Parental Monitoring and Its Associations With Adolescent Sexual Risk Behavior: A Meta-analysis

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abstract

CONTEXT: Increasingly, health care providers are using approaches targeting parents in an effort to improve adolescent sexual and reproductive health. Research is needed to elucidate areas in which providers can target adolescents and parents effectively. Parental monitoring offers one such opportunity, given consistent protective associations with adolescent sexual risk behavior. However, less is known about which components of monitoring are most effective and most suitable for provider-initiated family-based interventions.

OBJECTIVE: We performed a meta-analysis to assess the magnitude of association between parental monitoring and adolescent sexual intercourse, condom use, and contraceptive use.

DATA SOURCES: We conducted searches of Medline, the Cumulative Index to Nursing and Allied Health Literature, PsycInfo, Cochrane, the Education Resources Information Center, Social Services Abstracts, Sociological Abstracts, Proquest, and Google Scholar.

STUDY SELECTION: We selected studies published from 1984 to 2014 that were written in English, included adolescents, and examined relationships between parental monitoring and sexual behavior.

DATA EXTRACTION: We extracted effect size data to calculate pooled odds ratios (ORs) by using a mixed-effects model.

RESULTS: Higher overall monitoring (pooled OR, 0.74; 95% confidence interval [CI], 0.69–0.80), monitoring knowledge (pooled OR, 0.81; 95% CI, 0.73–0.90), and rule enforcement (pooled OR, 0.67; 95% CI, 0.59–0.75) were associated with delayed sexual intercourse. Higher overall monitoring (pooled OR, 1.12; 95% CI, 1.01–1.24) and monitoring knowledge (pooled OR, 1.14; 95% CI, 1.01–1.31) were associated with greater condom use. Finally, higher overall monitoring was associated with increased contraceptive use (pooled OR, 1.42; 95% CI, 1.09–1.86), as was monitoring knowledge (pooled OR, 2.27; 95% CI, 1.42–3.63).

LIMITATIONS: Effect sizes were not uniform across studies, and most studies were cross-sectional.

CONCLUSIONS: Provider-initiated family-based interventions focused on parental monitoring represent a novel mechanism for enhancing adolescent sexual and reproductive health.

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Youth in the United States are disproportionately affected by negative sexual and reproductive health outcomes that warrant greater attention from physicians, nurses, and other health care providers. Although young people aged 15 to 24 years represent a quarter of the sexually experienced population, they account for nearly half of all new sexually transmitted infections.[1] Rates of sexually transmitted infections, such as chlamydia, gonorrhea, and HIV, among people aged 15 to 24 years are unacceptably high, although current surveillance data show signs of potential progress in reducing rates for young people.[1,2] In 2012, the highest rate of new HIV diagnoses occurred among 20- to 24-year-olds.[2] Despite notable progress in reducing teen pregnancy,[3] the US teen pregnancy rate continues to be the highest among the developed world.[4] Each year ~750 000 teens <20 years old become pregnant in the United States, and more than three-quarters of these pregnancies are unplanned.[3,5] These data highlight the sexual and reproductive health needs of young people as a significant public health issue requiring renewed and ongoing focus. Complicating this problem is the perception by many, including parents, that adolescents are generally healthy and in less need of health care, along with the lower prioritization of adolescent preventive health care in many medical settings.[6] Increasingly, however, physicians and other health care providers have begun to recognize the importance of adolescence as a distinct developmental period for the onset of long-term health trajectories that contribute to disease morbidity and mortality in adulthood.[7–9] Sorely needed are focused interventions that provide specific guidance to health care providers regarding how best to support adolescent health.

Adolescent sexual and reproductive health not only is central to the immediate health of teens but also has implications for shaping future adult health. Behaviors initiated in adolescence are often directly linked to disease burden in adulthood. For example, it is estimated that nearly 70% of premature deaths in adulthood are associated with lifestyle factors initiated during adolescence.[10] Adolescents are particularly vulnerable to health-related risks because of behavioral decision-making that is largely influenced by the broader contexts in which they are embedded. Reinforcing contexts supportive of positive youth development and the prevention of adolescent problem behavior will decrease the likelihood of significant disease burden during adolescence and in later life.[9] For youth, among the most influential of these contexts is the family and, in particular, parents.[11–14] Interestingly, both parents and adolescents indicate that their health care providers are among the most trustworthy and expert sources of guidance regarding the promotion of health and overall well-being.[15–17] Therefore, research highlighting opportunities and specific mechanisms for triadic interventions, defined as provider-initiated efforts targeting adolescents and their families, is warranted and addresses a gap in the scientific literature. The dearth of empirically supported guidance for the development and implementation of triadic interventions is a significant gap in our nation's current efforts to reduce sexual and reproductive health disparities among youth.

