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Walden University

College of Health Sciences

This is to certify that the doctoral study by

Gloria Jean Mabry

has been found to be complete and satisfactory in all respects,
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Walden University
2020

Abstract

Predictors of LARC Use in High School Adolescent Females in the United States

by

Gloria Jean Mabry

MS, The New School for Social Research, 1991

BS, Cornell University, 1983

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

Walden University

March 2020

Abstract

Teen pregnancy is a major public health problem in the United States of America. Among many contraceptive methods, long acting reversible contraception (LARC) is popular and effective. However, there was no adequate research study performed to show if minority teenagers are less likely to use LARC. The purpose of this study was to explore the relationship between adolescent sexual behavior and activity and the use of LARC in females, ages 14 to 19, in high schools across the United States. The theoretical framework used for this study was the health belief model. The study population was 1,496 White, Black/African American, and Hispanic/Latino adolescent females, ages 14 to 19 years, who attended public and private schools in the United States and who participated in the 2017 National Youth Risk Behavior Survey. A univariate analysis was performed to describe study sample demographic characteristics. A bivariate analysis was conducted to determine whether there was any association between the independent variables and the dependent variable. Finally, a binary logistic regression was conducted to find an association between race and LARC usage. No statistically significant relationship between race and LARC usage was found. However, there was a statistically significant relationship between LARC usage and multiple sex partners. Multiple sex partners were the only significant predictor of LARC usage; for each additional sex partner, the log-odds of someone not using LARC decreased by 0.23 units (*OR*: 0.77; 95% *CI*: 0.69 – 0.87). The more sexual partners increased, the odds of LARC usage decreased. This study can contribute to positive social change by providing a framework to inform health providers with better counseling practices and strategies to engage sexually active African American and Hispanic females about LARC methods.

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Dedication

This study is dedicated to my parents, Sarah Irene Mabry and the late Watkins Theodore Mabry, both of whom instilled in me the love of reading and learning beyond the walls of our surroundings and believing that education was an opportunity not to be wasted. Thank you for always answering my whys, believing your middle child had greater potential beyond her wildest imagination and allowing me the space to make my way, including skipping kindergarten, 8th grade, and going off to college at fifteen.

#blackbutterfly

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I thank God Almighty for ordering my steps and allowing me to make mistakes, all the while guiding my steps and creating my destiny even though I kicked and screamed along the way. Thank you giving me a testimony, with the will and strength to get back up, dust myself off and continue along the path I was destined to follow, in His time and not on my own understanding. I am so blessed to be surrounded by good family, and friends; family not by blood but joined by Christ, love, and faith. My village has been with me every step of the way, praying for me and believing in me and not letting me quit, although I did every single day inside my head, since I opened my laptop for the first class assignment.

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I have to say thank you to infinity for my Committee Chair, Dr. Kyulo and my awesome Committee member, Dr. Banerjee for helping me do my best work, shaping me into a researcher and a writer. A debt of gratitude to Dr. Craig Marroquin for providing the best statistical tutoring and methodology assistance and making it “user-friendly”

from day one, I would not be here without you. I am indebted and humbled by this challenging and learning experience.

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Section 1: Foundation of the Study and Literature Review

Introduction

In the United States, adolescent pregnancy is a major public health issue that costs an estimated \$9.1 billion annually on teen childbearing (Daley, 2012). Approximately 750,000 women, aged 15 to 19 in the United States have become pregnant, with more than half giving birth, at higher rates than in other developed countries (Patel & Sen, 2012). African American teens have a higher birth rate of 123 per 1,000 annually as compared to the birth rate of Hispanic teens, 44 per 1,000 (Lewin et al., 2011). The economic impact of teen pregnancy is seen in public health expenditures associated with increased Medicaid enrollment and child welfare benefits for teen mothers and their children and lost tax revenue due to low wages and lower income potential (The National Campaign, 2016). Poor health outcomes due to increased pregnancy complications in teenagers, including intrauterine growth retardation, premature labor, obstructed labor, obstetric fistula, and eclampsia, have also been associated with teen pregnancy and adolescent maternal mortality (Chen et al., 2007; Ganchimeg et al., 2014; Nove, Matthews, Neal, & Camacho, 2014). Several studies conducted in developed and developing countries have revealed increased risk of preterm delivery, low-birth weight, small for gestational age births, and low apgar scores, in teens aged 15 to 19 years (Chen et al., 2007; Gilbert, Jandial, Field, Bigelow, & Danielsen, 2004; Greydanus, Huff, Omar, & Dodich, 2012). Chen et al. (2007) found that young maternal age was consistently noted as one of several markers for maternal risk factors associated with poor birth outcomes, with increased risk of neonatal mortality among infants born to teen mothers 15 years old or younger. African American teenagers have been found to have smoked cigarettes during pregnancy, received inadequate prenatal care, gained less

weight during pregnancy, and increased preterm deliveries (Dennis & Mollborn, 2013). Overall, findings have been reported that younger (age 15.9 years and younger) and older adolescents (age 16-19 years) are at greater risk of maternal anemia, preterm delivery at less than 37 weeks of gestation, and postpartum hemorrhage and blood transfusion as compared to young adults (age 20-24 years; Kawakita et al., 2016). The increased risk of adverse maternal outcomes among teens supports the need for pregnancy prevention strategies that are targeted to promote effective contraception to reduce unintended pregnancy for adolescent women (Ganchimeg et al., 2014).

There has been an increase in adolescent usage of contraception over the last 2 decades, with several studies showing an association with improvements in contraception usage among adolescents and an 86% reduction in teen pregnancy rates between 1995 and 2002 (Manlove, Karpilow, Welti, & Thomas, 2016). The teen pregnancy rate between 2000 and 2010 has declined by almost one-third (31%) from 83.4% pregnancies per 1,000 teen females to 57.4% per 1,000 female teens (Manlove et al., 2016). National estimates of contraceptive use among sexually experienced females aged 15 to 19 from 2002 to 2011 through 2015 shows an increase from 97.7% in 2002 to 99.4% in 2011 through 2015 (Abma & Martinez, 2017). The most commonly used methods reported among teen females in 2011 through 2015 were the condom (97.4%), withdrawal (59.7%), and oral contraception pills (OCPs; 55.5%; Abma & Martinez, 2017). Data from the National Survey of Family Growth (NSFG) shows revealed an upward trend in contraception use among sexually experienced females aged 15 to 19 at first sexual intercourse; in 2011 through 2015, 81% used a method at first sex as compared to 74.5% in 2002 (Abma & Martinez, 2017). Prior to 2006 through 2010, there were insufficient estimates of long-acting reversible contraceptive (LARC) methods among female teenagers to provide reliable

estimates of use (Abma & Martinez, 2017). NSFG data collected between 2011 and 2015 showed the percentage of female teens (17.3%) who had ever used an injectable, patch (1.8%), intrauterine device (IUD; 2.8%), or implants (3.0%) as compared to 2006 to 2010, with 2.5% of teens who had ever used an IUD and 0.6% who had ever used implants (Abma & Martinez, 2017). According to Manlove et al. (2016), changes in contraceptive method use in females aged 15 to 19 produced a reduction in the teen pregnancy rate, 8.1 pregnancies per 1,000 teens between 2002 and 2010. Manlove et al. found that an estimated 58% of the reduction was attributed to increased condom use and increased usage of pill, patch, ring, and LARC/injectable methods.

Overall, improvements in contraception use combined with the use of more effective methods, such as LARC methods, that is, IUDs and subdermal implants, have been found to be more effective than user-dependent methods, such as condoms and OCPs (Manlove et al., 2016). LARC methods are highly cost-effective in the long-term because of their limited contraindications, ability to be inserted right after delivery or abortion, and ability to have a rapid return to fertility following removal (Shoupe, 2016). Subdermal implants and IUDs are the most effective methods of contraception, which have been associated with lower failure rates of less than 1%; IUDs (0.2-0.8%) and implants (0.05%) as compared to the use of OCPs have a 9% annual failure rate for the general population and an estimated failure rate of 13% for adolescents (Parks & Peipert, 2016; Winner et al., 2012). Studies have shown that combined hormonal methods such as the pill, ring, and patch have a greater than 20-fold higher failure rate than LARC methods in young adults under 21 years of age (Diedrich, Klein, & Peipert, 2017; Winner et al, 2012).

Researchers have recommended LARC use as an effective strategy to help further reduce teen pregnancy, specifically IUDs and implants, and when combined with condoms, LARC methods can provide the most effective protection against pregnancy and sexually transmitted diseases (Romero et al., 2015). LARC has been endorsed by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (ACOG) to be safe and appropriate for adolescents, requiring no effort after insertion, depending on the type of LARC, and can prevent unintended pregnancy for at least 3 to 10 years (Romero et al., 2015). School-based health centers (SBHCs) that provide contraceptive services to adolescents can facilitate LARC use among teens seeking contraception, by providing access to trained providers, at a reduced or no cost contraception, and a counseling approach that discusses LARC as the most reliable and effective contraceptive method to reducing unintended teen pregnancy (Romero et al., 2015).

According to national estimates, LARC use has increased amongst 15 to 19-year-olds since 2002; however, the rates overall have remained low (Romero et al., 2015). In 2006 through 2010, 82% of teens at risk for unintended pregnancy used a birth control method, and only 59% used a highly effective contraceptive method (Branum & Jones, 2015; Guttmacher Institute, 2016). Manlove et al. (2016) found that 15 to 19-year-old teens used LARC methods (9.8%) in 2002, with only 3% using a LARC method (IUD or implant) in 2011 to 2013, a decline among sexually active teens at risk for an unintended pregnancy. Adolescents who use LARC methods have higher continuation rates than short-acting contraceptive methods, such as condoms or the pill. Researchers in the CHOICE project, a prospective cohort study aimed to promote LARC use among adolescents and young women (14-45 years), found that 81% of adolescent females aged

14 to 19 years continued a LARC method at 1 year, and 44% used shorter-acting methods (Secura, Allsworth, Madden, Mullersman, & Peipert, 2010).

However, despite satisfaction and continuation with LARC methods, only 5.8% of adolescents aged 15 to 19 years in 2011 through 2015 reported using the IUD (3.0%) or implant (2.8%; Secura et al., 2014). The authors attributed low LARC use in teens due to lack of information about LARC, misinformation about side effects, and high upfront costs to access LARC methods (Secura et al., 2014). Dehlendorf et al. (2014) found that the use of highly effective methods usage rates differed significantly by race and ethnic background; both Hispanic and Black females were less likely to use a moderately or highly effective method than White females (64% and 58% vs. 70%, respectively). In 2016, Hispanic adolescent females ages 15 to 19, had a higher birth rate (31.9 births per 1,000 adolescent females) than Black (29.3) and White (14.3) adolescent females (Martin, Hamilton, Osterman, Driscoll, & Drake, 2018). Sexually active Hispanic teens, 15 to 19 years, were reported to less likely use any method of contraception or were unlikely to use a highly effective method of birth control, with condoms or withdrawal as the most commonly used method (Gilliam, Neustadt, Whitaker, & Kozloski, 2011). Kusunoki, Barber, Ela, and Bucek (2016) stated that Black youth used less effective methods, such as condoms and the pill, for pregnancy prevention than use of LARC methods. Kramer, Higgins, Godecker, and Ehrenthal (2018) also found that Black women who had ever experienced an unintended pregnancy were not associated with a higher predicted probability of LARC use, as compared to White and Hispanic women. The researchers also noted several factors that have been associated with the pattern of LARC usage in women of color, including racial bias and provider pressure in family-planning to use LARC, and the experience of

unintended pregnancy (Kramer et al., 2018). These statistics help to illustrate a public health concern, that despite increased strategies to increase LARC use among teens, use within certain racial/ethnic groups remains lower to reduce unintended teen pregnancy (Romero et al., 2015).

Current studies have shown that LARC usage is lower among teens 15 to 19 years old, mainly African American and Hispanic females, despite improved access, effectiveness, safety, and ease of use (Kavanaugh, Jerman, & Finer, 2015). Research studies have supported the use of LARC to be 99% effective at preventing pregnancy, and LARC methods were over 20 times more effective at preventing unintended pregnancy (Secura, 2013). This study can contribute to positive social change within the adolescent patient population seeking reproductive and contraception services and the health provider community. The social change implications are to provide a mechanism to instruct and teach adolescents about LARC methods and build interventional strategies to tailor clinical practice and counseling to optimize LARC use among adolescents, 15 to 19 years (see Rubin, Davis, & Mckee, 2013). Providers and the adolescent community will gain an increased awareness and knowledge about LARC methods and the importance of identifying effective counseling strategies and techniques that are needed to address and reduce barriers to LARC use to reduce unintended pregnancy rates, especially for sexually active African American and Hispanic adolescents. In this study, I examined predictors of LARC use in high school adolescent females and explored the relationships between the use of LARC in African American and Hispanic females, ages 15 to 19, sexual behavior, contraceptive choices, condom use, and the importance of providing information to providers to identify those barriers to LARC use in these groups.

