

Sexual Risk-Taking in Adolescents; a Narrative Review

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Abstract

A review of recent literature on sexual activity in adolescents revealed a prevalence range of 6-65 % in different countries that may relate to sampling different age groups as well as various types of sexual activity. Many risk factors have been researched including parental factors (e.g. parent risk behavior), peer variables (e.g. peer pressure), religiosity (e.g. spiritual intelligence), mood (e.g. depression), health-related behavior (e.g. sexting), substance use (e.g. marijuana) and physiological markers (e.g. activation of various areas of the brain on fMRI scans). The few interventions have included motivational interviewing by clinician or computer and classroom education and condom distribution. Limitations of this literature include a paucity of longitudinal studies and intervention research.

Keywords: risky sexual behavior; adolescents; parent risk behavior

Introduction

A review of recent literature on sexual risk-taking in adolescents was conducted on PubMed and PsycINFO which involved entering the terms sexual activity, sexual risk-taking and adolescents. The inclusion criteria were peer reviewed empirical and review papers. Exclusion criteria were case studies and non-English papers. Following these criteria, 44 papers could be classified as adolescent sexual risk-taking/sexual activity studies including research on prevalence, risk factors and interventions. Most of the studies have been conducted in other countries where the prevalence of adolescent sexual activity has widely ranged from 6% to 65%. This variability may relate to different age groups and different types of sexual activity being surveyed. Many risk factors have been researched including parental factors (e.g. parent risk behavior), peer variables (e.g. peer pressure), religiosity (e.g. spiritual intelligence), mood (e.g. depression), health-related behavior (e.g. sexting), substance use (e.g. marijuana) and physiological markers (e.g. activation of various areas of the brain on fMRI scans). Very few interventions have been conducted (e.g. motivational interviewing by clinician or computer). Limitations of this literature include a limited number of longitudinal and intervention studies. This narrative review is accordingly divided into sections on prevalence data, risk factors and interventions for sexual activity in adolescents as well as methodological limitations of this literature.

Prevalence

The prevalence of sexual activity in the US has varied from 6% for sexual initiation before age 13 [32] to 65% for adolescents 15–19 years [22] (see Table 1 for prevalence figures and first authors). In the latter study, having multiple sex partners in the past year was most common among adolescents. Although in an analysis of the Youth Risk Behavior Survey data (N=147,800), annual averages on the prevalence of sexual activity declined 6% from the years 1999 to 2017 [5].

Prevalence	First author
US- 6% < 13 years 65% for 15-19 years	Morrow Habel
Brazil- 67% males 59% females	Goncalves
10 European countries- 19%	Gambadauro
Ghana- 52% < 14 years	Afriyie
Sub-Sahara Africa- 44%	Shayo
Ethiopia- 43%	Yimer
Taiwan- 16%	Lin
Korea- 6%	Lee
19 African, American, Asian countries - 12% (2019a)	Smith
38 countries- 13% (2019b)	Smith

Table 1. Prevalence of risky sexual behavior and first author.

A much higher prevalence was noted in data from Brazil [17]. In this sample (N=4027), 67% of the males and 59% of the females reported sexual initiation up to 16 years. The female adolescents who had sexual initiation at less than 17 years had higher odds of a major depressive episode by the age of 18, although that association was not reported for males.

A lower prevalence of 19% was reported for a sample of adolescents from 10 different European countries (N=11,110) [14]. The prevalence was significantly greater for adolescents older than 15 and for males. Logistic regressions suggested greater age/sex adjusted odds ratios for some predictor variables including smoking, alcohol, illegal drug use and poor sleep. Early sexual initiation was also related to externalizing and internalizing problems as well as fighting, truancy and low parental involvement.

The prevalence has been notably greater for African countries (ranging from 28% to 65%). A scoping review of published data on sexual health among Tanzanian adolescents (13 publications), for example, revealed high rates of early sexual initiation, multiple sex partners and limited use of condoms and contraceptives [33]. In a study from Ghana (N= 706), 28% were sexually active and of those, 52% had sexual intercourse at less than 14 years, 65% did not use a condom at their last sexual intercourse and 37% had multiple sexual partners but only 21% perceived themselves to be at risk for HIV infection [1]. Not surprisingly, those adolescents who had multiple sexual partners were more likely to perceive themselves at risk for HIV than those who had single partners.