A large evidence base supports the positive impact of parents on the sexual and reproductive health of youth.[12,13,18–20] Furthermore, research suggests that parents value and seek out practical guidance from their adolescent children's health care providers in supporting adolescent sexual and reproductive health.[15,16,21] Recently, some research has highlighted the importance of provider endorsement of effective parenting in support of adolescent health.[15,16,21,22] One of the core mechanisms by which parents modify sexual decision-making among teens is parental monitoring.[23–25] Although there is no single definition of parental monitoring, 2 aspects of monitoring have emerged as central, with implications for teen behavior. These are a global form of parental monitoring, parental knowledge of adolescents' companions, whereabouts, and activities, and a behavior-specific form of monitoring, enforcement of rules about friends and dating.[26] Youth who report higher levels of these forms of parental monitoring are more likely to report delaying the onset of sexual activity and to report use of condoms and contraceptives.[24,25,27,28] However, it is unclear whether 1 form of monitoring is more effective than another, or whether parental monitoring effects on youth vary by gender, age, or sexual experience. Given the significant health consequences that result from risky sexual behavior in adolescence, greater empirical evidence on the role and specific components of parental monitoring is needed to inform the development and delivery of effective triadic interventions.

This meta-analysis examines the relationship between parental monitoring and adolescent sexual behavior. We evaluate whether specific types of parental monitoring (ie, global knowledge of activities or enforcement of sexual behavior-specific rules) and overall parental monitoring have a differential effect on adolescent sexual intercourse, condom use, and contraceptive use, thereby also exploring the extent to which an adolescent's sexual experience is an important factor in determining parental influence. We also examine whether the age or gender of adolescents is associated with the strength of monitoring effects on sexual behavior.

METHODS

Data Sources

A Centers for Disease Control and Prevention research librarian and investigators conducted a computerized literature search of Medline, Cumulative Index to Nursing and Allied Health Literature, PsycInfo, Cochrane, Education Resources Information Center, Social Services Abstracts, Sociological Abstracts, Proquest, and Google Scholar databases using key terms related to parental monitoring practices (eg, monitoring, rules, enforcement, supervision) and adolescent sexual behavior (eg, sexual intercourse, condom and contraception use). Database search results that provided lists of references that cited eligible studies and references of eligible studies for inclusion were searched to identify additional studies not identified in the computer-based search.

Inclusion Criteria and Study Selection

Included studies were published in English between January 1984 and December 2014. The year 1984 was identified as the starting point for the search because the seminal study by Patterson et al[29] on parental monitoring was published that year. We focused on adolescents aged 10 to 19 years old (middle and high school age), and examined the association between parental monitoring and ≥1 of the following adolescent sexual risk behaviors: ever engaged in sexual intercourse, condom use, contraceptive use, intention to engage in sexual intercourse, frequency of sexual intercourse, number of sexual partners, and sexually transmitted infection and pregnancy outcomes. Studies that examined both condom and contraceptive use were required to report these data as separate outcomes. Condom and contraceptive use was not measured uniformly across studies and could include differing time frames of recall (eg, past year, last intercourse) and a list of individual methods (eg, birth control pill, patch, injections, intrauterine device) as well as a general measure of pregnancy prevention. We imposed no restriction on the type of parental monitoring examined (ie, knowledge of companions, whereabouts, and activities; enforcement of rules; direct supervision; youth disclosure; and parent solicitation). We did not attempt to contact authors for original data or include conference proceedings; however, unpublished dissertations were eligible for inclusion. We excluded studies that did not take place in the United States or in a country with a comparable Western culture and public health infrastructure (eg, Canada, Australia, Western European countries). We also excluded studies focused specifically on sexual minority youth because parenting behaviors may be different for this population.

After enumerating all eligible studies by sexual risk behaviors and parental monitoring types, we found studies that examined ever engaging in sexual intercourse, condom use, and contraceptive use to be the only outcomes with the appropriate number of studies from which to analyze data. Subsequently, from these studies, parental knowledge, mainly concerning child whereabouts, and parental enforcement of rules were the most prevalent parental monitoring types. Data extraction and analysis were limited to studies that focused on these parental monitoring types and sexual risk behaviors. Analyses of monitoring were conducted on an overall summary of parental monitoring and on the knowledge component and rules component separately.

Data Extraction

Articles were independently reviewed for inclusion by 4 authors (P.J.D., S.L.M., J.S.B., and K.M.G.) using abstracted study characteristics (ie, source, study design, sample characteristics, parental monitoring measures, adolescent sexual risk behavior measures, and analytic strategy). Using a structured coding sheet, 3 authors (P.J.D., S.L.M., and J.S.B.) simultaneously abstracted additional information (ie, effect size data) from eligible studies. Study quality was determined by the sum total of scores given for study design, sample size, sampling design, missing data, and reported psychometric properties of parental monitoring measures. The possible range of methodological quality scores was from 5 to 15. The actual range of scores from our studies was 6 to 14. A score of ≥9 was selected a priori to identify high-quality studies.

