, and risk factors that contribute to adverse maternal and infant outcomes” (Johnson et. al., 2006, p. 1). Researchers have found that only one out of six physicians provides preconception care for most women to whom they provide prenatal care (American Academy of Family Physicians, 2006).

Improving preconception health care and education can result in improved reproductive health outcomes and has the potential to reduce societal costs as well (American Academy of Family Physicians, 2006). Taking action on health issues and risks before pregnancy can prevent problems that may affect women and their babies in the future.

Statement of the Problem

Nearly half of all pregnancies are unintended. This results in nearly 2.8 million pregnancies in the United States annually (Kost, 2015). Births resulting from unintended pregnancies are associated with adverse health outcomes, including delaying prenatal care and premature birth. In 2010, the nationwide public health expenditure on unintended pregnancies was estimated to be \$21 billion (Kost, 2015). There is a need to shift care to the time before a child is conceived, which will allow for greater potential to prevent birth defects and other adverse pregnancy outcomes. Risk factors for adverse pregnancies include poor nutrition, low intake of folic acid, weight problems, medical conditions, use of alcohol, tobacco, and other drugs (Kost, 2015).

Because reproductive capacity spans several decades for most women, optimizing women’s health before and between pregnancies is an ongoing process that requires full participation of all segments of the health care system. “Preconception care is part of a larger health-care model that results in healthier women, infants, and families” (Johnson et. al., 2006, p. 2).

Significance of the Study

Published research that addresses the degree of knowledge reproductive aged women have about preconception health is very limited. Studies involving college students' perceptions of preconception health behavior are extremely limited.

It is the health educator's role to educate populations on health behaviors, risks, and diseases. The findings of this research will provide information of the degree to which undergraduate reproductive aged women are informed about preconception health practices. This information will help to identify knowledge gaps in preconception health information to help teach young women healthy preconception behaviors.

Research Questions

- 1) What is the degree of knowledge of selected young, reproductive aged college women about preconception health?
- 2) What is the relationship between the degree of knowledge and practicing recommended preconception health behavior?
- 3) What are the barriers to preconception health behavior?
- 4) What is the difference between pregnancy plans and preconception health knowledge?
- 5) What is the difference between pregnancy history and preconception health knowledge?

Limitations

- 1) There is a lack of existing research on undergraduate women's knowledge of preconception health.
- 2) Participants in the research may not complete the survey instrument.

- 3) Survey sample size may be too small to answer research questions.
- 4) Sample is limited to Minnesota State University, Mankato students.
- 5) The validity of Dr. Sarah Rodgers' Women's Preconception Health Survey used in this research was not reported.

Delimitations

Certain boundaries of my research include:

- 1) There was a limited time frame of three months to complete data collection and analysis.
- 2) Only Minnesota State University-Mankato female students aged 18 years and older were surveyed.

Assumptions

- 1) It is assumed that participants were truthful in responses to survey.
- 2) It is assumed that all participants could read and understand the survey instrument.
- 3) It is assumed that the survey instrument adequately assessed undergraduate women's degree of knowledge.

Definition of Terms

- a) Fetal Alcohol Spectrum Disorders: a group of conditions including physical problems, and problems with behavior and learning that can occur in a person whose mother drank alcohol during her pregnancy (CDC, 2015).
- b) Folic acid: a B vitamin women need before and during pregnancy to prevent major birth defects of the baby's brain and spine (CDC, 2016).

- c) Gestational diabetes: a condition in which pregnant women have never had diabetes before but have high blood glucose levels during pregnancy (American Diabetes Association, 2016).
- d) Hypertension: a condition characterized by high blood pressure during pregnancy (American Pregnancy Association, 2016).
- e) Preconception health: a woman's health before she becomes pregnant. It means understanding how health conditions and risk factors affect a baby if she were to become pregnant (Office on Women's Health, 2010).
- f) Pre-eclampsia: a pregnancy complication characterized by high blood pressure and signs of damage to another organ system (Mayo Clinic, 2014).

Chapter Two: Review of the Literature

Introduction

The purpose of this research was to determine selected reproductive aged, undergraduate women's knowledge of preconception health. This research focused on students' perceived knowledge of, and barriers to, practicing advantageous preconception health behaviors.

This review of literature has been divided into four parts. The first part addresses the Health Belief Model; the theoretical basis for this research. The second part reviews the perceived knowledge of men and women on preconception health care and behaviors. The third part focuses specifically on females' knowledge and risk factors relating to preconception health. The fourth part reviews the literature about recommendations to improve preconception health and health care.

Health Belief Model

The Health Belief Model suggests that the probability of a person practicing a certain health-related behavior depends on their perceptions of susceptibility to the health threat, the severity of the threat, the benefit of action, and the barriers to practicing the behavior. These perceptions are influenced by cues to actions which can be internal or external.

