

Influence of Current Contraceptive Use on the Abortion and Sexually Transmitted Disease Rates among Adolescents and Young Adults in the United States

*Richard J. Fehring, Ph.D., R.N.,**

*Thomas Bouchard, M.D.,***

*and Maria Meyers, M.D.****

* *Richard J. Fehring, Ph.D., RN, FAAN*, is Professor Emeritus and Director of the Marquette University College of Nursing Institute for Natural Family Planning. He received his master's degree and doctorate in nursing from the Catholic University of America and baccalaureate degrees in biology and nursing from Marquette University. He has published over 140 articles and book chapters, co-edited three books and has generated over \$2.5 million in research and foundation grants. His research interests include study of the effectiveness of fertility awareness methods of family planning, marital responses to family planning, and religious influences on human sexuality.

** After completing his undergraduate at McGill University, *Dr. Thomas Bouchard* spent three years doing research on dementia in Parkinson's disease at the University of Alberta. He then completed medical school and residency at the University of Calgary. He now practices general family medicine, low risk obstetrics, and is the medical director at two nursing homes. He has a special interest in natural family planning and is a medical consultant for the Institute of Natural Family Planning at Marquette University. Dr. Bouchard is the Past-President of the Canadian Federation of Catholic Physicians Societies. He is a Clinical Lecturer at the University of Calgary and sits on the Perinatal Palliative Care Committee. He has published articles on a wide variety of issues from Natural Family Planning to Parkinson's disease.

*** *Maria Meyers, M.D.*, earned a medical degree and performed her pediatric residency at Louisiana State Medical School in Shreveport, Louisiana. Upon receipt of the National Health Service Corp Award after residency, she became a pediatrician for Jefferson County Department of Health, Birmingham, Alabama, serving in indigent care for 20 years. During these years, she has been teaching chastity education to youth in groups and on a daily one-on-one basis. She is also an attending instructor for pediatric residents and nurse practitioners at the University of Alabama, Birmingham. She is a certified Marquette Natural Family Planning instructor. She and her husband

ABSTRACT: Hormonal and other types of contraceptive methods are often prescribed to adolescents and young adults for the treatment of health problems and to avoid unwanted pregnancies. We hypothesized that there is a greater likelihood of pregnancy, abortion, sexually transmitted diseases (STDs), and sexual behaviors that enhance such problems (e.g., earlier sexual debut and multiple sex partners) for single adolescents and young adults currently using contraception than for adolescents and young adults not using contraception. To test this hypothesis, we used data from 1,365 adolescents and young adults in the 2011-2013 National Survey of Family Growth to describe the influence of current use of contraception on sexual debut, multiple sex partners, sexually transmitted diseases, pregnancy, and abortion. We found that current use of contraception by adolescents and young adults in the U.S. results in a greater likelihood of pregnancy, abortion, and sexually transmitted diseases compared with the rates for those adolescents and young adults who never used oral contraceptives. Furthermore, those adolescents who currently use oral contraceptives had significantly more male sexual partners than those who never used them and an earlier sexual debut by almost five years. We concluded that the use of oral contraceptives by adolescents and young adults facilitates higher risk sexual behaviors. Further research is recommended to confirm these associations.

THERE HAS BEEN A SIGNIFICANT DECREASE in the birth rates among adolescents and young adults in recent years.¹ This decrease is attributed to the greater use and greater effectiveness of contraceptive methods. Sexually transmitted diseases, however, have continued to increase even with greater use of contraception.² There was an increase in sexually transmitted diseases from 2012 to 2013 in all four reported categories among young people aged 15-24, i.e., a 2.8% increase in chlamydia, a 5.1% increase in gonorrhea, and a 15.1% increase in primary and secondary syphilis.³ Other researchers at

have four children.

¹ L. Lindberg, J. Santelli, and S. Desai, "Understanding the Decline in Adolescent Fertility in the United States 2007-2012," *Journal of Adolescent Health* 59/5 (2016): 577-83.

² Ibid.

³ "Center for Disease Control Fact Sheet," National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention Centers for Disease Control and Prevention Reported STDs in the United States, 2014 National Data for Chlamydia, Gonorrhea, and Syphilis.

the Center for Disease Control found that one in four female adolescents have a sexually transmitted disease.⁴

Healthcare providers (i.e., physicians, physician assistants, and advanced practice nurses) are the main gateway for prescribing contraception to adolescents and young adults. Furthermore, healthcare providers often treat common adolescent health problems with oral hormonal contraceptives as a way to prevent unintended pregnancies.⁵ By doing so, health professionals may be contributing to lowering the barriers to risky sexual behaviors like early sexual debut and multiple sexual partners. Fear of pregnancy and not wanting to catch a sexually transmitted disease are frequent reasons why adolescents and young adults delay sexual intercourse.⁶ From a behavioral model standpoint, taking away these two consequences of sexual intercourse will likely encourage the behavior. Furthermore, the authority of the healthcare provider will send the message that sexual intercourse is expected. From an anthropological stance, the provision of contraception is sending a message that a woman's fertility is something to be avoided and not something to be integrated into a healthy lifestyle. Fertility becomes like a disease that needs to be treated rather than like something that indicates health.⁷ When healthcare providers use this approach with patients, the unexpected consequence of pregnancy is often viewed as an "adverse event" that needs to be dealt with, and abortion is commonly seen as the solution.