In section 1, I present the problem statement and purpose of the study. In the following subsections, I discuss the research questions and hypotheses, the theoretical foundation, and the nature of the study. In the following sections, I present a detailed literature search strategy and literature review, including definitions, assumptions, scope, and delimitations of the study. Lastly, I expand on the significance of the study and summarize the potential contributions for positive social change to advance reproductive and adolescent health practice and/or policy and a summary of the major themes in the literature.

Problem Statement

Teen pregnancy in the United States continues to be a major public health issue and at a higher rate in comparison to other developed countries (Danawi, Bryant, & Hasbini, 2016). In 2015, there were 57 pregnancies per 1,000 female adolescents, ages 15 to 19 in the United States, compared to 14 per 1,000 adolescents in the Netherlands and eight per 1,000 in Switzerland (Coles & Shubkin, 2018). The teen birth rate in Canada has been less than one-half of the United States, 13 per 1,000 females aged 15 to 19 in 2011, as compared to 34 per 1,000 females aged 15 to 19 in the United States in 2011 (Abma & Martinez, 2017). Similarly, France and Germany have also reported lower teen pregnancy rates, seven and five per 1,000 females aged 15 to 19 respectively in 2011 (Abma & Martinez, 2017). While overall teen pregnancy rates have declined in the United States, racial and ethnic minority groups still have higher teen pregnancy and birth rates than White teens (Danawi et al., 2016). Adolescent pregnancy is a relevant health issue for African American and Hispanic teens living in disadvantaged communities across the nation, where these identified communities have high rates of poverty, illiteracy, and disparities in access to health insurance and resources that can further increase the substantial impact of the

psycho-social and economic factors associated with teen pregnancy and birth rates (Centers for Disease Control and Prevention [CDC], 2016). Unintended teen pregnancy has been associated with both immediate and long-term consequences, accounting for an increase in early high school dropout rates among girls, unemployment, increased health care costs, admission to foster care, and lower wages and tax revenue (CDC, 2016). Low educational level, low socioeconomic status, lack of prenatal care, or inadequate prenatal care has been associated with a tendency for poorer health outcomes, including maternal anemia, premature labor, stillbirths, and spontaneous abortions in pregnant teens from 15 to 19 years of age (Greydanus et al., 2012). Several studies have reported that African American teens aged 15 to 19 are at increased risk for low-birth weight prevalence at 13.8%, as compared to a low-birth weight prevalence from 6.9% to 8.1% in Whites, Asians, American Indian, and Hispanic females (Dennis & Mollborn, 2013; Hamilton, Martin, & Ventura, 2009). Overall, the risk of adverse health outcomes, including low birth weight, premature birth, pregnancy induced hypertension, and eclampsia are increased for young adolescent mothers aged 10 to 19 years in comparison to mothers aged 20 to 24 years (Ganchimeg et al., 2014).

There still remains a low rate of LARC use among females ages 15 to 19. LARC use among teens has increased by national estimates but has been reported to remain at less than 5% in 2011 to 2013 as compared to 8.5% between 2006 and 2010 (Kavanaugh et al., 2015; Martinez & Abma, 2015). According to Romero et al. (2015), national estimates and patterns of LARC use among females ages 15 to 19 has shown improved contraceptive use, which has contributed significantly to the decline in the teen birth rate from 61.8 births per 1,000 teens aged 15 to 19 years in 1991 to 26.5 births per 1,000 teens in 2013. Martinez and Abma (2015) reported that

although the use of contraceptive methods has improved amongst teens having first sexual intercourse in 2011 through 2013 as compared to 2006 through 2010, condoms, withdrawal, and the OCP remain the most common contraceptive method used by teens. Data from the 2013 National Youth Risk Behavior Survey (YRBS) showed that 22.4% of sexually active female high school students (12th graders) used oral contraceptives as the most common highly or moderately effective birth control method, 1.8% used LARC, 5.7% used injection, patch, or ring, and 40.8% of the participants used condoms as the primary method to prevent pregnancy (as cited in Steiner, Lidden, & Swartzendruber, 2016). Among the same group, Black (21.2%) and Hispanic (23.7%) youth were found to be less likely to use any method of contraception (Steiner et al., 2016).

Data for reported national estimates for the percentage of LARC users in 15 to 19-year-olds have varied widely by state, region, and facility, with common barriers to LARC to include lack of awareness about LARC methods, safety concerns, and high up-front cost (Romero et al., 2015). Studies have been conducted that have shown a broad range of factors associated with adolescent sexual activity, behavior risk, and the decision-making process to use LARC (Branum & Jones, 2015). SBHCs provide an example of an integrated team approach to adolescent sexual behavior and pregnancy by providing adolescent reproductive health services and contraceptive methods, including LARC, oral contraception, and condoms (Daley, 2012). To date, several studies have addressed the role of the clinician in providing adolescent contraception and counseling practices and concluded there is further need for understanding the factors, patterns, and trends in teen sexual activity, contraceptive use, and their impact on teen pregnancy and need for future researchers to examine the knowledge gap in providing provider counseling with

LARC methods to promote effective pregnancy prevention (Danawi et al., 2016; Martinez & Abma, 2015; Rubin et al., 2013).

Purpose of the Study

The purpose of this quantitative study was to explore the relationship between predictors of adolescent sexual behavior and activity and the use of LARC in adolescent females ages 14 to 19 in high schools across the United States. This research can further emphasize the need to understand and address the adolescent female decision-making process to use effective contraception. In addition, this research can inform counseling practices for providers to develop a targeted intervention for sexually active adolescent females, which may help to facilitate the increased use of LARC methods in SBHCs, community-based health organizations, and family-planning clinics that serve adolescent populations to reduce unintended teen pregnancy. Further, this research can be used to provide a framework to inform clinicians and other health providers about the importance of understanding adolescent female attitudes, sexual behavior, and activity when providing counseling and access to safe, user-friendly, and effective contraception. The identified independent variables were sexual behavior and activity, age at first sexual intercourse, number of sexual partners in last 3 months, number of sexual partners in lifetime, contraceptive method used in last sexual encounter, and condom use at last sexual encounter. The dependent variable was use of LARC contraception. Covariates in this study were age, race/ethnicity, and educational level/grade.

Research Questions and Hypotheses

The following were the research questions and associated hypotheses for this study:

Research Question 1 (RQ1): Is there a difference in LARC usage between adolescent White, African American, and Hispanic females ages 14 to 19, in high schools in the United States?

H₀1: There is no difference in LARC usage between adolescent White, African American, and Hispanic females ages 14 to 19, in high schools in the United States.

H_a1: There is a difference in LARC usage between adolescent White, African American, and Hispanic females ages 14 to 19, in high schools in the United States.

RQ2: Is there a relationship between sexual behavior, activity, and LARC usage among White, African American, and Hispanic females ages 14 to 19, in high schools in the United States?

H₀2: There is no relationship between sexual behavior, activity, and LARC usage among White, African American, and Hispanic females ages 14 to 19, in high schools in the United States.

H_a2: There is a relationship between sexual behavior, activity, and LARC usage among White, African American, and Hispanic females ages 14 to 19, in high schools in the United States.

Theoretical Foundation for the Study

The theoretical framework for this study was the health belief model (HBM), developed in the 1950s by a group of social psychologists in the United States Public Health Service, based on the psychological and behavioral theory that sought to describe and predict health behavior (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977; (Glanz, Rimer, & Viswanath, 2015). The constructs of theoretical applications can be used to examine the relationships between

behavioral, cognitive, and cultural factors to explain the perspective of health behavior in the promotion of health practice (Raingruber, 2012). The HBM was one of the first models used to predict and explain variations in contraceptive behavior interventions in women in the 1970s and 1980s (Hall, 2012). According to the HBM, the decision to take action to protect a person's health is determined by four main constructs: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Glanz et al., 2015). The underlying concept of the HBM is that individuals will engage in health behavioral changes or take action to change when they believe there is a threat or if there are adverse consequences to their health (Glanz et al., 2015). The main premise of the HBM is to identify or predict factors that will help to reduce negative health outcomes with effective interventional and educational strategies (Bond & Nolan, 2011).

The constructs of the HBM have been shown to be effective to help identify and predict factors that impact the use of successful contraception (Hall, 2012). Roderique-Davies, McKnight, John, Faulkner, and Lancaster (2016) found that the interventions by providers that address the barriers to LARC use and increase the processes that influence the perceived benefits of LARC use would be more effective in increasing LARC use, which could reduce unintended pregnancy. The HBM offers a comprehensive approach to developing strategies for long-term patient contraceptive care and can provide a useful framework for providers to reassess adolescents' contraceptive behavior patterns, using the constructs of the model to guide practitioners in interviewing teens about their contraceptive needs, risks, and benefits of use and efficacy (Hall, 2012). For the purpose of this study, the constructs of the HBM can be applied to explore and understand how African American and Hispanic teens perceive the use of LARC,

the low rate of LARC use among these groups, and the barriers related to their lack of choice for LARC as a method for the prevention of unintended pregnancy. According to the HBM, an individual must perceive themselves susceptible to a getting a disease or a condition (becoming pregnant), susceptibility or perceived threat (unwanted pregnancy, risks of abortion, and consequences of becoming a teen parent), perceived benefit (obtaining a user-friendly, reversible, effective contraceptive method to prevent pregnancy), perceived barrier (fear of speculum used for IUD insertion or needle for subdermal implant insertion), and cues to motivate action (sexual partner not wanting to use condoms or counseling by a health provider; Glanz et al., 2015; Hall, 2012). The HBM provides a useful framework to improve education and knowledge about LARC methods and their effectiveness to improve initiation and continuation rates among African American and Hispanic females, seeking contraceptive care in SBHCS, community-based organizations, and family-planning facilities in the United States.

Nature of the Study

The nature of this study was a quantitative, cross-sectional study design. This quantitative research approach is appropriate to examine secondary data, using primarily medical charts and observation of collected data from surveys to determine if there is a relationship between independent and dependent variables to explain and offer insight about reliable and cost-effective birth control methods, such as LARC (see Either et al, 2011). The identified independent variables were sexual behavior and activity, age at first sexual intercourse, number of sexual partners in last 3 months, number of sexual partners in lifetime, contraceptive method used in last sexual encounter, history of pregnancy, and condom use at last sexual encounter. The

dependent variable was use of LARC contraception. The identified covariates were age, race/ethnicity, educational level/grade, and type of insurance coverage.

I used secondary analysis of archived data from the 2017 YRBS, which provides prevalence data that measure a variety of behaviors, including sexual behavior related to unintended pregnancy. The CDC conducts school-based state, territorial, tribal, and large urban school districts surveys which are administered by the CDC's National Youth Risk Behavior Surveillance System (YRBSS). The National YRBSS monitors priority health risk behaviors among public high school students, Grades 9 through 12 using questionnaires to assess a variety of behaviors, including tobacco, alcohol and drug use, violence, sexual and dietary behaviors, unintentional injury, and physical activity (see City of New York, 2016). The study population was White, African American, and Hispanic females ages 14 to 19 enrolled in high schools, Grades 9 to 12 in the United States and District of Columbia. I performed a univariate analysis to describe the study sample demographic characteristics and to obtain the frequencies and percentages for all the study variables. I conducted a bivariate analysis to determine whether there was an association between any of the independent variables and the dependent variable. As a result of the bivariate analysis, independent variables were identified that were included in the hierarchical multiple logistic regression, which was conducted to build a predictor model for LARC usage. Adjusted odds ratio (*OR*) and 95% CIs were generated and significant *p*-values were reported as $p < .05$.

Literature Search Strategy

The literature search strategy included using multiple search engines and databases, including Google, Google Scholar, Medline Plus, ProQuest, the Columbia Libraries Catalog/

Columbia University Libraries, and the Walden University Library. Additional online searches were conducted using Google to find statistical data briefs and vital statistics from the CDC and the New York City Department of School Health and current peer- review articles on LARC methods, including subdermal implants and hormonal and nonhormonal intrauterine devices.

The key search terms and combinations of search terms included the following: *LARC, unintended pregnancy, adolescents and contraceptive methods, LARC and teens, LARC and African American females and Hispanic females, racial and ethnicity and LARC, teen pregnancy prevention, barriers to LARC use, adolescent sexual behavior, access to LARC, LARC and school-based health clinics, LARC counseling, and attitudes and beliefs about LARC*. Although some of the research cited here is dated, the search time frame for the most current literature was from 2010 to 2018.

Literature Review Related to Key Variables and/ or Concepts

I focused the literature review on the summary of studies related to the use of LARC and teen pregnancy prevention, sexual behavior and activity, LARC use in African American and Hispanic adolescent females, and SBHCs and access to LARC. Although there has been an overall increase in access and use of LARC methods provided to African American and Hispanic teens and a decrease in the rate of unintended pregnancies, there still remains a lower rate of use among these minority adolescents. In this study, I reviewed the existing literature that has shown the need for further research on factors and interventional methods that can facilitate the contraceptive counseling process that providers use to effectively increase LARC usage in sexually active minority teens to reduce unintended pregnancy. These concepts are explained and

used to show how they relate to the key variables of the study and the need for future studies based on the gaps seen in the literature review.