Stout (1997) examined the use of the Health Belief Model as a theoretical basis for future prenatal care programming. For this research, perceived susceptibility is an individual's "beliefs about the likelihood of getting a disease or condition" (Glanz, Rimer, & Viswanath, 2008, p. 47). For instance, how susceptible does a woman feel she is to delivering a preterm baby; or having a child with neural tube defects?

Perceived severity is outlooks about the "seriousness of contracting an illness or of leaving it untreated include evaluations of both medical and clinical consequences and possible

social consequences” (Glanz et. al, 2008, p. 47). For example, does a woman view the delivery of a preterm baby as a serious problem in terms of the baby’s health at birth?

Perceived benefits are an individual’s beliefs “regarding the various available actions for reducing the disease threat” (Glanz et. al, 2008, p. 47). For instance, a pregnant woman may be aware of alternatives to preventing a child born with neural tube defects, but she will choose the alternative that she perceives will have the most benefits, and produce her desired outcome, a healthy baby.

Perceived barriers are the possible negative facets of a particular health action. Perceived barriers to preconception care include access and availability of care, time, and cost (Stout, 1997). Psychosocial barriers to care include a lack of support from partner and ambivalence or ignorance toward preconception care.

Knowledge of Preconception Health

Delgado (2012) conducted research on reproductive health awareness among college students. The author surveyed 241 undergraduate students. The lack of distribution of preconception health information by physicians is supported by research conducted by the author. Of the female undergraduate students surveyed who had ever visited a gynecologist, 77 percent reported that the gynecologist had not discussed behaviors and exposures that are dangerous during pregnancy; and 86 percent reported that the gynecologist had not discussed the positive behaviors women can take to increase the likelihood of having a healthy baby (Delgado, 2012).

Mitchell, Levis, and Prue (2010) conducted similar research that examined 1,796 men’s and 940 women’s awareness of exposure to preconception health information and of specific preconception health behaviors. When asked if they had seen, heard, or read anything about

recommendations for preconception in the past year, 52 percent of men and 43 percent of women said they had not (Mitchell et al., 2010).

Females and Preconception Health

Helping young women ensure physical health before pregnancy is critically important. For an example, to prevent neural tube defects, consumption of folic acid is a behavior that must be initiated during the preconception period to be optimally effective (Delgado, 2012). The risk of neural tube defects is greatest when the neural tube is forming, approximately 19-27 days after conception (Delgado, 2012). Delgado's (2012) research on reproductive health awareness among male and female college students found that only 32 percent of students correctly identified folic acid as the substance that has been proven effective in reducing neural tube defects. DeJoy also found that college women have knowledge deficits about preconception health (DeJoy, 2014). Similarly Mitchell, Levis, and Prue (2010) found that only 22.2 percent of women reported receiving preconception health information from their health care provider.

Risk Behaviors for Preconception Health

Risk behaviors present prior to conception have the potential to place babies at risk for adverse outcomes. These preconception factors include "a woman's genetic risks, health status, medical and reproductive history, lifestyle, and exposure to medications, environmental toxins, and other potential teratogens" (Delgado, 2012, p. 240).

Tobacco use. Amasha and Jaradeh (2012) researched the effects of maternal smoking on pregnancy outcomes. "Smoking during pregnancy doubles the risk of having a low-birth weight baby and significantly increases the rate of perinatal morbidity." (Amasha & Jaradeh, 2012, p. 335) The researchers found that more than seventy percent of the subjects who were active smokers and 39.4 percent of the passive smokers reported having hypertension, anemia,

abruption placenta and/ or placenta previa (Amasha & Jaradeh, 2012). More than half (53.3%) of active smokers delivered pre-term baby. These researchers also found that smoking during pregnancy resulted in a significant increase in congenital abnormalities, fetal distress, and poor APGAR scores at the first and fifth minutes (Amasha & Jaradeh, 2012).

Alcohol use. The use of alcohol during pregnancy can lead to fetal alcohol spectrum disorders (FASDs) and other adverse pregnancy outcomes. FASDs have a whole range of effects, and the conditions can range from mild to severe in each person. The Centers for Disease Control and Prevention (2015) finds that a person with FASD might have:

- Abnormal facial features
- Small head size
- Shorter-than-average height
- Low body weight
- Poor coordination
- Hyperactive behavior
- Difficulty with attention
- Poor memory
- Difficulty in school
- Learning disabilities
- Speech and language delays
- Intellectual disability
- Poor reasoning and judgement skills
- Sleep and sucking problems as a baby
- Vision or hearing problems

- Problems with the heart, kidney, or bones

Tan and associates (2015) found that one in ten pregnant women reported consuming alcohol in the past 30 days and one in 33 reported binge drinking. “Among all women who reported binge drinking, pregnant women reported a higher frequency of binge drinking than non-pregnant women.” (Tan et al., 2015, p. 1043)

Inadequate folic acid intake. Congenital abnormalities in babies are associated with folate deficiency. Supplementation with folic acid before and after conception has been known to reduce the risk of neural tube defects in babies. Certain behavioral factors such as smoking cigarettes, using alcohol, or using oral contraceptives are also associated with poor folic acid intake (Scholl & Johnson, 2000).

