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ABSTRACT

INTRODUCTION: Early sexual debut (ESD) is known to have negative health impacts on a female adolescent's future. There are multiple factors that can lead to ESD. Greater knowledge about ESD risks could provide robust ways to combat subsequent effects in daughters of teenage mothers, including early pregnancy.

AIMS: This study seeks to answer the following questions: (1) is being the daughter of a teenage mother a risk factor to ESD? (2) Does race/ethnicity or any other factors increase the likelihood of the daughter of a teenage mother having an ESD? (3) What are the predictor factors associated with ESD by race/ethnicity?

METHODS: National Survey of Family Growth data was used. Descriptive statistics were conducted. Univariate and multivariable analysis was conducted using logistic regression. Stepwise logistic regression method was performed to determine predictor variables of ESD by race/ethnicity.

RESULTS: Women whose mothers were teen mothers were 1.76 times as likely to experience ESD compared women whose mothers were not teen mothers. African American women are 81% more likely to experience ESD compared to non-Hispanic White women. History of smoking (AOR=2.55), alcohol use (AOR=1.79), and drug use (AOR=1.84) were each associated with increased odds of ESD. Women who were not raised by their mother were 2.54 times as likely to experience ESD compared to women who were raised by both parents.

CONCLUSION: Being the daughter of a teenage mother is a risk factor for ESD. Early sexual education for mothers and their daughters may help to reduce ESD. Future research needs to address all the multidimensional factors associated with adolescents' sexual health.

Epidemiology of
Early Sexual Debut Among Females

by

Tiffany Harris

B.S., GEORGIA STATE UNIVERSITY

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Epidemiology of
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by
Tiffany Harris

Approved:

Ike Okosun
Committee Chair

Barbara Yankey
Committee Member

5/06/2019

Author's Statement Page

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Tiffany Harris

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Chapter 1 – INTRODUCTION

1.1 Background

Having sexual intercourse for the first time is an important experience in every person's life. The age of sexual debut occurring can have serious implications not only a person's sexual behavior but also on overall health while growing up. In this study, early sexual debut is defined as adolescents having their first sexual intercourse at less than 18 years of age. Early sexual debut (ESD) is known to have multiple negative health consequences on a female adolescent's future. Unintended pregnancy, sexually transmitted infections (STIs), and sexual coercion are some of the well-known consequences of ESD (Graaf et al. 2012). Each of these consequences leads to a decrease in life opportunities. For example, unintended pregnancy among female adolescents can lead to "poorer mental health and psychological functioning, including heightened rates of depression, lower marital stability, larger families, and greater health risks" (Killebrew et al.,2014). In the United States, about 40% of high school children indicate that they have had sexual intercourse while, 17.2% female 9th graders report the same experience (CDC, 2018). A recent study indicates that sexual initiation is occurring in increasingly younger adolescent American females (Lui et al., 2015).

1.2 Research Questions and Hypotheses

Understanding teenage parenting and psychological functioning are particularly important given that effective parenting is an integral part of healthy childhood development (Coley & Chase-lansdale,1998). Although the negative effects of teenage motherhood are well known, little is known about the relationship between teenage motherhood and the quality of the relationship with their offspring. This study seeks to answer the following questions:

1. Is being a daughter of a teenage mother a risk factor to early sexual debut?

2. Is race/ethnicity associated with the odds of a daughter of a teenage mother having an early sexual debut?
3. What are the predictor factors associated with early sexual debut via race/ethnicity?

Being a daughter of a teenage mother is a risk factor to early sexual debut. Other factors that can lead to early sexual debut include those that lead to “risky behaviors” such as drinking and smoking. The potential importance of race and ethnicity as risk factors for ESD is not clear and may be connected with low socioeconomic status and education. We speculate that the following are potential risk factors of early sexual debut being the daughter of a teenage mother, quality of the relationship between mother and daughter, smoking, drinking, drug use, education, and socioeconomic status. Greater knowledge about the risks for early motherhood may help to institute public health prevention of early sexual initiation. Having a better understanding of the association between the daughter of a teenage mother and mothers ESD may help create specific programs directed at various race/ethnic groups.

Chapter 2 – LITERATURE REVIEW

Sexual debut is occurring at a much younger age in some racial and ethnic groups. “In 2010, the teenage pregnancy rate for African Americans was almost twice that of white teens” (Danawi, Bryant, & Hasbini, 2016). According to the Center for Disease Control and Prevention, those rates still hold true in 2017 (Martin et al., 2018). Early sexual debut may be one of the primary reasons for these high rates of ESD. African American and Hispanic teens are more likely to have sexual intercourse before the age of 13 years old compared to white teens (CDC, 2018). While studies typically examined low socioeconomic status, limited education, and engaging in risky behaviors as risk factors for ESD, many studies do not consider race and ethnicity as risk factors (Rew et al.,2011) (Hill et al.,2019).