LARC and Teen Pregnancy Prevention

Adolescent pregnancy is a major public health issue that costs an estimated \$9.1 billion spent annually in the United States (Daley, 2012). An estimated 750,000 women aged 15 to 19 in the United States have become pregnant, with more than half giving birth, as compared to other developed nations. (Patel & Sen, 2012). The unintended pregnancy rate for teens who are sexually active is more than twice the rate among all women (Kearney & Levine, 2015). In 2011, 45% of the 6.1 million pregnancies in the United States each year were unintended, and the highest were seen among low-income women, women aged 18 to 24 years of age, and minority women (Guttmacher Institute, 2016). In the United States, birth rates for teens have remained high, and African American adolescents in low-income communities have higher teen pregnancy and birth rates, 126 per 1,000 annually compared to non-Hispanic White youth, 44 per 1,000 (Lewin et al., 2011; Modi, Heitmann, & Armstrong, 2013). Unintended teen pregnancy has been shown to cause premature school dropouts, unemployment, and homelessness (Guttmacher Institute, 2016).

The ACOG and the American Academy of Family Physicians support the use of LARC as a first-line contraceptive choice, which with increased access can further help to contribute to decrease the rate of unintended pregnancies in the United States (Peipert, Madden, Allsworth, & Secura, 2012). Using contraception has had an estimated savings of nearly \$19 billion annually in direct medical costs, with LARC methods among the most cost-effective methods of contraception, which can lead to lower failure rates, higher compliance, and continuation with a

reduction in teen birth rates, abortions, and repeated abortions (Eisenberg, McNicholas, & Peipert, 2013; Manlove et al., 2016; Peipert et al., 2012). Secura (2013) found that providing education about LARC, access to LARC methods, and removing cost as a barrier for young women provided greater use and continuation of LARC methods to effectively reduce unintended and teen pregnancy. Manlove et al. (2016) conducted research to show the effectiveness of using a microsimulated model, Teen FamilyScape, to collect and study data on adolescent sexual behavior, use of contraception, and pregnancy outcomes in the United States between 2002 and 2010. The authors concluded that half of the decline in adolescent birth rates was due to changes in contraceptive methods, with increases in more effective hormonal/LARC methods and results showing that 30% of the LARC methods was attributed to an increase in teens using an IUD, implant, or injectable methods (Manlove et al., 2016). Manlove et al. found that there is a need for a two-step process to continue to reduce teen pregnancy rates for sexually active teens by first targeting teens most at risk for not using contraception and helping them to choose a method and second, increasing the effectiveness of the method chosen, including hormonal and LARC methods.

Trends in the use of effective contraception has led to a reduction in adolescent pregnancy or births, with an 86% reduction between 1995 and 2002 (Manlove et al., 2016). The use of LARC methods such as subdermal implants and IUDs has been shown to be more effective than user-dependent methods (condoms and oral contraception; Manlove et al., 2016). Winner et al. (2012) conducted a large prospective cohort study to promote the use of LARC to reduce unintended pregnancies. Study participants were enrolled from August 2007 through September 2011 and were provided with a no-cost reversible contraceptive method of their

choice; the rate of failure of LARC methods (IUDs and implants) was compared to OCPs, transdermal patch, vaginal ring, and depo injection in cohort groups stratified to less than 21 years of age vs. 21 years or older (Winner et al., 2012). The study participants were followed prospectively with telephone interviews done at 3 and 6 months and every 6 months thereafter for the duration of the follow-up (Winner et al., 2012). The findings revealed the cumulative percentage of participants with a contraceptive failure at 1, 2, or 3 years, with participants using OCPs, the patch, or a ring having a higher risk of contraceptive failure than those using LARC (Winner et al., 2012). The failure rates for those using pills, patch, or ring were 4.8%, 7.8%, and 9.4% in years 1, 2, and 3 as compared to the corresponding failure rates of participants using IUDs or implants, 0.3%, 0.6%, and 0.9% ($p < 0.001$; Winner et al., 2012).

Overall, the findings showed that participants using the pill, patch, or ring had a risk of contraceptive failure that was 20 times as high as the risk of those using LARC (Winner et al., 2012). The failure rate for those who used the pill, patch, or ring was 4.55 per 100 participant years as compared with 0.22 for those using depo and 0.27 for participants who used an IUD or implant (Winner et al., 2012). For study participants less than 21 years of age who used pills, patch, or ring, there was almost twice the risk of unintended pregnancy as older women who used the same methods (Winner et al., 2012). The findings on contraceptive method effectiveness from this study were consistent with previous results in similar studies, although it was noted that there are few prospective studies in the literature that assess the effectiveness of contraceptive methods in large diverse populations in the United States (Winner et al., 2012). Winner et al. concluded that LARC methods (IUDs or implants) were more effective than OCPs, patch, or ring in preventing unintended pregnancy and worked well regardless of age.

Limitations of the study were in the nonrandom design, which resulted in potential confounding of the association between contraceptive method and outcomes by characteristics associated with the contraceptive method chosen (Winner et al., 2012). Another limitation was in generalizability because the recruited study participants were at high risk for unintended pregnancy and had to be willing to switch to a new birth control method, which could have resulted in potential bias due to an overestimation of contraceptive failure rates when compared to the general population of the United States (Winner et al., 2012).

A similar study was conducted by Secura et al. (2014) to promote the use of LARC methods and provide no cost contraception to adolescents and women at risk for unintended pregnancy in the St. Louis region. Study participants recruited from two abortion facilities in the St. Louis region were enrolled into the Contraceptive CHOICE Project, a prospective cohort study of adolescents and women ages 14 to 45, seeking reversible contraceptive methods (Secura et al., 2014). Participants received contraception counseling with an emphasis on the benefits and effectiveness of LARC methods and were provided with their choice of LARC at no cost and followed for 2 to 3 years (Secura et al., 2014). There were 1,404 adolescents ages 14 and 19 years from 2007 through 2011, stratified by age group at enrollment (14-17 years vs. 18-19 years), with follow-up surveys conducted to record if pregnancy had occurred (Secura et al., 2014). Telephone interviews were administered to collect demographic information and reproductive history, including contraceptive method use and satisfaction, sexual behavior, and pregnancy (Secura et al., 2014).

The main objective of the Contraceptive CHOICE Project was to analyze pregnancy, birth, and induced abortion rates among female teens and women ages 15 to 19 years and to

compare them to national rates among teens in the United States in the same age group. In both age groups, the majority of teens chose LARC with teens 14 to 17 years more likely to use LARC methods (implant) than older teens (IUD; 77.5% vs. 68.4%, $p < 0.001$; Secura et al., 2014). Two-thirds of teens in the CHOICE cohort were also continued to use LARC methods longer than short-acting methods, such as the pill and depo injection at 24 months of follow-up (Secura et al., 2014). For the CHOICE teens, the overall annual rates of pregnancy, live birth, and induced abortion were 34.0 per 1,000 teens (95% *CI*, (25.7 -44.1), 19.4 per 1,000, (95% *CI*, (13.3- 27.4), and 9.7 per 1,000, (95% *CI* 5.6 -15.8) as compared to 57.4, 34.4, and 14.7 per 1,000 among teens nationally in the United States in 2010 (Secura et al., 2014).

Overall, the mean annual birth rate in the CHOICE cohort was 19.4 per 1,000 teens, 36% lower than the CDC Winnable Battle 2015 goal of 30.3 per 1,000 teens, reflecting a high rate of highly effective LARC use, 72% overall among teens (Secura et al., 2014). Secura et al. concluded that increasing access to the most effective contraceptive methods by removing barriers such as cost and access greatly increased the use of LARC methods among adolescents and women in the St. Louis region and the mean annual birth rates were much lower than national rates. Furthermore, findings were consistent with previous research that revealed that providing LARC methods as first-line contraception and at no-cost may result in an increased uptake of LARC methods and has the potential to reduce unintended pregnancies in the United States (Kavanaugh, Frohwirth, Jerman, Popkin, & Ethier, 2013; Peipert et al., 2012). However, the study had several noted limitations: Information about pregnancies was self-reported, which may have made it possible to underestimate the number of teen pregnancies in the CHOICE cohort; teens were surveyed regularly regarding their use of contraceptive method, which may

have influenced adherence to their contraceptive method; and generalizability due to how teens received standardized contraception counseling methods presented from most effective to least effective, which may differ from the usual counseling approaches that teens receive in the United States (Secura et al., 2014).

Kavanaugh et al (2013) examined provider and patient perspectives for teens and young adults regarding LARC. The objective of the research was to help identify ways that facilities providing family planning could improve LARC services to meet the needs of sexually active teens and young adults. The researchers collected qualitative data using telephone interviews with administrative directors at 20 publicly funded sites that provide family-planning services and six focus group discussions with facility staff from these sites and forty-eight in-depth interviews with female clients, ages 16-24. The 48 client respondents were teens ages 16-19 (46%) and young adults ages 20-24 (54%), mostly low-income (35%) and below poverty level (46%), White non-Hispanic (40%), Black non-Hispanic (19%), Hispanic (35%), mixed or other race (8%) and 2% did not identify race or ethnicity (Kavanaugh et al., 2013). The authors concluded that there were diverse attitudes representing differing needs among young females and emphasized a need for a tiered counseling approach and the importance of the availability of a diverse method mix to provide LARC methods to this population in order to better meet the contraceptive needs of young women and provide longer term protection with LARC and avoid unintended pregnancy (Kavanaugh et al., 2013). According to Sundstrom, DeMaria, Meier, Jones, & Moxley (2015) studies have been conducted to analyze women's attitudes and perceptions about LARC and other contraceptive methods and recommendations to promote use

of birth control methods, but there has not been sufficient research on how to design successful messages aimed at increasing the acceptance and use of LARC methods.

Sexual Behavior and Activity and LARC Use in African American and Hispanic

Adolescent Females

Studies have shown that sexual behavior and activity of minority ethnic adolescent females can be measured by knowledge, perceptions and motivations surrounding sexual activity and contraception and are important predictors of contraceptive use and consistency (Ryan, Franzetta, & Manlove, 2007). African American and Hispanic teenagers are more than twice as likely to become pregnant than white teenagers, with half becoming pregnant before age 20 (Parks & Peipert, 2016). Significant disparities by race/ethnicity, income, and education are seen in non-use, inconsistent use, gaps in use or incorrect use of contraception with African-American, women with low-income, women using Medicaid and less than a college education more likely to experience gaps in consistent use of reversible methods (Parks & Peipert, 2016).

Kramer et al. (2018) studied racial and ethnic differences in LARC use examining demographic, socioeconomic and reproductive health factors in women ages 15-44. The researchers used a national dataset from the 2011-2013 and 2013-2015 National Surveys of Family Growth (NSFG) to explore whether covariates including demographic characteristics (race-ethnicity, age, religion, marital status), socioeconomic characteristics (poverty level, education, and current health insurance), and reproductive health characteristics (parity, number of partners, and experience of unintended pregnancy) affect LARC use differently among non-Hispanic White, non-Hispanic Black, and Hispanic women ages 15-45 (Kramer et al., 2018). The results showed that Hispanic women (11%) and White women (9%) used LARC more than

Black women (7%) ($p = .03$). Black and Hispanic LARC users were younger than White LARC users ($p = .0002$). The data did not show that low income and education are more strongly associated with LARC use in Black and Hispanic women than for White women. The findings did show that White and Hispanic women who reported experience of unintended pregnancy had a higher predicted probability of LARC use than those who did not and among Black women, the experience of unintended pregnancy was not associated with a higher predicted probability of LARC use. Most important, the study of the NSFG data showed similar patterns of LARC use by race and ethnicity. The analysis did not include cultural or psychological factors that may influence patterns in LARC use by race, an issue that has been raised in prior findings where the possibility of racial bias in LARC promotion among women of color has been a concern (see Kramer et al., 2018). The research findings also indicated a need for providers to use patient-centered counseling approaches for LARC and other contraceptive methods that give every woman the autonomy to choose a method and control their fertility. Limitations of the study included lack of separate analysis of IUD and subdermal implant users by race, since more implant than IUD users are more likely to be younger, Black and lower-income. There were also statistical concerns using linear probability modeling to capture nuances that could help explain racial differences in contraceptive choice and use and compare effects across groups, that were more difficult to interpret than logistic regression (Kramer et al., 2018).