There are, however, protective factors that help adolescent and young adult women to remain virgins and to reduce sexual risk. Past research has shown that those adolescents and young women who hold religion to be very important in their lives and attend church at least once a week have an older

⁴ S.E. Forhan, S.L. Gottlieb, and M.R. Sternberg et al., "Prevalence of Sexually Transmitted Diseases among Female Adolescents Aged 14 to 19 in the United States," *Pediatrics* 124 (2009): 1505-12.

⁵ R.L. Rosenfield, "The Diagnosis of Polycystic Ovary Syndrome in Adolescents," *Pediatrics* 136/6 (2015): 1154-65; M. Youngster, M.R. Laufer, and A.D. Divasta, "Endometriosis for the Primary Care Physician," *Current Opinions in Pediatrics* 25/4 (2015): 454-62.

⁶ R. Fehring, K. Cheever, K. German, and C. Philpot, "Religiosity, Sexual Activity, and Attitudes of Sexual Permissiveness among Older Adolescents," *Journal of Religion and Health* 37/3 (1998): 229-48.

⁷ R. Fehring and W. Kurz, "Anthropological Differences between Natural Family Planning and Contraception," *Life and Learning* 10 (2002): 237-64.

age of sexual debut, less sexual intercourse, and fewer male sexual partners than those who are less religious.⁸ Having intact families, good communication with parents, private school, and simply pledging to remain a virgin until marriage are also factors that lead to less sexual risk among adolescents and young adult women.⁹

In opposition to the prevailing consensus that the use of contraception is necessary to prevent unintended pregnancy and the use of condoms to prevent sexually transmitted diseases among adolescents and young adults, we theorized that the use of contraception to treat health problems and/or to avoid unintended pregnancy actually leads to unhealthy sexual activity. Furthermore, unhealthy sexual activity, such as multiple sexual partners and early sexual debut, can lead to significant health problems like unintended pregnancy, abortion, and sexually transmitted diseases.

A previous study among all reproductive-age women, including adolescents and young adults, showed that there was a greater likelihood of abortion among those women who ever used methods of contraception, compared with women who never used contraceptive methods.¹⁰ A recent study also showed that those adolescents and young adults who ever used oral hormonal contraception and condoms were more likely to have had an abortion, pregnancy, a sexually transmitted disease, or behaviors that contribute to those outcomes compared to those adolescents who never used contraception.¹¹ We are now seeking to determine if this association also occurs among

⁸ L. Edwards, R. Fehring, K.M. Jarrett, and K. Haglund, "The Influence of Religiosity on the Sexual Behaviors of Latina/o Adolescents," *Hispanic Journal of Behavioral Sciences* 30/4 (2008): 447-62; K.A. Haglund and R.J. Fehring, "The Association of Religiosity, Sexual Education, and Parental Factors with Risky Sexual Behaviors among Adolescents and Young Adults," *Journal of Religion and Health* 49 (2010): 460-72; K. Haglund, L. Edwards, R. Fehring, and J. Pruzynski, "Religiosity and Sexual Risk Behaviors among Latina Adolescents: Trends from 1995 to 2008," *Journal of Women's Health* 20/6 (2011): 871-77.

⁹ M.D. Resnick, P.S. Bearman, and R.W. Blum et al., "Protecting Adolescents from Harm: Findings from the National Longitudinal Study on Adolescent Health," *Journal of the American Medical Association* 278 (1997): 823-32.

¹⁰ R. Fehring, "The Influence of Contraception on Abortion among Women of Reproductive Age in the United States," *Life and Learning* 21 (2014): 1-18.

¹¹ R. Fehring, T. Bouchard, and M. Meyer, "Influence of Contraception Use on the Reproductive Health of Adolescents and Young Adults," *The Linacre Quarterly* (accepted for publication, in press 2017).

adolescents and young adults who are currently using contraceptive methods.

We hypothesized that those adolescents who are currently using contraceptive methods will be more likely to have had an abortion, to have experienced pregnancy, to have had a sexually transmitted disease, to have had more male sexual partners, and to have had an earlier sexual debut than those adolescents and young adults who are not currently on a method of contraception. We also hypothesized that those adolescents and young adult women who view religion as very important, who have frequent church attendance, and who grew up with intact two-parent families would be less likely to have been sexually active than those who do not hold religion as important, do not have frequent church attendance, and did not grow up in intact families.

Methodology

For this study we used data from the Cycle 8 (2011–2013) National Survey of Family Growth (NSFG) and in particular the 1,367 females from the age 15 through 21 in the data set who were never married. The NSFG has been conducted by the National Center for Health Statistics (NCHS) approximately every five to seven years since 1973.¹² The NSFG includes factors that help explain trends in contraception use, infertility, sexual activity, and pregnancy outcomes. The NSFG is available to researchers who may use the data set to determine trends in family health, contraceptive use, infertility, and sexual health choices.

