

DISSERTATION

PRECONCEPTION HEALTH AND WELLNESS:
KNOWLEDGE AND ATTITUDES OF UNDERGRADUATE WOMEN

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ABSTRACT

PRECONCEPTION HEALTH AND WELLNESS: KNOWLEDGE AND ATTITUDES OF UNDERGRADUATE WOMEN

Despite recent acknowledgment of the importance of providing preconception care (PCC) to reproductive aged women, many women remain under-informed and underserved in this area. Guided by the tenets of the Information-Motivation-Behavioral Skills (IMB) model, the present study sought to evaluate the degree to which young, reproductive aged college women ($n=203$) are informed, motivated, and skilled to optimize preconception health. Overall, participants demonstrated low to moderate knowledge of issues related to preconception health, more favorable attitudes toward pregnancy prevention approaches, and propensities for reproductive health risk behaviors in several lifestyle areas. Improved dissemination of preconception health information to young women should include programming to increase the degree to which this population is motivated and skilled in optimizing reproductive health. Existing efforts and interventions to promote preconception health need to be expanded and new strategies developed.

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Introduction

Delineation of Preconception Care

Preconception care (PCC) aims to promote the health of women of reproductive age before conception, while preventing pregnancy-related outcomes such as low birthweight, premature birth, and infant mortality (Freda, Moos, & Curtis, 2006; Godfrey & Nachtigall, 2009; Johnson, Posner, Biermann, Cordero, Atrash, Parker, et al., 2006; Morgan, Hawks, Zinberg, & Schulkin, 2006; Wallace & Hurwitz, 1998). Specifically, preconception care is defined as “a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman’s health or pregnancy to have a maximal effect on health outcomes” (Johnson et al., 2006, p. 3). Programs of preconception health promotion should strive to include three central components: 1) the systematic and comprehensive identification of individual risks, 2) the dissemination of personalized, non-judgmental education, and 3) the access to complementary services (Cefalo & Moos, 1995).

Preconception Care: Past and Present

The notion of PCC and its relevance to healthy outcomes for aspiring parents and their future children is relatively new. Emerging in 1980 as a “specialty service” for women who had previously experienced compromised birth outcomes, education and development regarding PCC has grown substantially (Jack, Atrash, Bickmore, & Johnson, 2008). Despite recent gains in the theoretical appreciation for the value of PCC

information and the empowerment it may provide to reproductive age women, there has been only modest progress in the implementation of these concepts in clinical practice (Jack et al., 2008). National surveys indicate that most women (81%) of reproductive age seek regular, preventive health services each year – providing ample opportunity for health care providers to provide PCC information. However, only one in six obstetricians/gynecologists (OB/GYNs) or family physicians embrace such opportunities (Jack et al., 2008; Johnson et al., 2006).

Beginning in 1990, the United States Public Health Service recommended that all primary care providers should assess women of reproductive age for their preconception risk conditions and either directly provide or refer for preconception interventions as needed (Biermann, Dunlop, Brady, Dubin, & Brann, 2006; Freda, Moos, & Curtis, 2006; Korenbrot, Steinberg, Bender, & Newberry, 2002; Weisman, Hillemeier, Chase, Misra, Chuang, Parrott, & Dyer, 2008). This gap between the opportunities presented to physicians and care providers to intervene with their reproductive age patients and the actual provision of PCC prevention services is of considerable concern.

There are several barriers that have been implicated in the slowed growth of PCC care provision. Jack and Culpepper (1990) identified the following seven barriers to the effective dissemination of PCC health information: 1) those populations most in need of services are those least likely to receive them (e.g., demographic barriers such as low socioeconomic status, lack of medical insurance and/or coverage, etc) 2) the provision of services is often significantly fragmented, 3) there is a dearth of accessible treatment

services for high-risk behaviors, 4) reimbursement for risk assessment and preventive care is highly inadequate, 5) health promotion messages are not shown to be effective in the absence of patient motivation, 6) few preconception interventions have a substantial body of supportive data, and 7) many medical training programs do not emphasize the value of risk assessment and health promotion services. Taken together, these barriers serve to prevent women and couples from seeking information to maximize conception and pregnancy health outcomes, and represent a failure to effectively merge medical treatment philosophy with care delivery (Hillemeier, Weisman, Chase, Dyer, & Shaffer, 2007; Jack et al., 2008; Jack & Culpepper, 1990).

In order to be successfully adopted as routine practice in the United States, PCC must meet the needs and desires of patients, health professionals, and insurers alike (Prue & Daniel, 2006). This means that women and their partners may need to acknowledge that a healthy, wanted baby is in their potential future. For physicians, adopting PCC as routine practice means finding a balance between providing effective preventive services and tending to their urgent care caseload. Finally, for insurers, adjustments to service provision to meet both short and long-term financial goals are warranted (Prue & Daniel, 2006).

The Call to Improve PCC: A Shared Responsibility

There is a considerable body of literature calling on the professional medical community to better utilize opportunities with their patients to introduce and assess for knowledge, attitudes, and behaviors associated with optimal reproductive health.

Although historically specialists in the field of obstetrics and gynecology have directed the goals, content, and interventions that comprise preconception counseling, it has been suggested that PCC should instead be a multidisciplinary effort if its goals are to be fully achieved (Cefalo & Moos, 1995).

Fewer studies discuss how health educators may effectively intervene to improve the status of the dissemination of PCC information. All young people are deserving of access to the information and skills required to assist them in making responsible decisions about their sexuality; many students, however, do not have access to information regarding sexual education. Furthermore, the information that is available through sexual education may be narrowly focused and may not provide the necessary breadth to guide informed decision-making (Mabray & Labauve, 2002). Problematic with adolescent sexual education in the United States is its largely abstinence-only approach. This approach fosters several profound misperceptions among young people such as: a) abstinence is the only effective means of pregnancy prevention and b) there are no other health issues associated with sexuality other than pregnancy prevention (Mabray & Labauve, 2002). While research has shown growing support for the efficaciousness of comprehensive sexual education in reducing adverse consequences of sexual activity in adolescents (e.g., teen pregnancy, STI contraction, etc), fiscal policy in the United States has continued to allocate increasing amounts of funding to abstinence-only prevention programs. For example, the 2008 fiscal year budgeted proposed \$204

million for abstinence education as compared to only \$80 million in 2001 (Kohler, Manhart, & Lafferty, 2008).

Schalet (2000) conducted a study of adolescent sexuality in both the United States and the Netherlands and concluded that parents of adolescents in the United States largely ignore the sexuality of their children – often viewing teen sexuality as a lack of impulse control. Parents’ perspectives of adolescent sexual behavior, together with the generally narrow programming of many sexual education interventions, may deny young people (as well as their future children) information critical to maximizing healthy reproductive outcomes. Approaches to sexual education that are more multidimensional – incorporating health components, developmental issues, etc – are more likely to empower adolescents with information that serves to best protect and improve their future (Grobler, Botma, Jacobs, & Nel, 2007; Lindberg, Santelli, & Singh, 2006; Mabray & Lebauve, 2002). In sum, parents/caregivers in partnership with sexual health educators share a responsibility with the medical community to adequately inform young women of the broad scope of issues related to sexual health. Taken together, this united front may serve to nurture greater motivation for and behaviors toward optimal reproductive health.

Implicated Factors for Optimal Reproductive Health

Preconception health encompasses a wide range of areas including women’s genetic risks, overall health status, reproductive history, exposure to environmental toxins, and lifestyle. Moreover, risk factors such as pre-existing health conditions, exposure to dangerous substances, and engagement in high-risk behaviors (e.g., substance

use/abuse, excessive weight gain, etc) may increase the potential for adverse pregnancy and birth outcomes (Delgado, 2008). PCC, as with any preventive effort, is focused on the systematic study of potential precursors of dysfunction or health, called risk factors and protective factors, respectively. More specifically, risk factors refer to those variables associated with a high probability of onset, increased severity, and longer duration of health problems. Protective factors, on the other hand, are those that improve people's resistance to risk factors and disorder (Coie, Watt, West, Hawkins, Asarnow, Markman, et al., 1993).

Anderson and colleagues (2006) assessed the prevalence of risk factors for adverse pregnancy outcomes during the preconception period and throughout pregnancy. An important finding from this research was that risks for adverse pregnancy outcomes existed among more than half of women in the preconception period and among one-third of women who were pregnant. Nationwide, then, these figures represent approximately one million women in the preconception period and 835,000 pregnant women (Anderson, Ebrahim, Floyd, & Atrash, 2006). Many factors have been implicated in the prognosis for pregnancy outcome. Table 1 is a presentation of current research reflecting the relative contribution of several of these various factors of preconception health to the wellbeing of mother and child during pregnancy and birth.

Table 1

Implicated Factors for Optimal Reproductive Health and Pregnancy Outcomes

FACTORS	IMPLICATIONS
<i>Alcohol, Drugs, and Medications</i>	
Alcohol	<ul style="list-style-type: none"> • 33% of U.S. women report the use of alcohol during pregnancy (Biermann et al., 2006; Frey, 2002) • Fetal alcohol syndrome remains a significant concern in the U.S. • Even modest drinking during pregnancy can result in persistent neurobehavioral deficits in the womb (Frey, 2002)
Tobacco	<ul style="list-style-type: none"> • Smoking has been demonstrated to increase risk of infertility and complications during pregnancy (e.g., miscarriage, stillbirth, low birth weight) (Biermann et al., 2006; Frey, 2002; Roth & Taylor, 2001) • Women are largely unaware of these potential adverse effects of tobacco use (Roth & Taylor, 2001)
Illicit Drugs	<ul style="list-style-type: none"> • Adversely affect the health of the mother and contribute to higher incidences of low birth weight, premature birth, SIDS, growth retardation, congenital defects, and more (Kaiser & Hays, 2005)
Medications	<ul style="list-style-type: none"> • Prescription medications as well as herbal supplements have been identified as potentially harmful to fetal development (Frey, 2002)
<i>Environmental and Social</i>	
Environmental Toxins	<ul style="list-style-type: none"> • Range from occupational hazards to the use of everyday products in the home (Frey, 2002) • Can adversely interfere with typical embryonic development (Frey, 2002)
Intimate Partner Violence	<ul style="list-style-type: none"> • Women who are pregnant are at even greater risk of abuse during pregnancy (American College of Obstetrics and Gynecology, 2007)
<i>Nutrition and Exercise</i>	
General Diet and Weight	<ul style="list-style-type: none"> • Women who are pregnant are encouraged to follow a balanced diet and maintain an ideal Body Mass Index (BMI) for optimal embryonic development (Frey, 2002) • Pregnant women should be evaluated for the presence of eating disorders (Frey, 2002) • During pregnancy and while breastfeeding, women are discouraged from eating fish due to potential mercury exposure (Frey, 2002)
Supplements	<ul style="list-style-type: none"> • Pregnant women with more restrictive diets may consider supplementary vitamins and minerals (e.g., Iron, Folic Acid, etc) (Frey, 2002) • All pregnant women are encouraged to consume 0.4mg of folic acid per day (Frey, 2002; Hilton, 2007; Korenbrot et al., 2002)
Physical Activity	<ul style="list-style-type: none"> • Research demonstrates considerable benefit from exercise during pregnancy – for both the mother and the fetus (Cefalo & Moos, 1995; Frey 2002)

<i>Medical Conditions, Infections, and Immunizations</i>	
Diabetes	<ul style="list-style-type: none"> • Approximately 67% of women with diabetes who become pregnant do not intend to do so (Frey, 2002) • The most common anomalies in infants born to diabetic mothers are in organs that develop in the first eight weeks of gestation (Frey, 2002; Korenbrot et al., 2002)
Toxoplasmosis	<ul style="list-style-type: none"> • Pregnant women are discouraged from having contact with cats – specifically cat litter and waste (Cefalo & Moos, 1995) • Can lead to fetal development of cysts in the brain, retina, and muscles (Cefalo & Moos, 1995)
Chronic or Terminal Illness	<ul style="list-style-type: none"> • Critical to assess for mother’s history of high-risk behaviors and presence of infection such as Hepatitis B and HIV (Anderson et al., 2006; Frey, 2002) • Other disorders such as asthma, hypertension and seizure disorders can have adverse outcomes on pregnancy and birth weight
Vaccinations	<ul style="list-style-type: none"> • Pregnant women are encouraged to update their vaccinations and seek a seasonal flu shot (Frey, 2002)
Age	<ul style="list-style-type: none"> • Positive correlations have been found between maternal age (35 years and older) and the occurrence of chromosomal abnormalities, rates of infertility, and the likelihood of chronic illness (Frey, 2002) • Advanced paternal age (over 60 years) has also been linked to increased risk of fetal chromosomal abnormalities (Frey, 2002)
Family History	<ul style="list-style-type: none"> • A mother’s family history and ethnicity for specific genetic disorders and malformations should be considered pre-conception (Frey, 2002)

Preconception Care in the United States

Working to improve the delivery and dissemination of PCC health information is beneficial on many fronts and could serve to reduce overall societal costs (Johnson et al., 2006). In 2000, an estimated 62 million American women were of childbearing age (15-44 years). By age 25, approximately half of all women in the U.S. have experienced at least one birth, and approximately 85% of all women in the U.S. have given birth by 44 years of age (Johnson et al., 2006).

