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Best Youth Education Methods for Sexually Transmitted Infection Prevention

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NURS 695: Alternate Plan Paper

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Abstract

Sexual health education in the United States is inconsistent; information and methods vary from one location to another. Education plays a large role in developing safe sex practices, and despite the sexual education efforts, rates of sexually transmitted infections have risen for five consecutive years in the United States. A systematic literature review was conducted to determine the best methods for educating adolescents to promote behaviors to enhance sexual health. Multiple types of interventions have been studied including cognitive behavioral interventions, comprehensive sexual education, parent and teen dyad education, and abstinence only education. Sexual behavior is influenced by a variety of factors including individual environment, education, peer pressure, parental involvement, social situations, government and school policy, and many more. Abstinence education is a beneficial component of comprehensive sexual education, though it lacks the health information that an adolescent person needs. Comprehensive sexual education provides young people with the holistic knowledge, skills, attitudes, and values necessary to help them avoid negative consequences associated with sexuality. Adolescents have the right to medically accurate comprehensive sexual education beginning early in adolescence to build foundation for sexual health prior to the emergence of sexual intimacy. This education should be provided throughout the entirety of their education to solidify understanding and behavior to promote sexual health as adolescents prepare to enter adulthood.

Keywords: sex education, prevention of STIs, abstinence only, behavior modification, adolescent STI, STI prevention in adolescents, education techniques, school-based sex education, comprehensive sex education

Best Youth Education Methods for Sexually Transmitted Infection Prevention

Adolescence is a time which complex social, biological, and physiologic changes occur. The emergence of sexuality typically begins in adolescence and is a time when intimate relationships are often formed. The sexual health education provided to adolescents builds a foundation for their sexual behavior, which helps them prepare to grow into adults who are responsible for their health and wellbeing. Sexual health education has been taught in schools in the United States for decades. Despite this longevity, there is a lack of consistency with laws for education content, and teaching methods vary from one state to another (Guttmacher Institute, 2020).

According to the Guttmacher Institute (2020), 39 states and the District of Columbia mandate sexual health education. However, individual schools determine the approach and content for sexual health education. Some schools provide abstinence only content, other schools provide both sex education and human immunodeficiency virus (HIV) education, and others only provide sex education *or* only HIV education. Some states require contraception education, including abstinence or sexual avoidance education. Teaching approaches may also be nuanced by values or the choice of content to emphasize. There are also differences between states in the requirements for life skills, sexual consent, relationships, and prevention of dating and sexual violence (Guttmacher Institute, 2020).

Despite the education that adolescents receive in school and other initiatives for education, sexually transmitted infection (STI) rates continue to rise, and are disproportionately higher among adolescents (Santelli et al., 2017). The need for successful teaching interventions is critical, and research to enhance understanding of the

best methods for youth education is imperative (Berglas et al., 2016). There is a relationship between the risks associated with adolescents and sex, and the policies that are enforced by state and local governments (Santelli et al., 2017). The purpose of this review is to determine which methods are most effective in promoting safe sexual behavior to help the adolescent population develop the necessary skills to prevent contracting and spreading STIs which preserves the future of reproductive health.

Background

Clinical Significance

In the United States, rates of combined cases of gonorrhea, chlamydia, and syphilis have risen five consecutive years (Centers for Disease Control and Prevention [CDC], 2018), and worldwide more than one million new STIs are contracted daily (World Health Organization [WHO], 2019). According to the CDC, of those affected by STIs, young people age 15 to 34 are impacted at greater rates compared to the general population.

Many STIs can be treated with antibiotics; however, they still carry risks for adverse outcomes such as pelvic inflammatory disease and infertility, stillbirth or neonatal death, and increased risk for contracting HIV. Additionally, excessive and incomplete use of prescribed antibiotics has led to antibiotic resistance from certain strains of STIs, particularly gonorrhea (WHO, 2019).

There are some vaccinations for preventing viral STIs like the hepatitis B virus (HBV) vaccine, and the human papilloma virus (HPV) vaccine, but the vaccines are only effective if they are administered prior to exposure to the viruses (Sadovszky et al., 2014). HIV remains a global health concern, and there is not an effective vaccine to

prevent contracting the disease. Sadovszky et al. suggest that adequate education with an emphasis on behavior modification provides an intervention that can help people protect themselves from becoming infected with STIs.

A review on sexual education intervention techniques is necessary to determine characteristics of successful interventions so education can be tailored to meet the needs of the adolescent population; the adolescent population refers to people between the ages of 10 years and 19 years of age (WHO, 2019). Information from the studies used in this review can benefit programs designed to help adolescents take responsibility for their own sexual health. Hundreds of studies have been done to assess interventions, with behavior modification as the most widely studied intervention (Sandovszky et al., 2014). The body of evidence can provide valuable information for policy development for guiding educational development. By understanding the effectiveness of education methods that are already used, policy makers can use this knowledge to make decisions and provide funding for school-based education (Mirzazadeh et al., 2017).