In a study from sub-Saharan Africa including five countries (Benin, Mozambique, Namibia, Seychelles and Tanzania) (N= 15,318), the prevalence of sexual intercourse was 44% and the prevalence for sex with multiple partners was 21% [37]. Male adolescents had a greater prevalence of sex with multiple partners than female adolescents. And, the predictors of sexual activity with multiple partners were smoking cigarettes, alcohol use and the use of marijuana and amphetamines. In a systematic review of published articles on sexual activity in sub-Saharan African adolescents, the prevalence of practicing oral sex ranged from 1.7- 26.6% and anal sex from 6.4-12.4% [30]. These behaviors were reported more frequently by males and were associated with inconsistent condom use and multiple sexual partners.

In a cross-sectional study on Ethiopian adolescents (N=406), the Youth Risk Behavior Surveillance Questionnaire was used for data collection [49]. Two thirds of the participants reported sexual activity, with half of those who were currently sexually active reporting engaging in risky social behavior. The prevalence data included 43% starting sexual life earlier, 32% having multiple sexual partners and 24% not using condoms. Lesser odds of risky sexual behavior were associated with authoritative parenting and high-quality parent-adolescent relationships. A 37% increased odds of risky sexual behavior was reported for adolescents who had poor behavioral beliefs about sexual health and thought their parents' sexual health knowledge was poor.

The prevalence in Asian countries has been significantly lower. For example, in a study on Taiwanese adolescents (N=521), as many as 53% had experienced touching, hugging and kissing, but only 16% reported sexual activity [29]. The sexual activity in this study was associated with gender, number of past or current partners, drinking and drug use before sexual intercourse. Analysis of cross-sectional data from the Korea Youth Risk Behavior Survey (N= 60,040) yielded a very similar low rate of sexual experience (6%) [28]. In addition, a relationship was noted between sexual experience and depressive symptoms, with 34% of the girls and 21% of the boys having depressive symptoms.

More extensive data have come from a study on 19 countries that included Africa, the Americas and Asia (N= 34,674) [40]. Prevalence for the last year of sexual intercourse was 12% and a dose-dependent relationship was noted between sedentary behavior and the odds of reporting sexual intercourse. The largest association between sedentary behavior and sexual intercourse was mediated by alcohol use. The same research group reported data on 38 countries (N= 116,820) [41]. In this sample, the prevalence of sexual intercourse was virtually the same at 13%. And in this sample, they looked at suicide attempts which were positively related to sexual intercourse in 32 of the 38 countries. Having multiple sexual partners was associated with increased odds of suicide attempts and non-condom use was associated with suicide attempts among the boys in the Americas.

Risk Factors

Interestingly, the recent literature on sexual activity has more frequently focused on risk factors for sexual activity as opposed to an

earlier literature that focused on the effects of sexual behavior including teenage pregnancy and sexually transmitted disease (See Table 2 for list of risk factors and first authors). Many risk factors have been identified in the recent literature on sexual activity in adolescents including parental factors, peer relationships, spiritual intelligence and religiosity, mood states, sexual activity-related behavior and substance use.

Risk factors	First authors
Parental factors	
< Time with biological parents	Astle
> Residential mobility	Tuitt
> Parent risk behavior	Govender
Peer factors	
< Peer-group interactions	Syah Putri
> Peer pressure	Ybarra, Alimor
Religiosity & spiritual intelligence	
< Parent religiosity	Efrati
< Religiosity of adolesc	Vasilenko, Hayward
	Yazdi-Feyzabadi
< Spiritual intelligence	Simak
Negative mood states	
> Sadness & hopelessness	James
Depression	Foley
Depression & anxiety	Harries
Negativity about risky sex	Rouche
Sexting & sexually explicit material	
Sexting	Koletic, Mori
Substance use	
Alcohol	Dallo, Garcia
Alcohol & marijuana	Graves
Marijuana	Smith

Table 2. Risk factors for risky sexual behavior and first authors.