Recent studies demonstrate that, in the United States, approximately one in six couples of childbearing age experiences difficulties in conceiving or completing a successful pregnancy (Godfrey & Nachtigall, 2009). The Centers for Disease Control

and Prevention (CDC) recommends that risk assessment and education for infertility be provided as a routine part of the primary care visit for all reproductive age women. This is particularly important as only one third of women acknowledge communicating with their health care provider regarding issues related to preconception and pregnancy (Godfrey & Nachtigall, 2009). Unfortunately, since 1996, progress in the United States to further the implementation of PCC in routine health care practice has slowed substantially (Johnson et al., 2006).

Given that much of Western medicine is geared toward research and interventions related to treatment, it is not surprising that preventive care such as preconception counseling has been neglected both in research and practice. However, similar to many other issues with strong preventive campaigns (e.g., weight management, tobacco use, etc), the earlier a discussion regarding preconception health is initiated between a medical professional and the patient, the greater the efforts that can be made to enhance the likelihood for optimal conception and pregnancy outcomes.

Women's Attitudes Toward and Use of Preconception Health Services

Currently, most women are unaware of their pregnancy status until after the critical developmental period in the first several weeks has passed. This may expose the developing fetus to potentially harmful risks such as substance abuse, poor maternal health or disease, and so forth (Conrood, Bruce, Malcolm, Drachman, & Frey, 2009; Hillemeier et al., 2007; de Weerd, van der Big, Cikot, Braspenning, Braat, & Steegers, 2002). The embryonic stage (fertilization through 10 weeks gestation) of prenatal

development is thought to be too narrow a window in which to intervene to address many of the maternal health problems and risk factors that could potentially adversely impact the wellbeing of both mother and child (Weisman et al., 2008). Additionally, the fact that approximately half of U.S. pregnancies are unplanned implies that women may not even consider themselves as “preconceptional” – even if they are reproductive age or are considering pregnancy at some time in the future (Hillemeier et al., 2007).

Frey and Files (2006) investigated women’s general knowledge and beliefs regarding the optimization of their health prior to conception and their preferences for receiving information related to preconception health. The majority of participating women (98.6%) indicated that optimizing the health of a mother prior to conception would benefit the overall health of the pregnancy. Unfortunately, however, only 34.8% of participants reported that their physician had initiated conversation about their preconception health. Women indicated that they would prefer to receive PCC information from their primary care physician (51.3%) or their obstetrician-gynecologist (44%) (Frey & Files, 2006).

The authors also investigated the preconception health knowledge of the women who participated in the study. The study population demonstrated a high awareness of the risks associated with tobacco, alcohol, and drug use. They were much less aware, however, of the risks associated with the consumption of certain fish and exposure to cat litter. It is noteworthy that 70.6% of the participants of this study reported that they had no plans to become pregnant at the time of data collection (Frey &

Files, 2006). These data clearly present the gap in patient expectations regarding PCC-related services and the actual delivery of such services.

Unfortunately, many reproductive age women face barriers to accessing PCC. Such barriers include lack of health insurance, limited scope of health coverage, and ambiguity regarding where to acquire PCC (Hillemeier et al., 2007). Medicaid, for example, targets women only after conception and up to 60 days post-delivery, which means that opportunities for PCC interventions are entirely missed – particularly among poor and low-income women. Recent research estimated that 36.5 percent of women who had Medicaid benefits for childbirth between 1998-2000 did not have Medicaid coverage pre-pregnancy. The adverse impact of these issues is not limited to those with Medicaid. For example, the lack of billing codes associated with preconception services serves as a prominent barrier to service access for women with private health insurance (Anderson et al., 2006; Handler, Rosenberg, Rankin, Zimbeck, & Adams, 2006).

The research evidence regarding the use of PCC services is minimal, though the information that is available identifies the dearth of services provided (Hillemeier et al., 2007). While physicians tend to report introducing issues related to PCC in preventive visits with their female patients at fairly high rates, women indicate that many of these topics are not addressed during their medical appointments. For example, only one in four women reported receiving information related to the benefits of folic acid from their health care provided in a survey sponsored by the March of Dimes in 2004 (Hillemeier et al., 2007). Moreover, a recent survey of 499 women in primary care

practices revealed that 56 percent were very or somewhat interested in receiving preconception health information (Frey & Files, 2006).

Factors that have been determined to impact women's use of PCC services are several. Hillemeier and colleagues (2007) sought to understand those factors that may impact women's seeking preconception health care. The authors' most notable findings were the positive correlations between psychosocial stress and frequency of women's visits to an obstetrician-gynecologist, with receiving counseling regarding their general health, and with receiving counseling related to pregnancy planning. Cardiovascular risk (e.g., hypertension, high cholesterol, etc) and positive health behaviors (such as nutrition and physical activity) were also positively correlated with receiving general health counseling (Hillemeier et al., 2007).

Demographic variables such as age, educational attainment, marital status, socioeconomic status, and health insurance coverage were also found to significantly impact PCC use. Younger women with higher educational attainment were more likely to receive screening services and general health counseling. This may reflect increased levels of health awareness or more assertive health care seeking behaviors in this particular demographic. Additionally, being married or living with a partner was associated with greater services use. As would be expected, women without health insurance coverage were less likely to see an obstetrician-gynecologist or receive screening services related to PCC. Finally, poverty was found to be a significant risk

factor for suboptimal health care access and for poor birth outcomes (Hillemeier et al., 2007).

The Intersection of Preconception Care and Women of College Age

Reaching women prior to conception is challenging because approximately one half of all pregnancies in the United States are reported as unplanned (Biermann et al., 2006; Delgado, 2008; Hillemeier et al., 2007; Korenbrot et al., 2002). Additionally, the period of greatest sensitivity of the developing fetus to maternal risk factors and health conditions is between four and ten weeks of pregnancy (Korenbrot et al., 2002).

Preconception health information, then, needs to be provided to all women of reproductive age, independent of their reproductive status. Additionally, while PCC information is specific to pregnancy preparation, much of this same information is simultaneously beneficial for improving individuals' general health (e.g., managing health conditions, monitoring nutrition, and reducing high risk behaviors). In this way, PCC should be considered a vital component of a larger health-care model that supports healthier women and families (Delgado, 2008).

Delgado (2008) surveyed 241 undergraduate students at a private, southern university to assess student awareness of issues related to PCC health information and pregnancy. Participants were asked to indicate the degree to which they felt aware of the behaviors and other factors identified in the PCC-related questionnaire as being potentially dangerous to a developing baby during pregnancy. The majority of students indicated that they felt only slightly or moderately aware of the influence of behaviors

addressed in the questionnaire as relevant to pregnancy outcomes. Awareness among the factors presented in the student questionnaire varied a great deal. For example, students did demonstrate a high degree of awareness of the adverse impact of alcohol, tobacco, and illicit drug use during pregnancy (Delgado, 2008). However, students showed only moderate awareness of the impact and relevance of folic acid intake and relatively low awareness on health-related items such as weight gain and use of herbal products during pregnancy (Delgado, 2008).

Wimberly and colleagues (2003) conducted a qualitative study to investigate adolescent beliefs regarding fertility and conception. Themes pertaining to the causes of infertility that emerged as part of this study were: a) anatomic (e.g., ovarian or uterine abnormalities), b) sexually transmitted infections, c) genetics, d) substance use, e) stress, f) contraception, f) injury, h) violence, and i) environmental toxins (including tobacco use). The authors concluded that there are many misunderstandings of the mechanisms that truly underlie infertility and that these misunderstandings may lead to faulty decision-making regarding adolescent sexual behavior (e.g., choosing to abstain from contraceptive use, timing pregnancy, etc). Elucidating adolescent beliefs pertaining to fertility and conception is an important effort. Moreover, there is further evidence that young, reproductive age women are ill equipped by the medical community to make the healthiest choices for themselves and their potential future families (Wimberly et al., 2003).

These findings illuminate the considerable dearth of information provided to young adults of peak reproductive age. The author suggests that efforts to expand the scope of material provided at the high school level may serve to better address those areas of low and moderate awareness among young people. With the exception of the area of substance abuse, many college-aged adults seem to lack appropriate awareness of achieving and maintaining optimal reproductive health to maximize the likelihood of successful pregnancy and birth outcomes (Delgado, 2008). Increasing awareness in these areas could serve to reduce risk exposures and behaviors to ultimately improve the health and wellness of mothers, infants, and families alike.

Adolescent Awareness of Pregnancy Prevention and Contraception

In sharp contrast to the abovementioned findings related to adolescent awareness of preconception health information is adolescent awareness of pregnancy prevention information. Condom use is the most commonly known family planning method when male adolescents are surveyed and over 99 percent of males identify condom use as a primary pregnancy preventive method. Second to condom use is student awareness of the birth control pill with over 82 percent of female adolescents acknowledging “the pill” as a central method of pregnancy prevention (Deb, 2005).

Schrager and Hoffmann (2008) conducted a study to measure women’s knowledge of commonly used contraceptive methods. Women (aged 18-40) completed a written questionnaire containing nine true/false questions about various methods of contraception used to prevent pregnancy. Overall, the participants demonstrated a strong

awareness and knowledge of contraception methods (e.g., condoms, birth control pills, etc) (Schrager & Hoffmann, 2008). Similarly, an investigation of female college students' awareness of the effectiveness of various methods of pregnancy prevention revealed that nearly half of respondents overestimated the effectiveness of condoms, though 90 percent of the sample correctly estimated the efficacy of hormonal interventions (e.g., oral contraceptive pills) (Tessler & Peipert, 1997).

Traditional collegiate health education programs heighten awareness of the negative consequences of high-risk behaviors such as substance use (Eagle, Sheeder, Kelly, & Stevens-Simon, 2008). Scholly and colleagues (2005) discuss the term “health terrorism” – the tactic of utilizing threats of adverse effects to “scare the health into people.” However, the reality is that most students on college campuses do not engage in extremely high-risk health behaviors (Scholly, Katz, Gascoigne, & Holck, 2005). There is a meaningful gap, then, between the perceived health needs of college-aged adults and their actual needs. While much of the reproductive health information transmitted to adolescents and college students is centered in pregnancy prevention, little information related to PCC is provided. Inherently concerning in this cycle is that young, reproductive aged adults are not adequately armed with the health information they need to make the best decisions for themselves and their futures.

Adolescent Health Behaviors

Despite declines in teenage pregnancy over the past 30 years, birth rates among adolescents remain a considerable public health issue (Hueston, Geesey, & Diaz, 2008;

Talashek, Alba, & Patel, 2006). A primary reason for concern is that adolescent births are associated with higher rates of poor outcomes, such as low birth weight, when compared with birthing mothers in their twenties (Hueston, Geesey, & Diaz, 2008; Kaiser & Hays, 2005). Recent research suggests that adolescents who are pregnant tend to be members of minority populations and are more likely to be of a lower socioeconomic status. Additionally, pregnant teens are less likely to have health insurance coverage and are more likely to experience confusion regarding available prenatal services. Taken together, these factors predict poor use of prenatal care during pregnancy and increase risk of poor birth outcome (Hueston, Geesey, & Diaz, 2008; Talashek, Alba, & Patel, 2006).

Many health-risk behaviors among adolescents are considered to be underreported. Kaiser and Hays (2005) conducted a study to examine the frequency of prenatal health risk behaviors among first-time pregnant adolescents. Despite concerns related to participant underreporting, 27 percent of adolescents indicated continued tobacco use after becoming aware that they were pregnant. Six percent reported continued use of illicit drugs and one percent stated they were still consuming alcohol following confirmation of pregnancy (Kaiser & Hays, 2005).

College campuses provide an important context in which to study adolescent sexual behavior (Patrick, Maggs, & Abar, 2007). The percentage of students reporting that they are sexually active steadily rises throughout the college years, reaching approximately 86 percent by the senior year (Siegel, Klein, & Roghmann, 1999).

Adolescents and college students largely report high levels of awareness of contraceptive information (Skinner, Smith, Fenwick, Hendriks, Fyfe, & Kendall, 2009).

The Gap in Preconception Care and its Implications

Raising awareness of factors related to preconception health is critically important; many women – particularly young adults – enter pregnancy with pre-existing risks for adverse pregnancy and birth outcomes (Delgado, 2008). The presence of these risks can yield harmful effects as early as 17 days after conception – well in advance of the initial prenatal visit and often before a woman is aware that she is pregnant. For example, if a woman has her first prenatal visit following the first month of pregnancy, it is too late to prescribe folic acid supplementation to help prevent neural tube defects as the neural tube closes by the 28th day of fetal gestation (Biermann et al., 2006).

Unfortunately, the majority of adults in the United States, let alone adolescents, are not aware of many of the health and lifestyle factors that can influence pregnancy outcomes (Delgado, 2008). Moreover, some opportunities for effective intervention become obsolete after the confirmation of pregnancy or lose effectiveness very early on in the course of pregnancy (Korenbroet et al., 2002).

Hillemeier and colleagues (2007) conducted an interview study to investigate how health status and health risks of preconceptional women are related to their use of PCC services. An important finding of this study was that only half of the women who participated in the study reported that they had received any counseling with respect to pregnancy planning and that, even then, the counseling that had been provided was not

directly associated with specific health needs. This finding suggests that women at higher risk for adverse pregnancy outcomes are not any more likely to receive pregnancy planning counseling than their lower-risk counterparts (Hillemeier et al., 2007).

