



# HHS Public Access

Author manuscript

*J Midwifery Womens Health*. Author manuscript; available in PMC 2020 January 01.

Published in final edited form as:

*J Midwifery Womens Health*. 2019 January ; 64(1): 88–97. doi:10.1111/jmwh.12923.

## Is sexting associated with sexual behaviors during adolescence? A systematic literature review and meta-analysis

**Caroline Handschuh, CNM, MSN [certified nurse midwife and doctoral student],**  
Columbia University School of Nursing

**Allison La Cross, CNM, DNP [certified nurse midwife in the Bronx, NY and clinical instructor],** and  
Columbia University School of Nursing

**Arlene Smaldone, PhD, CPNP, CDE [Assistant Dean, Professor]**  
Scholarship and Research at Columbia University School of Nursing; Nursing and Dental Behavioral Sciences at Columbia University Medical Center

### Abstract

**Introduction:** A growing body of research has addressed adolescent use of mobile devices to exchange sexually explicit images and messages (sexting). While there are legal consequences in some states for sexting among adolescents, research findings have also demonstrated associations between sexting and sexual activity. The purpose of this systematic review was to synthesize research examining the association between adolescent sexting and sexual activity.

**Methods:** Five databases (The Cumulative Index to Nursing and Allied Health Literature, Embase, Ovid, MEDLINE, PsychINFO, and Scopus) were searched for studies measuring adolescent sexting and sexual behaviors. Studies were appraised for quality using a modified Downs and Black scale. Studies reporting frequencies or odds ratios were eligible for inclusion in random effects meta-analytic models.

**Results:** Of 669 articles retrieved, 9 studies met inclusion for systematic review; of these, 6 were included in meta-analysis. Pooling data from 9,676 adolescents, the odds of reporting sexual activity was 6.3 times higher (95% confidence interval 4.9–8.1;  $Q=14.3, I^2=65.1$ ) for adolescents who sent sexts compared to those who did not.

**Discussion:** These data suggest that adolescents who send sexually explicit text messages are more likely to report sexual activity than adolescents who do not. Midwives are well-poised to integrate a discussion of sexting into sexual and reproductive health counseling with adolescent and young adult patients.

### Precis

Adolescents who send sexts are more likely to report sexual activity than adolescents who do not. Midwives should address sexting in their sexual health counseling.

---

**Corresponding author:** Caroline Handschuh, CNM, MSN, 560 W 168<sup>th</sup> St, NY, NY 10032 Csh2152@cumc.columbia.edu (718) 594-6015.

Conflict of interest disclosure:

There are no conflicts of interest to report.

## Keywords

Adolescent health; Sexual and reproductive health; Text messaging

---

Given that mobile device ownership is increasingly common among adolescents and young adults,<sup>1</sup> a growing body of research has investigated the use of text messaging and social media as emerging contexts for sexual development and exploration.<sup>2–4</sup> Sexting, the exchange of sexually explicit messages or images,<sup>5</sup> has raised concerns among professional organizations about adolescent exposure to and sharing of unsolicited sexual content.<sup>6–8</sup> Additionally, media attention around specific sexting cases has highlighted the legal ramifications of minors sharing sexual images of themselves and others.<sup>9–12</sup>

The ability to send and receive text messages through free messaging apps on smart phones or purchase data through prepaid mobile plans has made cell phone communication increasingly more accessible.<sup>13</sup> Cell phones have consequently become the primary mode of social interaction and networking among teens.<sup>14</sup> Of 1,060 teens, aged 13 to 17 years old, who participated in a 2015 Pew Research Center survey,<sup>1</sup> 88% reported access to some type of mobile phone (smart phone, basic cell phone, or both) and reported either having sent or received an average of 30 text messages daily. As peer relationships take on a more central role during adolescence, cell phones have further broadened the reach of social networks, which can have a profound impact on behavioral choices and physical health outcomes.<sup>15,16</sup> A recent review suggests that 14.8% (95% confidence interval [CI], 12.8%–16.8%) of youth report having sent a sext and 27.4% (95% CI, 23.1%–31.7%) report having received one. Both the American Academy of Pediatrics (AAP)<sup>8</sup> and the American College of Obstetricians and Gynecologists (ACOG)<sup>7</sup> have published statements on the risks associated with social media, specifically addressing sexting with adolescents and young adults.

Among consenting adolescents who are exploring intimate relationships, sexting may be viewed as age-appropriate behavior.<sup>17</sup> A national survey of 600 teens suggests that as many as one in five teens who received a sext shared it with someone else.<sup>18</sup> In some instances sexting has been associated with sexual coercion<sup>19–21</sup> and behaviors such as having multiple sex partners<sup>22,23</sup> or not using contraception.<sup>24,25</sup> Sexting has also led to charges being filed against adolescents who have shared sexual images without consent, reporting malicious intent, bullying, and harassment.<sup>10</sup> Twenty states have enacted laws that address minors sending explicit messages and images, 18 of which also address minors who receive an explicit text.<sup>26,27</sup> Consequences range from required educational hours about sexting to a misdemeanor offence and in some instances, a felony offence for repeated sexting.<sup>26</sup> In a survey of American undergraduate students about sexting and legal risks, 61% reported they were unaware that sexting had legal consequences. Among these students, 59% reported that being aware of the legal ramifications of sexting would have been a deterrent for them.<sup>28</sup>

With documented declines in formal sex education across the United States, adolescents are left with few resources to navigate the increasingly grey area of sexual health and social media.<sup>29</sup> Just as pediatricians and obstetrician-gynecologists have been charged by their professional organizations to address sexting in the clinical encounter, midwives who care for adolescent populations are also well-poised to address sexting in the context of sexual

and reproductive health. Two prior systematic reviews<sup>30,31</sup> have examined the association between sexting and sexual behaviors.<sup>32</sup> However neither examined the association between sexting and sexual behaviors by age group, potentially misrepresenting actual participation in sexting and sexual behaviors for youth and adult populations. Given the increased use of cell phones among adolescents and almost exclusive use of text communication, the aim of this systematic review and meta-analysis was to examine the prevalence of sexting and the association between sending a sexually explicit text message and sexual activity among adolescents.

