

INCREASING PROVIDER AWARENESS AND KNOWLEDGE ABOUT PRECONCEPTION
CARE TO WOMEN OF REPRODUCTIVE AGE

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Increasing Provider Awareness and Knowledge about Preconception Care
to Women of Reproductive Age

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North Dakota State University's regulations and meets the accepted
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ABSTRACT

Infant morbidity and mortality are important indicators of the overall health of a nation. The United States ranks 26th among 29 developed countries, with an infant mortality rate of 6.1 per 1,000 live births (MacDorman, Mathews, Mohangoo, & Zeitlin, 2014). One explanation for such high rates is due to the fact that healthcare providers have failed to intervene before pregnancy to assess and modify maternal behaviors that contribute to adverse pregnancy outcomes (Atrash, Johnson, Adams, Cordero, & Howse, 2006). A proposed solution to decreasing infant mortality in the U.S. is to improve the health of women prior to pregnancy through the use of preconception care. Preconception care is defined as a set of interventions that seek to identify and modify risk factors to a woman's health that have the potential to affect pregnancy outcomes (Centers for Disease Control and Prevention, 2006).

A continuing education module aimed at increasing healthcare provider awareness and understanding of preconception care was developed in collaboration with the American Association of Nurse Practitioners Continuing Education Center. The overall objectives of the module were to heighten provider awareness about the importance of preconception care, increase provider understanding about the components of preconception care, enhance provider confidence in providing preconception care, and promote provider intent to incorporate preconception care into routine practice. The module includes information related to preconception care benefits, reproductive planning, maternal assessment, and counseling.

The module was evaluated through a series of pretest, posttest, and evaluation questions and had a total of 176 participants. After completing the module, over 80% (n=147) of respondents reported they were likely to incorporate preconception care into every encounter they have with women of reproductive age and over half (57.6%; n=102) stated they would

modify their practice, representing an increase in provider confidence and intent to incorporate preconception care into routine practice. A comparison of pretest and posttest answers reveals a rise in the percentage of correct answers, providing evidence of an increase in awareness and knowledge as a result of the learning intervention.

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DEDICATION

This dissertation is dedicated to my father, who always encouraged me to use my knowledge and skills to pursue my dreams. I will forever admire his determination and value his guidance. I'd also like to thank my mother for her continued love and support through this process. The lessons I've learned from my parents throughout my life have helped to get me where I am today. This dissertation is also dedicated to my husband, Jayme, my best friend and biggest source of encouragement. His sense of humor, patience, and unconditional love have gotten me through even the most challenging moments of this process. Lastly, I'd like to thank my classmates for their support, reassurance, and honesty. I feel so grateful to have had them in this journey and blessed for the opportunity to make lifelong friendships along the way.

TABLE OF CONTENTS

ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	v
DEDICATION.....	vi
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
CHAPTER ONE. INTRODUCTION.....	1
Background and Significance.....	1
The Problem with the Current Delivery of Preconception Care.....	3
Barriers.....	5
Objectives and Purpose of Project.....	6
CHAPTER TWO. LITERATURE REVIEW AND THEORITICAL FRAMEWORK.....	8
Introduction.....	8
Preconception Health Components.....	9
Screening Tools and Interventions Currently Used in Practice.....	14
Theoretical Framework.....	16
CHAPTER THREE. PROJECT DESCRIPTION.....	19
Project Design.....	19
Project Development.....	21
Project Implementation.....	21
Institutional Review Board.....	22
Data Collection.....	22
CHAPTER FOUR. EVALUATION.....	24
Logic Model.....	24

Objective One.....	25
Objective Two.....	26
Objective Three.....	26
Objective Four.....	27
Overall Evaluation.....	27
CHAPTER FIVE. RESULTS.....	28
Presentation of Findings.....	28
Objective One.....	30
Objective Two.....	31
Objective Three.....	33
Objective Four.....	33
Overall Evaluation.....	35
CHAPTER SIX. DISCUSSION AND RECOMMENDATIONS.....	36
Interpretation of Results.....	36
Limitations.....	38
Recommendations.....	39
Implications for Practice.....	41
Implications for Future Research.....	42
Application to Other Nurse Practitioner Roles.....	43
REFERENCES.....	45
APPENDIX A. PENDER’S HEALTH PROMOTION MODEL DIAGRAM.....	49
APPENDIX B. AANP APPROVAL LETTER.....	50
APPENDIX C. INSTITUTIONAL REVIEW BOARD APPROVAL LETTER.....	51
APPENDIX D. PRETEST.....	52
APPENDIX E. POSTTEST.....	54

APPENDIX F. EVALUATION QUESTIONS	56
APPENDIX G. LOGIC MODEL	59
APPENDIX H. MODULE OBJECTIVE AND ASSESSMENT QUESTIONS	60
APPENDIX I. FURTHER EVALUATION QUESTIONS	62
APPENDIX J. EXECUTIVE SUMMARY	63
Background	63
Project Summary	64
Results	64
Recommendations	66

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Participant Demographics.....	29

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Module Design Based on Health Promotion Model.....	20
2. Awareness and Knowledge Questions.....	32
3. Participant Rating of Perceived Awareness, Knowledge, and Confidence	33
4. Amount of Time Participants Utilized Preconception Care Prior to Intervention.....	34

CHAPTER ONE. INTRODUCTION

Background and Significance

Infant mortality and morbidity are important indicators of the health status of women both before and during pregnancy. Globally, infant mortality rates can provide information about the health of a nation. In 2010, the infant mortality rate in the United States (U.S.) was 6.1 per 1,000 live births (MacDorman et al., 2014). The U. S. ranked 26th among 29 developed countries in infant mortality, behind most European and Asian countries, Australia, and New Zealand (MacDorman et al., 2014). Prematurity, low birthweight, and birth defects also play an important role in determining infant health. In 2012, 8% of infants in the U.S. were born with a low birthweight, defined as less than 2500 grams, and 11.5% of infants were born premature, defined as being born before 37 weeks (Martin, Hamilton, Osterman, Curtin, & Mathews, 2013). About 3% of babies in the U.S. are born with some kind of birth defect, accounting for nearly 20% of all infant deaths (Centers for Disease Control and Prevention, 2014a). In addition to rising infant morbidity and mortality rates, the rate of maternal mortality rates has nearly doubled in the past 25 years (Hurst & Linton, 2015).

According to Atrash et al. (2006), one of the reasons that progress in improving pregnancy outcomes has slowed down in this country is due to that fact that healthcare providers have failed to intervene before pregnancy to detect, manage, modify, and control maternal behaviors that contribute to adverse maternal and infant outcomes. One solution to decreasing infant morbidity and mortality in the U.S. is to improve the health of women of childbearing age, which includes women ages 14 to 50, prior to pregnancy through the use of preconception care (Hurst & Linton, 2015). Preconception care is recognized as a critical component of healthcare and "aims to promote the health of women of reproductive age before conception and thereby

improve pregnancy related outcomes" (Centers for Disease Control and Prevention, 2006).

Although several definitions for preconception care exist, the Centers for Disease Control and Prevention (CDC) defines preconception care as "a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management" (Centers for Disease Control and Prevention, 2006).

Preconception risk assessments and interventions are traditionally completed at one scheduled preconception visit to women who are desiring a pregnancy. The visit may or may not be covered by a woman's insurance. However, because nearly 50% of all pregnancies in the U.S. are unintended, about half of all women could miss this vital education (Hillemeier, Weisman, Chase, Dyer, & Shaffer, 2008; Moos, Dunlop, Jack, Nelson, Coonrod, Long, Boggess, & Gardiner, 2008). Unintended pregnancies occur as a result of lack of contraception use, imperfect use of contraception, and contraceptive failure (Moos et al., 2008). In fact, a study published in the American Journal of Obstetrics and Gynecology found that 48% of unintended pregnancies occur in a month when women report that contraception was actually used (Moos et al., 2008). Unintended pregnancies cost the U.S. around \$11 billion per year and are associated with higher rates of elective abortions, later entry into prenatal care, maternal depression, increased risk for intimate partner violence during pregnancy, low birthweight, child abuse and neglect, and behavioral problems in children later in life (Healthy People 2020, 2014; Moos et al., 2008). Furthermore, even if a pregnancy is planned, a study done by Williams, Zapata, D'Angelo, Harrison, and Morrow (2011), found that only 32.4% of women actually utilized the initial preconception visit before becoming pregnant. Although many women understand the importance of prenatal care during pregnancy, few women understand the consequences that negative health behaviors can have prior to pregnancy (Centers for Disease Control and

Prevention, 2006). The greatest chance for fetal harm can occur as early as 17-56 days after conception (Centers for Disease Control and Prevention, 2014b), often before a woman even realizes she is pregnant and typically before she is even seen for her first prenatal appointment (Centers for Disease Control and Prevention, 2006). The first 10-12 weeks of a pregnancy are a crucial time when many of the fetal organs are being developed (Atrash et al., 2006). Exposure to toxins during this time can have a detrimental effect on the fetus, and many interventions that aim to prevent birth defects or adverse infant outcomes are ineffective if initiated after this time (Atrash et al., 2006). In order to provide the necessary screening and education to promote both the health of the woman and her future pregnancies, preconception care must take place at every encounter women of child bearing age have with their provider (Atrash et al., 2006).

The Problem with the Current Delivery of Preconception Care

Preconception care has been shown to increase daily consumption of multivitamins with folic acid prior to pregnancy, encourage earlier entry into prenatal care in women with intended pregnancies, promote cessation of drinking (Williams et al., 2011), promote weight loss in obese patients prior to pregnancy, and increase tobacco abstinence rates (Moos et al., 2008). Despite the potential for benefits that preconception care can have on the health of women and infants, research has shown that the amount of preconception care being provided to women varies greatly. According to Healthy People 2020 (2014), only about 30% of women reported receiving preconception counseling from a healthcare provider and only about 50% of the women reported their provider had discussed pregnancy planning with them in the past 12 months (Hillemeier et al., 2008). Only 20% of patients taking potentially teratogenic medication reported receiving counseling regarding the potential for adverse effects of medication use during pregnancy (Coffey & Shorten, 2014) and, in a study conducted by the March of Dimes, only one in four

women reported receiving folic acid recommendations, a critical component of preconception care, from their healthcare provider (Hillemeier et al., 2008). According to the 2009-2010 Pregnancy Risk Assessment Monitoring System from Minnesota, only 35.1% of patients reported discussing preconception health with a healthcare provider prior to pregnancy, 34.8% took a multivitamin with folic acid every day in the month prior to pregnancy, 32.8% reported not drinking alcohol in the three months prior to pregnancy, and 53.1% of women had a healthy BMI prior to pregnancy (Fishman, 2014). Such research suggests that preconception care is nowhere close to being provided to all women of reproductive age, necessitating a change in practice in order to improve pregnancy and infant outcomes.

Interventions that aim to increase provider awareness and knowledge about preconception care are necessary to facilitate its delivery. According to Williams et al. (2011), in order to broadly provide preconception care to women in their reproductive years, healthcare providers need education and training about how to incorporate preconception health components into routine visits. Although obstetricians and gynecologists (OB/GYNs) may be considered the specialty at the forefront of providing preconception counseling, primary care providers also play a critical role in the provision of preconception care (Dunlop et al., 2007). One study revealed that while only 55% of women saw an OB/GYN in the past year, 85% of the women reported some kind of provider visit in the past 12 months (Hillemeier et al., 2008), holding primary care providers just as accountable as other specialties for providing preconception care. Some patient surveys actually revealed that women prefer to receive preconception health information from their primary care providers compared to other disciplines (Dunlop et al., 2007). Although the concept of preconception care has been well articulated in the literature, the practice has not yet become a part of routine care for all primary

care providers (Dunlop et al., 2007), due in part to the fact that healthcare providers do not have the tools they need to implement what is known to work for improving preconception health (Atrash et al., 2006). Recommendations by the American Academy of Pediatrics (AAP), American College of Obstetrics and Gynecology (ACOG), and the CDC, address the knowledge gap by outlining specific preconception health care assessment topics and interventions that are evidence-based and can be used to formulate practice guidelines (Hillemeier et al., 2008).