Women of reproductive age are not regularly taking supplements. National Health and Nutrition Examination Survey (NHANES I) data in the United States suggests limited supplement use by women of reproductive age. Overall, only one-quarter of women reported regularly taking vitamin or mineral supplements (Scholl & Johnson, 2000).

In 2007 the Centers for Disease Control and Prevention staff collected data about the use of supplements containing folic acid among women of childbearing age in the United States. Among the women who reported taking supplements, 40 percent reported taking folic acid daily (CDC, 2016). However among all women of childbearing age, only 12 percent reported knowing that folic acid should be taken before pregnancy (CDC, 2016).

Obesity. Overweight and obese women are at an increased risk for pregnancy complications such as gestational diabetes, pre-eclampsia and fetal growth disorders (Kennedy et. al., 2016). In addition, maternal obesity is also a risk factor for miscarriages as well as for unexplained stillbirths (Leddy et. al., 2008).

Diabetes. Diabetes is the most commonly experienced medical complication during pregnancy, “representing 3.3 percent of all live births” (American Pregnancy Association, 2016, para 1). Reproductive aged women who are considering conception should talk to their health care provider to develop a healthy meal plan. Proper nutrition will be essential for controlling blood sugar levels. Making appointments with specialists who work with high risk pregnancies will also be important.

Recommendations to Improve Preconception Health and Health Care

In 2006 the Centers for Disease Control and Prevention provided recommendations to improve both preconception health and care (CDC, 2006). The recommendations are aimed at achieving four goals:

Goal One: Improve the knowledge and attitudes and behaviors of men and women related to preconception health.

Goal Two: Assure that all women of childbearing age in the United States receive preconception care services (such as evidence-based risk screening, health promotion, and interventions) that will enable them to enter pregnancy in optimal health.

Goal Three: Reduce risks indicated by a previous adverse pregnancy outcome through interventions during the interconception period, which can prevent or minimize health problems for a mother and her future children.

Goal Four: Reduce the disparities in adverse pregnancy outcomes among all women of reproductive age.

The target population for preconception health and health care promotion is women of reproductive age. The following recommendations from the Centers for Disease Control and Prevention are aimed at achieving the goals listed above:

Recommendation One: Each woman, man, and couple should be encouraged to have a reproductive life plan.

Recommendation Two: Increase public awareness of the importance of preconception health behaviors and preconception care services by using information and tools appropriate across various ages; literacy, including health literacy; and cultural/linguistic contexts.

Recommendation Three: As a part of primary care visits, provide risk assessment and educational and health promotion counseling to all women of childbearing age to reduce reproductive risks and improve pregnancy outcomes.

Recommendation Four: Increase the proportion of women who receive interventions as follow-up to preconception risk screening, focusing on high priority interventions (that is, those with evidence of effectiveness and greatest potential impact).

Recommendation Five: Use the interconception period to provide additional intensive interventions to women who have had a previous pregnancy that ended in an adverse outcome (that is, infant death, fetal loss, birth defects, low birthweight, or preterm birth).

Recommendation Six: Offer, as a component of maternity care, one prepregnancy visit for couples and persons planning pregnancy.

Recommendation Seven: Increase public and private health insurance coverage for women with low incomes to improve access to preventive women's health and preconception and interconception care.

Recommendation Eight: Integrate components of preconception health into existing local public health and related programs, including emphasis on interconception interventions for women with previous adverse outcomes.

Recommendation Nine: Increase the evidence base and promote the use of the evidence to improve preconception health.

Recommendation Ten: Maximize public health surveillance and related research mechanisms to monitor preconception health.

Improving preconception health will require a change in attitudes, knowledge, and behaviors globally. The purpose of preconception care is to improve the health of each and every woman before pregnancy, optimizing the future health of the woman and her family.

Summary

I have reviewed the literature on the theoretical basis for this research, the Health Belief Model in chapter two. In addition I reviewed the literature about perceived knowledge on preconception health care and behaviors from men and women, females' knowledge about the risk factors relating to preconception health, and the recommendations by the Centers for Disease Control and Prevention to improve preconception health and health care. The research methodology for this study is presented in Chapter Three.

Chapter Three: Research Methodology

Introduction

The objective of this research was to determine selected reproductive-aged undergraduate women's knowledge of preconception health. The researcher investigated students' demographics and knowledge about preconception health practices. This chapter outlines the research design, participant selection, instrumentation, data collection, and data analysis of this research.

Research Design

The study was conducted using a cross sectional design with a self-report instrument, with a sample of Minnesota State University undergraduate students in spring semester 2017. A cross sectional study design was chosen to determine knowledge of preconception health among selected undergraduate women through a cross-sectional survey of the population. A survey was created to determine sampled undergraduate students' demographics, knowledge about preconception health, and barriers to practicing recommended behaviors. Students were asked to complete a 33-item survey in order to answer the following research questions:

- 1) What is the degree of knowledge of selected young, reproductive aged college women about preconception health?
- 2) What is the relationship between the degree of knowledge and practicing recommended preconception health behavior?
- 3) What are the barriers to preconception health behavior?
- 4) What is the difference between pregnancy plans and preconception health knowledge?
- 5) What is the difference between pregnancy history and preconception health knowledge?