## METHODS

Using an a priori protocol developed for this systematic review,<sup>33</sup> the literature was searched using five databases: The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Embase, Ovid, MEDLINE, PsychINFO, and Scopus. The search was performed April 6, 2017. A library information specialist with expertise in systematic reviews provided assistance in this process.

### Search strategy

General search terms were chosen a priori including: adolescent, sexting, and sexual behavior. More defined terms were then chosen within each category. For example, the category, “sexting”, included terms such as “text,” “text message,” “short message service,” “cell phone,” and “mobile phone.” Medical subject heading (MeSH) terms were used when possible to capture all relevant articles in a database. Finally, depending upon the database, symbols for truncation (\*) as well as wildcards (\$) were used for all possible variations of a term such as text\* or t\$een\$. (Supplementary Information: Appendix S1)

### Inclusion and exclusion criteria

A study was eligible for inclusion if its sample was restricted to adolescents (10–19 years-old) based on the World Health Organization (WHO) definition of adolescent<sup>34</sup> and used a quantitative study design to measure the association between sexting and either past or current sexual activity. Grey literature that met these criteria was included. A study was excluded if it was published in a language other than English, of qualitative study design, examined sexting using a device other than a basic cell or smart phone (e.g. by e-mail or over a social networking site not accessed through a phone) and restricted subject inclusion to either youth less than 10 years or older than 19 years. No restrictions were placed on study design, date, or location.

Following removal of duplicates, studies were imported into Covidence (Covidence, Melbourne Australia), an online platform to facilitate article screening and data extraction for systematic reviews.<sup>35</sup> Titles and abstracts were screened by two authors (CH, AL). A full-text review of the remaining studies was then performed so that only studies for inclusion remained. Discrepancies were resolved by consensus.

### Quality appraisal and data extraction

Studies were appraised for quality using a modified Downs and Black Checklist.<sup>36</sup> Items of the Downs and Black checklist are organized into four broad categories: reporting, external validity, internal validity (bias and confounding), and power. Twelve questions not applicable to either cross-sectional or cohort studies were removed: questions 4 and 8 (reporting), 12 and 13 (external validity), 14–16, 19, 21, 23 and 24 (internal validity); and 27 (power). The modified scale contained 15-items with a maximum score of 16 possible points: 9 points for reporting (one question had a 2-point option); 1 point for external validity; and 6 points for internal validity. Two reviewers (CH and AS) appraised each study. Differences of opinion were resolved by consensus.

Sample characteristics, sexting prevalence, the proportion of the study sample who reported sending a sext, and report of either current or past sexual activity were systematically extracted from each study. Study findings of the association between sexting and reported sexual activity were also extracted.

### Quantitative synthesis

We first computed a pooled prevalence of sexting, defined as sending a sext, by summing the number of adolescents who reported sending a sext divided by the sum of the sample sizes and computed a 95% confidence interval.<sup>37</sup> Studies reporting the association between sending a sext and sexual behavior as an odds ratio (OR), risk ratio, or proportion were eligible for inclusion in meta-analysis. A standardized effect for each study and a pooled OR were computed across studies using a random effects meta-analysis model. Heterogeneity was evaluated next to detect any variability across studies greater than would be expected by chance alone that might affect the pooled study result.<sup>38</sup> For example, differences in male and female samples or population age could contribute to different outcomes between studies. Heterogeneity was assessed using Cochran's Q and I<sup>2</sup> statistics and was considered to be present if the Cochran's Q *P*-value was <.05 or I<sup>2</sup> was >50%.<sup>39</sup> To explore differences between studies that might explain heterogeneity, we conducted subgroup analyses which involves stratifying subject data into smaller subgroups (e.g., age or sex) and comparing any differences in outcomes between them.<sup>40</sup> To assess for publication bias, we constructed a funnel plot, examined it visually, and conducted a failsafe N test, which is carried out to determine the number of additional studies that would need to be added to the analysis to render the results non-significant.<sup>41</sup> Data were analyzed using Comprehensive Meta-Analysis statistical software (Biostat, Inc., Engelwood, NJ).

## RESULTS

Figure 1 provides detail regarding the literature search. Of 669 articles identified by the search, 24 studies met criteria for full text review and nine (7 cross-sectional<sup>17,22,24,25,42-44</sup> and 2 prospective cohort studies<sup>45,46</sup>) met all inclusion criteria. Six studies<sup>17,22,24,25,41,42</sup> were conducted in the United States; of the remaining studies, one was conducted in the Czech Republic,<sup>46</sup> one across 24 countries in the European Union,<sup>45</sup> and one was conducted in Australia.<sup>44</sup>

## Quality appraisal

Figure 2 presents results of the quality appraisal. Of the three categories assessed, internal validity was the most problematic. Only one<sup>46</sup> of the two cohort studies statistically adjusted for length of follow up. This study involved a national sample of Czech students, while the other<sup>45</sup> was an international sample of adolescents in the European Union. Questions from previously developed national and international surveys (Health Behavior in School-Aged Children 2005/2006 Survey,<sup>47</sup> Youth Risk Behavior Survey,<sup>48</sup> Survey of Australian Secondary Students and Sexual Health<sup>49</sup>) were used to measure sexual activity in four studies,<sup>22,24,44,45</sup> while the remaining studies<sup>17,25,42,43,46</sup> used investigator-developed questions to assess sexual activity. For the category of reporting, two studies<sup>45,46</sup> did not adequately describe the characteristics of participants who were included and one study<sup>46</sup> failed to clearly describe the main findings. Finally, for external validity, two studies<sup>45,46</sup> did not clearly describe the population from which subjects were recruited.

## Study characteristics

Characteristics of each study are presented in Table 1. In total, 29,115 adolescents (45% female) completed surveys that examined the relationship between sexting and sexual behaviors. Study samples ranged between 410<sup>43</sup> and 17,016<sup>45</sup> participants. For studies conducted in the United States,<sup>17,22,24,25,42,43</sup> the samples included 8,851 adolescents (14% African American, 23% Hispanic, 52% white, 11% other race). Adolescent sexual orientation defined as heterosexual, homosexual, or bisexual, was reported in only four of the nine studies.<sup>17,24,25,44</sup> Subject recruitment and survey administration varied across studies. Seven studies were conducted on a middle or high school campus<sup>22,24,25,42–44,46</sup> and two studies used web-based recruitment methods.<sup>17,45</sup>

## Sexting measurement

Measurement of sexting lacked consistency across studies, ranging from a comprehensive definition of sexting including sending, receiving, and/or forwarding a sexually explicit message or nude image<sup>22</sup> to a more limited definition of sending a sexually explicit message and/or image.<sup>17,24,42,43,45,46</sup> Of these, three studies defined sexting as sending either a written message and/or image,<sup>24,45,46</sup> one differentiated between sending a message and sending an image,<sup>43</sup> and two defined sexting as sending explicit images only.<sup>17,42</sup> The two remaining studies<sup>25,44</sup> differentiated between sending and receiving a sexually explicit message or image.

## Study outcomes

The prevalence of sending a sext ranged from 5%<sup>25</sup> to approximately 40%<sup>44</sup> and the prevalence of receiving a sext ranged from 20%<sup>25</sup> to 54%.<sup>44</sup> Pooling data across studies, the prevalence of sending a sext (6 studies) was 22% (95% CI, 20.6%, 22.8%) and the prevalence of receiving a sext (2 studies) was 44%. Six studies examined the prevalence of sexting by racial/ethnic characteristics with conflicting findings. Four studies<sup>17,22,24,25</sup> reported higher prevalence among African American adolescents; one<sup>42</sup> reported higher prevalence among white adolescents, and one<sup>43</sup> reported similar prevalence among African American and white adolescents. Across studies,<sup>17,22,24,25,42–46</sup> sexting was higher among

older adolescents than younger adolescents. One study<sup>17</sup> examined the relationship between geographic location and sexting and found a higher prevalence of sexting among adolescents living in small and suburban towns compared to those who lived in urban areas.

Definitions of sexual activity ranged from ever having engaged in a sexual behavior<sup>22,42–44</sup> to more recent (past 6 to 12 months)<sup>17,45,46</sup> or current<sup>24,25</sup> behavior. In some studies, survey questions explored type of sexual behavior (vaginal intercourse,<sup>17,43</sup> oral sex,<sup>17,22,43</sup> anal sex<sup>17,22</sup>), and number of sexual partners.<sup>17,22,42</sup> In other studies survey questions asked about other risky behaviors, such as engagement in unprotected sex,<sup>22,24,25</sup> use of condoms,<sup>17</sup> or use of drugs or alcohol during sexual activity.<sup>42</sup> Finally, two studies created composite scores for sexual behavior based on frequency of reported sexual activities such as fondling, kissing, and sexual intercourse.<sup>44,45</sup>

### Quantitative synthesis

Six of the nine studies,<sup>17,24,25,42–44</sup> met criteria for inclusion in the meta-analysis and represent data from 9,676 adolescents. Three studies were not eligible because it was not possible to convert the data presented (e.g., odds ratios, risk ratios, or probabilities).<sup>22,45,46</sup> Among adolescents who reported having sent a sext, the odds of reporting either past or current sexual activity, defined as vaginal intercourse, was 6.3 times higher compared to adolescents who did not send a sext (OR 6.3; 95% CI 4.9–8.1). Heterogeneity was greater than expected by chance alone (Cochran's  $Q=14.3$ ,  $P=.01$ ;  $I^2=65.1$ ). Stratified by sex, the odds of having reported either past or current sexual activity was 3.8 and 5.1 times higher for males (2822 subjects; OR, 3.8; 95% CI 2.0–7.4; Cochran's  $Q=14.7$ ,  $P<.001$ ;  $I^2=86.4$ ) and females (3,916 subjects; OR, 5.1; 95% CI, 2.1–12.6; Cochran's  $Q=47.9$ ,  $P<.001$ ,  $I^2=95.8$ ) who had reported having sent a sext. There were no statistically significant differences by sex (see Figure 3).

We explored possible reasons for heterogeneity by subgroup analysis. Studies were grouped by country of publication, age (older versus younger adolescents), and definition of sexual activity; in each case there were no statistically significant differences between groups that might explain heterogeneity. (Supplementary Information Appendix S2) A funnel plot, used to detect publication bias, suggests a low risk for bias based on the relative symmetry of the plot in the studies examined. (Supplementary Information Appendix S3) This is supported by the failsafe N test, which suggests that an additional 1,038 studies would have to be added to the analysis in order for the outcome to no longer be statistically significant.

## DISCUSSION

### Main findings of this study

Findings of this meta-analysis suggest that adolescents who sext are more likely to report past or current sexual activity than adolescents who do not engage in sexting; this is consistent with earlier reviews including both adolescents and adults.<sup>30,31</sup> Prior studies have estimated sexting prevalence in adolescents between 4%<sup>50</sup> and approximately 15%.<sup>32</sup> The sending of sexts by adolescents who participated in studies included in this review ranged between 5%<sup>25</sup> and 43%,<sup>44</sup> with a pooled prevalence of 22%, and is significantly higher than

earlier reports with estimates of teen sexting between 4%<sup>50</sup> and 15%.<sup>32</sup> These findings suggest that sexting among adolescents of all ages is an increasingly common phenomenon. While we found no differences between male and female respondents in the association between sexting and sexual activity, one study did ask students if they had ever been asked to send a sext and how they felt about it.<sup>42</sup> Female adolescents were 26% more likely to report being asked to send a sext than males and 24% more likely to be bothered by the request compared to males.<sup>42</sup>

### Clinical implications

Based on findings of this systematic review and meta-analysis, one in five adolescents sext, with no significant differences between younger and older adolescents. The context of a clinical visit can provide the opportunity to discuss social media use and communication with an intimate partner with both younger and older teens. Opinion statements of the AAP and ACOG have taken a risk-based approach to sexting. The AAP specifically encourages parents to engage their children about peer pressure to sext as well as the legal implications of sexting, pointing out that sending sexual images may be considered child pornography.<sup>6</sup> Similarly, ACOG recommends that obstetricians and gynecologists counsel patients about the harms and consequences of sexting and to counsel parents and guardians to monitor their children's social media and cell phone use, even limiting texting on their mobile devices.<sup>7</sup> Currently, the American College of Nurse Midwives does not offer specific practice guidelines about sexting or social media use and sexual health. However, evidence supporting the association between sexting and sexual activity is sufficient to support routine counseling of adolescent and young women about their use of social media to share sexual content. While the AAP and ACOG specifically address the negative aspects of sexting, a clinical encounter in which the provider creates an atmosphere of privacy and safety can allow them to explore why and how an adolescent engages in sexting and how this may be impacting their sexual and reproductive health. A simple question, "Have you ever sent or received a sexual image or message by text?" or "Have you ever felt pressured to be sexually intimate with someone as a result of sexting?" can open the door to conversation. For some adolescents, sexting with a trusted partner may be an activity in which they willingly engage. Others may reveal feelings of peer pressure or coercion and need their care coordinated with legal services and possibly mental health providers who deal with cases of sexual harassment or cyberbullying.

While some school districts in the United States have introduced sexting education programs into their schools, no states currently require sexting to be taught as part of their health education curricula.<sup>51,52</sup> Without formal instruction and/or guidance about healthy sexual behaviors, adolescents are not only at increased risk for misinformation about their sexual health, but also increased risk for non-consensual participation in sexual activities both on and off-line. Midwives can play an important role in counseling adolescent and young women about sexting as an element of sexual health and well-being.

### Limitations of this review

Findings of this systematic review must be considered in the context of the quality of included studies and outcome measures used. While the association between sexting and

sexual activity was established, we cannot infer that sexting causes adolescents to become sexually active or that only adolescent who are sexually active engage in sexting. Additionally, heterogeneity could not be explained by sub-group analyses. While the utmost effort was made to pool studies with similar definitions of sexting and sexual activity, it was not possible to completely control for different interpretations of these terms that may have contributed to variability in the studies' results. Further, associations with sexting were limited to only one type of sexual activity, vaginal sex, and did not include other types of activity such as oral or anal sex, or behaviors such as condom use or having multiple partners. Additionally, the association between sexting and sexual activity among adolescents who identify as gay, lesbian, bisexual, transgender, or questioning could not be evaluated in this review. While most studies included in this review were published in the United States, attitudes towards sexual behaviors may vary across cultures. For example, in one sample of 39 Australian young people (16 to 29 years of age), sexting was viewed as a normal aspect of sexual relationships with flirting and sexual experimentation viewed as positive outcomes of consensual sexting.<sup>53</sup> Nonetheless, in a study of sexting and revenge-porn laws in Australia, Canada, England, New Zealand, and South Africa, findings were largely inconsistent in terms of how teen sexting should be managed.<sup>54</sup> For example, while the Australian state of Victoria exempts teen sexting from child pornography laws, teen sexting in England falls under the child pornography and criminal justice act.<sup>54</sup>

## Conclusion

A strength of this review is in its focus on adolescents, establishing a clear relationship between teen sexting and sexual behaviors. As the prevalence of sexting continues to increase, it is extremely important to provide adolescents with clearer guidance on sexting, their sexual health, and social media use. Evidence is sufficient to support public health initiatives that include education about sexting risks and consequences both within school-delivered sex education programs and as a routine part of clinical visits.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgements:

This work was supported by National Institute of Nursing Research Training Grant T32 NR014205. We would like to thank Johanna Goldberg, Information Specialist at Columbia University Medical Center for her assistance with the literature search.

## REFERENCES

1. Teens Lenhart A., Social Media & Technology Overview 2015 Pew Research Center. 2015; 9 <http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/>. Accessed October 8, 2017.
2. O'Sullivan LF. Linking online sexual activities to health outcomes among teens. *New Directions for Child and Adolescent Development*. 2014;2014(144):37–51. [PubMed: 24962361]
3. Van Ouytsel J, Ponnet K, Walrave M, d'Haenens L. Adolescent sexting from a social learning perspective. *Telematics and Informatics*. 2017;34(1):287–298.
4. García-Gómez A Teen girls and sexual agency: exploring the intrapersonal and intergroup dimensions of sexting. *Media, Culture & Society*. 2017;39(3):391–407.



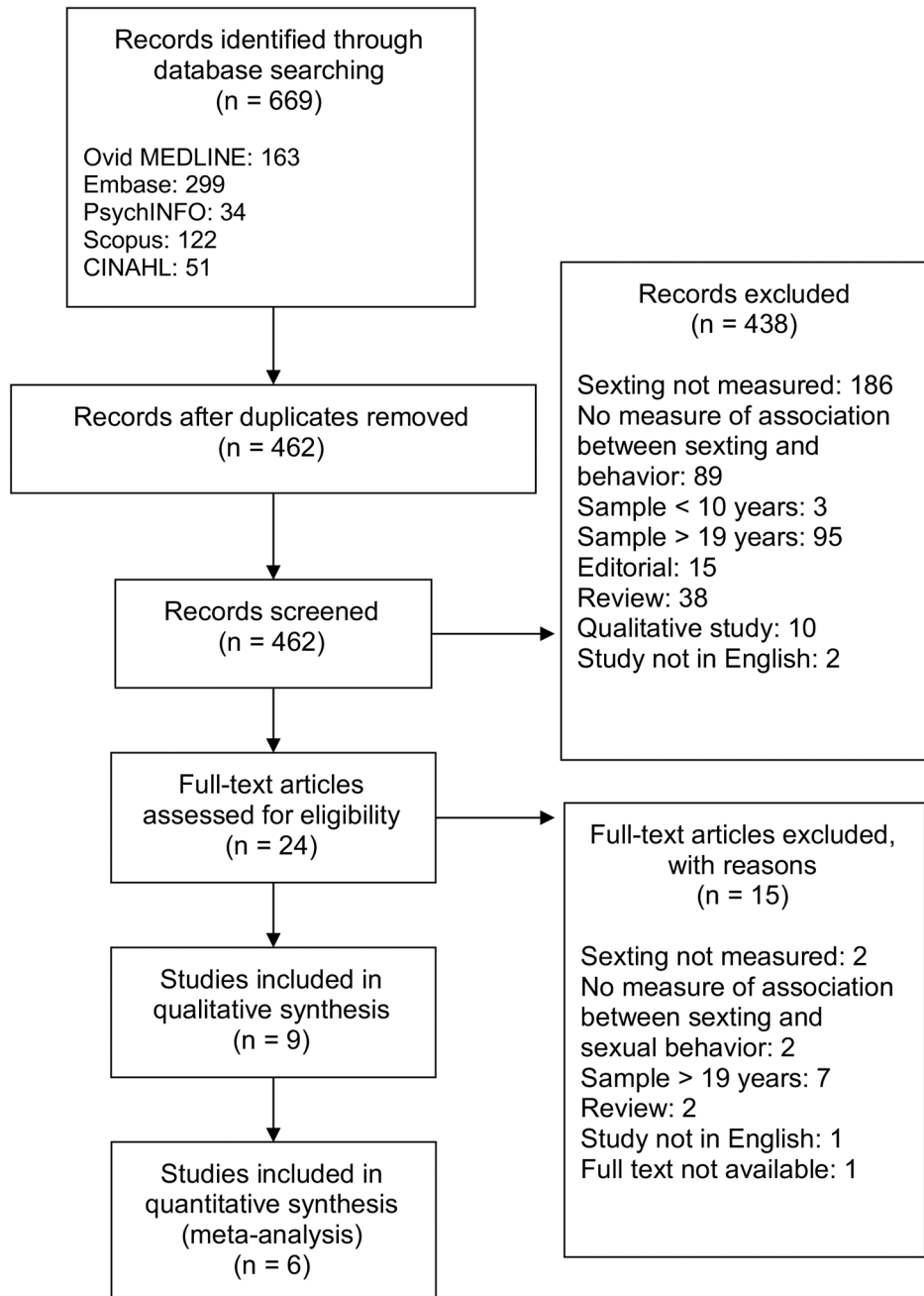
5. Teens Lenhart A. and sexting. A Pew Internet & American Life Project Report, 4:2010 <http://www.pewinternet.org/2009/12/15/teens-and-sexting/>. Accessed October 8, 2017.
6. American Academy of Pediatrics. Talking to kids and teens about social media and sexting. 2010 <https://www.aap.org/en-us/about-the-aap/aap-press-room/news-features-and-safety-tips/Pages/Talking-to-Kids-and-Teens-About-Social-Media-and-Sexting.aspx>. Accessed September 30, 2017.
7. Committee Opinion No 653 Summary: Concerns Regarding Social Media and Health Issues in Adolescents and Young Adults. *Obstetrics and Gynecology*. 2016;127(2):414. [PubMed: 26942381]
8. AAP COUNCIL ON COMMUNICATIONS AND MEDIA. Media Use in School-Aged Children and Adolescents. *Pediatrics*. 2016;138(5): e20162592 [PubMed: 27940794]
9. Reid D, Weigle P. Social media use among adolescents: Benefits and risks. *Adolescent Psychiatry*. 2014;4(2):73–80.
10. Lorang MR, McNiel DE, Binder RL. Minors and Sexting: Legal Implications. *The Journal of the American Academy of Psychiatry and the Law*. 2016;44(1):73–81. [PubMed: 26944746]
11. Villacampa C Teen sexting: Prevalence, characteristics and legal treatment. *International Journal of Law, Crime and Justice*. 2016.
12. Chalfen R 'It's only a picture': sexting, 'smutty' snapshots and felony charges. *Visual Studies*. 2009;24(3):258–268.
13. Lenhart A, Ling R, Campbell S, Purcell K. Teens and mobile phones: Text messaging explodes as teens embrace it as the centerpiece of their communication strategies with friends. Pew Internet & American Life Project. 2010 <http://www.pewinternet.org/2010/04/20/teens-and-mobile-phones/>. Accessed October 8, 2017.
14. Brown K, Campbell SW, Ling R. Mobile phones bridging the digital divide for teens in the US? *Future Internet*. 2011;3(2):144–158.
15. Viner RM, Ozer EM, Denny S, et al. Adolescence and the social determinants of health. *The Lancet*. 2012;379(9826):1641–1652.
16. Gardner M, Steinberg L. Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: an experimental study. *Dev Psychol* 2005;41(4):625–635. [PubMed: 16060809]
17. Ybarra ML, Mitchell KJ. "sexting" and its relation to sexual activity and sexual risk behavior in a national survey of adolescents. *Journal of Adolescent Health*. 2014;55(6):757–764. [PubMed: 25266148]
18. MTV-AP Digital Abuse Study, Executive Summary. A Thin Line. 2009 [http://www.athinline.org/MTV-AP\\_Digital\\_Abuse\\_Study\\_Executive\\_Summary.pdf](http://www.athinline.org/MTV-AP_Digital_Abuse_Study_Executive_Summary.pdf). Accessed October 8, 2017.
19. Choi H, Van Ouytsel J, Temple JR. Association between sexting and sexual coercion among female adolescents. *Journal of Adolescence*. 2016;53:164–168. [PubMed: 27814493]
20. Drouin M, Tobin E. Unwanted but consensual sexting among young adults: Relations with attachment and sexual motivations. *Computers in Human Behavior*. 2014;31:412–418.
21. Drouin M, Ross J, Tobin E. Sexting: a new, digital vehicle for intimate partner aggression? *Computers in Human Behavior*. 2015;50:197–204.
22. Dake JA, Price JH, Maziarz L, Ward B. Prevalence and Correlates of Sexting Behavior in Adolescents. *American Journal of Sexuality Education*. 2012;7(1):1–15.
23. Benotsch EG, Snipes DJ, Martin AM, Bull SS. Sexting, substance use, and sexual risk behavior in young adults. *Journal of Adolescent Health*. 2013;52(3):307–313. [PubMed: 23299017]
24. Rice E, Rhoades H, Winetrobe H, et al. Sexually explicit cell phone messaging associated with sexual risk among adolescents. *Pediatrics*. 2012;130(4):667–673. [PubMed: 22987882]
25. Rice E, Gibbs J, Winetrobe H, et al. Sexting and sexual behavior among middle school students. *Pediatrics*. 2014;134(1):e21–e28. [PubMed: 24982103]
26. Hinduja S, Patchin J. State sexting laws: A brief review of state sexting and revenge porn laws and policies. 2016 <https://cyberbullying.org/state-sexting-laws.pdf>. Accessed October 8, 2017.
27. Lorang MR, McNiel DE, Binder RL. Minors and Sexting: Legal Implications. *Journal of the American Academy of Psychiatry & the Law*. 44(1):73–81.

28. Strohmaier H, Murphy M, DeMatteo D. Youth sexting: Prevalence rates, driving motivations, and the deterrent effect of legal consequences. *Sexuality Research and Social Policy*. 2014;11(3):245–255.
29. Lindberg LD, Maddow-Zimet I, Boonstra H. Changes in Adolescents' Receipt of Sex Education, 2006–2013. *Journal of Adolescent Health*. 2016;58(6):621–627. [PubMed: 27032487]
30. Smith LW, Liu B, Degenhardt L, Richters J, Patton G, Wand H, ... & Lumby C (2016). Is sexual content in new media linked to sexual risk behaviour in young people? A systematic review and meta-analysis. *Sexual health*, 13(6), 501–515. [PubMed: 27509401]
31. Klettke B, Hallford DJ, Mellor DJ. Sexting prevalence and correlates: A systematic literature review. *Clinical Psychology Review*. 2014;34(1):44–53. [PubMed: 24370714]
32. Madigan S, Ly A, Rash CL, Van Ouytsel J, Temple JR. Prevalence of multiple forms of sexting behavior among youth: a systematic review and meta-analysis. *JAMA pediatrics*. 2018;172(4):327–335. [PubMed: 29482215]
33. Handschuh C, Smaldone A, LaCross A. Is sexting associated with sexual risk-taking among adolescents? A systematic review. PROSPERO. 2017 CRD42017056302 Available from: [http://www.crd.york.ac.uk/PROSPERO/display\\_record.php?ID=CRD42017056302](http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017056302)
34. World Health Organization, Department of Child and Adolescent Health and Development, Family and Community Health The second decade: Improving adolescent health and development. Geneva: World Health Organization 2001 [http://apps.who.int/iris/bitstream/handle/10665/64320/WHO\\_FRH\\_ADH\\_98.18\\_Rev.1.pdf;jsessionid=69A7780C6A58C43405A6F752AE520B3?sequence=1](http://apps.who.int/iris/bitstream/handle/10665/64320/WHO_FRH_ADH_98.18_Rev.1.pdf;jsessionid=69A7780C6A58C43405A6F752AE520B3?sequence=1). Accessed October 8, 2017.
35. Covidence. 2017 Melbourne, Australia <https://www.covidence.org/home>. Accessed February 1, 2017.
36. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology and Community Health*. 1998;52(6):377–384. [PubMed: 9764259]
37. Estimate prevalence: confidence interval for a simple random sample. [http://www.promesa.co.nz/Help/EP\\_est\\_simple\\_random\\_sample.htm](http://www.promesa.co.nz/Help/EP_est_simple_random_sample.htm). Accessed April 22, 2018.
38. Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*. 2017;358:j4008. [PubMed: 28935701]
39. Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ*. 2003;327(7414):557–560. [PubMed: 12958120]
40. Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011 Available from <http://handbook.cochrane.org>.
41. Persaud R Misleading meta-analysis.” Fail safe N” is a useful mathematical measure of the stability of results. *BMJ*. 1996;312(7023):125.
42. Temple JR, Paul JA, Van Den Berg P, Le VD, McElhany A, Temple BW. Teen sexting and its association with sexual behaviors. *Archives of Pediatrics and Adolescent Medicine*. 2012;166(9):828–833. [PubMed: 22751805]
43. Houck CD, Barker D, Rizzo C, Hancock E, Norton A, Brown LK. Sexting and sexual behavior in at-risk adolescents. *Pediatrics*. 2014;133(2):e276–e282. [PubMed: 24394678]
44. Patrick K, Heywood W, Pitts MK, Mitchell A. Demographic and behavioural correlates of six sexting behaviours among Australian secondary school students. *Sexual Health*. 2015;12(6):480–487. [PubMed: 26277625]
45. Šev íková A Girls' and boys' experience with teen sexting in early and late adolescence. *Journal of Adolescence*. 2016;51:156–162. [PubMed: 27391169]
46. Šev íková A, Blinka L, Daneback K. Sexting as a predictor of sexual behavior in a sample of Czech adolescents. *European Journal of Developmental Psychology*. 2017:1–12.
47. Inequalities in young people's health, Health behavior in school-aged children, International report from the 2005/2006 survey. Edinburgh: University of Edinburgh;2008.

