



Review article

Sex and substance use behaviors among children of teen mothers: A systematic review

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ABSTRACT

Introduction: Adolescent birth is a known correlate of many challenging behavioral health consequences for offspring. This systematic review seeks to understanding the sex and substance use behaviors of children born to teen mothers extending the body of literature on the long-term outcomes of being born to a teen mother.

Methods: A systematic approach, in accordance with PRISMA guidelines, was used to review and identify eligible studies in the following electronic databases: Web of Science, ProQuest, PubMed, and Ovid MEDLINE. Study inclusion: (a) maternal age (> 20) was the key predictor or group variable and (b) children's risky sexual or substance use behaviors were outcome variables. All articles meeting inclusion criteria were next screened using the quality assessment tool created by the Effective Public Health Practice Project.

Results: Seventeen articles reporting on risky sexual behaviors and 12 articles on substance use behaviors met inclusion criteria. We found a consistent association between being born to a teen mother and risky sexual behaviors, including early sexual debut and transitioning into motherhood during adolescence/young adulthood. The link between being born to a teen mother and substance use behaviors was inconsistent and only found in large population-based studies.

Conclusion: Teen mothers and their children have unique individual, family, and structural needs. Evidence highlights that while there is no clear need to adapt substance use prevention interventions for these children, investing in targeted adaptations of abstinence and safer sex interventions to meet the unique experiences of children of teen mothers and their children is warranted.

1. Introduction

Approximately 230,000 births to teens occur each year in the United States Center for Disease Control [CDC], 2019); most of these births are unplanned (Clear, Williams, & Crosby, 2012). Adolescent birth is a known correlate of many challenging behavioral health consequences for offspring (Gibbs, Wendt, Peters, & Hogue, 2012); these risks are the result of a confluence of factors (Meade, Kershaw, Ickovics, 2008), including selection into teen parenting (Hoffman, 2015; Mollborn, 2017) and influence of teen child-bearing on mother's educational and socioeconomic status over time (Diaz & Fiel, 2016; Mollborn, 2017). Although meta-analyses

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and systematic reviews have explored the links between early motherhood and childhood development (Meade et al., 2008), many risky behaviors impacted by early adversities do not appear until later developmental stages. To date, no identified study has systematically considered the association between teen motherhood and the sexual risk and substance use behaviors of their offspring. Using a problem behavior theory (Donovan & Jessor, 1985) as a guiding theoretical framework, this systematic review seeks to understand the behaviors of children born to teen mothers (during adolescence and emerging adulthood) and thus will extend the body of literature on the long-term outcomes of being born to a teen mother (Baudry, Tarabulsy, Atkinson, Pearson, & St-Pierre, 2017).

Being born to a teen mother is associated with negative outcomes at birth (e.g., low birth weight; Gibbs et al., 2012; Schummers et al., 2019) and into early and middle childhood (e.g., academic achievement & developmental outcomes; Baudry et al., 2017; Duncan, Lee, Rosales-Rueda, & Kalil, 2018). While less frequently studied, prior work has found that even into adolescence/early adulthood, there are differences in developmental outcomes for children born to teen mothers, including greater drinking expectations and risky sexual behaviors during adolescence (De Genna, Goldschmidt, & Cornelius, 2015; Hendrick & Maslowsky, 2019).

While often studied independently, sexual debut and initiation of substance use behaviors share several overlapping early risk factors. Consistent with problem behavior theory highlighting the common variance among alcohol use, drug use, and sexual intercourse (Donovan & Jessor, 1985), a meta-analysis showed a persistent relationship between sexual intercourse and substance use behaviors among adolescents (Ritchwood, Ford, DeCoster, Sutton, & Lochman, 2015). Given the overlapping links between factors that lead to both early sexual risk and substance use behaviors, this systematic review examines both behaviors among children of teen mothers.

1.1. Current study

Although a robust body of literature reports risk of teen pregnancy and challenges of early parenting, few studies have examined the impact of being born to a teen parent in later life. Because adolescence (Zucker, 2008) and young adulthood (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2017) are developmental periods featuring increased risky behaviors, understanding factors that influence initiation is critical to reducing early engagement in sex and substance use behaviors. This study explored the influence of being born to a teen mother on sex and substance use risk engagement among adolescents and emerging adults. Understanding these intergenerational patterns could allow clinicians and researchers to identify targeted intervention points to increase positive development among children of teen mothers.

2. Methods

2.1. Study identification

We conducted a systematic approach, in accordance with the PRISMA guidelines (Liberati et al., 2009), to review studies for inclusion. To identify relevant studies, we searched the widely used multidisciplinary databases: Web of Science, ProQuest – Multiple Databases, PubMed, and Ovid MEDLINE. The search was restricted to English language publications; because no prior review work has focused on these two specific outcomes, no date restriction was imposed. In our first search, we included keywords related to teen parenting and children of teen mothers: “teen childbearing,” “teen parenthood,” “maternal age,” “children of teen mother,” “children of young mothers,” “children born to teen mothers,” “adolescent parents,” “teenage birth,” “teenage mothers,” “adolescent mother,” “early childbearer,” and “age at first birth.” For risky sexual behaviors, key words included: “risky sex,” “sexual partner,” “sexual activity,” “risky sexual behavior,” “sexually transmitted diseases or infections,” “intergenerational patterns of early childbearing,” “patterns of early motherhood,” “sexual intercourse,” and “daughter's age at first birth.” Last, for substance use, the search terms included: “substance use,” “alcohol,” “drinking,” “smoking,” “cigarette,” “marijuana,” “cannabis,” “drug,” and “drug use.” We completed the initial search in February 2015 with updates in August of 2017 and April 2019.