Sample Selection

Prior to the collection of any data the Institutional Review Board (IRB) at Minnesota State University, Mankato approved the study (Appendix A). A total of 426 undergraduate female students participated. The researcher reviewed the 2017 spring semester schedule and identified classes consisting of 30 students or more throughout different academic disciplines. The researcher then contacted the instructors of those courses asking permission to distribute the survey to students during scheduled class time. Surveys were distributed in general education courses in health, sociology, and family consumer science.

Participants were required to be of legal age of consent (18 years) and identify as female. The participants received a copy of the consent form (see Appendix B) to keep for their own record. The participants did not receive any incentives for completing the survey. The researcher had permission from the instructors to distribute the paper survey during their regularly scheduled class time.

Instrumentation

The survey questions were based upon reviewed literature. A 33-item survey related to preconception health was developed for use in this study (see Appendix C). Twenty of the questions were created by the researcher and 13 questions were modified from Dr. Sarah Rodgers' "Women's Preconception Health Survey" distributed at the University of Nottingham (Rodgers, n.d.).

The survey instrument consisted of four sections. The first section identified the participant's preconception health practices. The second section identified the barriers to practicing recommended preconception health behaviors. The third section of the survey consisted of questions relating to the participant's preconception health knowledge. The fourth

section asked questions about participants' views about women's health and pregnancy. For these questions participants were asked to answer the questions using a three-point Likert Scale (agree to disagree).

Data Collection

Permission was obtained in advance from the instructors of the sampled classes to distribute the survey in their classes. The researcher informed students in each selected class that the data would remain confidential and that participation in the research was optional. The researcher read the consent form (see Appendix B) aloud to each class and all participants were given a copy to keep for their own record. The consent statement contained information on the purpose of this study, potential risks, and the participants' rights regarding their voluntary participation in the study. Participants were given the paper survey and consent form during regularly scheduled class time. Survey completion took less than ten minutes. Data was collected between January and March 2017.

Data Analysis

The research questions are described in Table 1. The findings were analyzed quantitatively using a descriptive analysis of the survey. Data was entered into SPSS for analysis by the researcher.

In order to determine the degree of knowledge of selected young, reproductive aged college women about preconception health the researcher reported the mean score and the standard deviation for the knowledge questions. Questions 15-33 pertain to this research question.

The second research question regards the relationship between the degree of knowledge and practicing recommended preconception health behaviors. This is answered by questions

seven through thirteen on the survey instrument. The researcher used a Pearson r correlation to analyze these findings.

The third research question addresses the barriers to practicing preconception health behavior. This is answered by question 14 on the survey instrument. Frequency data was used to determine the most commonly experienced barriers by undergraduate women.

The fourth research question looked at the difference between pregnancy plans and preconception health knowledge. This was answered by question four on the survey instrument. An ANOVA was used to analyze the difference between pregnancy plans and preconception health knowledge.

The fifth research question asked about the difference between pregnancy history and preconception health knowledge. Question five on the survey instrument answers this question. An independent t-test was used to analyze the difference. The results of the analyses are discussed in Chapter Four.

Table 1

Table of Specifications

Research Question	Survey items or methods used to assess RQ's	Level of Data (Nominal, Ordinal, Interval/Ratio)	Analysis needed to assess RQ
What is the degree of knowledge of selected young, reproductive aged college women about preconception health?	Questions 15-33	Interval	Descriptive statistics
What is the relationship between the degree of knowledge and practicing recommended preconception health behavior?	Questions 7-13	Nominal	Independent t-test
What are the barriers to preconception health behavior?	Question 14	Nominal	Frequency statistics
What is the difference between pregnancy plans and preconception health knowledge?	Question 4	Nominal	ANOVA
What is the difference between pregnancy history and preconception health knowledge?	Question 5	Nominal	Independent t-test

Chapter Four: Findings and Discussion

Introduction

The purpose of this research was to determine selected reproductive-aged undergraduate women's knowledge of preconception health. The study attempted to answer the following research questions.

- 1) What is the degree of knowledge of selected young, reproductive aged college women about preconception health?
- 2) What is the relationship between the degree of knowledge and practicing recommended preconception health behavior?
- 3) What are the barriers to preconception health behavior?
- 4) What is the difference between pregnancy plans and preconception health knowledge?
- 5) What is the difference between pregnancy history and preconception health knowledge?

Data for this study was collected in person using a 33-item printed survey. This chapter discusses findings obtained from the quantitative analysis of the data. The findings are organized in correspondence to each research question.