Barriers

Several barriers that prevent healthcare providers from providing preconception care to women of reproductive age on a routine basis have been identified. The presence of these variables can help explain the reasoning behind the inconsistent utilization of preconception care among providers. The first of these variables is related to beliefs about capabilities. According to Mazza, Chapman, and Michie (2013), providers felt that they did not have the opportunity to provide preconception counseling because they often did not see women at the preconception stage. They also stated that when they did see women for annual visits, competing preventative care priorities made it difficult to address specific areas related to preconception (Coffey & Shorten, 2014). For example, many of the providers believed that neural tube defects were too rare to warrant substantial time and that counseling related to other matters, such as STI screening, were more compelling issues (Mazza et al., 2013). One of the biggest barriers identified by providers was a lack of time (Coffey & Shorten, 2014; Dunlop, Jack, & Frey, 2007; Williams et al., 2011). Many providers feared that taking the time to assess for and discuss the necessary aspects of preconception care would take longer than a standard visit (Mazza et al., 2013). In addition to time constraints, providers were also concerned that they did not have the knowledge and resources necessary to provide evidence-based care related to preconception

(Coffey & Shorten, 2014; Dunlop et al., 2007; Mazza et al., 2013). Other barriers include lack of third-party reimbursement and lack of patient awareness (Dunlop et al., 2007; Williams et al., 2011). Although many women are aware of the benefits of vitamin supplementation and avoidance of harmful substances during pregnancy, very few consider the effects that health and lifestyle can play on fertility and the health of their future babies (Hurst & Linton, 2015). To overcome these barriers, providers expressed a need for increased awareness about the importance of preconception care, increased education resources from more credible, unbiased organizations related to preconception care, and the availability of preconception care checklists in order to ensure that all areas related to preconception care were discussed (Mazza et al., 2013). The results of the study stress the need for the development of interventions that respond to the preconception care concerns of healthcare providers.

Objectives and Purpose of Project

The overall purpose of this practice improvement project (PIP) was to increase healthcare provider awareness about the importance of preconception care as well as their intent to incorporate preconception counseling as part of routine care. The primary objectives of this project are to: 1) Heighten provider awareness about the importance of preconception care delivery to all women of reproductive age, 2) Increase provider understanding about the components of preconception care that have the potential to affect future pregnancies, 3) Enhance provider confidence in providing preconception care on a routine basis in practice, and 4) Promote provider intent to incorporate preconception care in practice to all women of reproductive age.

In order to meet the objectives of the project, an educational module for healthcare providers caring for women of reproductive age was used. The hour-long continuing education

module was developed in conjunction with the American Association of Nurse Practitioners Continuing Education Center (AANP CE Center) and included components to improve primary care provider awareness and understanding of preconception care through the use of case studies, health promotion topics, and interventions related to maternal and fetal risks. The target audience for the module includes all healthcare providers caring for women of reproductive age.

Increasing healthcare provider knowledge about the components of preconception care may increase the likelihood of its delivery, improve effectiveness and efficiency of administration, improve quality of care, and decrease the amount of time needed to provide preconception care at each visit.

CHAPTER TWO. LITERATURE REVIEW AND THEORITICAL FRAMEWORK

Introduction

In 2002, several institutions, including the Institute of Medicine, the U.S. Public Health Service, AAP, ACOG, and the March of Dimes made successively stronger calls for improving preconception health (Preconception Health and Health Care Steering Committee, 2014). In 2006, the CDC published "Recommendations to Improve Preconception Health and Health Care-United States: A Report of the CDC/ATSDR Preconception Care Workgroup and the Select Panel on Preconception Care" that included ten core recommendations aimed to improve preconception health and pregnancy outcomes (Centers for Disease Control and Prevention, 2006). The recommendations include: 1) individual responsibility across the lifespan, 2) consumer awareness, 3) preventative visits, 4) interventions for identified risks, 5) interconception care, 6) prepregnancy checkup, 7) health insurance coverage for woman with low incomes, 8) public health programs and strategies, 9) research, and 10) monitoring improvements (Centers for Disease Control and Prevention, 2006). The goals of the recommendations set forth by the CDC are to 1) improve the knowledge and attitudes and behaviors of men and women related to preconception health, 2) assure that all women of childbearing age in the United States receive preconception care services that will enable them to enter pregnancy in optimal health, 3) 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, and 4) reduce the disparities in adverse pregnancy outcomes (Centers for Disease Control and Prevention, 2006).

Preconception Health Components

Several preconception risk factors have been identified as having the potential to negatively affect pregnancy outcomes and have been used to develop clinical practice guidelines (Centers for Disease Control and Prevention, 2006). Based on evidence-based research and expert opinion from the AAP and ACOG, the main components of preconception care have been grouped into four categories of interventions. These categories include: maternal assessment, vaccinations, screening for disease processes, and counseling (Atrash et al., 2006).

Maternal assessment. Maternal assessment includes evaluating a woman's BMI and overall health, including physical activity, diet, and nutrient intake (Jack, Atrash, Coonrod, Moos, O'Donnell, & Johnson, 2008). Providers should also inquire about a woman's reproductive life plan, including her desire to conceive or delay pregnancy (Jack et al., 2008). Assessing for substance abuse should be done at every encounter and include tobacco, alcohol, and illicit drug use (Jack et al., 2008). Obtaining a detailed family history is necessary to identify any risks of having a future infant with developmental delays, congenital anomalies, or other genetic disorders (Jack et al., 2008). A complete reproductive history should also be done on a regular basis that incorporates detailed information about previous pregnancies, including spontaneous or elective abortions, prior preterm delivery, prior cesarean delivery, uterine anomalies, and information about the woman's menstrual cycle (Jack et al., 2008). Prolonged exposure to mercury, lead, solvents, pollutants, pesticides, and soil and water hazards, as well as workplace and household exposures, especially to toxoplasmosis from cat litter or under cooked meat, should also be assessed (Hurst & Linton, 2015; Jack et al., 2008). Healthcare workers routinely exposed to radiation, nuclear medicine, and chemotherapies should be counseled on their risk of exposure should they become pregnant (Hurst & Linton, 2015). A detailed list of

both prescription and over the counter medications should be obtained in order to identify any medications that are contraindicated in pregnancy (Jack et al., 2008). Certain medications used to treat many common medical conditions, such as anticonvulsants, immune-modulators, and angiotensin converting enzyme inhibitors, can be potentially teratogenic. Healthcare providers need to be aware of the importance of replacing potentially teratogenic medications with safer options in women of reproductive age or, if the woman remains on the medication, to provide education about the importance of discontinuing the medication if the woman does become pregnant (Oberg, 2009). Lastly, women in the preconception period should also be screened for intimate partner violence, which can become more prevalent during pregnancy, as well as for social support and the presence of any financial concerns (Pepid Online, 2014).

Vaccinations. Exposures to certain diseases can be very harmful in pregnancy so it is important to assess immunization status of women at each clinic visit. Providers should document immunization status for MMR, Varicella, Tdap, HPV, influenza, and Hepatitis B (Jack et al., 2008). Rubella immunization should be offered to any women who have not been previously vaccinated or who are not immune. Because pregnant women cannot receive the vaccine, immunization should be done prior to pregnancy and those receiving the vaccine should be instructed not to become pregnant for three months after vaccination (Jack et al., 2008). Varicella is also contraindicated in pregnancy, necessitating screening efforts to be completed in the preconception period (Jack et al., 2008). The Tdap vaccine provides immunity from tetanus toxoid, which may be protective against neonatal tetanus, and from pertussis, which can help provide immunity to infants in the immediate postpartum period (Jack et al., 2008). Current recommendations include a Tdap booster with each pregnancy (Centers for Disease Control and Prevention, 2013). Women under the age of 26 who have not had the HPV vaccine should

consider receiving the vaccine in the preconception period due to its potential to eliminate the need for procedures of the cervix during pregnancy that can contribute to cervical incompetency (Jack et al., 2008). Although immunization rates for the HPV vaccine have increased over the last decade, coverage rates for eligible women are still below 50%, and even lower for women of Asian, Hispanic, and African American ethnicities (Hurst & Linton, 2015). Influenza vaccination is recommended to any woman who may become pregnant during influenza season and to all those with an increased risk for influenza related complications (Jack et al., 2008). Hepatitis B vaccination is recommended to all high-risk women who have not been previously vaccinated prior to becoming pregnant in order to reduce the risk of passing the virus to their baby (Jack et al., 2008).

Disease processes. Women in the preconception period should be assessed for infectious diseases such as HIV, Hepatitis, Tuberculosis, and STIs such as gonorrhea, Chlamydia, syphilis, and herpes simplex virus (Jack et al., 2008). The CDC estimates that nearly 19 million new cases of STIs occur annually in the U.S., half of which occur among young adults, ages 15-24 years (Moos et al., 2008). Given the prevalence of STIs and their risk for serious health consequences in pregnancy, women should be screened at least annually and counseled based on individual risk factors (Moos et al., 2008). Chronic medical conditions in pregnancy are becoming increasingly common due to high rates of obesity, medical advances in infertility and chronic disease management, and an increase in the number of women conceiving after the age of 35 (Coffey & Shorten, 2014). Women with chronic medical conditions including diabetes mellitus, thyroid disease, phenylketonuria, seizure disorders, hypertension, rheumatoid arthritis, lupus, renal disease, cardiovascular disease, and asthma should be carefully managed prior to pregnancy and counseled about the effect that these conditions may have on future pregnancies

(Jack et al., 2008). Psychiatric conditions such as depression, anxiety, bipolar disease, and schizophrenia, should also be screened for and managed prior to pregnancy. Women desiring pregnancy should be counseled about the possible effect their medical condition can have on their pregnancy and the potential need to switch medications in the preconception period (Jack et al., 2008).

Counseling. In addition to screening, patient-centered counseling should be provided based on risk, immunizations status, and the presence of any medical conditions. Inquiring about a woman's desire for pregnancy on a routine basis is vitally important at each clinic visit (Moos et al., 2008). If a pregnancy is not desired, providers should educate patients about different birth control options based on the time frame the woman would like to delay a pregnancy and provide options for short-term versus long-term contraception (Jack et al., 2008). The decision to start a contraceptive method should also be based upon health risks, side effects, possible contraindications, effectiveness, cost, availability, patient compliance, and permanence (Hurst & Linton, 2015). Women with one or more children should be educated about the need to consider interconception spacing, defined as the amount of time between pregnancies. Shorter interconception periods, especially those less than six months, are associated with a greater risk for preterm birth and low birthweight (Hurst & Linton, 2015). Ideal spacing includes at least 12-18 months between birth and subsequent pregnancies (Hurst & Linton, 2015).

Patients with a BMI less than 19.7 should be assessed for eating disorders and counseled about the short- and long-term risks to their own health as well as the risk to future pregnancies, including infertility, preterm delivery, low birthweight, intrauterine growth restriction, and various birth defects (Jack et al., 2008; Moos et al., 2008). The incidence of eating disorders, including anorexia and bulimia, continue to increase, affecting over 20 million women and 10

million men in the U.S. (Hurst & Linton, 2015). Women with a BMI over 25, should be educated about the risks that being overweight can have both on their health and the future health of their pregnancy and infant (Jack et al., 2008). Risks include infertility, gestational diabetes, pregnancy-induced hypertension, preterm delivery, stillbirth, macrosomia, and congenital anomalies (Moos et al., 2008). Patients should also be given resources and information about how to lose weight and encouraged to consider enrolling in structured weight loss programs (Jack et al., 2008). Education about folate supplementation of 400 mcg should be provided to all women of child bearing age in order to reduce the risk for neural tube defects (Jack et al., 2008). Studies reveal that less than 40% of nonpregnant women use daily supplementation of folic acid (Moos et al., 2008).

Women who smoke should be counseled to limit exposure and provided resources for quitting if desired (Moos et. al, 2008). Smoking cessation before pregnancy has been proven to reduce infant mortality and morbidity associated with preterm delivery, restricted fetal growth, and sudden infant death syndrome (Williams et al., 2011). All women should also be educated about the risk associated with alcohol and drug use in pregnancy (Jack et al., 2008). Although no amount of alcohol is considered safe in pregnancy, fetal alcohol syndrome is most prevalent among women who consume more than two to five drinks per day (Hurst & Linton, 2015). Discontinuation of alcohol use prior to pregnancy reduces the risk for spontaneous abortion, preterm delivery, birth defects, and other developmental disorders associated with fetal alcohol syndrome (Williams et al., 2011). Although not contraindicated in pregnancy, women should also be educated about the association between caffeine intake of greater than 150 mg per day and an increased risk for miscarriages in the second trimester (Hurst & Linton, 2015). Lastly,

patients with a family history of developmental delays or genetic disorders may be offered a referral to a specialist prior to conception (Jack et al., 2008).