The Information, Motivation, and Behavioral Skills (IMB) Model for Preventive Health

The IMB model conceptualizes the psychological determinants of preventive behavior and provides a generalized framework for understanding and promoting health behavior. The model offers a set of causal relationships among informational, motivational, and behavioral skills factors as well as a set of operations to be utilized in the process of translating the relationships among these constructs into empirically supported prevention interventions (Fisher, Fisher, Amico, & Harman, 2006). While the model originally emerged as a basis for understanding HIV risk behavior, it has since been applied to the development of theoretically and empirically based interventions to promote healthy behavior change across a wide range of populations and health concerns (e.g., breast self-examination, exercise behavior, and smoking cessation) (Fisher, Fisher, & Shuper, 2009). The domain of preconception health seems to be an appropriate extension of the IMB model.

According to the IMB model, prevention *information* that is both directly relevant to preventive behaviors and readily utilized by an individual is an essential prerequisite to guide personal preventive action. In addition to the explicit valuation of concrete facts that are easy to translate into behavior, the IMB model acknowledges additional cognitive processes (such as prevention heuristics and implicit theories of risk) as facilitative of the

development of preventive behavior (Fisher, Fisher, & Shuper, 2009). These cognitive processes are considered bases upon which individuals make assessments regarding the necessity and utility of engaging in preventive actions.

Motivation to engage in preventive acts follows as an additional determinant of preventive behavior and directly influences the likelihood that even well-informed individuals will demonstrate an inclination to take action on what they know about a particular preventive strategy. The authors of the IMB model posit that motivation is influenced on both personal and social levels – personal attitudes toward the practice of certain behaviors and perceptions of social support for engaging in preventive acts (Fisher, Fisher, & Shuper, 2009).

The final construct central to the IMB model relates to those *behavioral skills* – an individual's objective ability and perceived self-efficacy – for engaging in behaviors associated with the practice of prevention. The IMB model specifies that prevention information and prevention motivation work primarily through prevention behavioral skills to influence general preventive behavior. Additionally, these central constructs should have specific content that is most relevant to the prevention needs of a particular population and a particular set of preventive practices (Fisher, Fisher, & Shuper, 2009). To the extent to which individuals are well-informed, highly motivated, and skilled, they are expected to initiate and maintain patterns of preventive behaviors.

As abovementioned, the IMB model not only offers a conceptualization for health behavior change, but also a framework for the development of conceptually-based and

empirically-targeted prevention interventions. The first stage in the process of changing preventive behavior involves *elicitation research*, which is conducted with a subsample for a target population for the purpose of identifying a population's deficits and assets in preventive information, motivation, and behavioral skills. The second stage involves the development of *empirically targeted interventions*, which are designed on the basis of the findings in the elicitation research. These interventions are then delivered to address a specific population's needs with regard to identified deficits of information, motivation, and behavioral skills. The final stage in the model is *evaluation research*; this goal of this stage is to determine whether an intervention has significant sustained effects on the information, motivation, and behavioral skills precursors of preventive behavior (Fisher, Fisher, & Shuper, 2009).

The IMB model serves as a parsimonious, evidence-based framework for conceptualizing the research goals of the present study. Additionally, the largely preventive nature of PCC is both acknowledged and supported by the IMB model. The present study would be considered a first step in the process of changing preventive behavior associated with preconception health and, ultimately, the well-being of women and families. It is hoped that this exploratory step will facilitate both the understanding and promotion of preconception health behavior in young adult women.

The Present Study

The goal of the present study was to evaluate the degree to which young, reproductive aged women are informed, motivated, and skilled in initiating and

maintaining patterns of preventive behaviors regarding preconception health. It was hoped that the findings may shed light on both the assets and deficits in preventive information, motivation, and behavioral skills related to preconception health.

Ultimately, the present study sought to provide foundational research in this area that may then lead to the development of empirically targeted interventions to address the reproductive health needs in young women. More broadly, the present study sought to inspire the system of care – health educators, medical professionals, and caregivers alike – working with young, reproductive aged women to carefully and thoroughly discuss issues related to optimizing preconception health. As the present study was largely exploratory in nature, the following research questions were offered in lieu of formal hypotheses (Fisher, Fisher, Bryan, & Misovich, 2002):

Q₁: To what extent are young women informed of the preventive strategies associated with healthy pregnancies and birth outcomes?

Q₂: To what extent are young women motivated to initiate and sustain preventive strategies associated with healthy pregnancies and birth outcomes?

Q₃: To what extent are young women skilled to practice effective preventive strategies associated with healthy pregnancies and birth outcomes?

Q₄: Are there certain demographic characteristics (e.g., age, educational attainment, employment status, socioeconomic status, etc) that may demonstrate significant effects with the degree to which young women are informed, motivated, and skilled in the domain of preconception health behavior?

*Q*₅: To what extent are young women informed of the preventive strategies associated with pregnancy prevention?

*Q*₆: To what extent are young women motivated to initiate and sustain preventive strategies associated with pregnancy prevention?

*Q*₇: To what extent are young women skilled to practice effective preventive strategies associated with pregnancy prevention?

*Q*₈: Are there certain demographic characteristics (e.g., age, educational attainment, employment status, socioeconomic status, etc) that may demonstrate significant effects with the degree to which young women are informed, motivated, and skilled in the domain of pregnancy prevention?

Extending beyond the exploration of the abovementioned research questions, this study also sought to provide validity information about the measures that have been developed and/or modified for use in the present study.

Methods

Participants

The data sample was comprised of 203 undergraduate women enrolled in an introductory psychology course at a large, mountain west university. The data collection period took place over the course of one academic semester (February through May 2010). Students were strongly encouraged to partake in psychological research as part of their academic curriculum and received academic credit for their participation. Criteria for exclusion from the study included whether the young women had given birth or had received prenatal care prior to study participation. Participants were largely self-reported White/non-Hispanic women (88.2%) with a mean age of 19.27 years ($SD = 2.09$). All grade levels were represented in the sample with a disproportionately greater number of first-year/sophomore level students (82.8%). Table 2 provides additional information relevant to the demographic characteristics of this sample.

Table 2

Sample Demographic Characteristics (n =203)

Characteristics	<i>n</i>	<i>%</i>
<i>Relationship Status</i>		
Single	99	48.8
Partnered	101	49.8
Married	2	1.0

<i>Employment Status</i>		
Employed	98	48.3
Unemployed	105	51.7
<i>Family Annual Income</i>		
Below \$30,000	14	6.9
\$30,000 - \$50,000	33	16.3
\$51,000 - \$75,000	44	21.7
\$76,000 - \$100,000	54	2.6
Over \$101,000	57	28.1
<i>Anticipated Education</i>		
Bachelor's Degree	58	28.6
Master's Degree	111	54.7
Doctoral Degree	33	16.3

Measures

Background Information Form. All participants were asked to complete a self-report background information form, which was created for the purpose of the present study. The form consisted of 40 items that assessed potentially relevant demographic information such as: race/ethnicity, age, and socio-economic status. Subjects were directly asked about potential risk factors associated with an increased need for preconception care as well as their perceptions of dissemination of information related to preconception care and pregnancy prevention. Items also assessed information relevant to the following: a) the degree to which students are informed of preventive strategies related to preconception health and pregnancy prevention, b) the degree to which students are motivated to engage such preventive strategies, and c) current behavioral practices associated with pregnancy prevention and preconception health (see Appendix A).

Reproductive Health Attitudes and Behavior Questionnaire. The Reproductive Health Attitudes and Behavior (RHAB) Questionnaire was developed as a theory-based instrument to assess issues related to reproductive health in adolescent females with diabetes (Charron-Prochownik et al., 2006). In the original study, the RHAB consisted of 10 subscales representative of constructs from three major social cognitive models: 1) Health Belief Model (HBM), 2) Theory of Reasoned Action (TRA), and 3) Social Cognitive Theory (SCT), with a total of 44 items. Most of the items were ordinal data, which are scored on a Likert-type scale (Wang, Charron-Prochownik, Sereika, Siminerio, & Kim, 2006).

Target behaviors included obtaining preconception counseling and using effective birth control methods, and subscales were broken down according theory. HBM included 5 scales, with higher summative scores reflecting stronger levels of beliefs. The subscales were: 1) Perceived susceptibility to complications of pregnancy and to becoming pregnant, 2) Perceived severity of complications of pregnancy and of becoming pregnant, 3) Perceived benefits of birth control and PCC, 4) Perceived barriers to using birth control and PCC, and 5) Cues to action – triggers to preconception planning behaviors (Wang et al., 2006). TRA included three scales, with higher summative scores reflecting higher positive anchor of the constructs: 1) Personal attitudes, 2) Subjective norms, and 3) Intention. SCT included two scales: 1) Self-efficacy and 2) Outcome expectations (Wang et al., 2006).

The present study used a modified version of the RHAB to be made applicable to a broader population of young women. The adapted RHAB used in the present study consisted of 40 items and remained representative of all 10 original subscales; items specifically related to diabetes and diabetes management were omitted (See Appendix B). *Reproductive Health Knowledge Scale for Women*. The Reproductive Health Knowledge Scale for Women (RHKS-W), developed by the author, was used to obtain information regarding the extent to which young women are informed of issues related to preconception health and pregnancy prevention. The questionnaire contained fifty-two items with a dichotomous response choice pattern: a) true and b) false. Items are evenly divided between those that assess knowledge of information pertinent to preconception health and those that assess knowledge of pregnancy prevention.

A composite score indicating the percentage of items answered correctly for each participant was used to evaluate student knowledge. Items for the RHKS-W were derived from content presented in the following sources: a) *Preconceptional Health Care: A Practical Guide, 2nd edition* (Cefalo & Moos, 1995), b) a previous study of undergraduate awareness of preconception health (Delgado, 2008) and c) the Canadian Federation for Sexual Health (2005) *Beyond the Basics: A Sourcebook on Sexual and Reproductive Health Education, 2nd edition* (see Appendix C).

Procedure

At the time of study participation, students were presented with an overview of the study procedures and asked to provide their written informed consent. Participants

then completed the Background Information Form, RHKS-W, and RHAB. Study participation required approximately 30 minutes. At the conclusion of their study participation, students were given the opportunity to ask questions of the research staff. Additionally, participants were anonymously invited to offer their electronic contact information so that they may learn of the findings at the conclusion of the study if they would choose. While participant names were collected for purposes of assigning appropriate academic credit and debriefing information, study materials were de-identified so that participants may remain anonymous.

Statistical Analyses

This study design was located within a quantitative paradigm designed to assess the degree to which young women are informed of, motivated for, and behaviorally exercising those strategies associated with optimal reproductive health. Reproductive health was considered broadly and was generally measured as two overarching constructs – 1) preconception health and 2) pregnancy prevention and contraception. The present study was conducted in order to shed light on the degree to which young women are aware of their general reproductive health in an effort to guide interventions that may best equip them to make health-related decisions that optimize pregnancy and birth outcomes. The present study used a multi-step approach to data analysis to address each research question:

Step One. Frequency and descriptive statistics for all demographic variables were calculated to provide information on both the more general characteristics of this sample.

Step Two. To evaluate item quality of the instrument developed for the purposes of the present study, classical item analysis was performed on the RHKS-W. Classical item analysis, “typically includes such tasks as gauging difficulty (prevalence of correct responses) and discrimination (ability to differentiate respondents on the trait being measured) for each item as well as estimating score reliability and distribution for the set of items to be used as a whole” (Lei & Wu, 2007, p. 527).

Step Three. To evaluate the informative value and impact of the modifications made on the RHAB, an exploratory factor analysis was performed. The factor-analytically derived dimensions served as subscales for the adapted RHAB that are representative of theoretical constructs consistent with the IMB model (Floyd & Widaman, 1995).

Step Four. Statistical analyses were conducted to examine the potential significant effects of demographic variables on the degree to which participants are informed, motivated, and skilled in the domains of preconception health and pregnancy prevention.

Step Five. Comparative and inferential statistical methods were used to evaluate the relationships among the self-report items on the Background Information Form and measured performance on both the RHAB and RHKS-W.

Table 3 (presented on next page) outlines the statistical approaches used to specifically address each of the research questions posed in the present study.

Table 3

Analytical Approach by Research Question

#	<i>Research Question</i>	<i>Analytical Approach</i>
1.	To what extent are young women informed of the preventive strategies associated with healthy pregnancies and birth outcomes?	Composite scores on the RHKS-W yielded an overall score to reflect the measured level of knowledge related to reproductive health. Participants also responded to self-report items designed to assess the degree to which they perceive they are knowledgeable.
5.	To what extent are young women informed of the preventive strategies associated with pregnancy prevention?	
2.	To what extent are young women motivated to initiate and sustain preventive strategies associated with healthy pregnancies and birth outcomes?	Several subscales on the RHAB provided information related to young women's individual attitudes, perceptions of social norms, and perceived relevance of issues related to both preconception health and pregnancy prevention.
6.	To what extent are young women motivated to initiate and sustain preventive strategies associated with pregnancy prevention?	
3.	To what extent are young women skilled to practice effective preventive strategies associated with healthy pregnancies and birth outcomes?	The Background Information Form asked participants to report information relevant to identified risk factors for reproductive health (e.g., drug/alcohol/tobacco use, exercise frequency, diet, condom use, etc). Moreover, two subscales on the RHAB provided scores reflective of participants' self-efficacy regarding behaviors associated with both preconception health and pregnancy prevention.
7.	To what extent are young women skilled to practice effective preventive strategies associated with pregnancy prevention?	