Analysis and Interpretation of the Data

The findings of the study include data from female students enrolled in four health and the environment courses, four drug education courses, two first aid and CPR courses, one personal and family living course, one introduction to sociology course, and one behavior change foundations and strategies course. A total of 426 surveys were administered through the process.

Demographic Results

Table 2 represents the demographic characteristics of participants of the research study. Participants included traditional and non-traditional undergraduate students. Table 2 shows 426

female participants were analyzed for this survey. The mean age of the participants was 19.48 years old ($SD=1.76$), with a minimum age of 18 and a maximum age of 38 years of age. The ethnicity distribution of this sample consisted of 80.8% Caucasian ($n=344$), 2.1% Hispanic or Latino ($n=9$), 6.1% Black or African American ($n=26$), 6.3% Asian or Asian American ($n=27$), .9% American Indian or Alaskan Native ($n=4$), and 3.8% self-identified as Biracial ($n=16$).

Table 2

Demographic Characteristics of Participants

Characteristics	n	%	M (SD)
Gender	426		
Female	426	100%	
Age	426		
18	113	26.5%	19.48 (1.76)
19	157	36.9%	
20	81	19.0%	
21	43	10.1%	
22	17	4.0%	
23	8	1.9%	
25	2	0.5%	
26	1	0.2%	
27	1	0.2%	
29	1	0.2%	
30	1	0.2%	
38	1	0.2%	

Demographic Characteristics of Participants

Ethnicity	426	
White or Caucasian	344	80.8%
Hispanic or Latino	9	2.1%
Black or African American	26	6.1%
Asian or Asian American	27	6.3%
American Indian/Alaskan Native	4	0.9%
Biracial	16	3.8%
Relationship Status	426	
Single, and not interested in dating	59	13.8%
Single, and interested in a dating relationship	132	31.0%
Single and looking for a sexual relationship	6	1.4%
In a relationship	225	52.8%
Married	4	0.9%
Plans about Getting Pregnant	426	
No plans at present time	310	72.8%
Currently trying	1	0.2%
Considering in next 1 to 2 years	7	1.6%
Considering in next 3 to 5 years	108	25.4%
Have tried and unable to get pregnant	0	0.0%

Findings Related to Research Questions

The following section describes the findings of the study related to the research questions.

Research Question One: What is the degree of knowledge of selected young, reproductive aged college women about preconception health?

Participants were asked to answer 22 questions on the survey measuring their preconception health knowledge. Participants were asked to answer multiple choice, true or false, and Likert scale questions. There was a correct answer for each question, and a knowledge score was calculated for each participant. A maximum score of 48 could be achieved. A frequencies distribution with mean scores, standard deviation, with minimum and maximum scores was computed. Respondents had a mean score of 42.85 (SD=2.68), indicating that respondents had a high level of knowledge regarding preconception health practices and information. Fourteen subjects' data was lost on the knowledge test due to missing data. This is a very low rate of attrition (n=412).

Research Question Two: What is the relationship between the degree of knowledge and practicing recommended preconception health behavior?

In order to determine the relationship between knowledge and behavior, a Pearson r correlation was conducted. Respondents' knowledge scores were statistically significant and correlated with their preconception health practices and behaviors. $r=.176$, $p=.000$. As knowledge scores increased, their preconception health practice and behaviors scores also increased.

Research Question Three: What are the barriers to preconception health behavior?

The greatest reported barrier to practicing recommended preconception health behavior was lack

of knowledge, at 49.2% of participants stating this as a difficulty. Cost was the second highest rated barrier at 35.8%. See Table 3 for an account of the reported barriers.

Table 3

Reported Barriers to Practicing Recommended Preconception Health Behavior

Barrier	No	Yes
Cost	64.2	35.8
Lack of Knowledge	50.8	49.2
Lack of Interest	81.1	18.9
Laziness	77.4	22.6
Daily Schedule	64.9	35.1
Time Constraints	70.1	29.9
Other*	97.9	2.1

Other responses included religion, not sexually active, health problems, no insurance, and don't want children.

Research Question Four: What is the difference between pregnancy plans and preconception health knowledge?

In order to determine if there were any significant differences between knowledge and pregnancy plans, a One Way ANOVA was performed. When comparing the groups for pregnancy plans and their knowledge score, no statistically significant differences were found between the groups.

F=1.141, p=.33.

Research Question Five: What is the difference between pregnancy history and preconception health knowledge?

An independent t-test was performed to determine if there were any significant differences between pregnancy history and knowledge score. No statistically significant differences were found $t=.770$, $p=.442$

Other Findings

Knowledge and Behavior scores were compared to Ethnicity, Relationship Status and Pregnancy Plans using a Univariate ANOVA, Roy's Largest Root with a Tukey's B Post Hoc test. Findings revealed that those who were single and looking for sex had a significantly lower mean score on the knowledge test when compared to all other groups $F=5.461$, $p=.000$. See Table 4.