Parental Factors

The parental variables that have been considered risk factors include limited time with biological parents, residential mobility, childhood adversity and parent risk behaviors. In a study on family of origin factors and sexual behavior in adolescents (N= 2556), the results showed that more time spent with biological parents was related to less likelihood of experiencing any kind of sex as an adolescent [4]. Residential mobility was another risk factor in a study on American Indian and Alaska native youth and sexual activity [44]. According to this research group, these youth were more likely to engage in sexual activity prior to age 13 compared to any other ethnic groups. The results of a structural equation model on these longitudinal data suggested a negative relationship between residential mobility and what they termed sex refusal self-efficacy. And, deviant peers mediated that relationship. In a large cross-sectional sample of South African adolescents (N= 2561), hierarchical ordinal logistic regression results suggested that parent risk behavior was a significant predictor of risky sexual behavior [19]. Other risk factors in this study were being black, male, greater age, and using alcohol excessively. In addition, peer risk behavior and feeling more pressure from peers "to have sex" were significant factors.

Peer Factors

Peer pressure "to have sex" has been noted in another cohort of adolescents (N=876) [48]. Their data suggested not only that adolescents perceived more peer pressure to have sex, but also that they were more accepting of brief non-marital sex. Typically both parents and peers have had important influences on adolescents' sexual behavior. For example, in a recent cross-sectional questionnaire study from Indonesia (N=10),

both parents' communication patterns and peer interactions were related to risky sexual behavior [43]. The intersection of parental and peer influence has also been noted in a systematic review of the literature on sexual behavior in Iranian adolescent girls [2]. This review also documented school and community influences on adolescent sexual behavior. Surprisingly, recent research on school and community influences did not appear in the recent literature on sexual risk-taking in adolescents, although schools would be the most common location for peer influences to occur.

Religiosity and Spiritual Intelligence

Religiosity and spiritual intelligence have appeared as buffers in literature on other adolescent problems including sexting [10] and pornography [11]. This has also been true for this literature on risky sexual behavior in adolescents. At least five papers in the recent literature have documented the protective effects of religiosity and spiritual intelligence. In one of these studies, Israeli parents and adolescents (N=275) completed questionnaires to determine whether parent-adolescent communication mediated the relationships between parental characteristics and adolescents' compulsive sexual behavior [7]. For girls, higher maternal self-esteem and lower psychopathology were related to better sex-related communication and lower compulsive sexual behavior. But for boys, only parental religiosity was related to the quality of sex-related communication. Religious parents had better communication with their adolescents than secular parents. In a much larger sample (N=10,149), the religiosity of the adolescents themselves was associated with lower odds of risky sexual behavior [46]. Using data from two waves of the National Study of Youth and Religion, the influence of religiosity was shown to increase as the adolescents became more religious [24].

In a systematic literature review of research conducted with adolescents in Iran, 12 studies revealed several risky sexual behaviors in adolescents [47]. These included the absence of religious beliefs as well as other risk factors including low self-esteem, antisocial behavior in the family, poor parenting style, poor intimacy of parents, and absence of parents, peer pressure and lack of appropriate recreation. In a cross-sectional study from Indonesia, adolescents were selected by stratified sampling from three junior high schools (N=302) [39]. A negative correlation was reported between scores on the Spiritual Intelligence Self-Report Inventory and risky sexual behavior as measured by the Sexual Risk Survey.

Negative Mood States

Negative mood states that are risk factors for risky sexual behavior among adolescents include sadness, hopelessness, depression, and anxiety. Although these negative mood states are often comorbid, the researchers have frequently focused on only one mood state. And, surprisingly, only a few studies on negative mood states have been published in this recent literature on risky sexual behavior in adolescents. In the first of these, data from the South African Youth Risk Behavior Survey (N=10,997) were submitted to a logistic regression analysis [25]. Feelings of sadness or hopelessness were significantly related to forced sex, ever having sex, and having more than one partner in the preceding three months. These feelings were also associated with being in the higher grades, being bullied, being assaulted by a partner, binge drinking, having made a plan to attempt suicide, and an actual suicide attempt.

In a sample of sexually active African-American adolescents (N=782), depressive symptoms significantly predicted sex with two or more partners for females, and depressive symptoms had a significant indirect effect on decreased condom use for both male and female adolescents [13]. In a study that compared adolescents who engaged in sexual behavior before age 15, between ages 15 and 18 and after age 18, those who engaged in sexual activity before age 15 had more depression and

anxiety symptoms and they had higher scores on a scale for pathological gambling [23].