In studies that reported measures for both parental knowledge and enforcement of rules, data were abstracted for each association with a sexual risk behavior. Associations reported separately by gender were also abstracted. To reduce potential confounding and bias in our summary estimates of observational studies, we preferred adjusted estimates that controlled for known demographic factors over crude estimates.[30] In studies where parental monitoring scores for both parents and adolescents were reported, the adolescent score was used. Studies that used large public data from national surveys, such as the National Longitudinal Study of Adolescent Health, were reviewed again to ensure that participants across the studies were not represented twice in the analysis. To ensure accuracy, 1 author (K.M.G.) blindly reviewed 25% of studies. Discrepancies in the abstraction were resolved by group consensus. The current meta-analysis followed the Meta-analysis of Observational Studies in Epidemiology checklist, and the study selection flowchart was adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.[31,32]

Data Analysis

All analyses were performed with Comprehensive Meta-Analysis

software (Biostat, Englewood, NJ).[33] We examined the overall effect of parental monitoring on each adolescent sexual risk behavior outcome (ie, sexual intercourse, condom use, and contraceptive use). We stratified the analysis to examine effect sizes for the different types of parental monitoring (ie, knowledge vs rules), and, number of studies permitting, gender and age, categorized as middle school (≤14 years old) and high school (>14 years old), were examined to determine their role in parental monitoring and sexual behavior. The analysis used a mixed effects model[33] in that for each sexual behavior outcome, pooled effect sizes for each parental monitoring type were calculated with the random effects model, then combined under the fixed effects model to calculate an overall summary effect size for overall parental monitoring.

Heterogeneity was assessed with the Q test statistic and I^2 values. The amount of heterogeneity, indicated by the I^2 value, can be interpreted with Higgins's index: I^2 values of 25%, 50%, and 75% correspond to low, moderate, and high heterogeneity, respectively.[34] We reran the analyses, removing 1 study at a time, observing how much each study accounted for heterogeneity. By using this process we identified potential outliers. Sensitivity analysis based on study quality and removal of outliers was used to address heterogeneity and increase the precision of the summary estimates. Metaregression was also used to determine whether age was a source of excess heterogeneity.

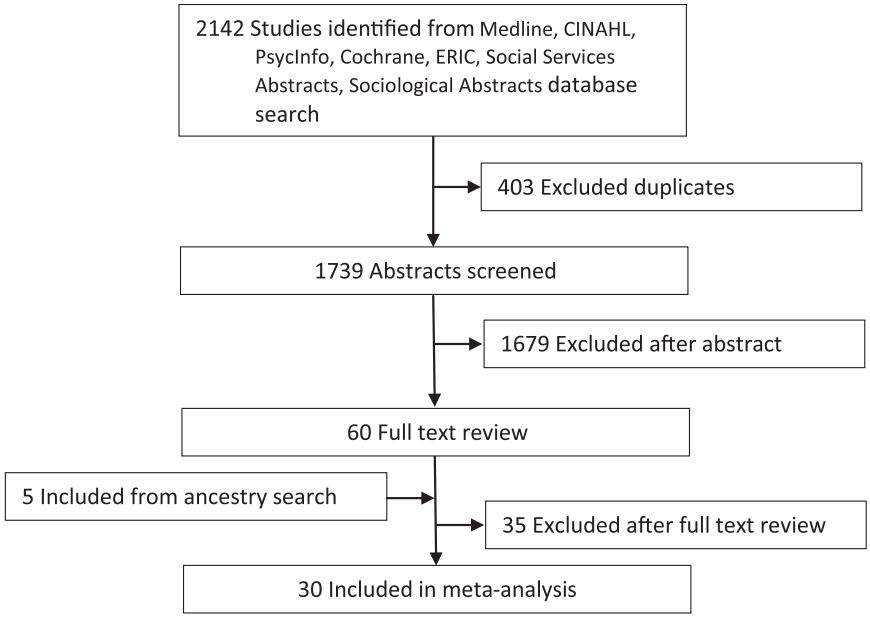

FIGURE 1
Selection process for study inclusion in the meta-analysis.

RESULTS

Search Results

The literature search yielded 2142 studies. After we excluded duplicates and screened 1739 abstracts by using a standardized coding sheet, 60 studies remained for full text review (Fig 1). Thirty eligible studies were identified, contributing 49 effect sizes with 40 625 participants (Table 1).[24,25,27,28,35–54] We narrowed our focus to studies that examined the outcomes of sexual intercourse, condom use, and contraceptive use because too few examined other sexual behaviors as they related to parental monitoring (eg, intentions to engage in intercourse, n = 2; frequency of intercourse, n = 1). Likewise, the majority of the studies examined parental monitoring knowledge (n = 20) or enforcement of rules (n = 10). Few studies included parental solicitation, youth disclosure, or supervision as they related to sexual behaviors; therefore, these 3 types of parental monitoring were not included in the meta-analysis. Descriptions of included studies by sexual risk behavior are listed in Table 1. We identified 24 studies evaluating 30 associations between parental monitoring and adolescents' report of having engaged in sexual intercourse.[25, 27, 28, 36–40, 42, 43, 45, 46, 48, 50, 51, 53, 55–62] We treated the 30 effect sizes as separate data points for analysis (19 for knowledge, 11 for rules). For condom use, we identified 9 studies evaluating 11 associations (6 for knowledge, 5 for rules).[24, 25, 28, 37, 38, 47, 50, 52, 57] For contraceptive use, we identified 6 studies with 8 associations (3 for knowledge, 5 for rules).[24,25,35,40,41,54] In total, 18 studies were cross-sectional and 12 were longitudinal. The age of adolescents ranged from 10 to 17 years. The analytic sample sizes of the studies ranged from 106 to 10 575, with the majority >300.