Table 4

Relationship Status and Knowledge Score

Relationship Status	Knowledge Score
Single and looking for sex	40.83
Single and interested in dating	42.37
Single and not interested in dating	42.80
In a relationship	43.16
Married	44.75

When comparing the different ethnicities, Asian or Asian Americans had significantly lower knowledge scores when compared to all other ethnic groups $F=2.3197$, $p=.043$. See Table 5.

Table 5

Ethnicity and Knowledge Score

Ethnicity	Knowledge Score
Asian or Asian American	41.07
Black or African American	41.95
Hispanic or Latino	42.33
White or Caucasian	43.01
Biracial	43.62
American Indian/Alaskan Native	44.66

When analyzing participants' current health behaviors as they relate to preconception health, it was found that most students are engaging in healthy behaviors. See Table 6.

Table 6

Percentage of Students Engaging in Health Behaviors

Health Behavior	Yes	No
Smoking	7.3	92.7
Exercise	81.6	18.4
Binge-drinking	26.1	73.9
Illicit drug use	13.4	86.6
Contraceptive use	50.6	49.4
Folic acid	7.8	92.2
Daily fruit and vegetable consumption	56.7	43.3

Summary

The focus of this study was to identify selected reproductive-aged undergraduate women's knowledge of preconception health. The researcher assessed knowledge of undergraduate women's preconception health by knowledge score. The researcher also looked at the relationship between the degree of knowledge and practicing recommended preconception health behavior. In addition, barriers women are experiencing to practicing preconception health behavior were identified. Lastly, the study looked at the difference between pregnancy plans and pregnancy history, and preconception health knowledge.

Respondents had a mean score of 42.85 (2.68) on the knowledge section of the survey; indicating that respondents had a high level of knowledge regarding preconception health practices and information.

Respondents' knowledge scores were statistically correlated with their preconception health practices and behaviors. $r=.176$, $p=.000$. As knowledge scores increased, preconception health practice and behaviors scores also increased. When analyzing participants' current health behaviors as they relate to preconception health, it was found that most students are engaging in healthy behaviors.

The greatest reported barrier to practicing recommended preconception health behavior was lack of knowledge, with 49.2% of participants stating this as a difficulty. Cost was the second highest rated barrier at 35.8%.

Findings revealed that those who were single and looking for sex had a significantly lower mean score on the knowledge test when compared to all other groups, $F=5.461$, $p=.000$. When comparing the different ethnicities, Asian or Asian Americans had significantly lower knowledge scores when compared to all other ethnic groups, $F=2.3197$, $p=0.43$. The summary, conclusions, and recommendations are provided in Chapter Five.

Chapter Five: Summary, Conclusions, and Recommendations

Summary

A goal of Healthy People 2020 is to improve preconception health and behaviors. Preconception health is a woman's health before she becomes pregnant. It means knowing and understanding how preexisting health conditions and risk factors could affect a woman or her unborn child if she becomes pregnant (Office on Women's Health, 2010). There is a need to shift care to the time before a child is conceived, which will allow for greater potential to prevent birth defects and other adverse pregnancy outcomes.

Helping young women ensure physical health before pregnancy is critically important. For an example, to prevent neural tube defects, consumption of folic acid is a behavior that must be initiated during the preconception period to be optimally effective (Delgado, 2012). The risk of neural tube defects is greatest when the neural tube is forming, approximately 19-27 days after conception (Delgado, 2012). Consistent with the reviewed literature, finding that women of reproductive age do not take daily supplements; in this research, 92.2 percent of respondents reported that they do not consume folic acid. It is concerning women are not consuming this vitamin through a daily supplement or in their everyday diet.

Previous studies exploring the degree to which reproductive-aged women are informed on preconception health have demonstrated that many are unaware of the recommended practices. However, the majority of women surveyed indicated that they had a high level of awareness of preconception health behavior and practices.

In this study, consisting of primarily Caucasian female participants, undergraduate students were asked to answer questions about their preconception health knowledge and practices. The research found by assessing the mean score of the participants, undergraduate

women have a high level of knowledge regarding preconception health practices and information. Respondents' knowledge scores were significantly correlated with their preconception health practices and behaviors. $r=.176$, $p=.000$. As knowledge scores increased, preconception health practice and behaviors scores also increased. When analyzing participants' current health behaviors as they relate to preconception health, it was found that most students are engaging in healthy behaviors.

The Health Belief Model suggests that the probability of a person practicing a certain health-related behavior depends on their perceptions of barriers to practicing the behavior. The greatest reported barrier to practicing recommended preconception health behavior was lack of knowledge, with 49.2% of participants stating this as a difficulty. Cost was the second highest rated barrier at 35.8 percent.

Conclusions

In this study, a relationship between knowledge score and preconception health practice and behaviors scores was found among female undergraduate students at Minnesota State University, Mankato. The more participants knew about preconception health the more likely they were to practice healthy preconception behaviors.

Recommendations

Recommendations for health educators and future research are in the following section.