The NSFG involves a nationally representative, randomly selected sample of women aged 15–44 in the United States. Interviews are conducted in person, and sensitive questions (such as past history of abortion) are asked through a self-paced computer-assisted interview program. The response rates of these surveys range from 75% to 80%. In 2014, data sets were released from Cycle 8 of the 2011–2013 NSFG. They include 5,601 women 15–44 years of age. The response rate for the 2011–2013 NSFG was 73.4% for females. There are over 3,000 variables in the Cycle 8 data set.

The independent variables (and their NSFG labels) for this study included “CurrMeth” – that is, the use of a contraceptive method during the month of the interview. The missing data for this variable was coded as “not being on a

¹² W.D. Mosher and J. Jones. “Use of Contraception in the United States: 1982–2008,” *Vital and Health Statistics*, Series 23, n. 29 (2010): 1–771.

contraceptive” on the assumption that the participants did not answer in the affirmative because they are not sexually active and not using a method of contraception. This assumption was validated when this variable was cross tabbed with the variable “ever having had sexual intercourse,” which indicated that only six of the 506 women who did not respond to the current method question ever had sex. Furthermore, there was no difference in the sexual activity, the number of male sex partners, or the age of sexual debut among the 324 women who indicated that they were not using a method of contraception during the month of interview. Finally, most of these 324 women indicated that they have used some method of contraception in the past. But, so that there would be no confusion, two sets of results were calculated, one investigating associations and differences between those adolescents and young adults who responded to the question of using a current method of contraception and those adolescent and young adults who did not respond to this question, i.e., the missing data. The second set of results did the same comparison but without including the data from the 324 women who responded that they were not using a method of contraception during the month of interview.

The health risk outcome variables were: (1) “EVERSEX” (those participants who ever had sexual intercourse with a male), (2) “partlif_1” (the number of male sexual partners that respondents have had in their lifetime), (3) “PARTS1YR” (the number of sexual partners in past twelve months), and (4) “AGEFSTSX” (the age of the respondent at first sexual intercourse).

The health outcome variables were: (1) “STDEVER” (respondents who were ever treated for a sexually transmitted disease), (2) “EVERPREG” (the respondents who were ever pregnant), and (3) “ABORTION 12” (the respondents who ever had an abortion in the past twelve months). The age entered for those respondents who never had sexual intercourse with a male was the current age at interview for the purposes of the survival analysis for sexual debut (see details below). The abortion variables had a lot of missing data. The missing data for this variable was coded as “not ever having had an abortion.” We assumed “never having an abortion” among those who responded “none” since most of the non-responding participants were not sexually active, i.e., they responded that they had never had sexual intercourse with a male.

The protective variables were importance of religion in respondent’s daily life (RELDLIFE), frequency of attendance at religious services (ATTND-NOW), and intact family (recoded as INTACT), i.e., they have always lived

with both biological or adoptive parents. For the purposes of this analysis, these responses were divided into two categories: (1) very important and (2) somewhat important and not important. Participants indicated their frequency of attendance at a religious service as more than once a week, once a week, one to three times per month, less than once a month, or never. For analysis, these responses were also collapsed into two categories. Frequent attendance at religious services included one or more times per week, and infrequent attendance included three times per month or less. Participants indicated whether they had resided within a two-parent family, defined in the original survey as the presence of both parents (biological or adoptive) from birth to age eighteen.

Descriptive statistics were used to determine the demographics of the sample, including age, marital status, race, religion, and whether the respondent lived in an intact family with a mother and a father. Relative risk odds ratios were calculated for “ever had sexual relations” or not, “ever having been treated for a sexually transmitted disease” or not, “ever pregnant” or not and “had an abortion in the last twelve months” or not, with comparisons between those who were currently using contraceptive methods and those adolescents or young adults who were not using a contraceptive method. We also used a student t-test to calculate the differences in the number of male sexual partners by comparing those adolescents and young adults who were using contraception and those who did not. Differences in age of sexual debut enabled us to compare respondents who ever had sex and those who never had sex through Survival Analysis (Kaplan-Meier), with the time being the current age or age of sexual debut, and by taking “ever having had sexual relations” as the event, and “ever having had sex” or not as the two conditions.

Logistic regression was used to determine the association between “ever having had sexual intercourse with a male” and “current use of contraception,” using as the protective variables the importance of religion, frequency of church attendance, and intact family. Odds ratios were created based on the Beta levels revealed. Statistical significance was set at the 0.05 probability level. In order to control for increased error rates with multiple testing, the Bonferonni average of .006 was determined. The Bonferonni correction was used to lower the p value needed to demonstrate a significant difference that could arise from the risk of repetitive sampling errors. Statistical analysis was performed by the use of the Statistical Package for Social Sciences (SPSS version 22). Only those women who indicated that they were heterosexual were

included in the data analysis.

The NSFG Cycle 8 data set is available through the NCHS and is downloadable through the Internet into SPSS files. The data set does not contain any identifying variables and is intended for public use (for statistical analysis only). Use of this data set was reviewed by the Office of Research Compliance at Marquette University and received exempt status.