Parental Monitoring and Adolescent Sexual Intercourse

Figure 2 shows the results of the mixed-effects meta-analysis examining the association between overall parental monitoring, type of parental monitoring, and adolescents' reports of ever having sexual intercourse. Higher overall parental monitoring was associated with a decrease in the number of adolescents ever having sex (pooled odds ratio [OR], 0.68; 95% confidence interval [CI], 0.61–0.75). Both higher monitoring knowledge (pooled OR, 0.72; 95% CI, 0.63–0.83) and enforcement of rules (pooled OR, 0.61; 95% CI, 0.52–0.72) were associated with a decrease in the

TABLE 1 Characteristics of Studies Included in Meta-Analyses

Source[a]	Sample (% Female)	Age, y[b]	Quality Score	Monitoring Type	Covariates[c]	Outcome Measure
Sexual intercourse						
Bersamin et al (2008)[d,e]	887 (48)	15	12	Knowledge	Adolescent: age, gender, ethnicity, family income	Vaginal intercourse: yes/no
Borawski et al (2003)[e]	692 (51.2)	16	11	Rules	Adolescent: age, gender, ethnicity, neighborhood SES	Sexual activity, past 4 mo: yes/no
Bouris (2009)[e]	10 575 (47.1)	16	12	Knowledge	Adolescent: age, gender, ethnicity, family structure (single- or 2-parent)	Ever had sex: yes/no
Capaldi et al (1996)[d,e]	206 (0)	15	10	Rules	Parent: parental/family structure transitions, parent SES, parental antisocial behavior Adolescent: deviant peer association	Ever had sex: yes/no
Chewning et al (2001)	476 (49)	15	8	Knowledge	Adolescent: age, gender, grade, school attended, family structure (single- or 2-parent)	Ever had sex, last 3 mo: yes/no
Dancy et al (2010)[d,e]	396 (100)	12	11	Knowledge	Adolescent: grade level, grade earned Mother: age, education, employment status, monthly income, receipt of welfare assistance, marital status, number of children	Have you ever had vaginal, anal, or oral sex: yes/no
Hope et al (2005)[e]	709 (52)	17	11	Knowledge	Adolescent: age, gender, race, family poverty status	Ever had sex: yes/no
Kapungu et al (2006)[d,e]	274 (57)	13	10	Rules	Adolescent: age, gender, HIV knowledge	Initiating sex: yes/no
Longmore et al (2001)[d]	752 (54.2)	15	13	Rules	Adolescent: race or ethnicity, poverty level estimate; maternal education	Ever had sexual intercourse: yes/no
Longmore et al (2009)[d]	697 (53.7)	15	14	Knowledge	Adolescent: age, gender, race or ethnicity	Ever had sexual intercourse: yes/no
Manlove et al (2012)	4588 (49.8)	13	12	Knowledge	Adolescent: age, race or ethnicity, born outside of the US, substance abuse in last year, behavior problems index, puberty status, number of dates in last year Parent: education, religious attendance	First heterosexual sex: yes/no
Miller et al (1986)	2329 (63)	16	7	Rules	None reported	Full sexual relations: yes/no
Morales-Campos et al (2012)	655 (60)	13	12	Knowledge	Adolescent: age, gender, family structure (single or 2-parent), acculturation level, parent or guardian education	Ever had vaginal sex: yes/no
Parkes et al (2011)[e]	1854 (50.1)	16	10	Rules	Adolescent: age, gender, family structure (single- or 2-parent), academic ability, paternal education	Ever had penetrative sex: yes/no
Rai et al (2003)[e]	1383 (52.3)	15	10	Knowledge	Adolescent: age, gender	Ever had sex: yes/no
Roche et al (2005)[d,e]	2559 (54.6)	15	11	Rules	Adolescent: gender, race or ethnicity, family income, family structure (single- or 2-parent), pubertal development, deviant peer affiliation	Had sex since time 1: yes/no
Romer et al (1999)	355 (51.3)	13	10	Knowledge	Adolescent: age, sex; parent interaction (frequency of monitoring), type of guardian	Had sex, made love: yes/no
Rose et al (2005)	408 (54)	10	10	Knowledge	Adolescent: gender Parent: marital status, education, employment outside home	Ever had sex: yes/no

