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Multiple Unintended Pregnancies in U.S. Women: A Systematic Review



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ABSTRACT

Background: Each year, nearly one-half of all pregnancies in the United States are unintended. Risk factors of unintended pregnancy have been studied without attention to whether the pregnancy was the woman's first unintended pregnancy or whether she had had more than one. Little is known about the prevalence, incidence, and risk factors for multiple unintended pregnancies. The purpose of this paper is to present a systematic review of the extant literature on the risk factors for multiple unintended pregnancies in women in the United States, and whether these factors are specific to multiple unintended pregnancies.

Methods: PubMed, PsychInfo, CINAHL, Web of Science, and JSTOR databases were searched for empirical research studies performed after 1979, in the United States, with a primary outcome of multiple unintended pregnancies. Articles that did not establish the intendedness of the studied pregnancies were excluded.

Results: Seven studies were identified. For multiple unintended pregnancies, incidence rates ranged from 7.4 to 30.9 per 100 person-years and prevalence rates ranged from 17% to 31.6%. Greater age; identifying as Black or Hispanic; nonvoluntary first intercourse, particularly at a young age; sex trade involvement; and previous abortion were found to be associated with multiple unintended pregnancies. Use of intrauterine devices or combined oral contraceptives were found to decrease the risk of multiple unintended pregnancies.

Conclusions: This review suggests a small number of modifiable factors that may be used to better predict and manage multiple unintended pregnancies.

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In the United States, 45% of pregnancies are estimated to be unintended each year (Finer & Zolna, 2016). Pregnancies are most commonly categorized into “intended” and “unintended” with unintended pregnancies subcategorized into “mistimed” pregnancies (occurring earlier than desired) and “unwanted” pregnancies (occurring when a woman wanted no more children or no children at all) (Committee on Unintended Pregnancy, Institute of Medicine, & National Academy of Sciences, 1995; Santelli et al., 2003). Intended pregnancies are defined as

pregnancies that occur at about the right time or later than desired, the latter a reflection of infertility or difficulty of conception (Santelli et al., 2003). Young women, poor women, minority women, and women who are cohabiting are at greatest risk of experiencing an unintended pregnancy (Finer & Zolna, 2011, 2014, 2016). Exposure to violence, such as intimate partner violence, as an adolescent or adult, a history of nonvoluntary first intercourse, and adverse events in childhood have been demonstrated to increase the risk of unintended pregnancy (Dietz et al., 1999; Miller et al., 2010; Pallitto, Campbell, & O'Campo, 2005).

Unintended pregnancies are associated with an increased likelihood that women will smoke during pregnancy, enter prenatal care late and have fewer visits, be less likely to initiate

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and continue breastfeeding (Kost & Lindberg, 2015), and be at greater risk of maternal depression and anxiety (Lau & Keung, 2007; Najman, Morrison, Williams, Andersen, & Keeping, 1991). Although an association between poor child health outcomes such as delivering preterm or low birthweight (Gipson, Koenig, & Hindin, 2008; Kost & Lindberg, 2015) is less supported, they have been demonstrated in a few studies. Unintended pregnancies that are categorized as “unwanted” versus “mistimed” are the most strongly associated with poor maternal and child outcomes (Santelli et al., 2003).

Higher order, meaning second or greater, unintended births are more likely to be considered unwanted at conception than a first unintended birth (Wildsmith, Guzzo, & Hayford, 2010). Because women in the United States are less likely to abort an unintended pregnancy than women in other industrialized countries (Committee on Unintended Pregnancy et al., 1995; Singh, Sedg, & Hussain, 2010), their unwanted pregnancies are more likely to result in a birth. Therefore, the prevention of multiple unintended pregnancies is a way to prevent the births most strongly associated with poor outcomes: births resulting from pregnancies that were unwanted (Figure 1). Nationally representative, cross-sectional studies have identified that 17% of women report experiencing more than one unintended pregnancy in their lifetime (Jones, Singh, Finer, & Frohworth, 2006); however, little is known about the prevalence, incidence, and risk factors that are specific to multiple unintended pregnancies (Jones et al., 2006; Kuroki, Allsworth, Redding, Blume, & Peipert, 2008; Magnusson, Masho, & Lapane, 2011).