Results

Demographics. Of the 5210 women participants in the Cycle 8 NSFG data set, 1367 were between the ages of 15 and 21 and never married. Of these participants, the mean age was 17.95 ($SD = 1.93$), none of whom were married but 129 (9%) indicated that they were cohabitating with a member of the opposite sex. The majority (60.6%; $N = 828$) were listed as white; 24.9% ($N = 341$) were listed as black; 14.5% ($N = 198$) were listed as other. The majority (47.9%) listed their religion as Protestant, 24.6% were Catholic, 10.2% were of other religion, and 20.0% of no religion.

Negative Health Outcomes

Likelihood of Pregnancy, Abortion, and STDs. Table 1 provides the odds ratios and confidence intervals of having a negative health outcome for those adolescents and young adults who were currently using contraception compared with adolescents and young adults who were not currently using contraceptive methods. The first row of results for each outcome includes all adolescents and young adults who responded to the question and the second row eliminated the 324 women who said that they were not using a method of contraception during the month of interview. The likelihood odds ratios and confidence intervals were similar to both sets of outcomes except for the likelihood of having had an abortion in the past twelve months with the total group being over ten times more likely among those adolescents and young adults on some form of contraception, compared to those who were not. By contrast, the reduced set (i.e., minus the 324 women) showed a 69% increased likelihood. Both groups of contraceptive users were approximately seven times more likely to have been treated for a sexually transmitted disease in the past twelve months, over forty times more likely to have had a pregnancy, and approximately five hundred times more likely to be sexually active.

Differences in the Number of Male Sexual Partners. Both groups of

adolescents and young adults who were currently using a method of contraception, i.e., the 850 (the total number of respondents) and the reduced group of 527 (those who responded that they were currently using a method of contraception) had significantly more sexual partners over a life time and in the past twelve months. For the total contraceptive active participants, the *Mean* was 3.70 (*SD* = 5.06; *range* 0-50). By comparison, the group of adolescents and young adults not using a method of contraception (*N* = 507) had the *Mean* = .022 (*SD* = .28; *range* 0-7; *t-test* = 16.36; *df* = 1.347; *Sig.* < 0.000). This same group of adolescents and young adults who were currently using a method of contraception also had significantly more sexual partners over the past twelve months (*Mean* = 1.29; *SD* = 1.30; *Range* 0-7) compared with the group of those adolescents and young adults who were not using a method of contraception (*Mean* = 0.013; *SD* = 0.23; *Range* 0-5; *t-test* = 21.96; *df* = 1.355; *Sig.* < 0.000).

The reduced group of participants who were currently using a method of contraception (i.e., not including those participants who indicated that they were not using such a method during the current month of interview) had a *Mean* of 3.66 lifetime male sexual partners (*SD* = 5.04) compared with the *Mean* of 0.02 (*SD* = 0.31) among the non-responding non-contracepting adolescent and young adults (*t-test* = 14.69; *df* = 1027; *sig.* < .000). The reduced group of participants who were currently using a method of contraception had a *Mean* of 1.28 male sexual partners (*SD* = 1.30) compared with the *Mean* of 0.01 (*SD* = 0.25) among the non-responding non-contracepting adolescent and young adults (*t-test* = 19.62; *df* = 1033; *sig.* < 0.000).

Mean Age of Sexual Debut. The mean age of sexual debut for the adolescents and young adults who were currently using contraception including the 324 who responded "not using contraception" in the month of interview was 16.23 (95% *CI* = 16.09 – 16.38) and for the adolescents and young adults who are not using contraception 20.92 (95% *CI* = 20.86–20.98). The mean age of sexual debut for the adolescents and young adults who were currently using contraception excluding the 324 who responded "not using contraception" in the month of interview was 16.21 (95% *CI* = 16.04 – 16.38) and for the adolescents and young adults who were not using contraception 20.92 (95% *CI* = 20.85 – 20.99). It should be noted that current age was used in the survival analysis for those who had not yet had intercourse. See Figure 1 and 2 for the Hazard Survival curve for these two scenarios.

Protective Factors

Table 2 shows the odds ratios of ever having had sex with potential factors that have been known to help protect against risky sexual behaviors, i.e., church attendance, importance of religion, and having an intact two-parent family. They were calculated by use of logistic regression with “ever having had sex” as the dependent variable and whether using contraception or not, rating religion as very important or not, going to church at least once a week or not, and having an intact two-parent family or not. The equation was significant at $p < 0.000$ and the $R^2 = 77\%$ for both sets of results (i.e., including and excluding the 324 current method respondents). The odds of having had sex among those sexually active was almost seven times more than those not on contraception. Those who related religion as very important, however, were 49% less likely to be sexually active, and those with an intact two-parent family were 33% less likely to be sexually active than those living in a one-parent family. Frequent church attendance did not reach significance of a probability less than 0.006.

Current Method of Birth Control: Not Currently Using versus Using

There were 324 adolescents and young adults among the 851 who responded to the question about what type of method of birth control they used during the current month by saying that they were using no method. There was no difference in the frequency of sexually transmitted diseases and abortion in the past twelve months, the frequency of pregnancy, and no difference in the number of lifetime sexual partners when compared with the 527 adolescents and young adults using some method of contraception. Furthermore, the age of sexual debut was similar for both groups of adolescents. The mean age of sexual debut for the not currently using any method of contraception was 17.32 (95% CI: 17.03 to 17.63) versus the mean age of 17.36 (95% CI: 17.12 to 17.60) among those adolescents and young adults using some form of contraception.