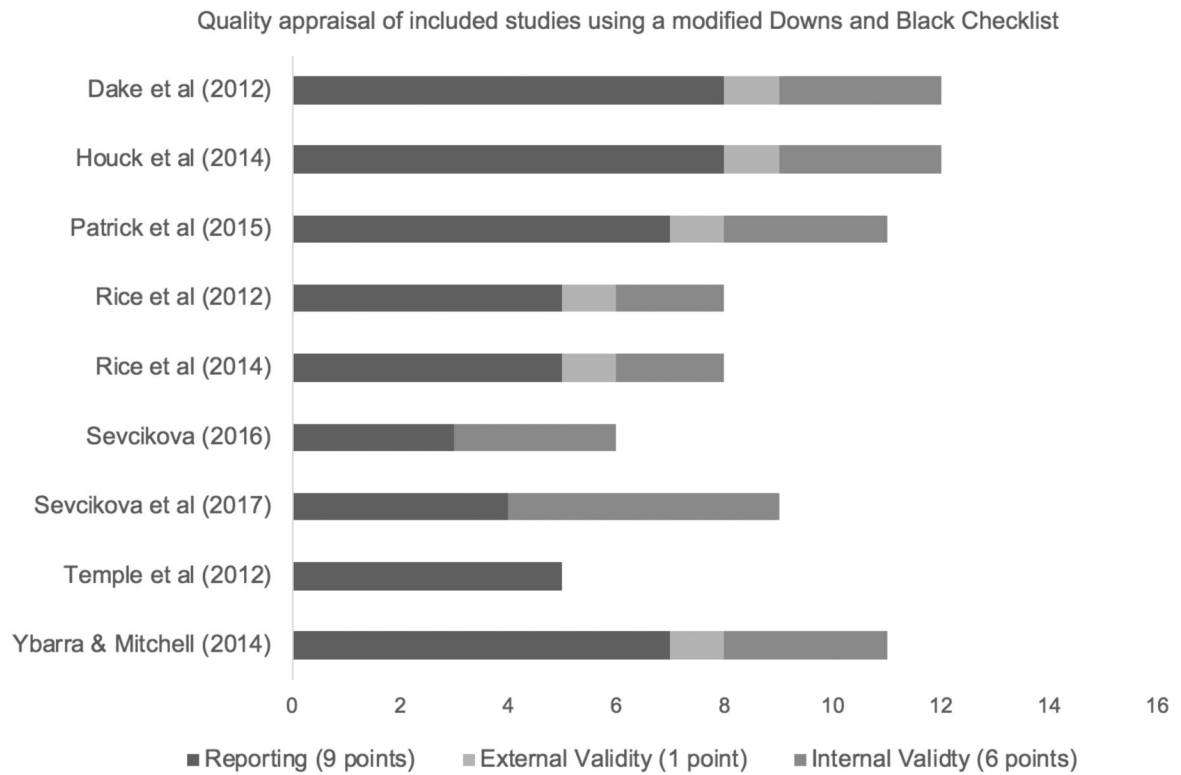
48. Youth Risk Behavior Surveillance System. 2016 <https://www.cdc.gov/healthyouth/data/yrbs/index.htm>. Accessed August 25, 2017.
49. Smith A, Agius P, Mitchell A, Barrett C, Pitts M. Secondary Students and Sexual Health 2008. Melbourne: Australian Research Centre in Sex, Health & Society, La Trobe University 2009.
50. Lenhart AL, Richard; Campbell, Scott. Teens, Adults, and Sexting: Data on sending & receipt of sexually suggestive nude or nearly nude images by American adolescents & adults. 2010 <http://www.pewinternet.org/2010/10/23/teens-adults-and-sexting-data-on-sendingreceiving-sexually-suggestive-nude-or-nearly-nude-photos-by-americans/>. Accessed October 8, 2017.
51. Carter LS. Effective responses to teen sexting, A guide for judges and other professionals. Futures Without Violence, San Francisco. 2012 <https://www.futureswithoutviolence.org/userfiles/file/Judicial/Effective%20Responses%20to%20Teen%20Sexting.pdf>. Accessed November 14, 2017.
52. Szymanski M Sexting education launches with 'Now Matters Later' video. LA School Report. 2015 <http://laschoolreport.com/sexting-education-launches-with-now-matters-later-video/>. Accessed October 8, 2017.
53. Yeung TH, Horyniak DR, Vella AM, Hellard ME, Lim MSC. Prevalence, correlates and attitudes towards sexting among young people in Melbourne, Australia. *Sexual Health*. 2014;11(4):332–339. [PubMed: 25087581]
54. O'Connor KW, Drouin M, Yergens N, Newsham G. Sexting Legislation in the United States and Abroad: A Call for Uniformity. *International Journal of Cyber Criminology*. 2017;11(2).

**QUICK POINTS:**

1. Approximately 1 in 5 adolescents sext (exchange sexually explicit images and message).
2. Adolescents who sext are more likely to report sexual activity than adolescents who do not.
3. Sexting has legal and public health implications, particularly when non-consensual information is shared.
4. Midwives should integrate sexting as an element of sexual health counseling with adolescent and young adult patients.



**Figure 1. Results of the literature search and final study inclusion**

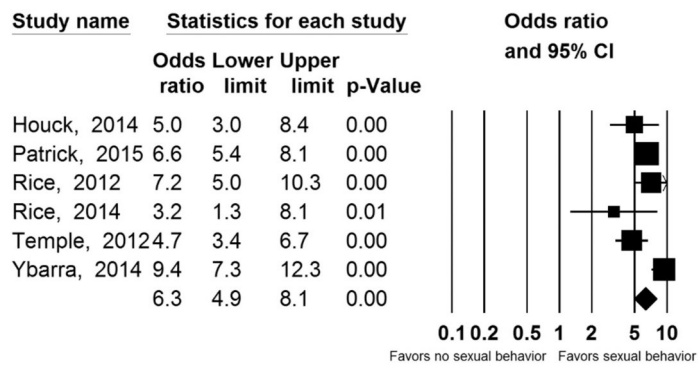


**Figure 2. Quality appraisal of included studies using a modified Downs and Black Checklist**

Source: Downs & Black, 1998 <sup>36</sup>

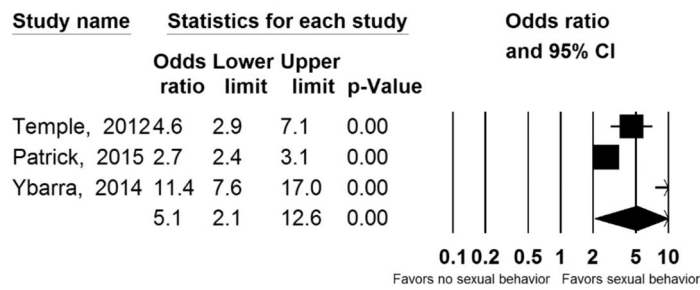
NOTE: The Downs and Black checklist is organized into four broad categories: reporting, external validity, internal validity (bias and confounding), and power. Twelve questions not applicable to cross-sectional or cohort studies were removed: questions 4 and 8 (reporting), 12 and 13 (external validity), 14–16, 19, 21, 23 and 24 (internal validity); and 27 (power). The modified scale contained 15-items with a maximum score of 16 possible points: 9 points for reporting (one question had a 2-point option); 1 point for external validity; and 6 points for internal validity.