- | | | |
|----|--|--|
| 4. | Are there certain demographic characteristics (e.g., age, educational attainment, employment status, socioeconomic status, etc) that may demonstrate significant effects with the degree to which young women are informed, motivated, and skilled in the domain of health behavior? | Correlational and inferential analyses were utilized to examine how certain demographic characteristics impacted the degree to which young women were measured to be informed, motivated, in skilled with regard to both preconception health behavior and pregnancy prevention. |
| 8. | Are there certain demographic characteristics (e.g., age, educational attainment, employment status, socioeconomic status, etc) that may demonstrate significant effects the degree to which young women are informed, motivated, and skilled in the domain of pregnancy prevention? | |
-

Results

Part One: Frequency and Descriptive Statistics

These data are presented in Table 4 and summarize findings related to the following sample dimensions: a) reproductive health risk factors, b) general health information, c) exposure to reproductive health information, and d) self-perceptions of reproductive health knowledge.

Part Two: RHKS-W and Classical Item Analysis

Classical item analysis was used to explore the psychometric properties of the RHKS-W so as to identify subscales that measure latent constructs within the overarching domain of reproductive health. Two knowledge subscales – 1) preconception health and 2) pregnancy prevention – were further examined. The discrimination (*D*-index), individual item difficulty based on the degree to which an item was answered correctly (*p*-value), and inter-item correlations determined the construction of the scales (see Table 5). Discrimination scores range from -1 to 1 with positive values indicating that higher performing students tended to choose the correct answer for a specific item than lower performing students; negative discrimination scores would be interpreted conversely – that lower performing students tended to respond correctly to a particular test item (<http://fcit.usf.edu/assessment/selected/responsec.html>; Lei & Wu, 2007). For

dichotomous items, as with the RHKS-W, p -values range from 0 to 1 with higher values indicating easier items (Lei & Wu, 2007) (see Table 5).

The results of the Classical Item Analysis demonstrated that the RHKS-W does not meet standard psychometric measurement guidelines. In light of the exploratory nature of the present study, however, composite scores (derived as total items correct) were used to represent each of the two subscales of the RHKS-W to conduct further analyses.

Part Three: Modified RHAB and Factor Analysis

Content Validity: The items utilized in the subscales for the RHAB were either directly taken or adapted from the original used by Charron-Prochownik et al. in 2006. The original RHAB was a modification of a validated “Pregnancy and Diabetes Interview Schedule,” which was a theory-based questionnaire developed by Janz, Herman, and Becker (1995).

Exploratory Factor Analysis: Results of the exploratory factor analysis revealed that all underlying constructs related to either preconception health or birth control, though the items pertinent to each were separated on different factors. Based on factor extraction and eigenvalues, 10 factors were identified; there were five factors that related to both dimensions, preconception health and birth control, respectively. The five factors within each dimension were named identically and were representative of the following motivational constructs: 1) Individual Attitudes, 2) Perceived Social Norms, 3) Self-Applicability, 4) Self-Efficacy, and 5) Perceived Severity.

The Individual Attitudes subscale was determined to be representative of participants' attitudes regarding the utility of preconception health or contraception for their intended outcomes (e.g., healthier pregnancies and families or pregnancy prevention). Scores on the Individual Attitudes subscale range from 0 to 10 for both the preconception health and pregnancy prevention and contraception domains. The Perceived Social Norms subscale was conceptualized to represent the degree to which individuals perceive these behaviors (e.g., seeking preconception counseling or using birth control) to be normative and experience social influence with regard to these behaviors. Scores on the Perceived Social Norms Subscale ranged from 0-25 for the preconception health domain and 0-20 for the pregnancy prevention and contraception domain. The Self-Efficacy subscale was determined to be representative of students' confidence to follow through with seeking preconception counseling or using birth control. Scores for the Self-Efficacy subscale range from 0-10 for the preconception health domain and 0-30 for the pregnancy prevention and contraception subscale. Lastly, the Perceived Severity subscale was conceptualized as representative of women's level of worry if they do not engage in behaviors such as seeking preconception counseling or using birth control. Scores for the Perceived Severity subscale range from 0-10 for both domains. Each of these five factors was determined to be representative of the motivational component of the IMB model.

Items with an eigenvalue of less than 0.4 were not retained in the model (see Table 6). The Self-Applicability subscale was considered representative of participants'

personal connection with the value of preconception counseling and birth control use. As the items comprising these scales were binary in nature, they were not scored in a continuous way.

Part Four: Demographic Analyses.

Q₄: Are there certain demographic characteristics (e.g., age, educational attainment, employment status, socioeconomic status, etc) that may predict the degree to which young women are informed, motivated, and skilled in the domain of preconception health behavior?

Q₈: Are there certain demographic characteristics (e.g., age, educational attainment, employment status, socioeconomic status, etc) that may predict the degree to which young women are informed, motivated, and skilled in the domain of pregnancy prevention?

The interrelationships between various demographic characteristics of the sample and measured levels of knowledge, motivation, and behavioral skill were explored using the independent-samples *t*-test with binary predictors, one-way analysis of variance (ANOVA) with polytomous predictors, and correlational analyses with continuous predictors. Based on findings in previous literature (Hillemeier et al., 2007), the following demographic variables were explored: 1) age, 2) relationship status, 3) employment status, 4) family annual income, and 5) anticipated highest level of education.

Information. The correlation between age and preconception health knowledge was significant ($r(201) = .22, p < .01$) with older participants demonstrating greater knowledge of preconception health as measured by the composite score on the preconception health subscale of the RHKS-W (see Table 7). Independent-samples t -tests were conducted to examine whether relationship status or employment status impacted performance on either the preconception health subscale or the pregnancy prevention and contraception subscale of the RHKS-W (see Table 8). There were no significant findings in these analyses.

One-way ANOVAs were conducted to explore the degree to which family annual income and participants' anticipated highest level of education influenced scores on the RHKS-W; these findings were not significant. One-way ANOVA analyses were also performed using the following behavioral variables: a) alcohol use, b) healthy diet, c) exercise, and d) condom use to assess their relationships with RHKS-W scores. Consistent with the aforementioned findings, these results were not significant indicating that participants did not score differently on the RHKS-W based on the degree to which they reported alcohol use, exercise frequency, nutritional awareness, and regularity of condom use (see Table 8).

Motivation. The correlation between age and perceived social norms of pregnancy prevention and contraception was significant ($r(201) = -.20, p < .01$) such that younger participants reported a greater sense of normative contraceptive use. The correlation between age and self-efficacy to engage in behaviors associated with

pregnancy prevention was also significant ($r(201) = -.21, p < .01$) with older women demonstrating a lower likelihood of prioritizing contraceptive use in their sexual relationships. There were no significant correlations between age and preconception health motivational subscales of the RHAB (see Table 7).

There were several significant correlations between RHAB motivational subscales for preconception health and pregnancy prevention and contraception, respectively. The Individual Attitudes subscale for both domains were significantly positively correlated ($r(201) = .16, p < .05$) (see Table 7). Additionally, the Perceived Social Norms subscales were significantly positively correlated ($r(201) = .35, p < .01$) (see Table 7) such that women with higher scores on this subscale for the preconception health domain were more likely to score higher on this subscale for the pregnancy prevention and contraception domain. Lastly, the Perceived Severity subscale scores for both domains were also significantly positively correlated ($r(201) = .25, p < .01$) (see Table 7). The two Self-Efficacy subscales were not significantly correlated (see Table 7).

An independent-samples *t*-test was conducted to explore the degree to which participants' relationship status affected scores on the motivational subscales of the RHAB. The test approached significance for the Individual Attitudes subscale for pregnancy prevention and contraception ($t(201) = 2.55, p = .055$) (see Table 10). Participants who self-identified as single ($n = 99$) were more likely to report more positive attitudes about pregnancy prevention and contraception ($M = 7.03, SD = 1.19$)

than those who self-identified as partnered or married ($n = 111$, $M = 6.58$, $SD = 1.33$) (see Table 10).

In an effort to explore the relationship between employment status and the degree to which participants are motivated to engage in preconception health and pregnancy prevention domains, an independent-samples t -test was conducted. There was a significant relationship between employment status and the Self-Efficacy subscale of the pregnancy prevention and contraception domain on the RHAB ($t(201) = 1.59$, $p = .00$) (see Table 10). These results demonstrated that students who self-identified as employed reported higher levels of self-efficacy to engage in preventive behaviors (e.g., frequency of condom use, ability to delay sex when birth control is not available, etc). Additionally, employed participants scored lower on the Perceived Social Norms subscale in the preconception health domain ($t(201) = -.25$, $p = .03$) (see Tables 9 and 10). These findings indicated that employed students were less likely to report that friends, family members, or partners felt that they should seek PCC.

Behavioral Skills. Chi-Square analyses were used to explore the interrelationships between demographic characteristics and the degree to which young women are skilled in the domains of preconception health and pregnancy prevention. The following demographic characteristics were considered: a) relationship status, b) employment status, c) annual family income, and d) anticipated education level. There were no significant differences found between these demographic characteristics and the behavioral skills assessed in the present study.

Part Five: Comparative and Inferential Statistics

Comparative and inferential analyses were utilized to examine the degree to which young women were measured to be informed, motivated, and skilled with regard to preconception health and pregnancy prevention. Where applicable, participant background characteristics and their effect on the observed levels of information, motivation, and behavioral skills in this sample were explored also. What follows is a presentation of these results in accordance with the research questions set forth in the present study.

Addressing the Research Questions:

Q₁: To what extent are young women informed of the preventive strategies associated with healthy pregnancies and birth outcomes?

Q₅: To what extent are young women informed of the preventive strategies associated with pregnancy prevention?

The RHKS-W provided information about the degree to which young women were able to demonstrate knowledge of both preconception health and pregnancy prevention and contraception. While psychometrically limited, it is noteworthy that students demonstrated substantially higher knowledge of pregnancy prevention and contraception ($M = 83.19$, $SD = 7.52$) than they did of preconception health ($M = 59.23$, $SD = 9.52$). Participants were also asked to provide self-report information regarding their perceptions of self-knowledge in domains of preconception health and pregnancy prevention and contraception. On a scale of 0 (“Very Limited”) to 4 (“Very Strong”),

participants rated themselves higher in the area of pregnancy prevention and contraception ($M = 2.25$, $SD = .71$) when compared to their self-ratings in the area of preconception health ($M = 1.41$, $SD = .85$). In total, 65.8 percent of participants rated their knowledge higher in the area of pregnancy prevention and contraception.

The Background Information Form, created for the purpose of the present study, asked participants about the dissemination of knowledge related to preconception health and pregnancy prevention and contraception by both medical professionals and through sexual education programming. Frequency data (see Table 4) revealed that 169 young women (83.3%) had talked about pregnancy prevention and contraception with a medical professional; however, only 40 young women (19.7%) reported that they had talked with a medical professional about preconception health. The results of a McNemar chi-square statistic indicated that significantly fewer participants had been introduced to issues related to preconception health by a medical professional ($p < .05$). Participants were also asked about both the breadth and depth of the sexual education programming they had received. Subjects reported generally favorable reviews with 161 individuals (79.3%) indicating that the quality of the sexual education they had received was “somewhat strong” or “very strong” and 143 young women (70.4%) indicating that the breadth of their sexual education was “somewhat broad” or “very broad” (see Table 4).

Q₂: To what extent are young women motivated to initiate and sustain preventive strategies associated with healthy pregnancies and birth outcomes?

Q₆: To what extent are young women motivated to initiate and sustain preventive strategies associated with pregnancy prevention?

As previously mentioned, there were five dimensions that emerged in the RHAB measuring motivational factors for both preconception health and pregnancy prevention and contraception. Paired-samples *t*-tests were conducted to explore significant differences among the following motivational subscales as measured in the RHAB: 1) Individual Attitudes, 2) Perceived Social Norms, 3) Self-Efficacy, and 4) Perceived Severity. The Self-Applicability subscale was not explored in these analyses due to the binary response nature of the items. Results of the *t*-test revealed that participants in the present study reported significantly more favorable attitudes toward pregnancy prevention and contraception ($M = 6.81, SD = 1.29$) than preconception health ($M = 6.43, SD = 1.63$), $t(202) = -2.80, p < .01$. Moreover, young women reported significantly greater perceived severity with factors related to preconception health ($M = 4.51, SD = 2.33$) in comparison with those factors related to pregnancy prevention and contraception ($M = 3.84, SD = 2.16$), $t(202) = 3.47, p < .01$. Finally, as both the Perceived Social Norms and Self-Efficacy subscales are not identically scored for both domains, these subscales were not statistically compared.