Discussion

Findings. According to the data from Cycle 8 of the NSFG, those U.S. adolescents and young adults who were currently using some form of contraception had a significantly greater likelihood of ever having had sexual intercourse, a sexually transmitted disease, a pregnancy, and having had an

abortion compared with those adolescents and young adults who were not using contraception. Furthermore, those adolescents who were using contraception had significantly more male sexual partners than those who were not using contraceptive methods by almost five years. Logistic regression analysis with data from the Cycle 8 dataset also indicated that those U.S. adolescents and young adults who felt religion to be very important in their lives and lived in an intact family were less likely to ever have had sexual intercourse than those adolescents and young adults who did not hold religion to be very important and lived in an intact family. These results are remarkable, especially the greater likelihood (over four hundred times greater) to be sexually active, forty times greater to have had a pregnancy, ten times greater to have had a sexually transmitted disease, and seven times greater to have had an abortion. The sexual debut (five years earlier) and the mean of over three sexual partners per year among contracepting teens and young adults compared to adolescents who are not using contraceptive methods is startling.

These findings (but with a greater magnitude) are similar to an earlier study that assessed the relationship of ever having used contraceptive methods (i.e., the hormonal pill) with an earlier sexual debut, more sexual partners, and more likelihood of being sexually active, or having had an abortion, of having become pregnant, and of having had a sexually transmitted disease than those adolescents and young adults who never used hormonal contraception but at a far greater level and likelihood.¹³ In a way that is similar to this earlier study, the current study also shows that coming from an intact family and having frequent church attendance seems to give some protection from becoming sexually active early on. Some earlier studies with Cycle 6 and 7 of the NSFG also showed that adolescents and young adults who held religion important in their lives and had frequent church attendance were less likely to be sexually active and to have a later age of sexual debut.¹⁴ Another study with an earlier version of the NSFG also showed that those women who held religion to be very important and attended church at least once a week also were less likely to ever have an abortion as compared to women who did not feel religion was very important and had less frequent church attendance.¹⁵ The results of our

¹³ Fehring, Bouchard, and Meyers (2017).

¹⁴ Edwards, Fehring, Jarrett, and Haglund (2008); Haglund and Fehring (2010); Haglund, Edwards, Fehring, and Pruzynski (2011).

¹⁵ R. Fehring and J. Ohlendorf, "The Influence of Religiosity on Contraceptive

study showing that those adolescents who are currently using contraceptive methods were more likely to have had a sexually transmitted disease coincide with findings that frequent intercourse is associated with sexually transmitted diseases.¹⁶

Theoretical Understanding of the Findings: Lowering the Barriers

The main reasons provided by adolescents and young adults in the Cycle 8 NSFG for not being sexually active are moral or religious, not having the right partners, fear of pregnancy and fear of sexually transmitted diseases. Providing adolescents contraceptive methods will lessen the fear of pregnancy and thus lower one obvious barrier to having an earlier sexual debut. But some, while willing to use a method of contraception, will not want to use condoms out of a sense that it is not natural, not needed to prevent pregnancy, or that the sexual partner does not like its use.¹⁷ Providing hormonal contraception for treating common adolescent health problems could also lower the normal barriers to becoming sexually active. Healthcare providers may prescribe hormonal contraception with the understanding that the risks of using hormonal contraception are outweighed by avoiding unintended pregnancies and the possibility of more frequent abortions. Our data demonstrate that, contrary to this belief, the use of contraception was associated with a more likely incidence of pregnancy and abortion.¹⁸ The provision of hormonal contraceptives by health professionals may also suggest to vulnerable adolescents that being on contraception is part of a normal course of development that involves sexual experimentation. Parents too may be fearful of unintended pregnancy in their children and for this reason may request that their child's healthcare provider prescribe contraceptive methods for avoiding pregnancy or for other health problems that can be effectively managed by other means. Our findings, however, demonstrate that uses of contraceptive methods are associated with

Use and Abortion in the United States," *Life and Learning*, vol. 17 (Washington, D.C.: University Faculty for Life, 2007), pp. 398-416.

¹⁶ Forhan, Gottlieb, and Sternberg et al. (2009); S. Genius, "Managing the Sexually Transmitted Disease Pandemic: A Time for Re-Evaluation," *American Journal of Obstetrics & Gynecology* 191/4 (2004): 1103-12.

¹⁷ L.H. Keogh, "Understandings of the 'Natural' Body: Comparison of the Views of Users and Providers of Emergency Contraception," *Sexual Health* 2 (2005): 109-15.

¹⁸ Fehring, Bouchard, and Meyers (2017).

a greater likelihood of unhealthy sexual activity, i.e., early sexual debut and multiple sexual partners.