Recommendations for Health Educators

Undergraduate women's awareness across the many areas of preconception health illuminate the importance of information provided to young women regarding this health topic. It is clear that we care about our future babies in the United States, and young women are retaining the information they have learned about best preconception health practices. The majority of

women are even practicing healthy behaviors related to preconception health. Of the females sampled 81.6 percent reported exercising and 56.7 percent reported consuming daily recommended fruits and vegetables. Early education on this topic may be beneficial in preventing adverse birth outcomes for mothers and infants in the United States. Even if pregnancy is not being planned at the present time, we know how nearly half of pregnancies are unintended. Learning how to establish a healthy lifestyle and take care of your body is not just beneficial for preconception health, but for all other aspects of health.

Health educators must reinforce the importance of consuming folic acid and having an overall healthy lifestyle. Health educators should continue to promote healthy preconception practices and behaviors. The study has found that females are retaining the information they've heard about preconception health, and the more they know the more they are practicing recommended behaviors.

Recommendations for Future Research

Modifying the survey instrument to include more questions about the knowledge of risk behaviors associated with preconception health would be beneficial for future research. Finding the gaps in knowledge would be beneficial for tailoring education programs and information for reproductive-aged women. It is clear from the findings that knowledge leads the practice of healthy preconception behaviors, and the prevention of adverse pregnancy outcomes for mothers and infants.

Further research should include males as subject samples to see how the knowledge and information gaps compare. Preconception health is not a topic specific to women, and research including both genders could benefit everyone on the health care continuum. There is significant opportunity for continued research on this up and coming important health topic.

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Appendices

Appendix A

Institutional Review Board Letter of Approval



January 27, 2017

Dear Autumn Hamilton:

Re: IRB Proposal entered [1016148-2] Preconception Health Knowledge Among Undergraduate Reproductive-Aged Women*
Review Level: Level [I]

Your IRB Proposal has been approved as of January 27, 2017. On behalf of the Minnesota State University, Mankato IRB, we wish you success with your study. Remember that you must seek approval for any changes in your study, its design, funding source, consent process, or any part of the study that may affect participants in the study. Should any of the participants in your study suffer a research-related injury or other harmful outcome, you are required to report them to the Associate Vice-President of Research and Dean of Graduate Studies immediately.

When you complete your data collection or should you discontinue your study, you must submit a Closure request (see <http://grad.msu.edu/irb/continuation.html>). All documents related to this research must be stored for a minimum of three years following the date on your Closure request. Please include your IRBNet ID number with any correspondence with the IRB.

Sincerely,

Handwritten signature of Mary Hadley in black ink.

Mary Hadley, Ph.D.
IRB Coordinator

Handwritten signature of Jennifer Veltos in black ink.

Jennifer Veltos, Ph.D.
IRB Co-Chair

Handwritten signature of Julie A. Carlson in black ink.

Julie Carlson, Ed.D.
IRB Co-Chair

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Generated on IRBNet

Appendix B

Survey Consent Form

SURVEY CONSENT

Female students are invited to participate in a research study supervised by Dr. Autumn Hamilton on undergraduate women's knowledge of preconception health. This survey should take about 5-10 minutes to complete. The goal of this survey is to understand the degree of knowledge reproductive-aged women have of preconception health practices. You will be asked to answer questions about that topic. If you have any questions about the research, please contact Dr. Autumn Hamilton at autumn.hamilton@mnsu.edu.

Participation is voluntary. You have the right to stop taking this survey at any time. Participation or nonparticipation will not impact your relationship with Minnesota State University, Mankato. If you have any questions about the treatment of human participants and Minnesota State University, Mankato, contact the IRB Administrator, Dr. Barry Ries, at 507-389-1242 or barry.ries@mnsu.edu.

Potential risk and mitigation strategies are as follows: 1) Some consider the collection of demographic data to be a potential breach in confidentiality/anonymity. Mitigation strategy-No identifying marks or person-identifying information (other than demographic items) will be collected. Responses will be anonymous. However, there is always the risk of compromising privacy, confidentiality, and/or anonymity when taking surveys in the classroom. None of your answers will be released and no names will be recorded. Original surveys will be kept in the Principal Investigators locked office until May 5, 2017 at which time they will be shredded. All data will be stored on a password protected computer. Further, only the Primary Investigator and student investigator will have access to the data. The risks of participating are no more than are experienced in daily life. There are no direct benefits to you as a result of participation in this research.

Returning the completed survey will indicate your informed consent to participate and indicate your assurance that you are at least 18 years of age.

Please keep a copy of this page for your future reference.

MSU IRBNet ID #1016148

Date of MSU IRB approval: 1/27/2017

Appendix C
Survey Instrument

Survey of Preconception Health Knowledge Among Undergraduate Women

Please take your time to answer the following questions honestly and completely.

Preconception health is a woman's health before she becomes pregnant. It means understanding how health conditions and risk factors could affect a woman and her baby if she becomes pregnant (Office on Women's Health, 2010).

1) How old are you (years)? _____

2) Please check your ethnicity or cultural group?