TABLE 1 Continued

Source[a]	Sample (% Female)	Age, y[b]	Quality Score	Monitoring Type	Covariates[c]	Outcome Measure
Sieverding et al (2005)[d]	307 (42.3)	16	10	Knowledge	Adolescent: age, sex	Had sex, last 6 mo: yes/no
Sneed et al (2009)	106 (0)	14	8	Knowledge	Adolescent: age, gender, ethnicity	Penis in your vagina: yes/no
Vélez-Pastrana et al (2005)	425 (63.5)	14	7	Knowledge	Adolescent: age, gender, grade, academic achievement (grades) Parent: education, marital status, religious affiliation	Ever had sex: yes/no
Whitbeck et al (1999)[d]	457 (54.3)	13	9	Knowledge	Adolescent: gender, grade, pubertal development, and family structure (single- or 2-parent)	Had sex, past year: yes/no
Wight et al (2006)[d,e]	5041 (53.5)	16	9	Rules	Adolescent: ethnicity, religiosity, family structure (single- or 2-parent), presence of friends at school and friends who smoke, sibling relations Parents: age, education, social class (nonmanual or manual), housing type (rented or owner)	Ever had sex: yes/no
Yang et al (2007)[d]	801 (57.7)	14	12	Knowledge	Adolescent: age, school performance, peer risk involvement, lifetime risk behavior	Vaginal sex: yes/no
Condom use						
Borawski et al (2003)[e]	243 (54.1)	16	10	Rules	Adolescent: age, gender, ethnicity, neighborhood SES	Consistent condom use, past 4 mo: every time/inconsistent
Bouris (2009)[e]	1999 (n/a)	16	12	Knowledge	Adolescent: age, gender, ethnicity, family structure (single- or 2-parent)	Consistent condom use, past 12 mo: 5-point scale, none to every time
DiClemente et al (2001)	522 (100)	16	9	Knowledge	Adolescent: religiosity, family structure (single- or 2-parent) Parent: employment status	Condom use at last sex: yes/no
Miller et al (1999)[e]	907 (57)	15	9	Knowledge	Adolescent: age, gender, ethnicity, city of residence	Consistent condom use, lifetime: 5-point scale, never to always
Parkes et al (2011)[e]	592 (54.6)	16	10	Rules	Adolescent: age, gender, family structure (single- or 2-parent), academic ability, paternal education	Consistent condom use, lifetime: 5-point scale, never to always
Rai et al (2003)[e]	626 (44)	15	10	Knowledge	Adolescent: age, gender	Condom use at last sex: yes/no
Romer et al (1999)	161 (32.2)	13	9	Knowledge	Adolescent: age, sex; parent interaction (frequency of monitoring), type of guardian	Ever use a condom during sex: yes/no
Stanton et al (2002)[d,e]	383 (44)	16	9	Knowledge	Adolescent: age, gender	Condom use at last sex: Yes/No
Wight et al (2006)[d,e]	1343 (53.5)	16	9	Rules	Adolescent: ethnicity, religiosity, family structure (single- or 2-parent), friends at school, friends who smoke, sibling relations Parents: age, education, social class (nonmanual or manual), housing type (rented or owner)	Consistent condom use: every time/inconsistent
Contraceptive use						
Baker et al (1999)	174 (100)	15	9	Knowledge	Adolescent: age, race Mother: education, age of first delivery	Consistent contraceptive use: yes/no
Chewning et al (2001)	140 (37.1)	15	8	Knowledge	Adolescent: age, gender, grade, school attended, family structure (single- or 2-parent)	Consistent birth control use, past 3 mo: less than most/always or most of the time
Commendador (2011)	112 (100)	16	9	Rules	Adolescent: grade, ethnicity, ethnic identification, living situation Parent: education	Consistent contraceptive use: 5-point scale, none to always

TABLE 1 Continued

Source[a]	Sample (% Female)	Age, y[b]	Quality Score	Monitoring Type	Covariates[c]	Outcome Measure
DiClemente et al (2001)	522 (100)	16	9	Knowledge	Adolescent: religiosity, family structure (single- or 2-parent) Parent: employment status	Contraceptive use, last 5 sex episodes: none/use
Watson (2007)[e]	1595 (52.6)	15	12	Rules	Adolescent: motivation for sex, sex education, risk behaviors, perceived risk of becoming pregnant or contracting AIDS	Contraceptive use, first sex: yes/no
Wight et al (2006)[d,e]	1343 (53.5)	16	9	Rules	Adolescent: ethnicity, religiosity, family structure (single- or 2-parent), friends at school, friends who smoke, sibling relations Parents: age, education, social class (nonmanual or manual), housing type (rented or owner)	Consistent contraceptive use: every time/inconsistent

SES, socioeconomic status.

[a] All studies are cross-sectional unless otherwise noted.

[b] Average age measured in years.

[c] Reported covariates were those noted by authors in the cited articles.

[d] Longitudinal study design.

[e] High-quality study (quality score ≥9).

number of adolescents ever having sex. Parental enforcement of rules had a stronger association with adolescents ever having sex than parental knowledge (0.61 vs 0.72, respectively); however, the difference was not statistically significant (Q value, 2.34; df = 1; P = .13). In an analysis that reflected only male subjects, only female subjects, and both genders, the association of parental monitoring remained significant for male and female subjects (male, pooled OR, 0.66; 95% CI, 0.53–0.82; female, pooled OR, 0.67; 95% CI, 0.54–0.82). Additionally, no significant differences in effect sizes were observed when we compared middle school and high school estimates (Q value, 0.76; df = 1; P = .38).