Screening Tools and Interventions Currently Used in Practice

An environmental scan completed by the CDC from 2011-2012 identified screening tools and brief interventions used by various healthcare facilities during preconception and interconception (Humphrey & Floyd, 2012). The goal of the scan was to summarize validated preconception and interconception screening tools and interventions and compare them to the evidence-based recommendations for preconception care outlined by ACOG (Humphrey & Floyd, 2012). The environmental scan analyzed programs comprised of screening tools, those used for interventions, and a couple that combined both screening tools and interventions (Humphrey & Floyd, 2012). Screening tools included checklists with multiple risk factors, paper and online questionnaires, toolkits, and interactive wheels used to identify specific risk factors. The screening tools and interventions, formatted in various outlines, were used in a variety of settings that included health departments, primary care settings, clinics, hospitals, and private practices (Humphrey & Floyd, 2012). The most consistent components that appeared among the programs included health promotion (e.g., family planning, weight status, and immunizations), infectious disease, medical conditions, parental exposures to alcohol, tobacco, and illicit drug use, and nutrition (Humphrey & Floyd, 2012). Less consistently discussed topics included those related to special populations, environmental exposures, and family and genetic history (Humphrey & Floyd, 2012).

One study by Bernstein, Sanghvi, and Merkatz (2000), assessed the effectiveness of an educational intervention to increase healthcare provider knowledge and documentation of preconception care. The study included a pre-intervention chart review of women of

reproductive age and survey of all providers to evaluate their knowledge and attitudes toward preconception care. The intervention utilized a two-pronged approach that included a one hour lecture about preconception care for providers and the addition of a standardized preconception care form in all charts. In order to evaluate effectiveness of the intervention, a post-intervention chart review was conducted as well as a repeat provider survey (Bernstein et al., 2000). Results of the analysis revealed that documentation of screening in almost all areas of preconception care improved following the intervention (Bernstein et al., 2000). The greatest improvements were noted in screening for medical risk factors, over the counter and prescription medications, domestic violence, and nutrition (Bernstein et al., 2000). However, provider knowledge of and attitudes toward preconception care were not significantly changed as a result of the intervention. According to Bernstein et al. (2000), the insignificant amount of change in provider attitudes before and after the intervention may reflect a relatively favorable attitude towards preconception care prior to the intervention. The authors attribute the insignificant change in knowledge as potentially being due to a long interval of time between the educational intervention and the post-test, or possibly due to the fact that a single lecture may have been inadequate to effectively cover the topic of preconception care. Researchers agreed, however, that providing healthcare providers with both education and tools related to preconception care led to a clear improvement in the documentation of preconception care (Bernstein et al., 2000).

Research among various studies reveal that the administration of preconception care has been positively correlated with daily consumption of multivitamins containing folic acid, earlier entry into prenatal care among women with intended pregnancy, cessation of drinking before pregnancy (Williams et al., 2011), and reduced risk for birth defects, fetal loss, low birthweight, and preterm delivery (Centers for Disease Control and Prevention, 2014b). Although many

preconception programs and tools exist, none have been identified as being significantly superior to the others. However, given the significance of preconception care, use of standardized tools should be considered to facilitate the delivery and documentation of preconception (Bernstein et al., 2000).

Theoretical Framework

The Health Promotion Model developed by Nola Pender focuses on the various factors that influence a person's health. The endpoint, and ultimate goal of the model, is to influence health-promoting behavior (Pender, Murdaugh, & Parsons, 2011). According to the model, individual characteristics, including prior related behavior, and personal factors such as gender, age, and BMI, combine with behavior-specific cognitions and affect to influence behavior outcomes (Pender et al., 2011).

Although individual characteristics cannot be modified, behavior-specific variables within the model can be modified through intervention. Behavior-specific variables include perceived benefits, perceived barriers, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences (Pender et al., 2011). According to the model, these factors are considered to have major motivating significance. Perceived benefits of action are what a person considers positive or reinforcing consequences of behavior (Pender et al., 2011). The intervention seeks to influence these beliefs by providing education to providers who can then provide education to their patients, increasing awareness about the importance of healthy behavior prior to conception to improve pregnancy outcomes. Knowing the benefits of preconception health, healthcare providers may be more likely to provide preconception care to their female patients and women may be more likely to take part in lifestyle changes to improve their health. Perceived barriers to actions include perceptions about unavailability,

inconvenience, expense, difficulty, or time-consuming components of an action (Pender et al., 2011). In order to minimize barriers, the intervention stresses the importance of optimizing time to provide preconception care at both scheduled and unscheduled visits the provider has with women of childbearing age and to conduct assessment and counseling related to preconception care in an efficient manner. Perceived self-efficacy is the woman's perception about her ability to improve her health prior to pregnancy (Pender et al., 2011). Healthcare providers can influence self-efficacy by identifying concerns during assessment and providing reinforcement during preconception counseling. Activity-related affect consists of three components: act related, self-related, and context related feelings that determine whether an individual will continue a behavior change (Pender et al., 2011). To support the continuation of healthy lifestyles that influence pregnancy outcomes, preconception care should be conducted in an ongoing manner, with every encounter the provider has with women of childbearing age.

Interpersonal influences include the behaviors, beliefs, or attitudes of others, particularly those of family, peers, and healthcare providers (Pender et al., 2011). The intervention seeks to influence the behaviors and beliefs of healthcare providers in relation to preconception care in hopes that they can emulate these same behaviors and beliefs to their patients. Situational influences include perceptions of available options, safety, and societal norms (Pender et al., 2011). Increasing awareness of the importance of preconception health not only to the healthcare community, but also to the general population, may have an influence on societal norms for healthy behaviors.

These actions and beliefs have the potential to lead to a plan of action, or the initiation of a behavioral event. In terms of the intervention, the behavioral event would be the determination to improve health prior to conception. Immediate competing demands or preferences are

considered alternative behaviors that compete for behavior change (Pender et al., 2011). Examples of competing demands include work or family responsibilities while examples of competing preferences include continuing to eat a high fat diet or sedentary lifestyle due to a person's lack of self-control. To be successful in changing a behavior, providers must examine the presence of factors that may compete for a woman's decision to improve her health. Health-promoting behavior, the ultimate goal of the model, results in improved health, enhanced functional ability, and better quality of life (Pender et al., 2011). In terms of the project, this would be true for the woman before, during, and after pregnancy as well as for her baby. A diagram of the Health Promotion Model can be found in Appendix A.

CHAPTER THREE. PROJECT DESCRIPTION

The literature review revealed that while there are tools being used in certain healthcare institutions in statewide programs across the country, there is no standardized approach to providing preconception care on a national level, making the delivery of preconception care variable and determinant upon the provider. Without formal education and tools, providers may miss important aspects of screening and counseling in the preconception period. The practice improvement project seeks to provide information to providers about the components of preconception care to promote consistency of delivery in practice.

Project Design

In order to meet the objectives of the project, a voice-over PowerPoint lecture was used to provide healthcare providers with information related to preconception care, an outline and discussion of the four main components of preconception health (maternal assessment, vaccination status, disease management, and counseling), and additional resources for both patients and providers. The information within the module and the voice-over lecture were developed based on evidenced-based research following an extensive literature review. To illustrate the importance of preconception care and increase awareness, basic statistics regarding infant morbidity and mortality in the U.S. were provided, as well as evidence regarding the effectiveness of preconception care at improving adverse infant outcomes. These elements of the module are examples of perceived benefits of action included in the Health Promotion Model. A visual depiction of the how the model aided in the development of the project can be found in Figure 1. Assessment topics related to preconception care included in the module were based upon the recommendations set forth by ACOG and the CDC and included screening related to maternal assessment, vaccinations, and disease processes. Counseling components included in

the preconception education consisted of vaccinations, reproductive planning, contraceptive options, healthy weight and nutrition, including folic acid supplementation, smoking cessation, alcohol education, and information related to teratogenic medications. The module also included links for additional resources on preconception care for both patients and providers.

In order to provide incentive to utilize the module, one hour of continuing education credits was offered to participants for their time. To assess knowledge, provide an opportunity to reinforce learning, and validate participation in the activity, a series of pre- and post-intervention questions were used. These questions were required in order for the participant to receive continuing education credits. The module also included a set of evaluation questions aimed at assessing the effectiveness of the intervention in meeting the objectives of the project. The pretest, posttest, and evaluation questions will be discussed further in the evaluation section.

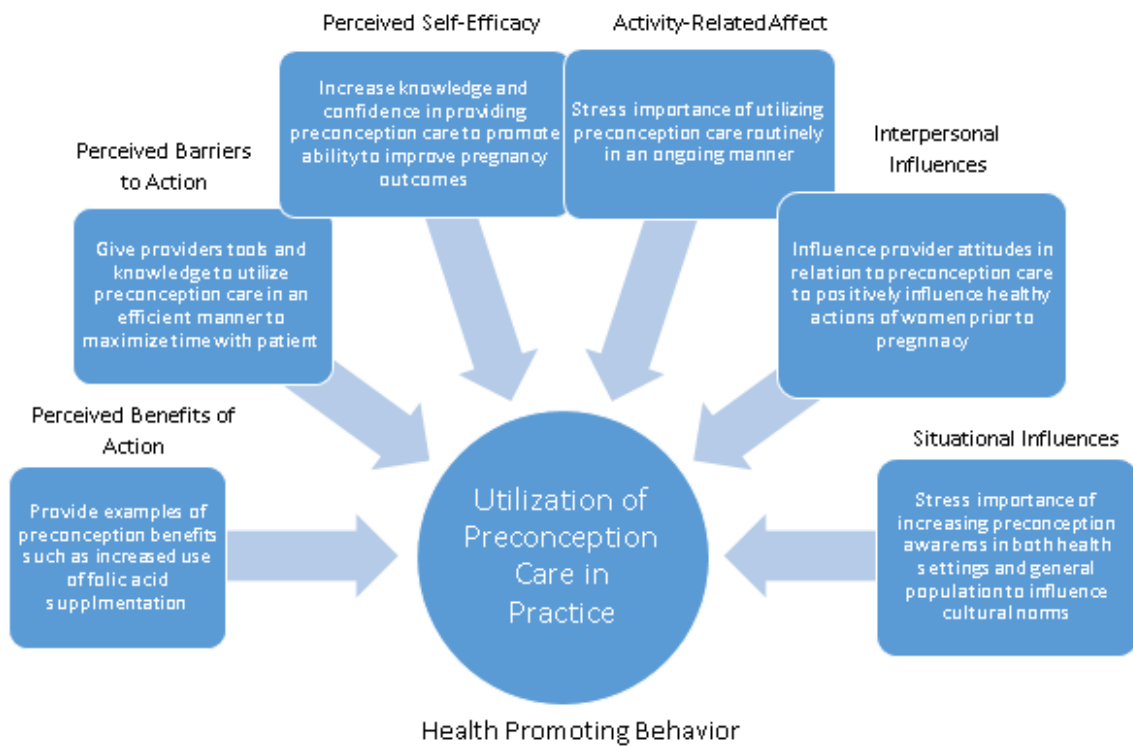


Figure 1. Module Design Based on Health Promotion Model

Project Development

The module was developed using Microsoft Office PowerPoint and recorded with the help of Information and Technology Services at North Dakota State University. The voice-over lecture was recorded on May 18, 2015, May 20, 2015, and June 1, 2015. Following the recording of the module, the project was then saved and converted to a video file that could be submitted to the AANP CE center.

Project Implementation

In order to facilitate the delivery of the intervention, project plans included partnering with the American Association of Nurse Practitioners (AANP). The goal of the AANP is to lead nurse practitioners in transforming patient-centered healthcare (American Association of Nurse Practitioners, 2014). According to the AANP, in order to receive accreditation, programs must be educationally sound, relevant to nurse practitioner practice, patient-centered, evidence-based, fair and unbiased, and promote positive outcomes (American Association of Nurse Practitioners, 2014). Content contained in the program should go beyond that obtained in basic nurse practitioner preparation and include assessment, diagnosis, management, health promotion and disease prevention, legislative/policy issues affecting healthcare and practice, or practice management. The project is in congruence with the AANP goals and values due to the fact that the intervention utilized a patient-centered approach to facilitate continuous improvement of care, is relevant to nurse practitioner practice, evidence-based, and promotes positive outcomes.

