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Understanding Adolescent Parenthood from a Multisystemic Perspective

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Abstract

PURPOSE—This study examined the associations between social, behavioral, and environmental factors and adolescent parenthood.

METHODS—We analyzed data from a subsample of participants, 18–30 years of age (N=7,937), who took part in the 2001–2002 National Epidemiologic Study on Alcohol and Related Conditions (NESARC), a nationally representative survey of adults. An extended Cox proportional hazards model was used to model time until becoming an adolescent parent (i.e., age at which first child was born if ≤ 18 years old). Predictor variables of interest included initiation of alcohol, marijuana, cocaine and daily use for smoking cigarettes, age of earliest conduct disorder symptom, having a parent with alcohol and/or drug problems, parental death, divorce and/or separation, race/ethnicity, and gender.

RESULTS—Several variables were associated with adolescent parenthood including initiation of daily cigarette smoking, age of first antisocial/conduct disorder symptom, and race/ethnicity. Parental alcohol/drug problems and parental death were also associated with adolescent parenthood for women. A significant interaction between initiation of daily cigarette smoking and ethnicity was present for women. Daily cigarette smoking was associated with adolescent parenthood to a greater degree than non-daily cigarette smoking for Caucasian and Hispanic women but not African American women. No significant associations were found between adolescent parenthood and initiation of drinking, marijuana, or cocaine and parental divorce/separation.

CONCLUSIONS—Prevention efforts should focus on adolescents who are at highest risk of adolescent parenthood.

Keywords

adolescent parenthood; substance use; adolescent health; sexuality education

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Introduction

Substance use and adolescent pregnancy often co-occur. This is likely due to the high prevalence of sexual risk behaviors (i.e., unplanned or unprotected sexual intercourse, multiple sexual partnerships, and earlier sexual debut) exhibited among substance-using adolescents [1–4]. Substance use patterns are also associated with adolescent parenthood, an outcome which occurs for the majority of adolescent pregnancies (four in seven end in live birth) and has more immediate and lasting social and financial consequences than adolescent pregnancies [5,6]. Early regular substance use (i.e., using cigarettes, alcohol, or cannabis at least monthly at age 15) has been linked to parenthood at age 25 or younger [7]. Similarly, youth who began smoking cigarettes by 13 years old were about four times more likely by grade 12 to experience early pregnancy and parenthood than nonsmokers [8]. To more adequately reflect the complexity of substance use behaviors and its association with adolescent parenthood we model exact age of substance use initiation across multiple substances in the present study.

Genetic effects are also related to the disinhibitory traits of individuals (i.e., sensation seeking, impulsivity, nonconformity) that place them at greater risk of violating social norms [9]. For instance, early conduct problems have been linked with higher rates of multiple sexual partnerships, early sexual debut, adolescent pregnancy, and substance use [10]. It may be that deviant problems at an early age predispose problems in adolescence such that pregnancy and parenthood at a young age is a manifestation of a tendency to problem behavior.

Adolescent parents often experience social disadvantage and childhood adversity prior to giving birth [11,12]. For instance, dysfunctional family dynamics aggravated by alcohol and drug use have been consistently linked with multiple deleterious emotional and behavioral problems in adolescent offspring that can increase the risk for unprotected sexual intercourse and early pregnancy [13]. Furthermore, tenuous relationships with family can result in a desire to gain power over one's current situation and escape personal difficulties [14,15], yearnings often correlated with adolescent parenthood [16].

In the study described here, we are guided by a multisystemic perspective of adolescent sexual risk-taking recently used by Kotchick et al. (2001) to underscore how factors from multiple systems of influence interact or combine with each other to affect sexual behavior and negative sexual outcomes. We hypothesize that social (i.e., gender, race/ethnicity), behavioral (i.e., age of substance use onset, antisocial/conduct problems), and environmental factors (i.e., stressful childhood events, parental alcohol and/or drug problems) are significantly linked to adolescent parenthood. We examined the relative contributions of different explanatory factors to clarify associations with adolescent parenthood in order to provide insights that will be applicable to prevention and policy activities aimed at deterring rates of adolescent parenthood.

Materials and Methods

Data Source

The analyses presented in this study utilized cross-sectional data from the 2001–2002 National Epidemiologic Study on Alcohol and Related Conditions (NESARC) [17]. Under contract and supervised by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), the US Census Bureau conducted face-to-face interviews with a multi-stage probability sample of 43,093 adults ages 18 and older (response rate of 81%). The purpose of the NESARC was to collect data on the prevalence of alcohol and drug use, abuse, and dependence as well as associated psychiatric and other medical conditions in the US adult population. Data were weighted to adjust for nonresponse at the household and person levels, the selection of one person per household, and over-sampling of young adults, African-Americans, and Hispanics. A detailed description of the survey methods, other quality control procedures, and test–retest

reliability tests has been documented [18]. The Washington University Human Research Protection Office determined that this project does not involve activities that are subject to Institutional Review Board oversight because the study relied on a publically available dataset.

In order for participants' data to be included in the statistical analyses, specific inclusion criteria were established. Because changes in the minimum legal drinking age have occurred over time, we examined only participants 18–30 years of age (n = 9,535 in the initial pool) at the time of their interview to correspond with an age group for whom the minimum legal drinking age was 21 years old across the country [19]. We also focused our analyses on Caucasian, African-American, and Hispanic samples, the three largest groups in the NESARC (n=8,976). Participants with missing data for our outcome of interest (n=112) and independent variables of interest (n=865) were excluded from the analysis. In addition, participants who reported initiating substance use before the age of eight (n=62) were excluded from the analysis because of concerns about the reliability of memory for earlier ages. These inclusion criteria resulted in 7,937 participants (3,475 men and 4,462 women). Participants aged 18–30 years excluded from the analysis due to missing data or reporting extremely young substance use were significantly more likely to be African American ($p < .001$) than those included in the analysis. No differences between the two groups were found in age (p=.764) or gender (p=.990).

Variables of Interest

In this study, age 18 was selected as the cutoff for adolescent parenthood because most of these adolescents have not yet graduated from high school and the consequences may be greater for adolescent parents who delay or do not complete high school [20]. Adolescent parenthood was assessed by the question "How old were you when your (FIRST) child was born or when your (FIRST) step, adopted or foster child began to live with you?" Most states have age restrictions for adoption and foster parents and do not permit individuals under the age of 21 to adopt and/or become foster parents [21]. Thus, we inferred that all or most adolescent parents assessed in the present study were biological.

Age at drinking onset was assessed by the question: "About how old were you when you first started drinking, not counting small tastes or sips?" Ages at marijuana and cocaine use onset were assessed by the question: "How old were you when you first used (name of drug category)?"

Cigarette onset during adolescence is common [22] and smoking cigarettes is often the first substance initiated by adolescents who later use alcohol, marijuana, and other drugs [23]. To measure a behavior more predictive of consequences associated with cigarette use, we opted to examine age when participant began smoking cigarettes daily assessed by the question, "About how old were you when you first started smoking cigarettes every day?"

To measure deviant problems prior to becoming an adolescent parent, we examined age when antisocial/conduct problems began. Participants were asked about specific behaviors related to antisocial personality disorder and conduct disorder including bullying, cruelty to people or animals, truancy, lying, or being arrested. The age of the earliest symptom was asked of participants when at least three antisocial/conduct problems were present; thus, meeting criteria for a diagnosis of antisocial personality disorder or conduct disorder was not necessary for information to be included. Of note, sexual promiscuity, adolescent pregnancy, or sexual debut are not symptoms of antisocial personality disorder or conduct disorder.

We included parental divorce and death of parent in our analyses to measure stressful events occurring before age 18 years. We examined the potential of living with foster parents and living in an institution, but the low number of people living with foster parents or in an institution (n=11) precluded the addition of these variables.

Lastly, family histories of alcohol and drug problems (any versus none) were based on respondents' reports as to whether their biological parents (father and/or mother) had ever "been an alcoholic or problem drinker," or had "problems with drugs".

Statistical Analysis

Descriptive statistics were used to summarize the data. The chi-square statistic was used to compare the proportion of adolescent parents by gender and race/ethnicity. We performed multivariable survival analyses predicting time to age of adolescent parenthood (≤18 years old) with the extended Cox proportional hazards regression model which allows for both time-independent and time-dependent predictors (independent variables).

The primary independent variables of interest were age at substance use initiation, onset of first antisocial/conduct problem, and age of parental divorce/separation or parental death. These variables were treated as time dependent covariates, with the values equal to 0 before they occurred and equal to 1 after they occurred. As a result, time dependent covariates are counted only if they occurred prior to the outcome of interest (adolescent parenthood). Participants who met the exposure criteria after the outcome of interest occurred are censored. The time-dependent variables were modeled using the counting process style of input (i.e. the Andersen-Gill Model). The time independent variables were parental history of alcohol/drug problems, gender, and race/ethnicity. Models were run separately for males and females because there is a large disparity of adolescent parenthood rates by gender and males misreport [24] or underreport information [25] about births more often than females. Proportional hazards assumptions were assessed using log-log survival curves. Two-way interactions were assessed among significant predictors in multivariable models. The Variance Inflation Factor (VIF) was used to assess multicollinearity among the independent variables.

Analyses were performed using SAS-Callable SUDAAN version 9.0.1, a software program that uses Taylor series linearization to adjust for complex sampling design effects of surveys like the NESARC [26]. We appropriately adjusted for nesting and weighting of the sample. For all analyses, $p<.05$ was considered statistically significant.

Results

Of the 18–30 year olds, 49.8% (95% Confidence Interval: 48.5 – 51.2%) were men and 50.2% (48.8 – 51.5%) were women. The racial breakdown for the male sample was 67.4% (63.4 – 71.1) Caucasian, 12.1% (10.5 – 13.8%) African American, and 20.6% (16.9 – 24.8%) Hispanic and for the female sample was 66.9% (62.3 – 71.1%) Caucasian, 14.8% (12.9 – 17.0%) African American, and 18.3% (14.5 – 22.9%) Hispanic. Table 1 summarizes additional demographic and other characteristics of the sample.

Adolescent Parenthood

The percentage of participants that became parents at age 18 or younger and were classified as "adolescent parents" was 9.4% (8.6 – 10.4%); 3.9% (3.2 – 4.7%) of men and 15.0% (13.5 – 16.5%) of women (men versus women, $p < .001$). A significantly larger percentage of women than men reported becoming adolescent parents across each race/ethnicity group (all $p < .001$), and the proportion who reported becoming adolescent parents differed by race/ethnicity for both males ($p < .001$) and females ($p < .001$). Among Caucasians, 2.4% (1.8 – 3.3%) of men and 10.7% (9.2 – 12.5%) of women were adolescent parents. There were 5.8% (4.0 – 8.2%) of men and 24.8% (21.5 – 28.5%) of women that were adolescent parents among African-Americans. Lastly, among Hispanics, 7.5% (5.3 – 10.4%) of men and 22.4% (19.5 – 25.6%) of women were adolescent parents.

Associations with Adolescent Parenthood

The overall model was significant for males (Wald χ^2 10 df = 8.13, $p < .001$). Onset of daily cigarette use was significantly associated with adolescent fatherhood (Hazard Ratio=3.0, 95% Confidence Interval 1.8 – 5.0, see Table 2). At any given time, the hazard of becoming an adolescent parent for a male adolescent who has begun daily smoking is 3.0 times the hazard for a male who has not begun daily smoking by that time. Onset of antisocial/conduct problems was significantly associated with adolescent fatherhood (1.8, 1.2 – 2.7). In addition, African American males became adolescent fathers at 3.4 (2.1 – 5.5) times the rate of Caucasian males while Hispanic males became adolescent fathers at 4.4 (2.7 – 7.1) times the rate. No significant associations were found between adolescent fatherhood and initiation of drinking, marijuana, or cocaine, parental alcohol/drug problems, parental divorce/separation, or parental death. No significant interactions were found.

The overall model was also significant for females (Wald χ^2 12 df = 19.65, $p < .001$). Onset of antisocial/conduct problems was significantly associated with adolescent motherhood (1.7, 1.4 – 2.1). In addition, parental alcohol/drug problems and parental death were significantly associated with adolescent motherhood (1.5, 1.2 – 1.8 and 1.4, 1.0 – 1.8, respectively). A significant interaction between ethnicity and initiation of daily cigarette use was found (Wald χ^2 2 df = 6.46, p =.009). No other significant interactions were found after adjusting for multiple comparisons. The Hazard Ratios and 95% confidence intervals for the different smoking status by ethnicity combinations were calculated using the beta coefficients, variances and covariance values from the model. Table 2 includes associations between adolescent parenthood and each ethnicity and smoking status group compared to non-daily smoking Caucasian females (reference group). Caucasian females who smoked daily became adolescent parents at 3.0 (2.1 – 4.2) times the rate of Caucasian females who did not smoke daily. Non-daily smoking African Americans and Hispanics became adolescent parents at a higher rate than non-daily smoking Caucasians (3.6, 2.8 – 4.8 and 3.2, 2.4–4.2, respectively). African American and Hispanic daily cigarette smokers became adolescent parents at a higher rate than non-daily smoking Caucasians (3.3, 2.0 – 5.5 and 5.5, 3.9 – 7.6, respectively). Initiation of daily cigarette use had a larger impact on the risk of adolescent parenthood for Caucasians and Hispanics than for the African Americans, which is apparent when comparing the risk of those who initiated daily cigarette smoking against those who had not initiated daily cigarette smoking by ethnic group status. There was no association with daily cigarette smoking and adolescent parenthood among African American females (3.6 for non-daily smokers versus 3.3 for daily smokers compared to the reference group). The hazard ratio was 0.9 (0.5 – 1.7) for African American females who initiated daily cigarette smoking when compared against African American females who had not initiated daily cigarette smoking. For Hispanic females who initiated daily cigarette smoking, the hazard ratio was 1.7 (1.1 – 2.7) when compared against Hispanic females who had not daily cigarette initiated smoking. Yet, Caucasian females who initiated daily cigarette smoking were 3.0 times (2.1 – 4.2) more likely to become adolescent parents than Caucasian females who had not initiated daily cigarette smoking. No significant associations were found between adolescent parenthood and onset of drinking, marijuana, or cocaine, and parental divorce/separation.

For both male and female models, variance inflation factor (VIF) tests of collinearity indicated no signs of collinearity (VIF was less than two in all cases) among the independent variables.

Discussion

The current study contributes to the literature on adolescent parenthood and substance use initiation in several important ways. First, a precise contribution of substance use initiation is identified by modeling exact age of initiation, a method that contrasts to the arbitrary and reductive dichotomy of “early” versus “later” initiation of substance use often found in past

research. We utilized the extended Cox proportional hazards model, which suggests the extent to which substance use initiation may accelerate the adolescents' time to parenthood relative to others who have not initiated the substance. The a hazard ratio presents a more dynamic approach to understanding the association between adolescent parenthood and substance use initiation than used in past studies. Finally, we utilized a nationally representative sample designed to facilitate generalization since past research is largely based on community and/or convenience samples.

We found that the effect of daily cigarette use is significantly associated with adolescent parenthood and it occurs before becoming an adolescent parent. This observed association might be linked by a number of commonalities including a trait of novelty seeking, a desire to alleviate a pervasive negative mood, increased family-child conflict, and/or a low motivation or ability to perform scholastically [27–31]. In addition, socioeconomically disadvantaged adolescents are exposed to a greater concentration of cigarette retailers and storefront cigarette advertising and tend to smoke more frequently; they are also more likely to experience early pregnancy and carry a pregnancy to term than affluent youth [32,33]. Thus, obtaining information on an adolescent's smoking status may be an efficient and effective way to identify youth at higher risk for adolescent parenthood. However, this intervention may be less effective for African American females since daily cigarette smoking initiation did not increase their risk for adolescent parenthood. This finding may reflect later patterns of smoking initiation, lower usage rates, and/or a weaker association between adolescent parenthood and deviant behavior for African American females [34].

Our results further revealed a similar risk of adolescent parenthood for participants endorsing antisocial/conduct problems. Like daily cigarette use at an early age and becoming an adolescent parent, it may be that behavioral problems during youth mark other processes that promote deviance and other risk-taking behaviors which deviate from social norms. Early pregnancy is more likely among youth with antisocial/conduct problems [10] and adolescent parenthood might be viewed positively, as an opportunity to improve social isolation and receive love, attention, and recognition [35].

Additional ethnic differences in the risk for becoming an adolescent parent must be noted. It may be that ethnic minority group status is a proxy for socio-economic status or social class. As well, the observed differences in adolescent parenthood may emerge from social and cultural understandings of what is appropriate for and expected of members of different ethnic groups.

Parental alcohol and/or drug problems and parental death during childhood were also associated with becoming an adolescent parent for women only. Family instability is linked to environmental factors that can cause stress and/or provoke behavioral problems of adolescents, including early and unprotected sexual activity [36,37]. We did not examine the perceptions of adolescent mothers; however, qualitative studies have found that adolescent mothers viewed the birth of their child as helping them to achieve independence, improve negative family situations, and become closer to their male partners when parental support was lacking [35]. These desires or an inability to choose otherwise can increase the likelihood of adolescent parenthood when early pregnancy occurs.

The findings of this study were limited by several factors. NESARC does not provide information on potential explanatory variables such as social class, family structure, and/or relationships with friends or intimate partners that are needed for more in-depth analyses. Current income and educational attainment were not included in the analyses because they correspond with indications of socioeconomic status after becoming an adolescent parent. We used participants' recollection of historic information and some error is likely. Adolescent

pregnancy was not available as an outcome variable to measure; therefore, we were unable to examine if patterns differed between those who experienced adolescent pregnancy but not parenthood versus those who became adolescent parents. Moreover, we did not differentiate between unwanted pregnancies versus planned pregnancies (due to their unavailability in the dataset) nor did we remove married adolescent parents from the analyses; however, past studies report that almost all of adolescent pregnancies are unintended (78–95%) and the majority end in live birth (four in seven) [5]. Lastly, we were not able to determine the exact timeframe when parents' alcohol or drug problems occurred because this information was not collected in the NESARC and they might have occurred after becoming an adolescent parent.

Despite the limitations of the study, the implications that are derived are significant. Our findings suggest the utility of targeting youth who have a history of behavioral problems for more intensive interventions to prevent adolescent parenthood. We examined conduct and antisocial behavioral problems which encompass a wide range of problem behaviors, including cruelty to people or animals, lying, truancy, and destroying property. We used a low threshold for incorporating behavioral problems in our analyses by requiring only three symptoms, and 30% of females and 45% of males met these criteria. A clinical diagnosis of conduct disorder or antisocial personality disorder includes more deviant behavior and is much less common in the population; 1.5% (1.3 – 1.9%) of our sample met clinical criteria for a conduct disorder diagnosis and 6.2% (5.5 – 7.0%) met clinical criteria for a diagnosis of antisocial personality disorder. Yet, even at this low threshold of only three symptoms endorsed from either conduct disorder or antisocial personality disorder, we see an increased risk associated with adolescent parenthood. Adolescent parenthood most likely represents a consequence of many underlying behavior issues, and it is concerning because adolescent parents with conduct and/or antisocial problems are potentially least prepared for positive parenting roles.

Daily cigarette smoking which is initiated in adolescence is another marker for adolescent pregnancy and parenthood. Because parental smoking has adverse consequences for infants and children, this finding is concerning. Though our work does not directly address the issue of whether the adolescent parents continued to smoke cigarettes during pregnancy and after the birth of the child, the finding raises public health concerns because of the negative health effects for the infant.

Our work does not support the independent role of alcohol, marijuana, or cocaine initiation in adolescent parenthood that has been previously reported. This is likely due to our inclusion of confounding variables (i.e., age of initiation of daily cigarette use, parental alcoholism, and onset of behavioral problems) which have a stronger association with adolescent parenthood. As well, modeling an exact age of substance use initiation as we did in the study described here might be a more appropriate way to delineate significant associations with adolescent parenthood than alternative methods used in past studies (i.e., arbitrary and reductive dichotomy of "early" versus "later" initiation). Thus, we believe that the association of adolescent parenthood and substance use found in past reports are better explained by underlying behaviors of smoking and antisocial/conduct problems.

In terms of prevention, parents and other influential persons (i.e., school guidance counselor, primary care physician, etc.) should discuss safe sex practices with all adolescents. Additionally, our study delineated factors that are associated with increased risk for adolescent parenthood including daily cigarette smoking, racial/ethnic minority status, antisocial/conduct disorder symptoms, and family instability (death of a parent or alcohol/drug problems for one or more parents). Thus, not all adolescents are equally at risk for adolescent parenthood and prevention efforts should understand the factors that increase risk as part of a comprehensive strategy for reducing this outcome.

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References

1. Hingson R, Heeren T, Winter MR, et al. Early age of first drunkenness as a factor in college students' unplanned and unprotected sex attributable to drinking. Pediatrics 2003 Jan;111(1):34–41. [PubMed: 12509551]
2. Hanna EZ, Yi HY, Dufour MC, et al. The relationship of early-onset regular smoking to alcohol use, depression, illicit drug use, and other risky behaviors during early adolescence: results from the youth supplement to the third national health and nutrition examination survey. J Subst Abuse 2001;13(3): 265–282. [PubMed: 11693451]
3. Buston K, Williamson L, Hart G. Young women under 16 years with experience of sexual intercourse: who becomes pregnant? J Epidemiol Community Health 2007 Mar;61(3):221–225. [PubMed: 17325399]
4. Cavazos-Rehg PA, Spitznagel EL, Bucholz KK, et al. The relationship between alcohol problems and dependence, conduct problems and diagnosis, and number of sex partners in a sample of young adults. Alcoholism: Clinical and Experimental Research 2007;31(12):2046–2052.
5. Ventura SJ, Freedman MA. Teenage childbearing in the United States, 1960–1997. Am J Prev Med 2000 Jul;19(1 Suppl):18–25. [PubMed: 10863126]
6. Finer LB, Henshaw SK. Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. Perspect Sex Reprod Health 2006 Jun;38(2):90–96. [PubMed: 16772190]
7. Woodward LJ, Fergusson DM, Horwood LJ. Gender differences in the transition to early parenthood. Dev Psychopathol 2006 Winter;18(1):275–294. [PubMed: 16478563]
8. Ellickson PL, Tucker JS, Klein DJ. High-risk behaviors associated with early smoking: results from a 5-year follow-up. J Adolesc Health 2001 Jun;28(6):465–473. [PubMed: 11377990]
9. Iacono WG, McGue M. Minnesota Twin Family Study. Twin Res 2002 Oct;5(5):482–487. [PubMed: 12537881]
10. Woodward LJ, Fergusson DM. Early conduct problems and later risk of teenage pregnancy in girls. Dev Psychopathol 1999 Winter;11(1):127–141. [PubMed: 10208359]
11. Hillis SD, Anda RF, Dube SR, et al. The association between adverse childhood experiences and adolescent pregnancy, long-term psychosocial consequences, and fetal death. Pediatrics 2004 Feb; 113(2):320–327. [PubMed: 14754944]
12. Furstenberg, FF., Jr; Brooks-Gunn, J.; Morgan, SP. Adolescent mothers in later life. Cambridge, England: Cambridge University Press; 1987.
13. Committee on Substance Abuse. Alcohol Use and Abuse: A Pediatric Concern. Pediatrics July 1;2001 108(1):185–189. [PubMed: 11433075]
14. Turner RJ, Lloyd DA. Lifetime traumas and mental health: the significance of cumulative adversity. J Health Soc Behav 1995 Dec;36(4):360–376. [PubMed: 8719054]
15. SmithBattle L. "I wanna have a good future" - Teen mothers' rise in educational aspirations, competing demands, and limited school support. Youth & Society 2007 Mar;38(3):348–371.
16. Musick, JS. The Psychology of Teenage Motherhood. New Haven: Yale University Press; 1993. Young, Poor, and Pregnant.
17. Grant BF, Stinson FS, Dawson DA, et al. Co-occurrence of 12-month alcohol and drug use disorders and personality disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. Arch Gen Psychiatry 2004 Apr;61(4):361–368. [PubMed: 15066894]

18. Grant, BF.; Moore, TC.; Shepard, J.; Kaplan, K. Source and accuracy statement: Wave 1 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2003.
19. Wagenaar AC, Toomey TL. Effects of minimum drinking age laws: review and analyses of the literature from 1960 to 2000. J Stud Alcohol Suppl 2002 Mar;14:206–225. [PubMed: 12022726]
20. Cheeseman-Day JJA. School enrollment. 2000
21. Gateway, CWI. Services USDoHaH. Who may adopt, be adopted, or place a child for adoption. Washington, DC: 2006.
22. Eaton DK, Kann L, Kinchen S, et al. Youth risk behavior surveillance--United States, 2007. MMWR Surveill Summ 2008 Jun 6;57(4):1–131. [PubMed: 18528314]
23. Kandel D, Yamaguchi K. From beer to crack: developmental patterns of drug involvement. Am J Public Health 1993 Jun;83(6):851–855. [PubMed: 8498623]
24. RIL. A national profile of young unwed fathers. In: Lerman, RIOT., editor. Young Unwed Fathers Changing Roles and Emerging Policies. Philadelphia: Temple University Press; 1993. p. 26-51.
25. Rendall MS, Clarke L, Peters HE, et al. Incomplete reporting of men's fertility in the United States and Britain: a research note. Demography 1999 Feb;36(1):135–144. [PubMed: 10036598]
26. Shah, BVBG.; Bieler, GS. The SUDAAN User's Manual, Release 7.5. Research Triangle Park, NC: Research Triangle Institute; 2002.
27. Flay BR, Hu FB, Richardson J. Psychosocial predictors of different stages of cigarette smoking among high school students. Prev Med 1998 Sep–Oct;27(5 Pt 3):A9–18. [PubMed: 9808813]
28. Spivak H, Weitzman M. Social Barriers Faced by Adolescent Parents and Their Children. Jama-Journal of the American Medical Association 1987 Sep 18;258(11):1500–1504.
29. Savitz D, Dole N, Henderson L, et al. Socioeconomic status, race, and pregnancy outcome. American Journal of Epidemiology 1999 Jun 1;149(11):S28–S28.
30. Markovitz BP, Cook R, Flick LH, et al. Socioeconomic factors and adolescent pregnancy outcomes: distinctions between neonatal and post-neonatal deaths? Bmc Public Health 2005 Jul;25(5)
31. Mayhew KP, Flay BR, Mott JA. Stages in the development of adolescent smoking. Drug and Alcohol Dependence 2000 May 1;59:S61–S81. [PubMed: 10773438]
32. Yang S, Lynch J, Schulenberg J, et al. Emergence of socioeconomic inequalities in smoking and overweight and obesity in early adulthood: the national longitudinal study of adolescent health. Am J Public Health 2008 Mar;98(3):468–477. [PubMed: 18235067]
33. Laws MB, Whitman J, Bowser DM, et al. Tobacco availability and point of sale marketing in demographically contrasting districts of Massachusetts. Tob Control 2002 Jun;11(Suppl 2):ii71–73. [PubMed: 12034986]
34. Blum RW, Beuhring T, Shew ML, et al. The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. Am J Public Health 2000 Dec;90(12):1879–1884. [PubMed: 11111260]
35. Herrman JW. Adolescent perceptions of teen births. J Obstet Gynecol Neonatal Nurs 2008 Jan–Feb; 37(1):42–50.
36. Latendresse SJ, Rose RJ, Viken RJ, et al. Parenting mechanisms in links between parents' and adolescents' alcohol use behaviors. Alcohol Clin Exp Res 2008 Feb;32(2):322–330. [PubMed: 18162066]
37. Obot IS, Wagner FA, Anthony JC. Early onset and recent drug use among children of parents with alcohol problems: data from a national epidemiologic survey. Drug Alcohol Depend 2001 Dec;Jan; 65(1):1–8. [PubMed: 11714584]

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Table 1

Demographic, social, behavioral, environmental characteristics and adolescent parenthood, 18–30 year olds, 2001–2002 NESARC (N=7,937)

		Males (n=3,475)		Females (n=4,462)	
Variable	**Weighted:**	**%**	**95% CI**	**%**	**95% CI**
Age, years					
18–19		17.7	16.2 – 19.4	15.4	14.1 – 16.8
20–25		44.8	42.8 – 46.9	47.3	45.4 – 49.2
26–30		37.5	35.2 – 39.7	37.3	35.3 – 39.4
Race					
Caucasian		67.4	63.4 – 71.1	66.9	62.3 – 71.1
African American		12.1	10.5 – 13.8	14.8	12.9 – 17.0
Hispanic		20.6	16.9 – 24.8	18.3	14.5 – 22.9
Adolescent parenthood by race					
Caucasian		2.4	1.8 – 3.3	10.7	9.2 – 12.5
African American		5.8	4.0 – 8.2	24.8	21.5 – 28.5
Hispanic		7.5	5.3 – 10.4	22.4	19.5 – 25.6
Age of adolescent parenthood by race, mean					
Caucasian		17.3	17.1 – 17.6	17.1	16.9 – 17.2
African American		17.2	16.8 – 17.6	16.6	16.4 – 16.8
Hispanic		17.3	16.9 – 17.6	16.8	16.7 – 17.0
Substance use					
Drinking					
Initiated through age 18		58.6	56.5 – 60.8	46.7	44.3 – 49.1
Age of initiation, mean		16.3	16.2 – 16.4	16.5	16.4 – 16.6
Daily smoking					
Initiated through age 18		25.1	23.1 – 27.2	22.7	20.8 – 24.7
Age of initiation, mean		16.0	15.8 – 16.1	15.7	15.6 – 15.9
Marijuana					
Initiated through age 18		25.2	23.3 – 27.1	18.5	16.8 – 20.3
Age of initiation, mean		15.6	15.4 – 15.8	15.7	15.5 – 15.9
Cocaine					
Initiated through age 18		3.9	3.1 – 4.9	2.0	1.5 – 2.6

Variable	Weighted:	Males (n=3,475) %	Males (n=3,475) 95% CI	Females (n=4,462) %	Females (n=4,462) 95% CI
Age of initiation, mean		16.7	16.4 – 17.1	16.3	15.9 – 16.7
First antisocial/conduct disorder symptom					
First symptom through age 18		39.0	36.6 – 41.5	26.3	24.5 – 28.2
Age of first symptom, mean		13.9	13.7 – 14.1	14.1	13.9 – 14.3
Alcohol/drug problems for one or more parents		24.8	22.8 – 26.8	30.5	28.7 – 32.4
Parental divorce/separation by age 18		24.8	23.0 – 26.7	23.8	22.3 – 25.4
Age divorce/separation occurred, mean		8.5	8.1 – 8.9	8.0	7.7 – 8.3
Parental death by age 18		4.6	3.9 – 5.5	6.4	5.6 – 7.3
Age divorce/separation occurred, mean		9.4	8.5 – 10.3	10.4	9.7 – 11.0

Table 2

Multivariable extended Cox proportional hazards model of predictors of time to adolescent parenthood (≤ 18 years old)

	Males[a]		Females[a]	
	aHR	**95% CI**	**aHR**	**95% CI**
Ethnicity				
Caucasian	1.0			
African American	3.4	2.1 – 5.5		
Hispanic	4.4	2.7 – 7.1		
Initiation of daily cigarette use [b]				
No	1.0			
Yes	3.0	1.8 – 5.0		
Initiation of daily cigarette use by race [b,c]				
Caucasian, no			1.0	
Caucasian, yes			3.0	2.1 – 4.2
African American, no			3.6	2.8 – 4.8
African American, yes			3.3	2.0 – 5.5
Hispanic, no			3.2	2.4 – 4.2
Hispanic, yes			5.5	3.9 – 7.6
Initiation of drinking[b]				
No	1.0		1.0	
Yes	1.0	0.6 – 1.6	0.8	0.6 – 1.1
Initiation of marijuana use[b]				
No	1.0		1.0	
Yes	1.0	0.6 – 1.7	0.8	0.6 – 1.1
Initiation of cocaine use[b]				
No	1.0		1.0	
Yes	1.3	0.5 – 3.2	0.7	0.4 – 1.3
First antisocial/conduct disorder symptom[b]				
No	1.0		1.0	
Yes	1.8	1.2 – 2.7	1.7	1.4 – 2.1
Alcohol/drug problems for one or more parents				
No	1.0		1.0	
Yes	1.1	0.7 – 1.7	1.5	1.2 – 1.8
Parental divorce/separation[b]				
No	1.0		1.0	
Yes	1.2	0.8 – 2.0	1.1	0.9 – 1.4
Parental death[b]				
No	1.0		1.0	
Yes	0.8	0.3 – 2.6	1.4	1.0 – 1.8

[a] Participants with missing data for variables in the model were excluded.

The model for males included 148 adolescent fathers and 3,327 who were not adolescent fathers.

The model for females included 837 adolescent mothers and 3,625 who were not adolescent mothers.

[b] Time dependent covariates

[c] Interaction of ethnicity and initiation of cigarette use was significant (Wald X^2 6.46, df 2, p =.009).