High levels of heterogeneity were observed between all the studies (I^2 = 89%), between studies of parental knowledge (I^2 = 87%), and between studies of enforcement of rules (I^2 = 74%). Sensitivity analyses, in which we removed outliers and low-quality studies, still showed that higher parental monitoring was associated with a decrease in adolescents ever having sex (pooled OR, 0.74; 95% CI, 0.69–0.80). Higher monitoring knowledge (pooled OR, 0.81; 95% CI, 0.73–0.90) and higher rules (pooled OR, 0.67; 95% CI, 0.59–0.75) remained significantly associated with a decrease in adolescents' ever having sex, with the enforcement of rules having a statistically significantly stronger inverse association with adolescents' ever having sex than monitoring knowledge (Q value, 5.96; df = 1; $P < .05$). Heterogeneity was also improved for overall estimates, parental knowledge, and enforcement of rules (I^2 = 55%, 43%, and 44%, respectively). The meta-regression analysis of average age did not yield significant results for overall monitoring, parental knowledge, or enforcement of rules. Regression analyses across studies that reflected only male subjects, only female subjects, and both genders again did not yield significant results, indicating that age and gender were probably not contributors to heterogeneity.

Parental Monitoring and Adolescent Condom Use

Figure 3 shows the association between overall parental monitoring, type of parental monitoring, and adolescent condom use. Higher monitoring was associated with increased condom use (pooled OR, 1.16; 95% CI, 1.02–1.33). Parental knowledge (pooled OR, 1.24; 95% CI, 1.04–1.47) was associated with increased condom use; however, enforcement of rules was not (pooled OR, 1.08; 95% CI, 0.91–1.28), and there was no statistical difference between monitoring knowledge and enforcement of rules (Q value, 1.14; df = 1; P = .29). Because of the limited number of studies, analysis of gender and age was not performed.

Heterogeneity was substantial for overall monitoring, parental knowledge, and enforcement of rules (I^2 = 72%, 70%, and 68%, respectively). When we examined only high-quality studies, effect sizes were slightly attenuated for overall monitoring and parental knowledge (pooled OR, 1.12; 95% CI, 1.01–1.24; pooled OR, 1.14; 95% CI, 1.01–1.31, respectively). Heterogeneity for parental knowledge also improved, from I^2 = 72% to I^2 = 21%). The meta-regression analysis did not indicate age as a contributor to the observed heterogeneity.

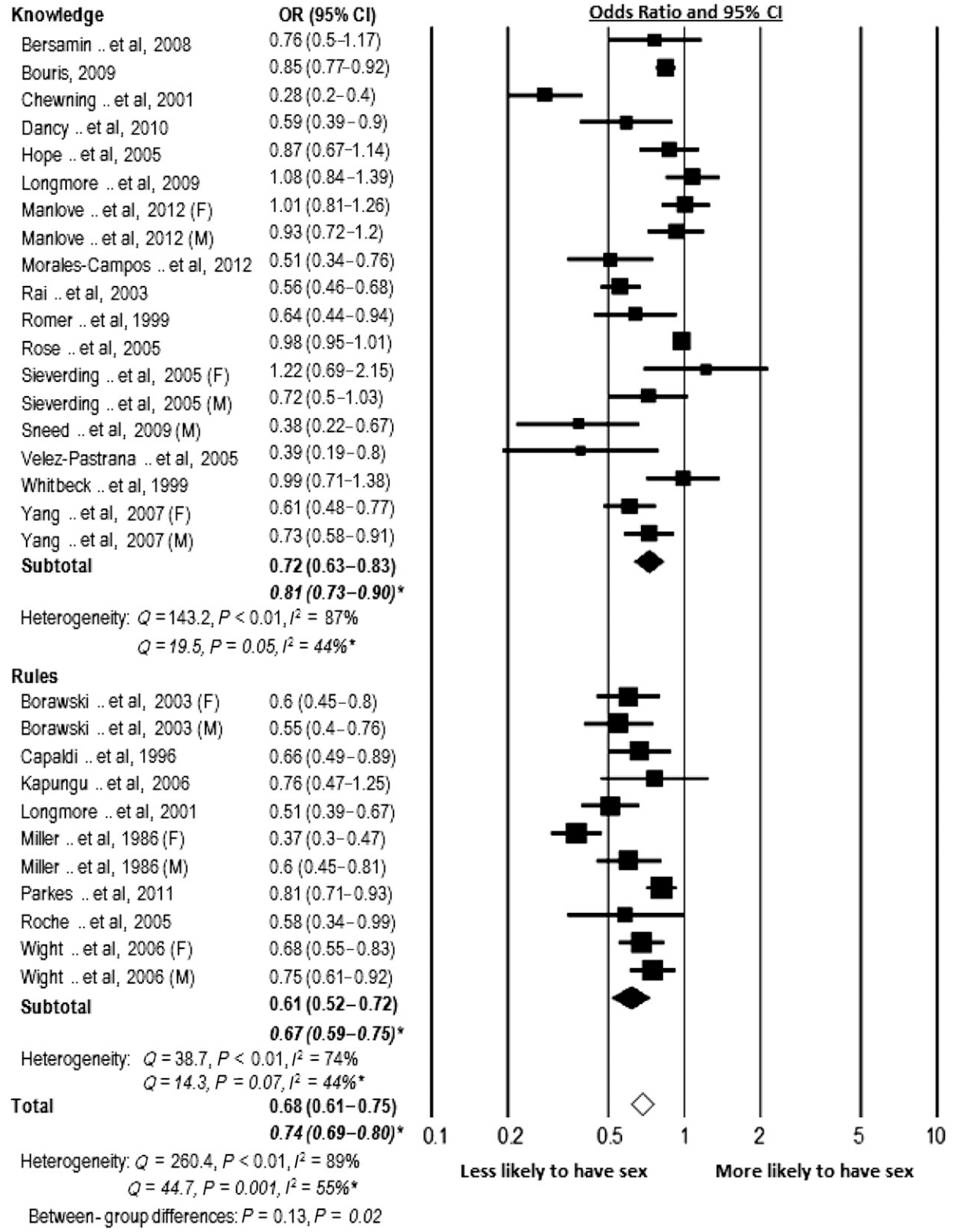

FIGURE 2

Associations between parental monitoring type and adolescent sexual intercourse. *Includes only high-quality studies only (score ≥9) and excludes outliers (Rose et al, Rai et al, Longmore et al, and Morales-Campos et al).

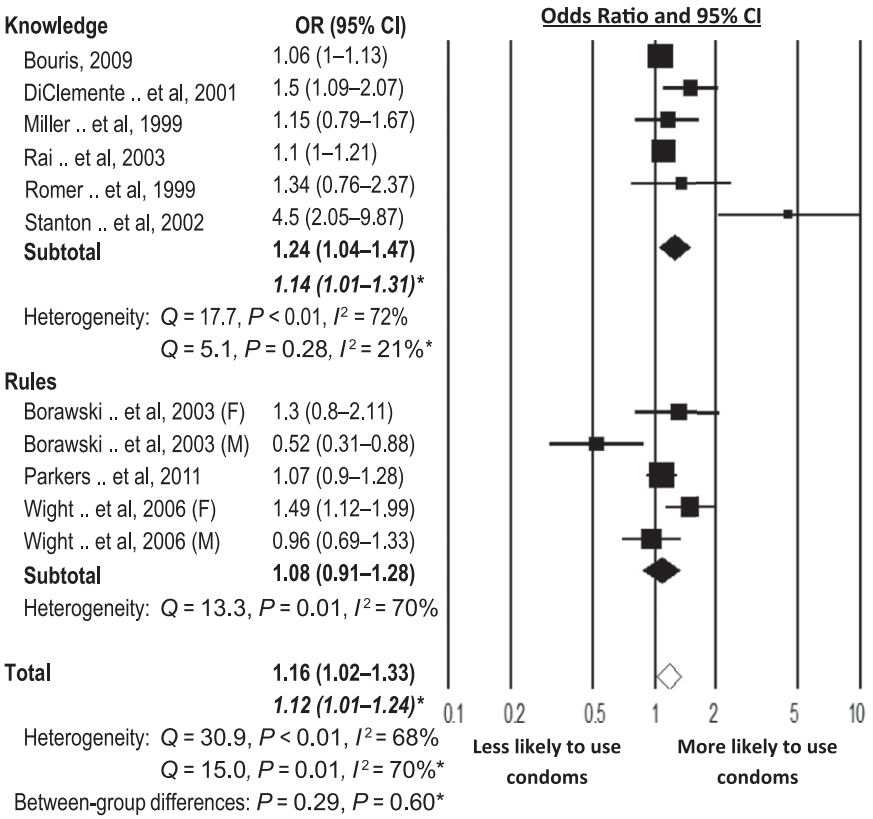

FIGURE 3

Associations between parental monitoring type and adolescent condom use. *High-quality studies only (score ≥9).

Parental Monitoring and Adolescent Contraceptive Use

Higher levels of overall parental monitoring were associated with increased contraceptive use (pooled OR, 1.42; 95% CI, 1.09–1.86) (not shown). Higher levels of parental knowledge was associated with increased contraceptive use (pooled OR, 2.27; 95% CI, 1.42–3.63); however, enforcement of rules was not (pooled OR, 1.13; 95% CI, 0.81–1.57). Because of the limited numbers of studies, sensitivity analysis on age, gender, and study quality was not performed.

Publication Bias

Using funnel plots, we examined publication bias for all outcomes and found evidence of asymmetry for sexual intercourse and contraceptive use. We applied Duval and Tweedie's[63] trim and fill procedure, as recommended by Borenstein et al,[33] to identify how many studies might be missing from the current meta-analyses. The results showed that 5 studies potentially were missing from the sexual intercourse outcome and 1 from contraceptive use. Results of this analysis produced similar effect sizes with no change in the interpretation of results, suggesting this risk of bias did not significantly affect the cumulative evidence.