Data from the 2014 cross-sectional Health Behavior in School-Age Children Study in Belgium (N=1778) suggested that 26% had poor health-related quality of life, 20% expressed a negative feeling about the timing of their first sexual intercourse and 20% did not think about it [35]. Adolescents who felt negatively about the timing and those who did not think about it were more likely to have a poor health-related quality of life.

Sexting and Sexually Explicit Material

The data on the associations between online sexual activity and risky sexual behavior have been mixed, with some saying that online sexual activity leads to risky sexual behavior and some reporting no association. For example, in a longitudinal study on Croatian adolescents (N=368), the association between the frequency of sexually explicit material use and risky sexual behavior was assessed [27]. The measures of risky sexual behavior were the lack of condom use and multiple sexual partners. The results suggested no association between the frequency of sexually explicit material and the two measures of sexual risk-taking. Others, however, have cited several studies suggesting a relationship between sexting or the exchange of sexual messages, photographs or videos online and risky sexual behavior. In this meta-analysis on 23 studies (N=41,723), significant associations were noted between sexting and sexual activity as well as between sexting and having multiple sexual partners and the lack of contraception use [31]. Not surprisingly, sexting was also associated with delinquent behavior, anxiety, depression, alcohol use and smoking, as had been noted in a recent review on sexting in adolescents [10].

Substance Use

Surprisingly few studies were found in this recent literature on substance use as a risk factor for risky sexual behavior. Those few studies involved alcohol and/or marijuana. In a study on Brazilian secondary school students (N=590), 14% engaged in risky drinking behavior with a higher rate among boys and 31% engaged in binge drinking [6]. Young boys reputedly started sexual life earlier and had uncommitted relationships. With respect to the association between alcohol use and risky sexual behavior, 47% stated that they used alcohol before having sex and those who started sexual activity earlier got more drunk and had higher scores on the Alcohol Use Disorders Identification Test.

In a review on hookups (uncommitted sexual encounters), sexual victimization was associated with alcohol-related hookups [15]. In a truant adolescent sample (N=76), the use of marijuana and/or alcohol on a given day was associated with greater odds of engaging in sexual intercourse on the same day [21]. The odds of risky sexual activity were greater for those who occasionally versus frequently used marijuana and those who frequently versus occasionally used alcohol.

In a survey on adolescents (12-15-years old) from 21 low and middle income countries (N=84,867), 13% reported having sexual intercourse [40]. Of those, 53% said they had multiple sexual partners. Those who used marijuana were more likely to have ever had sexual intercourse. And, among those who had sexual intercourse, those who used marijuana were more likely to have had multiple sexual partners.

Potential Underlying Mechanisms

In contrast to the risk factor literature on sexual activity in adolescents, very little research has focused on potential underlying mechanisms for risky sexual behavior (See Table 3 for list of potential underlying mechanisms and first authors).

Mechanism	First authors
Insufficient sleep	Short
Dietary effects	La, Allen
> Activation reward centers in brain (fMRIs)	Gardiner

Table 3. Potential underlying mechanisms for risky sexual behavior and first authors.

Insufficient sleep and sexual risk-taking have been linked by some, dietary effects by others, and still others have addressed activation in different brain regions as being a potential underlying mechanism. In a systematic review and meta-analysis on sleep and sexual risk-taking in adolescents, insufficient sleep was associated with greater odds of risk-taking including sexual risk-taking [38]. In this large pool of participants (N= 579,380), diverse categories of risk-taking were noted including alcohol use, drug use, smoking, violent/delinquent behavior, and road safety. The authors acknowledged a risk of bias as the quality of the studies was mixed, and the absence of longitudinal or experimental designs limited any causality conclusions.

The role of diet has also been said to affect sexual activity [3, 27]. The Western diet, Mediterranean diet and high fiber diets may affect the activation of hormonal responses that determine sexual activity. Diets can increase mitochondrial function that provide cognitive control to brain regions and activation of the brain. These dietary effects have been reported for samples of men and their circulating sex hormones [3, 27], although they have not yet been studied in adolescents.