The continuing education module and application packet were submitted to the AANP CE Center on May 27, 2015 and the content was approved on June 1, 2015. The letter of approval is included as part of Appendix B. Minor changes were made to the module prior to receiving approval in order to be in accordance with the AANP CE requirements. The module

went live on June 2, 2015 and is available until June of 2017 for participants to complete.

Although the module is live for two years, data from responses was only collected for the first three months. The module is available to both AANP members and non-members free of charge, providing the participant creates an account on the AANP's website and includes their contact information. In the first three months that the module was live, healthcare providers of various specialties, including family practice, adult health, and women's health had the opportunity to complete the module and provide feedback.

Institutional Review Board

The project was submitted to North Dakota State University's Institutional Review Board in order to protect participants of the intervention. The project did not involve any direct patient contact and carried minimal risk to its participants and was therefore approved for exempt criteria on April 20, 2015. After making minor changes to the project, it was then resubmitted and received approval for the amendment on May 20, 2015. The approval letter is attached as part of Appendix C. Participant responses to pretest, posttest, and survey evaluation questions were kept completely confidential and anonymous.

Data Collection

Prior to completing the module, participants were asked to complete a pretest, consisting of ten questions that assessed knowledge, awareness, and experience in providing preconception care before the learning intervention (Appendix D). Following completion of the module, participants were then prompted to complete a six question posttest to assess learning (Appendix E) as well as an overall survey evaluation. The evaluation included questions pertaining to demographic data, as well as a personal assessment of awareness, knowledge, confidence, and practice changes as a result of the learning intervention (Appendix F). Participant answers to

pretest, posttest, and evaluation questions were compiled into data reports and sent by the AANP CE Center to the principle investigator each month. The data report for the month of June was received on July 22, 2015, data from the month of July was received on August 12, 2015, and data from the third and final month of August was received on September 18, 2015.

CHAPTER FOUR. EVALUATION

Logic Model

Using an evaluation tool, such as the Logic Model, helps determine the inputs, activities, outputs, outcomes, and impact of the project. The purpose of a Logic Model is to describe the sequence of events connecting the need for the intervention with the desired results. The inputs, or resources, of an intervention include the human, financial, organizational, and community resources necessary to carry out a program (W.K. Kellogg, 2004). Resources required to carry out the intervention include time, technology to develop module, technology to record the voice-over, collaboration with the AANP CE Coordinator, and internet sources to disseminate the module.

The activities of the Logic Model are referred to as the actions that are done to utilize the resources in order to bring about the intended results of the program. They include processes, tools, events, and technology (W.K. Kellogg, 2004). In terms of the project, the activities are the development of the learning module, process to obtain CE credit, dissemination of the PowerPoint to nurse practitioners, and development of pre and post module surveys.

Outputs of the Logic Model are defined as the direct products of a project. Project outputs include the completion of the educational module by healthcare providers. Outcomes of the Logic Model are defined as specific changes in participants' behavior, knowledge, skills, status, and level of functioning that occur as a result of the outputs (W.K. Kellogg, 2004). The outcomes can be separated into short-term, medium-term, and long-term, or the ultimate impact of the project. The short-term outcomes of the project are to increase healthcare provider awareness, understanding, and confidence in providing preconception care and promote their intent to incorporate preconception care into practice. The four objectives of the project can be

evaluated to determine the effectiveness of the short-term outcomes. The medium-term outcome is that providers integrate preconception care into their practice as a result of the intervention.

The long-term outcome, or overall impact of the project, is defined as the intended change occurring as a result of program activities (W.K. Kellogg, 2004). In this case, the overall impact of the project is the reduction of negative pregnancy outcomes associated with infant morbidity and mortality. Due to the time constraints of the project, it is infeasible to assess the medium- and long-term outcomes of the intervention. The Logic Model pertaining to the project can be found in Appendix G.

Objective One

The first objective was to heighten provider awareness about the importance of preconception care delivery to all women of reproductive age. Approximately 15 minutes of the presentation was spent introducing information aimed at meeting this objective. The module included infant mortality statistics of the United States, along with a comparison of statistics to that of other developed countries, a dialog about the leading causes of infant mortality, a listing of specific benefits related to preconception care, discussion of the problem with the traditional delivery of preconception care, rates and consequences of unintended pregnancies, and greatest chance for fetal harm in pregnancy. The information was provided to participants in various formats throughout the slides and included the use of tables and graphs. Participants were asked three questions in the pre and posttest in order to evaluate this objective. Questions included ranking where the U.S. falls in terms of infant morbidity and mortality in comparison to other developed countries, identifying which pregnancy outcomes are influenced by preconception care, and stating the importance of the routine delivery of preconception care to women of childbearing age. In addition to knowledge questions, participants were also asked to rate their

awareness about the importance of preconception care prior to completing the module in the pretest and following the module in the evaluation using a five-point Likert scale. The four questions and associated answer options for objective one can be found in Appendix H.

Objective Two

The second objective, to increase provider understanding about the components of preconception care that have the potential to affect future pregnancies, was evaluated using a series of knowledge questions based on the recommendations set forth by ACOG and the CDC. A vast majority of the module, about 30 minutes, was allocated to introducing and describing in detail the four components of preconception care: maternal assessment, immunization status, disease management, and topics for counseling. Three case studies utilized analysis of these components to promote interaction and critical thinking. Three questions in the pre and posttest focused on specific elements of preconception care including identifying main components, teratogenic drugs, and folic acid recommendations. Participants were also asked to rate their perceived knowledge about the components of preconception care both prior to, in the pretest, and following the intervention, in the evaluation, using the same five-point Likert scale. The four questions and associated answer options can be found in Appendix H.

Objective Three

The third objective is to enhance provider confidence in providing preconception care on a routine basis in practice. Healthcare provider confidence in providing in preconception care was promoted through the introduction and thorough discussion of preconception care's benefits and components. This objective was evaluated through the assessment of provider confidence in providing preconception care to their female patients of reproductive age both before the module

in the pretest and after completion of the module in the evaluation. The question, included in both the pretest and evaluation, used a five-point Likert scale and is included in Appendix H.

Objective Four

Lastly, the fourth objective seeks to promote provider intent to incorporate preconception care in practice to all women of reproductive age. By increasing awareness, specific knowledge, and confidence in providing preconception care, the module's overall intent was to increase the delivery of preconception care in routine practice. To evaluate this objective, participants were asked to estimate the amount of time they utilized preconception care with their female patients of reproductive age in the pretest, prior to completing the module. In order to assess any change in practice as a result of the intervention, participants were then asked three questions in the evaluation: the likelihood of incorporating preconception care into every encounter they have with women of reproductive age, the likelihood of making any change to their practice, and what, if any, specific changes they intend to make to their practice as a result of the learning intervention. These questions and answers can also be found in Appendix H.

Overall Evaluation

In order to obtain some demographic data, participants were asked to provide information regarding their gender, years of practice, geographical region, and primary area of practice in the evaluation. To be in accordance with the requirements for AANP accreditation, participants were then asked to rate the extent to which the intervention met the objectives of the module and was free of commercial bias using a five-point Likert scale. These questions can be found in Appendix I. Participants were also given the option to include specific comments about the module and provide suggestions for improvement. These comments will be discussed in greater detail later in the paper.

CHAPTER FIVE. RESULTS

Presentation of Findings

Participant responses to pretest, posttest, and evaluation answers were summarized into monthly data reports and presented in aggregate form. In order for individuals to receive continuing education for the module, the participant had to complete the module in its entirety, including the pretest, posttest, and evaluation questions. In the first month the module was on the AANP website, 133 participants started the program with 87 participants completing the module in its entirety and receiving a certificate. In the second month, 93 participants started the module with 60 of the participants receiving certificates. In the third, and final month, 53 participants started the module with 29 of them receiving certificates. In order to advertise new education modules, the AANP CE Center places the most recent learning modules at the beginning of the list of continuing education programs. The older a module becomes, the further down the list the program is moved, providing one explanation for higher response rates in the first month of the program being launched and reduced rates thereafter. The overall completion rate for the program was approximately 63% as 279 participants started the module and 176 of them finished the module in its entirety to receive continuing education credit.

Over 95% (n=168) of the participants were female and over half (n=101) had been practicing for 10 years or less. Responses included those from participants in 11 different regions in the United States. Family practice nurse practitioners comprised over 57% (n=102) of the participants, with the specialty of women's health at 15.8% (n=28) representing the second most common area (Table 1).

Table 1

Participant Demographics

Demographics	(%)	(n)
Gender		
Female	95.5	168
Male	4.5	8
Years of Practice		
<5 Years	22.2	39
5-10 Years	35.2	62
10-20 Years	25.6	45
>20 Years	17.0	30
Region of Practice		
Region 1: Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont	3.9	7
Region 2: New Jersey, New York, Puerto Rico	8.4	15
Region 3: District of Columbia, Delaware, Maryland, Pennsylvania, Virginia, West Virginia	9	16
Region 4: Kentucky, North Carolina, South Carolina, Tennessee	18.5	33
Region 5: Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	13.5	24
Region 6: Arkansas, Louisiana, New Mexico, Oklahoma, Texas	10.7	19
Region 7: Iowa, Kansas, Missouri, Nebraska	7.9	14
Region 8: Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming	2.8	5
Region 9: Arizona, California, Hawaii, Nevada, Pacific U. S. Territories	7.9	14
Region 10: Alaska, Idaho, Oregon, Washington	2.8	5
Region 11: Alabama, Florida, Georgia, Mississippi, Caribbean U. S. Territories	14.6	26

Table 1. *Participant Demographics* (continued)

Demographics	(%)	(n)
Primary Area of Practice		
Family	57.6	102
Adult	10.7	19
Women’s Health	15.8	28
Acute Care	2.8	5
Internal Medicine	2.8	5
Other	10.1	18

Objective One

The first objective was to heighten provider awareness about the importance of preconception care delivery to women of reproductive age. Prior to completing the module, participants answered a series of pretest questions regarding their degree of awareness. The proportion of correct pretest and posttest responses was statistically significant ($p < .0001$), with less than 17% ($n=30$) of the participants correctly answering a question regarding where the U.S. ranks in terms of infant morbidity and mortality in the pretest, compared to the 71.7% ($n=127$) who answered the question correctly in the posttest. In a question analyzing preconception care outcomes, the proportion of pre and posttest answers was moderately significant ($p = .0223$), with 54.8% ($n=97$) of the respondents answering the question correctly in the pretest and 65.9% ($n=116$) answering the question correctly in the posttest. About 44% ($n=77$) of the participants correctly answered the question pertaining to the importance of the routine, ongoing delivery of preconception care in the pretest compared to the 71.4% ($n=125$) who answered the question correctly in the posttest, making the ratio of pre and posttest responses also statistically

significant ($p < .0001$). A summary of these questions and answers can be viewed in Figure 2. A statistically significant ($p < .0001$) change in the percentage of answers in the pretest and survey was also observed in a question comparing perceived awareness about the importance of preconception care both prior to and following the intervention. About 50% ($n=88$) of respondents stated they were moderately or extremely aware of the importance of preconception care prior to the intervention, compared to the 87.5% ($n=154$) who rated their awareness as moderate or extreme following the intervention. An illustration of this change can be viewed in Figure 3. Overall, as a result of the continuing education module, an increase in participants' awareness about the importance of preconception care was evidenced by a comparison of their answers to pretest, posttest, and evaluation questions.

Objective Two

The second objective was to increase provider understanding about the components of preconception care that have the potential to affect future pregnancies. In a question asking participants to identify one of the four main components of preconception care, 39% ($n=68$) of participants answered the question correctly in the pretest, compared to the 69.3% ($n=122$) who answered the question correctly in the posttest, resulting in a statistically significant ($p < .0001$) difference in proportion of pre and posttest answers. In terms of teratogenic drug identification, 52.5% ($n=94$) of participants were able to correctly the answer in the pretest compared to the 84% (148) in the posttest. There was a statistically significant ($p < .0001$) difference in pre and posttest answer percentages. Sixty percent of participants were able to correctly identify the recommended amount of daily folic acid intake for women of childbearing age in the pretest, compared to the 89.2% of people in the posttest, revealing a statistically significant ($p < .0001$) change in the ratio of answers regarding knowledge of folic acid recommendations. A summary

of these four questions and their associated answers can be found in Figure 2. A comparison of perceived knowledge prior to and following the intervention, revealed that 37.9% (n=67) of participants rated they were moderately or extremely knowledgeable about the components of preconception care prior to the completing the activity, while 89.2% (n=157) of participants stated they were moderately to extremely knowledgeable following the intervention, a statistically significant ($p < .0001$) change (Figure 3). The educational intervention increased participants' knowledge about the components of preconception care as evidenced by responses to pre and posttest questions and perceived rating of knowledge both prior to and following the intervention.