Multiple Unintended Pregnancy: Predictor of Poor Maternal and Neonatal Outcomes or Outcome Itself?

Whether unintended pregnancies cause poor neonatal and maternal outcomes or whether they instead contribute to the likelihood of other events (e.g., violence between parents) is an ongoing question in the unintended pregnancy literature (Gipson et al., 2008). However, unintended pregnancy can also be considered a poor outcome itself. This is consistent with the view that unintended pregnancy is a human rights issue, because all people should have the ability to autonomously control their family size (United Nations Population Fund, 1994). For this review, multiple unintended pregnancies is the outcome of interest and the focus is on synthesizing the current literature to determine which maternal factors have been shown to increase risk of experiencing multiple unintended pregnancies. Identifying the maternal risk factors for multiple unintended pregnancies is the first step in developing ways to assist clinicians in assessing and intervening with this understudied phenomenon.

Methods

We identified studies published between January 1, 1979, and October 1, 2012, through searches of the PubMed, PsychInfo, CINAHL, Web of Science, and JSTOR databases using combinations of the following keywords: *multiple, repeat, higher order, unintended, unplanned, unwanted, pregnancy, abortion, birth, and childbearing*. Reference lists of relevant articles were also searched iteratively to identify additional articles for inclusion. All authors contributed to the development of the search strategy, inclusion and exclusion criteria, and the abstraction form. The first author performed the search and abstraction with input as necessary from the co-authors.

Studies were included if they met the following criteria: 1) empirical research with an outcome measure of multiple unintended pregnancies 2) research performed in the United States and 3) research performed during or after 1979. January 1, 1979, was chosen as the earlier boundary date as that was the year the first *Healthy People* report was published (Office of the Surgeon General & Office of the Assistant Secretary for Health, 1979). This report identified unintended pregnancy as a national health concern and established the first national goals for the reduction of unintended pregnancy (Office of the Surgeon General & Office of the Assistant Secretary for Health, 1979). Because the rate of unintended pregnancy in the United States is higher than that of many other developed nations (Lakha & Glasier, 2006; Singh et al., 2010), we limited studies to the United States. This higher rate in the United States may be owing to cultural and health system characteristics that are unique to the United States, including different patterns of contraceptive use and the lack of a single-payer health care system (Committee on Unintended Pregnancy et al., 1995; Trussell & Raymond, 2006; Trussell & Wynn, 2008). Articles were excluded if they did not establish the intendedness of a repeat pregnancy or birth (i.e., reporting on multiple pregnancies in adolescence or repeat nonmarital birth without establishing the intendedness of the births).

Studies that met the inclusion criteria were reviewed using the Quality Assessment Tool for Studies with Diverse Designs (QATSDDD) by both EAJ and MM independently (Sirriyeh, Lawton, Gardner, & Armitage, 2011). As recommended by the instrument developers (Sirriyeh et al., 2011), if EAJ and MM disagreed, the study was discussed until agreement was reached on the assigned quality score. The validity and reliability of the QATSDDD