Waddell, Orr, Sackoff, & Santelli (2010) examined risk factors for pregnancy risk among Black, White, and Hispanic teens in New York City public high schools. Data was analyzed from the 2005 and 2007 New York City YRBS using pregnancy risk index (PRI) methodology to estimate probability of pregnancy based on current sexual activity and birth control method used

at last intercourse and examining factors: race/ethnicity, grade level, age, borough, and school neighborhood. NYC had shown significant disparities in the teen pregnancy rate by race/ethnicity and neighborhood, with the 2007 NYC rate for females 15-19 about 83 per 1,000 compared to the 2005 national rate, 71 pregnancies per 1,000. The results showed that Blacks (35.4%) and Hispanics (32.7%) had higher rates of current sexual activity and as compared to Whites (23.4%). Whites also had a lower PRI (5.4%) than Blacks (9.0%) and Hispanics (10.5%) respectively, with lower PRI rates in Blacks and Hispanics attributed to poor contraceptive use, 19% and 50%. Hormonal contraception rates were low for all sexually active females among all of the groups, Whites (11.6%), Blacks (7.8%), and Hispanics 97.5%). Pregnancy rates were also found to be four times higher among NYC Black (122/1,000) and Hispanic teens (114/1,000) than among White teens (21/1,000).

Overall, the researchers concluded that race/ethnicity and school neighborhood were significantly associated with differences in contraceptive use and Blacks and Hispanics had greater pregnancy risk compared to White teens, the differences between Black and White teens attributed to higher rates of sexual activity and the difference between Hispanics and Whites were mainly due to less contraceptive use among sexually active girls. These findings offered evidence and supported data from previous studies that race/ethnicity and school neighborhood independently influenced pregnancy risk and teens living in socioeconomically depressed neighborhoods are more likely to engage in sex at an earlier age and to become pregnant (Waddell et al., 2010; Cubbin, Santelli, Brindis, & Braveman, 2005). This study reinforces the need for pregnancy prevention programs among diverse populations which should include

counseling to delay sexual activity and interventional messages that promote the use of LARC as the first option for highly effective contraception choice to help reduce teen pregnancy.

R-Almendarez and Wilson (2013) conducted a study utilizing data collected by the CDC, using the 2007 YRBSS to analyze and compare the sexual behaviors of African American, Hispanic, and White adolescent males and females. The results concluded that African American and Hispanic females reported higher levels of sexual behavior at young ages, an estimated 16% of males and females reporting first sexual encounter before the age of 13. The researchers emphasized the findings to support the importance of sex education, including abstinence and contraception prior to high school to reduce the risks and consequences associated with sex that could help reduce teen pregnancy as well as the percentages of youth diagnosed with sexually transmitted illnesses (STIs) and infections.

Lee, Cintron, & Kocher (2014) conducted an integrative literature review study to investigate factors related to risky sexual behaviors among African American adolescents living in an urban community on the South side of Chicago and propose suggestions for future intervention programs targeting African American adolescents. The findings indicated five major factors contributing to risky sexual behaviors: substance use, gender roles, peer influences, parental involvement, and level of knowledge and information on sex and STIs. Following the results of the study, six national intervention programs were determined to be effective, culturally sensitive and tailored to provide information relevant to pregnancy prevention strategies and HIV/STI risk-reduction interventions for African American adolescents. Findings from the study contribute to other studies that also emphasize the importance of a better understanding of factors related to risky sexual behaviors that increase the risk of adolescent

pregnancy and of contracting an STI in an at-risk population (Lee et al., 2014; Bachanas et al., 2002). Overall, the researchers found that successful interventional programs should promote interventions that are targeted to change behavior outcomes including, increasing condom use, increasing use of effective hormonal contraception, reducing frequency of sexual activity and sexual partners and delayed onset of recent and first time sexual intercourse.

School-Based Health Centers and Access to LARC

SBHCs have evolved as a critical partner since the 1970s and 1980s to facilitate and provide enhanced access to reproductive services for adolescents, currently operating in 48 states, with 70% providing counseling about birth control methods (BCM) and 39% dispensing contraception (Sangraula et al., 2016; Mabry, 2016; American Academy of Pediatrics, 2012). The SBHC model includes partnerships with local health care organizations and institutions and schools to provide onsite primary care services, health education, mental health counseling to all students registered in the school, offering scheduled and walk-in services at no out of pocket cost, when schools are in session and twenty-four telephone coverage when schools are closed (New York City Department of Education [NYCDOE], 2017; Sangraula et al., 2016). Studies have shown the significant role which SBHCs have had on the provision of health care services, by providing services on-site that create access to care, reducing financial, familial and cultural barriers for adolescents in communities where they reside (Guo, Wade, Pan, & Keller, 2010). SBHCs are the center of health in schools with a multidisciplinary team, which may include a physician, nurse practitioner, or a physician assistant, health educators, nurses, dentists, nutritionists and mental health providers, working together to provide integral primary health

care and education with a focus on reproductive and contraception services, disease management and treatment (NYCDOE, 2017).

Despite access to reproductive and contraception services in SBHCs, research has shown a low rate of use among minority adolescents (Haider et al., 2013). A review of the literature has shown that lack of awareness and knowledge, incorrect or misunderstood information about LARC methods, and fear of adverse effects associated with LARC methods, can influence the utilization of IUDs and subdermal implants (Sundstrom et al., 2015). DiClemente, Salazar, & Crosby (2007) offer that a broader ecological perspective is needed to expand and extend the efficacy of adolescent sexual risk reduction interventions and address the influence of different levels of causation to promote adolescent's adoption and maintenance of preventive sexual behavior. Half of all unintended pregnancies are due to contraceptive failure because of inconsistent or incorrect use of contraceptive methods (Sundstrom et al., 2015). Even with improved access to LARC methods, half of all pregnancies in the United States are unplanned (Sundstrom et al., 2015). Research has shown that among women at risk for unintended pregnancy, adolescent females, ages 15-19, use a contraceptive method 81% of the time and are less likely to use effective contraceptive methods, with Blacks less likely to use a method 84% compared to Hispanic and White women, both 91% (Haider et al., 2013).

Sangraula et al (2016) conducted a quality improvement project to assess the quality of care at three New York City SBHCs before, during and after LARC services and to identify strategies to improve LARC services. The researchers used a cross-sectional design and qualitative method to interview 18 female adolescents from 15 - 19 years, who received LARC services, using the IUD and subdermal implant. Study participants were asked about their

experiences receiving LARC services before, during, after their procedures and were given a chance to give feedback about the quality of care and the providers and to make suggestions about improvements of services within the SBHC (Sangraula et al., 2016). Key themes were structured corresponding to domains of youth-friendly services, including setting (accessibility of health care and age-appropriate environment), peer influences, medical care (health outcomes and medical competency), staff interactions (communication and staff attitude) and involvement in health care that were identified with a focus on recommendations to improve LARC services in SBHCs (Sangraula et al., 2016). Results showed that the participants were highly satisfied with the SBHC LARC services and provided feedback about the need for balanced communication from providers and health educators, regarding autonomy in choosing a contraceptive method when given proper information and options about how a method works and side effects. The study was limited by the small sample size, as interviews were conducted during summer months, which resulted in limited access to study participants and interviews were done directly after LARC methods were done, which may have limited the feedback if LARC services had been in place for a longer period. Overall, the findings generated recommendations that adolescents have for LARC services and showed the need for providers to have a balance when providing information about LARC services to female adolescents and further studies to evaluate the effect of implementing the proposed strategies on reproductive outcomes among female adolescents utilizing LARC services at SBHCs.

Several studies have shown that SBHCs can provide reproductive care to adolescents that is readily accessible, familiar and beneficial by providers dispensing contraception that can have a significant impact on increasing a student's likelihood of using a method to avoid

unintended pregnancy (Brakman & Gold, 2015). Smith, Novello & Chacko (2011) conducted a study examining two SBHCs in demographically similar high schools, one that dispensed contraception on-site and one that offered referrals for contraception off-site. A retrospective chart review and electronic database review was done of both clinics from 2008-2009 to determine whether or not the receipt of hormonal contraception on-site at a SBHC made an impact on pregnancy rates among female students. The results showed that the pregnancy rate was significantly higher at the school that made off-site referrals (20%) for students requesting contraception compared to the school with onsite services (6%) ($p < 0.05$). The limitations of the study were the retrospective chart review method and the small sample size. The use of condoms and emergency contraception were not examined during the study period, and the possible impact of cultural values surrounding pregnancy at early ages among certain ethnic immigrant populations were also not included in the statistical analysis (Smith et al., 2011). The study was important because it showed the significant contribution that SBHCs can make on pregnancy prevention by providing high-risk teen populations with access to no-cost and effective LARC, reproductive and sexual health services.

Minguez, Santelli, Gibson, Orr, & Samant (2015) conducted a quasi-experimental research design to examine the impact of school health centers (SHC) on reproductive health behavior and on-site provision of hormonal contraception among students at high schools compared with students in a school without a school health center. Study participants, grades 9-12 were given a paper and pen questionnaire modeled after the 2007 NYC YRBS, focused on four measures: willingness to use an SHC for reproductive health care, receipt of classroom education and health care provider counseling, use of contraception, and source of contraception.

The findings showed that students with access to comprehensive reproductive health services in a school with a SHC reported greater exposure to reproductive health education, counseling, and higher use of hormonal contraception in comparison with a NYC high school without a SHC. The study had several limitations. First, there was a small sample size when analyzing contraceptive use as IUDs in SHCs became available after the study data was collected. Other limitations reported were the use of self-reported data, only two schools were used and the difficulty in matching public high schools on key demographic factors that could influence SHC use and contraceptive use. This study contributed to the growing evidence that SBHCs are an important and effective strategy in teen pregnancy prevention efforts, by improving access to reproductive health education in classrooms, increased conversation between providers and students and increased contraceptive use with sexual intercourse. Although both studies showed the positive impact of SBHCs on improving access to reproductive health services, the students remained at risk for unintended pregnancy. The current study will examine the factors that may help providers to develop additional strategies, which can be used to identify and counsel at risk female teens about LARC methods, increase use at first sexual intercourse, and improve continuation rates at subsequent sexual encounters.

Definitions

Barrier methods: Contraceptive methods that are placed inside the vagina to cover the cervix and block male sperm. (CDC, 2018a).

Hormonal contraceptive methods: Birth control methods that use hormones composed of estrogen and progestin to regulate or stop ovulation and prevent pregnancy. These include short-

acting and long acting reversible contraceptive methods: pills, injectable, transdermal (skin) patches, vaginal rings, intrauterine devices, and implantable rods (CDC, 2018a).

Implant: A single, thin rod that is inserted under the skin of a woman's upper arm, which releases a hormone into the body over 3 years (CDC, 2018a).

Injectable contraception ("shot"): Subcutaneous injection of the hormone, progestin, Depo-Provera (depot medroxyprogesterone acetate [DMPA], that is given once every 12- 14 weeks in the arm or buttocks (CDC, 2018a).

Intrauterine device (IUD): A small device that is placed inside the uterus by a health care provider, which can remain in place for several years at a time for effective pregnancy prevention (CDC, 2018a).

Long-acting reversible contraception (LARC): Reversible hormonal contraception methods that provide effective contraception that does not depend on daily adherence: implants and intrauterine device (National Collaborating Centre for Women's and Children's Health, 2005).

Male condom: A sheath, most commonly made of latex, worn over the penis during sexual intercourse to keep sperm from getting into a woman's body, to prevent pregnancy, HIV and other sexually transmitted illnesses (CDC, 2018a).

Oral contraceptive pill (OCP): The "pill" contains combined oral synthetic hormones, estrogen and progestin, that a woman takes once a day to prevent ovulation (CDC, 2018a).

Short-acting hormonal methods: These methods refer to injectable, pills, patch, and ring.

Transdermal patch: A thin, plastic patch that is placed on the skin and releases hormones through the skin into the bloodstream, a new patch is applied weekly for 3 weeks and removed during the fourth week to allow menstruation. (CDC, 2018a).

Vaginal ring: A thin, flexible, plastic ring inserted and left in the vagina that releases a combination of hormones continually for 3 weeks. The woman removes the ring for the fourth week and reinserts a new ring 7 days later (CDC, 2018a).

Assumptions

One assumption made was that a large number of female respondents ages 15 to 19 were sexually active and self-reported their own sexual behavior, and were able to identify and provide information on the LARC method used at the last time of sexual intercourse. Secondly, this study used a population-based dataset to select a demographic subgroup of adolescent participants, with an assumption that the external validity of this study will be increased (CDC, 2018b; Hanson, 2018).

Scope and Delimitations

This study used a quantitative, cross-sectional design. The YRBS data from 2017 was selected because it provided an ongoing analysis of health-risk behaviors among high school students at the national and state levels, and in large urban school districts and specifically monitored the behaviors that contribute to unintended pregnancy. The study examined the predictors of LARC usage and sexual behavior and activity in adolescent females ages 15 to 19, in high schools across the United States. This study was limited to secondary data from the YRBS, and as a result no primary data was collected and control groups were not used in this study. YRBS data was self-reported and adolescents in the study may have underreported or over

reported responses. The national YRBS study population excludes high school students from alternative schools, Bureau of Indian education schools, special education schools, schools operated by the Department of Defense, and vocational high schools (CDC, 2018b). The quantitative data collected was limited to adolescents in Grades 9 to 12, who attend high school and are not representative of all adolescents in this age group (CDC, 2018b).