Given the many fMRI studies on other adolescent problems including sexting [10] Internet addiction [8], and cyberbullying [9], it is surprising that only one study could be found on fMRI scans and their relationship to risky sexual behavior in adolescents [16]. These authors suggested that risky sex involves reward and cognitive control brain regions that have also been implicated in real-world risky decision-making. In this study, adolescents reported on risky sexual behavior at baseline and at three month intervals over one year. They also engaged in a cognitive paradigm that involved reward and cognitive control during fMRI scanning. Greater activation in brain regions that involve reward and cognitive control including, for example, the anterior cingulate and the dorsolateral prefrontal cortex, was associated with greater increases in risky sexual behavior across the study period. These findings highlight the neural basis for risky behavior and suggest a potential underlying mechanism for risky sexual activity.

Interventions

A number of different kinds of interventions have appeared in the recent literature on risky sexual activity in adolescents (See Table 4 for a list of interventions and first authors).

Intervention	First author
Media literacy	Vahedi
Video games	Fiellin
Computerized motivational interviewing	Shafi
Group counseling	Kabiri
Classroom discussion & condom distribution	Pakainen
HPV vaccination	Grandahl

Table 4. Interventions for risky sexual behavior and first authors.

These include media literacy, videogames, classroom discussion, condom distribution, motivational interviewing by clinician or computer, group counseling, and HPV vaccination. Media literacy interventions have focused on critical media consumption in order to decrease risky health behaviors including risky sexual activity and substance use [45]. In a meta-analysis of 15 studies on the effectiveness of interventions focusing on media literacy skills, positive effects were noted on both media literacy

skills and attitudes and intentions. In a videogame intervention for sexual risk reduction in racial/ethnic minority adolescents, participants (N=333) were randomly assigned to an experimental videogame or control videogames for a six- week period and follow-up assessments were conducted at 6 weeks and at 36 weeks and 12 months [12]. Over the 12 month period, the intervention group showed improved sexual health attitudes and increased sexual health knowledge, although surprisingly the groups did not differ on intentions to delay the start of intercourse.

Computerized motivational interviewing is another possible Internet intervention. In a study on clinicians using motivational interviewing, the large majority (82%) reported that it would be extremely useful to conduct motivational interviewing on sexual risk behaviors on computerized programs [36]. In this survey, the clinicians suggested that this would be a more cost-effective way of screening, generating risk profiles and providing risk-reduction counseling as opposed to doing it themselves.

Group counseling has also been effective, as was noted in a study from Iran [26]. This intervention program was comprised of 60-minute sessions over a seven-week period that were focused on self-awareness skills. The group counseling decreased sexual risk-taking in the students. This study was limited, however, by recruiting only female adolescents and by relying on scores on the Adolescent Risk-Taking Scale.

Changing attitudes, knowledge and sexual behavior has also been the focus of classroom interventions. For example, in a study from Finland, the intervention was comprised of classroom sessions, information materials, and free condom distribution [34]. The results were based on electronic surveys that suggested that the intervention resulted in better knowledge and more frequent testing for sexually transmitted infections. However, it's not clear which aspect of this multi-faceted intervention was effective. In a Swedish national school-based vaccination program, adolescents were provided HPV vaccinations [20]. The HPV vaccinated girls perceived HPV infections as more severe, had more insight into their susceptibility to infection, perceived more benefits of the vaccine as protection against cervical cancer, had a greater intention to engage in HPV-preventive behavior, and were also less likely to have unprotected sex.

Discussion

The prevalence data highlight sexual risk-taking as a widespread problem across many cultures. The effects or the correlates of sexual risk-taking can contribute to dysfunctional behavior during adolescence. The risk factors not only reside within personality factors but also parenting behavior and peer influence. Unfortunately very little underlying mechanism research has been conducted, although some data on substance use, dietary effects and fMRI scans are suggestive. The intervention research has been extremely limited likely because profiles need to be identified and the predictor/risk factor research needs to better inform intervention protocols. Despite the strides that have been made in this recent literature, there are many methodological limitations.