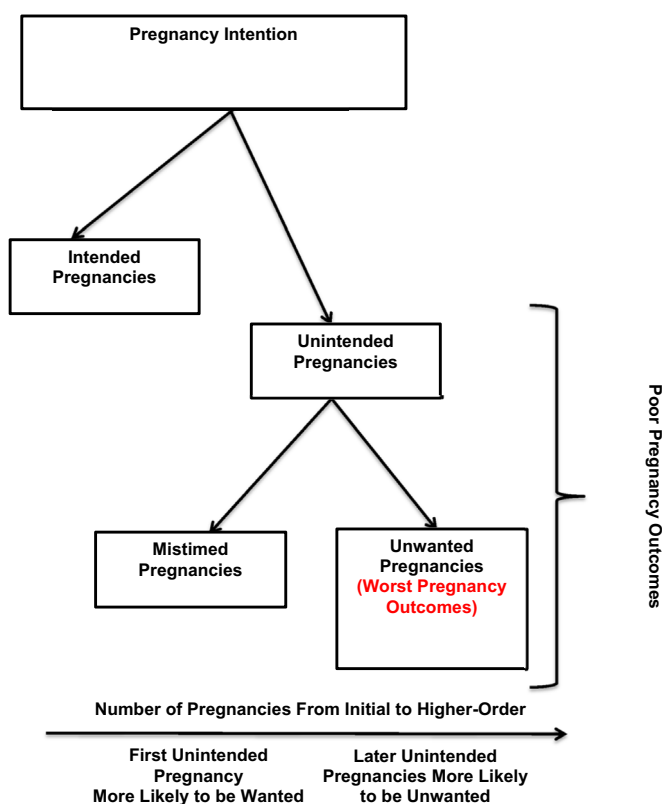


Figure 1. Pregnancy intention and associated pregnancy outcomes.

is established and has been reported (Sirriyeh et al., 2011). When used to evaluate quantitative research, as we did in this review, the tool consists of 14 items which can be scored from 0 to 3 (where 0 = not at all and 3 = complete), resulting in total scores ranging from 0 to a maximum score of 42 (Sirriyeh et al., 2011).

Results

From this process, 1,388 studies were identified (Figure 2). An initial title and abstract review resulted in the exclusion of 1,333 studies. The remaining studies ($n = 55$) were obtained as full-text; of these, 48 did not meet the inclusion criteria. The final sample ($n = 7$) was abstracted for this analysis. Overall, the seven studies that reported on multiple unintended pregnancies were published between 1985 and 2012 (Tables 1 and 2). Sample sizes ranged from 215 to 7,643 U.S. women. Participant ages ranged from 12 to 44 years. The QATSDD scores ranged from 19 to 35 (Table 3).

Study Design

Three of the studies were cross-sectional (Decker et al., 2012; Jones et al., 2006; Magnusson et al., 2011), two were prospective (Abrams, 1985; Upadhyay, Brown, Sokoloff, & Raine, 2012), one involved a retrospective chart review (Shlay, Zolot, Bell, Maravi, & Urbina, 2009), and one involved a pseudo cohort extracted from a randomized controlled trial by ignoring randomization (Cremer et al., 2011).

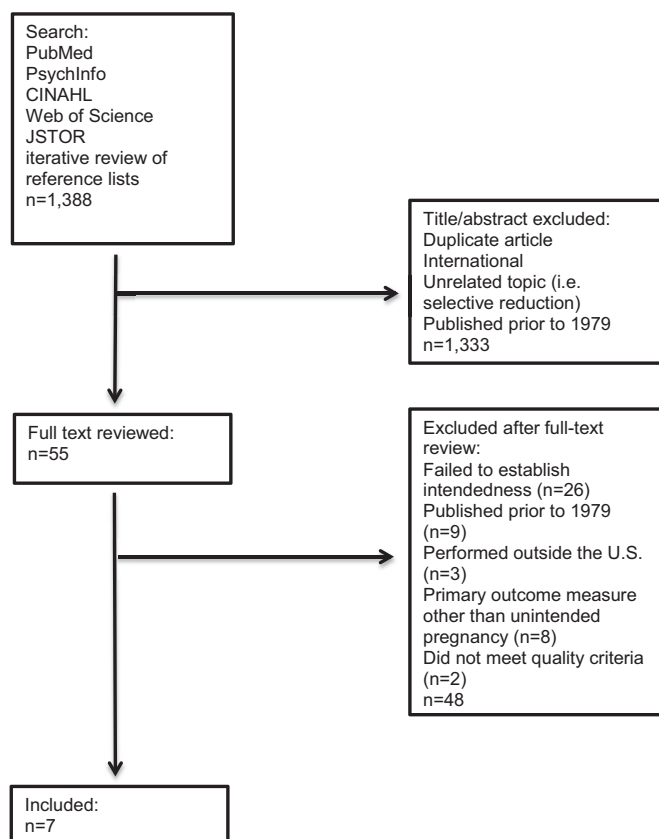


Figure 2. Selection of articles for inclusion in review.

Measures of Pregnancy Intention

Measures used to categorize pregnancy intention varied across the studies. Two of the cross sectional studies used data obtained from the National Survey of Family Growth (NSFG) cycle 6 survey (Jones et al., 2006; Magnusson et al., 2011). The NSFG is an ongoing, sequential cross sectional in-person survey that is representative of women in the United States (Mosher, Jones, & Abma, 2012). Two other studies did not report the questions that were used to determine pregnancy intention (Abrams, 1985; Decker et al., 2012). Two studies prospectively asked participants if they hoped to delay or avoid childbearing in the future (Cremer et al., 2011; Upadhyay et al., 2012). One study assumed that women desired to delay or avoid pregnancy based on request for contraception (Shlay et al., 2009). In these articles, the term “unplanned” was often used interchangeably with “unintended.” In a report by the National Center for Health Statistics, these terms were reported to frequently be used interchangeably in the literature (Mosher et al., 2012).

Prevalence

Although we identified few studies that estimated the prevalence of multiple unintended pregnancies among U.S. women, the studies that do were of good quality and both used NSFG data, which is nationally representative. Jones et al. (2006) and Magnusson et al. (2011) reported prevalence of 17% and 31.6%, respectively, for multiple unintended pregnancies. Jones et al. (2006) based their analysis on pregnancies reported by all surveyed women, excluding those that ended in fetal loss (miscarriage or stillbirth). Magnusson et al. (2011) chose to limit the pregnancies they evaluated to pregnancies reported by women reporting at least two acts of intercourse with a man since menarche, and those reporting at least one sex partner in the 12 months before the survey.

Incidence

Three studies, two of which had the highest QATSDD scores, reported incidence rates of multiple unintended pregnancies (Table 2; Abrams, 1985; Cremer et al., 2011; Upadhyay et al., 2012). All the reported rates were converted to person-time as sample sizes and durations of follow-up varied. Rates ranged from 8.4 (Cremer et al., 2011) to 30.9 (Upadhyay et al., 2012) per 100 person-years. In the study by Abrams (1985), the incidence rate for new, multiple unintended pregnancies was 4.8 per 100 person-years. This broad range in incidence may be owing to different risk of multiple unintended pregnancies among women presenting at these different study sites, that is, sexually transmitted infection clinics versus abortion clinics.

Sociodemographic Characteristics

Age

As shown in Tables 1 and 2, Jones et al. (2006) and Magnusson et al. (2011) reported associations between multiple unintended pregnancies and sociodemographic characteristics. Experiencing more than one unintended pregnancy was positively associated with greater age (Jones et al., 2006), being Black or Latina (Jones et al., 2006; Magnusson et al., 2011), having an income below the federal poverty level (Jones et al., 2006), having a mother who was herself younger than 18 years at her first birth (Magnusson et al., 2011), and having a history of more than one sexual partner

Table 1
Prevalence Estimates From Included Studies (Listed in Order of Prevalence Magnitude)

First Author (Year)	Sample/Setting Design Age	No. of Participants	Prevalence (%)	Correlates	Risk	95% CI	Assessed Covariates ^a
Magnusson et al. (2011)	NSFG cycle 6 Cross-sectional 18–44 y	4,521	31.6	Race/ethnicity (AOR)			
				Black	3.19	2.27–4.48	1, 2
				Hispanic	1.75	1.30–2.34	
				White	1.00		
				Mother <18 y at her first birth			
				Yes	1.44	1.10–1.90	1, 3, 4
				No	1.00		
				Age and voluntary nature of first intercourse			
				15–17 y, voluntary	2.41	1.90–3.29	1, 2, 5, 6, 7
				15–17 y, nonvoluntary	5.62	3.29–9.59	
				<15 y, voluntary	6.96	4.26–11.39	
				<15 y, nonvoluntary	27.10	11.03–66.57	
Decker et al. (2012)	Recruited from 5 northern California Planned Parenthood Clinics Cross-sectional 16–29 y	1,277	17.4	≥18 y, voluntary or nonvoluntary	1.00		
				No. of lifetime sex partners			
				1–4	3.42	2.46–4.67	6, 8
				5–9	6.47	4.59–9.12	
				≥10	12.14	8.14–19.12	
Jones et al. (2006)	NSFG cycle 6 Cross-sectional 15–44 y	7,643	17	1	1.00		
				Sex trade (ARR)			
				Yes	1.52	1.11–2.07	5, 9, 10, 11
				No	1.00		
				N/A	N/A	N/A	N/A

Abbreviations: AOR, adjusted odds ratio; ARR, adjusted risk ratio; CI, confidence interval; N/A, not applicable; NSFG, National Survey of Family Growth.

* For Table 1, the numbers correspond with the following listed covariates: 1 = number of sex partners, 2 = parent's educational attainment, 3 = <18 y of age at first intercourse, 4 = nonvoluntary first intercourse, 5 = race/ethnicity, 6 = parental living situation at age 14, 7 = mother's age at first birth, 8 = mother's educational attainment, 9 = age, 10 = nativity, 11 = recruitment site, 12 = previous abortion, 13 = previous birth, 14 = certainty of continuation of birth control method, 15 = plans if pregnant in the next 3 months, 16 = educational attainment, 17 = hormonal contraception use at baseline.

in a woman's lifetime (Magnusson et al., 2011). Jones et al. (2006) did not determine if these differences in rates were significant, because their study focused on multiple abortions rather than multiple unintended pregnancies; however, they did present percentages of women by age, race/ethnicity, and income who reported more than one unintended pregnancy.

Race/ethnicity

As Tables 1 and 2 show, 29.6% of Black women and 19.8% of Hispanic women reported experiencing more than one unintended pregnancy (Jones et al., 2006). Likewise, Magnusson et al. (2011), using a denominator of all women with pregnancies, found that Black and Hispanic women were significantly more likely than White women to report multiple unintended pregnancies (adjusted odds ratio [AOR], 3.19; and AOR, 1.75, respectively) after adjusting for number of lifetime sexual partners, and parent's educational attainment. In the study by Magnusson et al. (2011), other sociodemographic factors significantly associated with multiple unintended pregnancies when compared with women with all intended pregnancies included having a mother who was younger than 18 years at her first birth and having a history of more than one lifetime sexual partner.

Income

Jones et al. (2006) reported on the poverty levels of women in the sample. Of women whose income was below 100% of the federal poverty level, 24.7% reported two or more unintended pregnancies, excluding pregnancies that ended in miscarriage or stillbirth. By comparison, 13.6% of women whose income was above 200% of the federal poverty level reported two or more

unintended pregnancies. No tests of significance for the differences between these rates were reported.

Based on prior literature supporting an association between women's childhood life factors and the overall phenomenon of unintended pregnancy, Magnusson et al. (2011) attempted to determine if childhood socioeconomic status was also associated with multiple unintended pregnancies. These investigators used information on the highest level of education attained by parents of the participants as a proxy for childhood socioeconomic status. In the final logistic regression model that adjusted for sociodemographic variables, women reporting multiple unintended pregnancies were no more likely to report a low educational attainment for their parents than women who reported all intended pregnancies.

Contraception Type and Use

The use of certain contraceptives was found to be associated with an increased likelihood of experiencing multiple unintended pregnancies for women. Using an as-treated analysis, intrauterine devices, if inserted immediately after a second trimester pregnancy termination, were shown to be effective at preventing a subsequent unintended pregnancy during the observed follow-up period ($p = .022$; Cremer et al., 2011). Women choosing the contraceptive patch or vaginal ring were significantly more likely than women using combined oral contraceptives to report a subsequent unintended pregnancy during the 1-year follow-up (hazard ratio [HR], 1.65; and HR, 1.80, respectively; Upadhyay et al., 2012). It is important to note that these studies do not compare intrauterine device use with use of the contraceptive patch or vaginal ring.

Table 2
Incidence Estimates From Included Studies (Listed in Order of Incidence Magnitude)

First Author, Year	Sample/Setting Design Age	No. of Participants	Incidence of Repeat Unintended Pregnancy per 100 Woman-years	Length of Follow-Up	Risk Factors	Risk	95% CI Interval	Assessed Covariates*
Upadhyay et al. (2012)	Recruited from 4 northern California Planned Parenthood Clinics Prospective survey 15–24 y	1,316	30.9	1 y	Contraceptive type (AHR)			12, 13, 14, 15
					Patch	1.65	1.21–2.26	
					Ring	1.80	1.26–2.57	
					Pill	1.00		
					Enrolled on day of abortion			
Yes	1.63	1.21–2.20	5, 9, 11, 13, 14, 15, 16					
No	1.00							
Prior abortion								
Yes	1.66	1.18–2.33	5, 9, 11, 13, 14, 15, 16, 17					
No	1.00							
Abrams (1985)	Presenting for abortion at a clinic in Boston Prospective observational ≤18 y	345	4.8	2 y	N/A	N/A	N/A	N/A
Cremer et al. (2011)	Presenting for abortion at a clinic in New York City RCT 16–43 y	215	8.4	1 y	N/A	N/A	N/A	N/A
Shlay et al. (2009)	Women who had more than one visit to a Denver STI clinic Retrospective chart review 12–44 y	710	Unable to determine from published report	1.2-y mean f/u time	Previous abortion (AOR)			5, 9
					Yes	1.17	0.64–4.04	
					No	1.00		

Abbreviations: AHR, adjusted hazard ratio; AOR, adjusted odds ratio; CI, confidence interval; N/A, not applicable; RCT, randomized, controlled trial; STI, sexually transmitted infection.

* For Table 2, the numbers correspond to following listed covariates: 1 = number of sex partners, 2 = parent's educational attainment, 3 = younger than 18 at first intercourse, 4 = nonvoluntary first intercourse, 5 = race/ethnicity, 6 = parental living situation at age 14, 7 = mother's age at first birth, 8 = mother's educational attainment, 9 = age, 10 = nativity, 11 = recruitment site, 12 = previous abortion, 13 = previous birth, 14 = certainty of continuation of birth control method, 15 = plans if pregnant in the next 3 months, 16 = educational attainment, 17 = hormonal contraception use at baseline.

Nonvoluntary First Intercourse

First intercourse before age 18 years of age, particularly if that intercourse was before 15 years of age and nonvoluntary, was

associated with an increased risk of experiencing multiple unintended pregnancies in the study by Magnusson et al. (2011) when compared with women whose first intercourse was over age 18, voluntary or nonvoluntary. The investigators found that

Table 3
Quality Assessment of Included Studies Using QATSDD

Criteria	Abrams (1985)	Cremer et al. (2011)	Decker et al. (2012)	Jones et al. (2006)	Magnusson et al. (2011)	Shlay et al. (2009)	Upadhyay et al. (2012)
Explicit theoretical framework	0	0	0	0	0	0	1
Statement of aims/objectives in main body of report	2	3	3	3	3	3	3
Clear description of research setting	3	3	2	1	2	3	3
Evidence of sample size considered in terms of analysis	0	3	0	1	1	0	2
Representative sample of target group of a reasonable size	2	3	2	3	2	2	3
Description of procedure for data collection	3	3	2	3	3	3	3
Rationale for choice of data collection tool(s)	0	2	3	3	2	2	3
Detailed recruitment data	1	3	3	3	2	2	3
Statistical assessment of reliability and validity of measurement tool(s) (quantitative only)	0	3	2	2	3	0	0
Fit between stated research question and method of data collection (quantitative only)	2	3	3	3	2	2	3
Fit between stated research question and format and content of data collection tool, e.g., interview schedule (qualitative only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fit between research question and method of analysis (quantitative only)	3	3	3	3	2	3	3
Good justification for analytic method selected	3	3	3	3	2	3	3
Assessment of reliability of analytic process (qualitative only)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Evidence of user involvement in design	0	0	0	0	0	0	0
Strengths and limitations critically discussed	0	3	3	1	3	2	0
Total	19	35	29	30	28	24	30

Abbreviations: N/A, not applicable; QATSDD, Quality Assessment Tool for Studies with Diverse Designs.

For Table 3, score (0–3), where 0 = not at all; 1 = very slightly; 2 = moderately; 3 = complete; Total possible score for quantitative studies is 42; for qualitative studies is 39 (Sirriyeh et al., 2011).

women who reported both a first act of intercourse before age 15 years and a nonvoluntary first intercourse were more likely (AOR, 27.10) than women whose first act of intercourse occurred when they were 18 years or older, regardless of whether that first act was voluntary or not, to report multiple unintended pregnancies after adjusting for putative confounders (Table 1). Magnusson et al. combined the voluntariness of intercourse with age to create a new variable owing to the theoretical connection between the two factors. The risk of multiple unintended pregnancy was highest for the combined group than either one alone (AOR, 27.10 vs. 6.96, respectively).

Sex Trade¹

Decker et al. (2012) considered an association of sex trade with a variety of reproductive health outcomes for young women, including multiple unintended pregnancies. Among women completing the survey, 8.1% reported a history of sex trade. Women who reported a history of recent sex trade were significantly more likely than those with no history to report multiple unintended pregnancies (adjusted risk ratio, 1.52).

Previous Abortion

Two studies examined the effect of previous abortion on the likelihood of a subsequent unintended pregnancy and the results were mixed. In the study conducted by Shlay et al. (2009), a history of previous abortion was not associated with the report of an unintended pregnancy in the interim between the initial and repeat visit when controlling for all the other factors. In the study by Upadhyay et al. (2012), women with a history of abortion (women enrolled either on the day of their abortion or women who reported a previous abortion) were significantly more likely than those with no history of a previous abortion to report a pregnancy during the 1-year follow-up period (HR, 1.63; HR, 1.66, respectively).

Discussion

Despite limited data to date, the major finding from this review is that risk factors for multiple unintended pregnancy can be identified from the published literature: nonvoluntary first intercourse, sex trade, and contraceptive type and use. Although addressing whether a woman will or will not experience nonvoluntary first intercourse or need to participate in sex trade would involve broad structural and societal change, these are potentially preventable or modifiable risks. It is not surprising that the use of an intrauterine device immediately after an abortion decreased the likelihood of experiencing a subsequent unintended pregnancy (Cremer et al., 2011). The effect a previous abortion might have on the likelihood of experiencing a second or higher order unintended pregnancy is not clear based on this review. We found only two studies that investigated this association (Schlay et al., 2009; Upadhyay et al., 2012), and only Upadhyay et al. (2012) received a high quality score. Clearly, a previous abortion indicates fecundity. And, by definition, a pregnancy can only be considered to be a multiple pregnancy if pregnancies have preceded it. So both history of pregnancy and history of abortion will be associated with multiple unintended

pregnancies by definition. However, it is an open question whether, among women at risk of pregnancy, having had a previous abortion is associated with sexual behavior or contraceptive use that in turn makes conception more or less likely. The socio-demographic characteristics that were associated with multiple unintended pregnancies were consistent with those identified for the umbrella phenomenon of unintended pregnancy, but again were only investigated by a fraction of the identified studies.

Of note, none of the studies reported that they excluded women who terminated previous pregnancies for fetal anomalies. Instead, the included studies assumed a pregnancy that ended in abortion to be unintended. Although the percentage of elective abortions obtained for intended pregnancies is likely low (Finer, Frohworth, Dauphinee, Singh, & Moore, 2005; Finer, Frohworth, Dauphinee, Singh, & Moore, 2006), at least some proportion of the previous abortions reported in these studies could have been obtained for intended pregnancies for reasons owing to fetal anomalies, risks to maternal health, or changed life situations necessitating abortion.

Caveats should be acknowledged. First, the number of studies that met the inclusion criteria was limited. These studies had varying quality assessment scores. Additionally, valid measurement of pregnancy intention remains a concern. Unintended pregnancies and prior abortions are frequently underreported (Jones et al., 2006). Some included studies used NSFG data or defined intendedness in ways that were similar to the definitions used by the NSFG. However, concerns have been raised regarding the ability of this measure to capture the actual intendedness of any conception and account for the inherent complexity associated with this issue (Committee on Unintended Pregnancy et al., 1995; Santelli et al., 2003). The NSFG data are from sequential cross-sections and, although this design is efficient, it suffers from potential recall bias and inability to establish temporality (Menard, 2008).

Future research to identify risk factors for multiple unintended pregnancies should work to clarify the many questions that remain regarding the association between nonvoluntary first intercourse and multiple unintended pregnancies. Previous research using the Adverse Childhood Experiences Study data demonstrated that women who reported childhood abuse or household dysfunction were more likely to report first intercourse before age 15 and more than 30 lifetime sexual partners (Hillis et al., 2004). Additional research is needed to clarify if there is an effect from childhood adverse experiences other than nonvoluntary first intercourse on the risk of multiple unintended pregnancies and to determine if this effect is exerted through risky sexual behaviors.

Subsequent studies will provide stronger inferences if they use a prospective design that also includes multiple measures of pregnancy intention. Additionally, it will be important to attempt to differentiate risk factors of multiple unintended pregnancies from those that affect all unintended pregnancies. As the effect of previous abortion remains uncertain (Shlay et al., 2009; Upadhyay et al., 2012), attempts should be made to obtain the most accurate pregnancy history possible over the longest amount of time possible.

Implications for Practice and/or Policy

The seven studies included in this review provide information on the risk factors associated with multiple unintended pregnancies. Clinicians should be aware that factors such as sexual violence or participation in sex trade may be associated with a greater risk of multiple unintended pregnancies.

¹ The term "sex trade" is used in this paper for two reasons: 1) this is the term the authors of the referenced study used and 2) "sex trade" may be better understood to include the exchange of sex for more than just money (i.e., housing, drugs, food).

Much of the research on multiple unintended pregnancies has been driven by concerns regarding multiple abortions (Abrams, 1985; Weitz & Kimport, 2012; Westfall & Kallail, 1995). However, unintended pregnancies can end in miscarriage, abortion, or birth. Limited research suggests a small number of modifiable factors that may be used to better predict and manage multiple unintended pregnancies that can result in adverse outcomes. To date, the variability of measures, limited variables considered, and the predominant use of cross sectional designs all limited confidence in the inferences. Subsequent investigation can build on these studies and extend our ability to provide appropriate interventions for the women most at risk of experiencing multiple unintended pregnancies.

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