2.2. Screening

Studies were included for review if they met the following criteria: (a) maternal age was the key predictor or group variable and (b) children's risky sexual or substance use behaviors were among the outcome variables. The initial search process was limited to a review of the title and abstract. We excluded duplicate citations and studies that included maternal age as a control variable without reporting its associated coefficient. Further, we screened the reference lists of the initially selected articles to identify additional articles that could meet study criteria.

2.3. Eligibility

We created a standardized coding form to extract relevant information. Based on the coding form, an author (CY) extracted key information from the included studies: (a) study characteristics (authors, years, publication types); (b) sample characteristics (age, gender, sample sizes); (c) outcome measures (question and response categories); (d) maternal age (categorization of teen mothers); (e) analytic approaches (data type, covariates) and (e) reported results. A second author (CJ) reviewed extracted data. When disagreements occurred between the data extracted and reviewed by the two authors, they were resolved through discussion with the study team, particularly the first (JC) and last (JOL) authors.

Table 1
Characteristics of reviewed studies – sexual risk.

N = 17	Number (%)
<i>Study Design</i>	
Cross-sectional	3 (17.65)
Longitudinal	14 (82.35)
<i>Sample Size</i>	
< 1,000	4 (23.52)
1,000–1,999	6 (35.30)
2,000–4,999	1 (5.90)
5,000 +	6 (35.30)
<i>Racial/Ethnic Distribution of Sample</i>	
> 50% Racial/Ethnic Minority	5 (29.40)
> 50% White	8 (47.10)
Not Reported	4 (23.50)
<i>Female</i>	
> 50%	8 (47.10)
≤ 51%	6 (35.30)
Not Reported	3 (17.65)
<i>Defining Teen Mother</i>	
< 19	2 (11.76)
< 20	10 (58.84)
Multiple teen mom grouping	5 (29.40)
<i>Recruitment</i>	
National survey	14 (82.35)
Community	3 (17.65)
<i>Study Country</i>	
United States	12 (70.55)
United Kingdom	3 (17.65)
New Zealand	1 (5.90)
Norway	1 (5.90)
<i>Study outcome^a</i>	
Sex debut before age 16	6 (35.3)
Use of birth control	2 (11.76)
Pregnancy expectations	1 (5.90)
Frequency of sexual intercourse	1 (5.90)
Number of partners	1 (5.90)
Birth before age 18	1 (5.90)
Birth before age 19	2 (11.76)
Birth before age 20	10 (58.82)

^a Some studies collected more than one outcome; therefore percent exceeds 100.

2.3.1. Quality assessment

All studies meeting inclusion criteria were next screened using the quality assessment tool for quantitative studies created by the Effective Public Health Practice Project, which designates 8 domains for review (selection bias, study design, confounders, blinding, data collection methods, withdrawals and dropouts, intervention integrity, and analysis; Armijo-Olivo, Stiles, Hagen, Biondo, & Cummings, 2012). This provided a structured framework for identifying study strengths and limitations. The first (JC) and last (JOL) authors independently reviewed the selected studies. Discrepancies in evaluation between the two reviewers were discussed and consensus reached. Among the included studies (n = 22), 55% (n = 12) were rated to have strong quality, 41% (n = 9) to have moderate quality, and 5% (n = 1) to have weak quality.

2.4. Analysis of included studies

Studies focusing on sexual risk were grouped by three categories—sexual debut (initiation of sexual intercourse), risky sexual behaviors, and teen birth (Table 1). Studies investigating substance use are presented as substance use behavior and then its attendant pathology, dependence or abuse (Table 2).

3. Results

As shown in Fig. 1, the initial search generated 671 records of risky sexual behaviors and 769 records of substance use. After excluding duplicate citations and irrelevant records based on the title and abstract review (most dropped because not specific to children born to teen mothers), 25 records of risky sexual behaviors and 13 records of substance use were eligible for review.

In the process of review, nine of the 26 risky sexual behavior articles (35%) and one of the 13 articles of substance use (8%) were excluded. The nine sexual risk studies were excluded for the following reasons: (a) three studies ran models with maternal age as continuous (not allowing for a comparison of teen vs. nonteen mothers); (b) one study was not peer reviewed; (c) one study was a

Table 2
Characteristics of reviewed studies – substance use.

N = 12	Number (%)
<i>Study Design</i>	
Cross-sectional	2 (17)
Longitudinal	10 (83)
<i>Sample Size</i>	
< 1,000	3 (25)
1,000–1,999	5 (42)
2,000–4,999	0 (0)
5,000 +	4 (33)
<i>Racial/Ethnic Distribution of Sample</i>	
> 50% Black	3 (25)
> 50% White	5 (42)
Not Reported	4 (33)
<i>Female</i>	
> 50%	6 (50)
≤ 51%	3 (25)
Not Reported	3 (25)
<i>Defining Teen Mother</i>	
≤ 18	1 (8)
< 20	6 (50)
Multiple teen mom grouping	5 (42)
<i>Recruitment</i>	
National survey	4 (33)
Population	5 (42)
Community	3 (25)
<i>Study Country</i>	
United States	5 (42)
Sweden	2 (17)
United Kingdom	1 (8)
New Zealand	1 (8)
Australia	2 (17)
Denmark	1 (8)
<i>Study outcome^a</i>	
Substance-related hospitalization	2 (17)
DSM Abuse/Dependence: Nicotine	2 (17)
DSM Abuse/Dependence: Alcohol	2 (17)
DSM Abuse/Dependence: Cannabis	2 (17)
DSM Abuse/Dependence: Illicit Drugs	2 (17)
ICD-10-DCR: Alcohol Use	1 (8)
ICD-10-DCR: Cannabis Use	1 (8)
Smoke at least 1 cigarette daily	2 (17)
Smoked Cannabis is last 30 days	1 (8)
Smoked Cannabis in last year	1 (17)
Monthly alcohol use	1 (8)
Monthly cannabis use	1 (8)
Alcohol use frequency	1 (8)
Cannabis use frequency	1 (8)

^a Some studies collected more than one outcome; therefore percent exceeds 100.

dissertation, a duplicate of a published study; (d) one study did not clearly explicate maternal age at first birth; (e) one study ran models in which being born to a teen mother or having a teen sister were both included (unable to disaggregate); (f) one study did not include teen mothers; and (g) one study focused on premarital birth, not teen birth specifically. The excluded substance use article set maternal age of first birth at less than or equal to 26 years (including teen and young adult mothers in one group). Thus, the final systematic review included 17 studies of risk sexual behaviors (see Table 3) and 12 studies of substance use (see Table 4).