A conceptual model of explaining single adolescent and young adult sexual behaviors can be illustrated by the A-B-C behavioral model, i.e., the antecedents (A) and consequences (C) of a Behavior (B).¹⁹ Antecedents of a behavior are behaviors, environmental cues, or cognitions that either decrease or increase the likelihood of a behavior happening, and the consequences of a behavior (either bad or good), e.g., affirmations or condemning an action could either enhance, reduce, or eliminate a behavior. Figure 3 illustrates some of the possible antecedents and consequences that could either enhance the likelihood or decrease the likelihood of sexual behavior outside of marriage as applied to variables available in the NSFG data sets. Obviously fear of pregnancy and experiencing a sexually transmitted disease are both real and cognitive factors that would reduce sexual behavior (i.e., early sexual debut, male sexual partners, and ever having had sexual intercourse). But the prescribing of contraception and condoms by a health professional and especially encouraging the behavior will reduce the fear and legitimize sexual behaviors as long as one is “protected.” We call this “lowering of the barriers.” A religious environment (i.e., church attendance) and beliefs that discourage sexual intercourse outside of marriage and having two caring parents who encourage those restrictions are part of the antecedents, along with fear of punishment from a higher authority or parents as consequences.

Other variables from the NSFG data set that could be added to this model are the attitudes that the participants have about sexual activity outside of a marital covenant. The NSFG has two items about whether sexual activity by a 16-year-old and/or an 18-year-old outside of marriage is morally permissible or not. A more conservative view that adolescents should remain chaste most likely would be associated with less sexual activity among the participants. As healthcare providers, we also have an interest in an adolescent’s knowledge of and appreciation for her fertility on the grounds that appreciating and understanding one’s fertility and how to keep it healthy would limit sexual behaviors that would damage fertility. That variable, however, does not exist in the dataset at this time. There are variables about sexual education with or without the mention of contraceptive methods, but this variable as presented

¹⁹ R.G. Miltenberger, *Behavior Modification: Principles and Procedure*, 4th edition (Belmont CA: Thomson Wadsworth, 2008).

in the data set does not seem to be a predictive variable for sexual behavior.²⁰

Limitations of the Study

An obvious limitation is that the main independent variable of current use of a method of contraception was manipulated by coding the missing data in that category to be “not using a method of contraception.” It could be said is that the study actually investigated missing data with participants who actually responded to this question. We showed, however, that almost all (i.e., 500 out of the 506 respondents) indicated that they were never sexually active. This lends evidence that the “missing data” cases were just participants who did not see as relevant the question of using a method of contraception in the current month.

Another limitation of the NSFG data set that has been reported in the literature is the potential under-reporting of abortion.²¹ It could be that the lower use of abortion among those adolescents and young adults not using methods of contraception comes from admitting to having had an abortion would be an embarrassment since among Catholics, more conservative Protestants, and among Christians generally, abortion is a grave wrong.

Another obvious weakness of the study is that it can be assumed that most adolescents and young adults who seek out contraception do so for the purpose of being sexually active, thus the intent comes before the use of contraceptive methods for some of the respondents. The purpose of this study, however, was to show associations between risky sexual activity and other health outcomes with current use of contraception and not to claim that there was cause and effect. The use of contraception may reduce the fear of pregnancy but (as shown) not the risk of experiencing a sexually transmitted disease or reducing pregnancy rates.

A strength of this study is that it is population-based. Because of that we can make generalizations for the U.S. population of adolescents and young adults at large. The findings are also strengthened by having similar results

²⁰ Fehring, Bouchard, Meyers (2017).

²¹ R. Jagannathan, “Relying on Surveys to Understand Abortion Behavior: Some Cautionary Evidence,” *American Journal of Public Health* 91 (2001): 1825-31; L.B. Smith, N.E. Adler, and J.M. Tschann, “Under-Reporting of Sensitive Behaviors: The Case of Young Women’s Willingness to Report Abortion,” *Health Psychology* 18 (1999): 37-43.

from early versions of NSFG data sets.²²

Another limitation is the difficulty of trying to measure religiosity among women using a retrospective data set. Religiosity has multiple dimensions that include belief, intrinsic religiosity, religious well-being, and participation in organized religious activity.²³ The measure of religiosity in this study was limited to the items used in the Cycle 8 of the NSFG. A very important component of religiosity that is missing is whether faith is intrinsic (or extrinsic) to the individual respondent. Finally, this study did not include other factors that are associated with risky sexual behaviors among adolescents and young adults, such as alcohol and illicit drug use.

Recommendations for Future Research

Recommendations for future research include comparing the findings from earlier versions of the NSFG data sets to determine trends in contraception use, sexual activity, pregnancy, abortion, sexually transmitted diseases, and sexual debut. Analysis of the effects of current use of hormonal contraceptives versus using no method of family planning on health outcomes among all of the participants in the data set (i.e., women 15-44) would strengthen the evidence for the influence of contraception on the reproductive health of adolescents and young adults, or at least extending the age through 25 years, since most abortions, sexually transmitted diseases, and pregnancies occur during the early twenties. Another recommendation is to look at Cycle 8 of the NSFG as was done in this study, but to break down the analysis with special sub-populations of interest and especially different ethnicities and races.

Conclusion

The consensus among health professionals is that there is a great need to provide sexually active adolescents with the pill and the condom to prevent unintended pregnancy and sexually transmitted diseases.²⁴ Although there is

²² Edwards, Fehring, Jarrett and Haglund (2008); Fehring and Ohlendorf (2008); Haglund and Fehring (2010); Haglund, Edwards, Fehring, and Pruzynski (2011); Fehring, Bouchard, and Meyers (2017).