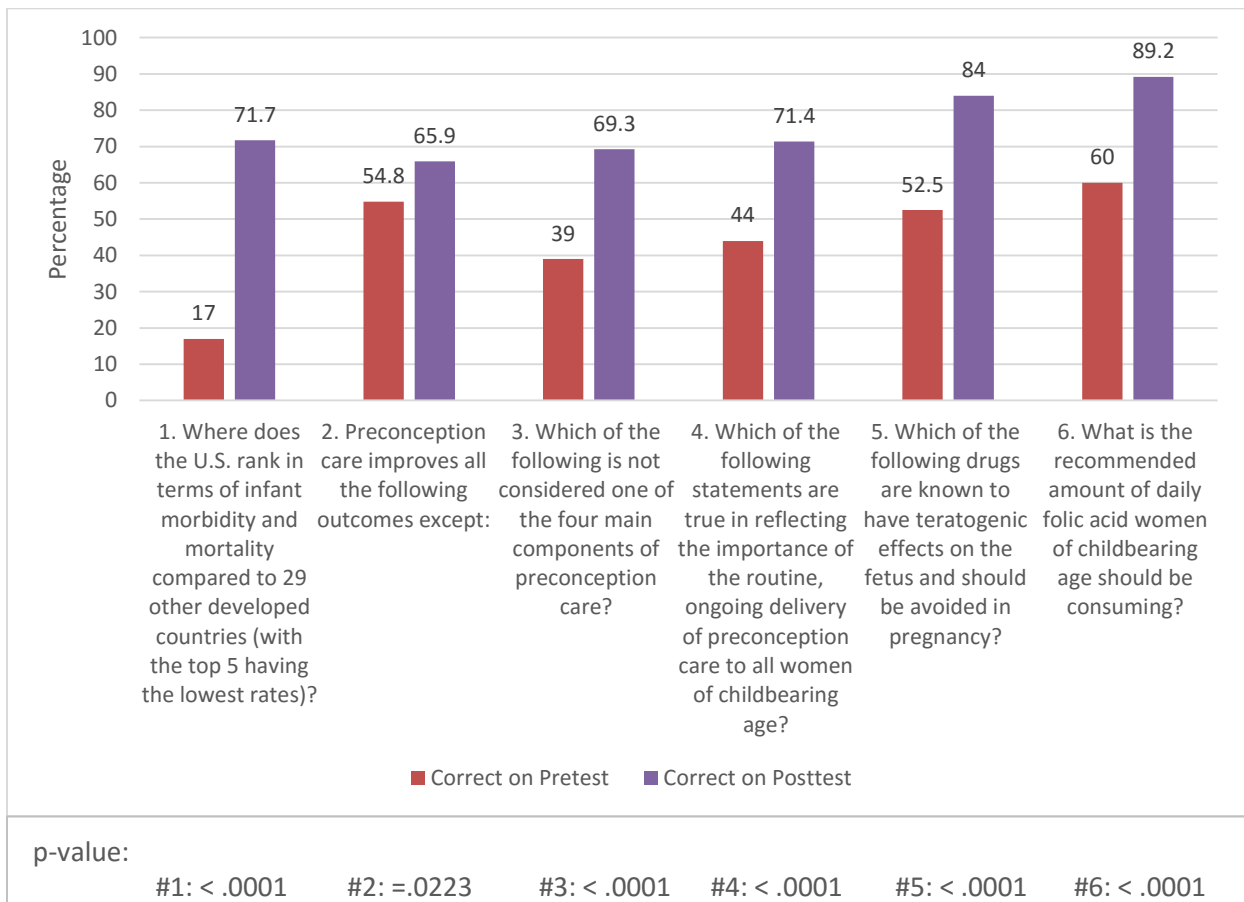


Figure 2. Awareness and Knowledge Questions

Objective Three

The third objective was to enhance provider confidence in providing preconception care on a routine basis in practice. Participants rated their perceived their confidence in providing preconception care to women of reproductive age both prior to and following the intervention. About 37% (n=65) of participants reported moderate to extreme confidence in providing care before completing the activity while over 86% (n=152) of participants reported moderate to extreme confidence after completing the module (Figure 3). Responses revealed a statistically significant ($p < .0001$) change in comparison of pre and posttest answers. Overall, an increase in confidence levels in terms of providing preconception care to their female patients was seen as a result of the educational module.

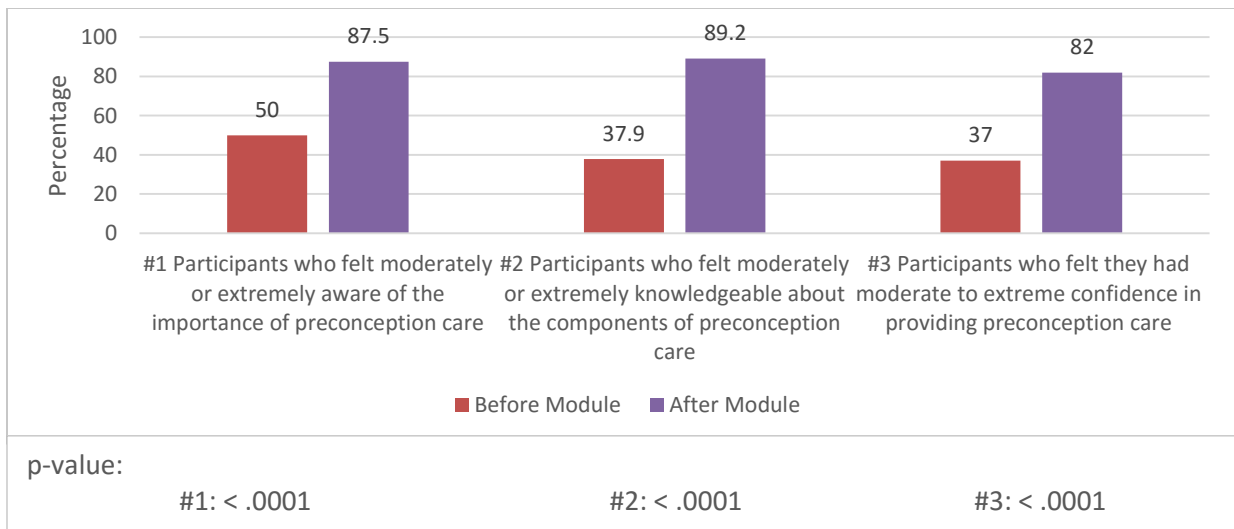


Figure 3. Participant Rating of Perceived Awareness, Knowledge, and Confidence

Objective Four

The fourth, and final objective was to promote intent to incorporate preconception care in practice to all women of reproductive age. Prior to completing the activity, only 2.2% (n=4) of participants stated that they utilized preconception care 100% of the time in their visits with women of reproductive age, while 58.7% (n=104) stated they utilized preconception care less

than 25% of the time (Figure 4). Following completion of the education intervention, 84.5% (n=147) of participants reported they were likely or extremely likely to incorporate preconception care into every encounter they have with women of reproductive age. As a result of the module, 57.6% (n=102) of providers stated they would modify their practice, while 33.3% (n=59) stated they would seek more information prior to changing their practice. In terms of specific changes to practice, 21.5% (n=38) of providers stated they will provide more in depth preconception counseling to patients of reproductive age as a result of participating in this educational offering, 9% (n=16) said they will perform thorough assessment and close management of disease processes known to effect pregnancy outcomes, 27.1% (n=48) reported they will discuss reproductive life planning with patients of reproductive age, 32.2% (n=57) stated they will provide more thorough maternal assessments based upon preconception recommendations, and 10.1% (n=18) stated that no changes in practice will be made. Overall, the intervention encouraged a specific change in practice by nearly 90% of the participants.

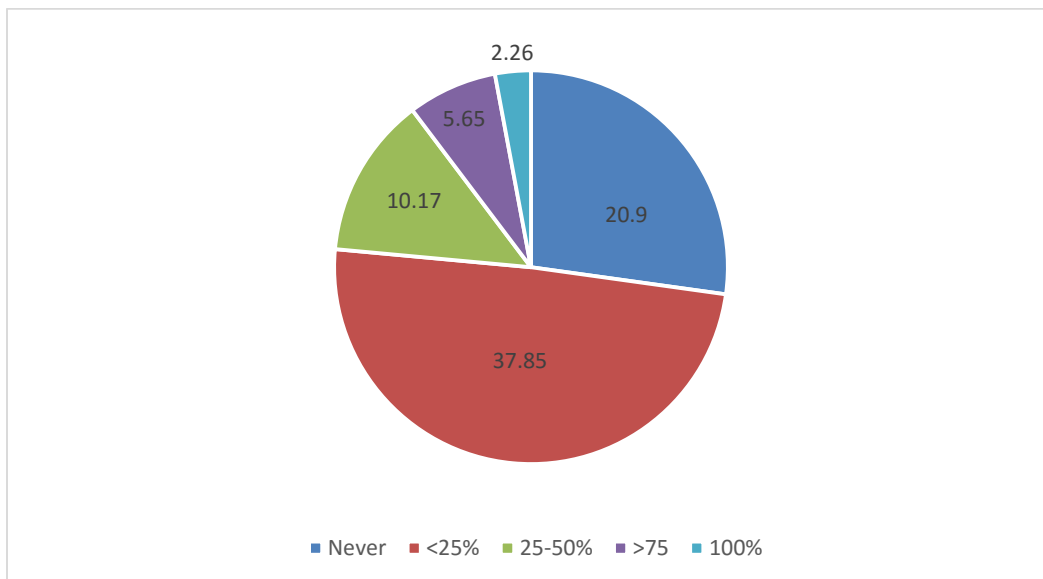


Figure 4. Amount of Time Participants Utilized Preconception Care Prior to Intervention

Overall Evaluation

Over 80% (n=141) of participants stated their ability to meet the project objectives was either completely or very enhanced by the continuing education module. Additionally, over 98% (n=173) of participants stated that the program was moderately to extremely free of commercial bias. The opportunity to provide written feedback about the module allowed participants to voice their opinions, provide recommendations for future educational topics, and offer suggestions for improvement. Thirty-five of the participants included written comments as part of their completion of the module. Twenty-eight of the responses included positive feedback of the module, stating that the module was a good reminder, a great presentation, very informative, or very useful. Two of the participants indicated they would like more educational offerings related to teratogenic drugs and women's health on the AANP CE center. Five of the participants included critiques such as the presence of difficult pre and posttest questions, inclusion of too many statistics, and technical issues such as a static sound in the background. Three participants indicated they would have liked to have the opportunity to print off the module and take notes for future reference. Specific examples of comments include: "Great topic that I will use in my practice daily to counsel all women of child bearing age; The module encouraged me to use preconception counseling at every visit; Very informative and highly pertinent information; and Good information for anyone in primary care."

CHAPTER SIX. DISCUSSION AND RECOMMENDATIONS

Interpretation of Results

Overall, the continuing education model was an effective teaching tool, with 80% (n=141) of participants stating their ability to meet the project objectives was either completely or very enhanced by the continuing education module. A majority of participants, (57.6%; n=102) practiced primarily in family practice, which is important to note due to the fact that some studies show that women prefer to receive preconception health information from their primary care providers compared to other disciplines (Dunlop et al., 2007). Furthermore, as discussed in the literature review, one study found that nearly 85% of the women reported they had contact with a healthcare provider in the past 12 months (Hillemeier et al., 2008), stressing the importance of primary care provider understanding of preconception care.

Over 87% (n=154) of participants stated they were moderately aware or extremely aware of the importance of preconception care as a result of the learning module, compared to the 50% (n=88) who alleged this prior to the intervention. An increase in awareness can be further evidenced by comparing the number of correct answers in the pretest with the posttest. The percentage of correct responses in the pretest pertaining to awareness ranged from 17% to 54.8% compared to the 65.9% to 71.7% of correct answers in the posttest. Participants scored lowest on a pretest question pertaining to where to the U.S. ranks in terms of infant morbidity and mortality, with only 17% (n=30) of the participants correctly identifying the answer, suggesting an overall lack of awareness. However, as a result of education module, 71.7% (n=127) of participants answered the questions correctly, representing over a 50% increase.