3.1. Sexual risk

3.1.1. Sexual debut

Five of the 17 papers (35.3%) examined sexual debut; all noted differences in sexual debut by maternal age at offspring's birth

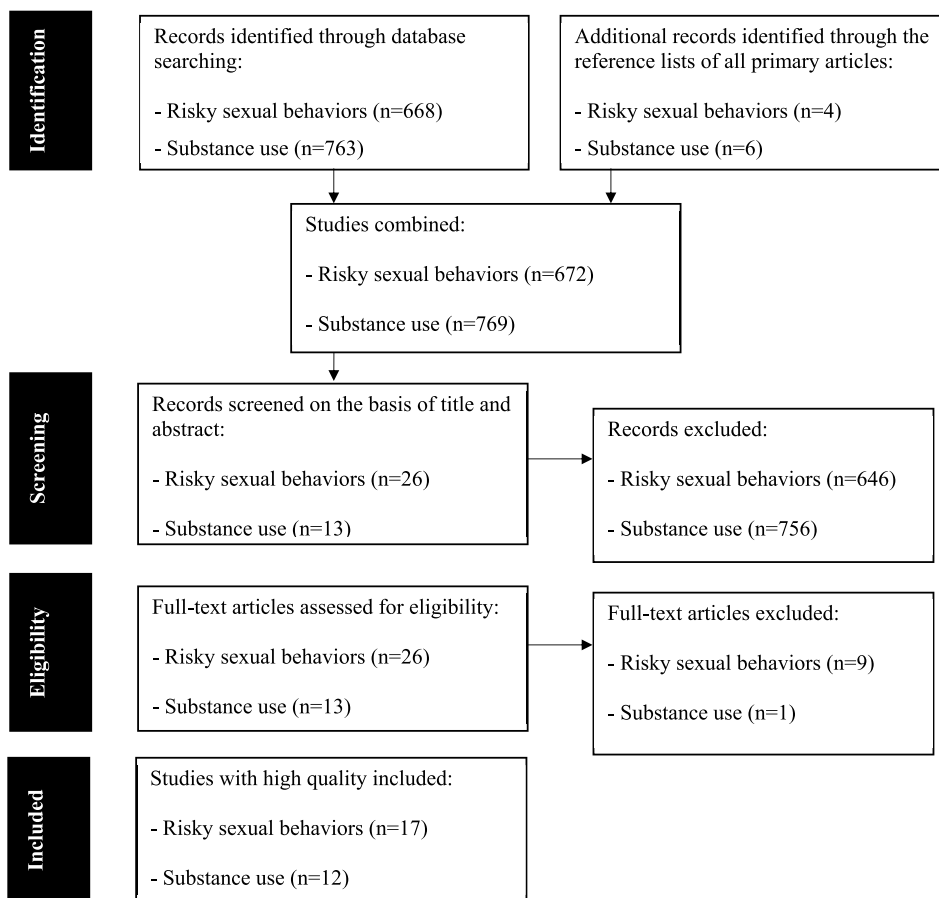


Fig. 1. Flow diagram of study selection.

(teen vs. nonteen mother). Eshbaugh (2008) noted that children of teen mothers were 1.86 times ($p < .01$) more likely to report debut by age 16; other covariates associated with early sexual debut were male (vs. female), lower maternal education, lower socioeconomic status (SES), living with one (vs. two) parent, and being African American. Levine and colleagues (Levine, Emery, & Pollack, 2007; Levine, Pollack, & Comfort, 2001) found a graded relationship between maternal age at child’s birth and likelihood of debut— compared to older parents, youth born to a mother aged 16 years or younger and those born to moms 17 or 18 years were 9.14 times ($p < .01$) and 6.46 times ($p < .05$), respectively, more likely to report sexual debut before age 16 (Levine et al., 2001). The only other covariate associated with sexual debut was self-identifying as African American. Later work by Levine et al. (2007) found similar results; youth born to mothers 16 years or younger were 3.30 times ($p < .01$) and those both to mothers aged 17 or 18 years 2.14 times ($p < .05$) more likely than peers born to older mothers, to report debut before age 16. No other covariates predicted early sexual debut. Gender differences have been also reported, although evidence is mixed for which gender is more impacted— the effect was stronger for sons in one study (Eshbaugh, 2008) and daughters in another (Manlove, Ikramullah, Mincieli, Holcombe, & Danish, 2009).

3.1.2. Birth control, frequency of intercourse, and sexual partners

Four studies (23.5%) examined issues of contraception use and partnering behaviors that place adolescents with teen mothers at risk for unplanned pregnancy. While three of the studies found no differences in use of birth control or frequency of intercourse by maternal age at adolescent’s birth (Eshbaugh, 2008; Manlove et al., 2009; Zimmerman et al., 2001), Hendrick and Maslowsky (2019) found that 32% (vs. 19%) of adolescents born to teen mothers reported unprotected sex. Other factors associated with reporting unprotected sex were lower academic aptitude, younger age at first sex, and parental monitoring (for delayed sexual debut only). Also, in a cohort of Black adolescent boys with and without teenage mothers, Zimmerman (2001) found that those born to mothers 18 or 19 years reported more partners than those born to non-teen mothers ($F = 4.61; p < .05$); no other covariates were associated with outcomes of interest. While having a teen mother was not a significant predictor in most studies, other factors did influence these outcomes. Eshbaugh (2008) reported that adolescents who reported birth control use at first sex were more likely to be female, have mothers with higher levels of education, have smaller household sizes, self-identify as African American, and individuals reporting later sexual debut. Manlove et al. (2009) also reported a number of demographic predictors of increased likelihood of contraceptive use at first sex, including race (Hispanic youth were least likely), menarche after age 12, higher parental education, and

Table 3
Studies of sexual risk behaviors in children of teen mothers.

Study	Sample size and demographics	Type of study and location	Being born to teen mothers (% of the study sample)	Sexual risk behavior	Age of children at assessment	Results (children born to teen mothers)
Aizer et al. (2019)	N = 42,000 48% female	° National (Norway) ° Longitudinal	Maternal age at birth < 20 years (14%)	Age at birth of first child	30	(Relative Risk = 0.069 ^{***})
Card (1981)	N = 5,000 + 87% White 10% Black	° National (US) ° Longitudinal	Maternal age at birth < 20 years (50%)	Age at birth of first child	30	Giving birth at an earlier age (participants having a teen mother = 21.9 vs. participants having an older mother = 23; F-test ^b : 4.24 ^{**})
Eshbaugh (2008)	Gender: NR ^a N = 5,000 + 60% White 25% Black	° National (US) ° Longitudinal	Maternal age at birth < 20 years (27.4%)	Age of sexual debut Use of birth control Pregnancy expect.	20–24	Higher odds of having sex by 16 (OR ^c = 1.86 ^{**}) Believe they will become pregnant in next year ($\beta = .12^*$) ^b
Francesconi (2008)	Gender: NR N = 1,787	° British Household Panel Study (UK) ° Longitudinal	Maternal age at birth < 20 years (7.2%)	Teenage birth (birth < 20)	16–21	Higher odds of teenage birth (OR = 1.03 [*])
Hardy et al. (1997)	N = 1,758 82% Black 18% White	° Community (US) ° Longitudinal	Maternal age at birth < 20 years (28%)	Teenage birth (birth < 20)	27–33	Higher odds of teenage birth (OR = 1.62 ^{**})
Hardy et al. (1998)	N = 1,758 82% Black 54% female	° Community (US) ° Longitudinal	Maternal age at birth < 20 years (28%)	Teenage birth (birth < 20)	27–33	Higher odds of teenage birth (OR = 1.69 +) Higher odds of early birth (OR = 2.87 ^{**})
Jaffee et al. (2001)	N = 999 93% White 48% female	° National (NZ) ° Longitudinal	Maternal age at birth < 19 years (21.4%)	Early birth (birth < 25) Early birth (birth < 21)	21	No direct impact of having a teen mother on early birth (OR = 1.65; NS) ^a
Kahn & Anderson (1992)	N = ,5000 + 67% White 33% Black 100% female	° National (US) ° Cross-sectional	Maternal age at birth < 18 years, 18–19 years, and 20 + years [ref] (30.5%)	Teenage birth (birth < 20)	20–44	Higher odds of teenage birth for Whites: OR for participants with mothers who gave birth < 18 years = 2.01 ^{**} ; OR for participants with mothers who gave a birth 18–19 years = 1.94 ^{**} for Blacks: OR for participants with mothers who gave birth < 18 years = 1.66 ^{**} ; OR for participants with mothers who gave a birth 18–19 years = 1.66 ^{**} Higher odds of teenage motherhood (OR = 1.6 ^{**})
Kieran (1997)	N = 5,000 + Race: NR Age: 33 yrs Gender: NR	° National (UK) ° Longitudinal	Maternal age at birth < 20 years (15.5%)	Early motherhood (birth < 20) Early fatherhood (fathered a child < 22)	7–16	OR for participants with mothers who gave birth \leq 16 years = 9.14 ^{**} ; OR for those with mothers who gave birth 17–18 years = 6.46 [*]
Levine et al. (2001)	N = 1,341 60% White 23% Black 48% female	° National (US) ° Longitudinal	Maternal age at birth \leq 16 years, 17–19 years, 20–21 years, < 21 years, and < 22 [ref]	Sexual debut < 16	14–24	OR for participants with mothers who gave birth \leq 16 years = 3.30 ^{**} ; OR for those with mothers who gave birth 17–18 years = 2.14 [*]
Levine et al. (2007)	N = 1,736 72% White 20% Black 48% female	° National (US) ° Longitudinal	Maternal age at birth \leq 16 years, 17–18 years, 19 years, 20–21 years, < 21 years, and < 22 [ref] (56%)	Sexual debut < 16	14–24	Higher risk of teenage birth (Hazard Ratio = 1.61 ^{**})
Manlove et al. (1997)		° National (UK)	Teenage birth (birth < 20)	Teenage birth (birth < 20)	7–23	(continued on next page)

Table 3 (continued)

Study	Sample size and demographics	Type of study and location	Being born to teen mothers (% of the study sample)	Sexual risk behavior	Age of children at assessment	Results (children born to teen mothers)
	N = 2,183 Race: NR Age: 23 yrs 100% female	° Longitudinal	Maternal age at birth < 20 years (1.2%)			
Manlove et al. (2009)	N = 5,000 + 65.8% White 14.2% Black 57.9% female	° National (US) ° Cross-sectional (multiple years merged)	Maternal age at birth < 20 years (31.4%)	Earlier sexual debut (transition to first sex by age 19) Use of contraceptive at first sex Teenage birth (first birth < 19)	15–19	<i>For females:</i> Higher odds of earlier sexual debut (OR = 1.31**) Higher odds of teenage birth (OR = 1.34**) <i>For males:</i> Higher odds of earlier sexual debut (OR = 1.22*)
Meade et al. (2008)	N = 1,430 54% White 25.5% Black Age: 17 yrs 100% female	° National (US) ° Longitudinal	Maternal age at birth < 20 years (26.3%)	Time to first childbirth	13–19	Higher risk of earlier transition to first childbirth (Relative Risk = 1.66**)
Pogarsky et al. (2006)	N = 729 68% Black 15% White 30.1% female	° Community (US) ° Longitudinal	Maternal age at birth < 19 years vs. 19–20 years vs. > 20 [ref] (7.4%)	Teenage birth (birth before age 19)	22	Higher odds of teenage birth <i>For females:</i> OR for those having a mother who gave birth < 19 = 3.49*; OR for those having a mother who gave a birth 19–20 = 7.17* <i>For males:</i> OR for those having a mother who gave birth < 19 = 2.25* Participants having a mother who gave birth to a child at 18–19 reported more partners than those having a mother who gave birth to a child > 20 years (F-test: 4.61*)
Zimmerman et al. (2001) ^e	N = 570 100% Black 100% male	° Community (US) ° Cross-sectional	Maternal age at birth ≤ 17 years vs. 18–19 years vs. > 20 years (25%)	Age of sexual debut Frequency of sexual intercourse Number of partners Use of birth control	14.6	

Note.

+ $p < 1.0$; * $p < .05$; ** $p < .01$.

^a NR = Not reported.

^b Regression coefficient (standardized).

^c OR = Odds Ratio.

^d NS = Not Significant.

^e Zimmerman et al. (2001) report two studies within this publication; sexual risk behaviors were reported for the second study only.

Table 4
Studies of substance use behaviors in children of teen mothers.

Study	Sample	Design	Definition of Teen Mother	Substance Use	Age of children at assessment	Significant findings for Participants with Teen Mothers
Coyne et al. (2013)	N = 5,000+ Race: NR ^a Gender: NR	<ul style="list-style-type: none"> ◦ Population-based (Sweden) ◦ Longitudinal 	Maternal age at birth < 20 years (5.8%)	Substance-related hospitalization	21–50	Higher risk of becoming hospitalized ($b^b = 0.346^*$; $HR^c = 1.41^*$)
Ekeus et al. (2006)	N = 5,000+ Race: NR 48.7% female	<ul style="list-style-type: none"> ◦ Population-based (Sweden) ◦ Longitudinal 	Maternal age at birth < 20 years (3.2%)	Substance-related hospitalization: Alcohol Substance-related hospitalization: Illicit Drugs	18	Higher risk of becoming hospitalized for alcohol ($RR^d = 1.6^*$) and illicit drug abuse ($RR = 2.2^*$)
Fergusson and Woodward (1999)	N = 1,025 93% White Gender: NR	<ul style="list-style-type: none"> ◦ Population-based ◦ Christchurch Health & Development Study (NZ) 	Maternal age at birth < 20 years (8.8%)	DSM-IV Abuse/Dependence: Nicotine DSM-IV Abuse/Dependence: Alcohol DSM-IV Abuse/Dependence: Cannabis DSM-IV Abuse/Dependence: Illicit Drugs	18	More likely to receive DMS-IV Abuse/Dependence diagnosis for: Nicotine ($\chi^2 = 19.32^{***}$) Cannabis ($\chi^2 = 13.66^{***}$) Illicit Drugs ($\chi^2 = 16.12^{***}$)
Francesconi (2008)	N = 1,787 Race: NR 47% female	<ul style="list-style-type: none"> ◦ Longitudinal ◦ British Household Panel Study (UK) 	Maternal age at birth < 20 years (7.2%)	Smoke at least one cigarette daily	16–21	No direct impact of having a teen mother on smoking ($b^b = 0.001$; NS)
Harden et al. (2007)	N = 1,368 100% White 51.5% female	<ul style="list-style-type: none"> ◦ National (Australia) ◦ Longitudinal ◦ Twins Study 	Maternal age at birth < 20 years (6.7%)	Aggregated variable - Substance use problems (DSM-IV abuse/dependence); Nicotine + Alcohol + Cannabis + Illicit Drugs	14–39	Those born to teen mothers no more likely to receive DMS-IV Abuse/Dependence diagnosis ($OR^e = 1.37$; NS)
Levine et al. (2001)	N = 1,341 60% White 23% Black 48% female	<ul style="list-style-type: none"> ◦ National (NLSY; US) ◦ Longitudinal ◦ Comparison Group 	Maternal age at birth \leq 16 years vs. 17–19 years vs. 20–21 years vs. < 21 years vs. 22 years or older [ref] (7.3%)	Smoking marijuana in last 30 days	14–24	Those born to teen mothers no more likely to report smoking marijuana in past 30 days ($OR = 1.27$; NS)
Levine et al. (2007)	N = 1,736 72% White 20% Black 48% female	<ul style="list-style-type: none"> ◦ National (NLSY79/CNLSY79; US) ◦ Longitudinal ◦ Comparison Group 	Maternal age at birth \leq 16 years vs. 17–19 years vs. 20–21 years vs. < 21 years vs. 22–35 years [ref] (56%)	Smoking marijuana in last year	14–24	Those born to teen mothers no more likely to report smoking marijuana in past 30 days ($R = 1.31$; NS)
McGrath et al. (2014)	N = 5,000+ Race: NR Gender: NR	<ul style="list-style-type: none"> ◦ Population-based (Denmark) ◦ Longitudinal 	Maternal age at birth < 20 years (NR %)	ICD-10-DCR for mental/behavioral disorders due to: Alcohol use (F10) Cannabis use (F19)	NR	Those born to teen mothers more likely to meet ICD-10-DCR criteria for: Alcohol ($OR = 1.51^{***}$) Cannabis ($OR = 2.22^{***}$) Boys born to teen mothers were more likely to report illicit drug use ($OR = 2.78^*$)
Pogarsky et al. (2006)	N = 538 68% Black 15% White 69.9% male	<ul style="list-style-type: none"> ◦ Rochester Youth Development Study (US) ◦ Longitudinal 	Maternal age < 19 years vs. 19–20 years (100%)	Total number of times reported use of 9 illicit substances	~22	Those born to teen mothers were more likely to report daily smoking in past week ($OR = 2.10^{***}$) and trended towards more alcohol
Shaw et al. (2006)	N = < 5000 93.9% White Gender: NR	<ul style="list-style-type: none"> ◦ Mater-University Study of Pregnancy (Australia) ◦ Longitudinal 	Maternal age at birth < 18 years (8.7%)	Daily smoking in the past week Drinking alcohol at least monthly	14	Those born to teen mothers were more likely to report daily smoking in past week ($OR = 2.10^{***}$) and trended towards more alcohol

(continued on next page)

Table 4 (continued)

Study	Sample	Design	Definition of Teen Mother	Substance Use	Age of children at assessment	Significant findings for Participants with Teen Mothers
Zimmerman ^f (2001)	N = 205 100% Black 100% male	° US ° Cross-sectional	Maternal age at birth ≤ 17 years vs. 18–19 years vs. > 20 years (38%)	Problems behaviors, including drinking and marijuana use	16.9	consumption in last monthly (OR = 1.44+) No direct impact of having a teen mother on frequency of substance use (F = 1.57; NS)
Zimmerman et al. (2001)	N = 570 100% Black 100% male	° US ° Cross-sectional	Maternal age at birth ≤ 17 years vs. 18–19 years vs. > 20 years (25%)	Problems behaviors, including drinking and marijuana use	14.6	No direct impact of having a teen mother on frequency of substance use (F = 1.50; NS)

Note.

+ $p < 1.0$; * $p < .05$; ** $p < .01$.

^a NR = Not reported.

^b Cox regression coefficient.

^c HR = Hazard ratio.

^d RR = Relative Risk.

^e OR = Odds Ratio.

^f Zimmerman et al. (2001) report two studies within this publication.

having a partner that was less than 5 years older than the adolescent.

3.1.3. Teen pregnancy intentions and births

Twelve of the 17 studies (70.59%) compared adolescents born to teen mothers to those born to older mothers with respect to rates of teen birth. Only one study did such comparison with respect to pregnancy expectations (5.90%). Eshbaugh (2008) found that compared to those born to older mothers, adolescents born to a teen mother were more likely to believe that they would become pregnant in the subsequent year ($\beta = 0.12$; $p < .05$). Other factors associated with pregnancy intention was lower maternal education, living in a single-parent household, and self-identifying as African American. Similarly, most studies reported that being a child of a teen mother consistently predicted early birth. Hendrick and Maslow (2019) found that a teen birth was reported by 14% of children born to teen mothers, as compared to 4% among those born to older mothers. Also associated with teen birth were lower maternal education, younger age at first sex, and lower SES.

Consistently, Card (1981) reported that those born to younger mothers were more likely to report a teen birth ($F = 4.24$; $p < .05$), White adolescents and those from higher income families less likely to report a teen birth. In a longitudinal panel study in the United Kingdom, Francesconi (2008) found that adolescents born to teen mothers were slightly more likely ($OR = 1.03$; $p < .05$) to become a teen parent; other mediators were not reported. Other studies found higher relative risk: (a) Hardy et al. (1997) noted that along with lower maternal education and being female, the increased odds of giving birth as a teen to be 1.62 times ($p < .01$) higher for those born to a teen mother; (b) Manlove et al. (2009), who reported that along with self-identifying as Hispanic or Black, coming from a single-parent household, lower parenting education, younger age at first sex, and having a partner 3–4 or 5 years older, kids of teen mothers were 1.34 times more likely ($p < .01$) to give birth before age 19; and (c) Kiernan (1997), who noted that along with low SES, lower educational attainment by adolescent, reporting internalizing behaviors, and attitude toward timing of family formation, offspring of teen mothers were 1.6 times ($p < .01$) more likely to report a teen birth than offspring of older mothers. Similar hazard ratio and relative risk were reported by Manlove (1997; $HR = 1.61$, $p < .01$) and Meade et al. (2008; $RR = 1.66$, $p < .01$). Manlove (1997) also reported that lower SES, great number of siblings in the home, menarche before age 12, poorer academic achievement, and attitude towards early ideal age to parent were associated with relative risk for teen birth. Meade et al. (2008) found that along with having a teen mother, reporting poorer school performance, lower maternal education, living in a single parent household, greater number of siblings, lower parental monitoring, more deviant peers, reporting having “been on dates”, self-identifying as African American, lower SES, and living in a less enriched environment were associated with teen births. Last, Aizer, Devereux, and Salvanes (2019) girls born to teen mothers was associated with increased probability of having a teen birth (0.069; $p < .001$). The study also found that paternal and maternal entry into high school by age 16 and family resources (SES) accounted for the heightened probability of teen birth among children born to teen mothers. Two studies found no difference in early birth to children of teen mothers (Hardy, Astone, Brooks-Gunn, Shapiro, & Miller, 1998; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001), through Hardy et al. (1998) found risk for a birth during emerging adulthood (before age 25) was 2.87 times higher ($p < .01$) among children of born to teen mothers. Further, Hardy et al. (1998) found that lower SES, living in a single parent household, and lower academic achievement were associated with a teen birth. In Jaffe et al.’s (2001) work, factors associated with a teen birth were having a mother with education, parental history of incarceration, lower SES, changes in caregiver, changes in residence, parenting behaviors, and parent-child relationship quality at age 15.

Other studies examined differences by gender and race. In a national sample of U.S. women, Kahn and Anderson (1992) found that being born to a teen mother increased the odds of becoming a mother before age 18 for both White ($OR = 2.01$, $p < .01$) and Black ($OR = 1.66$, $p < .01$) women. This influence also held for birth at age 18 or 19 (White: $OR = 1.94$, $p < .01$; Black: $OR = 1.66$, $p < .01$). They concluded that the influence of being born to a teen mother on offspring teen pregnancy was more prominent for White compared to Black women. Two studies explored differences in teen parenting rates (by maternal age at offspring birth) by gender. Whereas Manlove et al. (2009) found no significant differences by gender, Pogarsky, Thornberry, and Lizotte (2006) found that being born to a teen mother was predictive of having a child before age 19 for both girls ($OR = 3.49$, $p < .05$) and boys ($OR = 2.25$, $p < .05$). Further, girls born to a teen mother were 7.17 times more likely to give birth at age 19 and 20; giving a birth during emerging adulthood is also considered to be young motherhood and linked to compromised developmental outcomes in children (Agnafors, Bladh, Svedin, & Sydsjo, 2019). There were no significant differences for their male counterparts.

3.2. Substance use

Studies focusing on the association between being born to teen mothers and substance use in offspring had less consistent findings than those regarding sexual risk behaviors. Of the selected 12 studies, seven (58%) focused on substance use behavior and five (42%) focused its attendant pathology, substance use abuse or dependence—assessed using the Diagnostic and Statistical Manual of Mental Disorders or International Classification of Diseases and hospitalization due to excessive substance use.

3.2.1. Substance use behavior

The selected seven studies considered various substances. Two studies focused on smoking behaviors (Francesconi, 2008; Shaw, Lawlor, & Najman, 2006), although findings were inconsistent. Francesconi (2008) found no significant differences in the smoking behaviors of adolescents by maternal age; no covariates were reported. On the contrary, a national longitudinal Australian study reported that participants born to teen mothers were 2.10 times more likely ($p < .001$) to report daily smoking in the past week (Shaw et al., 2006). Other mediators of smoking were SES, having a depressed mother, living in a single-parent household, and maternal smoking. With respect to marijuana use, Levine et al. (2001) reported no differences between adolescents born to teen

mothers and those born to nonteen mothers ($OR = 1.27$, p -value $> .05$), though self-identifying as Hispanic was associated with lower odds of reporting marijuana use. Similar findings were reported in their later work ($OR = 1.31$, p -value $> .05$; Levine et al., 2007), with mediators associated with lower likelihood of reporting marijuana use including self-identifying as African American and being female. In neither study reported by Zimmerman were differences found (2001; Study 1: $F = 1.57$, p -value $> .05$; Study 2: $F = 1.50$, p -value $> .05$). Pogarsky et al. (2006) found that having a teen mother was associated with higher count of illicit drug use (a composite score reflecting use of marijuana, hallucinogens, cocaine, crack, heroin, PCP, tranquilizers, uppers, and downers; $p < .05$), as was ineffective parenting and maternal marijuana use.

3.2.2. Abuse, dependence, and hospitalization

Two studies used Diagnostic and Statistical Manual of Mental Disorders (4th edition) diagnostics criteria to examine difference in alcohol and illicit drug use dependence by maternal age. Being born to teen mothers was associated with increased odds of having alcohol abuse ($OR = 1.51$; $p < .001$) in a Danish sample (McGrath et al., 2014; no mediators reported); nicotine abuse or dependence ($\chi^2 = 19.32$; $p < .001$) in a New Zealand sample (Fergusson & Woodward, 1999); cannabis abuse or dependence in both samples ($\chi^2 = 13.66$; $p < .001$) [27] ($OR = 2.22$; $p < .001$; McGrath et al., 2014); and illicit drug ($\chi^2 = 16.12$; $p < .001$) abuse or dependence (Fergusson & Woodward, 1999). Fergusson and Woodward (1999) noted that lower SES and mother's report of smoking during pregnancy as associated with nicotine abuse/dependence, maternal ethnicity (Maori) as associated with alcohol abuse/dependence, having an unplanned pregnancy predicting cannabis abuse/dependence, and lower maternal education, having an unplanned pregnancy, and maternal relationship with her own mother as covariates of illicit drug abuse/dependence. This is supported by an Australian-based twins study that found, even after controlling for demographic factors, children born to teen mothers were more likely to report substance use problems (an aggregate variable that included alcohol dependence and abuse, and illicit drug use; Harden et al., 2007). Other predictive covariates were child gender (male) and older age.

Two of these five studies (40%) examined substance related hospitalization. Coyne, Långström, Lichtenstein, and D'Onofrio (2013) reported that in a population-based Swedish sample, children born to teen mothers were 1.41 times ($p < .05$) more likely to experience a substance-related hospitalization. These findings mirrored earlier population-based work in Sweden (Ekeus, Olausson, & Hjern, 2006), which found that the relative risk of being hospitalized 1.6 times higher for alcohol abuse and 2.2 times higher for illicit substance use among adolescents born to teen mothers. While both studies included mediators, the association of these variables with the outcomes of interest are not reported.

4. Discussion

The goal of this review was to improve our understanding of the links between being born to a teen mother and the sexual health and substance use behaviors of their offspring. The majority of studies reported that being born to a teen mother was associated with early sexual debut and teen birth; findings associated with substance use were less consistent. Overall, the results contribute to the literature on the effect of being born to a teen mother on negative outcomes among offspring. Our study extended these prior findings by aggregating and reporting on two externalizing behaviors in adolescence and emerging adulthood: sexual risk, including pregnancy and birth, and substance use and abuse or dependence.

4.1. Sexual risk

One third of studies included in our systematic review of sexual risk behavior examined sexual debut (Eshbaugh, 2008; Levine et al., 2001, 2007; Manlove et al., 2009; Zimmerman et al., 2001). Across all studies, being born to a teen mother was predictive of earlier sexual debut (Levine et al., 2001, 2007; Manlove et al., 2009; Zimmerman et al., 2001). A dose-response relationship was also observed; the younger the mother was at time of birth, the higher the likelihood of early sexual debut among offspring (Levine et al., 2001, 2007). Fewer studies explored contraception or partnering with mixed conclusion (Eshbaugh, 2008; Manlove et al., 2009; Zimmerman et al., 2001). Early sexual debut is important because it is predictive of increased number of partners, engagement in risky sexual behaviors (i.e., sex without a condom), and sexually transmitted infections (Erkut et al., 2013; Kastbom, Sydsjö, Bladh, Priebe, & Svedin, 2015), all of which are associated with teen pregnancy. While not explored in the studies included in the review, further work would be enhanced by the exploration of differences in sexual risk engagement by racial/ethnic differences. This is particularly important given the differential rates, particularly in the U.S. of teen births by racial/ethnic groups (Center for Disease Control and Prevention, 2019; Yee, Cunningham, & Ickovics, 2019). Last, considering early sexual debut plays a critical role in shaping subsequent sexual behaviors and reproductive health, health education interventions should continue to emphasize the importance of delaying sexual initiation.

Most of the sexual health studies (60%) focused on adolescent births (Card, 1981; Francesconi, 2008; Hardy et al., 1998; Jaffee et al., 2001; Kahn & Anderson, 1992; Kiernan, 1997; Manlove, 1997; Manlove et al., 2009; Pogarsky et al., 2006); the majority reported a significant relationship between being born to teen mothers and likelihood of early birth (Card, 1981; Francesconi, 2008; Jaffee et al., 2001; Kahn & Anderson, 1992; Kiernan, 1997; Manlove, 1997; Manlove et al., 2009; Pogarsky et al., 2006). The critical importance of comprehensive sex education—including knowledge and skills building—in deterring early births in adolescents is well-documented (Oringanje et al., 2016). Interventions that include both parents and children have demonstrated particularly promising success in reducing sexual risk behaviors (Sutton, Lasswell, Lanier, & Miller, 2014). Further, as shown in our review, parenting behaviors relevant to parent-child relationship emerged as critical factors underlying the link between having a teen mothers and sexual behaviors (Jaffee et al., 2001; Kahn & Anderson, 1992; Manlove, 1997; Meade et al., 2008). Taken together,

abstinence and safer sex intervention strategy including both parents and children may be particularly relevant to explore for this target group.

4.2. Substance use

In this review, we found much more discrepancies in evidence of a relationship between being born to a teen mother and offspring substance use behaviors. Half of the 11 articles (representing 12 studies [one publication described two separate studies]) found no statistical significance between maternal age at offspring's birth and substance use behaviors (Fergusson & Woodward, 1999; Francesconi, 2008; Levine et al., 2001, 2007; Zimmerman et al., 2001). Studies reporting significant differences included large sample sizes (5,000+; Ekeus et al., 2006; Coyne et al., 2013; Harden et al., 2007; Shaw et al., 2006) and examined substance abuse or dependence rather than substance use behaviors (Coyne et al., 2013; Ekeus et al., 2006; Fergusson & Woodward, 1999; Harden et al., 2007; McGrath et al., 2014). It may be that some of these finds are impacted by the large variability in country of origin study a study's data was drawn from. Many samples from included studies from outside of the U.S. have more heterogenous populations than the U.S. Given known differences in substance use behaviors by race/ethnicity among adolescents (Center for Disease Control (CDC), 2018) and factors like minority stress that are particularly salient influences or risk behaviors among ethnic minority youth in the U.S (Cervantes, Cardoso, & Goldbach, 2015; Hurd, Varner, Caldwell, & Zimmerman, 2014; Sudhinaraset, Wigglesworth, & Takeuchi, 2016). Because of these limited and mixed findings, and differences in experiences by country of residence (particularly differences in the U.S. context), continued research is needed to better understand factors associated with substance use behaviors in adolescents born to teen mothers.

4.3. Limitations

Our study is limited in three ways. First, although we reviewed many manuscript titles and abstracts in a systematic way, we may not have identified all studies, particularly those that were unpublished. Second, due to heterogeneity in outcome measures across studies, we are unable to make more conclusive statements related to findings. Last, we were unable to examine factors that may influence selection into (Aizer et al., 2019; Hoffman, 2015; Mollborn, 2017), which may in turn influence sexual and substance use risk behaviors of offspring over time.

5. Conclusion

This is the first identified systematic review of sexual and substance use risk behaviors among offspring of teen mothers. The strengths of this review include the comprehensive nature of the searches and rigorous methods used for review and inclusion of studies. This review provides evidence that offspring of teen mothers are at risk of problematic outcomes well beyond childhood and early adolescence and thus contribute to our understanding of the lifelong risks experienced by these children.

The findings highlight several critical gaps in the literature. First, there is a lack of consensus in how to operationalize outcome measures. This wide variation in reviewed study outcomes precluded completing a more rigorous meta-analysis of either sexual risk or substance use among children of teen mothers. Second, as studies examining long-term among children both to teen mothers emerges, studies investigating mechanisms underlying the link or limited. A systematic exploration, with an eye for tailoring for specific cultural needs, of mechanisms would best inform intervention adaptation for this high-risk group of mothers and children. Last, an extension of work on the children of teen mothers to include Hispanic/Latinx teen mothers and children, particularly given that Latinx adolescent girls are overrepresented among teen births, will help to better understand the specific needs of Latinx children of teen mothers.

This work highlights the importance of tailoring abstinence and safer sex interventions for children of teen mothers to effectively respond to their unique needs. Modifications to meet the needs of children born to teen mothers should include an examination of attitudes and normative social factors that influence intergenerational risk behaviors, and focus on increasing efficacy of parenting behaviors to influence positive youth development and reduce risk engagement among teens.

Declaration of competing interest

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