There were several behavioral characteristics of the sample that impacted the degree to which young women felt motivated across the subscales of the RHAB. For example, a one-way ANOVA revealed that alcohol use frequency had a significant effect on the Self-Efficacy subscale score in the domain of pregnancy prevention and

contraception ($F(2, 199) = 3.21, p = .02$) (see Table 10). Post-hoc comparisons using the Tukey's HSD test revealed that the mean self-efficacy subscale score for young women who reported being abstinent from alcohol use ($M = 27.21, SD = 3.87$) was significantly higher than those who reported using alcohol three or more days per week ($M = 20.03, SD = 4.76$). Additionally, one-way ANOVAs were conducted to explore how condom use frequency and the motivational subscales of the RHAB are related. There was a significant effect for condom use frequency on the Self-Efficacy subscale for pregnancy prevention ($F(4, 195) = 4.55, p = .002$) (see Table 10). Tukey's HSD revealed that women who reported using condoms "all of the time" scored significantly higher on the Self-Efficacy subscale ($M = 27.59, SD = 3.19$) in comparison with those who reported using condoms "not much of the time" ($M = 25.40, SD = 4.20$) or "some of the time" ($M = 24.21, SD = 5.50$) ($p < .05$) (see Table 10). Moreover, there was a significant effect on the Individual Attitudes subscale for pregnancy prevention and contraception ($F(4, 196) = 2.39, p = .05$). The Tukey's HSD post-hoc analyses indicated that individuals reported using condoms "not much of the time" scored significantly higher ($M = 7.15, SD = 1.10$) on the Individual Attitudes subscale in comparison with those who reported condom use as "not applicable/not sexually active" ($M = 6.43, SD = 1.50$) ($p < .05$) (see Table 10). One-way ANOVAs were also conducted to examine the interrelationships between behavioral characteristics and motivational subscales of the preconception health domain of the RHAB; there were no significant findings in these analyses (see Table 9).

*Q*₃: To what extent are young women skilled to practice effective preventive strategies associated with healthy pregnancies and birth outcomes?

*Q*₇: To what extent are young women skilled to practice effective preventive strategies associated with pregnancy prevention?

The exploration of young women's behavioral skills as they relate to both preconception health and pregnancy prevention and contraception is best achieved through closer examination of the frequency data (see Table 4). The majority of young women sampled ($n = 125$, 61.6%) reported using alcohol at least once per week; however, only 7.4 percent reported regular tobacco use. While many participants ($n = 188$, 92.6%) indicated "somewhat strong" or "very strong" awareness of healthy nutritional guidelines, far fewer ($n = 98$, 59.6%) reported that they follow these guidelines "most of the time" or "all of the time." With regard to exercise, more than half of women in the sample ($n = 120$, 59.1%) reported that they work out at least three days per week.

Discussion

Summary of Findings

Purpose. Guided by the tenets of the IMB model, the present study sought to evaluate the degree to which young, reproductive aged women are informed, motivated, and skilled in initiating and maintaining patterns of preventive behaviors regarding preconception health. The IMB model provides a compelling theoretical framework that presents a multidimensional approach to assessing the strengths and needs of young women with regard to reproductive health in the spirit of prioritizing preventive research and intervention development. In light of the potential seriousness of high-risk health behaviors among adolescents, the susceptibility for an unplanned pregnancy among adolescent women, and the well-established benefits of PCC, empirical research designed to evaluate adolescent awareness of issues related to optimizing preconception health is warranted (Charron-Prochownik et al., 2006; Kaiser & Hays, 2005). It was hoped that the findings of the present study might shed light on both the assets and deficits in preventive information, motivation, and behavioral skills related to preconception health. More broadly, the present study sought to provide initial research in this area that may then facilitate the development of empirically targeted interventions to address the reproductive health needs of adolescent and young adult women (Fisher et al., 2002).

Information. Previous investigations exploring the degree to which young women are informed of factors related to preconception health and pregnancy have yielded findings that demonstrate many are unaware of the plethora of lifestyle factors that influence reproductive health and child-bearing (Delgado, 2008). Consistent with previous research (Delgado, 2008), the majority of women surveyed indicated that they felt only slightly or moderately aware of the influence of certain lifestyle behaviors on pregnancy and birth outcomes. A significantly greater proportion of the sample (65.8%) reported higher levels of knowledge in the domain of pregnancy prevention and contraception as compared to that of preconception health. These self-reported levels of awareness appear to be a reasonable reflection of students' measured knowledge via the RHKS-W. Statistical comparison of the composite scores, generated as total percent correct, showed that participants scored significantly higher ($M = 83.19\%$) on the pregnancy prevention and contraception subscale than they did on the preconception health subscale ($M = 59.23\%$). These findings of low to moderate awareness across many areas related to preconception health and pregnancy illuminate the dearth of information provided to young women regarding this set of issues. There was a significant positive correlation between age and performance on the preconception health subscale of the RHKS-W such that older participants scored higher. This finding is unsurprising given the known risk of increased health problems during pregnancy with the advancement of maternal age. It is more likely that these women have been

introduced to preconception health issues by medical professionals or others in their community as pregnancy becomes more salient in their lives.

In light of the role of medical professionals in the provision of preconception health information, participants were asked to report whether or not they had experienced such conversations in a medical setting. The majority of young women (83.3%) reported that a medical professional had initiated discussion of pregnancy prevention and contraception; however, only 40 percent reported that such discussion had occurred regarding preconception health. This striking disparity in the communication between medical professionals and their female patients may serve as one area where young women could be better informed and empowered to make decisions consistent with optimizing their reproductive health.

While medical professionals do carry a certain level of responsibility to provide women with critical health information, sexual education programming is another way in which young people are exposed to issues related to reproductive health. As such, participants were asked about both the breadth and depth of the sexual education programming they had received. Subjects reported generally favorable reviews with 79.3 percent indicating that the quality of the sexual education they had received was “somewhat strong” or “very strong” and 70.4% indicating that the breadth of their sexual education was “somewhat broad” or “very broad.” Students may be less likely to report gaps in their sexual education due, at least in part, to an unawareness of where and how to identify such gaps.

Motivation. According to the IMB model, ‘motivation’ is influenced on both personal and social levels – personal attitudes toward the practice of certain behaviors and perceptions of social support for engaging in preventive acts (Fisher, Fisher, & Shuper, 2009). Interestingly, there were several significant effects between certain demographic characteristics of the sample and motivational factors for pregnancy prevention and contraception; there were no significant correlations between these demographic factors and preconception health motivation, however.

Individual factors for motivation were represented by three subscales on the RHAB: 1) Individual attitudes, 2) Self-efficacy, and 3) Perceived severity. Women who reported themselves as being in a romantic relationship were more likely to hold less positive attitudes about pregnancy prevention and contraception. Additionally, older participants demonstrated a lower sense of self-efficacy to prioritize condom use in their sexual relationships. Women who self-identified as being employed were more likely to demonstrate higher levels of self-efficacy with regard to pregnancy prevention and contraception in comparison with those who identified as unemployed.

Social support factors for motivation were represented by the ‘Perceived Social Norms’ subscale on the RHAB. There was a significant negative correlation between age and perceived social norms of pregnancy prevention and contraception such that younger participants reported a greater sense of normative contraceptive use. Together, these findings suggest that women who are more likely to be in longer-term relationships would feel less motivation to be as vigilant with their use of contraceptives. This may be

due to an increased desire for pregnancy (or decreased worry about becoming pregnant), increased trust in the health of their sexual partners, and/or the adoption of other means of family planning (e.g., natural family planning). In addition, there was a significant effect of employment status on the Perceived Social Norms subscale in the domain of preconception health such that employed participants were more likely to report a lower sense of normative use of preconception counseling. This finding, in part, conflicts with the findings of Hillemeir et al. (2007), which suggested that employed women tend to hold more favorable attitudes of preconception counseling. One explanation for these differing results may lie in the developmental considerations of college aged women who are employed; these women may be less likely to have peers and colleagues whom they would perceive to be normatively seeking preconception counseling.

In addition to the demographic characteristics discussed above, there were two behavioral variables that yielded significant effects on the degree to which participants reported levels of motivation on the RHAB. Subjects who reported using alcohol three or more times per week reported significantly lower levels of self-efficacy to follow-through with contraceptive use. This finding may suggest that increased alcohol use interferes with young women's confidence to make decisions consistent with safe sex practices. Moreover, young women who reported increased condom use frequency were more likely to report higher levels of self-efficacy to use contraceptives consistently.

The results of the exploratory factors analysis conducted with the RHAB yielded highly similar subscale domains for both preconception health and pregnancy prevention

and contraception. As two of these scales (Individual Attitudes and Perceived Severity) were scored identically in both domains, comparative analyses were conducted. The results indicated that participants reported significantly more favorable individual attitudes with regard to pregnancy prevention and contraception. On the contrary, young women reported significantly increased levels of perceived severity in the domain of preconception health. The observed skewed attitudes and beliefs of young women that comprise these motivational subscales may be attributed, in part, to a general lack of information and knowledge of preconception health factors and implications.

Behavior. The exploration of young women's behavioral skills as they relate to both preconception health and pregnancy prevention and contraception is best achieved through closer examination of the frequency data (see Table 4). The majority of young women sampled ($n = 125$, 61.6%) reported using alcohol at least once per week; however, only 7.4 percent reported regular tobacco use. While many participants ($n = 188$, 92.6%) indicated "somewhat strong" or "very strong" awareness of healthy nutritional guidelines, far fewer ($n = 98$, 59.6%) reported that they follow these guidelines "most of the time" or "all of the time." With regard to exercise, more than half of women in the sample ($n = 120$, 59.1%) reported that they work out at least three days per week.

It is noteworthy to acknowledge that, while participants demonstrated increased knowledge and awareness of issues related to pregnancy prevention and contraception, the degree to which they report the implementation of behavioral strategies consistent

with such knowledge is markedly lower. For example, while participants scored a mean of 83.3 percent correct on the pregnancy prevention and contraception subscale of the RHKS-W, only 36.4 percent of the sample reported using condoms “most of the time” or “all of the time.” These findings are consistent with previous research indicating that consistent condom use is not the behavioral norm among most sexually active undergraduate college students (Scholly et al., 2005).

Clinical Implications of Findings

The findings of the current study bear important implications – particularly for medical professionals and health educators working with young women. The preconception period continues to gain recognition as an optimal opportunity to enhance the health and wellness of reproductive aged women (deWeerd et al., 2003). The findings from the present study offer an analysis of the strengths and deficits along dimensions of information, motivation, and behavioral skills in college aged women in the area of preconception health. The development of intervention programming should consider that young women are demonstrating only low to moderate awareness of those factors related to optimizing reproductive health; in this way, an emphasis on dispelling misperceptions and offering greater breadth and depth of information regarding the preconception period may serve to better equip young women to make decisions that will ultimately optimize the health of their bodies and those of their future children. Moreover, results of the present study suggest that young women demonstrate greater motivation for pregnancy prevention and contraception when compared to preconception

health. While it is important to continue to foster campaigns to protect young women from unwanted pregnancy and sexually transmitted infections, it is simultaneously valuable to facilitate greater understanding and motivation of lifestyle factors that contribute to reproductive health and wellness. Finally, interventions developed to address the preconception needs of young women should include programming to assess for engagement in higher risk behaviors and offer skills for healthy living.

Strengths of the Present Study

Preconception health status is critically central to the determination of potential adverse pregnancy-related outcomes (Delgado, 2008). The dissemination of information and skills related to optimal preconception health should be done in a timely manner, as approximately 50% of adult pregnancies and 95% of teenage pregnancies are unplanned (Vause, Jones, Evans, Wilkie, & Leader, 2009). With these statistics, the assessment of (and eventual intervention with) college-aged women is critically important; there is great potential to better equip and empower young women to strive for healthier pregnancies and babies. The present study serves to better integrate the research that has been done to illuminate the significance of preconception health with a most relevant population – older adolescent and young adult women. Moreover, where there has been a considerable lack of psychometrically sound instrumentation in the study of preconception health, the present study offered further support for the use of the RHAB with a more generalizable sample. While the RHKS-W did not meet general psychometric guidelines for validity and reliability, it serves as a beginning step toward

better understanding the strengths and needs with regard to reproductive health knowledge in this population of young women.

Another strength of the present study was that the study procedures allowed for the anonymous completion of questionnaires. Identification numbers, which were never linked to the names of participants, were marked at the top of all paperwork completed by participants prior to questionnaire administration. Moreover, the data collected herein was solely for the purpose of the present study; as compared to data derived from pre-existing clinical or medical records, there were extremely low incidences of missing data in this sample.

Limitations

While there are many potentially positive contributions and implications of the present study, there are several limitations that warrant discussion. First, the generalizability of these findings to young adults in general is unknown. The results of this study are representative of only a small number of students enrolled in a single course at a single university. Moreover, student participation in the present study was completed in partial fulfillment of the course research requirement. Although participation was optional, students may have felt some pressure to participate. Additionally studies are needed to more fully understand student awareness of preconception health and pregnancy issues. Second, the sample utilized in the present study was inclusive of women only. Future studies should consider assessing the degree to which young men are informed, motivated, and skilled in the domain of preconception

health. This would facilitate the evaluation of gender differences, which may then inform intervention programming to better meet the needs of all young adults of reproductive age. Third, the measures utilized in the present study were representative of an emerging effort to capture the strengths and deficits of reproductive health awareness among young women. In light of the considerable scarcity of research in this area, there is a concerning lack of psychometrically sound measurement options.

Directions for Future Research

In light of the exploratory nature of the present study, additional research is needed to further assess and replicate findings that may ultimately guide the development of interventions in the area of preconception health. Specifically, future studies should seek to establish a firmer understanding of the knowledge, motivation, and skills held by reproductive aged women regarding reproductive health so that the strengths and deficits of this population respective to each of those areas may be considered in program development. Moreover, research designed to better understanding the reproductive health needs of young men is greatly needed.

Any future research in the area of preconception health would be greatly strengthened by the development of psychometrically sound measures to assess the awareness of preconception health factors. For example, the preconception health scale on the revised RHAB demonstrates statistical promise. With further revision toward utility with a healthy population, this subscale could comprise a screening instrument to be utilized in routine health visits to facilitate the introduction of preconception health

information. Furthermore, as further elicitation research is conducted, future research should move in the direction of actual program development and, ultimately, evaluation studies to hone the effectiveness of such interventions.