Significance of the Study and Potential Implications for Positive Social Change

This study is significant because it expands on the literature on predictors of LARC use by adolescents and on the counseling practices used to increase the awareness and effectiveness of LARC methods to improve teen pregnancy prevention in SBHCs. Martinez and Abma (2015) found that 30% of high school students (Grades 9 to 12) report that they have had sexual intercourse and only 58% report that they or their partner used a condom during last sexual intercourse in 2015. Despite an overall decline in teen pregnancy rates across the United States, racial/ethnic and geographical disparities remain in rural and urban communities, where African American and Hispanic teens have some of the highest teen birth rates at higher risk for unintended pregnancy (United States Department of Health and Human Services [DHHS], 2017). With birth rates higher among African Americans and Hispanic adolescent females ages 15 to 19 than their white counterparts, there is a significant need to focus on innovative strategies for teen pregnancy prevention that address this subgroup of the population associated with high teen birth rates (DHHS, 2017). Research studies have supported the use of LARC to be 99% effective at preventing pregnancy and LARC methods were over 20 times more effective at preventing unintended pregnancy (Secura, 2013). Gaps seen in the literature have indicated the need for increased efforts to identify and promote strategic and custom-tailored reproductive and

contraceptive counseling to adolescent females from diverse cultural backgrounds who are at increased risk for sexual behaviors and activity that may increase unintended pregnancy (Bachanas et al., 2002; Hoopes et al., 2016; Lee et al., 2014; R-Almendarez & Wilson, 2013; Waddell et al., 2010). This research can be used to provide a framework to inform clinicians and other health providers about the importance of understanding adolescent female attitudes, sexual behavior and activity and providing counseling and access to safe, user-friendly and effective contraception. This study may build on the body of research to design and develop a counseling tool to help providers reach African American and Hispanic females in school-based health clinics and other adolescent health settings and explore attitudes and motivations about LARC and sexual behavior and associations between LARC knowledge, use and acceptability (Hoopes et al., 2016).

Summary and Conclusions

Overall, using contraception has an estimated savings of nearly \$19 billion in direct medical cost each year, with LARC methods among the most cost-effective methods of contraception (Eisenberg et al., 2013). Adolescent females, predominately African American and Hispanic living in disadvantaged communities in the United States, with high rates of poverty, unemployment, illiteracy, and single parent homes, are at increased risk because of the substantial impact of the psycho-social and economic factors associated with teen-pregnancy and childbearing (Mabry, 2017). Teen pregnancy rates are higher among African American and Hispanic teens and within disadvantaged communities (Hamilton & Ventura, 2012). According to the National Vital Statistics System (NVSS), across national, state and county levels, the data from 1991 through 2014 shows the teen birth rate remained approximately twice as high for

African American and Hispanic teens compared with White teens (Romero et al., 2016). There is a continual public health concern to provide pregnancy prevention for teens of color who are at the highest risk for unintended pregnancy in the United States. Important factors to consider when providing reproductive health counseling and contraception education include the attitudes, perceptions and skills of health providers and health educators. This study evaluated possible predictors and factors related to sexual behavior and activity, grounded in theoretical constructs from the HBM, of African American and Hispanic female adolescents, ages 14 to 19 to measure the impact of knowledge, attitudes and information about sexual behavior, and sexual activity as possible predictors of LARC use. The findings of this study could help to address the high rate of adolescent pregnancy in at-risk communities across the United States, where SBHCs may be used to provide effective teenage pregnancy services, and most important, by increasing the understanding of possible predictors of African American and Hispanic teen attitudes and motivation to start and continue LARC.

Section 2: Research Design and Data Collection

Introduction

The purpose of this study was to explore the potential relationship between predictors of adolescent sexual behavior and activity and the use of LARC in adolescent females ages 14 to 21 in high schools in the United States. In this quantitative research study, I further emphasized the need to understand and address the adolescent female decision-making process to use effective contraception. In this section, I provide the overview of the research design and rationale, methodology, and threats to validity.

Research Design and Rationale

The identified independent variables were sexual behavior and activity, age at first sexual intercourse, number of sexual partners in last 3 months, number of sexual partners in lifetime, contraceptive method used in last sexual encounter, and condom use at last sexual encounter. The dependent variable was use of LARC contraception. The identified covariates were age, race/ethnicity, and educational level/grade. I used a quantitative, cross-sectional study design using secondary YRBS data collected during 2017, specifically examining data from the YRBS, conducted by the CDC as well as school-based state, territorial, tribal, and large urban school district surveys collected by education and health agencies (CDC, 2018b). I used the secondary data to assess for predictors of LARC use and the sexual behaviors and characteristics among the sexually active female adolescent students in the United States.

Methodology

Population

The target population for this study was sexually active adolescent females between the ages of 15 and 19 years, in Grades 9 through 12 in high schools across the United States and the District of Columbia. The data were provided by the YRBS, using the data cycle from 2017 summarizing sexual health behaviors related to unintended pregnancy defined by sex, race/ethnicity, and grade in school. The national YRBS participants are representative of students in ninth through 12th grades attending public and private high schools in the 50 states and District of Columbia. The surveys are administered biennially, and student participation is voluntary and anonymous; parental permission was obtained before any YRBS survey was given.

Sampling and Sampling Procedures Used to Collect Data

According to the CDC (2018b) data collected for the YRBS uses PCSample, which was developed specifically as a specialized software program that uses two-stage cluster samples of schools and classes within sampled schools for each site. Schools are selected with probability proportional to school enrollment size, and classes are randomly selected (CDC, 2018b). The YRBSS includes both a school-based national YRBS and state and large urban school district YRBSs that have been conducted biennially since 1991, among representative samples of students in Grades 9 through 12 (CDC, 2018b). According to the CDC, the sample population is representative of students in regular public schools, charter school students from some jurisdictions in Grades 9 through 12 in 26 states, and 13 large urban school districts, including students from other types of public schools (public alternative, special education, vocational schools or schools managed by the Bureau of Indian Education). Each state, territorial, tribal, and large urban school district YRBS uses a two-stage cluster sample design that includes (a) the first sampling stage where schools with any Grades 9 through 12 are selected with probability

proportional to school enrollment size and (b) the second sampling stage, which includes random selection of students from intact classes of a required subject or from intact classes during a required period. All students from sampled classes are eligible to participate (CDC, 2018b).

I used the 2017 YRBS datasets and questionnaires that are accessible and available for the public domain, and it was not necessary to request permission to gain access to the data. To obtain the datasets, I identified and searched for YRBS data through the search engine Google and selected the 2017 cycle. I searched through the national and the New York State YRBSS sexual health behavior data files to examine and compare variables, reviewed the questionnaires and datasets, and saved the Excel files for data merge into the Statistical Package for Social Sciences® (SPSS) version 25.

Sample Size

Sexually active female adolescents between 14 and 19 years were included in this study. For the 2017 national YRBS, 14,956 surveys were completed from 144 schools; after editing for missing data and inconsistencies, 14,765 questionnaires were available for analysis (see CDC, 2018b). Following the National YRBS protocol, after the data are collected, a weight factor is applied to each student record to adjust for student nonresponse and the distribution of students by gender within grade and race/ethnicity (CDC, 2018b). In 2017, the school response rate was 75%, the student response rate was 81%, and the overall response rate was 60% (CDC, 2018b). Across the states, the student sample sizes were from 1,273 to 51,057 (median response: 2,139) and among the large urban school districts, the student sample sizes were from 805 to 10,191 (median response: 1,971; CDC, 2018b). Among the states, overall school and student response

rates were from 60% to 82 %, and among the larger urban school districts, the overall school and student response rates ranged from 61% to 89% (CDC, 2018b).

A priori power analysis was conducted using the software package GPower (see Faul, Erdfelder, Lang, & Buchner, 2007). The recommended effect sizes used for this assessment were as follows: small ($f^2 = .02$), medium ($f^2 = .15$), and large ($f^2 = .35$; Cohen, 1977). The alpha level used for this analysis was $p < .05$. The priori power analyses revealed the sample size need for each effect, with achieving a statistical power of .80, for 11 dichotomous producers were as follows: small = 850, medium = 123, and large = 59.

Justification for the Effect Size, Alpha Level, and Power Level

An alpha level of .05 was used to reduce Type I error and a minimum power level of .80 was used to reduce Type 2 error that may minimize potential threats to external validity and improve the generalizability of the study results (see Creswell, 2009).

Instrumentation and Operationalization of Constructs

The CDC developed the YRBS in 1991 as a tool to collect data on the health-risk behaviors that affect the morbidity and mortality among adolescents and young adults (CDC, 2018b). The YRBS questionnaire measures six categories of priority health-risk behaviors that contribute to unintentional injuries and violence, sexual behaviors that contribute to unintended pregnancy, HIV infection and other STIs, tobacco, alcohol and other drug use, dietary behavior, and physical activity, as well as the prevalence of asthma and obesity among youth and young adults (CDC, 2018b). The research is based on a national school-based survey conducted by the CDC as well as state, territorial, tribal, and large urban school district surveys that have been collected biennially since 1991, which are representative of public high school students in

Grades 9 through 12 (CDC, 2018b). Since 1995, as a result of a need for more and higher quality data on the health-related behaviors of sexually minority high school students, the CDC has supported states and large urban school districts to include at least one or two questions related to their YRBS questionnaires to collect data on sexual identity, sex of sexual contacts, or both and to provide estimates of health-related behavior by sexual identity and sex of sexual contacts (CDC, 2018b). Questions pertaining to sexual identity and sex of sexual contacts were placed on the 1997 YRBS cycle and added to the standard YRBS questionnaire in 2015 and 2017, which have been used by national, state, and large urban school districts to provide estimates and overall trends in health-related behavior by demographic subgroups (sex, race/ethnicity, and grade) and on the numbers of sexual minority high school students (CDC, 2018b). I used the national YRBS dataset from 2017 to explore the sexual-related health behaviors that may determine the predictors of LARC use in African American and Hispanic adolescent females aged 14 to 19 years in high schools in the United States.

Operationalization

The independent variables for this study were sexual behavior and activity, age at first sexual intercourse, number of sexual partners in last 3 months, number of sexual partners in lifetime, contraceptive method used in last sexual encounter, and condom use at last sexual encounter. I defined age at first sexual intercourse (13 years -17 years or older). Contraceptive method was defined as none, never used a method, condom, birth control pills, IUD (Mirena or Paragard), implant (Implanon or Nexplanon), shot (Depo-Provera), patch (Ortho Evra), birth control ring (Nuvaring), or withdrawal. The dependent variable was use of LARC contraception, defined as use of implant, ring, or IUD. This variable was categorical “yes or no”.

The covariates I used were age, race/ethnicity, and educational level/grade. Age was categorized into groups: 14 years, 15 to 17 years, and 18 years or older. Educational level/grade was categorized as Grades 9 to 12.

Data Analysis Plan

The IBM SPSS Version 25 was used to analyze data. The data analysis phase included both descriptive and inferential data analysis, using multiple and logistic regression analyses to identify and measure associations between the identified independent and dependent variables in this study. The data were exported to SPSS, which was used to set up, designate, and import variable names, types, and value labels and generate and edit data for detailed analysis (IBM.com, 2018). Identified variables were recoded and aligned with the research questions and data operationalization plans. Descriptive statistics were created and used in tables. Univariate, Chi-Square analyses and logistic regressions analyses were conducted to identify relationships and measure levels of significant associations between dependent and independent variables. Statistical calculations were performed, including p -values, adjusted OR s and 95% CIs.

Research Questions and Hypotheses

The research questions and hypotheses were as follows:

Research Question 1 (RQ1): Is there a difference in LARC usage between adolescent White, African American and Hispanic/Latino females, ages 14 to 19, in high schools in the United States?

(H_01): There is no difference in LARC usage between adolescent White, African American and Hispanic/Latino females, ages 14 to 19, in high schools in the United States?

(H_{a1}): There is a difference in LARC usage between adolescent White, African American and Hispanic/Latino females, ages 14 to 19, in high schools in the United States?

(RQ2): Is there a relationship between sexual behavior, activity and LARC usage among White, African American and Hispanic/Latino females, ages 14 to 19, in high schools in the United States?

(H_02): There is no relationship between sexual behavior, activity and LARC usage among White, African American and Hispanic/Latino females, ages 14 to 19, in high schools in the United States?

(H_{a2}): There is a relationship between sexual behavior, activity and LARC usage among White, African American and Hispanic/Latino females, ages 14 to 19, in high schools in the United States?

Threats to Validity

Cross-sectional study designs are used to understand the prevalence of outcomes, services, and treatments and the factors associated with such outcomes (Carlson & Morrison, 2009). Cross-sectional study designs are limited because exposure and outcome are determined simultaneously for each study participant and although an association may be shown between an exposure and outcome, evidence of causality may be unclear that the exposure caused the outcome (Carlson & Morrison, 2009).

The national YRBS uses a three-stage, cluster sample designed to be nationally representative of a sample of high school students in grades 9 to 12 in the 50 states and the District of Columbia (CDC, 2018b). Prior to the 2013 national YRBS, strategies were used to oversample African American and Hispanic students to increase the probability of sampling

schools with high minority enrollment, which has changed in 2015 and 2017 due to increases in the proportion of these groups in the population (CDC, 2018b). Using secondary data may present threats to content and construct validity due to missing data, inconsistencies in data collection, and in reporting and responses (Creswell, 2009).

Ethical Procedures

This study used secondary data collected from 2017. The secondary YRBS data was utilized without disclosing personal protected health information to avoid ethical concerns and edited to protect the anonymity of students. Institutional permission from Walden University, including the Institutional Review Board (IRB Approval Number: 03-18-19-0141965) was obtained prior to the study. All data utilized for this study was saved on an encrypted flash drive, and will be properly deleted from the corresponding technical device after five years as directed by Walden University IRB guidelines.

Summary

In this section I discussed the research design, a quantitative cross-sectional study, rationale and methodology of the study. The methodology section described the study population of White, African American and Hispanic/Latino adolescent females, ages 14-19 in high schools in the United States (YRBS 2017). This section also included sampling and sampling procedures, instrumentation and operationalization of constructs. In addition, the data collection, data analysis plan, dependent and independent variables, threats to validity, and ethical procedures as well as data treatment and storage were all discussed. In the next section, Section 3, I presented the results and findings of this study. I also discussed the timeframe for data collection, recruitment and the response rate of the participants in the secondary data set. Descriptive and

demographic characteristics of the sample population, basic univariate, and hierarchical multiple logistic regression analyses were also presented.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative study was to explore the relationship between predictors of adolescent sexual behavior and activity and the use of LARC in adolescent females ages 14 to 19 in high schools in the United States. Section 3 includes findings of statistical analysis on secondary data collected from YRBS. This section includes a description of the timeframe for data collection and descriptive and demographic characteristics of the sample population, representativeness of the sample, and univariate analysis and bivariate characteristics of the sample. I also include the results of the chi-square tests for RQ1 and RQ2 and the binary logistic regression model.

Data Collection of Secondary Data Set

The school-based YRBS is administered biennially, and student participation is anonymous and voluntary. As a result, parental permission is obtained prior to survey distribution. Students completed the self-administered questionnaire during one class period, and responses were recorded directly on a computer booklet or answer sheet that can be scanned. I used the National YRBS dataset from 2017, as it pertains to the demographic characteristics and questionnaire of sexual-related health and lifestyle behaviors of adolescent females and LARC usage in high schools in the United States, to conduct chi-square and logistic regression analyses, as outlined in the research questions.

Time Frame and Response Rates

The school-based national YRBS has been conducted every 2 years since 1991, amongst students in Grades 9 to 12 from national, state, and large urban school districts. The 2017

National YRBS includes 14,956 completed surveys from 144 schools. However, after editing for missing data and inconsistencies, 14,765 surveys were available for analysis. Among the usable 14,765 questionnaires, the school response rate was 75% and the student response rate was 81%, with an overall response rate of 60%. A weight based on student sex, race/ethnicity, and grade was applied to each record to adjust for lack of student and school response and oversampling of Black and Hispanic students (CDC, 2018b). The overall weights are scaled, so the weighted estimates are representative of the student population in Grades 9 through 12 attending public and private schools in the United States. For the National YRBS, the data from state and large urban school districts that had a representative sample of students were cleaned and edited for quality control, and an overall response rate of $\geq 60\%$ was weighted (CDC, 2018b).

In order to select a sufficient sample size for analyses on health-related behaviors with condom use and birth control use, from the 14,765 respondents, 1,496 students who selected female, heterosexual (straight), and who had sexual contact with the opposite sex and identified race/ethnicity as White, Black or African American, and Hispanic or Latino were selected for this study cohort (see CDC, 2018b). Males and students who selected gay, lesbian, and bisexual, or not sure were excluded from analyses on condom use, birth control use, and sexual behaviors (see CDC, 2018b). For the purpose of this study, 1,496 adolescent females, 910 White, 397 Black, and 189 Hispanic females, ages 14 to 19 were studied to explore the relationship between adolescent sexual behavior and activity and the use of LARC in high schools across the United States. The demographic subgroups for the sample cohort were chosen because significant health disparities such as pregnancy and STIs have been shown to exist among sexual minority youth as

defined by race/ethnicity, sex, and grade level in school and occur more often in these subgroups (CDC, 2018b).

Descriptive Demographics of the Sample

The sample population in this study consisted of 1,496 sexually active White, Black, and Hispanic female adolescents between 14 and 19 years with a median age of 17 years. The subgroup of 1,496 female adolescents chosen for this study identified as female, heterosexual and as White, Black/African American, and Hispanic/Latino and responded to the questionnaire regarding sexual-related health and lifestyle behaviors and LARC usage in high schools in the United States.

Representativeness of the Sample

The sample for the 2017 National YRBS was selected to be representative of all regular public schools, including charter and Catholic school students and other nonpublic schools in Grades 9 to 12, within the United States and the District of Columbia (see CDC, 2018b). A two-stage cluster sample design was used to produce samples that are representative of the students within the jurisdiction of state and large urban school districts. The demographic data from the state and local samples were weighted to match the demographic characteristics of the national population based on student sex, race/ethnicity, and grade to adjust for nonresponses and oversampling of Black and Hispanic students (see CDC, 2018b). Of the 14,765 National YRBS 2017 student responses, 1,496 White, Black, and Hispanic adolescent females ages 14 to 19 formed the study sample.

Study Results

Univariate Characteristics of the Sample

The sample consisted of 1,496 sexually active female adolescents between 14 and 19 years with a median age of 17 years (see Table 1). The racial demographics consisted of 61% (60.8%) White, 26.5% Black, and 12.6% Hispanic/Latino adolescent females. Thirty-seven percent (37%) of the respondents were in the 12th grade (36.9%), 30% in the 11th grade and 22% in the 10th grade. Four percent (4%) of the adolescents indicated they had sex before the age of 13, and approximately 58% indicated they had multiple sex partners at one time. Nearly 85 % (84.6%) had specified only one current sex partner, 10.4% had engaged in sexual activity with two persons, and 3% reported sex with three persons. Fifty-one percent (51.5%) of the adolescents did not use condoms during the last sexual activity. Condoms (34%) were the highest reported method of birth control used, and birth control pills (20%) were the second most used method, while LARC methods (IUD/implants) were used the least (5.35%).

In this section, I display the study results for each research question. I conducted chi-square analyses to determine if there was an association between LARC usage and race/ethnicity, age, multiple sex partners, sex before age 13, and current sexual activity. Table 1 displays the demographic and sexual behavior and activity characteristics of the sample population. Table 2 and Table 4 display the Chi-square analyses used to analyze the relationships between LARC usage and age, race, multiple sex partners, sex before the age 13, current sexual partners, and birth control methods. The logistic regression of covariates by LARC usage is shown in Table 3 and Tables 5 through 7.

Table 1

Univariate Descriptive Analyses of Study Population Demographics and Sexual Behavior and Activity Characteristics

	<i>n</i>	%
<i>N</i> = 1,496		
Age		
14 years	74	4.90%
15 years	223	14.90%
16 years	389	26.00%
17 years	534	35.70%
18 years or older	276	18.40%
Total	1,496	100.00%
Grade		
9th	156	10.4%
10th	334	22.30%
11th	451	30.10%
12th	552	36.90%
Missing	3	2.00%
Total	1,496	100.00%
Race		
Black/African American	397	26.50%
White	910	60.80%
Hispanic/Latino	189	12.70%
Total	1,496	100.00%
Sex before 13 years		
12 years or younger	57	3.80%
13 years	125	8.40%
14 years	294	19.70%
15 years	457	30.50%
16 years	401	26.80%
17 years old or older	157	10.5%
Missing	5	3.0%
Total	1,496	100.0%
Current sexual activity		
One person	1,266	84.6%
Two people	155	10.4%
Three people	45	3.0%
Four people or more	30	2.0%
Total	1,496	100.0%

(continued)

Table 1

	<i>n</i>	%
Multiple Sex Partners		
One Person	620	41.4%
Two people	350	23.4%
Four people or more	188	12.6%
Four people or more	330	22.1%
Missing	8	0.5%
Total	1,496	100.0%
Condom use before last sexual activity		
Yes	685	45.8%
No	771	51.5%
Missing	40	2.7%
Total	1,496	100.0%
Method of birth control		
Birth control pills	301	20.1%
Condoms	503	33.6%
IUD/Implant	80	5.4%
Shot/Patch/Ring	102	6.8%
Withdrawal	143	9.6%
No Method	251	16.8%
Not Sure	36	2.4%
Missing	80	5.4%
Total	1,496	100.0%

RQ1: Is there a difference in LARC usage with race/ethnicity and age in adolescent White, African American, and Hispanic females ages 14 to 19, in high schools in the United States?

To assess the differences in LARC usage, two statistical analyses were employed. First, as race/ethnicity are categorical variables, a chi-square test was the appropriate analysis to determine if there were independence or if there was a statistically significant relationship among LARC usage and age while controlling for race/ethnicity. Overall, among adolescent females, 5.3% ($n = 80$) indicated usage of a LARC method (IUD/implant) while 94.7% ($n = 1,416$) did not use a LARC method. Chi-square analyses were used to analyze the relationships between LARC usage and age, multiple sex partners, sex before age 13, and current sexual activity while controlling for race. The top section of Table 2 displays LARC usage by age, and the results indicate a statistically significant association between LARC usage and age ($\chi^2(4) = 11.72, p < .05$), suggesting the variables are not independent of each other. Next, a chi-square analysis for LARC usage and race/ethnicity indicates no statistically significant relationship ($\chi^2(2) = 4.83, p > .05$).

Table 2

LARC Usage by Age and Race

		LARC usage Yes Frequency (%)	LARC usage No Frequency (%)	<i>p</i> -value
Age	14	2 (2.7%)	72 (97.3%)	< .05
	15	3 (1.3%)	220 (98.7)	
	16	26 (6.7%)	363 (93.3%)	
	17	36 (6.7%)	498 (93.3%)	
	18+	13 (4.7%)	263 (95.3%)	
Race	Black/AA	15 (3.8%)	382 (96.2%)	> .05
	White	58 (6.4%)	852 (93.6%)	
	Hispanic/Latino	7 (3.7%)	182 (96.3%)	

In addition to the chi-square analysis, a logistic regression was conducted to examine the probability of race/ethnicity and age, with age performing as a confounder variable, predicting the usage of LARC. The logistic regression model (see Table 3) was not statistically significant, ($\chi^2(26) = 8.67, p > .05$). Therefore, race/ethnicity and age were not significant predictors of LARC usage between adolescent White, African American and Hispanic females, ages 14-19, in high schools in the United States.

Table 3

Hierarchical Multiple Logistic Regression Analysis of Age and Racial Characteristics for LARC Usage With OR, 95% CI, Wald and P values (N= 1,496)

Variable	%	OR	95% CI		Wald	P
			Lower	Upper		
Model 1						
White	26.54	1.00				
Black/AA	60.83	1.73	0.97	3.01	3.45	0.06
Hispanic Latino	12.63	1.77	0.80	3.94	1.95	0.16
Model 2						
White	26.54	1.00				
Black/AA	60.83	1.76	0.98	3.14	3.61	0.06
Hispanic Latino	12.63	1.86	0.83	4.16	2.30	0.13
Age		0.81	0.66	1.01	3.48	0.06

RQ2: Is there a relationship between sexual behavior, activity, and LARC usage among White, African American, and Hispanic females ages 14 to 19, in high schools in the United States?

Similar to RQ1, both chi-square and logistic regression analyses were used to answer research question two. As race/ethnicity, sexual behavior, activity, and birth control methods are categorical variables, chi-square analyses were used to determine if a relationship existed among the variables or if the variables were independent, and are shown in Table 4. The results suggest a statistically significant association between race and multiple sex partners, race and no method used, race and birth control pills, and race and shot/patch/ring. Conversely, as shown in Table 4, race and sex before the age of 13, race and the number of current sex partners, race and condoms, race and withdrawal method, and race and LARC usage (i.e., IUD) were not statistically significant. As a result, logistic regressions were used to determine the degree of

variables: race/ethnicity, age, sex before the age of 13, multiple sex partners, and current sex partners predicting the probability of LARC usage.

Table 4

Chi-Square Analyses for Sexual Activity and Birth Control Variables by Race

		AA	Hispanic	White	P Value
Sex before age 13					
	Yes	19	3	35	$p > .05$
	No	378	186	875	
Multiple sex partners					
	Yes	143	88	389	$p < .05$
	No	254	101	521	
Current sex partners					
	1	331	170	765	$p > .05$
	2	41	16	98	
	3	14	3	28	
	4+	11	0	19	
No method					
	Yes	274	128	763	$p < .05$
	No	95	48	108	
Birth control pills					
	Yes	329	155	631	$p < .05$
	No	40	21	240	
Condoms					
	Yes	242	103	568	$p > .05$
	No	127	73	303	
IUD					
	Yes	354	169	813	$p > .05$
	No	15	7	58	
Shot/Patch/Ring					
	Yes	335	171	808	$p < .05$
	No	34	5	63	
Withdrawal					
	Yes	324	158	790	$p > .05$
	No	44	18	81	

Logistic Regression of Covariates

Next, three logistic regressions were performed to account for the confounder variables of age and race/ethnicity in relation to sex before 13, multiple sex partners, and current sex partners to predict LARC usage. Three hierarchical logistic regressions were used to examine the confounder (i.e., moderating) variables. The first of these analyses examined the relationship between sex before the age of 13 and the confounder variables of age and race/ethnicity. The first model (i.e., step one), which only took sex before the age of 13 into consideration was significant ($\chi^2(1) = 8.99, p < .05$), however, the variable sex before the age of 13 was not a significant predictor of LARC usage. Next, the confounder variables of age and race/ethnicity were entered into the model. The model was statistically significant ($\chi^2(4) = 10.16, p < .05$) with the model explaining 2% (Nagelkerke R^2) of the variance in LARC usage and correctly classified 94.7% of cases. However, none of the predictors were statistically significant (Table 5).

Table 5

Hierarchical Multiple Logistic Regression Analysis of Sex Before 13, Age and Racial Characteristics for LARC Usage With OR, 95% CI, Wald and P values (N= 1,496)

Variable	%	OR	95% CI		Wald	P
			Lower	Upper		
Model 1						
No sex before 13	3.80	1.00				
Sex before 13	96.20	1.75	0.68	4.51	1.34	0.25
Model 2						
No sex before 13	3.80	1.00				
Sex before 13	96.20	0.64	0.73	4.94	1.73	0.19
White	26.54	1.00				
Black/AA	60.83	1.77	0.99	3.18	3.73	0.05
Hispanic/Latino	12.63	1.83	0.82	4.10	2.18	0.14
Age		0.81	0.65	1.00	3.80	0.05

The second of the analyses examined the relationship between multiple sex partners, and age, and race/ethnicity as confounding variables. The first model (i.e., step one), which only analyzed multiple sex partners was significant ($\chi^2(1) = 16.21, p < .001$), with multiple sex partners being a significant predictor of LARC usage. For each additional sex partner, the log-odds of someone using LARC decreases by 0.23 units, (*OR*: 0.77; 95% *CI*: 0.69- 0.87). Next, the confounder variables of age and race/ethnicity were entered into the model. The model was statistically significant ($\chi^2(4) = 21.25, p < .001$), with the model explaining approximately 4% (Nagelkerke R^2) of the variance in LARC usage and correctly classified 94.6% of cases. In this instance, multiple sex partners were the only significant predictor of LARC usage. The reference group for the multiple sex partners was one sex partner where participants with one sex partner had a .79 odds ratio of LARC usage. As the number of sex partners increase, the odds of LARC

usage decreases (*OR*: 0.79; *CI*: 0.70 -0.90). Participants with two sexual partners had a 1.58 odds ratio of LARC usage; participants with three sexual partners had a 2.37 odds ratio of LARC usage; and participants with four or more sexual partners had a 3.16 odds ratio of LARC usage (Table 6).

Table 6

Hierarchical Multiple Logistic Regression Analysis of Multiple Sex Partners, Age, and Racial Characteristics for LARC Usage With OR, 95% CI, Wald and P values (N= 1,496)

Variable	%	OR	95% CI		Wald	P
			Lower	Upper		
			Model 1			
Multiple sex partners		0.77	0.69	0.87	17.25	0.001
			Model 2			
Multiple sex partners		0.79	0.70	0.90	13.40	0.001
White	26.54	1.00				
Black/AA	60.83	1.66	0.92	2.98	2.88	0.090
Hispanic/ Latino	12.63	1.61	0.72	3.62	1.34	0.248
Age		0.88	0.70	1.10	1.35	0.246

Finally, the last logistic regression assessed the relationship between current sex partners, age, and race/ethnicity as confounding variables. The first model (i.e., step one), which only analyzed current sexual partners was not statistically significant ($\chi^2(1) = 0.60, p > .05$). Next, as shown in Table 7, the confounder variables of age and race/ethnicity, were entered into the model. The model was not statistically significant ($\chi^2(4) = 9.08, p > .005$).

and race/ethnicity, and sexual behavior and activity, variables sex before the age of 13 and current sexual partners were not statistically significant and were not significant predictors of LARC usage among White, African American and Hispanic/Latino high school adolescent females in the United States. However, there was a statistically significant relationship between LARC usage and multiple sex partners. Multiple sex partners were the only significant predictor of LARC usage, for each additional sex partner, the log-odds of someone not using LARC decreases by 0.23 units, (*OR*: 0.77; 95% *CI*: 0.69 – 0.87). The more sexual partners increased, the odds of LARC usage decreases. In Section 4, I display a summary of the interpretation of the findings, limitations, recommendations, and implications for professional practice and social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The purpose of this quantitative study was to explore the relationship between predictors of adolescent sexual behavior and activity and the use of LARC in adolescent females ages 14 to 19 in high schools in the United States. Overall, there was no statistically significant relationship found between LARC usage and age or between LARC usage and race/ethnicity, sexual behavior, and activity. However, when examining the relationship between the variables to each other, the only significant predictor of LARC usage was multiple sex partners. This section includes an interpretation of the key findings, limitations of the study, recommendations for further research, and implications for professional practice and positive social change.

Interpretation of the Findings

The analyses of the 2017 National YRBS data indicated no statistically significant relationships between LARC usage and age, race/ethnicity, birth control methods, sex before age 13, and current sexual activity. The only statistically significant predictor of adolescent sexual behavior and activity and LARC use in White, African American, and Hispanic/Latino adolescent females ages 14 to 19 in high schools in the United States was multiple sex partners. In the following subsection, I compare this study's findings to the literature and discuss the relationship between the variables race/ethnicity, sexual behavior and activity, and LARC usage.

Findings and the Literature

LARC and Teen Pregnancy Prevention

LARC methods are among the most cost-effective methods of contraception that can lead to lower failure rates, higher compliance, and continuation with a reduction in teen birth rates,

abortions, and repeated abortions (Eisenberg et al., 2013; Manlove et al., 2016; Peipert et al., 2012). Manlove et al. (2016) conducted research to show the effectiveness of using a micro-simulated model, Teen FamilyScape, to collect and study data on adolescent sexual behavior, use of contraception, and pregnancy outcomes in the United States between 2002 and 2010. The results showed that half of the decline in adolescent birth rates were due to changes in contraceptive methods, with increases in more effective hormonal/LARC methods, with the results showing that 30% of the LARC methods were attributed to an increase in teens using an IUD, implant, or injectable method (Manlove et al., 2016). Overall, Manlove et al. identified a need for a two-step process to help reduce pregnancy rates for sexually active teens by targeting teens most at risk for not using contraception and helping them to choose an effective method of contraception, such as hormonal and LARC methods.

LARC use has been endorsed by the American Academy of Pediatrics and ACOG as safe and appropriate for adolescents to prevent unintended pregnancy for at least 3 to 10 years (Romero et al., 2015). Current studies have shown that LARC usage is lower among 15 to 19-year-olds, mainly African American and Hispanic females, despite improved access, effectiveness, safety, and ease of use (Kavanaugh et al., 2015). Secura et al. (2014) found that only 5.8% of adolescent females aged 15 to 19 years in 2011 through 2015 reported using an IUD (3.0%) or implant (2.8%). The authors attributed low use of LARC methods to lack of information about LARC, misinformation about LARC side effects, and high upfront costs to access LARC methods. Dehlendorf et al. (2014) reported that the use of highly effective method usage rates differed significantly by race and ethnic background, with both Hispanic and Black

females less likely to use a moderately or highly effective method than White females (64% and 58% vs, 70%, respectively).

Similarly, Chacko et al. (2015) conducted a study to assess factors predisposing pregnant Latina and African American female adolescents' choice to use less effective contraceptive methods over LARC methods. Demographic and reproductive characteristics, including race/ethnicity, age, marital status, education, and high-school status, attitudes, behavioral beliefs, normative beliefs, and subjective norms (parent and partner's roles role in decisions about contraception) were found to be independently related to intent to use contraception (Chacko et al., 2015). Chacko et al. found that 23% of the adolescents intended to use a nonhormonal method (male/female condom, abstinence, withdrawal, and no method) or short/medium acting hormonal contraception (birth control pill, patch, ring, or injectable) postpartum compared with LARC methods (implant and intrauterine device). Chacko et al. reported that adolescent users of nonhormonal or short/ medium acting hormonal contraception were significantly more likely to believe that LARC methods were not as effective in preventing pregnancy. However, the researchers did not include age, race/ethnicity, education level, preexposure to LARC, attitudes toward LARC, the importance of partners and peers, or parental influence on contraceptive decision, school status, and planned current pregnancy (Chacko et al., 2015).

Cohen, Sheeder, and Teal (2019) conducted a prospective study using surveys to identify factors associated with the use of contraceptive implants and IUDs by adolescent and young women aged 14 to 24 years in Title X funded and youth-focused clinics. They found that knowing someone who uses a specific method and likes it (previsit personal acceptability) was the strongest predictor of an adolescent females' decision to choose both implants and IUDs and

the importance of contraceptive counseling to initiate a specific method (Cohen et al., 2019).

These study results suggest the importance of improving comprehensive contraception counseling and education that targets lack of knowledge and attitudes about LARC and addresses individual needs and preferences for pregnancy planning and prevention (Chacko et al., 2016; Cohen et al., 2019). I also found low use of a LARC method (IUD/implant) among Black and Hispanic adolescent females aged 15 to 19 years who used a contraceptive method. The results from this study showed no statistically significant relationships between race/ethnicity and LARC usage, and race/ethnicity and age were not statistically significant predictors of LARC usage.

Sexual Behavior and Activity and LARC Use in African American and Hispanic Adolescent Females

Waddell et al. (2010) examined risk factors for pregnancy risk among Black, White, and Hispanic teens in New York City public high schools. Data were analyzed from the 2005 and 2007 New York City YRBS using pregnancy risk index (PRI) methodology to estimate probability of pregnancy based on current sexual activity and birth control method used at last intercourse and examining factors race/ethnicity, grade level, age, borough, and school neighborhood (Waddell et al., 2010). The results showed that Blacks (35.4%) and Hispanics (32.7%) had higher rates of current sexual activity and as compared to Whites (23.4%; Waddell et al., 2010). Whites also had a lower PRI (5.4%) than Blacks (9.0%) and Hispanics (10.5%) respectively, with lower PRI rates in Blacks and Hispanics attributed to poor contraceptive use, 19% and 50% (Waddell et al., 2010). Hormonal contraception rates were low for all sexually active females among all of the groups, Whites (11.6%), Blacks (7.8%), and Hispanics (9.7.5%);

Waddell et al., 2010). Pregnancy rates were also found to be four times higher among NYC Black (122/1,000) and Hispanic teens (114/1,000) than among White teens (21/1,000; Waddell et al., 2010). Overall, Waddell et al. concluded that race/ethnicity and school neighborhood were significantly associated with differences in contraceptive use. Blacks and Hispanics had greater PRI compared to White teens, the differences between Black and White teens were attributed to higher rates of sexual activity, and the difference between Hispanics and Whites were mainly due to less contraceptive use among sexually active girls (Waddell et al., 2010).

R-Almendarez and Wilson (2013) conducted a study employing data collected by the CDC, using the 2007 YRBSS to analyze and compare the sexual behaviors of African American, Hispanic, and White adolescent males and females. They concluded that African American and Hispanic females reported higher levels of sexual behavior at young ages, an estimated 16% of males and females reporting first sexual encounter before the age of 13 (R-Almendarez & Wilson, 2013). R-Almendarez and Wilson emphasized the findings to support the importance of sex education, including abstinence and contraception prior to high school, to reduce the risks and consequences associated with sex that could help reduce teen pregnancy as well as the percentages of youth diagnosed with STIs and infections. I found that none of the birth control methods (birth control pills, condom, shot/patch/ring, and withdrawal) were statistically significant in predicting LARC usage.

Despite significant evidence of LARC effectiveness, reversibility, and safety, studies show that they are underused by African American and Hispanic female adolescents. According to the 2015-2017 NSFG, LARC use among adolescent females aged 15 to 19 at risk for unintended pregnancy was only 8.2% (as cited in Daniels & Abma, 2018). While I did not

explore pregnancy rates, I did show that there was no statistically significant relationship between LARC usage and race/ethnicity. There was also no statistically significant relationship between LARC usage by race and sex before the age of 13 and current sex partners among high school adolescent females.

Another factor to be considered is the impact of risky sexual behavior and counseling interventions for sexually active adolescents. Lee et al. (2014) conducted an integrative literature review study to investigate factors related to risky sexual behaviors among African American adolescents living in an urban community on the South side of Chicago and proposed suggestions for future intervention programs targeting African American adolescents. The findings indicated five major factors contributing to risky sexual behaviors: substance use, gender roles, peer influences, parental involvement, and level of knowledge and information on sex and STIs (Lee et al, 2014). Following the results of the study, six national intervention programs were determined to be effective, culturally sensitive, and tailored to provide information relevant to pregnancy prevention strategies and HIV/STI risk-reduction interventions for African American adolescents. Lee et al. suggested that successful interventional programs should promote interventions that are targeted to change behavior outcomes, including increasing condom use, increasing use of effective hormonal contraception, reducing frequency of sexual activity and sexual partners, and delaying onset of recent and first time sexual intercourse.

In this current study, I found no statistically significant relationship between LARC use, sex before the age 13, and current sex partners, with age and race/ethnicity as confounding variables. None of these variables were found to be statistically significant predictors of LARC

usage among the study participants. Race was also not a significant predictor. Multiple sex partners were the only significant predictor of LARC usage; for each additional sex partner, the log-odds of someone not using LARC decreased by 0.23 units (*OR*: 0.77; 95% *CI*: 0.69 – 0.87). The more sexual partners increased, the odds of LARC usage decreased.

Multiple Sex Partners

Previous research has demonstrated that rates of risky sexual behavior increase in adolescence and peak in early adulthood (Pflieger, Cook, Niccolai, & Connell, 2013). In the literature, in adolescence risky sexual behavior is commonly characterized as sexual initiation at an early age, (i.e., engaging in vaginal sex before the age of 15 years) and greater number of sexual partners (Pflieger et al., 2013). The younger the age becoming sexually active increases the likelihood of multiple sex partners and exposure to older and riskier sexual partners (Pflieger et al., 2013). The authors noted that another marker of risky sexual behavior is the lack of contraception use. Using latent class analysis (LCA), the authors examined patterns of sexual risk behavior over an extended period, starting in adolescence to young adulthood for Blacks, Hispanics, and Whites, aiming to link sexual risk patterns over time to risk for STIs. The authors found that multiple sex partners and early sexual initiation were strong predictors for increased risk of STIs and most important, across all racial/ethnic groups, engaging in risky sexual behaviors with risky partners most increased odds of having an STI with differences in the frequency and initiation of condom use for protection against STIs (Pflieger et al., 2013). Vasilenko & Lanza (2014) examined time-varying associations between predictors of multiple sexual partners from middle adolescence through young adulthood. The authors found significant positive associations between depressive symptoms and substance abuse and multiple sex

partners were strongest early in adolescence and then decreased with age, suggesting that factors associated with having multiple recent sex partners change at different ages and over developmental time (Vasilenko & Lanza, 2014). Overall, the authors found that the time-varying effect model can be used to identify risk factors and age periods, particularly in adolescence, where the odds of multiple partners increase sharply during teenage years and then plateau by the early twenties which may offer the best hope for intervention strategies to address sexual and other adolescent risk behaviors. Similar to these studies, the results of this study showed that multiple sex partners were a predictor of risky sexual behavior and suggest that as sexual activity with additional partners increased, there is a decrease in LARC use to prevent unintended pregnancy.

Limitations of the Study

In this study, there was a lack of sexually active female adolescent participants that used hormonal contraception or LARC methods (implants and IUDs), consistent with other studies that had smaller sample sizes and may not generalize to populations of female adolescents from other geographic locations. Another limitation in this study was the secondary data did not allow enough of a sample population using LARC methods to control for covariates and the sample/case numbers were too low for valid regression analyses to be properly conducted and may affect the sensitivity (or precision) of the results. The use of complex samples logistic regression may have accounted for sampling variations and provided more accurate variance and confidence interval estimates. The National YRBS Study population excludes high school students from alternative schools, Bureau of Indian education schools, special education schools, schools operated by the Department of Defense, and vocational high schools, which may have reduced

the subgroups of minority sexually active respondents eligible to participate in the YRBS questionnaire (see CDC, 2018b). In addition, as responses to sexual behavior and activity and knowledge about LARC methods was self-reported, there may have been social desirability bias at the time of the survey. In this type of response bias, survey respondents may have under reported or over reported their answers in an effort to be seen as more favorably accepted by others. Social desirability can be a potential threat to validity by reducing the validity of the questionnaire and compromising the accuracy of self-reports and the ability to make meaningful conclusions (Latkin, Edwards, Davey-Rothwell, & Tobin, 2007). It is also important to note that questions pertaining to history of pregnancy were not provided on the 2017 National YRBS survey which is essential when addressing the issue of teen pregnancy prevention and adolescent contraception use. Furthermore, although the YRBSS is designed to ask health-related behaviors risks among high school adolescents, there was no survey question inquiring about access to reproductive and contraception counseling or whether there were school-based health clinics located within the high schools. This information was not provided and may have given knowledge about the accessibility to contraceptive methods, peer influences, communication and attitudes about health provider interactions, and services provided to adolescents in an age-appropriate environment (Sangraula et al., 2016).

School-based health centers (SBHCs) have facilitated and provided enhanced reproductive services for adolescents since the 1970s and 1980s, currently operating in 48 states with 70% providing contraception counseling and 39% dispensing birth control methods (American Academy of Pediatrics, 2012; Sangraula et al., 2016). Studies have shown that SBHCs, which usually include a multidisciplinary team of health providers, can provide integral

primary health care and education with a focus on reproductive and contraception services, disease management and treatment which may have a significant impact on increasing an adolescent's likelihood of using a method to avoid unintended pregnancy (Brackman & Gold, 2017; Minguéz, et al., 2015; NYCDOE, 2017; Sangraula et al., 2016). According to current studies, adolescents with access to comprehensive reproductive health services in schools with a SBHC report greater exposure to reproductive health education, counseling, and higher use of hormonal contraception in comparison to schools without a SBHC (Fisher, Luong, & Tiezzi, 2016; Gilmore et al., 2015; Minguéz et al., 2015). However, the impact and access to SBHCs on adolescent sexual behavior and activity and LARC utilization was not analyzed in the current study because this variable was not included in the 2017 National YRBS dataset (CDC, 2018b).

Recommendations

Due to the small sample size, there is a need to conduct future research studies which include all sexually active adolescents in high schools across the United States, to increase the subpopulation of minority representation of female adolescents utilizing hormonal contraception and LARC methods. In this sample population, there were not a significant number of LARC methods (IUD/implants) users. It would also be imperative to include the access to SBHCs and the impact of SBHCs and counseling by health providers on adolescent contraceptive choices and LARC methods. This information may be utilized to gain perspective and understanding about adolescent perceptions, knowledge, misconceptions, and usage of different contraception methods to assist in the design and implementation of pregnancy prevention strategies for at-risk youth of color (Cohen et al., 2019; Gilmore et al., 2016; Pritt, Norris, & Berlan, 2017). African American and Hispanic females have been shown to be less likely to use effective hormonal

contraception and have lower rates of LARC usage as compared to White adolescent females. In this study, race/ethnicity and age, sex before age 13, and current sex partners, were not significant predictors of LARC usage. Because the only significant predictor of LARC use was multiple sex partners, preventative efforts should target adolescents at risk for early age of sexual initiation and also focus on sexual partner behavior (Pflieger et al., 2013). It would also be beneficial for health providers to further examine other factors associated with LARC initiation and usage and provide reproductive and contraception counseling that was tailored to assess adolescent's perceptions on relationships and sexual experiences and contraceptive behavior.

While I did not examine adolescent perceptions and attitudes and history of pregnancy, more clinical studies are needed to determine if sexual behavior and activity are predictors of LARC usage for at risk adolescent youth and the role of demographic and attitudinal factors, including social networks and partner preferences in choosing a contraceptive method to prevent unintended pregnancy (Pritt et al., 2017). African American and Hispanic adolescents are more likely to receive directive counseling to initiate LARC because of the high rates of unintended pregnancy among this subpopulation of sexually active adolescent females but less likely to use a highly effective, user-friendly LARC method because of lack of knowledge about LARC side effects, distrust of health care providers, negative experiences, and subtle discrimination when promoting usage of a method that would not have otherwise been chosen (Cohen et al., 2019). Lastly, a recommendation to further explore the impact of provider knowledge, attitudes and role in LARC counseling and initiation may also be used to understand the contraceptive decision-making process in teenage pregnancy prevention (Cohen et al., 2019; Pritt et al., 2017).

Implications for Professional Practice and Social Change

The approach to affect positive social change should incorporate a collaborative process to identify public health issues, develop and build resources and partnerships that will help to gain information and knowledge and to inform policy, that may bring about transformative change and health reform. Teen pregnancy rates in the United States are significantly higher than other developed countries and unintended pregnancies disproportionately affect those from racial and ethnic minority groups. Research has shown that providing effective LARC to adolescent females can lead to fewer unintended pregnancies and abortions. However, despite improved access to LARC, usage among African American and Hispanic adolescents has remained low. LARC methods can provide the most effective protection against pregnancy, specifically implants and IUDs, especially when combined with condoms. Additional research is needed to explore why adolescent females of color do not choose LARC methods as compared to the use of condoms or withdrawal, as the most commonly used method. Health providers are essential to the provider-patient relationship to help inform, counsel, and educate adolescents during the clinical visit about the best contraceptive option, by improving knowledge, and considering factors such as attitudes, beliefs and sexual behavior and activity on the decision-making process with LARC usage. The public policy approach to teen pregnancy prevention initiatives has to continue to build initiatives and support strategic planning, which allows for greater outreach and community effort to bring awareness about LARC and promotion to help decrease rates of unintended and adolescent pregnancy. Furthermore, the expansion of SBHCs into identified high-risk communities would be another way to deliver pregnancy prevention strategies, targeted to promote effective LARC to reduce unintended pregnancies among at risk sexually active adolescents.

The current study can contribute to positive social change within the adolescent patient population seeking reproductive and contraceptive services and the health provider community. Providers and the adolescent community can increase their awareness and knowledge about LARC methods and the importance of identifying effective counseling strategies that are necessary to identify and address barriers to LARC usage to reduce unintended pregnancy rates in at risk adolescent females. If an adolescent's sexual behavior and activity can help to predict their decision to use LARC for unintended pregnancy prevention, there should be an effort to increase counseling practices to learn more about the impact of these factors when presented in a clinical or counseling setting. The study by Cohen et al (2017) examined the important contribution of understanding the factors associated with contraception choice and initiation of LARC methods in adolescent, including the role of previsit personal acceptability, attitudes, and beliefs on intention and contraceptive behavior during the clinical visit. Subsequently, the authors found that individualization of contraceptive counseling, may improve initiation and utilization of implants and IUDS by adolescents and young women.

With the prevalence of unintended teen pregnancy among African American and Hispanic females, understanding perceptions about sexual behavior and activity in these groups, can help health providers guide pregnancy prevention counseling initiatives which promote LARC as highly effective, safe and user-friendly. Furthermore, this research can be used to provide a framework to inform clinicians and other health providers about the importance of understanding adolescent female attitudes, sexual behavior and activity when providing counseling and initiation of contraceptive methods. The social change implications are to provide health providers and professionals, with better counseling practices and tools that aim to engage

sexually active African American and Hispanic females, in the decision-making process about LARC methods and build interventional strategies that optimize LARC utilization and prevention of unintended pregnancy. Most important, increased funding and support for SBHCs in more public school communities can provide access to increased reproductive and contraceptive counseling interventions and targeted in communities with at-risk, sexually active adolescent females of color.

Conclusion

The purpose of this quantitative study was to explore the relationship between predictors of adolescent sexual behavior and activity and LARC use in adolescent females, ages 14 to 19, in high schools across the United States. Overall, this study found no statistically significant relationship between age, and race/ethnicity and LARC usage and the only statistically significant predictor of LARC use was multiple sex partners. It is important to for health providers to target counseling practices to gain information about sexual activity and behavior when approaching African American and Hispanic sexually active adolescents about contraceptive choice and initiation, tended to promote LARC utilization as a highly effective method for unintended pregnancy prevention. Health providers should acknowledge and attempt to understand the role of adolescent attitudes and perceptions about sexual behavior and activity and the impact of partners, social networks, cultural and community experience and exposure in making contraceptive choices. It is also important to recognize the continued need to provide opportunities for expansive and informative counseling and educational resources, that pertain to reproductive health and contraception for sexually active adolescents and those intending to become sexually active. Well-informed and trained health providers should focus on identifying

opportunities and increasing exposure to LARC and engaging adolescent African American and Hispanic females, recognizing differences in their sexual beliefs, activity and behavior which may guide the decision to use LARC and aid in reducing unintended pregnancy.

Future research that integrates the health belief model and the role of sexual behavior and activity may be a mechanism to identify or predict factors that help to understand the adolescent female decision-making process and may be beneficial to improving LARC usage among sexually active African American and Hispanic adolescent females. Lastly, reproductive and contraceptive counseling practices that focus on the promotion of LARC methods may provide the best public health intervention for sexually active adolescent females, which may help to facilitate the increased utilization of LARC methods in SBHCs, community-based health organizations and family-planning clinics to reduce unintended teen pregnancy.

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