DISCUSSION

This meta-analysis examined the association between different components of parental monitoring and adolescent sexual risk behaviors. We found that higher levels of parental monitoring were associated with lower likelihood of adolescents ever having engaged in sexual intercourse and greater likelihood of sexually experienced adolescents using both condoms and contraceptives. Significantly less research has focused on the effects of parenting behaviors on adolescent sexual decision-making for youth who are sexually active.[21] In this regard, the research reported here is timely and of great utility to the advancement of evidence related to parental monitoring's effect on sexual behavior for teens with and without sexual experience. In addition, 1 of the primary objectives of the study was to examine different types of parental monitoring to gain a better understanding of how specific parental monitoring behaviors affect adolescent sexual risk behaviors. We found that both global and sexual behavior–specific forms of parental monitoring are important in helping reduce risk behavior. Additionally, we found that parental enforcement of rules about friends and dating (ie, sexual behavior–specific monitoring) was more strongly associated with delaying adolescent sexual intercourse than was parental knowledge of friends, whereabouts, and activities (ie, global parental monitoring), whereas enforcement of rules was not associated with condom or contraceptive use. These findings add to the knowledge base on parental monitoring and help establish the distinct components of monitoring practices and their differential impacts on adolescent behavior.

We also sought to identify for whom parental monitoring efforts were likely to have the greatest impact. We found that parental monitoring effects are robust across age, gender, and sexual experience, suggesting that parents can positively influence the sexual risk behavior of boys as well as girls, for older as well as younger adolescents, and, as we previously reported, for adolescents who have or have not initiated sexual intercourse. This is an important finding because it cements the importance of parental monitoring efforts for a broad range of adolescents, making it a suitable focal point for triadic interventions intended to be implemented with a

broad range of adolescents and their parents. With regard to sexually experienced adolescents, type of monitoring matters, in that enforcement of rules about friends and dating was not found to be associated with condom use or contraceptive use. It appears that establishing and enforcing rules that limit an adolescent's unsupervised time is effective in limiting opportunities to engage in sex; however, for those who do find those opportunities, rules do not directly affect protective behaviors. However, the more global form of monitoring is associated with increased condom and contraceptive use. Again, these findings may be helpful in developing specific messages about monitoring so as to maximize the impact of provider and parental efforts in supporting adolescent sexual and reproductive health.

This analysis does not contribute to our understanding of how and why monitoring serves as a protective factor for adolescents. However, parents who engage in active monitoring behaviors that lead to greater knowledge about their adolescent's companions, whereabouts, and activities and who enforce rules that limit opportunities for engagement in risk behavior are engaging in behaviors that emphasize demandingness and responsiveness, reflecting an authoritative parenting style that has been found to facilitate the development of personal, social, and academic competencies in adolescents.[64,65] Protective behaviors such as delaying sexual initiation and using condoms and contraceptives to prevent STIs and pregnancy may reflect these competencies, which may be affected by these parenting practices. The mechanism for these effects is unclear; however, more complex models of parenting influences that incorporate communication and relationship quality may help us understand the underlying mechanisms responsible for these findings.[66]

There were some limitations to our review. Although our data extraction method did attempt to use effect size data that best controlled for common demographic characteristics and relevant covariates, studies did not control for the same things, and in some cases only crude effect size data were reported. Additionally, the majority of our studies were cross-sectional, which limits inferences of causality. Finally, our findings are focused solely on heterosexual adolescents, because of the limited number of studies of sexual minority youth. A recent study suggests that parenting behaviors, including parental monitoring, may not be protective for sexual minority youth, highlighting the need for additional research on this high-priority population.[67] Despite these limitations, the current research provides important guidance for the delivery of triadic interventions in clinical settings. Although implementation of triadic interventions has been limited in addressing adolescent sexual and reproductive health, evidence suggests that such approaches can be implemented effectively and that these interventions influence adolescent sexual behavior in positive ways.[15,16,21,22] Additional research is needed on the protective effects of parental monitoring efforts, including examination of a broader range of monitoring behaviors and a broader range of adolescent outcomes. Of particular importance will be future research that evaluates how parental monitoring and broader parenting behaviors can be reinforced effectively in support of adolescent health through triadic interventions.

CONCLUSIONS

Numerous professional health and provider organizations advocate for increased parental involvement and provider–parent collaboration in adolescent health care.[23,68–70] Despite strong endorsement, triadic models of adolescent health care remain limited. The results of the current study suggest that provider encouragement of parents to monitor their children through efforts to gain knowledge of their whereabouts, companions, and activities, and through the use and enforcement of rules about friends and dating, will help protect adolescents from the negative consequences of engaging in sexual risk behavior. Provider-initiated interventions targeting both adolescents and their parents may increase effectiveness in reducing negative adolescent sexual and reproductive outcomes by incorporating both global and sexual behavior–specific parental monitoring components. Primary care physicians, nurses, and other providers are uniquely positioned to convey this message to parents and to provide them with targeted resources addressing key issues in adolescent sexual and reproductive health (ie, information about contraceptives) and through reinforcement of parenting behaviors associated with adolescent health outcomes (ie, monitoring). The development of brief educational tools such as fact sheets, pamphlets, and digital and online resources for parents and endorsed by providers represents a feasible method for building stronger collaboration with both adolescents and their parents while addressing provider time and workload constraints in the majority of adolescent health care settings. The development of focused triadic interventions is warranted and represents a novel strategy for improving the overall health of our nation's adolescents and an important paradigm shift in reducing adult morbidity and mortality.

ABBREVIATIONS

CI: confidence interval
OR: odds ratio

The views and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC).

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