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Table 4

Sample Frequency Statistics (N = 203)

Characteristics	<i>n</i>	<i>%</i>
<i>Reproductive Health Risk Factors</i>		
Alcohol Use (weekly)		
None	78	38.4
1-2 days	109	53.7
3-4 days	15	7.4
5 or more days	1	0.5
Tobacco Use		
Yes	15	7.4
No	188	92.6
Chronic Illness Diagnosis		
Yes	28	13.8
No	175	86.2
Nutritional Awareness		
Somewhat Limited	14	6.9
Somewhat Strong	117	57.6
Very Strong	71	35.0
Follow Nutritional Guidelines		
Not Much of the Time	16	7.9
Some of the Time	89	43.8
Most of the Time	93	45.8
All of the Time	5	2.5
Exercise Frequency (weekly)		
None	23	11.3
1-2 days	60	29.6
3-4 days	92	45.3
5 or more days	28	13.8

Characteristics	<i>n</i>	%
Sexually Active		
Yes	134	66.0
No	69	34.0
Taking Hormonal Birth Control		
Yes	131	64.5
No	72	35.5
Frequency of Condom Use		
N/A (not sexually active)	61	30.0
Not much of the time	47	23.2
Some of the time	19	9.4
Most of the time	25	12.3
All of the time	49	24.1
Diagnosis of STD		
Yes	7	3.4
No	196	96.6
Health Insurance		
Yes	184	90.6
No	19	9.4
Knowledge of Health Insurance Plan		
Very Limited	41	20.2
Somewhat Limited	61	30.0
Somewhat Strong	57	28.1
Very Strong	26	12.8
<i>Exposure to Reproductive Health Information</i>		
Close Friends or Relatives Pregnant		
Yes	149	73.4
No	54	26.6
Quality of Sexual Education		
Very Limited	3	1.5
Somewhat Limited	39	19.2
Somewhat Strong	108	53.2

Characteristics	<i>n</i>	%
Very Strong	53	26.1
Range of Sexual Education		
Very Narrow	10	4.9
Somewhat Narrow	49	24.1
Somewhat Broad	108	53.2
Very Broad	35	17.2
Doctor Discussed Birth Control/Contraception		
Yes	169	83.3
No	34	16.7
Doctor Discussed Preconception Health		
Yes	40	19.7
No	163	80.3
<i>Self-Perceptions of Reproductive Health Knowledge</i>		
Knowledge of Pregnancy Prevention		
Very Limited	3	1.5
Somewhat Limited	23	11.3
Somewhat Strong	97	47.8
Very Strong	80	39.4
Knowledge of Preconception Health		
Very Limited	27	13.3
Somewhat Limited	86	42.4
Somewhat Strong	69	34.0
Very Strong	21	10.3
Less Knowledge of Preconception Health		
Yes	133	65.8
No	69	34.2

Table 5

Results of the Conventional Item Analysis for the RHKS – W

<i>Preconception Health Subscale ($\alpha = .17$)</i>			<i>Pregnancy Prevention & Contraception Subscale ($\alpha = .31$)</i>		
Item	D-index	p-value	Item	D-index	p-value
1	.14	.66	1	.08	.95
2	.17	.18	2	.29	.68
3	.15	.79	3	.29	.35
4	.17	.44	4	.01	.99
5	.21	.34	5	.14	.93
6	.38	.51	6	.08	.82
7	.28	.81	7	.07	.94
8	.01	.46	8	.16	.89
9	.17	.46	9	.20	.58
10	.42	.68	10	.01	1.00
11	.37	.38	11	.05	.91
12	.30	.33	12	.04	.98
13	.13	.92	13	.02	.98
14	.11	.22	14	.11	.95
15	.05	.97	15	.08	.92
16	.16	.64	16	.00	1.00
17	.15	.82	17	.19	.89
18	.03	.75	18	.03	.92
19	.15	.81	19	.25	.82
20	.29	.33	20	.35	.69
21	.25	.81	21	.17	.67
22	.12	.13	22	.34	.78
23	.54	.59	23	.38	.51
24	.09	.94	24	.30	.76
25	.32	.71	25	.23	.81
26	.35	.70	26	.04	.99

Table 6

Item Factor Loading for the RHAB

Item	Factor	Loading
Preconception Care		
<i>Individual Attitudes</i>		
Responding Scores: 1. 'not at all' to 5. 'a lot'		
1. Would seeking preconception counseling (special medical care and advice) when planning a pregnancy improve your chances of having a healthy baby?	1	.87
2. Would seeking preconception counseling (special medical care and advice) improve your chances of having a healthy pregnancy?	1	.81
<i>Perceived Social Norms</i>		
Responding Scores: 1. 'not at all' to 5. 'all of the time'		
3. Would you say that your parents think you should seek preconception counseling (special medical care and advice) when planning a pregnancy?	2	.73
4. When it comes to preconception counseling, do you want to do what your parents think you should do?	2	.65
5. Would you say that your friends think you should seek preconception counseling (special medical care and advice) when planning a pregnancy?	2	.77
6. When it comes to preconception counseling, do you want to do what most of your friends think you should do?	2	.61
7. Would you say that your boyfriend/girlfriend/partner/husband thinks you should seek preconception counseling (special medical care and advice) when planning a pregnancy?	2	.59
<i>Self-Applicability</i>		
Responding Scores: 1. 'yes' or 2. 'no'		
8. Has a health care professional (doctor, nurse, etc) ever told you that you should get special medical care and advice before you become pregnant or plan for a pregnancy? This is called	3	.70

preconception counseling.

9. Has anyone else (boy/girlfriend, parent, friend, etc) ever told you that you should get preconception counseling (special medical care and advice) before you become pregnant or plan for a pregnancy?	3	.53
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Self-Efficacy

Responding Scores:

1. 'not a problem' to 5. 'a serious problem'

10. How difficult would it be for you to seek preconception counseling (special medical care and advice) when planning a pregnancy?	4	.72
11. How difficult would it be to follow the preconception counseling advice given by health professionals?	4	.72

Perceived Severity

Responding Scores:

1. 'not serious at all' to 5. 'very serious'

12. If you developed health problems during pregnancy, do you think the problems would be...	5	.87
13. If your baby developed health problems during pregnancy, do you think the problems would be...	5	.82

Pregnancy Prevention & Contraception

Individual Attitudes

Responding Scores:

1. 'not at all' to 5. 'all of the time'

14. Would using birth control prevent an unplanned pregnancy?	6	.57
15. Would you say that using birth control would help <i>you</i> prevent an unplanned pregnancy?	6	.41

Perceived Social Norms

Responding Scores:

1. 'not at all' to 5. 'all of the time'

16. Would you say that your parents think you should use birth control when preventing a pregnancy?	7	.70
17. When it comes to using birth control, do you think you want to do what your parents think you should do?	7	.45
18. Would you say that most of your friends think that you should use birth control when preventing a pregnancy?	7	.56

19. When it comes to using birth control, do you think you want to do what your friends think you should do?	7	.46
<i>Self-Applicability</i>		
Responding Scores:		
1. 'yes' or 2. 'no'		
20. Has a healthcare professional (doctor, nurse, etc) ever told you that you should use some type of birth control when preventing a pregnancy?	8	.58
21. Has anyone else (boy/girlfriend, parent, friend, etc) ever told you that you should use some type of birth control when preventing a pregnancy?	8	.44
<i>Self-Efficacy</i>		
Responding Scores:		
1. 'not at all confident' to 10. 'absolutely confident'		
22. How confident am I that I could use birth control each time I have sex when preventing a pregnancy?	9	.73
23. How confident am I that I could delay sex with boy/girlfriend/partner/husband if birth control is not available?	9	.59
24. How confident am I that I could convince my boy/girlfriend/partner/husband that it is necessary for me to use birth control, even if s/he doesn't want me to use it?	9	.47
<i>Perceived Severity</i>		
Responding Scores:		
1. 'not at all' to 5. 'a lot'		
25. How much do you worry that you would become pregnant?	10	.47
26. How much do you worry that you would catch a sexually transmitted disease (e.g., AIDS, venereal disease, etc)?	10	.45

Table 7

Correlation Matrix: Age, RHAB Subscales, and RHKS-W Subscales

Characteristic or variable	1	2	3	4	5	6	7	8	9	10
1. Age	--									
<i>RHAB Subscales (Preconception)</i>										
2. Attitudes	-.08	--								
3. Norms	-.03	.38**	--							
4. Efficacy	.11	-.14*	-.18*	--						
5. Severity	-.06	.18*	.22**	-.08	--					
<i>RHAB Subscales (Contraception)</i>										
6. Attitudes	-.11	.16*	.18*	.02	-.07	--				
7. Norms	-.20**	.11	.35**	.07	.17*	.27**	--			
8. Efficacy	-.21**	-.01	.13	-.07	.03	.08	.31**	--		
9. Severity	.07	.07	.01	.06	.25**	-.10	.02	-.16*	--	
<i>RHKS-W Subscales</i>										
10. Preconception	.22**	-.05	.04	.04	-.04	-.01	.12	.05	.05	--
11. Contraception	-.05	.03	.09	.04	.11	.21**	.13	-.02	.04	.13

Table 8

RHKS – W Subscale Scores by Demographic Characteristics and Behavioral Variables

Characteristic or variable	<i>Preconception health subscale Mean (SD)</i>	<i>p</i>	<i>Pregnancy prevention subscale Mean (SD)</i>	<i>p</i>
<i>Relationship Status</i>		.75		.48
Single (<i>n</i> = 99)	59.13 (9.55)		83.40 (7.87)	
Partnered/Married (<i>n</i> = 104)	59.32 (9.55)		84.03 (7.01)	
<i>Employment Status</i>		.69		
Employed (<i>n</i> = 98)	60.01 (9.27)		83.08 (8.06)	
Unemployed (<i>n</i> = 105)	58.50 (9.74)		83.30 (7.01)	
<i>Family Annual Income</i>		.28		.32
Below \$30,000 (<i>n</i> = 14)	60.99 (9.40)		85.44 (8.01)	
\$30,000 - \$50,000 (<i>n</i> = 33)	59.67 (10.71)		84.15 (6.36)	
\$51,000 - \$75,000 (<i>n</i> = 44)	59.70 (8.02)		82.26 (7.57)	
\$76,000 - \$100,000 (<i>n</i> = 54)	56.77 (9.03)		81.91 (7.96)	
Over \$101,000 (<i>n</i> = 57)	60.39 (10.28)		84.01 (7.55)	
<i>Anticipated Education Level</i>		.62		.64
Bachelor's Degree (<i>n</i> = 58)	57.96 (9.08)		84.15 (7.14)	
Master's Degree (<i>n</i> = 111)	59.70 (10.09)		82.61 (7.81)	
Doctoral Degree (<i>n</i> = 33)	59.67 (8.39)		83.45 (7.29)	
<i>Alcohol Use Frequency</i>		.64		.21
None (<i>n</i> = 78)	60.16 (10.43)		82.30 (7.42)	
1-2 days/wk (<i>n</i> = 109)	58.61 (9.03)		83.63 (7.66)	
3 or more days/wk (<i>n</i> = 16)	58.46 (8.37)		83.85 (6.37)	

	<i>Preconception health subscale Mean (SD)</i>	<i>p</i>	<i>Pregnancy prevention subscale Mean (SD)</i>	<i>p</i>
<i>Healthy Diet Frequency</i>		.82		.17
Not much of the time (<i>n</i> = 16)	61.06 (11.14)		83.41 (7.26)	
Some of the time (<i>n</i> = 89)	58.99 (10.04)		84.18 (7.57)	
Most or all of the time (<i>n</i> = 98)	57.86 (8.81)		80.13 (14.49)	
<i>Exercise Frequency</i>		.79		.63
None (<i>n</i> = 23)	60.20 (10.98)		60.20 (10.98)	
1-2 days/wk (<i>n</i> = 60)	59.17 (9.26)		59.17 (9.26)	
3-4 days/wk (<i>n</i> = 92)	59.49 (9.11)		59.49 (9.11)	
5 or more days/wk (<i>n</i> = 28)	57.69 (10.47)		57.69 (10.47)	
<i>Condom Use Frequency</i>		.43		.16
N/A (not active) (<i>n</i> = 61)	59.58 (10.12)		81.27 (7.31)	
Not much of the time (<i>n</i> = 47)	60.07 (9.81)		83.96 (8.46)	
Some of the time (<i>n</i> = 19)	55.26 (9.6)		84.62 (7.90)	
Most of the time (<i>n</i> = 25)	58.92 (9.07)		84.62 (6.93)	

*Total sample size = 203

** Independent-samples *t*-tests were used for binary variables, and one-way ANOVAs were used for all polytomous variables

Table 9

Preconception Health Motivational Subscales (RHAB) by Demographic Characteristics and Behavioral Variables

<i>Preconception Health Motivation Subscales</i>				
Characteristic or variable	<i>Attitudes Mean (SD)</i>	<i>Norms Mean (SD)</i>	<i>Efficacy Mean (SD)</i>	<i>Severity Mean (SD)</i>
<i>Relationship Status</i>	<i>p = .09</i>	<i>p = .25</i>	<i>p = .13</i>	<i>p = .17</i>
Single (<i>n</i> = 99)	6.53 (1.53)	11.01 (5.26)	1.10 (1.38)	4.54 (2.23)
Partnered/Married (<i>n</i> = 104)	6.33 (1.74)	10.19 (4.82)	1.03 (1.29)	4.47 (2.43)
<i>Employment Status</i>	<i>p = .77</i>	<i>p = .034</i>	<i>p = .49</i>	<i>p = .49</i>
Employed (<i>n</i> = 98)	6.36 (1.61)	10.52 (5.38)	1.00 (1.28)	4.43 (2.39)
Unemployed (<i>n</i> = 105)	6.50 (1.66)	10.70 (4.75)	1.12 (1.38)	4.58 (2.28)
<i>Family Annual Income</i>	<i>p = .71</i>	<i>p = .68</i>	<i>p = .08</i>	<i>p = .63</i>
Below \$30,000 (<i>n</i> = 14)	6.21 (1.72)	8.93 (5.57)	2.00 (1.84)	3.79 (2.61)
\$30,000 - \$50,000 (<i>n</i> = 33)	6.76 (1.28)	11.18 (5.07)	.79 (1.05)	4.27 (2.49)
\$51,000 - \$75,000 (<i>n</i> = 44)	6.27 (1.89)	10.52 (5.12)	1.07 (1.48)	4.66 (2.38)
\$76,000 - \$100,000 (<i>n</i> = 54)	6.52 (1.48)	11.00 (4.60)	1.02 (1.22)	4.78 (2.24)
Over \$101,000 (<i>n</i> = 57)	6.42 (1.66)	10.47 (5.35)	1.02 (1.30)	4.49 (2.23)
<i>Anticipated Education Level</i>	<i>p = .045</i>	<i>p = .40</i>	<i>p = .65</i>	<i>p = .71</i>
Bachelor's Degree (<i>n</i> = 58)	6.53 (1.69)	10.45 (5.03)	1.19 (1.16)	4.47 (2.26)
Master's Degree (<i>n</i> = 111)	6.47 (1.56)	11.04 (4.75)	1.05 (1.30)	4.50 (2.32)
Doctoral Degree (<i>n</i> = 33)	6.27 (1.65)	9.61 (6.03)	.88 (1.71)	4.70 (2.52)

<i>Preconception Health Motivation Subscales</i>				
Characteristic or variable	<i>Attitudes Mean (SD)</i>	<i>Norms Mean (SD)</i>	<i>Efficacy Mean (SD)</i>	<i>Severity Mean (SD)</i>
<i>Alcohol Use Frequency</i>	<i>p = .56</i>	<i>p = .50</i>	<i>p = .47</i>	<i>p = .80</i>
None (<i>n</i> = 78)	6.27 (1.66)	10.37 (5.28)	.86 (1.21)	4.41 (2.27)
1-2 days/wk (<i>n</i> = 109)	6.52 (1.59)	10.51 (5.03)	1.22 (1.40)	4.61 (2.33)
3 or more days/wk (<i>n</i> = 16)	6.67 (1.89)	12.12 (3.87)	.80 (1.08)	4.20 (2.78)
<i>Healthy Diet Frequency</i>	<i>p = .93</i>	<i>p = .42</i>	<i>p = .36</i>	<i>p = .88</i>
Not much of the time (<i>n</i> = 16)	6.44 (1.55)	10.19 (5.23)	1.25 (1.00)	4.44 (2.89)
Some of the time (<i>n</i> = 89)	6.52 (1.54)	10.02 (4.78)	1.21 (1.37)	4.42 (2.29)
Most or all of the time (<i>n</i> = 98)	6.37 (1.69)	10.82 (5.51)	.75 (1.12)	4.31 (2.46)
<i>Exercise Frequency</i>	<i>p = .17</i>	<i>p = .96</i>	<i>p = .055</i>	<i>p = .81</i>
None (<i>n</i> = 23)	6.57 (1.78)	10.09 (5.92)	1.78 (1.91)	4.70 (2.27)
1-2 days/wk (<i>n</i> = 60)	6.63 (1.63)	10.70 (4.71)	.98 (1.16)	4.70 (2.34)
3-4 days/wk (<i>n</i> = 92)	6.46 (1.56)	10.72 (4.98)	.97 (1.24)	4.36 (2.33)
5 or more days/wk (<i>n</i> = 28)	5.82 (1.70)	10.50 (5.49)	.96 (1.32)	4.43 (2.43)
<i>Condom Use Frequency</i>	<i>p = .65</i>	<i>p = .07</i>	<i>p = .71</i>	<i>p = .64</i>
N/A (not active) (<i>n</i> = 61)	6.23 (1.67)	9.93 (4.89)	1.05 (1.35)	4.54 (2.36)
Not much of the time (<i>n</i> = 47)	6.38 (1.57)	10.49 (5.21)	1.17 (1.36)	4.47 (2.52)
Some of the time (<i>n</i> = 19)	6.53 (1.43)	8.74 (5.67)	1.11 (1.15)	3.79 (2.15)
Most of the time (<i>n</i> = 25)	6.71 (1.65)	12.00 (5.19)	1.32 (1.57)	4.56 (2.04)
All of the time (<i>n</i> = 49)	6.43 (1.63)	11.86 (4.43)	.88 (1.25)	4.80 (2.36)

Table 10

Pregnancy Prevention and Contraception Motivational Subscales (RHAB) by Demographic Characteristics and Behavioral Variables

<i>Pregnancy Prevention & Contraception Motivation Subscales</i>				
Characteristic or variable	<i>Attitudes Mean (SD)</i>	<i>Norms Mean (SD)</i>	<i>Efficacy Mean (SD)</i>	<i>Severity Mean (SD)</i>
<i>Relationship Status</i>	<i>p = .055</i>	<i>p = .77</i>	<i>p = .37</i>	<i>p = .34</i>
Single (<i>n</i> = 99)	7.03 (1.19)	13.39 (2.68)	26.96 (3.73)	3.49 (2.16)
Partnered/Married (<i>n</i> = 104)	6.58 (1.33)	12.90 (2.93)	26.38 (4.49)	4.20 (2.11)
<i>Employment Status</i>	<i>p = .59</i>	<i>p = .43</i>	<i>p = .00</i>	<i>p = .67</i>
Employed (<i>n</i> = 98)	6.83 (1.31)	13.41 (2.81)	27.15 (3.28)	3.84 (2.21)
Unemployed (<i>n</i> = 105)	6.79 (1.26)	12.91 (2.79)	26.23 (4.74)	3.84 (2.12)
<i>Family Annual Income</i>	<i>p = .29</i>	<i>p = .86</i>	<i>p = .33</i>	<i>p = .22</i>
Below \$30,000 (<i>n</i> = 14)	6.14 (1.96)	12.71 (2.84)	25.50 (4.36)	3.07 (1.82)
\$30,000 - \$50,000 (<i>n</i> = 33)	6.70 (1.33)	12.94 (2.99)	25.91 (4.37)	3.91 (2.38)
\$51,000 - \$75,000 (<i>n</i> = 44)	6.89 (1.26)	13.16 (2.80)	27.61 (3.47)	3.41 (2.30)
\$76,000 - \$100,000 (<i>n</i> = 54)	6.80 (1.27)	13.48 (2.47)	26.81 (3.83)	4.28 (2.17)
Over \$101,000 (<i>n</i> = 57)	6.96 (1.05)	13.05 (3.07)	26.53 (4.61)	4.89 (1.97)
<i>Anticipated Education Level</i>	<i>p = .73</i>	<i>p = .44</i>	<i>p = .58</i>	<i>p = .78</i>
Bachelor's Degree (<i>n</i> = 58)	6.72 (1.31)	13.00 (2.83)	26.57 (3.96)	3.66 (2.19)
Master's Degree (<i>n</i> = 111)	6.86 (1.22)	13.41 (2.44)	26.96 (3.95)	3.98 (2.22)
Doctoral Degree (<i>n</i> = 33)	6.76 (1.46)	12.55 (3.78)	25.84 (4.94)	3.67 (1.95)

<i>Alcohol Use Frequency</i>	<i>p</i> = .82	<i>p</i> = 1.00	<i>p</i> = .02	<i>p</i> = .58
None (<i>n</i> = 78)	6.81 (1.40)	13.13 (2.90)	27.21 (3.87)	3.62 (2.29)
1-2 days/wk (<i>n</i> = 109)	6.81 (1.24)	13.17 (2.83)	26.66 (4.01)	3.92 (2.09)
3 or more days/wk (<i>n</i> = 16)	6.73 (1.03)	13.20 (2.37)	20.03 (4.76)	4.40 (2.06)
<i>Healthy Diet Frequency</i>	<i>p</i> = .10	<i>p</i> = .24	<i>p</i> = .53	<i>p</i> = .79
Not much of the time (<i>n</i> = 16)	7.13 (1.15)	12.63 (3.99)	26.19 (3.54)	4.25 (2.38)
Some of the time (<i>n</i> = 89)	6.63 (1.45)	13.44 (2.25)	26.60 (4.20)	3.81 (2.29)
Most or all of the time (<i>n</i> = 98)	6.89 (1.24)	13.23 (2.66)	26.96 (3.87)	3.62 (1.94)
<i>Exercise Frequency</i>	<i>p</i> = .86	<i>p</i> = .65	<i>p</i> = .33	<i>p</i> = .53
None (<i>n</i> = 23)	6.78 (1.24)	12.96 (3.13)	25.61 (5.03)	4.13 (2.56)
1-2 days/wk (<i>n</i> = 60)	6.92 (1.36)	12.82 (2.93)	27.36 (3.62)	4.10 (2.27)
3-4 days/wk (<i>n</i> = 92)	6.78 (1.23)	13.39 (2.70)	26.47 (4.19)	3.65 (2.11)
5 or more days/wk (<i>n</i> = 28)	6.68 (1.36)	13.25 (2.68)	26.82 (3.97)	3.64 (1.73)
<i>Condom Use Frequency</i>	<i>p</i> = .052	<i>p</i> = .32	<i>p</i> = .002	<i>p</i> = .13
N/A (not active) (<i>n</i> = 61)	6.43 (1.50)	12.67 (2.97)	27.62 (3.66)	4.23 (2.47)
Not much of the time (<i>n</i> = 47)	7.15 (1.10)	13.23 (2.82)	25.40 (4.20)	3.40 (1.83)
Some of the time (<i>n</i> = 19)	6.95 (1.03)	14.00 (2.38)	24.21 (5.50)	4.53 (2.09)
Most of the time (<i>n</i> = 25)	6.96 (1.06)	13.76 (1.69)	26.88 (4.38)	3.88 (1.89)
All of the time (<i>n</i> = 49)	6.82 (1.27)	13.18 (3.10)	27.59 (3.19)	3.49 (2.17)

Appendix A

Background Information Form

*Please answer the following questions as completely as possible. Where multiple options are given, please select the **ONE** answer choice that **BEST** describes you.*

1. Select which sex best describes you.

☐

Male

☐

Female

☐

Other (Specify: _____)

2. Select which racial/ethnic identity best describes you.

☐

Latino/a/Hispanic

☐

Black/African American

☐

Asian or Pacific Islander

☐

Caucasian/White

☐

Native American

☐

Biracial (Specify: _____)

☐

Multiracial (Specify: _____)

3. Age (in years): _____

4. Select university class year.

☐

First Year

☐

Sophomore

☐

Junior

☐ Senior

☐ Graduate Student

5. Indicate your major or anticipated major: _____

6. Indicate your relationship status:

☐ Single

☐ Partnered (boyfriend or girlfriend)

How long have you been with this person? _____

☐ Married

How long have you been with this person? _____

7. Select the option that best describes your *current* living situation:

☐ I live alone

☐ I live with roommates

How many roommates do you have? _____

Are they: ☐ Male ☐ Female ☐ Both

☐ I live with my parent(s)/guardian(s)

☐ I live with my partner (boy/girlfriend, husband/wife)

☐ Other (Describe: _____)

8. Indicate your employment status:

☐ Unemployed

☐ Employed

9. Indicate your *mother's* employment status:

☐ Unemployed

☐ Employed

10. Indicate your *father's* employment status:

☐ Unemployed

☐ Employed

11. To the best of your knowledge, what is your family's yearly income?

☐ Below \$30,000

☐ \$30,000-\$50,000

☐ \$50,000-\$75,000

☐ \$75,000-\$100,000

☐ Over \$100,000

12. To the best of your knowledge, what is the highest level of education your *mother* received?

☐ Less than high school

☐ High school diploma

☐ Some College

☐ Associate's Degree (2-year undergraduate degree)

☐ Bachelor's Degree (4-year undergraduate degree)

☐ Master's Degree

☐ Doctoral Degree

13. To the best of your knowledge, what is the highest level of education your *father* received?

☐ Less than high school

☐ High school diploma

☐ Some College

☐ Associate's Degree (2-year undergraduate degree)

☐ Bachelor's Degree (4-year undergraduate degree)

☐ Master's Degree

☐ Doctoral Degree

14. What is the highest educational degree *you* plan to obtain?

☐ Bachelor's

☐ Master's

☐ Doctoral

15. Do you currently have health insurance?

☐ Yes

☐ No

16. If you answered “yes” to question 15, please answer the following: How would you describe your knowledge of the medical coverage included in your health insurance plan?

- ☐ Very Limited
- ☐ Somewhat Limited
- ☐ Somewhat Strong
- ☐ Very Strong

17. How many days each week do you drink alcohol?

- ☐ None
- ☐ 1-2 days
- ☐ 3-4 days
- ☐ 5 or more days

18. Do you smoke cigarettes?

- ☐ Yes
- ☐ No

19. Have you been diagnosed with a chronic illness (e.g., diabetes, hypertension (high blood pressure), asthma, etc)?

- ☐ Yes
- ☐ No

20. How would you describe your knowledge of what a “healthy” diet means?

- ☐ Very Limited
- ☐ Somewhat Limited

☐ Somewhat Strong

☐ Very Strong

21. How much of the time would you say you follow the guidelines of a “healthy” diet?

☐ Not much of the time

☐ Some of the time

☐ Most of the time

☐ All of the time

22. How many days per week do you exercise?

☐ None

☐ 1-2 days

☐ 3-4 days

☐ 5 or more days

23. Are you currently sexually active?

☐ Yes

☐ No

24. Are you currently taking hormonal birth control (such as “the pill,”)?

☐ Yes

If “yes,” since when (month, year): _____

☐

No

If “no,” have you ever taken birth control?

☐

Yes

If “yes,” for how long (e.g., weeks, months, years) _____

☐

No

25. If you are sexually active, how often do you use condoms when having sex?

☐

N/A (I’m not sexually active)

☐

Not much of the time

☐

Some of the time

☐

Most of the time

☐

All of the time

26. Since you were 12 years of age, have any of your *close* friends or relatives become pregnant?

☐

Yes (If so, who (e.g., friend, sister, cousin): _____

☐

No

27. Have you ever been diagnosed with a sexually transmitted infection (STI) before (e.g., herpes, syphilis, Chlamydia)?

☐

Yes

☐

No

28. How would you describe the *quality* of the sexual education you have received thus far?

☐

Very Limited

☐

Somewhat Limited

☐ Somewhat Strong

☐ Very Strong

29. How would you describe the *range of topics* that have been covered in your sexual education thus far?

☐ Very Narrow

☐ Somewhat Narrow

☐ Somewhat Broad

☐ Very Broad

30. To the best of your knowledge, has a doctor ever talked to you about pregnancy prevention and/or contraception (e.g., birth control pills, condoms, etc)?

☐ Yes

If "yes," where were you told this information:

☐ Primary Care Physician (PCP) Office

☐ Obstetrician-Gynecologist (OB-GYN) Office

☐ Other Medical Setting (Describe: _____)

☐ No

31. To the best of your knowledge, has a doctor ever talked with you or given you advice about how healthy behaviors that would help you have healthier pregnancies and babies in the future? This kind of special care and advice is called preconception counseling.

☐ Yes

If "yes," where were you told this information:

☐ Primary Care Physician (PCP) Office

☐ Obstetrician-Gynecologist (OB-GYN) Office

☐ Other Medical Setting (Describe: _____)

☐ No

32. On the following scale, how would you rate your knowledge of pregnancy prevention and contraception?

☐ Very Limited

☐ Somewhat Limited

☐ Somewhat Strong

☐ Very Strong

33. On the following scale, how would you rate your knowledge of healthy behaviors that would help you have healthier pregnancies and babies in the future?

☐ Very Limited

☐ Somewhat Limited

☐ Somewhat Strong

☐ Very Strong

34. To the best of your knowledge, has anyone in your family ever had difficulty getting pregnant?

☐ Yes (Who (e.g., mother, sister, aunt, etc)): _____)

☐ No

35. To the best of your knowledge, has anyone in your family experienced complications during pregnancy (e.g., high blood pressure, premature delivery, miscarriage, stillbirth, etc)?

☐ Yes

☐ No

36. To the best of your knowledge, have you ever been told that you might have difficulty getting pregnant in the future?

☐ Yes (Who told you this: _____)

☐ No

37. Do you have any sisters?

☐ Yes (If "yes," how many? _____)

What are their ages: 1. _____

2. _____

3. _____

☐ No

38. To the best of your knowledge, do you hope to have children one day?

☐ Yes

If "yes," at approximately what age (in years): _____

How many children would you hope to have: _____

☐ No

39. Have you ever completed coursework related to pregnancy, pregnancy planning, and/or pregnancy prevention?

☐ Yes

☐ No

40. If you were to become pregnant, to what degree would you feel equipped with the knowledge you would need to contribute to a healthy pregnancy?

☐ Not at all Knowledgeable

☐ Somewhat Knowledgeable

☐ Quite Knowledgeable

☐ Very Knowledgeable

Appendix B

Reproductive Health Attitudes and Behaviors (RHAB) Questionnaire

Please select **ONE** answer to each of the questions below. Please select the answer choice that **BEST** represents you.

	Not at All	A Little	Somewhat	A Moderate Amount	A Lot
Assuming you were sexually active:					
1. How much do you worry that you would become pregnant?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How much do you worry that you could catch a sexually transmitted disease (e.g., AIDS, venereal disease, etc)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. How much do you worry that you could develop health problems during pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How much do you worry that your baby could develop health problems during pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Would using birth control prevent an unplanned pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Not Serious At All	A Little Serious	Somewhat Serious	Moderately Serious	Very Serious
6.	Would seeking preconception counseling (special medical care and advice) when planning a pregnancy improve your chances of having a healthy baby?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Would getting preconception counseling (special medical care and advice) improve your chances of having a health pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	If you developed health problems during pregnancy, do you think that those problems would be:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	If your baby developed health problems during pregnancy, do you think the problems would be:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	If you had an unplanned pregnancy, do you think that this problem would be:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Not a Problem	A Little Problem	Somewhat of a Problem	A Moderate Problem	A Serious Problem
11. How much of a problem for you is the cost of birth control?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. How much of a problem for you is using birth control on a regular basis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. How difficult would it be for you to seek preconception counseling (special medical care and advice) when planning a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. How difficult would it be to follow the preconception counseling advice given by health professionals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Yes	No			
15. Has a health care professional (doctor, nurse, etc) ever told you that you should get special medical care and advice before you become pregnant or plan for a pregnancy? This is called preconception counseling.	<input type="checkbox"/>	<input type="checkbox"/>			

	Yes	No					
16. Has anyone else (boy/girlfriend, parent, friend, etc) told you that you should get preconception counseling (special medical care and advice) before you become pregnant or plan for a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>					
18. Has a healthcare professional (doctor, nurse, etc) told you that you should use some type of birth control when preventing a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>					
19. Has anyone else (boy/girlfriend, parent, friend, etc) told you that you should use some type of birth control when preventing a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>					
	Not at All	A Little of the Time	A Moderate Amount of the Time	A lot of the Time	All of the Time		
20. Would you say that your boyfriend/girlfriend/partner/husband thinks you should use birth control when preventing a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
21. When it comes to using birth control, do you want to do what your boyfriend/girlfriend/partner/husband thinks you should do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

	Not at All	A Little of the Time	A Moderate Amount of the Time	A lot of the Time	All of the Time
22. Would you say that your boyfriend/girlfriend/partner/husband thinks you should seek preconception counseling (special medical care and advice) when planning a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. When it comes to preconception counseling, do you want to do what your boyfriend/girlfriend/partner/husband thinks you should do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Would you say that your parents think you should use birth control when preventing a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. When it comes to using birth control, do you think you want to do what your parents think you should do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Would you say that your parents think you should seek preconception counseling (special medical care and advice) when planning a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Not at All	A Little of the Time	A Moderate Amount of the Time	A lot of the Time	All of the Time
27. When it comes to preconception counseling, do you want to do what your parents think you should do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Would you say that most of your friends think that you should use birth control when preventing a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. When it comes to using birth control, do you want to do what most of your friends think that you should do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Would you say that most of your friends think that you should seek preconception counseling (special medical care and advice) when planning a pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. When it comes to preconception counseling, do you want to do what most of your friends think you should do?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Not at All	A Little	Some	A Moderate Amount	A Lot
32. Would you say that preconception counseling would help you have a healthy baby?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Would you say that preconception counseling would help you have a healthy pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Would you say that preconception counseling would help you decide what birth control method to use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Would you say that using birth control would help you prevent an unplanned pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

On a scale of 0 to 10, rate how confident you are that you could regularly do each activity for at least 6 months. Choose the number from 0 to 10 that **BEST** describes your level of confidence where 0 is “Not at All Confident” and 10 is “Absolutely Confident.”

How confident am I that I could:

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| 36. Get preconception counseling before I get pregnant? | _____ |
| 37. Follow the recommendations I am given in preconception counseling to help me have a healthy pregnancy and baby? | _____ |
| 38. Convince my boy/girlfriend/partner/partner that it is necessary for me to use birth control, even if s/he doesn't want me to use it? | _____ |

39. Delay sex with my boy/girlfriend/partner/husband if birth control is not available?

40. Use birth control each time I have sex when preventing a pregnancy?

Appendix C

Reproductive Health Knowledge Scale for Women (RHKS-W)

Please select **ONE** answer for each of the following questions. Please be sure to answer **ALL** questions.

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| 1. Spermicides are an effective protection against HIV/AIDS. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 2. The “patch” is less effective in women who weigh more than 198 pounds. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 3. Intrauterine devices (IUDs) are effective birth control options for up to 10 years after insertion. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 4. Under ideal conditions, couples have a 20-25% chance of conception each month. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 5. “Advanced maternal age” is defined as women who are 40 years old or older. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 6. Douching, showering, or bathing immediately after sex can prevent pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 7. An estimated 2% of all birth abnormalities are due to a mother’s use of medications during pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 8. Fertility interventions should be considered after 6 months of trying to conceive without success. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |

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| 9. Certain antibiotics can reduce the effectiveness of hormonal birth control methods. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 10. Diaphragms and cervical caps come in different sizes. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 11. Mother's, but <i>not</i> father's, advanced age has been linked with increased risk of chromosomal abnormalities in the womb. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 12. Oral contraceptives (the birth control pill) are effective immediately after a woman starts taking them. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 13. Women planning to conceive should consume 0.4mg of folic acid daily to prevent birth defects. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 14. Smoking has been shown to increase risk for infertility (inability to become pregnant). | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 15. A mother's ethnicity can lead to increased risks of certain abnormalities in her unborn baby. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 16. Withdrawal is an effective method of birth control. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 17. Vegetarian diets have been considered <i>unsafe</i> during pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 18. Women must receive Depo-Provera ("the shot") injections every 6 months. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |

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| 19. A condom can be used more than once. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 20. Abstinence is 100% effective in the prevention of Sexually Transmitted Infections (STIs) and pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 21. Vaginal deodorants and sprays are effective ways to kill sperm. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 22. Asthma is a chronic condition that has no impact on the overall health of pregnancy and birth. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 23. Women should begin taking pre-natal vitamins <i>after</i> they become pregnant. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 24. Natural herbal supplements are widely considered safe to take during pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 25. Sexually transmitted infections such as Hepatitis B and HIV are <i>not</i> transmitted between a mother and her developing baby. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 26. Seasonal flu vaccines are <i>not</i> recommended for women who are pregnant or planning to become pregnant. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 27. Due to advances in medicine, fetal alcohol syndrome is a pregnancy complication of the past. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |

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| 28. If you and your partner do not have a condom on hand, making one with plastic wrap or a balloon are effective options. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 29. If a woman does not orgasm, she can still get pregnant. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 30. Hormonal birth control methods (e.g., the “pill,” the “shot,” the “patch,” etc) are <i>less</i> effective than barrier methods (e.g., condoms, diaphragms, etc). | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 31. Emergency contraception (“The Morning After Pill”) can only be used once in your lifetime. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 32. Condoms are effective if they are put on just prior to ejaculation. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 33. A woman who is breastfeeding cannot become pregnant. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 34. An estimated 58% of fertilized eggs do not survive long enough to result in a woman’s missed period. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 35. Women who are victims of domestic violence are at even greater risk of being abused by their partner during pregnancy | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 36. If you’re on the pill and want to get pregnant, you should go off the pill right away. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |

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| 37. It is possible for a woman to become pregnant if she has vaginal intercourse during her period. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 38. It is safe to remove a diaphragm immediately after intercourse. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 39. Infants of diabetic mothers are 2 to 3 times more likely to have heart defects than those of non-diabetic mothers. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 40. Condoms should <i>not</i> be applied tightly over the end of the penis. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 41. Domestic cats can pose significant health risks during pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 42. The average woman's fertility peaks when she is 24 years of age. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 43. Ovulation typically occurs 14 days <i>before</i> the first day of a woman's period. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 44. Consuming any kind of fish is encouraged during pregnancy to increase potential health benefits. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 45. Women trying to conceive are encouraged to discontinue a regular exercise routine. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |

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| 46. Condoms can safely be used with water-based lubricants. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 47. Birth defects are more common in women who give birth with an intrauterine device (IUD) in place. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 48. Emergency contraception ("The Morning After Pill") can be taken up to 3 days after unprotected vaginal intercourse. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 49. The "rhythm" method relies on a woman's knowledge of her menstrual cycles to prevent pregnancy. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 50. An <i>increase</i> in basal body temperature helps women predict when they are most fertile. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 51. Oral contraceptives (the birth control pill) should be taken at the same time every day. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |
| 52. A Body Mass Index (BMI) over 30 is a healthy weight to achieve before becoming pregnant. | <input type="checkbox"/> TRUE | <input type="checkbox"/> FALSE |