Clinical Question

The phenomenon of interest for this review surrounds understanding how the sexual health and wellbeing of adolescents is impacted through education. Awareness of the efficacy of existing sexual health education methods can be used to inform recommendations to address the disproportionately higher rates of STIs in this particular group. The guiding clinical question for this literature review: *In the adolescent population how does multicomponent sexual education compare to abstinence only education in behavior modification for prevention of sexually transmitted diseases?*

Methods

A systematic literature review was conducted to gain further insight into the best practice methods to promote behaviors for prevention of STIs. Five electronic databases were selected in this literature review to include CINAHL, Cochrane, MEDLINE, Nursing and Allied Health, and PsycINFO. Databases were selected based on their content related to health and behavior. Table 1 (see appendix) provides rationale for selection of each database, as well as restrictions and date ranges used for each. The keywords “prevention of STIs,” “sex education,” “comprehensive sexual education,” “behavior modification,” “school-based sex education,” “adolescent,” “abstinence only,” and “education techniques” were used in various combinations in each database for this literature review. Each search term combination was used in each database, and then recorded in Table 2 along with the results per database (see appendix). Studies were then selected based on their titles, abstracts, and relevance to the topic and population. Further review of the articles was completed to determine whether each study met the specific criteria to inform the clinical question. The inclusion criteria were focused on the adolescent population and the methods most effective for safe sex practices to prevent sexually transmitted infections. The exclusion criteria were studies that focused on sexual minority groups, pregnancy prevention only, studies on all types of risky behavior (like drug use), studies on increasing condom availability only, and STI treatment in adolescents. Table 3 (see appendix) identifies the studies included and excluded along with the rationale.

Articles were selected based on their ability to inform the clinical question and phenomenon of interest within the adolescent population. Twenty-one articles were

reviewed, and 12 met inclusion criteria, and further detail to include the population, study size, study design, and level of evidence was extracted and included in Table 4 (see appendix). The inclusion criteria used for this literature review was focused on the adolescent population, sexual health education (comprehensive, mixed-method, and abstinence only), and outcomes from the education. The highest level of evidence selected included two level I studies, and the lowest level of evidence included were two level IV studies.

Literature Review

A total of 12 articles met inclusion criteria, and represented a total of 32 studies and over 6,562 adolescent participants. Studies from the United States, Italy, Mexico, and Uganda were used, and included participants of rural, urban, and suburban communities. Multiple types of interventions studied including cognitive behavioral intervention, comprehensive sexual education, parent and teen dyad education, and abstinence only education were included. The different methods for delivering the educational interventions included internet-based education, face-to-face education, and educational DVDs and workbooks.

Synthesis of Evidence

Sexual behavior is influenced by a variety of factors to include individual environment, education, peer pressure, parental involvement, social situations, government and school policy, and many more (Berglas et al., 2016; Crosby et al., 2014; Doubova et al., 2016; Shepherd et al., 2017). Adolescents have human rights to health, information, and life; comprehensive sexual health education helps adolescents learn safe sex practices to protect their health and lives (Santelli et al., 2017).

Abstinence education is a beneficial component of comprehensive sexual education, though it lacks the health information that adolescents need to protect their health if and when they become sexually active. Comprehensive sexual education provides young people with the holistic knowledge, skills, attitudes, and values necessary to help them avoid negative consequences associated with sexuality (Peskin et al., 2015; Shepherd et al., 2016; Ybarra et al., 2015). According to Guttmacher Institute (n.d.), comprehensive sexual education covers gender-specific sexual and reproductive health, sexual rights, pleasure, sexual violence, sexual diversity, and relationships. This education typically begins in elementary school with anticipatory education on puberty, followed by sexual health when children enter and progress through adolescence.

Multicomponent Sexual Education

Of the 12 articles reviewed, 11 involved at least one sexual education intervention, or multiple sexual education techniques to prevent STIs. One of the articles was a systematic review of randomized control trials, and one of the articles was a systematic review of randomized control trials and cohort studies, and included a meta-analysis. Four of the articles were randomized control trials, four of the articles were quasi-experimental studies, and one was a cohort study. These studies can be further divided into categories of in-person education and technology-based education.

In-Person Education. The systematic review and meta-analysis by Mizazad et al. (2018) proposed the question of whether or not comprehensive sexual education reduced rates of STIs. Researchers found that there were not documented studies to determine whether or not education actually reduced rates of STIs, and the findings from studies demonstrated the relationship between education and behavior. A systematic review by

Sandovsky et al. (2014) that assessed behavioral interventions to promote safer sexual behavior had similar findings. This evidence suggests that behavior interventions are effective educational methods that increase safer sexual practices among adolescents. However, this study did not correlate education and rates of STIs.

Two studies reviewed used the same evidenced-based practice method for comprehensive sexual education called Becoming a Responsible Teen (BART). Shepherd et al. (2017) conducted a randomized control trial to compare BART with an abstinence only teaching method and used an African Traditions and Vibes course as a control method in African American adolescents in an urban southern United States setting. A 2016 study by Hallum-Montes et al. conducted a cohort study on Southern African American adolescents in the rural setting where they also implemented BART and evaluated the method over time with their participants. Hallum-Montes adapted BART to the participants by renaming it Swagga & Lace and reframing content to make it more appealing to the adolescent African American participants. Both studies found that programs like BART are beneficial for youth because they offer comprehensive education, medically accurate information, and diverse teaching strategies. Participants in the BART intervention demonstrated improved knowledge and self-efficacy for correct and consistent condom use and had more favorable attitudes towards condom use (Hallum-Montes et al., 2016; Shepherd et al., 2017).

Focus on the Future (FoF) is another evidence-based intervention that is designed for use in the clinic setting. Crosby et al. (2014) conducted a randomized control trial in a clinic setting where a one-hour session of a tailored version of FoF was provided, along with an ample supply of high quality condoms and lubricant; the control group was

provided with good quality condoms and lubricant with a basic educational presentation on STIs. The study found that the participants in the intervention group who received the education and the condoms demonstrated reduced sexual risk behaviors with correct and consistent condom use compared to the control group. Among those in the intervention group, the rate of correct and consistent condom use was 60% greater compared to the control group (Crosby et al., 2014). This study was unique because it was the only one in this review that tested participants for the STIs. Gonorrhea (GC) and chlamydia (CT) data were identified at baseline and at six months post intervention based on self-reported infections and treatment for GC and CT. There was a significant reduction of STIs in the intervention group, and no statistically significant difference in the rates of STIs between the control and intervention group; Crosby et al. attribute this finding to the intervention group starting with a higher baseline rate of STIs.

In a randomized control trial by Berglas et al. (2016), students from multiple schools were randomly assigned into either (a) a 12-session rights-based multicomponent education group, or (b) a three-session group that covered basic sexual health topics such as anatomy, and STI and pregnancy prevention. Researchers found that providing a school environment where students were allowed to have open and respectful discussions with other students, faculty, and families, students demonstrated an enhanced ability to manage their own sexuality and help prevent STIs compared to students who received basic sexual health education (Berglas et al., 2016). Berglas et al. also discussed the importance of starting comprehensive education during early adolescence to build a good foundation for behavior and attitudes before sexual activity begins. Bogani et al. (2016) found that students who received school-based sexual health education demonstrated

more knowledge on risks for STIs and pregnancy compared to students who did not receive school-based education; however, there was not a statistically significant difference between high-risk behaviors or differences in attitudes about high-risk behavior. One important concept from the Bogani et al. study is that there was a large amount of adult reluctance with sexual education compared to the Berglas et al. study where they describe respectful conversations between adolescents and adult faculty and parents as a key component to success in sexual education. Bogani et al. also described a lack of standardization; standardization of education contributes to overall success of sexual health education, and there was a lack of consistency in the groups they included.

Technology-Based Education. Of the 12 studies used in this review, three of the studies were online education modules and one was a DVD with a provided workbook. Two of the online modules were randomized control trials and one was a quasi-experimental study. The DVD and workbook study was a cohort design that compared parent and adolescent dyads who either received a DVD and workbook that provided sexual health education, and another that was a general health promotion DVD and workbook.

Online education is a cost-effective way to provide accessible information to promote sexual health (Peskin et al., 2015). Online and DVD sexual health education can benefit a large number of people in a short amount of time and offer flexibility and convenience to participants (Doubova et al., 2016; Peskin et al., 2015). A 2015 Ybarra et al. study in Uganda reports that an online intervention delivery method is promising in developing countries because the cost is lower. Ybarra et al. also discuss how internet-based sexual education can provide valuable information to people in an anonymous

setting, which would help participants avoid common stigma associated with sexual discussions.

Evidence suggests that technology-based programs demonstrate positive sexual behavior outcomes, though the significance was modest (Hadley et al., 2016; Peskin et al., 2015; Ybarra et al., 2015). Each technology-based study demonstrated a significant impact on STI knowledge and condom use self-efficacy compared to the control group, however the evidence did not support a significant impact on sexual abstinence. Ybarra et al. state that adolescents who participated in the intervention group with an additional booster class were three times more likely than participants who were in the control group to remain abstinent in the six-month post-intervention survey, suggesting the additional education is beneficial in promoting safe sexual health behavior.

Abstinence Only Education

Of the 12 articles reviewed, two of them researched abstinence only methods. One study was a cohort study on females who pledged abstinence only until marriage, and the other was a quasi-experimental study comparing comprehensive sexual education and abstinence only education. Abstinence only education is offered in schools throughout the United States and is the only method for education in some schools. In theory, abstinence is the most effective method for preventing the spread of STIs and unintended pregnancies, but in actual practice it often fails because a majority of adolescents who choose abstinence are not able to uphold their decision (Paik et al., 2016). Abstinence only education often does provide education on risk for sexually transmitted infections, with emphasis that infections can still occur even with the proper use of condoms, so the only sure way to prevent infection is to remain abstinent (Paik et al., 2016; Shepherd et

al., 2016). Paik et al. found that those who were taught and pledged abstinence had higher rates of STIs. Researchers attributed this finding to the message with abstinence only education that condoms are not effective. Shepherd et al. (2016) discuss evidence that supports that adolescents who received abstinence only education were more likely to have unprotected sex compared to adolescents who received comprehensive sexual education.

An important predictive factor for whether someone will use condoms to prevent STIs is their attitude towards condom use. Abstinence only education can be effective in reducing sexual activity and providing valuable education on about partner selection, and reducing the number of lifetime sexual partners (Paik et al., 2017; Shepherd et al., 2016). Abstinence education should be incorporated into comprehensive sexual education as an option for STI prevention because it is a choice some students make, and the information should be made available for those students (Shepherd et al., 2016).

Quality of Evidence

Through this literature review, 12 studies were selected which represent a variety of evidence. The Hierarchy of Evidence described by Melnyk and Fineout-Overholt (2015) rates level I evidence as the highest level of evidence as is consists of a systematic review of randomized control trials, level II studies are randomized control trials, level III studies are well-designed control trials without randomization, level IV studies are case-control or cohort studies, level V evidence are systematic reviews of descriptive and qualitative studies, level VI evidence is a single descriptive or qualitative study, and level VII evidence is an expert opinion. Two of the studies included are level I evidence, four of the studies are level II evidence, four studies are level III evidence, and two studies are

level IV evidence. The level I evidence provides the highest level of quality, however, the variety of other studies provide valuable insight to different methods and techniques, and they offer explanation as to why certain methods are more or less effective. Mixed methods research provides learning opportunities that are important for identifying community resources and needs to ensure adolescents from different backgrounds received adequate education (Melnik & Fineout-Overholt, 2015).

Literature Gaps

On the topic of sexual health education for adolescents, the primary focus in the literature has been on behavioral outcomes and attitudes rather than on biological outcomes. There is a sizeable amount of evidence that demonstrates positive outcomes with comprehensive education, but not the long-term impact that the education has on STI rates. In a 2017 systematic review and meta-analysis by Mirzazadeh et al., found no studies on the effects of education on the incidence of HIV, and concluded that it is difficult to identify specific interventions that reduce rates of STIs. Mirzazadeh et al. discuss how attitudes and behaviors can serve as a predictive indicator of the likelihood of a person practicing safe sex through the use of condoms, but the data on attitudes and behaviors do not provide actual data on the impact on STI rates. Crosby et al. (2014) conducted the only study found during this literature review that incorporated the rates of STIs with the education. However, this study was done in the clinical setting rather than the school setting thus school-based educational modalities is needed.

Discussion

Adolescents have the right to medically accurate comprehensive sexual education beginning early in adolescence to build foundation for sexual health prior to the

emergence of sexual intimacy (Berglas et al., 2016). This education should be provided throughout the entirety of their education to solidify understanding and behavior to promote sexual health as adolescents prepare to enter adulthood (Berglas et al., 2016; Doubova et al., 2017; Hallum-Montes et al., 2016; Sandovsky et al., 2014; Shepherd et al., 2017). Comprehensive sexual behavior should incorporate human anatomy, sexual and reproductive health, risk avoidance, sexual rights, relationships, and sexual violence (Berglas et al.; 2016; Guttmacher Institute, n.d.). The most effective method to promote healthy behavior is cognitive behavioral training, and in-person learning provides the best environment to support comprehensive education (Shepherd et al., 2017).

Abstinence should be offered as a part of comprehensive sexual education; however, it should not be the only method taught because this deprives adolescents of important health information for their sexual health. Abstinence education holds great value in sexual health, and it *is* the best method to prevent consequences of sexual activity, but in actual practice it is ineffective because it is not a choice that everyone makes, and intentions to maintain abstinence are not always upheld (Santeli et al., 2017). Education should be provided on actual success rates of condoms and adverse events associated with sexual activity should be incorporated to emphasize the responsibility associated with sex (Berglas et al., 2016; Crosby et al., 2014).

One of the biggest issues with sexual education for adolescents is the lack of consistency from one school to another. Some students receive high quality comprehensive education, where others are provided education based on state and school policy, and some include limited information on sexual health (Santeli et al., 2017). The mode of education can impact the effectiveness of the education; in-person education has

more benefits for a lasting impact, but tech-based education materials are a cost effective way to provide education to a large amount of people with limited resources (Doubova et al., 2017; Hadley et al., 2016; Peskin et al., 2015).

Limitations

A common limitation noted throughout the literature was that sexual health behaviors were self-reported by the participants because they are not generally observable, creating the potential for misinformation. Sexually transmitted infection rates in studies were also based on self-reporting by the participants rather than a biological test for the disease, with the exception of the Crosby et al. (2014) study that screened at an STI facility. Another limitation discussed in technology-based education was that the lack of interaction with a teacher and with other students in group discussions, important pieces of sexual education are missed through their ability to ask questions and talk through complex topics (Hadley et al., 2016; Peskin et al., 2015; Ybarra et al., 2015).

There were some noted limitations of the evidence during the review process. One limitation noted is that most of the studies have not been replicated which weakens the evidence (Denford et al., 2016). Although having so many different types of studies and methods available provides evidence that is tailored to specific populations and techniques, it does not provide the strongest evidence because these studies have not been replicated, and therefore limits the strength of the evidence. With the exception of BART, none of the other frameworks were used in other studies. Additionally, although BART was used in two of the studies reviewed, the methods for the studies were different in that one was a randomized control trial, and the other was a cohort study, which makes the results of these two studies difficult to compare.

Areas for Further Research

Existing Knowledge

Within the context of existing knowledge, evidence suggests that by providing abstinence only education, adolescents are lacking the information necessary to make informed decisions about their sexual health needs (Santeli et al., 2017). It is well known that education empowers people to make informed decisions about their health (Ybarra et al., 2015), and this is a valuable consideration for this literature review. The research that is done to determine which methods are the best for promoting safe and effective sexual health behavior is beneficial to ensure evidenced-based education is provided.

Further Research

Additional studies on education that promotes self-efficacy with condom negotiation skills would be beneficial to help validate this education method so it can be implemented in sexual health education. Condom use negotiation skills provide adolescents with the necessary tools to empower them to enforce condom use in the event their partner has a negative attitude toward condom use (Shepherd et al., 2017). These studies would help researchers inform policy makers and educators on which areas are most important to place emphasis on when providing sexual health education.

Shepherd et al. (2017) also recommend future intervention studies on favorable attitudes and social norms with condom use and abstinence. A 2016 study by Berglas et al. on multicomponent sexual education suggests that larger scale studies over longer time periods are needed to evaluate the needs of different communities and what the long-term outcomes are of education are. Evidence suggests that when adolescents received education prior to becoming sexually active, they had more favorable attitudes

towards safe sex practices, and further studies to determine long-term effectiveness and self-efficacy with safe sex practices could influence the onset of sexual education (Berglas et al., 2016).

Additional research is recommended to assess the needs for rural, suburban, and urban communities (Hallum-Montes et al., 2016). Research is also necessary to assess the needs for different racial minorities within different populations, because African American and Hispanic youth are disproportionately affected by STIs (Hadley et al., 2016; Hallum-Montes et al., 2016; Peskin et al., 2015; Shepherd et al., 2017). Berglas et al. (2016) suggest that larger scale studies are necessary to determine innovative approaches in diverse schools to also address the sexual health needs of the lesbian, gay, bisexual, transgender, and queer (LGBTQ) students, as LGBTQ students often do not have their needs met with sexual education.