Female adolescents living in low socioeconomic environments have a greater risk for early sexual activities than females who live in high socioeconomic environments (Jordahl & Lohman, 2009). These environments often include overcrowded areas, poor infrastructure, high levels of violence, and overall physical disorders in the area (Danawi, Bryant, & Hasbini, 2016). Adolescents in low socioeconomic environments are known to have lifestyles that include greater health risks than those in high socioeconomic environments. Some of the lifestyles include dropping out of high school, engaging in drug use, and teenage pregnancy (U.S. Department of Education, 2014) (Bachman et al.,2011) (Danawi, Bryant, & Hasbini, 2016). A study suggests that living in low socioeconomic environments can negatively influence the teenager’s future career expectations. While some teenage girls may look forward to becoming a mother as a future goal instead of going to college (East, Khoo, & Reyes, 2006). Early sexual debut among teenage girls can hamper this ambition.

Adolescents who indulge in risky behaviors are more likely to engage in risky sexual behaviors (Rew et al.,2011). Other known risky behavior includes smoking, drug use, and drinking. Risky sexual behaviors include: engaging in unprotected sexual activities and an increase in the number of sexual partners. A study from the United Kingdom’s Board of Health found 40% of sexually active 13 and 14 year-olds said they were drunk or high when they first had sex, and 10% of 15 and 16 year-olds said they had sex after drinking and later regretted it (UK Department of Health, 2008). Adolescents involved in any one of the risky behaviors, sexual or not, stated earlier are given the opportunity to engage and practice other risky behaviors. Adolescence substance use is strongly associated with an early sexual debut (Cha, Masho, & Mezuk, 2016).

Parental influence is an important factor in the age of sexual debut. It can either be a risk factor or protective factor. For most adolescents, parents are recognized as the primary source of sexual information. Parents serve as a role model for their children willingly or not. A regression analysis indicated that parents, grandparents, and religious sources of learning were associated with beliefs likely to delay sex (Bleakley, Hennessy, Coles, & Jordan, 2009). Teenagers whose parents are more involved in their lives are more likely to delay sexual initiation which can, in turn, decrease the negative consequences associated with it (Danawi, Bryant, & Hasbini, 2016). “Proactive parents” were found to discuss health more frequently with their children, including topics on emotional and physical health (Rickert, Gilbert, & Aalsma, 2014). These topics are especially important with adolescents because they are at the age where they are impressionable and need guidance to help get them through puberty. Barman-Adhikari et al. (2014) study found daughters who were monitored more by their mothers were less likely to exhibit susceptibility to peer influence and consequently, less likely to intend to have sex (Barman-Adhikari et al., 2014).

Having open, positive, frequent discussions about sex with adolescents can delay their sexual debut.

Chapter 3 - METHODS

3.1 Data Collection

The data for this study is from the Center for Disease Control and Prevention's (CDC) National Survey of Family Growth (NSFG), years 2006 - 2010. The NSFG survey gathers information on family life, marriage and divorce, pregnancy, infertility, use of contraception, and men's and women's health. The survey results are used to plan health services, health education programs, and statistical studies. The 'FemaleRespondent Data File' (2006_2010_FemResp.dat), which is publicly available, was used for this research. The Audio Computer-Assisted Self-Interviewing (ACASI) File (2006 – 2010) which is not publicly available, had to be requested from the NSFG Reproductive Statistics Branch of the CDC. The documents had to explain the purpose for requesting the ACASI data and signing a confidentiality agreement.

The NSFG conducted in-person continuous interviews for about 48 weeks straight every year for 4 years in multiple locations of the United States. The interviews are conducted by the University of Michigan's Institute for Social Research under a contract with the National Center for Health Statistics. Starting in June 2006 through June 2010, the women are interviewed. All interviews are voluntary and confidential. Most of the interviews are conducted by an interviewer. However, a small portion of the more sensitive questions is answered privately by self-administration, ACASI. The ACASI portion of the survey allowed interviewees to hear the question being asked through headphones or read it from the laptop screen and entered the answer directly into the computer. This allowed the interviewee more privacy when answering sensitive questions. The interview with women lasted about 71 minutes and was conducted in Spanish if needed. The sample was drawn from 110 major areas randomly around the United States (Lepkowski, et al., 2013).

3.2 Data

The NSFG data was used because the samples were made to have a national representation of women. This data contained all the variables being studied; as well as being free, making it cost-efficient. It has a large sample size which means the results will be more representative. Less time was needed to complete the experiment because it already has the outcome variable in the data, which is the age of the participant's sexual debut.

The computer-assisted personal interview (CAPI)-Lite Year 1 (NSFG_2006-2010_Y1_FemaleCapilite) codebook was used to find the questions to match the corresponding variables being studied. Below is the list of variables and the corresponding questions:

- Race/ethnicity
 - Are you Hispanic or Latina, or of Spanish origin?
 - Which of the groups on Card 2 describe your racial background? Please select one or more groups. ENTER all that apply.
- Education level
 - What is the highest grade or year of (regular) school you have ever attended?
- Mother's marital status
 - Were your biological parents married to each other at the time you were born?
- Level of closeness to mother
 - Who, if anyone, do you think of as the woman who mostly raised you when you were growing up?
 - Which, if any, of the topics shown on Card 23 (did you ever talk/have you ever talked) with a parent or guardian about?
- Mother's education level
 - What is the highest level of education your mother completed?

- Mother's socioeconomic status
 - During most of the time you were growing up, that is when you were between the ages of 5 and 15, did your mother usually work full-time, part-time or did she not work for pay at all?
- Age of the mother's first childbirth
 - How old was she when she had her first child who was born alive?
- Age when first sexually active
 - That very first time that you had sexual intercourse with a man, how old were you?
- Knowledge about contraceptives
 - (Before you were 18 years old,) which, if any, of the topics shown on Card 23 (did you ever talk/have you ever talked) with a parent or guardian about?
 - (Before you were 18, did you ever have/ Have you ever had) any formal instruction about sex education at school, church, a community center or some other place about how to say no to sex?
 - (Before you were 18, did you ever have/ Have you ever had) any formal instruction at school, church, a community center or some other place about methods of birth control?
- Socioeconomic status
 - Which category represents (your total (weekly/monthly/yearly) income/the total combined (weekly/monthly/yearly) income of your family) in the year (year of interview - 1), including income from all the sources you just went through, such as wages, salaries, Social Security or retirement benefits, help from relatives, and so forth? Please enter the amount before taxes.
- Religion
 - In what religion were you raised, if any?
- Smokes cigarettes
 - During the last 12 months, that is, since (INTERVIEW MONTH, INTERVIEW YEAR - 1), how many cigarettes did you smoke a day, on average?

- Alcohol use
 - During the last 12 months, that is, since (INTERVIEW MONTH, INTERVIEW YEAR - 1), how often have you had beer, wine, hard liquor, or other alcoholic beverages?
- Drug use
 - During the last 12 months, how often have you smoked marijuana?
 - During the last 12 months, how often have you used cocaine?
 - During the last 12 months, how often have you used crack?
 - During the last 12 months, how often have you used Crystal or meth, also known as tina, crank, or ice?

The data were recoded before the analysis. Participants' responses that included 'don't know' or 'refused to answer' were recoded as missing. Race and ethnicity variables were recoded to only including: White, Black or African American, Hispanic, or Other. The educational level variable was recoded to high school and college. Age when mother first became pregnant variable was recoded to less than 18 years old or 18 years old or older. Age when the participant first became sexually active variable was recoded to less than 18 or 18 years old and up. For the drug use variables, the questions about marijuana, cocaine, crack, and crystal meth were combined to create a new variable called Druguse: yes or no. Smoking was recoded to none or smokes. Drinking was recoded to none or drinks. The woman who raised the participant variable was recoded to biological mother, other mother, or no mother. If the participant's parents were married, then the original data were coded as missing for the woman who raised the participants variable. For this study, the missing data for the woman who raised the participant variable was recoded to parents married. The mother's education was recoded to less than high school or high school graduate and higher. The mother's employment was recoded to employment or no employment. The topics about sex and birth control discussed with parents were recoded to discussed how no to sex, discussed birth control, discussed STDs, or none.

Religion raised was recoded to raised in no religion or raised in a religion. Sexual orientation was recoded to heterosexual or LGBTQ. Income was recoded to low income, median income, or high income based off the U.S. Census Bureau.

The sampling method used was nonprobability, quota sampling. The participants had to be female in order to participate in the study. The variables listed earlier will be measured by how the participants responded to the corresponding questions. Each response to the questions is coded with numbers. For example, when the participant answers the question ‘that very first time that you had sexual intercourse with a man, how old were you?’ the answer choices are:

- Less than 18 years old.....1
- 18 years old or older.....2

The participants for this study are 9,898 females aged between 15 to 45 years old. The dependent variable being studied is the age of first sexual intercourse. The main independent variable being studied is the age of the mother’s first childbirth. Other independent variables being studied are:

- Demographic variables
 - Race/ethnicity
 - Education level
 - Religion raised
 - Socioeconomic status
- Sexual education variables
 - Discussed sex with parents
 - Formally educated about how to say no to sex
 - Formally educated about birth control
- Risky behavior variables
 - Drug use
 - Alcohol use
 - Smokes cigarettes
- Maternal characteristics variables
 - Raised by whom
 - Mother’s employment
 - Mother’s education level

Moderator variables to be considered are variables associated with risky behaviors.

2.2 Statistical Analysis

The Statistical Analysis System (SAS) 9.3 software was used for all data analyses. Descriptive statistics were conducted first to determine the distribution of the categorical variables. The p-value was used to establish statistical significance with an alpha of 0.05. Then chi-square tests were used to compare the demographic variables, behavioral variables, sexual behavioral variables, sexual educational variables, and mother's variables between the participants' age of sexual debut. The sexual debut was defined as <18 years old and \geq 18 years old. Next univariate analysis was done to gain a better understanding of how each attribute varies with the individual effect of the outcome variable in the regression analysis by using logistic regression to compute the odds. Multivariable analysis was used to determine the effect of multiple variables on the outcome variable using logistic regression to compute the adjusted odds ratio. The variables used for multivariable analysis are race/ethnicity, education, income, religion, smoking, drinking, drug usage, who the participant was raised by, and age of mother's first child's birth. To examine the association of race and ethnicity with the demographic, behavioral, and mother's variables multivariable analysis was done by using logistic regression to compute odds ratios. Finally, stepwise logistic regression method was performed to determine predictor variables of an early sexual debut by race/ethnicity. The data was unweighted because the difference between weighted and unweighted was not significant.

Chapter 3 – RESULTS

3.1 Descriptive Statistics

The distribution of demographics, behavioral, sexual education, and mother's characteristics are shown in Table 1. Out of the 9,898 participants, 62.7% of them experienced sexual initiation less than 18 years old and 37.3% of them experienced sexual initiation at the age of 18 years old or older. Race/ethnicity does have statistical significance, showing it is an important factor in relation to the age of sexual debut. Non-Hispanic Black participants that experienced early sexual initiation are 25.70% compared to the 14.56% non-Hispanic Black that did not experience early sexual initiation. Most of the participants who did not experience early sexual debut had an education level of at least an Associate's degree or higher, with 71.5%. The behavioral variables all are statistically significant. About three-fourths, 77%, of the participants that did not experience early sexual debut, also do not smoke cigarettes. The majority of the participants that did experience early sexual debut also drink alcohol, 82.6%. Almost 90% of the participants that did not experience early sexual debut have never taken drugs including marijuana, cocaine, crack, and crystal meth. Only one of the sexual educational characteristics were statistically significance, discussed sex with parent/guardian, with a p-value of 0.0057. Although it is a small difference, 50.8% of the participants did not experience early sexual debut and 47.3% of the participants did experience early sexual debut. It should be noted that the other two sexual educational characteristics, whether the participants received formal instruction on how to say no to sex and about birth control, are homogeneous. Neither is statistically significant. Who the participant was raised by was statistically significant. The majority of the participants that did not experience early sexual initiation, 71.2%, are raised by married parents. When comparing if the participants were raised by another mother figure, such as their

grandmother, 11.2% did experience early sexual initiation while 4.68% did not experience early sexual initiation. Among the participants that did not experience early sexual debut, 87% of their mothers did not have their first child until they were at least 18 years old or older. For both groups of the participants, the majority of them did not have teen mothers. However, 21.5% of the participants that did experience early sexual initiation did have a teen mother while only 13% of the participants that did not experience early sexual initiation had teen mothers.

3.2 Multivariable Analysis

The association between demographic, behavioral, and maternal variables with age of sexual debut is shown in Table 2. After adjusting for the variables listed in the Statistical Analysis section, non-Hispanic Black participants are 80% more likely than White participants to experience early sexual debut. However, Hispanic participants (AOR=0.80) and Other participants (AOR=0.66) are less likely to experience early sexual debut compared to White participants. The highest level of education gained is very significant. Participants whose highest level of education is High School are 2.21 times as likely to experience early sexual debut compared to participants whose highest level of education is at least some college. Low-income participants are 1.07 times as likely to experience early sexual debut compared to high-income participants. Participants that were not raised in religion are 46% more likely to experience early sexual debut compared to participants that are raised in religion. When comparing the risky behavioral variable, participants that smoke (AOR=2.55), drink (AOR=1.79), or use drugs (AOR=1.84) have an increase in odds of experiencing early sexual debut. The participants who were raised by single mothers compared to the participants raised by married parents are 2.01 times as likely to experience early sexual debut. The participants who were raised by another

mother figure (such as their grandmother, stepmother, aunt, or female non-relative) compared to participants raised by married parents are 2.54 times as likely to experience early sexual debut. Participants whose mothers were teen mothers are 58% more likely to experience early sexual debut compared to participants who are not the daughter of teen mothers.

The association between demographic, behavioral, and maternal variables with age of sexual debut by race/ethnicity are shown in Table 3. The highest level of education gained remains statistically significant for all races/ethnicities. Black participants are 77% more likely to experience early sexual debut if the highest level of education gained is High School. Hispanic participants are 2.23 times as likely to experience early sexual debut if the highest level of education gained is High School compared to Hispanic participants whose highest level of education is greater than High school. Median income participants for all races/ ethnicities, less likely to experience early sexual initiation compared to participants with high income. However, for median income Other participants, they are 2.08 times as likely to experience early sexual initiation compared to high-income Other participants. White participants are 45% more likely to experience early sexual initiation when raised in religion compared to White participants that are not raised in a religion. Black and Hispanic participants that were not raised in religion are about 2 times as likely to experience early sexual initiation compared to Black and Hispanic participants that were raised in a religion. Other participants that were not raised in religion are 0.62 times as likely to experience early sexual initiation compared to Other participants that are raised in a religion. The risky behavioral variables smoking, drinking, and drug use all affect the participants differently by race/ ethnicity. Other participants had the highest odds of experiencing early sexual initiation if they smoked cigarettes, AOR=3.87. White participants had the second highest odds of experiencing early sexual initiation if they smoked cigarettes, AOR=2.79. Black

participants are 57% more likely to experience early sexual initiation if they drink alcoholic beverages compared to Black participants that do not drink alcoholic beverages. Other participants have the highest odds of experiencing early sexual initiation if they drink alcoholic beverages, AOR=3.86. Hispanic participants have the highest odds of experiencing early sexual debut if they use drugs (AOR=2.45) compared to Hispanic participants that do not use drugs. Other participants have the highest odds of experiencing early sexual initiation if they were raised by a single mother compared to Other participants whose parents are married (AOR=3.148). White participants are 2.10 times as likely to experience early sexual debut if they were raised by single mothers compared to White participants whose parents were married. Black participants have the lowest odds of experiencing early sexual debut if they were raised by a single mother compared to Black participants whose parents are married (AOR=1.68). White participants and Hispanic participants have about the same odds of experiencing early sexual debut if they were raised by another mother figure (such as their grandmother, stepmother, aunt, or female non-relative) compared to White and Hispanic participants that are raised by married parents (AOR=2.2). Hispanic participants are 84% more likely to experience early sexual initiation if they were raised by a single mother figure compared to Hispanic participants whose parents were married. Black participants have the highest statistically significant odds of experiencing early sexual debut if they are daughters of teenage mothers (AOR=1.96). Hispanic participants and Other participants are both about 1.2 times as likely to experience early sexual debut if they are the daughter of a teenage mother compared to participants that are not the daughter of a teenage mother, neither are statistically significant.

The predictor variables that lead to early sexual debut by race/ethnicity are shown in Table 4. Being the daughter of a teenage mother was only significantly associated with an early

sexual debut for White and Black participants. For all participants variables: education, smokes cigarettes, drinks alcohol, and the woman that raised the participants are all associated with an early sexual debut. Income level was only significantly associated with Other participants. Religion and drug usage are significantly associated with early age of sexual debut for all participants, Other.

Chapter 4 – DISCUSSION

5.1 Discussion of Research Questions

The age of sexual debut can have a significant effect on a woman's overall health, especially their sexual health. There are multiple factors that can influence the age of sexual debut: race/ethnicity, socioeconomic status, adolescent's behavior, and relationship with parents. Early sexual debut for a woman can lead to several negative health outcomes such as unintended pregnancy, STIs, and sexual coercion (Graaf et al. 2012). As stated earlier, the relationship between adolescents and their parents has an influence on the age of sexual debut, specifically the relationship between mother and daughter. Studies show that parents with a close relationship to their children have a later age of sexual debut than parent's that are not close with their children (Lara & Abdo, 2016) (Barman-Adhikari et al., 2014). The association between being the daughter of a teenage mother and the age of sexual debut is unknown. This study contributes to research by exploring this association and comparing it by race/ethnicity.

The data used is secondary data from the Center for Disease Control and Prevention's (CDC) National Survey of Family Growth (NSFG). It has a national representation of women with large sample size. The age of the participant's ranged from 15 years old to 45 years old. The race/ethnicity of the participants was: non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Other (American Indian, Asian, Native Hawaiian). The results of this study can be used for a wide array of individuals.

The first hypothesis that being the daughter of a teenage mother is a risk factor to early sexual debut was supported. A similar finding was found in the De Genna et al. 2011 study that found the age of maternal first sex was a significant risk factor for early sexual debut in

offspring. Multiple factors can be considered to explain these findings. Teenage mothers have higher odds of having a more difficult life (Danawi, et al., 2016). They have a decrease in life opportunities, a decrease in educational life span, an increase in the low SES, and an increase in negative health outcomes. All of these affect the way an adolescent is raised and increases the odds of adolescents engaging in risky sexual behavior, such as early sexual debut.

The second hypothesis that race/ethnicity increases the risk of early sexual debut was only supported by Black participants. Hispanic and Other participants were not significantly affected by being the daughter of a teenage mother. Table 3 shows that there is no statistical significance for the variable being the daughter of a teenage mother for both Hispanic and Other participants. Table 4 shows that the variable being the daughter of a teenage mother is not a predictor variable for early sexual debut both Hispanic and Other participants. Durrett et al. (1975) study found that Hispanic parents are more protective and monitor their children more than non-Hispanic parents. The findings in Durrett et al. (1975) study might explain the results of this study. However, future research needs to be conducted to gain a better understanding of the relationship between Hispanic parent's and their children compared to non-Hispanic parent's and their children. Upon further analysis of the Other participants, the variables income and education were found to be most influential on the variable being the daughter of a teenage mother. Future research needs to be conducted with these three variables to gain a better understanding of how they interact with each other.

The third hypothesis that risky behavior is associated with early sexual debut was supported. Risky behavior for this study is smoking, drinking, and drug use. The results are consistent with several studies (Gyu-Young & Yun-Jung, 2017; Rew et al., 2011). The Hill et al., 2019 study shows that adolescents in middle school that engage in drug use have higher odds of

having consistent attitudes and behaviors towards sexual intercourse. Alcohol and drugs can impair an individual's judgment, especially an adolescent who is still growing and developing. Another variable that is associated with an early sexual debut is participants not being raised in a religion. Several other studies showed the same results (Rew, Carver, & Li, 2011). The Lara & Abdo 2016 study shows that the encouragement of religion reduces the risk of early sexual debut. However, most religions encourage abstinence and this same study shows that adolescents sexual health programs that push abstinence have higher incidences of an early sexual debut than adolescents that don't have abstinence pushed on them. While being raised in religion can be a preventative factor in early sexual debut, it must be done in tandem with other preventative factors.

Participants who were not nurtured by their mothers were found to have a greater risk for ESD compared to participants who were nurtured by both parents. The Price 2011 study found that adolescents with poor relationships with their mothers are more likely to initiate early sexual behaviors. The Barman-Adhikari et al., 2014 study shows that mother-daughter relationships can reduce the daughter's vulnerability to negative peer influence which could lead to early sexual debut. The Rew et al. 2011 study mentions that adolescents who felt they had caring adults in their lives were less likely to engage in risky sexual behavior than adolescents who felt they had no support. A caring adult in an adolescent's life can be a preventative factor to early sexual debut if the adolescent has no parent. The relationship between parents and adolescents is an important protective factor to consider for all adolescent's sexual health.

The fourth hypothesis that being the daughter of a teenage mother, the relationship with their mother, smoking, drinking, drug use, and education were predictor variables to early sexual debut were supported. Another predictor variable that is associated with an early sexual debut is

the participant not being raised in a religion. However, socioeconomic status (SES) as a predictor variable was not supported. The results in Table 4 show that for the majority of the participants SES does not significantly lead to early sexual debut, except for non-Hispanic Other. This is a similar finding to Rew et al. 2011 where SES levels did not affect the sexual-risk behaviors among adolescents. Maternal education and maternal employment were initially included in the analyses because of its association with relationship to daughter. However, these variables did not show any statistical significance with any participants and early sexual debut.

5.2 Study Strengths and Limitations

A strength of the study was the large sample size and the robustness of NSFG data, making it generalizable. The study has several limitations including self-reported measures, lack of peer influence variables, and the data was unweighted. Self-reported measures can cause bias in the response from participants. The NSFG reporting about first sex occurs many years after the event for some participants causing recall bias. Participants that reported ‘Don’t Know’ or ‘Refused’ were recoded as missing to adjust for bias. However, that could lead to underreporting bias for some variables. Peer influence is known to be a significant risk factor with an early sexual debut (Price, 2011; Hoskins & Simons, 2015; East, Khoo & Reyes, 2006; Barman-Adhikari et al., 2014).

5.3 Implications of Findings

Incorporating positive parental influence with prevention programs has the potential to delay sexual debut even with adolescents that are daughters to teenage mothers. Early sexual debut can lead to unintended pregnancy and STIs. According to the Guttmacher Institute (2015), unintended pregnancy costs taxpayers about \$21 billion dollars every year. About 20 million

people are diagnosed with STIs every year and half of them are people between the ages of 15 – 24 years old. STIs cost taxpayers about \$16 billion dollars (Owusu-Edusei et al.,2013). The results of this study can assist researchers and health professionals create better interventions that could decrease the costs stated earlier. This study may be useful for researchers and health professionals because it shows the significance of parental influence. In future studies, peer influence should be considered when investigating the factors associated with early sexual debut along with parental influence, specifically that of a mother to a daughter. An adolescent's sexual health can be affected by a variety of risk factors. This research shows the relationship between risky behavior, race/ethnicity, and parental influence are variables that heavily impact an adolescent's sexual health. When teaching adolescents about their sexual health, risky behavior variables should be considered, such as drinking, smoking, and drug usage because these variables are strongly associated with an early sexual debut. Prevention programs should be comprehensive to not only discuss contraceptives, STIs, how to say no to sex but also behaviors that increase the risk of early sexual debut.

5.4 Conclusion

Being the daughter of a teenage mother is a risk factor for early sexual debut. However, what is a greater risk factor for early sexual debut is the lack of closeness between a mother and daughter. When doing future research or prevention interventions, this needs to be included to address all the multidimensional factors associated with adolescents' sexual health.

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APPENDICES

Table 1: Distribution of Characteristics Across the Age of Sexual Debut Categories (n=9898)

Variables	Age of Sexual Debut ≤17 years old 6202 (62.66%)	Age of Sexual Debut ≥18 years old 3696 (37.34%)	
	Total n (%)	Total n (%)	X ² P-value
Demographics:			
Race/ethnicity:			
White	3518 (56.72)	2147 (58.09)	251.09 <0.0001
African American	1594 (25.70)	538 (14.56)	
Hispanic	797 (12.85)	670 (18.13)	
Other	293 (4.72)	341 (9.23)	
Education:			
High School	3009 (48.53)	1053 (28.50)	384.01 <0.0001
College	3191 (51.47)	2642 (71.50)	
Income:			
Low Income	3511 (61.25)	1718 (49.65)	127.64 <0.0001
Median Income	1386 (24.18)	1006 (29.08)	
High Income	835 (14.57)	736 (21.27)	
Religion:			
No Religion	753 (12.16)	266 (7.21)	61.31 <0.0001
Religion	5439 (87.84)	3424 (92.79)	
Behavioral Variables:			
Smokes cigarettes:			
No	3216 (52.06)	2832 (77.00)	604.57 <0.0001
Yes	2961 (47.94)	846 (23.00)	
Drinks alcoholic beverages:			
No	1073 (17.37)	1040 (28.28)	162.96 <0.0001
Yes	5104 (82.63)	2637 (71.72)	
Does Drugs*:			
Never	4612 (74.79)	3292 (89.58)	318.66 <0.0001
At least once	1555 (25.21)	383 (10.42)	
Sexual Educational Variables:			
Learned about sex/birth control from parent/guardian:			
How to say no to sex	995 (47.27)	337 (50.83)	12.57 0.0057
Birth Control	434 (20.62)	100 (15.08)	
STDs	97 (4.61)	23 (3.47)	
None of the above	579 (27.51)	203 (30.62)	
Any formal instruction about how to say no to sex:			
Yes	1779 (84.55)	573 (86.56)	1.59 0.2078
No	325 (15.45)	89 (13.44)	
Receive formal instructions about birth control:			
Yes	1626 (77.32)	509 (76.77)	0.09 0.7702
No	477 (22.68)	154 (23.23)	
Mother's Variables:			
Woman who raised daughter:			
Biological mother	2651 (42.74)	892 (24.13)	601.27 <0.0001
Other mother figure	696 (11.22)	173 (4.68)	
No mother figure			
Parent's Married	2855 (46.03)	2631 (71.19)	
Age of mother's first birth:			
Less than 18 years old	1336 (21.54)	482 (13.04)	111.60 <0.0001
18 years old or older	4866 (78.46)	3214 (86.96)	