A. Association between sexting and sexual behaviors



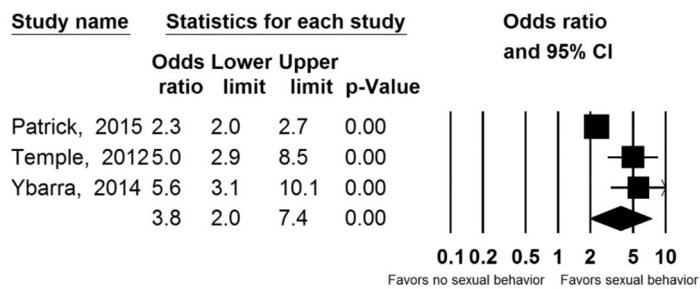
Random effects model, Cochran's Q = 14.3, p = 0.01, I square = 65.1

B. Association between sexting and sexual behaviors in females



Random effects model, Cochran's Q = 47.9, p < 0.001, I square = 95.8%

C. Association between sexting and sexual behaviors in males



Random effects model, Cochran's Q = 14.7, p < 0.001, I square = 86.4%

**Figure 3. Meta-analysis results for the pooled sample from six studies with results stratified by male and female study participants**

**Table 1.** Characteristics of included studies in systematic review and meta-analysis of sexting and adolescent sexual behaviors

Author (Year) Country	Sample	Definition of sexting	Sexting prevalence	Sexual activity	Association between sexting and sexual activity	Quality appraisal <sup>d</sup>
Dake (2012), United States	N=1,289 Age 12–18 years Female: 48% Race/ethnicity: African American: 4% Hispanic: 5% White: 87% Other: 4% Sexual preference: NR	Sent or received sexually explicit text	17%	Ever 47%	OR 5.4 95% CI 3.5, 8.4	Reporting: 8 points External validity: 1 point Internal validity: 3 points
Houck (2014), United States	N= 410 Age 12–14 years Female: 46% Race/ethnicity: African American: 35% White: 38% Other: 27% Sexual preference: NR	Sent sexually explicit text	17%	Ever 22%	OR 5.0 90% CI 3.0, 8.4	Reporting: 8 points External validity: 1 point Internal validity: 3 points
Patrick (2015), Australia	N=2114 Age: 10–12 <sup>th</sup> grade Female: 62% Race/ethnicity: NR Sexual preference: Heterosexual: 78% Bisexual: 11% Homosexual: 6%	Sent sexually explicit text.	43%	Ever Male 74% Female 72%	Male RR 2.3 95% CI 2.0, 2.7 Female RR 2.7 95% CI 2.4, 3.1	Reporting: 7 points External validity: 1 point Internal validity: 3 points
Rice (2012), United States	N= 1,714 Age 14–17 years Female: 48% Race/ethnicity: African American: 12% Hispanic: 72% White: 9% Sexual preference: Heterosexual: 87% Bisexual: 7% Homosexual: 2% Transgender: 0.5%	Sent sexually explicit text or photo.	41%	Current 41%	OR 7.2 90% CI 5.0, 10.3	Reporting: 5 points External validity: 1 point Internal validity: 2 points
Rice (2014), United States	N= 841 Age 10–15 years Female: 48% Race/ethnicity: African American: 18% Hispanic: 60% White: 15%	Sent sexually explicit text	5%	Current 11%	OR 3.2 95% CI 1.3, 8.1	Reporting: 5 points External validity: 1 point Internal validity: 2 points



Author (Year) Country	Sample	Definition of sexting	Sexting prevalence	Sexual activity	Association between sexting and sexual activity	Quality appraisal <sup>a</sup>
Sevcikova (2016), European Union	Sexual preference: Heterosexual: 96% Bisexual: 3% Homosexual: 1% N=17 016 Age 11–16 years Female: 50.3% Race/ethnicity: NR Sexual preference: NR	Sent or received sexually explicit text.	3%	Current NR	Male 11–14 years: OR 3.5 95% CI 1.6, 7.5 15–16 years: OR 3.4 95% CI 2.4, 4.8 Female 11–14 years: OR 1.9 95% CI 0.9, 4.1 15–16 years: OR 2.3 95% CI 1.5, 3.8	Reporting: 3 points External validity: 0 points Internal validity: 3 points
Sevcikova (2017) Czech Republic	N=1134 Age:13.8 years (SD 1.9) Race/ethnicity: NR Sexual preference: NR	Sent or received sexually explicit text	3–5%	Current NR	NR	Reporting: 4 points External validity: 0 point Internal validity: 5 points
Temple et al. (2012), United States	N= 882 Age 14–19 years Female: 56% Race/ethnicity: African American:31% Hispanic: 28% White: 29% Sexual preference: NR	Sent sexually explicit	22%	Ever Male 45% Female 55%	Male 82% vs 45% Female 77% vs 42%	Reporting: 5 points External validity: 0 point Internal validity: 0 points
Ybarra & Mitchell (2014), United States	N= 3,715 Age 13–18 years Female: 56% Race/ethnicity: African American: 10% White: 75% Sexual preference: Heterosexual: 96% Lesbian, gay, bisexual, other: 4%	Sent sexually explicit text	5%	Current Male 40% Female 60%	Male OR 5.6 95% CI 3.1, 10.1 Female OR 11.4 95% CI 7.6, 17.0	Reporting: 7 points External validity: 1 point Internal validity: 3 points

Abbreviations: OR, Odds Ratio; RR, Relative Risk; NR; Not reported

<sup>a</sup>Quality appraisal of each study was done using a modified Downs and Black checklist.<sup>36</sup> Total scores for each appraisal category are: Reporting, 9 points; External validity, 1 point; Internal validity, 6 points.