Implications

Recommendations for Practice

In the family practice setting, nurse practitioners can use information about the best methods for promoting sexual health behaviors in adolescents to discuss sexual health practices with patients. The family nurse practitioner can help fill knowledge gaps in sexual health and provide medically correct education to their patients. Crosby et al. (2014) suggest providing education on correct and consistent condom use in the clinical setting, along with high quality condoms and lubricant during patient visits. Their study recommends that facilities hire a sexual health educator for this specific purpose. This may not be feasible in every setting, but nurse practitioners can help bridge the gap between the knowledge and skills a patient has, and those they are lacking.

Education Recommendations

The sexual health education needs for adolescent students should be assessed, and education should be tailored to meet their unique population. Diverse teaching strategies should be used to expand the needs of comprehensive sexual education (Hallum-Montes et al., 2016). Comprehensive sexual education should be provided at minimum to include human biology, sexual and reproductive health, sexually transmitted diseases, sexual rights, sexual violence, and relationship management (Berglas et al., 2016). Abstinence should be taught as an option but should not be the only form of education for students receiving sexual health education. Correct and consistent condom use, condom negotiation skills, and condom effectiveness education should be provided, and students should be aware of consequences of sexual activity. Adolescents should be taught how to have respectful conversations regarding sex to promote healthy relationships with partners where they are able to establish boundaries for sex (Hallum-Montes et al., 2016).

Recommendations for Policy

Education barriers and determinants of health vary based on the community and population served in the area. The needs for health education in a rural area will be different compared to the health education needs in an urban area, and it is important for policy makers to be aware of these needs when deciding which form of education to provide to adolescents in a given area (Hadley et al., 2016; Hallum-Montes, 2016). There is no blanket method that will benefit an entire population equally; so comprehensive sexual education should be tailored to fit the needs of the community (Santelli et al., 2017). Nurse practitioners could serve within their communities to address the educational needs of adolescents.

Conclusion

Adolescence marks a time when sexual emergence commonly occurs and intimate relationships are initiated. Sexual relationships take on a new role in adolescent health, and adolescents need to learn how to manage their health needs independently to avoid negative consequences associated with sexual intercourse (Mirzazadeh et al., 2017; Sandovszky et al., 2014). Sexual health education is typically started in early adolescence, but consistent methods are not used to provide education. There are large gaps in education, which is problematic as it is related to disproportionate rates of STIs in the adolescent population compared to the general population (CDC, 2018; Guttmacher Institute, 2020).

Comprehensive sexual education is the best method for providing information to youth to adequately prepare them to make informed decisions about their sexual health (Bergals et al., 2016; Hallum-Montes, 2016; Sandovsky et al., 2014; Shepherd et al., 2017). It is most effective when it is started before adolescents initiate sexual intercourse because it helps promote healthy attitudes towards partner selection, sexual conversations, and condom use; adolescent attitudes towards sexual health are directly related to their behavior and self-efficacy (Berglas et al, 2016). Comprehensive sexual education typically does prevent adolescents from engaging in sexual activity, but it does significantly impact their sexual behavior (Peskin et al., 2015)

Education should be developed with a thorough understanding of the health education and health services needed for a given community (Doubova et al., 2017; Shepherd et al., 2017; Ybarra et al., 2015). In communities with limited resources, technology-based interventions are suitable to provide comprehensive sexual education to

adolescents (Doubova et al., 2017, Peskin et al 2015). Technology-based education is more effective when there are “booster” lessons to reinforce participant’s knowledge and promote healthy behavior (Ybarra et al., 2015). Lastly, social determinants of health should be addressed with sexual health education to ensure the needs of the community are being met.

Although there is strong evidence to suggest comprehensive sexual education is a superior form of education compared to abstinence-only sexual education, abstinence education holds great value in sexual health education (Mizazadeh et al., 2018). Abstinence education should be incorporated into comprehensive sexual education to ensure adolescents are receiving well-rounded education (Berglas et al., 2016). Adolescents have the right to accurate comprehensive information about sexual health to provide a foundation for their behavior.

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Appendix

Table 1
Database Search Description

Database	Restrictors/Expanders Added to Search	Dates Included in Database	General Subjects Covered in Database
1. CINAHL	All search terms, full text, peer reviewed	2010-2020	Nursing, allied health, health education, medical laboratory
2. Cochrane	All search terms, apply equivalent subjects, full text	2010-2020	Controlled trials providing unbiased source of data and systemic review.
3. MEDLINE	Full text, humans	2009-2019	Research, clinical practice, administration, policy issues, and healthcare services
4. Nursing and Allied Health	Full text, peer reviewed, adolescent, English	After 2014	Citations, abstracts, and full text articles related to nursing and allied health
5. PsycINFO	Peer reviewed, adolescent age group, human	After 2014	Articles and books relate to psychology, psychiatry, education, business, medicine, nursing, pharmacology, law, linguistics, and social work

Table 2
Data Abstraction Process: Hit Results by Database

Key Words	CINAHL	Cochrane	MEDLINE	Nursing and Allied Health	PsycINFO
“Sex education” AND “Prevention of STIs”	*3	2	3,659	*2	*1
“Sex education” AND “abstinence only” OR “behavior modification”	2,588	1	34	2,125	X
“Adolescent STI”	200	1	1,365	902	425
“STI Prevention in adolescents”	*3	1	72	819	223
“STI Prevention”	672	1	1,559	825	286
“STI Prevention” AND “Education system”	10	0	27	434	4
“STI Prevention” AND “Education techniques”	3	0	361	203	3
“School based sex education” AND “adolescents”	159	2	90	*3	*2
“Comprehensive sexual education” OR “Abstinence only” AND “Adolescents”	124	3	605	*4	2,846
“STI prevention education” and “behavior change”	26	X	17	492	14
“STI prevention in adolescents” AND “Education”	42	X	137	713	95
“STI prevention” and “education” and “Abstinence”	5	X	6	52	5
“STI prevention in adolescents” AND “Behavior modification”	*3	X	17	40	1
“STI Prevention” and “abstinence only”	2	X	2	157	2

* **BOLD**= articles reviewed and deemed as match based on systemic review inclusion criteria.

X= not searched in database

Table 3

Characteristics of Literature Included and Excluded

Reference	Included/Excluded	Rationale
<p>Alekseeva, E. G., Krasnopolskaya, I., & Skokova, Y. (2015). Introducing sexual education to Russian schools: Effects of dance4life program on perceptions and behavior of adolescents and teachers. <i>Health Education, 115</i>(1), 7-37. https://doi.org/10.1108/HE-02-2014-0014</p>	Excluded	<p>This study used qualitative and quantitative methods for evaluation of students before and after a program to promote sexual reproductive health rights and healthy habits; however, the students were evaluated on knowledge and attitudes and no formal survey on STI prevention was conducted.</p>
<p>Berglas, N. F., Jerman, P., Rohrbach, L. A., Angulo-Olaiz, F., Chou, C., & Constantine, N. A. (2016). An implementation and outcome evaluation of a multicomponent sexuality education programme for high school students. <i>Sex Education, 16</i>(5), 549-567. https://doi.org/10.1080/14681811.2015.1133408</p>	Included	<p>This study uses multiple teaching techniques for adolescents, which helps answer the PICO question.</p>
<p>Bogani, G., Cromi, A., Serati, M., Monti, Z., Apolloni, C., Nardelli, F., Di Naro, E., & Ghezzi, F. (2015). Impact of school-based educational programs on sexual behaviors among adolescents in northern Italy. <i>Journal of Sex & Marital Therapy, 41</i>(2), 121-125. https://doi.org/10.1080/0092623X.2014.958791</p>	Included	<p>This study was on school based sexual education programs with adolescents in middle school and high school and fits the PICO question</p>
<p>Crosby, R. A., Charningo, R. J., Salazar, L.F., Pasternak, R., Terrell, I.W., Ricks, J., Smith, R., & Taylor, S. (2014). Enhancing condom use among black male youths: A randomized control trial. <i>American Journal of Public Health, 104</i>(11), 2219-2225. https://doi.org/10.2105/AJPH.2014.302131</p>	Included	<p>This RCT used teaching methods for correct and consistent condom use in African American adolescents and reassessed participants 6 months later to assess efficacy.</p>
<p>Dobova, S. V., Martinez-Vega, I., Infante-Castañeda, C., & Pérez-Cuevas, R. (2017). Effects of an internet-based educational</p>	Included	<p>This study is an RCT with comprehensive sexual education internet-based training with adolescents, which helps to answer</p>

<p>intervention to prevent high-risk sexual behavior in Mexican adolescents. <i>Health Education Research</i>, 32(6), 487-498. https://doi.org/10.1093/her/cyx074</p>		<p>the PICO question.</p>
<p>Hadley, W., Brown, L. K., Barker, D., Warren, J., Weddington, P., Fortune, T., & Juzang, I. (2016). Work it out together: Preliminary efficacy of a parent and adolescent DVD and workbook intervention on adolescent sexual and substance use attitudes and parenting behaviors. <i>AIDS and Behavior</i>, 20(9), 1961-1972. https://doi.org/10.1007/s10461-016-1418-6</p>	<p>Included</p>	<p>This study provided information relevant to the PICO question and focuses on an adolescent population. This study focused on an intervention that included the parents of adolescents.</p>
<p>Hoefler, S. E., & Hoefler, R. (2017). Worth the wait? The consequences of abstinence-only sex education for marginalized students. <i>American Journal of Sexuality Education</i>, 12(3), 257-276.</p>	<p>Excluded</p>	<p>This study is a qualitative study on adolescent's experiences after receiving abstinence-only sexual education; however, the focus was on participants who were sexual minorities, and this does not apply to the specific PICO question.</p>
<p>Hallum-Montes, R., Rhodes, L., Malone, C., Martin, G., Senter, L., & Bunyasanand, P.(2016). 'Our only resource': Perspectives and recommendations of rural African American youth on adapting sexual health and risk reduction interventions. <i>Journal of Health Care for the Poor and Underserved</i>, 27(2), 622-635. https://doi.org/10.1353/hpu.2016.0073</p>	<p>Included</p>	<p>This study follows adolescent students who participated in cognitive-behavioral intervention education to prevent STIs, and this is applicable to the PICO question.</p>
<p>Ma, Z., Fisher, M. A., & Kuller, L. H. (2014). School-based HIV/AIDS education is associated with reduced risky sexual behaviors and better grades with gender and race/ethnicity differences. <i>Health Education Research</i>, 29(2), 330-339. https://doi.org/10.1093/her/cyt110</p>	<p>Excluded</p>	<p>This study examined the behaviors associated with adolescents after they receive education on HIV/AIDS such as attitudes on drug use, unsafe sex, school, etc., but was not specific to STI prevention.</p>
<p>McKee, A., Watson, A., & Dore, J. (2014). 'It's all scientific to me': Focus group insights into why</p>	<p>Excluded</p>	<p>This study offers some explanation as to why some adolescents don't practice safe sex, but is not</p>

<p>young people do not apply safe-sex knowledge. <i>Sex Education</i>, 14(6), 652-665. https://doi.org/10.1080/14681811.2014.917622</p>		<p>necessarily related to the PICO context.</p>
<p>Mizazadeh, A., Biggs, M. A., Viitanen, A., Horvath, H., Li, Y. W., Dunville, R., Barrios, L., Kahn, J. G., & Marseille, E. (2018). Do school-based programs prevent HIV and other sexually transmitted infections in adolescents? A systematic review and meta-analysis. <i>Prevention Science</i>, 19(4), 490-506. https://doi.org/10.1007/s11121-017-0830-0</p>	<p>Included</p>	<p>This systematic review and meta-analysis fit the criteria for answering the PICO question</p>
<p>Paik, A., Sanchagrin, K. J., & Heimer, K. (2016). Broken promises: Abstinence pledging and sexual and reproductive health. <i>Journal of Marriage and Family</i>, 78(2), 546-561. https://doi.org/10.1111/jomf.12279</p>	<p>Included</p>	<p>This was a longitudinal study that researched adolescents who were previously abstinence pledging after their abstinence only education and this is applicable to the PICO question.</p>
<p>Peskin, M. F., Shegog, R., Markham, C. M., Thiel, M., Baumler, E. R., Addy, R. C., Gabay, E.K., & Emery, S. T. (2015). Efficacy of <i>it's your game-tech</i>: A computer-based sexual health education program for middle school youth. <i>Journal of Adolescent Health</i>, 56(5), 515-521. https://doi.org/10.1016/j.jadohealth.2015.01.001</p>	<p>Included</p>	<p>This study includes adolescent participants, and describes behavior with abstinence and safe sex practices based on education provided.</p>
<p>Raspberry, C. N., Condron, D. S., Lesesne, C. A., Adkins, S. H., Sheremenko, G., & Kroupa, E. (2018). Associations between sexual risk-related behaviors and school-based education on HIV and condom use for adolescent sexual minority males and their non-sexual-minority peers. <i>LGBT Health</i>, 5(1), 69-77. http://doi.org/10.1089/lgbt.2017.0111</p>	<p>Excluded</p>	<p>This article does answer parts of the PICO question; however, the population is specific to adolescent <i>sexual minority males</i>, rather than adolescents in general. This article does provide good insight, but it is comparing sexual minorities and non-sexual minorities.</p>

Sandovsky, V., Draudt., & Boch, S. (2014). A systematic review of behavioral interventions to promote condom use. <i>Worldviews on Evidence-Based Nursing</i> , 11(2), 107-117. https://doi.org/10.1111/wvn.12017	Included	This article fits criteria to answer the PICO question for behavior modification.
Scull, T. M., Kupersmidt, J. B., Malik, C. V., & Morgan-Lopez, A. (2018). Using media literacy education for adolescent sexual health promotion in middle school: Randomized control trial of media aware. <i>Journal of Health Communication</i> , 23(12), 1051-1063. https://doi.org/10.1080/10810730.2018.1548669	Excluded	This article focused on sexual health education, but was aimed more at contraception, attitudes, gender roles, whether or not they were likely to engage in sexual activity, and sexual violence rather than STI prevention.
Shepherd, L. M., Sly, K. F., & Girard, J. M. (2017). Comparison of comprehensive and abstinence-only sexuality education in young African American adolescents. <i>Journal of Adolescence</i> , 61, 50-63. https://doi.org/10.1016/j.adolescence.2017.09.006	Included	This study compares adolescent behavior between those who have had comprehensive sexual education, and those who have had abstinence only education.
Stamm, C. A., Mirand, R. H., & Mcgregor, J. A. (2011). An evidence-based approach to managing common STIs in adolescents. <i>Contemporary OB/GYN</i> , 56(9), 43-50.	Excluded	This article focused on STIs in adolescents; however, it was on treatment and screening of STIs rather than prevention
Wolf, H. T., Teich, H. G., Halpern-Felsher, B., Murphy, R. J., Anandaraja, N., Stone, J., & Kalumuna, C. (2017). The effectiveness of an adolescent reproductive health education intervention in uganda. <i>International Journal of Adolescent Medicine and Health</i> , 29(2) https://doi.org/10.1515/ijamh-2015-0032	Excluded	This study provided information on benefits of sexual education for students; however, the study determined that education was beneficial for providing knowledge, but did not indicate benefits for STI prevention.
Wretzel, S. R., Visintainer, P. F., & Koenigs, L. M. P. (2011). Condom availability program in an inner city public school: Effect on the rates of gonorrhea and	Excluded	This study was and RCT on the adolescent population that observed a reduction in the rates of STIs after initiating a condom availability program in the study group;

<p>chlamydia infection. <i>Journal of Adolescent Health</i>, 49(3), 324-326. https://doi.org/10.1016/j.jadohealth.2010.12.011</p>		<p>however, the study was only on increasing the availability of condoms to adolescents, and not providing additional education.</p>
<p>Ybarra, M. L., Korchmaros, J. D., Prescott, T. L., & Birungi, R. (2015). A randomized controlled trial to increase HIV preventive information, motivation, and behavioral skills in Ugandan adolescents. <i>Annals of Behavioral Medicine</i>, 49(3), 473-485. https://doi.org/10.1007/s12160-014-9673-0</p>	<p>Included</p>	<p>Study includes adolescents and a comparison of taught behavioral skills and compared to a control group, which fits the PICO question.</p>

Table 4
Literature Review Table of All Included Studies

Citation	Study Purpose	Pop(N) /Sample Size(n) /Setting (s)	Design/ Level of Evidence	Variables/ Instruments	Intervention	Findings	Implication
Berglas et al., (2016)	1-year Evaluation of multi-component intervention	972	RCT Level II	Pre and post education surveys and one year post curriculum completion test.	Classroom and workshop education, parental education, peer advocate program.	These interventions demonstrated effectiveness in some areas such as increased/consistent condom use, and use of other health services, but needs of specific schools must be evaluated to determine the best approach to take for a given community.	Innovative approaches are needed to provide sexual education in schools because there is such diversity in student populations and sexual education needs like sexual orientation, sexual experience, and race. Larger scale studies are needed to identify strategies for managing these gaps.
Bogani et al., (2016)	Determine effectiveness of school-based sexual education	664	Quasi-experimental Level III	Questionnaires for both the students who received school-based sexual education, and those who did not	School-based education	The students who received school-based education demonstrated higher knowledge about STIs, pregnancy, and risks than the students who did not receive the education; however, there was not a reduction in high-risk behavior or a change in attitude for high-risk behavior.	Students demonstrate improved knowledge when school-based education is provided, but these strategies were ineffective in reducing high-risk behavior. There was a lack of consistency with school-based methods used, and a high level of adult reluctance with providing education to adolescents.
Crosby et al.,	Testing the	702	RCT Level II	Assessment at baseline, 2	Education on correct and	The study group was more likely to correctly	Education interventions on sexually transmitted infection

(2014).	efficacy of condom education			months, and 6 months	consistent condom used	and consistently use condoms compared to the control group	prevention demonstrated effectiveness for correct and consistent use of condoms, which will help reduce rates of STIs.
Doubova et al., (2017)	To evaluate the effect of an internet-based education intervention	456	Quasi-experimental Level III	Internet based questionnaire	Internet-based education	Students who were in the study group demonstrated significantly higher knowledge in STIs, prevention, improved health behavior, and higher rates for self-efficacy toward consistent and correct condom usage.	The culturally contextualized, internet-based education may be a valuable intervention to be added to improve knowledge of STIs, and enhance consistent condom used.
Hadley et al., (2016)	Evaluate the effectiveness of an interactive DVD and workbook	170 parent-adolescent dyads	Quasi-experimental Level III	Post-education Questionnaire and three month follow-up	Work It Out Together DVD or General Health Promotion DVD	The groups who had the “Work it out together” DVD demonstrated higher HIV knowledge, and greater STI prevention self-efficacy. At the 3-month follow up, parents and adolescents reported higher levels on parental monitoring, and sexually active adolescents reported higher levels of consistent condom use and a lower rate of recent sex compared to those who received the	The “work it out together” program was an effective way to improve adolescent’s sexual health behavior.

						general health DVD.	
Hallum-Montes et al., (2016)	To evaluate the effectiveness of comprehensive sex education in adolescents	73	Cohort study, Level IV	Semi-Structured interviews	Cognitive behavior intervention – Becoming a Responsible Teen (BART)	Comprehensive sexual education using cognitive behavioral interventions improved student’s knowledge for correct condom use, and enhanced understanding of the spread of STIs and risks for unintended pregnancies. There is currently no standard for sexual education curriculum, and school either choose comprehensive sexual education or abstinence only sexual education.	Diverse teaching strategies are important, and there is a need for expanded comprehensive sexual education to reduce sexual associated risks. Additional research is needed to understand how to meet the sexual health education needs of rural youth.
Mizazadeh et al., (2018)	Assess the effectiveness of school-based programs for STI prevention	9 studies	Systematic review and meta-analysis of RCTs and cohort studies Level I	N/A	N/A	Schools that used CSE had improved knowledge of STI transmission, but there was not reported decrease in STI rates from students who have received CSE.	CSE education improves knowledge and attitudes. There was not documented changes in STI incidence to demonstrate whether or not these interventions impacted rates of STIs or not and further research is needed to make this determination.
Paik et al., (2016)	Compare sexual behavior and STIs between	1,335	Cohort Study, Level IV	Longitudinal interviews and questionnaires	N/A	Student’s who pledged abstinence and broke their pledge use condoms and contraceptives less	Students should be offered comprehensive sexual education, but still encouraged to practice abstinence.

	abstinence pledgers and those who do not pledge abstinence					consistently, and were more likely to contract infections and have unintended pregnancies.	
Peskin et al., (2015)	Evaluate efficacy of computer-based sexual health education	1,374	RCT Level II	1-Year post evaluation	It's your Game (IYG)-Tech	There was no significant difference between delay of sexual activity between intervention and control group; however, there was a significant difference in the intervention group's knowledge related to STIs and condom use, and condom use self-efficacy	Computer-based education can be beneficial for promoting education on STI prevention and condom use, but is not as effective for delay of sexual activity.
Sandovsky et al., (2014)	To evaluate behavioral intervention studies that promote condom use and determin	13 Studies	Systematic review of RCTs Level I	N/A	N/A	Behavioral interventions are effective in promoting condom use and other safer sexual practices and reducing STIs.	The evidence suggests that behavioral interventions promote condom use and reduce STIs.

	e which characteristics are successful and need to be implemented in practice.						
Shepherd et al., (2017)	To identify predictors of sexual behavior and condom use.	450	Quasi-Experimental Level III	Post-education attitudes and beliefs survey	Becoming a responsible teen (BART), Choosing the best Path (abstinence only), Tradition and Vibes (Control Group)	Adolescents who received abstinence-only education had reduced favorable attitudes towards condom use and were more likely to have unprotected sex than students who received comprehensive sexual education.	Future interventions should promote favorable attitudes and social norms towards both abstinence and condom use, and teens should be taught to have responsible and respectful conversations with sexual partners about condom use and sexual decisions.
Ybarra et al., (2015)	Evaluate the impact of internet based	366	RCT Level II	Baseline, 3-month, 6-month assessment	Information-motivation-Behavioral skills: CyberSenga	The intervention group demonstrated enhanced knowledge of STI transmission and motivation to use condoms compared to the control group	Internet-based CyberSenga education improved prevention of infections and motivation for condom use.

Melnik, B. M., & Fineout-Overholt, E. (2015). Evidence-Based Practice in Nursing & Healthcare: A Guide to Best Practice (3rd ed.). Wolters Kluwer.