_____ **A) American Indian/ Alaskan Native**

_____ **B) Asian or Asian American**

_____ **C) Black or African American**

_____ **D) Hispanic or Latino**

_____ **E) White or Caucasian**

3) What is your current relationship status? Please check one.

_____ **A) Single, and not interested in dating**

_____ **B) Single, and interested in a dating relationship**

_____ **C) Single and looking for a sexual relationship**

_____ **D) In a relationship**

_____ **E) Married**

4) What are your plans about getting pregnant? Please check one.

_____ **A) No plans at present time**

_____ **B) Currently trying**

_____ **C) Considering in next 1 to 2 years**

_____ **D) Considering in next 3 to 5 years**

_____ **E) Have tried and unable to get pregnant**

5) Have you ever been pregnant?

_____ A) Yes

_____ B) No

6) If you have been pregnant, were previous pregnancies planned?

_____ A) Yes

_____ B) No

7) Have you visited a physician in the past year?

_____ A) Yes

_____ B) No

8) Have you had a Pap test in the past year?

_____ A) Yes

_____ B) No

9) Have you seen a dentist in the past year?

_____ A) Yes

_____ B) No

10) Has your doctor ever spoken to you about preconception health?

_____ A) Yes

_____ B) No

11) Do you consume 400 mcg of folic acid daily through supplements or foods?

_____ A) Yes

_____ B) No

12) Do you know your family health history?

_____ **A) Yes**

_____ **B) No**

13) Do you currently perform any of the following? Check all that apply.

_____ **A) Smoke**

_____ **B) Exercise**

_____ **C) Binge-drink (4 or more drinks per occasion)**

_____ **D) Illicit recreational or prescription drug use**

_____ **E) Contraceptive use**

_____ **F) Folic acid intake**

_____ **G) Recommended daily fruit and vegetable consumption (3 servings of each)**

14) What are the barriers to practicing recommended preconception health behaviors?

Check all that apply.

_____ **A) Cost**

_____ **B) Lack of knowledge**

_____ **C) Lack of interest**

_____ **D) Laziness**

_____ **E) Daily schedule**

_____ **F) Time constraints**

_____ **G) Other (please specify) _____**

Preconception Health Knowledge**Please check one answer which you believe to be correct.****15) Preconception health is only important for those who have health problems.** A) True B) False**16) A female has decided to start trying to conceive. When should she visit an obstetrician?** A) Now, before conception occurs B) At the time she discovers she is pregnant? C) After three months of pregnancy D) Unsure**17) When should prenatal vitamin use be started?** A) During ovulation B) When a female discovers she is pregnant C) After the first doctor's appointment D) 2-3 months before conception**18) Which one of the following could be effective in reducing the risk of birth defects?** A) Folic acid B) Iron C) Calcium D) Unsure**19) Only pregnant women need to consume folic acid.** A) True B) False

20) Women who are overweight (Body Mass Index 25-29.9) or obese (Body Mass Index > 30) before getting pregnant have increased risks of:

Check True or False for each option below.

- | | | |
|--|------------|-------------|
| A) Not being able to conceive children | True _____ | False _____ |
| B) Diabetes | True _____ | False _____ |
| C) Cesarean section (C-section) | True _____ | False _____ |
| D) Birth defects | True _____ | False _____ |

The following questions were adapted from Dr. Sarah Rodgers' "Women's Preconception Health Survey" distributed at the University of Nottingham.

For each statement please check one answer.

1) Folic acid should be taken before pregnancy.

Disagree _____ Unsure _____ Agree _____

2) Smoking while pregnant does NOT harm the baby.

Disagree _____ Unsure _____ Agree _____

3) Prescription and non-prescription medications need to be reviewed with your doctor before pregnancy.

Disagree _____ Unsure _____ Agree _____

4) It is important to achieve and maintain good health before pregnancy.

Disagree _____ Unsure _____ Agree _____

5) Prior to a pregnancy, a woman and her partner should review their family history and genetic history with their doctor.

Disagree _____ Unsure _____ Agree _____

6) The age of the mother is NOT important to the outcome of the baby.

Disagree _____ Unsure _____ Agree _____

7) Certain foods should be avoided when considering pregnancy.

Disagree _____ Unsure _____ Agree _____

8) **One alcoholic drink a day will NOT harm the baby in the early stages of pregnancy.**

Disagree _____ Unsure _____ Agree _____

9) **Regular exercise can harm an unborn child.**

Disagree _____ Unsure _____ Agree _____

10) **A woman's immunizations should be up to date before she becomes pregnant.**

Disagree _____ Unsure _____ Agree _____

11) **It is important to have appropriate testing to rule out significant infectious diseases before becoming pregnant.**

Disagree _____ Unsure _____ Agree _____

12) **Recreational drugs such as marijuana or cocaine should not be used when considering conception.**

Disagree _____ Unsure _____ Agree _____

13) **When considering becoming pregnant, the cat litter box should be avoided.**

Disagree _____ Unsure _____ Agree _____