²³ H.G. Koenig, M. Smiley, and J.A.P. Gonzales, *Religion, Health, and Aging: A Review and Theoretical Integration* (Wesport CT: Greenwood Press, 1988).

²⁴ P.K. Braverman, W.P. Adelman, E.M. Alderman, C.C. Breuner, D.A. Levine, A.V. Marcell, R.F. O'Brien, and AAP Committee on Adolescence, "Contraception for

some mention of use of abstinence and fertility awareness methods, they claim that these methods are not very effective and that pregnancy is a worse health outcome than the use of hormonal contraception. Moreover, these studies suggest that adolescents should have confidential office visits to discuss these issues apart from their parents. Yet these approaches are not solving the problem of unintended pregnancy, abortion, and sexually transmitted diseases. Since the goals of reducing pregnancy and sexually transmitted disease rates are not being achieved either with the widespread use of hormonal contraceptives and condoms, healthcare providers should also provide information on other factors that reduce these consequences of risky sexual behaviors, including religiosity and an intact family.²⁵

The purpose of this paper was to show the association between current contraceptive use in adolescents and health outcomes. The NFSG data from 2011-2013 has been used to demonstrate that adolescents and young adults who were never married and are currently using contraception were ten times more likely to have a sexually transmitted disease, and surprisingly seven times more likely to become pregnant, the very outcome that contraception is intended to prevent, compared to the non-contracepting group. This data also showed that users of contraception have significantly more male partners than their contraceptive naive counterparts and significantly earlier sexual debut. Protective factors such as importance of religion and being raised in an intact two-parent family were found to decrease the likelihood of sexual activity.

In light of the NFSG data, the claim that contraception is the best means of achieving reduced teen pregnancy rates, abortion rates, and sexually transmitted disease rates and of improving overall teen health needs to be seriously reconsidered. More efforts need to be given toward the total well-being of the adolescent, including spiritual well-being. Healthcare providers can also provide mental health for adolescents and their parents to help maintain intact families. Lastly, healthcare providers can be trained to provide

Adolescents,” *Pediatrics* 134/4 (2014): e1244-56; ; M.A. Ott, G.S. Sucato, P.K. Braverman, W.P. Adelman, E.M. Alderman, C.C. Breuner, D.A. Levine, A.V. Marcell, R.F. O'Brien, and AAP Committee on Adolescence, “Contraception for Adolescents: Technical Report,” *Pediatrics* 134/4 (2014): e1257-1281; R.E. Lawrence, K.A. Rasinski, J.D. Yoon, and F.A. Curlin, “Adolescents, Contraception, and Confidentiality: A National Survey of Obstetrician and Gynecologists,” *Contraception* 84/3 (2011): 259-65.

²⁵ Haglund and Fehring (2010).

a non-contraceptive milieu and support to the adolescent and their parents when contemplating contraception.

Table 1: Odds ratio (OR) of ever having had an abortion, STD, PID, and Pregnancy among Adolescents and Young Adults who are using contraception compared to Adolescents and Young Adults who Never Used the Pill as found in Cycle 8 of the NSFG.

| Health Risk Problem | Odds Ratio | 95% CI | <i>p</i> levels |
|----------------------------------------------------------|------------|------------------|-----------------|
| Abortion last 12 months | 10.50 | 4.07 – 27.07 | < .000* |
| | 1.69 | 1.60 – 1.77 | < .000 |
| Had a sexually transmitted disease in the past 12 months | 7.37 | 3.17 – 17.10 | < .000 |
| | 6.74 | 2.66 – 17.11 | < .000 |
| Ever been pregnant | 42.31 | 15.63 – 114.56 | < .000 |
| | 43.64 | 13.81 – 137.91 | < .000 |
| Ever had sexual intercourse with a male | 544.60 | 237.62 – 1247.60 | < .000 |
| | 489.51 | 197.04 – 1216.01 | < .000 |

* Abortion results need to be interpreted with a realization of under-reporting of having had an abortion among the participants

Table 2: Logistic regression of ever having had sex with a male by protective behavior among adolescents and young adults who are currently contracepting versus those that are not using any method of contraception as found in Cycle 8 of the NSFG.

| Protective Behaviors | Beta | Significance |
|------------------------|------|--------------|
| Contraception use | 6.60 | < .000 |
| | 6.18 | < .000 |
| Importance of religion | .51 | < .054 |
| | .50 | < .063 |
| Church attendance | .47 | < .085 |
| | .20 | < .471 |
| Intact family | .67 | < .004 |
| | .63 | < .005 |

Figure 1: Hazard Survival Curve. It shows differences in age of sexual debut between adolescents and young adults (15-21 Years Old) in the NSFG who currently use birth control versus those who never used the pill. The rising line shows the quick and early sexual debut among the adolescents on contraceptives compared with the slow and minimal line at the bottom rise of those adolescents and young adults not using contraception.

