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Rajvi J. Shah   April 21, 2018

The Influence of Psychosocial Factors on Contraceptive Use among
Sexually Active Adolescent and Young Adult Women in Atlanta, Georgia

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Abstract

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By Rajvi J. Shah

Sexually transmitted infections and unintended pregnancies remain two pertinent public health concerns for young individuals in the U.S. Nearly half of all new sexually transmitted infections are acquired by adolescent and young adults and almost half of all pregnancies in the U.S. are unplanned. Protective behaviors, such as the correct and consistent use of contraception can prevent the occurrence of these adverse health outcomes. Researchers have identified numerous determinants of women's contraceptive behaviors. However, adverse social circumstances and psychological factors have been studied to a lesser extent. To better understand the psychosocial dynamics of women's contraceptive use, this study applied the Social Cognitive Theory as a model for examining the association between young women's social discrimination and depressive symptoms and their current contraceptive use.

Baseline data of a sub-sample of sexually active 15-24-year-old adolescent and young adult females (n=122) enrolled in the Young Women's Stress Study were utilized to evaluate these relationships. Bivariate indicators of moderate/high social discrimination and moderate/severe depressive symptoms were created to examine differences in contraceptive use between those who experienced unfair treatment and depressive symptoms and those who did not. A mediation analysis was also performed to assess whether depressive symptoms explained the relationship between social discrimination and contraceptive use. Multivariable models adjusted for sociodemographic covariates were created for analyses. Results revealed that social discrimination and depression were individually associated with lower contraceptive use among women at risk for STIs and unintended pregnancies. Findings also suggest that depressive symptoms may have mediated the pathway linking social discrimination with contraceptive use, although this was not clearly established.

This study shows that sexually active women with greater perceived social discrimination and elevated depressive symptoms may be at an increased risk of STIs and unintended pregnancies due to contraception nonuse. Based on these findings among a cohort of young females in the Southeast, where rates of STIs and unintended pregnancy tend to be higher, family planning clinics as well as school and university health centers should incorporate screening measures to account for women's social situations and mental health status when recommending and providing contraceptive services.

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Introduction

In the United States, about 30% of high school youth are currently sexually active and thus at risk for STIs and unintended pregnancies (Kann et al., 2016). Evidence suggests that adolescents are also more likely to engage in sexual risk behaviors, such as unprotected sex, which can increase their risk for these adverse health consequences and their sequelae (Kirby, 2007). The latest data reveal that a lower percentage of 15-19-year-old females use contraceptive methods at both first and last sex in comparison to their male counterparts (Abma & Martinez, 2017). This can substantially increase females' likelihood of contracting STIs and becoming pregnant. Current trends additionally demonstrate that the prevalence of chlamydia is greatest among young women aged 15-24 years and that rates for unintended pregnancies are highest among women aged 18-24 years (Centers for Disease Control & Prevention, 2017a; Finer & Zolna, 2016). These findings therefore, suggest that young women may be particularly susceptible to high risk behaviors, which have important implications for their sexual and reproductive health.

Modern contraception use in the United States has prevailed since the 20th century with the advent of various safe and effective family planning methods. The diversity, accessibility, and use of contraceptive methods not only enable women to achieve their desired family size, but also help them avoid unintended pregnancies and consequences of miscarriages and abortions as well as prevent STI transmission (CDC, 1999). Approximately 62% of women aged 15-44 years currently use some form of birth control, especially the oral contraceptive pill (Daniels et al., 2014). While non-barrier techniques, including intrauterine devices and hormonal patches drastically minimize the risk of pregnancy, condoms provide dual protection against unintended pregnancies and sexually transmitted infections when used correctly and consistently (CDC, 2017b). Yet, variations in women's contraceptive behaviors during sexual activity persist in contemporary society, in

which inconsistent use and nonuse contribute to adverse health, social, and financial outcomes (Chang, O'Brien, Nathanson, Mancini, & Witter, 2003; Dehlendorf et al., 2010; Finer & Zolna, 2016).

<u>Risk Factors for Contraceptive Use</u>

While numerous factors have been identified that help explain the differences in contraceptive behaviors, sociodemographic factors, such as race and age, have been among the most well documented correlates women's contraceptive use and method preferences (Daniels et al., 2014; Dehlendorf et al., 2014; Jackson, Karasek, Dehlendorf, & Foster, 2016; Kim, Dagher, & Chen, 2015; Finer & Henshaw, 2006). African American women are less likely to have any use of contraception when compared to White women (Daniels et al., 2014; Dehlendorf et al., 2014; Jackson et al., 2016). Both African American and Hispanic women use less effective methods than their White counterparts as well (Daniels et al., 2014; Dehlendorf et al., 2014; Jackson et al., 2016). When stratified by age, the data show a positive association between increasing age and contraceptive use, with the lowest rates of use (47.4%) among females aged 15-24 years and the highest rate (70%) among women aged 35-44 years (Daniels et al., 2014). Both race and age also contribute to these disparate family planning outcomes in tandem, as contraception use at first sex has been shown to be the lowest among 15-19-year-old Black female teens followed by Hispanic and White female teens (Abma & Martinez, 2017). This underscores the importance of exploring women's multidimensional identities, including but not limited to age and ethnic backgrounds, to determine what these facets entail for their sexual and reproductive health.

Alongside these demographic traits, previous works have also noted multiple psychosocial determinants of women's contraceptive behaviors, including pregnancy intentions and attitudes, relational influences, and sexual health communication with others (Kenyon, Sieving, Jerstad,

Pettingell, & Skay, 2010; Commendador, 2010; Sayegh et al., 2006; Frost & Darroch, 2008; Johnson, Sieving, Pettingell, & McRee, 2015). Among a sample of 18-44-year-old women, Frost, Singh, & Finer, 2007 discovered that pregnancy ambivalence was associated with both nonuse and gaps in use among study participants. When examining partner communication as a predictor of contraceptive method choice among sexually active adolescent females', Johnson et al. found that contraceptive-specific communication was positively associated with consistent hormonal contraceptive use. Similarly, Kenyon et al. found that partner support for birth control use is a strong predictor of adolescent females' consistency in hormonal contraceptive use at a12-month follow-up, but not for participants' condom use. Weinman et al. and Dittus et al. additionally found that parent-child sexual health communication and high parental monitoring were associated with increased contraceptive use, including condom use.

Nevertheless, women's lack of social and psychological wellbeing has not been as closely examined as underlying mechanisms of their contraceptive behaviors. Analyzing these distal elements can further contribute to our understanding of contraceptive patterns among young women. A few studies show that social dimensions of women's health, such as discriminatory encounters may shape their contraceptive behaviors. Kossler et al. found that reproductive aged women who reported any experiences of discrimination (EODs) linked to race/ethnicity or gender were more likely to report use of less effective contraceptive methods, such as withdrawal. Another study examined sexism as a correlate of women's HIV risk and discovered that psychological distress and difficult sexual situations may serve as pathways through which experiences of sexism are indirectly linked to unprotected sex (Choi, Bowleg, & Neilands, 2011).

Apart from socioenvironmental influences, existing literature additionally suggests that young women's individual mental health status may impact their contraceptive usage (Hall,

Moreau, Trussell, & Barber, 2013; Hall, Kusunoki, Gatny, & Barber, 2015). The data from a cohort of 18-20-year-old young women derived from these longitudinal studies by Hall et al. illustrate that women with depressive and stress symptoms have increased odds for contraceptive inconsistency. General temporal trends from 2005 to 2014 also indicate that female 12-25-year-old adolescents and young adults are more likely to have a major depressive episode than males within same age group (Mojtabai, Olfson, & Han, 2016). Considering females' increased proclivity for developing depressive disorders, a closer investigation of these symptoms as a potential antecedent of young women's contraceptive use is necessary to better understand the process by which mental health impacts sexual and reproductive health.

While social discrimination may be independently associated with women's contraceptive use, research shows that it may also precede the onset of depressive symptoms among females (Banks, Kohn-Wood, & Spencer, 2006; Gee, Spencer, Chen, Yip, & Takeuchi, 2007; Anderson et al., 2016). Considering the known impacts of social discrimination on young women's mental health status as well as its potential association with use of family planning methods, it is important to consider whether depressive symptoms can help explain relationship between women's EODs and contraceptive use. Only one study examined the mediating effect of young women's mental health for a similar relationship between social discrimination and unintended pregnancy outcomes and found that depressive and stress symptoms did not fully mediate the relationship (Hall et al., 2015).

<u>Gaps in Literature</u>

While the studies presented allude to an independent association between both social and psychological attributes of women's lives and their sexual behaviors, further research is necessary

to enhance our knowledge of the dynamics of adverse social situations and mental health within the realm of women's reproductive health.

Several of the sources mentioned earlier have limited generalizability to younger and/or older adult female populations and to women outside clinic-based settings (Mazzaferro et al., 2006; Kenyon et al., 2010; Choi et al., 2011; Hall et al., 2013). Moreover, racial/ethnic and gender discrimination were the primary forms of discriminatory experiences measured by researchers (Kossler et al., 2011; Choi et al., 2011), although general discrimination that women experience in their everyday lives may also influence their family planning choices.

Purpose of Current Study

To account for these gaps, a secondary analysis of baseline data from a prospective Young Women's Stress Study (YWSS) will be performed to identify associations between every day discrimination and depressive symptoms and current contraceptive use among adolescent (15-19 years) and young adult women (20-24 years) at risk for unintended pregnancies and STIs. These young women were sampled from communities in the Southeastern region of the United States and represent a diverse cohort of study participants. Descriptive, bivariate, and regression analyses will be run to assess the exposure and outcome variables of interest while adjusting for women's sociodemographic and reproductive characteristics using SPSS. A mediation analysis will additionally be conducted to determine whether depressive symptoms serve as an explanatory variable for the relationship between social discrimination and women's contraceptive use, for which limited data currently exist.

The Social Cognitive Theory (SCT) will be applied to inform the current study to assess the psychosocial facets of young women's health in relation to their individual contraceptive practices. SCT is a conceptual framework that is used to explain health behaviors based on the

interplay of individual and environmental factors (Bandura, 1989). This study will be guided by the construct of reciprocal determinism, which is represented as a triad comprised of the individual, environment, and behavior. In line with this triadic model, this study will explore the impacts of individual affective (depressive symptoms) and social environmental (discrimination) factors on young women's current contraceptive use.

Hypotheses

Among a sub-sample of young women at risk for STIs and unintended pregnancies, this study hypothesizes the following:

1. Moderate/high social discrimination will be negatively associated with women's contraceptive use when adjusted for sociodemographic and reproductive covariates.

2. Moderate/severe depressive symptoms will be negatively associated with women's contraceptive use when adjusted for sociodemographic and reproductive covariates.

3. Depressive symptomatology will mediate the association between women's experiences of social discrimination and contraceptive use in an adjusted model.

Literature Review

STI and Unintended Pregnancy in the U.S.

Youth between the ages of 15 and 24 years account for nearly half of the 20 million new cases of sexually transmitted infections (STIs) that occur each year in the United States (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2017). Among young adults, women are highly susceptible to STIs due to both the thin lining of vaginal cells and cervical ectropion, which is a normal condition often observed in some adolescent females (CDC, 2011; CDC, 2017a). Research demonstrates that 1 in 4 sexually active adolescent female develops an STI, such has chlamydia, for which rates are highest among young women 15-24 years of age (Forhan et al., 2009; CDC, 2017a) Primary and secondary syphilis rates are also on the rise among this age group, which has coincided with increased rates of congenital syphilis as well (Bowen, Su, Torrone, Kidd, & Weinstock, 2015). While STIs like chlamydia and gonorrhea are treatable, failure to get treated for these conditions can increase risk for HIV and lead to long-term sequelae, including pelvic inflammatory disease and infertility (CDC, 2017c). Infections during pregnancy that are left untreated can cause preterm birth or fetal death (CDC, 2017d). Given young women's susceptibility to STIs and related health consequences, they serve as a critical population of interest for sexual and reproductive health studies.

While rates of overall pregnancies, including unintended pregnancies, among teens and young women have declined in the United States, the occurrence of unplanned pregnancies remain high in the country compared to most developed countries (Sedgh, Singh, & Hussain, 2014). The highest rates are observed among women 20 to 24 years of age (Finer & Zolna, 2016). However, when accounting for sexual activity, adolescents aged 15 to 19 years exhibit the highest rates of unintended pregnancy (Finer, 2010). Between 2006 and 2010, approximately 4 in

5 births to 15-19-year-old teen mothers and half of births among women aged 20-24 years were unintended (Mosher, Jones, & Abma, 2012). These unplanned pregnancies can pose significant health and socioeconomic risks to both mother and child, including delayed prenatal care, pre-term and low-birth weight infants, as well incarceration of children of teen mothers (Shah, P.S. et al., 2011; Perper, Peterson, & Manlove, 2010; Hoffman, 2008). Adolescent mothers aged 19 or younger are also more likely to drop out of high school (Perper et al., 2010). This has important ramifications for their employment prospects and socioeconomic status (SES), as younger mothers are more likely to live below the poverty level in the U.S. and rely on public assistance (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2012). Children of teen mothers are also at increased risk of lower educational attainment (Mollborn & Dennis, 2011). These adverse outcomes can ultimately diminish the quality of life of young mothers and their children and hinder their ability to become productive members in society.

Both STIs and unplanned births contribute to large societal costs as well. New sexually transmitted infections that occur among those aged 15-24 years account for almost $16 billion in healthcare costs (National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, 2017). Some infections, including HIV require life-long treatment and management, which may exacerbate the costs incurred by individuals and the government. The latest data from 2010 similarly show that the federal and state expenditures on publicly funded unintended births that given year amounted to $21 billion (Sonfield & Kost, 2015). Considering the health and financial burden of STIs and unintended pregnancies, it is important to address key indicators of these risks, such as contraceptive use and their subsequent protective and risk factors. Examining the contraceptive behaviors of at risk populations, such as young female adolescents and adults, can help inform sex education and intervention strategies for risk mitigation.

Trends in Sexual activity and contraceptive use

Temporal trends since the 1990s portray that sexual activity is on the decline among youth in the United States (Kann et al., 2016a). Sexual debut before the age of 13 has significantly decreased as well in recent decades and youth on average tend to engage in sexual intercourse for the first time at 17 years of age (Finer & Philbin, 2014; Kann et al., 2016a). Yet, when assessing prevalence of sexual activity among females, data from the National Family Growth Survey reveal that during 2011-2015 period, 55% of female teenagers had sex by the age of 18 (Abma & Martinez, 2017). Currently, 30% of heterosexual female students are sexually active (Kann et al., 2016b). However, only a little over half used a condom at last sexual intercourse and nearly 14% did not use any method to prevent pregnancy (Kann et al., 2016b). Considering that adolescence represents a critical life phase often associated with increased sexual risk behaviors, young females may be at a heightened risk of STIs and unintended pregnancies (National Research Council and Institute of Medicine, 2009).

Contraception Benefits

Contraceptive use is a well-known mechanism directly involved in women's sexual and reproductive health outcomes. Family planning methods not only prevent STIs and unintended pregnancies, but also offer women protection against high-risk pregnancies, while reducing the need for unsafe abortion and mitigating risk of maternal and child mortality (World Health Organization Media Centre, 2017). In addition to these health benefits, contraceptive techniques empower women to choose their family size with appropriate timing and spacing of births, pursue educational and employment opportunities, and avert substantial costs linked to unplanned pregnancies (USAID, 2017). In 2010 alone, publicly funded family planning services resulted in a net savings of $13.6 billion (Frost, Sonfield, Zolna, & Finer, 2014). The diversity,

availability, and application of contraceptives can thus improve the health and life trajectory of women and their children.

<u>Reproductive-aged Women's Contraceptive Method Use</u>

Currently, about 62% of reproductive aged women (15-44 years) use one or more forms of birth control in the United States (Daniels, Daugherty, Jones, & Mosher, 2015). The type and effectiveness of the methods utilized have direct implications for women's risk of sexually transmitted infections (STIs) and unintended pregnancies (CDC, 2017d). Long-acting reversible contraception (LARC) which encompasses intrauterine devices and implants are the most effective pregnancy prevention methods with a failure rate of less than 1% (CDC, 2017d). Barrier methods, such as male condoms can prevent both unintended pregnancies and STIs when used correctly and consistently (CDC, 2017d). Older women, especially those aged 25-34 years, have the highest rates of LARC use, whereas adolescent females and young women rely on user dependent methods like birth control pills and condoms (Branum, 2015; Daniels, Daugherty, & Jones, 2014). However, adolescents and young adults are more prone to inconsistent and incorrect condom use, which can increase their likelihood of experiencing negative health outcomes (Kirby, 2007; Shih et al., 2011).

Given young females' predisposition to STIs and unintended pregnancies, understanding adolescent and young adult females' contraceptive behaviors can provide insight on the extent to which they take such preventative measures as well as guide intervention efforts. While condoms and pills are the most frequently utilized methods, the majority of female adolescent also use the withdrawal technique as birth control (Abma & Martinez, 2017). Moreover, use of emergency contraception has significantly risen among 15-19-year-old females within the past decade, largely due to unprotected sex (Daniels, Jones, & Abma, 2013; Martinez & Abma, 2015). A

greater use of these ineffective methods may not only help explain unsafe sex practices but also youth's increased STI and pregnancy risk. LARC on the other hand, maximizes protection against pregnancy for several years and has been shown to contribute to declining teen pregnancies and abortion rates in the U.S. (Ricketts, Klingler, & Schwalberg, 2014). However, merely 5.8% of teenagers used LARC between 2011 and 2015 (Abma & Martinez, 2017). While the benefits of LARC are substantial, it is important to note that these methods do not prevent STIs.

Dual Contraceptive Method Use

Dual use, involving hormonal contraceptives or IUDs as well as condoms can safeguard women from both STIs and unintended pregnancies with the utmost effectiveness. Nevertheless, the 2015 YRBS shows that only 11.4% of heterosexual female students used both a condom and either LARC, an injectable, patch, or birth control ring during last sexual intercourse (Kann et al., 2016b). Several studies have generated similar results, reflecting the low prevalence of dual use, especially among younger adolescents who commonly use condoms alone (Tyler et al., 2014; Shih et al., 2011; Manlove et al., 2011; Hood, Hogben, Chartier, Bolan, & Bauer, 2014). An analysis of data from the 2013 YRBS revealed that among the 1.8% of sexually active female high school students, about 60% were less likely to use condoms compared to those who use oral contraceptives (Steiner, Liddon, Swartzendruber, Rasberry, & Sales 2016). This suggests that while adolescents are gradually utilizing more effective pregnancy prevention methods, they may be placing themselves at greater risk of STIs with condom nonuse. Therefore, concurrent use of LARC and condoms are salient means of minimizing these consequences and associated effects.

Demographic Disparities in Contraceptive Use

Although a multitude of individual and interpersonal level predictors shape women's overall contraceptive behaviors, studies repeatedly demonstrate a strong link between sociodemographic variables, such as race, and women's choice and utilization of family planning options. Black women of reproductive age are less likely to use any contraceptive method compared to White women as well as opt for less effective methods (Dehlendorf et al., 2014). These disparities are further evident in women between the ages of 15 and 24 years as Hispanic and Black women are both less likely to use contraceptives (Bahamon, Leung, & Ireland, 2017).

Moreover, among currently sexually active high-school students, prevalence of condom, birth control pill, IUD or implant, shot, patch, or birth control ring use at last intercourse was higher among White females than Black females (Kann et al., 2016a). Age at sexual debut additionally impacts contraceptive use as a higher percentage of contraceptive users are female teens who have first intercourse at 18 or 19 years of age in comparison with those who have first intercourse at 17 years of age or younger (Martinez & Abma, 2015). However, adolescents who report condom use at sexual debut are more likely to engage in protective behaviors than those who do not report condom use at first intercourse (Shafii, 2007). This may provide a window of opportunity for targeted interventions to educate younger sexually active women about contraceptive use and reinforce safe sex behaviors.

When assessing attitudes and contraceptive knowledge, Hispanic women tend to be less aware of specific contraceptives than White women, whereas awareness is similar among Black and White women (Rocca & Harper, 2012; Craig, Dehlendorf, Borrero, Harper, & Rocca, 2014). Black and Hispanic women are also more likely to prefer contraceptives without hormones compared to white women and display greater skepticism towards the government's claims of

contraceptive safety (Rocca & Harper, 2012; Craig et al., 2014). Knowledge of LARC is limited among adolescents and young women as well (Craig et al., 2014; Teal & Romer, 2013). However, teens and young women value effectiveness and safety when selecting contraceptive methods (Teal & Romer, 2013; Melo, Peters, Teal, & Guiahi, 2015). Considering the low rates of LARC use among this age group, health care providers can play a key role in educating patients about these options. This can allow women to employ the most effective pregnancy prevention methods.

<u>Psychosocial Determinants of Contraceptive Use</u>

A comprehensive review of U.S. studies on adolescents aged 18 years and younger demonstrates that over 500 risk and protective factors influence sexual behavior, including the use of condoms and other contraception (Kirby, 2007). Among female adolescents and young adult women, some of the more well documented predictors of contraceptive use include awareness of family planning methods and attitudes towards contraception and pregnancy (Kirby, 2007; Frost, Singh, & Finer, 2007; Frost, Lindberg, & Finer, 2012; Bruckner, Martin & Bearman, 2004). A former study examining contraceptive knowledge and behaviors among 18-29-year-old adults found that young women's objective knowledge about contraceptive methods increased their likelihood of utilizing hormonal or LARC methods for pregnancy prevention (Frost et al., 2012). Other studies among both adolescent and reproductive aged women have reported an association between ambivalent pregnancy attitudes and elevated risk of contraceptive non-use and inconsistent use (Bruckner et al., 2004; Frost et al., 2007).

Additional personal factors, such as self-efficacy and the number of sexual partners, have also been shown to influence women's contraceptive behaviors (Davies et al., 2006; Crosby et al., 2013; Shih et al., 2011). Crosby et al. discovered that condom negotiation self-efficacy was

attributed to more consistent condom use among a cohort of 15-21-year-old African American women. Similar results were found in a study of predominantly White college educated women between the ages of 19 and 35 years (Nesoff, Dunkle, & Lang, 2016). Davies et al., also found that having multiple and/or older partners is correlated with lower and inconsistent condom use among female youth.

Apart from these individual cognitive and behavioral characteristics, prior research has found that youths' social networks can function as antecedents of their contraceptive use as well (Manlove, Ryan, & Franzetta, 2007; Weinman, Small, Buzi, & Smith, 2008). Studies have demonstrated that improved sexual communication with a partner is associated with greater contraceptive use (Davies et al., 2006; Kenyon et al., 2010). Another study investigated the different types of partner communication and found that adolescent girls who discussed contraceptive use with their partner were more likely to exhibit hormonal contraceptive consistency (Johnson et al., 2015). Furthermore, the same study found that contraceptive-specific and general communication were both associated with increased consistency for girls in steady relationships. Parent-adolescent communication about birth control (Weinman et al., 2008) and peers' contraceptive attitudes and actual use of contraception can impact female participants' own use (Cohen, Sheeder, Kane, & Teal, 2017). Personal relations with others therefore, have the potential to shape adolescents' sexual behaviors and thus, reduce their risk of STIs and unintended pregnancies.

Social Discrimination

While a multitude of factors have been linked to women's contraceptive behaviors, there are relatively few studies centered on women's negative social experiences (e.g. discrimination) and contraceptive patterns. Social or everyday discrimination encompasses multiple domains

through which individuals may experience disrespect, unfair treatment, and hostility (Clark, Salas-Wright, Vaughn, & Whitfield, 2015). Discrimination has been consistently linked to adverse mental and physical health outcomes, although its impacts have been less understood within the scope of women's reproductive health (Lewis, Cogburn, & Williams, 2015). However, prior research evaluating the impacts of prejudice in health care delivery discovered that adolescent and adult women who sought family planning services reported race-based discrimination, poorer service, and stereotyping from clinical staff (Thorburn & Bogart, 2008). Provider related biases have also been shown to influence the recommendations made to women for effective contraceptive methods (Dehlendorf et al., 2010). The study by Dehlendorf et al. demonstrated that providers were more likely to recommend intrauterine contraception to Hispanic and Black women than White women if they were perceived to be of low SES, despite the absence of clinical differences. Such discriminatory practices can contribute to the long-standing health disparities in family planning outcomes.

While these studies depict discrimination experienced by women directly from providers within a healthcare context, other researchers have attempted to portray a broader spectrum of women's experiences of discrimination (EODs) who are of reproductive age. For instance, results from a secondary data analysis of the Contraceptive CHOICE Project revealed that women 15-44 years of age who reported general EODs based on race, gender, and socioeconomic status had higher rates of any contraceptive use prior to study enrollment but utilized less effective methods like withdrawal (Kossler et al., 2011). When examining college-aged women, researchers found that subtle experiences of sexism and condom use were interrelated, in which women who encountered sexist attitudes and behaviors daily were less likely to use condoms (Fitz & Zucker, 2015). These findings illuminate the multifaceted ways in

which women's subjective experiences of different forms of discrimination shape their

contraceptive behaviors, including method of choice and frequency of use.

These studies, nonetheless, have looked at specific and direct reports of racial/ethnic,

socioeconomic, and gender discrimination, and have not assessed women's general

discriminatory experiences within their social environments, especially among population-based

cohorts. Therefore, greater research is needed to add to the literature on such adverse social

circumstances and contraception use to capture the nuances of prejudiced treatment as well as

increase generalizability of findings to other adolescent and young adult populations outside

clinical and university settings.

Depressive Symptoms

There is limited research on the effects of depression on women's contraceptive use,

specifically among adolescent and young adult cohorts, although depression (major depressive

disorder) itself has been shown to peak during the teen and early adult years (Hankin et al.,

1998). The Fourth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-

IV) defines a major depressive disorder (MDD) as the period of at least 2 weeks when a person

experiences a depressed mood or loss of interest or pleasure in daily activities in addition to five

or more symptoms of depression (e.g. problems with sleep, change in appetite, loss of energy,

diminished ability to concentrate, and suicidality) (Federal Interagency Forum on Child and

Family Statistics, 2017). According to the National Survey on Drug Use and Health, the

prevalence of MDD for 12-17-year-old adolescents is more than twice as high among females

than males (Federal Interagency Forum on Child and Family Statistics, 2017). Gender

differences in depressive symptomatology can be attributed to genetic, hormonal, individual, and

environmental influences (Altemus, Sarvaiya, & Epperson, 2014). Yet, females' overall

increased risk of this mental health condition raises concerns about the extent to which depression affects their sexual and reproductive outcomes as well.

Depression has largely been known to have a significant impact on adolescent development and well-being as it can lower academic performance and increase risk of comorbidities and suicidal ideation among other negative sequelae (Keenan-Miller, Hammen, & Brennan, 2007; Forman-Hoffman et al., 2016; Mojtabai, Olfson, & Han, 2016). However, depressed mood can also interfere with an individual's ability to accurately judge or perceive risks related to STIs and pregnancy (Khan et al., 2009). Research has shown a link between depression and sexual risk behaviors among youth, such as unprotected sex (Lehrer, Shrier, Gortmaker, & Buka, 2006; Seth et al., 2011). Among a sample of depressed young women 14-25 years of age, those with higher levels of depression were less likely to report consistent condom use, with a stronger effect observed among the adolescent sub-group under the age of 20 (Mazzaferro et al., 2006). Data from a longitudinal cohort study assessing young women's contraceptive practices through weekly journal entries up to a 12-month follow-up period revealed that participants with moderate/severe depressive symptoms at baseline had 47% reduced odds of contraceptive consistency each week in comparison to asymptomatic women (Hall, Moreau, Trussell, & Barber, 2013). While this study did not continually assess psychological symptoms over time, the study findings along with other bodies of research elucidate the relationship between mental and sexual health and provide opportunity for an evaluation of psychological correlates of contraception use in different community-based samples.

Mediating Role of Depressive Symptoms

As briefly mentioned earlier, social discrimination is also viewed as a psychosocial stressor that can impact an individual's coping mechanisms and lead to negative health outcomes (Lewis et al., 2015; Fitz & Zucker, 2015). Research over the past few decades has depicted a strong link between discriminatory treatment and depressive symptoms as well as major depressive disorder (Banks et al., 2006; Gee, Spencer, Chen, Yip, & Takeuchi, 2007). Experiences of discrimination during adolescence may also pose difficulties, since youth seek to become independent and establish their own identities during this critical life phase (Sanders, 2013), which can heighten their sensitivity to others' perceptions of them (Greene, Way, & Pahl, 2006). Black, Latino, and Asian American youth who have experienced stereotyping and discrimination from other peers and adults have reported more depressive symptoms compared to those with fewer experiences (Greene et al., 2006; Grossman & Liang, 2008). Such discriminatory encounters at a young age can potentially lead to more chronic exposures to social discrimination, further impacting youth's mental health.

Although studies connect social discrimination to both depressive symptoms and young women's use of family planning methods, experiences of discrimination may concurrently influence young women's mental health status and contraceptive behaviors as well (Wachter & Bulatao, 2003). A paucity of research exists regarding this specific mediation model, although one study assessing unintended pregnancy outcomes found that mental health symptoms (e.g. depressive and stress symptoms) did not fully mediate the relationship between discrimination and unintended pregnancy (Hall et al., 2015). The current study will thus examine the mediation effect of depressive symptoms on the relationship between social discrimination and young women's contraceptive use to clarify its role in this pathway.

Methods

<u>Study Design and Sample</u>

A secondary analysis was performed utilizing baseline data collected from a racial/ethnically and socioeconomically diverse adolescent and young adult females enrolled in the Young Women's Stress Study (YWSS), which is a parent prospective cohort study. YWSS is a one-year longitudinal study that seeks to understand the role of biological, psychological, and social elements of young women's health in early and unintended pregnancy outcomes. Recruitment and enrollment of young women for YWSS took place throughout 2017. Study material and procedures were reviewed and approved by the Institutional Review Board of Emory University prior to initiation.

Participants were recruited through advertising and snowball sampling from community sites, such as organizations, shopping centers, and local events in Georgia. Trained research assistants disseminated study contact information on site and responded to interested potential participants via email and/or telephone within 24 hours to conduct an eligibility screening and schedule an in-personal baseline interview. Young women were eligible to participate if they were 1) Between the ages of 15-24 years; 2) English speaking; 3) a resident of the community within 20-mile radius of Atlanta; and 4) had internet access. Women who were pregnant during the recruitment period and those with known histories of primary amenorrhea, ovarian disease and cancer or exposure to gonadotoxic therapies were excluded.

The in-person baseline visit took place at Emory University, during which a trained research assistant obtained informed consent from participants. Parental consent and participant assent were also obtained for minors. The research assistant administered a computer-based three-hour baseline psychosocial and health survey, which comprised of over 850 questions

examining women's sociodemographic characteristics and multiple dimensions of health. Biological specimen, including hair and salivary cortisol samples and dried blood spots were also collected to assess neuroendocrine markers of stress and Anti-Mullerian hormone levels. Women were compensated with a $50 gift card to a retailer of their choice for completing the baseline interview and invited to participate in monthly 10-15-minute surveys to assess their fecundability. Among the 199 participants who provided baseline data, the current study will assess a sub-sample of 122 currently sexually active women for analysis.

Measures

In line with the triadic model of reciprocal determinism under the Social Cognitive Theory, this study will independently evaluate social discrimination and depressive symptoms as the environmental and individual level predictors of young women's current contraceptive use respectively. While these determinants may singly explain young women's contraceptive patterns, discrimination may concurrently predict the onset of depressive symptoms and women's contraceptive use. Therefore, this study will utilize a mediation model to examine whether depressive symptoms mediate the relationship between social discrimination and adolescent and young adult females' contraceptive patterns.

Social Discrimination

The original Everyday Discrimination Scale consists of nine items and examines the frequency of social discriminatory experiences in respondents' daily lives (Williams, Yu, Jackson, & Anderson, 1997). This study will use an abbreviated version of the scale developed for the Chicago Community Adult Health Study (CCAHS), which consists of five items with a reliability of 0.77 (Sternthal, Slopen, & Williams, 2011). Through the shortened scale, young women were asked how often any of the following happened to them in their day-to-day life:

"You are treated with less courtesy or respect than other people"; "You receive poorer service than other people at restaurants or stores"; "People act as if they think you are not smart"; "People act as if they are afraid of you"; and "You are threatened or harassed." Responses were re-coded using a six-point Likert scale as follows: 1= never; 2=less than once a year; 3=a few times a year; 4= a few times a month; 5= at least once a week; and 6=almost every day. Scores ranged from 5-24 in the study sample with a Cronbach's alpha coefficient of 0.64, indicating somewhat adequate internal consistency among scale items. A non-scored sixth question also assessed women's perceived reasons for their discriminatory experiences.

Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9) is a nine-item scale from the full PHQ that assesses the severity of depressive symptoms over the past two weeks (Kroenke, Spitzer, & Williams, 2001). The scale was used to ask participants how often they have been bothered by nine symptoms in the past two weeks. Items included "Little interest or pleasure in doing things"; "Feeling down, depressed, or hopeless"; "Trouble falling or staying asleep, or sleeping too much"; "Feeling tired or having little energy"; "Poor appetite or overeating"; "Feeling bad about yourself- or that you are a failure or have let yourself or your family down"; "Trouble concentrating on things, for example reading the newspaper or watching television"; "Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual"; and "Thoughts that you would be better off dead or of hurting yourself in some way." Responses were coded using a four-point Likert scale (0=Not at all; 1= Several days; 2=More than half the days; and 3= Nearly every day) with scores in this study sample ranging from 0-23. Reliability assessment additionally demonstrated a Cronbach's alpha coefficient of 0.84, suggesting good internal consistency

among scale items. Scores ≥10 demonstrate a sensitivity and specificity of 88% for major depression as well as high construct, criterion, and external validity (Kroenke et al., 2001). A tenth non-scored question was also used to assess the extent to which women's depressive symptoms affected their level of functioning, with responses coded as 0=Not applicable; 1=Not difficult at all; 2=Somewhat difficult; 3=Very difficult; and 4=Extremely Difficult.

Contraceptive Use

Young women's use of family planning methods was assessed for analysis among the total baseline sample as well as the sub-set of women at risk for STIs and unintended pregnancies. Contraceptive use was measured through a variable that asked women whether they are currently using any birth control method that can help them avoid becoming pregnant, even if they are not using it to keep from getting pregnant themselves, with responses coded as 1= yes and 2= no.

Covariates

The following baseline sociodemographic and reproductive characteristics were examined as potential confounders in this study: age, race/ethnicity, educational attainment, household income, primary relationship status (married, engaged, cohabitating, in a serious relationship but not cohabitating, dating or having casual sex, and not in any relationship), and the number of pregnancies, current fertility intentions, and clinical history of sexually transmitted infections. These covariates have been used in prior studies due to their potential confounding effects and/or have been shown to influence contraceptive behaviors, including use and consistency (Bruckner et al., 2004; Frost et al., 2007; Hall et al., 2013; Hall et al., 2015).

Statistical Analyses

Univariate analysis was carried out to obtain unweighted frequencies and proportions for the exposures, outcome, and covariates in the total sample as well as in the sub-sample of women at risk for STIs and unintended pregnancies. To assess varying levels of the predictors of interest, categorical indicators were established for moderate/high social discrimination scores and moderate/severe depressive symptoms based on 20th percentile sample distributions for the total sample and sub-sample. T-tests were used to evaluate bivariate associations between mean discrimination and depression scores and current contraceptive use. Chi-square tests and its non-parametric equivalent, Fisher's exact test were run to examine associations between: (1) moderate/high discrimination and contraceptive use; (2) moderate/severe depressive symptoms and contraceptive use; and (3) women's sociodemographic/reproductive characteristics and contraceptive use. Age was dichotomized to determine any sub-group differences among adolescents (15-19 years) and young adults (20-24 years). Race/ethnicity was recoded to reflect White, Black or African American, Hispanic or Latino, Asian, and Other. Education was also collapsed into five groups due to small cell counts: under 12th grade; completed 12th grade; completed 1-3 years of college; completed 4 years of college; and completed beyond a college degree. Parity was a categorical variable established by computing the number of pregnancies per respondent.

Multivariable regression models were constructed to estimate the effect of moderate/high social discrimination and moderate/severe depressive symptoms on females' contraceptive use while controlling for significant background and reproductive/sexual health characteristics. The final models retained covariates significantly associated with the outcome (p<.05) or those of conceptual importance. The model chi-square test and the Hosmer Lemeshow test were used to

assess the significance of the overall model and goodness of fit, respectively. Regression results for the reduced models are presented as adjusted odds ratios with 95% confidence intervals.

Lastly, Baron and Kenny's formal mediation criteria was applied to test the mediating effects of depressive symptoms on the relationship between young women's experiences of social discrimination and their contraceptive behaviors via regression models (Baron & Kenny, 1986). The following four criteria were used to establish mediation: (1) Independent variable affects the mediator in Path A (social discrimination influences depressive symptoms); (2) Mediator affects the dependent variable in Path B (depression influences young women's contraceptive use); and (3) Independent variable affects the dependent variable in Path C when controlling for Path B (social discrimination influences women's contraceptive use when controlling for depressive symptoms). Full mediation holds if Path C is no longer significant when the mediator (Path B) is controlled. Partial mediation holds if Path C remains significant, but with a smaller effect when the mediator (Path B) is controlled.

All analyses were conducted using SPSS software at Emory University.

Results

 This study examined data from 199 young women between the ages of 15 and 24 years who were interviewed for baseline assessments in 2017 as part of the longitudinal Young Women's Stress Study. A total of 77 women were identified as not being currently sexually active, which was defined as having heterosexual intercourse within the past 3 months of the survey. Therefore, 122 young women representing 61.3% of the original sample were at risk for STIs and unintended pregnancies and included in the sub sample analyses. The distribution of the total sample and sub-sample by exposure and sociodemographic and reproductive factors is displayed in **Table 1**.

<u>Descriptive and Bivariate Analysis</u>

 Among the sample of currently sexually active young women, the majority of participants were young adult females between the ages of 20 and 24 years (n=91); Black or African American (n=46); completed some 1-3 years college (n=49); had a high household income (n=44); were in a serious relationship (n=39); had no pregnancy history (n=92); had no intentions of becoming pregnant (n=118); and had no prior diagnosis of an STI (n=99). Similar distributions were observed among the total sample, although a higher proportion of women were not in any relationship (n=86, 43.2%) when compared to the at-risk women.

 About 20% of women experienced moderate/high social discrimination (scores ≥16), with a smaller proportion of these women (54.5%) reporting contraceptive use in comparison to those with low social discrimination (78.4%). Bivariate results further showed that this association was significant ($x^2 = 5.16$, DF = 1; p= 0.023). When asked about the reasons for perceived discrimination, the highest proportion of women (32.2%) cited race as the primary reason. Additional reasons provided by participants for their discriminatory experiences are

shown in **Table 2**. Approximately 21% of women at risk for STIs and unintended pregnancies

exhibited moderate/severe depressive symptoms (scores ≥13). Compared to women without

these symptoms, a smaller proportion of depressed women (63.6 %) were currently using any

birth control method, although this relationship was not significant ($x^2 = 1.56$, DF=1; p=0.211).

When questioned about the level of difficulty women faced when doing work and interacting

with others, more than half of the women (53.3%) claimed that it was somewhat difficult as

shown in **Table 3.**

Results from the sub-sample analysis additionally demonstrated a statistically significant

difference between the proportion of at-risk women currently using contraception and those not

using any method by education (p=0.011) and income level (p=0.001). A higher proportion of

women that completed some (84.4%) or all four years (81.8%) of college were current

contraceptive users. Moreover, approximately 91% of women with a total household income of

$75,000 or more were current contraceptive users compared to lower income women (47.4 %).

No statistically significant differences were observed between the proportion of current

contraceptive users and non-users by age, race/ethnicity, relationship status, pregnancy

intentions, number of pregnancies, and history of an STI diagnosis. However, adolescent

females, Asian or Pacific Islander women, women not in any relationship, and women with a

history of one pregnancy and a clinical STI diagnosis appeared to be at a greater risk for STIs

and unintended pregnancies than their counterparts.

Regression Analysis

Sub-sample analyses portrayed a significant inverse relationship between young women's

moderate/high social discrimination (p=0.042) and moderate/severe depressive symptoms

(p=0.035) and current contraceptive use when controlling for age, race/ethnicity, educational

attainment, total household income, and pregnancy history. Results, as depicted in **Table 4**, show that young women with baseline moderate/high social discrimination had 82% reduced odds of using contraception (aOR: 0.18; 95% CI: 0.04-0.94; p= 0.042) than women without these adverse experiences. Women with baseline moderate/severe depressive symptoms also had 82% reduced odds of using contraception (aOR: 0.18; 95% CI: 0.04-0.89; p= 0.035) compared to women with mild or no symptoms. Full regression models are presented in Appendix I.

Mediation Analysis

Estimates from the reduced logistic regression model illustrated in **Table 5** revealed that Path A, in which moderate/high social discrimination was predicted to influence moderate/severe depressive symptoms was not found to be statistically significant when adjusted for sociodemographic and reproductive covariates (aOR: 2.78; 95% CI: 0.62-12.56; P = 0.184). Results for Path B, which examined the association between depressive symptoms and current contraceptive use are presented above. Lastly, analysis of Path C revealed that the odds of contraceptive use was about 79% lower among women with moderate/high social discrimination compared to those with low discrimination when adjusted for depressive symptoms and other covariates. This relationship was not significant (aOR: 0.21; 95% CI: 0.04-1.21; p=0.08).

While social discrimination independently predicted contraceptive use based on the prior adjusted model (p=0.042), this association was no longer significant in the mediation analysis. This may still indicate that moderate/severe depressive symptoms somewhat mediated the association between moderate/high social discrimination and women who were current contraceptive users even though not all of Baron and Kenny's mediation criteria were satisfied.

Discussion

While numerous individual, interpersonal/relational, and environmental factors have been linked to adolescents' and young women's sexual risk behaviors and use of family planning methods (Kirby, 2007), the predictive powers of women's social circumstances and mental health have garnered less attention in contraception research. Social discrimination has been generally less studied in relation to women's contraceptive behaviors with much of the research focusing on one-dimensional discriminatory experiences, such as racism and/or sexism (Choi et al., 2011; Kossler et al., 2011; Fitz & Zucker, 2015). With regards to women's mental health status, a recent study reported the reverse association between contraceptive use and depression as higher rates of antidepressant use and depression diagnoses were observed among hormonal contraceptive users without a prior history of mental illness (Skovlund, Steinrud, & Kessing, 2016).

The 2013 and 2015 studies by Hall et al. however, suggest that moderate/high social discrimination and moderate/severe depressive symptoms may place women at an increased risk for inconsistent contraceptive practices and unintended pregnancies. The current study built upon this work to analyze a sample of 122 sexually active women from an urban Southeastern community. This study involves a cohort of younger, diverse women whereas prior work by Hall et al. has examined older women from the Midwest. The findings from Hall et al. particularly informed the hypotheses of the current study as well, in which women with greater perceived experiences of discrimination and depressed women would be less likely to utilize any method of birth control than those without adverse experiences and depressive symptoms.

The present study found that 74% of sexually active women in the sub-sample were using at least one form of contraception at baseline. Crosstab analysis found that almost 15% and 17%

of these women met the criteria for discrimination and depression respectively. Consistent with the research by Hall et al., the current study revealed that the proportion of contraceptive users among sexually active women with moderate/ high social discrimination and moderate/ severe depressive symptoms differed significantly from those with lower levels when adjusted for age, race/ethnicity, education, total household income, and number of pregnancies. These results have important implications for clinical practice, as family planning clinics and other health centers may not account for women's negative social situations and mental health status when providing reproductive and contraceptive counseling. Implementing psychosocial health screenings, such as the 9-item Patient Health Questionnaire for depression, during women's gynecological visits can particularly allow for more comprehensive assessments of patients' individual needs to inform providers' recommendations for contraception and subsequently positively shape women's own contraceptive behaviors. However, providers should also utilize their expertise to rule out physical causes of depression, such as chronic pain as well as depression due to normal bereavement when consulting women.

Considering women's reports of discrimination experienced from providers and staff when seeking family planning services (Thorburn & Bogart, 2008; Dehlendorf et al., 2010), the results from this study also beg to question the extent to which women's day-to-day levels of social discrimination overlap with or translate to their EODs in healthcare settings, if at all. While it is important to employ clinic-based practices to address women's mental health status and other socio-environmental factors during family planning visits, it is also critical to reduce providers' implicit biases that can result in greater disparities in contraceptive use among women at risk for STIs and unintended pregnancies. Although progress has yet to be made in implementing effective programs for overcoming provider bias, some researchers suggest that introducing

mindfulness skill-based training to increase providers' awareness of their biases and improve their emotional regulation processes may be a step in the right direction (Burgess, Beach, & Saha, 2017). Therefore, utilizing an integrated approach to assess contraceptive-seeking women's depression and negative social circumstances through quality screening metrics while addressing provider prejudices, such as through mindfulness trainings, may provide a highly effective means of ensuring that women receive comprehensive contraceptive care and direct counseling services or referrals for their mental health needs. However, further research is needed to examine women's everyday discrimination in tandem with their clinical EODs.

Although social discrimination has been considered to precede the onset of depressive symptoms (Banks et al., 2006; Gee et al., 2007), a reduced model adjusted for sociodemographic and reproductive covariates did not offer a clear indication of the mediating role of depressive symptoms in the relationship between women's discriminatory experiences and their contraceptive use, although it still may have, as hypothesized in this study. The first step (Path A) of Baron and Kenny's mediation criteria was not satisfied as moderate/high discrimination did not predict moderate/severe depressive symptoms. The mediation result must therefore be interpreted with caution. Other non-sociodemographic covariates may need to be included in models assessing Path A to more precisely determine the impact on the effect of the association between the predictor and mediator. Moreover, while Baron and Kenny's mediation criteria can apply for binary variables using logistic regression, standardizing coefficients for each variable is recommended when the mediator and/or outcome are dichotomous as in the case of the current study (Imai, Keele, & Tingley, 2010). Some researchers believe that using logistic regression to calculate indirect effects of Pathways A and B and C when controlled for Path B are not equivalent (Winship & Mare, 1983). This work, therefore, highlights the need to apply more

suitable statistical measures that can increase our understanding of the psychological and social influences of women's contraception utilization through a mediation analysis. Doing so may help to better address negative social stimuli in women's lives that can represent one means of undermining young women's mental health and subsequently sexual and reproductive health. It can also inform points of early screening and interventions focused on coping strategies to prevent the onset of depressive symptoms due to social discrimination.

The theoretical construct of reciprocal determinism from the Social Cognitive Theory (SCT) also facilitated the analysis of the dynamic interactions between individual and social environmental factors and contraceptive behavior in this study. Nevertheless, additional constructs should be incorporated in future work, such as sexually active women's self-efficacy to use contraception and outcome expectations to examine positive behavioral changes over time. A past study that utilized the SCT as well as the Theory of Gender and Power showed that an HIV/STI risk reduction intervention was efficacious in improving condom use and reducing incidence of chlamydial infection among a clinic-based sample of high-risk African American adolescent females in the intervention group during follow-up (DiClemente et al., 2009). Although this intervention solely looked at high-risk females of one racial group, similar intervention designs that factor in women's unique sociodemographic, psychosocial (e.g. social discrimination and depression), and cognitive (e.g. contraceptive knowledge/beliefs) factors may show promise of improving sexual and reproductive health outcomes in young women, especially when tested for impact in the long term.

Strengths and Limitations

One key strength of this study is that it primarily builds upon the previous works by Hall et al. to measure the interrelationships between women's psychosocial and reproductive health,

thus expanding the limited data that is currently available in this area of research. The study also utilizes a cohort of diverse young women sampled from the Southeast who enrolled in the parent population-based prospective study examining unintended pregnancy outcomes in comparison to clinic-based samples assessed in prior studies (Mazzaferro et al., 2006; Kenyon et al., 2010). This study additionally utilized constructs for every day discrimination and depressive symptoms that were measured by validated scales. These scales provided a reliable means of assessing these psychosocial stressors at the time of the baseline questionnaire. Furthermore, this study controlled for several covariates in the full models, including history of a diagnosed sexually transmitted infection, which was acknowledged to be a potential confounder in the 2013 study by Hall et al. that was not controlled for when measuring the relationship between women's mental health symptoms and contraceptive use.

Several limitations in this study must also be noted. Foremost, temporality was not established between women's experiences of discrimination and depressive symptoms and contraceptive behavior due to the cross-sectional nature of this study. While validated measures were employed to examine depressive symptoms in this study, young women's self-reports may not have resulted in accurate classification of depression in comparison to a provider-based diagnosis. Self-reported data also may have led to recall and social desirability biases, influencing participants' responses and thus, study results. This study used a simple measure of contraception non-use as well, without accounting for limited and/or inconsistent use. Small sub-sample size of participants (n=122) additionally limited statistical power. Regression analyses had 27% of data missing as well, which may have biased the results. Participants were also sampled from the metro-Atlanta region, which may limit generalizability to other adolescent and young adult populations due to regional differences. A relatively large proportion of women in

this study had attained higher education and had a higher total household income, which may be attributed to the enrollment of a fair number of women from Emory University and its graduate programs. This study also did not account for additional cognitive and environmental factors, such as contraceptive knowledge, pregnancy ambivalence, and barriers to accessing family planning methods that may confound the relationships examined between the exposures and outcome of interest.

Conclusion

Although a small sub-subset of the sample was included in the final analyses and results should be interpreted with caution, this study demonstrated that sexually active women with elevated levels of social discrimination and depressive symptoms may be at risk for STIs and unintended pregnancies due to contraceptive nonuse. Findings indicate that when seeking family planning services, adolescent females and young adult women may benefit from screenings that address their social well-being and mental health status to allow providers to make informed recommendations tailored to meet their clients' individual needs. Given the confluence of psychological and contraceptive behaviors among high school and college age women, health centers in academic institutional settings can additionally offer comprehensive health education and clinical services with an increased potential to improve female students' access to contraception as well.

Future Direction

The current study contributes to our understanding of the psychosocial dimensions of women's lives that can influence their reproductive choices and associated health outcomes. The findings warrant future research that utilizes a larger cohort of women and repeated measures to assess nuances in women's experiences of discrimination and depressive symptoms as well as

consistency of contraceptive use over time. Additional research is necessary to particularly evaluate causal pathways between these predictors and women's contraceptive use by method and efficacy to determine any observable differences in preference and utilization of least effective to most effective methods, when stratified by sociodemographic variables, such as race.

Researchers have shown that African American women are not only less likely to use contraception, but, are more likely to report frequent experiences of discrimination than White women, which has a negative impact on their mental and general health as well (Schulz, Israel, Williams, Parker, Becker, & James, 2000; Schulz, Gravlee, Williams, Israel, Mentz, & Rowe, 2001; Bahamon et al., 2017). Moreover, while non-Hispanic Asian women were observed to have higher rates of condom use compared to other racial subgroups in the U.S. several years ago (Jones, Mosher, & Daniels, 2012), they are often excluded from recent analyses in contraceptive research, perhaps due to low-sampling. Therefore, greater diversity is needed in studies examining women's contraceptive behaviors that can lead to more precise assessments of sub-group differentials when examining exposures as social discrimination, for which there have been various reports of unfair treatment among Asian Americans (Gee, Ro, Shariff-Marco, & Chae, 2009). Doing so can subsequently inform the development or modification of culturally and age appropriate behavioral interventions for women with higher perceived social discrimination and depression.

Furthermore, this study may steer future research by allowing for the exploration of individuals' multiple social identities, such as ethnic background and sexual orientation, at the interface of their contraceptive patterns. This can provide deeper insights on macro-level societal structures that contribute to adverse sexual and reproductive health outcomes among other marginalized populations (e.g. minority women who identify as LGBTQ). While research

addressing women's sexual risk behaviors at the intersection of their various identities is not as extensive, one study of young adult low-income African American women did demonstrate that behaviorally bisexual women were less likely to report condom use during vaginal sex than exclusively heterosexual women (Alexander, Volpe, Abboud, & Campbell, 2016). Since sexual minority youth alone are more likely to experience stigma and discrimination (Kann et al., 2016b), it is important to examine the extent to which these combined aspects of women's lives are correlated with their mental health outcomes and sexual and reproductive risk behaviors to determine how findings can impact clinical practices.

References

Abma, J.C. & Martinez, G.M. (2017). Sexual Activity and Contraceptive Use among Teenagers

in the U.S., 2011-2015. *National Health Statistics Report.* Retrieved from

https://www.cdc.gov/nchs/data/nhsr/nhsr104.pdf?utm_campaign=website&utm_source=s

endgrid&utm_medium=email

Alexander, K.A., Volpe, E.M., Abboud, S., & Campbell, J.C. (2016). Reproductive coercion,

sexual risk behaviors, and mental health symptoms among young low-income

behaviorally bisexual women: implications for nursing practice. *Journal of Clinical

Nursing, 25*, 3533-3544. doi: 10.1111/jocn.13238s

Altemus, M., Sarvaiya, N., & Epperson, C.N. (2014). Sex differences in anxiety and depression

clinical perspectives. *Frontiers in Neuroendocrinology, 35,* (3), 320-330.

https://doi.org/10.1016/j.yfrne.2014.05.004

Anderson, N.B., Nordal, K.C., Ballard, D.W., Bufka, L.F., Diaz-Granados, J., Keita,

G.P.…Bethune, S. (2016). Stress in America: The Impact of Discrimination. *American

Psychological Association.* Retrieved from

https://www.apa.org/news/press/releases/stress/2015/impact-of-discrimination.pdf

Aruda, M.M. (2011). Predictors of Unprotected Intercourse for Female Adolescents Measured at

Their Request for a Pregnancy Test. *Journal of Pediatric Nursing, 26* (3), 216-223.

http://www.sciencedirect.com/science/article/pii/S0882596310000503#bb0120

Bahamon, C. Leung, K. G. & Ireland, L. D. (2017). Racial and Ethnic Disparities in

Contraceptive Use in Young Women. University of Massachusetts Medical

School. *Senior Scholars Program.* Paper 252.

http://escholarship.umassmed.edu/ssp/252

Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development Vol. 6. Six theories of child development* (pp.1-60). Greenwich, CT: JAI Press.

Banks, K.H., Kohn-Wood, L.P., & and Spencer, M. (2006). An Examination of the African American Experience of Everyday Discrimination and Symptoms of Psychological Distress. *Community Mental Health Journal 42* (6), 555-70. DOI: 10.1007/s10597-006-9052-9

Baron, R.M., & Kenny, D.A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology, 51* (6), 1173-1182.

Bowen, V., Su, J., Torrone, E., Kidd, S., & Weinstock, H. (2015). Increase in Incidence of Congenital Syphilis – United States, 2012-2014. *Morbidity and Mortality Weekly Report, 64* (44), 1241-1245. Retrieved from https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6444a3.htm

Branum, A.M. & Jones, J. (2015). Trends in Long-acting Reversible Contraception Use Among U.S. Women Aged 15-44. *National Center for Health Statistics, 188,* 1-7. https://www.cdc.gov/nchs/data/databriefs/db188.pdf

Bruckner, H., Martin, A., & Bearman, P.S. (2004). Ambivalence and Pregnancy: Adolescents' Attitudes, Contraceptive Use and Pregnancy. *Perspectives on Sexual and Reproductive Health, 36* (6), 248-257. DOI: 10.1111/j.1931-2393.2004.tb00029.x.

Burgess, D.J., Beach, M.C., & Saha, S. (2017). Mindfulness practice: A promising approach to reducing the effects of clinical implicit bias on patients. *Patient Education and Counseling, 100* (2), 372-376. https://doi.org/10.1016/j.pec.2016.09.005

Centers for Disease Control and Prevention (1999). Achievements in Public Health, 1900-1999:

Family Planning. *Morbidity and Mortality Weekly Report, 48* (47), 1073-1080. Retrieved from,

Centers for Disease Control and Prevention. (2011). [Fact Sheet]. *10 Ways STDs Impact Women Differently from Men.* Retrieved from https://www.cdc.gov/std/health-disparities/stds-women-042011.pdf

Centers for Disease Control and Prevention. (2017a). STDs in Adolescents and Young Adults. Retrieved from https://www.cdc.gov/std/stats16/adolescents.htm#

Centers for Disease Control and Prevention. (2017b). How Effective are birth control methods? Retrieved from https://www.cdc.gov/reproductivehealth/contraception/index.htm#44

Centers for Disease Control and Prevention. (2017c). STDS & Infertility. Retrieved from https://www.cdc.gov/std/infertility/default.htm

Centers for Disease Control and Prevention. (2017d). STDs in Women and Infants. Retrieved from https://www.cdc.gov/std/stats16/womenandinf.htm

Choi, K., Bowleg, L., & Neilands, T.B. (2011). The Effects of Sexism, Psychological Distress, and Difficult Sexual Situations on U.S. Women's Sexual Risk Behaviors. *AIDS Education and Prevention, 23* (5), 397-411. https://doi.org/10.1521/aeap.2011.23.5.397

Clark, T.T., Salas-Wright, C.P., Vaughn, M.G., & Whitfield, K.E. (2015). Everyday discrimination and mood and substance use disorders: A latent profile analysis with African Americans and Caribbean Blacks. *Addictive Behaviors, 40,* 119-125. https://doi.org/10.1016/j.addbeh.2014.08.006

Cohen, R., Sheeder, J., Kane, M., & Teal, S.B. (2017). Factors Associated with Contraceptive Method Choice and Initiation in Adolescents and Young Women. *Journal of Adolescent Health, 61* (4), 454-460. https://doi.org/10.1016/j.jadohealth.2017.04.008

Commendador, K.A. (2010). Parental Influences on Adolescent Decision Making and

    Contraceptive Use. *Pediatric Nursing, 36* (3), 147-156.

Craig, A., Dehlendorf, C., Borrero, S., Harper, C.C., & Rocca, C.H. (2014). Exploring Young

    Adults' Contraceptive Knowledge and Attitudes: Disparities by Race/Ethnicity and Age.

    Women's Health Issues, 24(3), e281-e289.

    http://www.sciencedirect.com/science/article/pii/S1049386714000097.

Crosby, R.A., DiClemente, R.J., Salazar, L.F., Wingood, G.M, McDermott-Sales, J., Young,

    A.M., & Rose, E. (2013). Predictors of Consistent Condom Use Among Young African

    American Woman. *Aids and Behavior, 17*(3), 865-871.

    https://rd.springer.com/article/10.1007/s10461-011-9998-7?no-access=true

Daniels, K., Daugherty, J., & Jones, J. (2014). Current Contraceptive Status Among Women

    Aged 15-44: United States, 2011-2013. *National Center for Health Statistics Data Brief,*

    173, 1-7. Retrieved from https://www.cdc.gov/nchs/data/databriefs/db173.pdf

Daniels, K., Daugherty, J., Jones, J., & Mosher, W. (2015). Current Contraceptive Use and

    Variation by Selected Characteristics Among Women Aged 15-44: United States, 2011-

    2013. *National Health Statistics Report, 86,* 1-15. Retrieved from

    https://www.cdc.gov/nchs/data/nhsr/nhsr086.pdf

Daniels, K., Jones, J., & Abma, J. (2013). Use of Emergency Contraception Among Women

    Aged 15-44: United States, 2006-2010. *National Center for Health Statistics Data Brief,*

    112, 1-7. https://www.cdc.gov/nchs/data/databriefs/db112.pdf

Davies, S.L., DiClemente, R.J., Wingood, G.M., Person, S.D., Dix, E.S., Harrington, K., Crosby,

R.A., & Oh, K. (2006). Predictors of inconsistent contraceptive use among adolescent girls: findings from a prospective study. *Journal of Adolescent Health, 39* (1), 43-49. http://www.jahonline.org/article/S1054-139X(05)00486-6/fulltext

Dehlendorf, C., Park, S.Y., Emeremni, C. A., Comer, D., Vincett, K., & Borrero, S. (2014). Racial/Ethnic Disparities in Contraceptive Use: Variation by Age and Women's Reproductive Experiences. *American Journal of Obstetrics and Gynecology, 210* (6), 526 e1-e9. http://www.sciencedirect.com/science/article/pii/S0002937814000969

Dehlendorf, C., Ruskin, R., Grumbach, K., Vittinghoff, E., Bibbins-Domingo, K., Schillinger, D., & Steinauer, J. (2010). Recommendations for intrauterine contraception: a randomized trial of the effects of patients' race/ethnicity and socioeconomic status. *American Journal of Obstetrics and Gynecology, 203* (4), 319.e1-e.8. https://doi.org/10.1016/j.ajog.2010.05.009

DiClemente, R.J., Wingood, G.M., Rose, E.S., Sales, J.M., Lang, D.L., Caliendo, A.M.,…Crosby, R.A. (2009). Efficacy of Sexually Transmitted Disease/Human Immunodeficiency Virus Sexual Risk–Reduction Intervention for African American Adolescent Females Seeking Sexual Health Services: A Randomized Controlled Trial. *Arch Pediatr Adolesc Med, 163 (*12), 1112-1121. Doi:10.1001/archpediatrics.2009.205

Dittus, P.J., Michael, S.L., Becasen, J.S., Gloppen, K.M., McCarthy, K., & Guilamo-Ramos, V. (2015). Parental Monitoring and Its Associations with Adolescent Sexual Risk Behavior: A Meta-analysis. *Pediatrics, 136* (6), e1588-e1599. DOI: 10.1542/peds.2015-0305

Federal Interagency Forum on Child and Family Statistics. (2017). *Adolescent Depression.* Retrieved from https://www.childstats.gov/americaschildren/health4.asp#f140.

Finer, L.B. (2010). Unintended Pregnancy Among U.S. Adolescents: Accounting for Sexual

Activity. *Journal of Adolescent Health, 47* (3), 312-314.

http://dx.doi.org/10.1016/j.jadohealth.2010.02.002

Finer, L.B. and Philbin, J.M. (2014). Trends in ages at key reproductive transitions in the United

States, 1951–2010, *Women's Health Issues*, 2*4* (3), e271–e279,

doi:10.1016/j.whi.2014.02.002.

Finer, L.B. and Zolna, M.R. (2016). Declines in Unintended Pregnancy in the United States,

2008-2011. *The New England Journal of Medicine, 374*, 843-852. DOI:

10.1056/NEJMsa1506575

Fitz, C.C., & Zucker, A.N. (2015). Everyday Exposure to Benevolent Sexism and Condom Use

Among College Women. *Women & Health, 55* (3), 245-262.

https://doi.org/10.1080/03630242.2014.996721

Forhan SE, Gottlieb SL, Sternberg MR, Xu F, Datta SD, McQuillan GM, et al. (2009).

Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in

the United States. *Pediatrics, 124*(6), 1505-12. DOI: 10.1542/peds.2009-0674

Forman-Hoffman, V., McClure, E., McKeeman, J., Wood, C.T., Middleton, J.C., Skinner,

A.C.,…Viswanathan, M. (2016). Screening for Major Depressive Disorder in Children

and Adolescents: A Systematic Review for the U.S. Preventive Services Task Force.

Annals of Internal Medicine, 164, 342–349. DOI: 10.7326/M15-2259

Frost, J.J., Lindberg, L.D., & Finer, L.B. (2012). Young Adults' Contraceptive Knowledge,

Norms and Attitudes: Associations with Risk of Unintended Pregnancy. *Perspectives on

Sexual and Reproductive Health, 44* (2), 107-116. DOI: 10.1363/4410712.

Frost, J.J., Singh, S., & Finer, L.B. (2007). Factors Associated with Contraceptive Use and

Nonuse, United States, 2004. *Perspectives on Sexual and Reproductive Health, 39* (2), 90-99. DOI: 10.1363/3909007. https://www.guttmacher.org/journals/psrh/2007/factors-associated-contraceptive-use-and-nonuse-united-states-2004

Frost, J.J., Sonfield, A., Zolna, M.R., & Finer, L.B. (2014). *The Milbank Quarterly, 92*(4), 667-720. https://www.guttmacher.org/sites/default/files/pdfs/pubs/journals/MQ-Frost_1468-0009.12080.pdf.

Gee, G.C., Ro, A., Shariff-Marco, S., & Chae, D. (2009). Racial Discrimination and Health Among Asian Americans: Evidence, Assessment, and Directions for Future Research. *Epidemiological Reviews, 31* (1), 130-151. https://doi.org/10.1093/epirev/mxp009

Gee, G.C., Spencer, M., Chen, J., Yip, T., & Takeuchi, D.T. (2007). The association between self-reported racial discrimination and 12-month DSM-IV mental disorders among Asian Americans nationwide. *Social Science & Medicine, 64* (10), 1984-1996. https://doi.org/10.1016/j.socscimed.2007.02.013

Greene, M.L., Way, N., & Pahl, K. (2006). Trajectories of perceived adult and peer discrimination among Black, Latino, and Asian American adolescents: Patterns and psychological correlates. *Developmental Psychology, 42*(2), 218-236. http://dx.doi.org/10.1037/0012-1649.42.2.218

Grossman, J. M., & Liang, B. (2008). Discrimination distress among Chinese American Adolescents. Journal of Youth and Adolescence, 37, 1–11. doi:10.1007/s10964-007-9215-1

Hall, K.S., Kusunoki, Y., Gatny, H., & Barber, J. (2015). Social Discrimination, Stress, and Risk of Unintended Pregnancy Among Young Women. *Journal of Adolescent Health, 56* (3), 330-337. https://doi.org/10.1016/j.jadohealth.2014.11.008

Hall, K.S., Moreau, C., Trussell, J., & Barber, J. (2013). Young women's consistency of

    contraceptive use – does depression or stress matter? *Contraception, 88* (5), 641-649.

    https://doi.org/10.1016/j.contraception.2013.06.003

Hankin, B.L., Abramson, L.Y., Moffitt, T.E., Silva, P.A., Mcgee, R., & Angell, K.E.

    (1998). Development of depression from preadolescence to young adulthood: emerging

    gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology, 107*

    (1), 128-140. DOI: 10.1037/0021-843X.107.1.12

Hoffman SD. (2008). Kids Having Kids: Economic Costs and Social Consequences of Teen

    Pregnancy. Washington, DC: The Urban Institute Press.

Hood, J.E., Hogben, M., Chartier, M., Bolan, G., & Bauer, H. (2014). Dual Contraceptive use

    among adolescents and young adults; correlates and implications for condom use and

    sexually transmitted infection outcomes. *Journal of Family Planning and Reproductive*

    Health Care, 40, 200-207.

    http://jfprhc.bmj.com/content/familyplanning/40/3/200.full.pdf

Imai, K., Keele, L., & Tingley, D. (2010). A general approach to causal mediation analysis.

    Psychological methods, 15(4), 309.

Johnson, A.Z., Sieving, R.E., Pettingell, S.L., & McRee, A. (2015). The Roles of Partner

    Communication and Relationship Status in Adolescent Contraceptive Use. *Journal of*

    Pediatric Health Care, 29 (1), 61-69. https://doi.org/10.1016/j.pedhc.2014.06.008.

Jones, J., Mosher, W., & Daniels, K. (2012). Current Contraceptive Use in the United States,

    2006–2010, and Changes in Patterns of Use Since 1995. *National Health Statistics*

    Report, 60, 1-25.

Kann, L., McManus, T., Harris, W.A., Shanklin, S.L., Flint, K.H., Hawkins, J.…Zaza, S.

(2016a). Youth Risks Behavior Surveillance – United States, 2015. *CDC Morbidity and Mortality Weekly Report, 65* (6), 1-74.

https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2015/ss6506_updated.pdf

Kann, L., Olsen, E.O., McManus, T., Harris, W.A., Shanklin, S.L., Flint, K.H….Zaza, S. (2016b). Sexual Identity, Sex of Sexual Contacts, and Health-Related Behaviors Among Students in Grades 9–12 — United States and Selected Sites, 2015. *CDC Morbidity and Mortality Weekly Report, 65* (9), 1-202.

https://www.cdc.gov/mmwr/volumes/65/ss/pdfs/ss6509.pdf

Keenan-Miller, D., Hammen, C. L., & Brennan, P. A. (2007). Health outcomes related to early adolescent depression. *Journal of Adolescent Health, 41*, 256-262.

https://doi.org/10.1016/j.jadohealth.2007.03.015

Kenyon, D.B., Sieving, R.E., Jerstad, S.J., Pettingell, S.L., & Skay, C.L. (2010). Individual, Interpersonal, and Relationship Factors Predicting Hormonal and Condom Use Consistency Among Adolescent Girls. *Journal of Pediatric Health Care, 24* (4), 241-249. DOI: 10.1016/j.pedhc.2009.06.014

Khan, M. J., Kaufman, J.S., Pence, B.W., Gaynes, B.N., Adimora, A.A., Weir, S.S., & Miller, W.C. (2009). "Depression, Sexually Transmitted Infection, and Sexual Risk Behavior Among Young Adults in the United States" *Archives of Pediatric and Adolescent Medicine, 163* (7), 644-652. DOI:10.1001/archpediatrics.2009.95

Kirby, D. (2007). Emerging Answers 2007: Research Findings on Programs to Reduce Teen Pregnancy and Sexually Transmitted Diseases. *The National Campaign to Prevent Teen and Unplanned Pregnancy,* 1-199. Retrieved from

http://www.in.gov/isdh/files/Emerging_Answers_2007.pdf

Kossler, K., Kuroki, L.M., Allsworth, J.E., Secura, G.M., Roehl, K.A., & Peipert, J.F. (2011).

    Perceived racial, socioeconomic and gender discrimination and its impact on

    contraceptive choice. *Contraception, 84* (3), 273-279.

    https://dx.doi.org/10.1016%2Fj.contraception.2011.01.004

Kroenke, K., Spitzer, R.L., & Williams, J.B. (2001). The PHQ-9: Validity of a Brief Depression

    Severity Measure. *Journal of General Internal Medicine, 16* (9), 606-613.

    https://dx.doi.org/10.1046%2Fj.1525-1497.2001.016009606.x

Lehrer, J.A., Shrier, L.A., Gortmaker, S., Buka, S. (2006). Depressive Symptoms as a

    Longitudinal Predictor of Sexual Risk Behaviors Among US Middle and High School

    Students. *Pediatrics, 118* (1). https://doi.org/10.1542/peds.2005-1320

Lewis, T.T., Cogburn, C.D., & Williams, D.R. (2015). Self-reported experiences of

    discrimination and health: scientific advances, ongoing controversies, and emerging

    issues. *Annual Review of Clinical Psychology, 11* (1), 407-440.

    https://dx.doi.org/10.1146%2Fannurev-clinpsy-032814-112728

Manlove, J., Ryan, S., & Franzetta, K. (2007). Contraceptive use patterns across teens' sexual

    relationships: The role of relationships, partners, and sexual histories. *Demography, 44*

    (3), 603-621. https://doi.org/10.1353/dem.2007.0031

Manlove J, Welti K, Barry M, et al. (2011). Relationship characteristics and contraceptive use

    among young adults. *Perspectives on Sexual and Reproductive Health, 43,* 119 e 28

Martin, J.A., Hamilton, B.E., & Osterman, M.J.K. (2017). Births in the United Sates, 2016.

    National Center for Health Statistics Data Brief, 287, 1-7. Retrieved from

    https://www.cdc.gov/nchs/data/databriefs/db287.pdf

Martinez G.M. & Abma J.C. (2015). Sexual Activity, Contraceptive Use, and Childbearing of

Teenagers Aged 15–19 in the United States Key findings.

https://www.cdc.gov/nchs/data/databriefs/db209.pdf

Mazzaferro, K.E., Murray, P.J., Ness, R.B., Bass, D.C., Tyus, N., & Cook, R.L. (2006).

Depression, Stress, and Social Support as Predictors of High-Risk Sexual Behaviors and

STIs in Young Women. *Journal of Adolescent Health, 39* (4), 601-603.

https://doi.org/10.1016/j.jadohealth.2006.02.004.

Melo, J., Peters, M., Teal, S., & Guiahi, M. (2015). Adolescent and Young Women's

Contraceptive Decision-Making Processes: Choosing "The Best Method for Her."

Journal of Pediatric and Adolescent Gynecology, 28 (4), 224-228.

http://www.sciencedirect.com/science/article/pii/S1083318814002708.

Miller, B.C. (2002). Family influences on adolescent sexual and contraceptive behavior. *The*

Journal of Sex Research, 39 (1), 22-26. http://dx.doi.org/10.1080/00224490209552115

Mojtabai, R., Olfson, M., & Han, B. (2016). National trends in the prevalence and treatment of

depression in adolescents and young adults. *Pediatrics, 138* (6).

http://pediatrics.aappublications.org/content/early/2016/11/10/peds.2016-1878

Mollborn, S. & Dennis, J.A. (2011). Ready or not: Predicting high and low levels of school

readiness among teenage parents' children. P*opulation Research and Policy Review,*

31(1), 31-66.

Morrison, L.F., Sieving, R.E., Pettingell, S.L., Hellerstedt, W.L., McMorris, B.J., & Bearinger,

L.H. (2016). Protective Factors, Risk Indicators, and Contraceptive Consistency among

College Women. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 45* (2), 155-

165. https://doi.org/10.1016/j.jogn.2015.10.013

Mosher, W.D., Jones, J., & Abma, J.C. (2012). Intended and Unintended Births in the United

states: 1982-2010. *National Health Statistics Report, 55*, 1-28.

https://www.cdc.gov/nchs/data/nhsr/nhsr055.pdf

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. (2017). [Fact Sheet].

Reported STDS in the United States. Retrieved from

https://www.cdc.gov/nchhstp/newsroom/docs/factsheets/std-trends-508.pdf

National Research Council and Institute of Medicine. 2009. *Adolescent Health Services: Missing*

Opportunities. Washington, DC: The National Academies Press.

https://doi.org/10.17226/12063

https://www.nap.edu/read/12063/chapter/1

Nesoff, E.D., Dunkle, K., & Lang, D. (2016). The Impact of Condom Use Negotiation Self-

Efficacy and Partnership Patterns on Consistent Condom Use Among College-Educated

Women. *Health Education & Behavior, 43*(1), 61-67. DOI: 10.1177/1090198115596168

http://journals.sagepub.com/doi/pdf/10.1177/1090198115596168

Perper K, Peterson K, Manlove J. (2010). [Child Trends Fact Sheet]. Diploma Attainment

Among Teen Mothers. Retrieved from https://www.childtrends.org/wp-

content/uploads/2010/01/child_trends-2010_01_22_FS_diplomaattainment.pdf

Ricketts, S., Klingler, G., Schwalberg, R. (2014). Game change in Colorado: widespread use of

long-acting reversible contraceptives and rapid decline in births among young, low-

income women. *Perspectives on Sexual and Reproductive Health*, *46*(3), 125-132.

Rocca, C.H. & Harper, C.C. (2012). Do Racial and Ethnic Differences in Contraceptive Attitudes

and Knowledge Explain Disparities in Method Use. *Perspectives on Sexual and*

Reproductive Health, 44(3), 150-158. DOI: 10.1363/4415012

Sanders, R.A. (2013). Adolescent Psychosocial, Social, and Cognitive Development. *Pediatrics*

Review, 34 (8), 354-358. DOI: 10.1542/pir.34-8-354

Sedgh, G., Singh, S., & Hussain, R. (2014). Intended and unintended pregnancies worldwide in 2012 and recent trends. *Studies in Family Planning*, *45*, 301-314.

Seth, P., Patel, S.N., Sales, J.M., DiClemente, R.J., Wingood, G.M., Rose, E.S. (2011). The Impact of Depressive Symptoms on risky sexual behavior and sex communication among African American female adolescents. *Psychology, Health, & Medicine, 16* (3), 346-356. http://dx.doi.org/10.1080/13548506.2011.554562.

Shafii T. (2007). Association between condom use at sexual debut and subsequent sexual trajectories: A longitudinal study using biomarkers. AJPH, 97(6). http://ajph.aphapublications.org/doi/10.2105/AJPH.2005.068437

Shah, P.S., Balkhair, T., Ohlsson, A., Beyene, J., Scott, F., & Frick, C. (2011). Intention to Become Pregnant and Low Birth Weight and Preterm Birth: A Systematic Review. *Maternal and Child Health Journal, 15*(2), 205-216. DOI: https://doi.org/10.1007/s10995-009-0546-2

Shih, S.L., Kebodeaux, C.A., Secura, G.M., Allsworth, J.E., Madden, T., & Peipert, J.F. (2011). Baseline correlates of inconsistent and incorrect condom use among sexually active women in the contraceptive CHOICE Project. *Sexually Transmitted Diseases, 38* (11), 1012-1019. DOI: 10.1097/OLQ.0b013e318225f8c3

Skovlund, C.W., Mørch, L.S., & Kessing, L.V. (2016). Association of Hormonal Contraception With Depression. *JAMA Psychiatry, 73* (11), 1154-1162. doi:10.1001/jamapsychiatry.2016.2387

Sonfield, A., and Kost K. (2015). Public Costs from Unintended Pregnancies and the Role of

Public Insurance Programs in Paying for Pregnancy-Related Care: National and State

Estimates for 2010. *Guttmacher Institute*. Retrieved

from http://www.guttmacher.org/pubs/public-costs-of-UP-2010.pdf.

Steiner, R.J., Liddon, N., Swartzendruber, A.L., Rasberry, C.N., & Sales, J.M. (2016). Long-

Acting Reversible Contraception and Condom Use among Female US High School

Students. *Adolescent and Young Adult Health, 170* (5), 428-434.

DOI:10.1001/jamapediatrics.2016.0007.

Sternthal, M.J., Slopen, N., & Williams, D.R. 2011. Racial Disparities in Health: How Much

Does Stress Really Matter? *Du Bois Review: Social Science Research on Race*, 2011;

8(1): 95-113. https://doi.org/10.1017/S1742058X11000087

Teal, S.B. & Romer, S.E. (2013). Awareness of Long-Acting Reversible Contraception Among

Teens and Young Adults. *Journal of Adolescent Health, 52*, 535-539.

https://doi.org/10.1016/j.jadohealth.2013.01.013

The National Campaign to Prevent Teen and Unplanned Pregnancy. (2012). *Why It Matters:*

Teen Childbearing, Education, and Economic Wellbeing.

Thorburn, S., & Bogart, L.M. (2008). African American Women and Family Planning Services:

Perceptions of Discrimination. *Women & Health, 42 (1),* 23-39.

https://doi.org/10.1300/J013v42n01_02

Tyler, C.P., et al. (2014). Dual Use of Condoms with Other Contraceptive Methods Among

Adolescents and Young Women in the United States. *Journal of Adolescent Health, 54,*

169-175. http://www.jahonline.org/article/S1054-139X(13)00424-2/pdf

USAID. (2017). *Family Planning and Reproductive Health*. Retrieved from

https://www.usaid.gov/what-we-do/global-health/family-planning

Wachter, K.W., & Bulatao, R.A. (Eds.), Offspring: Human fertility behavior in biodemographic

    perspective. Panel for the workshop on the biodemography of fertility and family

    behavior. National Research Council of the National Academies, National Academies

    Press, Washington, DC (2003).

Weinman, M.L., Small, E., Buzi, R.S., & Smith, P.B. (2008). Risk Factors, Parental

    Communication, and self-beliefs as predictors of condom use among female adolescents

    attending family planning clinics. *Child and Adolescent Social Work Journal, 25*, 157-

    170.

Williams, D.R., Yu, Y., Jackson, J.S., & Anderson, N.B. (1997). Racial Differences in Physical

    and Mental Health. *Journal of Health Psychology, 2* (3), 335-351.

    https://doi.org/10.1177/135910539700200305

Winship, C., & Mare, R. D. (1983). Structural equations and path analysis for discrete data.

    American Journal of Sociology, 54-110.

World Health Organization Media Centre. (2017). *Family Planning/Contraception*. (2017).

    Retrieved from http://www.who.int/mediacentre/factsheets/fs351/en/

Table 1. Young Women's Sociodemographic, Reproductive, and Psychosocial Characteristics

Baseline Characteristics	Total Sample (N=199)				At Risk for Unintended Pregnancy and/or STIs (N=122)			
	N (%) or Mean (SD)	Currently Using any BC Method N (%)	Not using any BC method N (%)	P-value	N (%) or Mean (SD)	Currently Using any BC Method N (%)	Not using any BC method N (%)	P-value
Age				0.373				0.193
15-19 years	76 (38.2)	24 (63.2)	14 (36.8)		31 (25.4)	18 (64.3)	10 (35.7)	
20-24 years	123 (61.8)	78 (70.9)	32 (29.1)		91 (74.6)	66 (76.7)	20 (23.3)	
Race/ethnicity				0.160				0.346
White	52 (26.1)	36 (81.8)	8 (18.2)		32 (26.2)	27 (87.1)	4 (12.9)	
Black or African American	82 (41.2)	34 (58.6)	24 (41.4)		46 (37.7)	28 (68.3)	13 (31.7)	
Hispanic or Latino	22 (11.1)	11 (68.8)	5 (31.3)		17 (13.9)	11 (68.8)	5 (31.3)	
Asian or Pacific Islander	17 (8.5)	6 (66.7)	3 (33.3)		10 (8.2)	6 (66.7)	3 (33.3)	
Other	26 (13.1)	15 (71.4)	6 (28.6)		17 (13.9)	12 (70.6)	5 (29.4)	
Education				0.045*				0.011*
Under 12th grade	40 (20.1)	9 (64.3)	5 (35.7)		11 (9.0)	5 (62.5)	3 (37.5)	
12th grade	29 (14.6)	12 (52.2)	11 (47.8)		19 (15.6)	10 (52.6)	9 (47.4)	
1-3 years of College	72 (36.2)	44 (78.6)	12 (21.4)		49 (40.2)	38 (84.4)	7 (15.6)	
Four years of College	43 (21.6)	30 (75.0)	10 (25.0)		34 (27.9)	27 (81.8)	6 (18.2)	
Beyond a College Degree	15 (7.5)	7 (46.7)	8 (53.3)		9 (7.4)	4 (44.4)	5 (55.6)	
Total Household Income				<0.001*				0.001*
$14,999 or under	15 (9.6)	4 (44.4)	5 (55.6)		10 (10.1)	4 (57.1)	3 (42.9)	
$15,000-$44,999	37 (23.6)	11 (44.0)	14 (56.0)		21 (21.2)	9 (47.4)	10 (52.6)	
$45,000-$74,999	38 (24.2)	23 (85.2)	4 (14.8)		24 (24.2)	19 (82.6)	4 (17.4)	
$75,000 or greater	67 (42.7)	47 (83.9)	9 (16.1)		44 (44.4)	39 (90.7)	4 (9.3)	
Relationship Status				0.130				0.179
Married	5 (2.5)	3 (75.0)	1 (25.0)		5 (4.1)	3 (75.0)	1 (25.0)	
Engaged to be married	7 (3.5)	5 (71.4)	2 (28.6)		6 (4.9)	5 (83.3)	1 (16.7)	
Cohabitating but not married or engaged	19 (9.5)	13 (72.2)	5 (27.8)		17 (13.9)	13 (76.5)	4 (23.5)	
In a serious relationship, not living together	43 (21.6)	33 (82.5)	7 (17.5)		39 (32.0)	32 (84.2)	6 (15.8)	

Dating or having sex casually	39 (19.6)	23 (69.7)	10 (30.3)		32 (26.2)	20 (71.4)	8 (28.6)	
Not in a relationship	86 (43.2)	25 (54.3)	21 (45.7)		23 (18.9)	11 (52.4)	10 (47.6)	
Current intentions to become pregnant				0.228				0.169
Yes	4 (2.0)	1 (33.3)	2 (66.7)		4 (3.3)	1 (33.3)	2 (66.7)	
No	195 (98.0)	101 (69.7)	44 (30.3)		118 (96.7)	83 (74.8)	28 (25.2)	
Number of Pregnancies				0.417				0.474
0	165 (82.9)	83 (70.3)	35 (29.7)		92 (75.4)	66 (75.9)	21 (24.1)	
1	22 (11.1)	12 (57.1)	9 (42.9)		20 (16.4)	12 (63.2)	7 (36.8)	
2 or more	12 (6.0)	7 (77.8)	2 (22.2)		10 (8.2)	6 (75.0)	2 (25.0)	
History of STI Diagnosis				0.949				0.625
Yes	22 (11.1)	14 (70.0)	6 (30.0)		22 (18.2)	14 (70.0)	6 (30.0)	
No	176 (88.9)	88 (69.3)	39 (30.7)		99 (81.8)	70 (75.3)	23 (24.7)	
Social Discrimination Scale (Mean, SD)	11.93 (4.11)	11.85 (3.48)	12.89 (4.70)	0.188	12.36 (4.05)	11.77 (3.44)	13.82 (4.92)	0.044*
Depressive Symptoms Scale (Mean, SD)	7.53 (5.35)	7.57 (5.22)	8.04 (5.51)	0.619	8.13 (5.46)	7.58 (5.31)	9.21 (6.07)	0.173
Social Discrimination	**Scores ≥15**				**Scores ≥16**			
Moderate/high	49 (25.3)	21 (55.3)	17 (44.7)	0.037*	24 (20.3)	12 (54.5)	10 (45.5)	0.023*
Low to none	145 (74.7)	78 (73.6)	28 (26.4)		94 (79.7)	69 (78.4)	19 (21.6)	
Depressive Symptoms	**Scores ≥12**				**Scores ≥13**			
Moderate/severe	42 (21.5)	20 (66.7)	10 (33.3)	0.760	25 (20.8)	14 (63.6)	8 (36.4)	0.211
Mild to none	153 (78.5)	80 (69.6)	35 (30.4)		95 (79.2)	69 (76.7)	21 (23.3)	

*Denotes a significance level of p <0.05.

Table 2. Percent Distribution of Reasons Cited for Perceived Social Discrimination

Reason for Perceived Social Discrimination	Women at Risk of STIs and Unintended Pregnancies N (%)
Your ancestry or National Origins	4 (3.5)
Your Gender	33 (28.7)
Your Race	37 (32.2)
Your Age	18 (15.7)
Your Religion	2 (1.7)
Your height or weight	4 (3.5)
Some other aspect of your appearance	6 (5.2)
A physical disability	1 (0.9)
Other (e.g. demeanor, personality traits, occupation)	5 (4.3)
Don't Know	5 (4.3)

Table 3. Influence of Depressive Symptoms on Young Women's Level of Functioning

Difficulty in performing work, taking care of things at home, or getting along with other people	Women at Risk of STIs and Unintended Pregnancies N (%)
Not Applicable	3 (2.5)
Not difficult at all	35 (28.7)
Somewhat difficult	65 (53.3)
Very Difficult	12 (9.8)
Extremely Difficult	7 (5.7)

Table 4. Adjusted Odds Ratio (aOR) for current contraceptive users vs. non-users among young women at risk for STIs and unintended pregnancies

Predictors/Covariates	Odds of Current Contraceptive Use	
	Reduced Model for Social Discrimination	Reduced Model for Depressive Symptoms
	aOR (95% CI)	aOR (95% CI)
Moderate/ high social discrimination	0.18 (0.04-0.94) *	---
Moderate/severe depressive symptoms	---	0.18 (0.04-0.89) *
Age		
15-19 years	0.35 (0.06-2.17)	0.42 (0.07-2.60)
20-24 years[a]	1.00	1.00
Race/Ethnicity		
White[a]	1.00	1.00
Black or African American	2.57 (0.29-22.92)	1.91 (0.23-16.17)
Hispanic or Latino	0.97 (0.08-11.88)	1.15 (0.11-12.45)
Asian or Pacific Islander	1.28 (0.07-22.33)	1.42 (0.08-24.63)
Other	1.23 (0.11-14.21)	0.86 (0.09-8.12)
Education		
Less than 12th grade	12.13 (0.34-434.41)	68.96 (1.46-3259.14) *
12th grade	3.62 (0.21-63.72)	5.31 (0.25-113.80)
Some college	10.17 (0.96-108.18)	16.68 (1.31-212.43) *
Four years of college or more	14.61 (0.95-225.41)	16.51 (0.96-282.93)
Beyond college degree[a]	1.00	1.00
Total Household Income		
$14,999 or under	0.14 (0.01-1.46)	0.09 (0.01-0.90) *
$15,000-$44,999	0.05 (0.01-0.34) *	0.04 (0.01-0.28) *
$45,000-$74,999	0.24 (0.03-1.68)	0.30 (0.04-2.12)
$75,000 or greater[a]	1.00	1.00
No. of Pregnancies		
0[a]	1.00	1.00
1	0.57 (0.08-4.11)	1.59 (0.22-11.32)
2+	2.16 (0.12-38.11)	0.81 (0.06-11.11)

*Denotes a significance level of p <0.05.

[a] Referent group.

Table 5. Depressive Symptoms Mediation Model

Predictor & Covariates	Reduced Depressive Symptoms Mediation Model
	aOR (95% CI)
Moderate/high social discrimination	0.21 (0.04-1.21)
Moderate/severe depressive symptoms	0.18 (0.03-1.02)
Age	
15-19 years	0.27 (0.04-1.96)
20-24 years[a]	1.00
Race/ethnicity	
White[a]	1.00
Black or African American	2.87 (0.27-30.18)
Hispanic or Latino	0.81 (0.06-10.69)
Asian or Pacific Islander	1.02 (0.06-18.37)
Other	1.70 (0.12-24.60)
Education	
Less than 12th grade	33.93 (0.62-1853.95)
12th grade	7.93 (0.25-249.02)
One – three years of college	15.33 (1.13-207.78) *
Four years of college	19.35 (0.89-420.74)
Beyond a college degree[a]	1.00
Total Household Income	
$14,999 or under	0.11 (0.01-1.21)
$15,000-$44,999	0.04 (0.01-0.33) *
$45,000 - $74,999	0.24 (0.03-1.97)
$75,000 or greater[a]	1.00
No. of Pregnancies	
0[a]	1.00
1	0.99 (0.12-8.53)
2+	1.31 (0.07-25.01)

*Denotes a significance level of $p < 0.05$.
[a] Referent group.

APPENDIX I: Full Regression Models for Social Discrimination and Depressive Symptoms

Predictors/Covariates	Odds of Current Contraceptive Use	
	Full Model for Social Discrimination (N=89)	Full Model for Depressive Symptoms (N=90)
	aOR (95% CI)	aOR (95% CI)
Moderate/ high social discrimination	0.16 (0.02-1.30)	---
Moderate/severe depressive symptoms	---	0.09 (0.01-0.85) *
Age		
15-19 years	0.75 (0.08-6.96)	0.42 (0.04-4.27)
20-24 years[a]	1.00	1.00
Race/Ethnicity		
White[a]	1.00	1.00
Black or African American	2.50 (0.15-43.09)	1.14 (0.08-16.55)
Hispanic or Latino	0.21 (0.01-6.13)	0.30 (0.01-6.64)
Asian or Pacific Islander	0.51 (0.01-18.63)	0.36 (0.01-12.59)
Other	2.12 (0.11-40.14)	0.52 (0.04-7.61)
Education		
Less than 12th grade	4.31 (0.07-273.95)	55.26 (0.46-6592.30)
12th grade	6.49 (0.20-214.37)	7.88 (0.15-428.88)
One - three years of college	9.44 (0.51-175.06)	19.48 (0.56-681.11)
Four years of college or more	36.54 (1.11-1202.11) *	39.89 (0.84-1891.85)
Beyond college degree[a]	1.00	1.00
Total Household Income		
$14,999 or under	0.05 (0.003-0.90) *	0.04 (0.002-0.62) *
$15,000-$44,999	0.02 (0.002-0.24) *	0.01 (0.001-0.16) *
$45,000-$74,999	0.46 (0.04-4.93)	0.32 (0.03-3.76)
$75,000 or greater[a]	1.00	1.00
Relationship Status		
Married[a]	1.00	1.00
Engaged	---	---
Cohabitating	19.64 (0.01-33549.16)	3.88 (0.00-965071.43)
In a serious relationship	3.85 (0.003-5197.87)	0.70 (0.00-169123.49)
Dating or having sex casually	3.03 (0.002-4094.38)	1.90 (0.00-449158.62)
Not in any relationship	0.17 (0.00-197.25)	0.09 (0.00-20794.13)
No. of Pregnancies		
0[a]	1.00	1.00
1	0.15 (0.01-1.87)	1.39 (0.10-19.85)
2+	10.57 (0.11-991.90)	1.05 (0.04-26.17)
Clinical STI Diagnosis		
Yes[a]	1.00	1.00
No	1.71 (0.22-13.43)	0.89 (0.02-46.11)

Current intentions to become pregnant		
Yes[a]	1.00	1.00
No	0.57 (0.01-30.37)	2.36 (0.28-19.71)

*Denotes a significance level of p < 0.05.

[a] Referent group.