In addition to increases in awareness, an overall increase in knowledge was accomplished through the educational module with 37.9% (n=67) of participants stating they felt moderately or

extremely knowledgeable about the components of preconception care prior to the completing the activity, and 89.2% (n=157) of participants stating they felt moderately to extremely knowledgeable following the intervention. Percentages of correct responses in the pretest ranged anywhere from 39-60% compared to the 69-89% of correct answers in the posttest. Overall, analysis revealed about a 30% increase in correct answers in each of the three questions as a result of the educational intervention.

Correlating with increases in awareness and knowledge, an overall increase in confidence was also reported. Prior to the educational module about 37% (n=65) of participants reported moderate to extreme confidence in providing care. After completing the module over 86% (n=152) of participants reported they felt moderately to extremely confident in providing preconception care.

In terms of the delivery of preconception care, only 18% (n=32) of providers stated that they utilized preconception care over half the time they cared for women of reproductive age and 58.7% (n=104) of providers utilized preconception care less than 25% of the time prior to the educational offering. As discussed in the literature review, only about 30% of women report receiving preconception counseling from a healthcare provider (Healthy People 2020, 2014), which correlates with responses about the utilization of preconception care from providers. As a result of the education intervention, a vast majority (84.5%; n=147) of participants reported they were likely or extremely likely to incorporate preconception care into every encounter they have with women of reproductive age and over half (57.6%; n=102) of participants stated they would modify their practice. The biggest changes in practice reported by respondents was the intent to provide more thorough maternal assessments based upon preconception recommendations and the intent to discuss reproductive life planning with patients of reproductive age.

Overall, the participants provided positive feedback regarding the program, and the results demonstrate an increase in participant awareness and knowledge about the benefits of preconception care as well as an increase in reported confidence and intent to provide preconception care as part of the routine delivery of care. A comparison of pre and posttest answers reveals an increase in the percentage of correct answers for all questions, supporting the belief that providers lack sufficient knowledge about preconception care in their practice. Furthermore, participant feedback about the usefulness of the module supports evidence discussed in the literature review about healthcare providers expressing a need for increased awareness and education regarding preconception care.

Limitations

There are several limitations associated with this practice improvement project. The first is the inability to directly compare individual response on pre and posttest questions in order to help identify knowledge gaps based on certain demographic factors. Monthly data provided by the AANP CE Center could only be obtained in aggregate form for confidentiality purposes. While this format allowed for a comprehensive analysis of the results, it did not allow for the development of more in depth inferential statistics. Without this information, it is difficult to make hypotheses about specific demographic influences, such as practice experience, area of practice, or gender of the participant, on participant awareness and knowledge of preconception care.

The second limitation is the amount of time it took providers to complete the module. The AANP CE Center required a minimum of 1 hour of educational content in order for participants to receive continuing education credits. Due to the amount of time involved in completing the module, overall completion rate for the program was approximately 63%,

indicating that nearly 40% of the participants did not complete the entire module. Due to time constraints and busy patient schedules, it may not be appropriate to expect healthcare providers to be able to commit to a full hour of preconception education. In order to reach more providers, it may be more realistic to provide the education in a 20 to 30 minute educational session.

Another limitation is the inability for participants to have a hard copy of the presentation to follow along with. The use of voice-over with the presentation did not allow for a format in which participants could print off a copy for themselves. The availability of these slides would allow participants to take notes in order to promote recollection of information and serve as a resource for future use.

The final limitation of the project is the avenue through which the module was provided to healthcare providers. Although the AANP CE Center served as an effective platform for the practice improvement project, it did to some extent limit the amount of providers that could utilize the educational intervention. Although healthcare providers who are not members of the AANP do have access to the module, it is likely that many nonmembers did not utilize the module due to the fact that the module is not advertised anywhere but the AANP website. Furthermore, because the AANP website is directed toward nurse practitioners and nurse practitioner students, other providers, including physicians and physician assistants, may have had decreased ability to access the module.

Recommendations

The marked increase in learning assessment scores between the pre and posttest provides evidence of knowledge gaps related to preconception care and offers utility as to the usefulness of the education module. The positive results of the continuing education module, along with recommendations for the routine delivery of preconception care set forth by the AAP, ACOG,

and the CDC, indicate that it is reasonable to recommend that all healthcare professionals caring for women of childbearing age participate in continuing education activities associated with providing preconception care.

The continuing educational module is available on the AANP CE Center website for two years after its start date of June 2015. In order to increase the number of providers who complete the module, one recommendation is to utilize advertisement campaigns within healthcare centers to promote involvement of all providers caring for women of childbearing age, including physicians and physician assistants. In order to enhance learning in participants who complete the module, it would also be helpful to provide an attachment with the slides so participants could follow along with a hard copy and take notes as needed. The ability to be actively involved in the module would likely increase the ability of the participants to retain the information and use the information in their future patient encounters.

Due to the fact that an evidenced gap in knowledge does exist in terms of provider knowledge of preconception care, another recommendation is to incorporate preconception care education as part of the curriculum for family practice medical students, nurse practitioner students, and physician assistant students planning to work in primary care settings. This mandatory education would offer healthcare providers intending on caring for women of reproductive age with the necessary tools needed to assess for potential risk factors that can negatively influence pregnancies, discuss family planning and reproductive health, and provide counseling and education based on risk factors.

Overall, participants provided positive feedback about the module and indicated the learning intervention was informative and useful to their practice. Several participants suggested further educational offerings related to teratogenic drugs and women's health on the AANP CE

center. Thus, another recommendation is for the AANP CE Center to incorporate more presentations about components of preconception care such as maternal health, teratogenic drugs, family planning, and preconception counseling topics.

Implications for Practice

In order to reduce infant morbidity and mortality in the U.S. associated with negative pregnancy outcomes, healthcare providers caring for women of reproductive age need to be aware of the importance of routinely providing preconception to their patients. The intervention provided awareness about the prevalence of negative pregnancy outcomes in the U.S., information regarding the benefits of preconception care, a systematic way to assess maternal health, methods to facilitate creating a reproductive plan in collaboration with the patient, and topics for counseling based on patient risk. An overall documented increase in awareness, knowledge, confidence, and intent to incorporate preconception care into routine practice as a result of the learning intervention makes this module an important tool to promoting positive pregnancy outcomes and reducing infant mortality.

In addition to providing important educational information to providers, the practice improvement project also provides useful information regarding provider awareness and knowledge about preconception care both prior to and following the intervention. With 176 participants completing the module, the project offers important information related to the knowledge gap among healthcare providers in terms of providing competent preconception care. This gap in knowledge adds to the available literature documenting an overall lack of awareness and knowledge healthcare providers have about preconception care and further supports the call for increasing education efforts.

Organizations such as the CDC and ACOG have made recommendations regarding the provision of preconception care education. Yet there still remains a great percentage of providers who lack adequate education regarding the components of preconception care. One implication for practice is for greater advertisements and campaigns that promote preconception health both in a healthcare as well as a public setting. Healthcare providers caring for women of reproductive age are at the forefront of this movement and have a responsibility not only to educate themselves, but also their colleagues, their patients, and the general public about the importance of preconception care. Understanding preconception care's importance and components has the potential to encourage lifestyle changes that can improve maternal health prior to pregnancy, increasing the number of healthy pregnancies and decreasing infant mortality.

Healthcare providers caring for women of reproductive age need to develop a practice that includes preconception assessment and counseling as part of their routine care. With nearly half of pregnancies in the U.S. unplanned and the greatest potential for fetal harm occurring in the first eight weeks of pregnancy, preconception care must take place on a routine basis in order for it to be effective. Healthcare providers need to strive to include this care at every encounter they have with women of reproductive age in order to reach the maximum number of patients and have the greatest effect. An executive summary of the project is included in Appendix J.

Implications for Future Research

Although the educational intervention did yield meaningful results, further research is needed in order to determine the best approach to offering preconception education to providers. The literature review did not provide data about the most effective way to reach a large number of providers and provide them with useful information that can be carried over to their practice.

Additional research could compare effectiveness of various other educational avenues, such as conferences, workshops, or in-services, in order to determine which educational approach could provide optimal education and yield the most meaningful results.

In addition to an overall lack of awareness and knowledge about preconception care, other barriers to the delivery of preconception care include time, lack of third-party reimbursement, and the presence of competing preventative care priorities. Further research is needed in order to determine ways to overcome these barriers. Specific areas for research include determining the most efficient way to provide preconception care, identifying a tool to facilitate the delivery of preconception that utilizes the most important components of preconception care, and determining the possibility of being able to bill for preconception care at routine visits. Such research could provide healthcare providers with options to overcome documented barriers and increase the likelihood of preconception care delivery into routine practice.

Application to Other Nurse Practitioner Roles

Nurse practitioners working in primary care settings often serve as an initial contact point for a majority of patients. They have the ability to provide preconception care to patients both during annual physicals as well as at episodic visits. The delivery of preconception care should not be limited to nurse practitioners working in women's health or primary care settings, however. Numerous disciplines in the healthcare system provide care to women of reproductive age, holding them equally responsible for providing preconception care. Improving pregnancy planning and spacing, and preventing unintended pregnancies as well as improving the health and well-being of women, infants, children, and families are two of the goals of Healthy People 2020 (2014), making preconception care a responsibility of all healthcare providers caring for women with reproductive potential. Nurse practitioners working in any healthcare setting have

the opportunity to provide important assessments and education that have the potential to improve maternal health and pregnancy outcomes.

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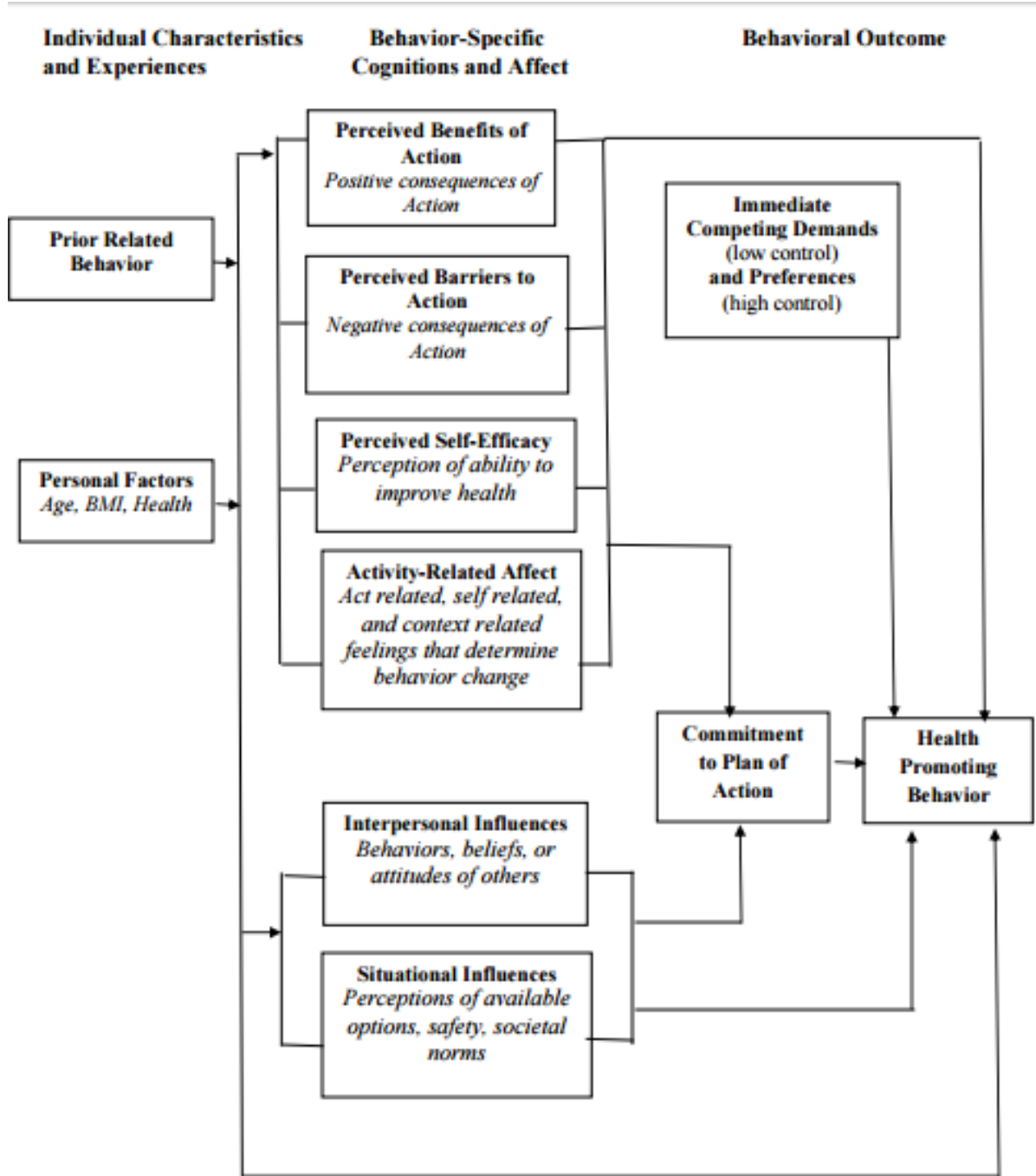
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APPENDIX A. PENDER'S HEALTH PROMOTION MODEL DIAGRAM



APPENDIX B. AANP APPROVAL LETTER



The Voice of the Nurse Practitioner®

June 2, 2015

Amanda Helmer
amanda.goldade.1@ndsu.edu

Dear Amanda,

The continuing education activity *Increasing Provider Awareness and Knowledge about Preconception Care to Women of Reproductive Age* is approved for continuing education by the American Association of Nurse Practitioners. All session contact hours are approved as submitted.

Use the following statement in your literature to indicate the maximum *credit one person can obtain* upon completion of this activity.

"This program is approved for 1.0 contact hour(s) of continuing education by the American Association of Nurse Practitioners. Program ID 1505252. This program was planned in accordance with AANP CE Standards and Policies and AANP Commercial Support Standards."

This approval is for the continuing education activity listed in the original application. With this approval, ALL changes to this program must be reported to the AANP for review as soon as they are identified. This includes but is not limited to:

- session drops/additions,
- speaker changes,
- objective changes,
- date and /or venue changes.

Any changes to content or speakers that is not reviewed by the AANP are not approved for credit.

ID number 1505252 has been assigned to this application. Refer to this number with *all communication* pertaining to this application including the required post-program reports. This program has been approved for 2 years (through May 28, 2017), provided no changes are made. Attendance sheets and evaluation summaries are due in this office one month after the program's initial presentation (no later than July 5, 2015).

Thank you,

A handwritten signature in black ink that reads "Stormy Causey". The signature is written in a cursive style with a long, sweeping underline.

Stormy Causey
CE Coordinator

APPENDIX C. INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

April 20, 2015

Mykell Barnacle
Nursing
Sudro 118B

Re: IRB Certification of Exempt Human Subjects Research:
Protocol #PH15237, "Increasing Provider Knowledge and Awareness about Preconception Care to Women of Reproductive Age"

Co-investigator(s) and research team: Amanda Helmer

Certification Date: 4/20/15 Expiration Date: 4/19/18
Study site(s): online - varied
Sponsor: n/a

The above referenced human subjects research project has been certified as exempt (category # 1) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol submission (received 4/20/15).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,

Kristy Shirley

Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, o=NDSU
ou=Institutional Review Board,
email=kristy.shirley@ndsu.edu, c=US
Date: 2015.04.20 14:54:33 -0500

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult http://www.ndsu.edu/research/integrity_compliance/irb/. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

APPENDIX D. PRETEST

1. Where does the U.S. rank in terms of infant morbidity and mortality compared to 29 other developed countries (with the top 5 having the lowest rates)?
 - a. In the top 5
 - b. 5-10th
 - c. 10-20th
 - d. 20-29th

2. Preconception care improves all the following outcomes except:
 - a. decreases the number of babies born with low birthweight
 - b. decreases the numbers of babies born prematurely
 - c. decreases the number of unintended pregnancies
 - d. promotes earlier entry into prenatal care in women with intended pregnancies

3. Which of the following is not considered one of the four main components of preconception care?
 - a. Assessment of maternal health
 - b. Assessment of vaccination status
 - c. Development of a reproductive plan
 - d. Screening for/management of disease processes
 - e. Providing counseling based on risk factors

4. Which of the following statements are true in reflecting the importance of the routine, ongoing delivery of preconception care to all women of childbearing age?
 - a. Only about half of women planning a pregnancy actually utilize the initial preconception visit before becoming pregnant
 - b. 25% of unplanned pregnancies occur in a month when contraception was used
 - c. Less than 40% of pregnancies are planned
 - d. The greatest risk for fetal harm occurs in the first 2-8 weeks after conception

5. Which of the following drugs are known to have teratogenic effects on the fetus and should be avoided in pregnancy?
 - a. rosuvastatin
 - b. clonazepam
 - c. tetracycline
 - d. carbamazepine
 - e. A and B
 - f. A, C, and D
 - g. All of the above

6. What is the recommended amount of daily folic acid women of childbearing age should be consuming?
 - a. 100 mcg
 - b. 400 mcg
 - c. 1 mg
 - d. 4 mg

7. Prior to completing this activity, please rate your perceived awareness about the importance of preconception care delivery to all women of childbearing age:
 - a. 5=extremely aware
 - b. 4=moderately aware
 - c. 3=somewhat aware
 - d. 2=slightly aware
 - e. 1=not at all aware

8. Prior to completing this activity, please rate your perceived knowledge about the components of preconception care:
 - a. 5=extremely knowledgeable
 - b. 4=moderately knowledgeable
 - c. 3=somewhat knowledgeable
 - d. 2=slightly knowledgeable
 - e. 1=not at all knowledgeable

9. Prior to completing this activity, how would you rate your confidence in providing preconception care to women of reproductive age:
 - a. 5=extremely confident
 - b. 4=moderately confident
 - c. 3=somewhat confident
 - d. 2=slightly confident
 - e. 1=not at all confident

10. Prior to completing this activity, what percent of time would you say you utilize preconception care in women of reproductive age:
 - a. Never
 - b. < 25%
 - c. 25-50%
 - d. 51-75%
 - e. >75%
 - f. Always

APPENDIX E. POSTTEST

1. Where does the U.S. rank in terms of infant morbidity and mortality compared to 29 other developed countries (with the top 5 having the lowest rates)?
 - a. In the top 5
 - b. 5-10th
 - c. 10-20th
 - d. **20-29th**

2. Preconception care improves all the following outcomes except:
 - a. decreases the number of babies born with low birthweight
 - b. decreases the numbers of babies born prematurely
 - c. **decreases the number of unintended pregnancies**
 - d. promotes earlier entry into prenatal care in women with intended pregnancies

3. Which of the following is not considered one of the four main components of preconception care?
 - a. Assessment of maternal health
 - b. Assessment of vaccination status
 - c. **Development of a reproductive plan**
 - d. Screening for/management of disease processes
 - e. Providing counseling based on risk factors

4. Which of the following statements are true in reflecting the importance of the routine, ongoing delivery of preconception care to all women of childbearing age?
 - a. Only about half of women planning a pregnancy actually utilize the initial preconception visit before becoming pregnant
 - b. 25% of unplanned pregnancies occur in a month when contraception was used
 - c. Less than 40% of pregnancies are planned
 - d. **The greatest risk for fetal harm occurs in the first 2-8 weeks after conception**

5. Which of the following drugs are known to have teratogenic effects on the fetus and should be avoided in pregnancy?
 - a. rosuvastatin
 - b. clonazepam
 - c. tetracycline
 - d. carbamazepine
 - e. A and B
 - f. A, C, and D
 - g. **All of the above**

6. What is the recommended amount of daily folic acid women of childbearing age should be consuming?

- a. 100 mcg
- b. 400 mcg**
- c. 1 mg
- d. 4 mg

APPENDIX F. EVALUATION QUESTIONS

1. Gender:
 - a. Male
 - b. Female

2. Years of experience in healthcare:
 - a. < 5 years
 - b. 5-10 years
 - c. 10-20 years
 - d. >20 years

3. In which region do you currently practice in?
 - a. Region 1: Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont
 - b. Region 2: New Jersey, New York, Puerto Rico
 - c. Region 3: District of Columbia, Delaware, Maryland, Pennsylvania, Virginia, West Virginia
 - d. Region 4: Kentucky, North Carolina, South Carolina, Tennessee
 - e. Region 5: Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin
 - f. Region 6: Arkansas, Louisiana, New Mexico, Oklahoma, Texas
 - g. Region 7: Iowa, Kansas, Missouri, Nebraska
 - h. Region 8: Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming
 - i. Region 9: Arizona, California, Hawaii, Nevada, Pacific U. S. Territories
 - j. Region 10: Alaska, Idaho, Oregon, Washington
 - k. Region 11: Alabama, Florida, Georgia, Mississippi, Caribbean U. S. Territories

4. What is your primary area of practice?
 - a. Family
 - b. Adult
 - c. Women's Health
 - d. Acute Care
 - e. Internal Medicine
 - f. Other

5. To what extent will this program enhance your ability to:
 1. Describe where the U.S. ranks in terms of infant mortality rates in comparison to other developed countries.
 2. Describe the specific benefits of preconception care to women of childbearing age.
 3. Discuss the importance of the routine, ongoing delivery of preconception care to all women of childbearing age.
 4. State the 4 components of preconception care that have the potential to affect future pregnancies.
 5. Describe at least 2 assessment/counseling topics that should be included in the routine delivery of preconception care.
 - a. Extremely/Completely
 - b. Very
 - c. Moderately
 - d. Slightly
 - e. Not at all

6. Following completion of the educational intervention, please rate your awareness about the importance of preconception care:
 - a. 5=extremely aware
 - b. 4=moderately aware
 - c. 3=somewhat aware
 - d. 2=slightly aware
 - e. 1=not at all aware

7. Following completion of the educational intervention, please rate your knowledge about the components of preconception care:
 - a. 5=extremely knowledgeable
 - b. 4=moderately knowledgeable
 - c. 3=somewhat knowledgeable
 - d. 2=slightly knowledgeable
 - e. 1=not at all knowledgeable

8. Following completion of the educational intervention, please rate your confidence in providing preconception care to women of reproductive age:
 - a. 5=extremely confident
 - b. 4=moderately confident
 - c. 3=somewhat confident
 - d. 2=slightly confident
 - e. 1=not at all confident

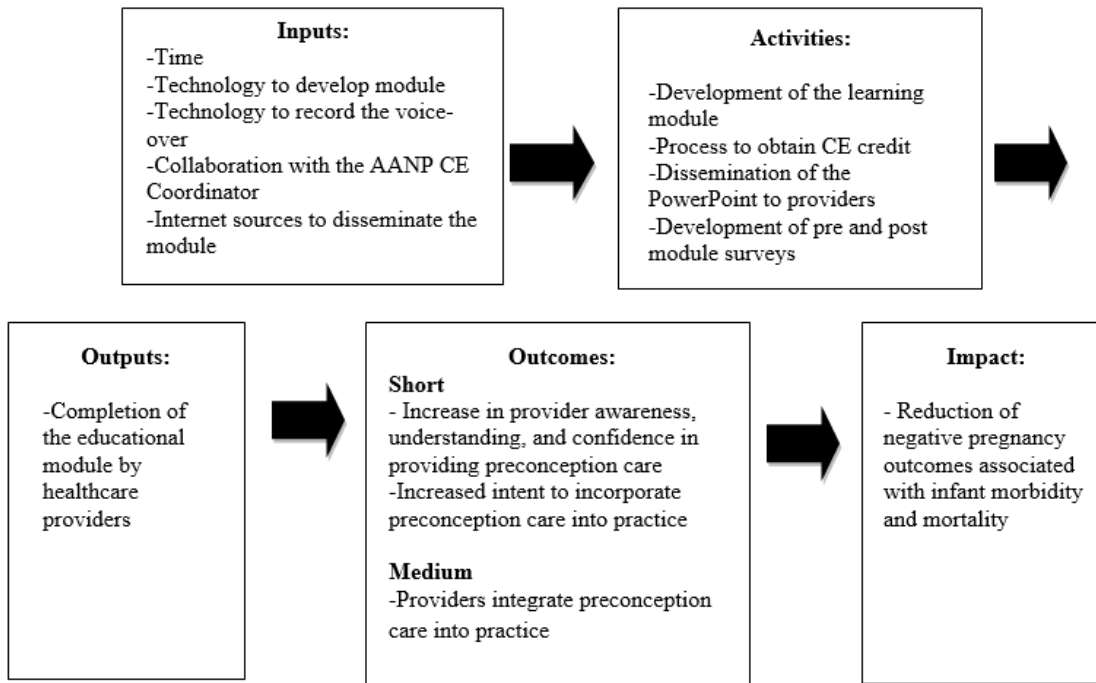
9. Following completion of the educational intervention, how likely are you to incorporate preconception care into every encounter you have with women of reproductive age?
 - a. 5=extremely likely
 - b. 4=likely
 - c. 3=neutral
 - d. 2=unlikely
 - e. 1=extremely unlikely

10. To what degree was the content balanced (free of commercial bias)?
 - a. Extremely/Completely
 - b. Very
 - c. Moderately
 - d. Slightly
 - e. Not at all

11. As a result of this educational activity:
 - a. I will modify my practice
 - b. I will seek more information before modifying my practice
 - c. I see no need to modify my practice

12. What, if any, practice change do you believe will occur as a result of participating in this educational offering?
 - a. Provide more thorough maternal assessments based upon preconception recommendations
 - b. Discuss reproductive life planning with patients of reproductive age
 - c. Perform thorough assessment and close management of disease processes known to effect pregnancy outcomes
 - d. Provide more in depth preconception counseling to patients of reproductive age
 - e. No changes will be made

APPENDIX G. LOGIC MODEL



APPENDIX H. MODULE OBJECTIVE AND ASSESSMENT QUESTIONS

Objective 1: Heighten provider awareness about the importance of preconception care delivery to all women of reproductive age	
Where does the U.S. rank in terms of infant morbidity and mortality compared to 29 other developed countries (with the top 5 having the lowest rates)?	<ul style="list-style-type: none"> a. In the top 5 b. 5-10th c. 10-20th d. <u>20-29th</u>
Preconception care improves all the following outcomes except:	<ul style="list-style-type: none"> a. Decrease the number of babies born with low birthweight b. Decrease the number of babies born prematurely c. <u>Decrease the number of unintended pregnancies</u> d. Promotes earlier entry into prenatal care in women with intended pregnancies.
Which of the following statements are true in reflecting the importance of the routine, ongoing delivery of preconception care to all women of childbearing age?	<ul style="list-style-type: none"> a. Only about half of women planning a pregnancy actually utilize the initial preconception visit before becoming pregnant b. 25% of unplanned pregnancies occur in a month when contraception was used c. Less than 40% of pregnancies are planned d. <u>The greatest risk for fetal harm occurs in the first 2-8 weeks after conception</u>
Prior to completing this activity/Following this activity, please rate your perceived awareness about the importance of preconception care delivery to all women of childbearing age:	<ul style="list-style-type: none"> a. 5= extremely aware b. 4=moderately aware c. 3=somewhat aware d. 2=slightly aware e. 1=not at all aware
Objective 2: Increase provider understanding about the components of preconception care that have the potential to affect future pregnancies	
Which of the following is not considered one of the four main components of preconception care?	<ul style="list-style-type: none"> a. Assessment of maternal health b. Assessment of vaccination status c. <u>Development of a reproductive plan</u> d. Screening for/management of disease processes e. Providing counseling based on risk factors
Which of the following drugs are known to have teratogenic effects on the fetus and should be avoided in pregnancy?	<ul style="list-style-type: none"> a. Rosuvastatin b. Clonazepam c. Tetracycline d. Carbamazepine e. A & B f. A, C, & D g. <u>All of the above</u>

What is the recommended amount of daily folic acid women of childbearing age should be consuming	<ul style="list-style-type: none"> a. 100 mcg b. <u>400 mcg</u> c. 1mg d. 4mg
Prior to completing this activity/Following completion of this activity, please rate your perceived knowledge about the components of preconception care:	<ul style="list-style-type: none"> a. 5= extremely aware b. 4=moderately aware c. 3=somewhat aware d. 2=slightly aware e. 1=not at all aware
Objective 3: Enhance provider confidence in providing preconception care on a routine basis in practice.	
Prior to completing this activity/Following completion of this intervention, how would you rate your confidence in providing preconception care to women of reproductive age:	<ul style="list-style-type: none"> a. 5= extremely confident b. 4=moderately confident c. 3=somewhat confident d. 2=slightly confident e. 1=not at all confident
Objective 4: Promote provider intent to incorporate preconception care in practice to all women of reproductive age	
Prior to completing this activity, what percent of time would you say you utilize preconception care in women of reproductive age:	<ul style="list-style-type: none"> a. Never b. <25% c. 25-50% d. 50-75% e. >75% f. Always
Following completion of the educational intervention, how likely are you to incorporate preconception care into every encounter you have with women of reproductive age?	<ul style="list-style-type: none"> a. Extremely likely b. Likely c. Neutral d. Unlikely e. Extremely unlikely
As a result of this educational activity:	<ul style="list-style-type: none"> a. I will modify my practice b. I will seek more information before modifying my practice c. I see no need to modify my practice
What, if any, practice change do you believe will occur as a result of participating in this	<ul style="list-style-type: none"> a. Provide more thorough maternal assessments based upon preconception recommendations b. Discuss reproductive life planning with patients of reproductive age c. Perform thorough assessment and close management of disease processes known to effect pregnancy outcomes d. Provide more in depth preconception counseling to patients of reproductive age e. No changes will be made

APPENDIX I. FURTHER EVALUATION QUESTIONS

Gender	<ul style="list-style-type: none"> a. Male b. Female
Years of experience in healthcare:	<ul style="list-style-type: none"> a. < 5 years b. 5-10 years c. 10-20 years d. >20 years
In what region do you currently practice?	States divided up into 11 regions for the participant to select
What is your primary area of practice?	<ul style="list-style-type: none"> a. Family b. Adult c. Women's Health d. Acute Care e. Internal Medicine f. Other
To what extent will this program enhance your ability to: 1. Describe where the U.S. ranks in terms of infant mortality rates in comparison to other developed countries. 2. Describe the specific benefits of preconception care to women of childbearing age. 3. Discuss the importance of the routine, ongoing delivery of preconception care to all women of childbearing age 4. State the 4 components of preconception care that have the potential to affect future pregnancies 5. Describe at least 2 assessment/counseling topics that should be included in the routine delivery of preconception care.	<ul style="list-style-type: none"> a. Extremely/completely b. Very c. Moderately d. Slightly e. Not at all
To what degree was the content balanced (free of commercial bias)?	<ul style="list-style-type: none"> a. Extremely/completely b. Very c. Moderately d. Slightly e. Not at all

APPENDIX J. EXECUTIVE SUMMARY

Background

Infant mortality and morbidity are important indicators of the health status of women both before and during pregnancy. Globally, infant mortality rates can provide information about the health of a nation. In 2010, the infant mortality rate in the United States (U.S.) was 6.1 per 1,000 live births (MacDorman et al., 2014). The U. S. ranked 26th among 29 developed countries in infant mortality, behind most European and Asian countries, Australia, and New Zealand (MacDorman et al., 2014).

According to Atrash et al. (2006), one of the reasons that progress in improving pregnancy outcomes has slowed down in this country is due to that fact that interventions have failed to intervene before pregnancy to detect, manage, modify, and control maternal behaviors that contribute to adverse maternal and infant outcomes. One solution to decreasing infant morbidity and mortality in the U.S. is to improve the health of women of childbearing age prior to pregnancy through the use of preconception care. Preconception care is recognized as a critical component of healthcare and "aims to promote the health of women of reproductive age before conception and thereby improve pregnancy related outcomes" (Centers for Disease Control and Prevention, 2006). Although several definitions for preconception care exist, the Centers for Disease Control and Prevention (CDC) defines preconception care as "a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management" (Centers for Disease Control and Prevention, 2006).

Preconception care has been shown to increase daily consumption of multivitamins with folic acid prior to pregnancy, encourage earlier entry into prenatal care in women with intended

pregnancies, promote cessation of drinking (Williams et al., 2011), promote weight loss in obese patients prior to pregnancy, and increase tobacco abstinence rates (Moos et al., 2008). Despite the potential for benefits that preconception care can have on the health of women and infants, research has shown that the amount of preconception care being provided to women varies greatly. According to Healthy People 2020 (2014), only about 30% of women report receiving preconception counseling from a healthcare provider. One of the barriers preventing healthcare providers from utilizing preconception care in their practice is a lack of knowledge and resources regarding how to provide such care (Mazza et al., 2013; Dunlop et al., 2007; Coffey & Shorten, 2014).

Project Summary

Based on the need for enhanced awareness and education about preconception care, a continuing educational module was developed in conjunction with the American Association of Nurse Practitioners Continuing Education Center (AANP CE Center). The module consists of a voice-over PowerPoint presentation that includes important information related to preconception care benefits, reproductive planning, maternal assessment, and counseling components. The module was disseminated to healthcare providers using the AANP CE Center website and available to both members and non-members of the AANP with around the clock access. The target audience for the module included any healthcare provider caring for women of reproductive potential.

Results

The module was evaluated through a series of pretest, posttest, and evaluation questions. Response data was collected for the first three months the module was live and had a total of 176 participants. Over 95% (n=168) of the participants were female and over half (n=101) had been

practicing for 10 years or less. Responses included those from participants in 11 different regions in the United States. Family practice nurse practitioners comprised over 57% (n=102) of the participants, with the specialty of women's health at 15.8% (n=28) representing the second most common area. The pretest, posttest, and evaluation questions correlated with the four learning objectives of the continuing education module, and included learning assessment questions related to awareness and knowledge about preconception care as well as Likert scales for participants to rate their perceived awareness, knowledge, confidence, and intent to incorporate preconception care into routine care before and after the intervention.

A comparison of pretest, posttest, and survey evaluation answers, reveals an increase in the percentage of correct answers, providing evidence of an increase in awareness and knowledge as a result of the learning intervention as well as an increase in provider confidence and intent to incorporate preconception care into routine practice. Over 80% (n=141) of participants stated their ability to meet the project objectives was either completely or very enhanced by the continuing education module. Furthermore, after completing the module, over 80% (n=147) of respondents reported they were likely to incorporate preconception care into every encounter they have with women of reproductive age and over half (57.6%; n=102) stated they would modify their practice. Participants provided mostly positive comments regarding the content and quality of the module. Overall, the results indicate the learning module had a positive impact on the participants, increasing their awareness about the importance of preconception care, knowledge about preconception components, confidence in providing preconception care, and intent to incorporate preconception counseling as part of their routine practice.

Recommendations

An overall documented increase in awareness, knowledge, confidence, and intent to incorporate preconception care into routine practice as a result of the learning intervention, makes this module an important tool in promoting positive pregnancy outcomes and reducing infant mortality. In addition to providing important educational information to providers, the practice improvement project also provides useful information regarding provider awareness and knowledge about preconception care both prior to and following the intervention. With 176 participants completing the module, the project offers important data related to the knowledge gap among healthcare providers in terms of providing competent preconception care. This gap in knowledge adds to the available literature documenting an overall lack of awareness and knowledge healthcare providers have about preconception care and further supports the call for increasing education efforts.

Despite the call for greater utilization of preconception care in practice, there still remains a great percentage of providers who lack adequate education regarding the components of preconception care. The positive results of the continuing education module, along with recommendations for the routine delivery of preconception care set forth by the American Academy of Pediatrics (AAP), American College of Obstetrics and Gynecology (ACOG), and the CDC, indicate that it is reasonable to recommend that all healthcare professionals caring for women of childbearing age participate in continuing education activities associated with providing preconception care. One implication for practice is for greater advertisements and campaigns that promote preconception health both in a healthcare as well as a public setting. Healthcare providers caring for women of reproductive age are at the forefront of this movement and have a responsibility not only to educate themselves, but also their colleagues, their patients,

and the general public about the importance of preconception care. Understanding preconception care's importance and components has the potential to encourage lifestyle changes that can improve maternal health prior to pregnancy, increasing the number of healthy pregnancies and decreasing infant mortality.

Healthcare providers caring for women of reproductive age need to develop a practice that utilizes preconception assessment and counseling as part of their routine care. With nearly half of pregnancies in the U.S. unplanned and the greatest potential for fetal harm occurring in the first eight weeks of pregnancy, preconception care must take place on a routine basis in order for it to be effective. Healthcare providers need to strive to include this care at every encounter they have with women of reproductive age in order to reach the maximum number of patients and have the greatest potential to reduce infant morbidity and mortality in the U.S associated with negative pregnancy outcomes.