* Drugs = marijuana, cocaine, crack, and crystal meth

Table 2: Association Between Demographic, Behavioral, and Maternal Characteristics with Age of Sexual Debut

Variables	OR _c 95% CI	P-Value	OR _A * 95% CI	P-Value
Race/ethnicity:				
African American vs. White	1.81 (1.62 - 2.02)	<0.0001	1.76 (1.54 - 2.00)	<0.0001
Hispanic vs. White	0.73 (0.73 - 0.65)	<0.0001	0.80 (0.70 - 0.93)	0.0002
Other vs. White	0.52 (0.52 - 0.45)	<0.0001	0.66 (0.55 - 0.80)	<0.0001
White (R)	Reference		Reference	
Education:				
High School vs. College	2.37 (2.17 - 2.58)	<0.0001	2.21 (1.99 - 2.46)	<0.0001
Income:				
Low Income	1.80 (1.61 - 2.02)	<0.0001	1.07 (0.93 - 1.22)	0.1369
Median Income	1.21 (1.07 - 1.38)	0.0485	0.97 (0.84 - 1.12)	0.2713
High Income (R)	Reference		Reference	
Religion:				
No Religion vs. Religion	1.78 (1.54 - 2.06)	<0.0001	1.46 (1.23 - 1.73)	<0.0001
Smokes cigarettes:				
Yes vs. No	3.08 (2.81 - 3.38)	<0.0001	2.55 (2.30 - 2.84)	<0.0001
Drinks alcoholic beverages:				
Yes vs. No	1.88 (1.70 - 2.07)	<0.0001	1.79 (1.59 - 2.02)	<0.0001
Does Drugs:				
Yes vs. No	2.90 (2.570 - 3.270)	<0.0001	1.84 (1.61 - 2.11)	<0.0001
Woman who raised daughter:				
Biological mother vs. Parents Married	2.740 (2.50 - 3.00)	<0.0001	2.01 (1.81 - 2.23)	0.0004
Other mother figure vs. Parents Married	3.71 (3.11 - 4.42)	<0.0001	2.54 (2.09- 3.09)	<0.0001
Parents Married	Reference		Reference	
Age of mother's first birth:				
Less than 18 years old vs. 18 or older	1.83 (1.63 - 2.05)	<0.0001	1.58 (1.38 - 1.81)	<0.0001

*Adjusted for race/ethnicity, education, income, religion, smoking, drinking, drug usage, relationship with mother, and age of mother's first child's birth

*COR = crude odds ratio; AOR = adjusted odds ratio; CI = confidence interval

Table 3: Association Between Demographic, Behavioral, and Maternal Characteristics with Age of Sexual Debut by Race and Ethnicity

	White N= 5665		Black N=2132		Hispanic N=1467		Other N=634	
Variables	OR _C 95% CI	OR _A * 95% CI	OR _C 95% CI	OR _A * 95% CI	OR _C 95% CI	OR _A * 95% CI	OR _C 95% CI	OR _A * 95% CI
Education: High School vs. College	2.95‡ (2.60 - 3.34)	2.45‡ (2.12 - 2.85)	2.19‡ (1.79 - 2.69)	1.77‡ (1.40 - 2.24)	1.68 ‡ (1.36 - 2.07)	2.23‡ (1.72 - 2.90)	2.86‡ (2.02 - 4.05)	2.08† (1.32 - 3.29)
Income: Low Income	1.74‡ (1.51 - 2.01)	0.99 (0.84 - 1.16)	1.69‡ (1.18 - 2.41)	1.14 (0.78 - 1.67)	1.15 (0.80 - 1.64)	0.80 (0.53 - 1.20)	3.52‡ (2.20 - 5.63)	2.84† (1.6 - 5.01)
Median Income	1.18 (1.01 - 1.37)	0.92 (0.78 - 1.09)	0.99 † (0.66 - 1.46)	0.91 (0.60 - 1.38)	1.07 (0.71 - 1.61)	0.83 (0.53 - 1.29)	2.12 (1.27 - 3.55)	2.08 (1.15 - 3.79)
High Income (R)	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Religion: No Religion vs. Religion	1.90‡ (1.60 - 2.27)	1.45† (1.19 - 1.77)	2.38† (1.45 - 3.89)	2.06† (1.18 - 3.59)	2.74† (1.59 - 4.70)	2.27 (1.24 - 4.17)	0.78 (0.47 - 1.29)	0.62 (0.32 - 1.20)
Smokes cigarettes: Yes vs. No	3.69‡ (3.29 - 4.14)	2.79‡ (2.46 - 3.17)	2.35‡ (1.83 - 3.02)	1.62† (1.23 - 2.14)	2.53‡ (1.91 - 3.35)	1.90‡ (1.39 - 2.57)	4.81‡ (3.34 - 6.94)	3.87‡ (2.50 - 5.99)
Drinks alcoholic beverages: Yes vs. No	1.86‡ (1.61 - 2.15)	1.75‡ (1.48 - 2.08)	1.59‡ (1.28 - 1.98)	1.57† (1.22 - 2.02)	1.77‡ (1.42 - 2.20)	1.71‡ (1.32 - 2.21)	3.56‡ (2.43 - 5.21)	3.86‡ (2.37 - 6.29)
Does Drugs: Yes vs. No	2.66‡ (2.30 - 3.09)	1.79‡ (1.51 - 2.11)	2.80 ‡ (2.08 - 3.75)	1.87† (1.34 - 2.61)	3.27‡ (2.21 - 4.84)	2.45‡ (1.60 - 3.75)	4.21‡ (2.55 - 6.95)	1.53 (0.82 - 2.86)
Woman who raised daughter: Bio. mother vs. Parents Married	2.74‡ (2.42 - 3.10)	2.10‡ (1.83 - 2.41)	1.89 (1.54 - 2.33)	1.68 (1.34 - 2.11)	2.23† (1.75 - 2.83)	1.84 (1.41 - 2.40)	4.59† (3.07 - 6.86)	3.15 (1.96 - 5.05)
Other mother figure vs. Parents Married	3.35‡ (2.58 - 4.35)	2.20† (1.65 - 2.95)	3.57‡ (2.50 - 5.10)	2.94‡ (1.99 - 4.35)	2.456† (1.65 - 3.65)	2.19† (1.43 - 3.37)	5.52† (2.91 - 10.47)	3.98† (1.80 - 8.82)
Parents Married	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Age of mother's first birth: Less than 18 years old vs. 18 or older	2.11‡ (1.75 - 2.55)	1.68‡ (1.35 - 2.09)	2.05‡ (1.62 - 2.59)	1.96‡ (1.51 - 2.55)	1.17 (0.93 - 1.47)	1.20 (0.93 - 1.56)	2.00† (1.31 - 3.08)	1.29 (0.75 - 2.23)

*Adjusted for education, income, religion, smoking, drinking, drug usage, relationship with mother, and age of mother's first child's birth

*COR = crude odds ratio; AOR= adjusted odds ratio; CI = confidence interval

†P<0.05 & ‡P<0.0001

Table 4: Result of Stepwise Logistic Regression Analysis of Demographic, Behavioral, and Maternal Characteristics that Predict Early Age of Sexual Debut by Race and Ethnicity

	White N=5665	Black N=2132	Hispanic N=1467	Other N=634
Variables	ORA 95% CI	ORA 95% CI	ORA 95% CI	ORA 95% CI
Age of mother's first birth: Less than 18 years old vs. 18 or older	1.73 (1.39 - 2.16)	2.03 (1.56 - 2.64)	—	—
Education: High School vs. College	2.49 (2.15 - 2.88)	1.92 (1.52 - 2.41)	2.56 (1.97 - 3.34)	2.53 (1.58 - 4.05)
Income: Low Income Median Income High Income (R)	—	—	—	3.09 (1.73 - 5.51) 2.06 (1.12 - 3.77) Reference
Religion: No Religion vs. Religion	1.41 (1.16 - 1.73)	2.13 (1.21 - 3.78)	2.06 (1.12 - 3.79)	—
Smokes cigarettes: Yes vs. No	2.76 (2.43 - 3.14)	1.74 (1.32 - 2.31)	1.73 (1.27 - 2.36)	3.99 (2.58 - 6.17)
Drinks alcoholic: Yes vs. No	1.67 (1.41 - 1.99)	1.52 (1.18 - 1.95)	1.58 (1.22 - 2.05)	3.65 (2.22 - 5.98)
Does Drugs: Yes vs. No	1.78 (1.50 - 2.11)	1.78 (1.27 - 2.49)	2.13 (1.39 - 3.26)	—
Woman who raised daughter: Biological mother vs. Parents Married Other mother figure vs. Parents Married Parents Married	1.98 (1.73 - 2.28) 2.39 (1.78 - 3.21) Reference	1.64 (1.31 - 2.07) 3.19 (2.15 - 4.76) Reference	1.66 (1.27 - 2.18) 2.37 (1.53 - 3.66) Reference	2.78 (1.71 - 4.51) 4.66 (2.14 - 10.18) Reference

*All variables have a p-value of <0.05