The methodological limitations of the recent literature on risky sexual activity in adolescents include variability of sampling, definitions of risky sexual activity, self-report measures, and data analyses. The variability has, in turn, limited meta-analyses. The majority of the research has been epidemiological studies focused on prevalence and risk factors. Unlike the older literature, recent research has not focused on negative effects of risky sexual behavior, for example, teenage pregnancies and sexually transmitted diseases. And, only a few underlying mechanism and intervention studies could be found in this literature search.

In addition, most of the prevalence studies have been conducted in Africa and Asia, although a few were multiple-country studies. Unlike other adolescent problems, for example, Internet addiction [8] and sexting [10], risky sexual activity has not been studied in many cultures, possibly

because parents need to give informed consent for their adolescents' participation and they may not be willing to acknowledge that their adolescents are engaging in risky sexual activities. Similarly, the adolescents themselves may not want to acknowledge that activity. These problems limit the representativeness and generalizability of the datasets. In addition, most of the studies are convenience samples that have not been randomly selected, again limiting generalizability. Some of the studies are even limited to female or male adolescents. Others have been large age-range samples and have, for example, combined middle school and high school students in their data analyses despite the expected variability across age on the types of sexual behavior as well as the frequency of risky sexual activity. And, surprisingly, some studies have reported sexual risk-taking activity as early as pre-adolescence.

Further, most of the recent studies on risky sexual activity have been cross-sectional, making it impossible to determine causality or direction of effects. Although most of the research has focused on risk factors, those factors could also be considered effects, as many of the variables may be reciprocal or bi-directional, for example, alcohol leading to risky sex, in turn, leading to more alcohol. More longitudinal studies are needed to determine direction of effects to inform intervention research.

Risky sexual activity has also varied in its definition, as some researchers have focused on pre-adolescent and early adolescent sexual behaviors as being sexual risk-taking while others have defined sexual risk-taking as sex without condoms and/or with multiple partners. Similarly, the measures have been highly variable on the time of occurrence, for example, the "last month" or "have you ever had sex". And, in most cases, the contexts and the immediate precursors for risky sexual activity, except for alcohol intake, have not been measured.

As has been noted in research on other risky behaviors in adolescents, the primary measures have been self-reports which could result in over-reporting or under-reporting or questionable reliability. Most of the surveys have been online questionnaires and the adolescents have often been recruited at their schools. Even if they are anonymous surveys, adolescents (and their consenting parents) may feel embarrassed or ashamed to report risky sexual behavior. This is exemplified by the relative absence of parental reports in this literature.

The influences of parents, peers and teachers are notably absent in this literature given that peer pressure has been noteworthy in the sexting research [10]. And media influences have also been absent from this literature, although they have been apparent in the sexting research [10]. In addition, very little research has focused on physiological measures that might suggest potential underlying mechanisms. Although one study reported sleep deprivation and another focused on greater activation in various areas of the brain, these measures have rarely been used in this literature. Laboratory measures might help profile at-risk adolescents for prevention/intervention programs which are also rare. Surprisingly few interventions have been researched, including those that have been effective for other adolescent problems, e.g. cognitive behavior therapy.

Following these methodological limitations, future research might include longitudinal studies to determine direction of effects. Interview studies might help determine immediate precipitating factors as well as predisposing risks. Research on biochemical and physiological correlates such as neurotransmitter profiles and fMRI scans might also be informative as they have been for other addictive behaviors in adolescents like sexting [10] internet addiction [8] and cyberbullying [9]. Similarities and differences might be noted for these addictive behaviors. Tapping a wider variety of variables might also help identify risk profiles. On the other hand, the absence of systematic reviews and meta-analyses might relate to excessive variability in sampling and measures that has precluded these types of research. And, more complex data analyses such as

mediator/moderator and structural equations models might be informative.

Conclusion

Many risk factors have been researched including parental factors (e.g. parent risk behavior), peer variables (e.g. peer pressure), religiosity (e.g. spiritual intelligence), mood (e.g. depression), health-related behavior (e.g. sexting), and substance use (e.g. marijuana) as well as physiological markers (e.g. activation of various areas of the brain on fMRI scans). Insufficient sleep, dietary effects and activation of various brain regions have been offered as potential underlying mechanisms. The methodological limitations of this recent literature on the prevalence and risk factors highlight the need for further research as well as prevention/intervention programs to reduce sexual risk-taking in adolescents

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