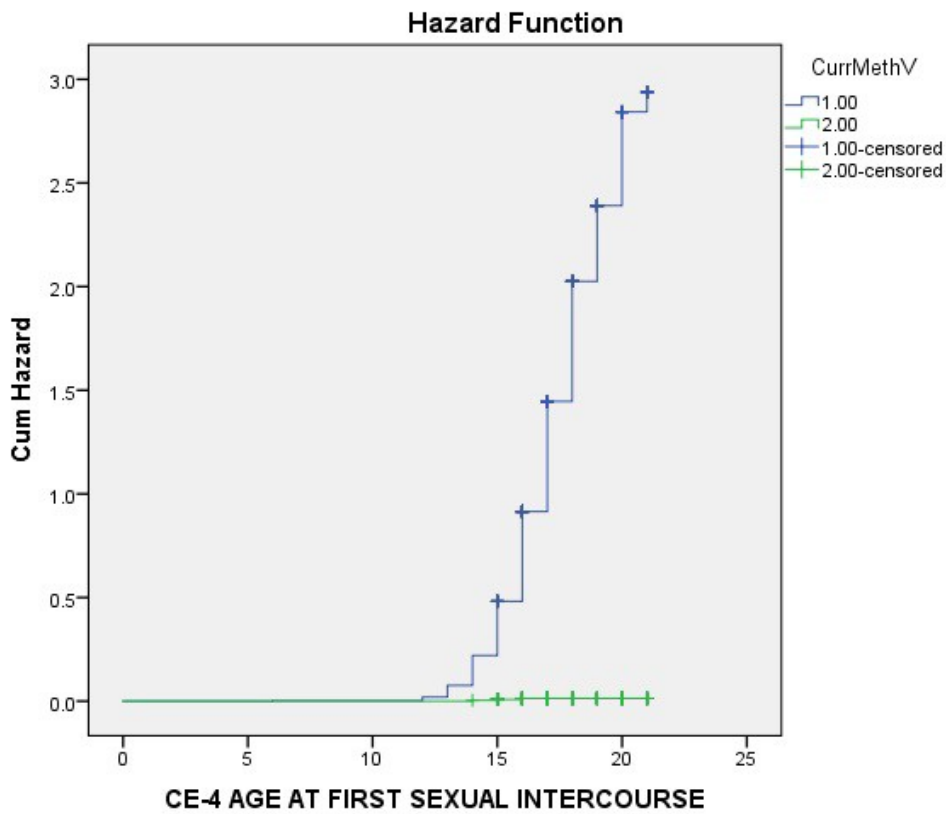


Figure 2: Hazard Survival Curve, showing differences in the age of sexual debut between adolescents and young adults (15-21 Years Old) in the NSFG who currently use birth control (but eliminating those who responded not in month of interview) versus those who never used the pill. The blue line shows the quick and early sexual debut among the adolescents on contraceptives compared with the slow and minimal green line rise of those adolescents and young adults not using contraception.

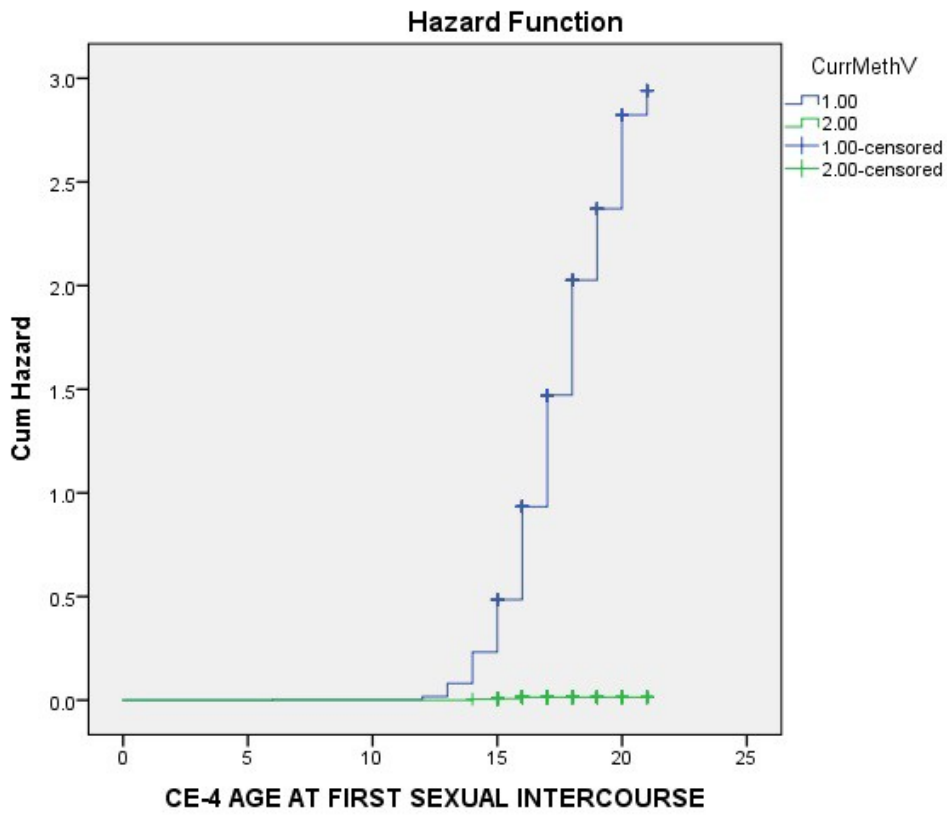


Figure 3: