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Contraceptive Accessibility and Reproductive Outcomes in Adolescents Seeking Care at School-Based Health Centers: A Systematic Review

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Abstract

Context*:* Adolescent pregnancy continues to be a public health concern in the United States. School-based health centers are an ideal setting for providing affordable, accessible, and confidential reproductive services for adolescents that can help prevent unintended pregnancies. However, there are great variations in the reproductive services offered at school-based health centers across the United States. ***Objective****:* This study aims to explore the question: *Do school-based health centers that provide on-site contraception access have lower adolescent pregnancy rates and higher reported contraception use when compared to school-based health centers that do not provide on-site contraception?* ***Methods****:* A literature review was conducted between October and November 2020. Six current research articles met inclusion criteria and were analyzed for this paper. ***Results****:* Providing contraception on-site at school-based health centers is associated with higher reported contraception use in adolescents and is associated with an estimated reduction in unintended pregnancies. ***Conclusions****:* In order to encourage consistent use of contraception in sexually active adolescents as well as prevent unintended adolescent pregnancies, school-based health centers should provide on-site contraception access.

Keywords: school-based health centers, SBHC, contraception, pregnancy, birth-control, adolescents, teen pregnancy, healthcare access

Contraceptive Accessibility and Reproductive Outcomes in Adolescents Seeking Care at School-Based Health Centers: A Systematic Review

School-based health centers (SBHCs) play an integral role in the delivery of cost-effective, accessible, and prevention-focused healthcare to children, adolescents, and families (Daley, 2012; Fisher et al., 2019; URSA, 2017). In the United States (US), there are more than 2,000 school-based health centers that deliver a variety of services to local youth and their families (Daley, 2012; URSA, 2017). Services can include visits for acute illnesses, mental health treatment and counseling, and primary care services such as vaccinations and asthma management (Daley, 2012; URSA, 2017). School-based health centers can also serve as an accessible, adolescent-friendly resource for reproductive health care. However, the range of reproductive services offered in school-based health centers varies greatly. Many SBHCs face restrictions from providing reproductive services, resulting in a major gap in care for many adolescents (Daley, 2012; Ethier et al., 2011).

Background

While the rate of teenage pregnancy in the US has declined since its peak in the early 1990s, the US continues to have the highest adolescent pregnancy rate among developed nations (Daley, 2012; Fisher et al., 2019; Kaneshiro & Darroch, 2017; Tebb et al., 2018). The decline in teen pregnancy rate in the US can be attributed to increased sexual education, decreased adolescent sexually activity, more effective contraceptive use amongst teens, increased accessibility to contraception, and focused public service campaigns (Daley, 2012; Kaneshiro & Darroch, 2017). However, teenage pregnancy continues to be a major public health concern in the US (Daley, 2012; Fisher et al., 2019; Kaneshiro & Darroch, 2017; Tebb et al., 2018). Pregnancy during adolescence has a strong link to poverty and can have lasting impacts on the

mental health, development, education, and financial outcomes of the mother and child (Blank et al., 2010; Daley, 2012; Fisher et al., 2019). For example, most teenage mothers will not graduate from high school or college (Kaneshiro & Darroch, 2017). “Sixty percent of adolescent mothers do not graduate from high school and only 2% complete college by the age of 30 years” (Kaneshiro & Darroch, 2017, p. e143). Adolescent pregnancy is not only unfavorable to the mother and child when compared to pregnancy in adulthood, but it is costly to society. “In 2010, births among adolescents cost an estimated $9.4 billion more than if they had occurred to women aged 20–21 years” (Kaneshiro & Darroch, 2017, p. e143).

Most adolescent pregnancies are unintended (Daley, 2012). In one study, 18% of sexually active 15–19-year-olds used no form of birth control but stated they did not wish to become pregnant (Stein et al., 2020). It is estimated that 85% of women will get pregnant within one year if sexually active and not using contraception (Daley, 2012). With approximately 57% of adolescents becoming sexually active during high school, it is extremely important to ensure adequate access to reproductive health counseling as well as contraception to help prevent unintended pregnancy in this population (Stein et al., 2020). Many adolescents do not use contraception due to accessibility issues, insurance status, fear regarding confidentiality, and knowledge deficit (Blank et al., 2010; Daley, 2012; Fisher et al., 2019; Stein et al., 2020).

SBHCs can play a central role in providing contraceptive and reproductive services to adolescents. SBHCs are accessible, allow easy, convenient follow-up, are adolescent-friendly, confidential, and are typically available without cost to the patient (Daley, 2012). However, many SBHCs face restrictions on the reproductive services they can provide to students (Daley, 2012; Ethier et al., 2011). Restrictions on reproductive services are multifactorial. Factors that influence reproductive services provided include local laws, school district guidelines, and

provider preferences and abilities (Daley, 2012). While most SBHCs provide some form of reproductive services, a minority of SBHCs provide no type of reproductive services to students. The most commonly reported reproductive services at SBHCs are abstinence counseling, pregnancy testing, and contraception counseling (Ethiers et al., 2011). Sixty percent of SBHCs are prohibited from dispensing contraception on site, meaning they can only refer students to an outside source to access contraception (Daley, 2012; Ethier et al., 2011). While most SBHCs are prohibited from providing contraception on site, some SBHCs are not only able to dispense contraception such as condoms and oral contraceptive pills (OCPs), but they are expanding contraceptive services by placing long-acting reversible contraception (LARCs) on site (Bersamin et al., 2017; Fisher et al., 2019; Stein et al., 2020). Yet, SBHCs adding LARCS to their list of services offered to students is still rare. Within SBHCs that dispense contraception on site, only 39.8% placed LARCs (Stein et al., 2020).

With a large disparity in reproductive services offered at SBHCs in the US, adolescents may face variable degrees of restriction and obstacles in obtaining contraception. This systematic review aims to answer the following question: *Do school-based health centers that provide on-site contraception access have lower adolescent pregnancy rates and higher reported contraception use when compared to school-based health centers that do not provide on-site contraception?*

Many SBHCs are staffed by advanced practice registered nurses (APRNs) (Daley, 2012). APRNs can have an influential role in determining which services are offered at SBHCs. With SBHCs being a cost-effective and accessible health care model for many adolescents, APRNs can influence change and increase accessibility to reproductive health care for this population. This review aims to investigate ways to promote reproductive health in adolescents, find

strategies that support adolescent reproductive health, and provide data that supports and influences services offered at SBHCs.

Methods

Databases

A literature review was conducted between the dates of 10/8/20 and 11/12/20. The databases searched included Academic Search Premier, CINAHL, HealthSource: Nursing/Academic Edition, and PubMed. More information on the databases searched, including subjects covered can be found in Table 1 of the appendix. Search terms used included "school-based health," "pregnancy," "contraception," "SBHC," "access," and "contracept*."

Study Selection

Search limits included results from the years 2010-2020, full text availability, peer reviewed, and English language. All titles for searches with 30 hits or less were included in the review. Titles were eliminated if they were already included in a prior database search. These hits are indicated in bold in Table 2 of the appendix.

Search Strategies

Studies that focused on reproductive outcomes of adolescents receiving school-based health services were included. Reproductive outcomes were defined as contraception use and pregnancy rates. Studies that did not focus on contraception provision were excluded. These included studies that focused on sexual education and adolescent attitudes toward contraception. Studies that focused on provider attitudes towards contraception provision in SBHCs were excluded. Studies that focused on implementation of on-site contraception and not on outcomes were excluded. Studies that focused on contraception use in adolescents but did not focus on

SBHCs were excluded. Table 3 of the appendix summarizes specific inclusion and exclusion reasoning for all article hits.

A total of six articles met inclusion criteria and were included in this paper. Articles included reviews of experimental studies, correlational studies, and quasi-experimental studies. Summaries of the articles reviewed for this paper can be found in Table 4 of the appendix.

Summary of the Literature

Study Characteristics

Of the six articles reviewed, two were reviews of experimental studies, two were descriptive correlational studies, one was a quasi-experimental study, and one was a descriptive longitudinal study. All studies focused on adolescent high school students. Studies were mainly focused on urban setting SBHCs. Locations included Los Angeles, New York City (NYC), Oregon, and Washington. Two studies focused on LARCs specifically. One study focused on advanced provision emergency contraception for adolescents. Three studies focused on all forms of contraception including OCPs and condom use. All studies focused on reported contraception use in the study population. One study estimated pregnancies prevented based on contraception use (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020).

Synthesis of Research

SBHCs and Contraception Use.

Provision of on-site contraception at SBHCs is associated with increased contraception use in adolescents seeking care at these centers (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). Adamji and

Swartwout (2010) found that advanced provision of emergency contraception resulted in an increased use of emergency contraception in adolescents. This study also found that advanced provision of emergency contraception did not increase negative sexual behavior or decrease use of non-emergency contraception in these students (Adamji & Swartwout, 2010). Bersamin et al. (2018) compared contraception use in adolescents with and without access to SBHCs. Students with access to a SBHCs were 31% more likely to use contraception than those that did not have access to SBHCs. Within SBHCs, those that provided on-site access to contraception saw a 42% increase in students reporting contraception use during their last sexual encounter compared to schools with SBHCs that did not provide on-site contraception (Bersamin et al., 2018). In students who were sexually active within the previous 3 months, the number of students with access to SBHCs that dispense contraception on-site reporting contraception use during their last sexual encounter was 77% higher than comparable students with access to SBHCs that did not dispense contraception (Bersamin et al., 2018). Blank et al. (2012) found similar results after reviewing 29 experimental studies. SBHCs that provided on site contraception saw higher rates of contraception use compared to those that did not (Blank et al., 2012). Provision of long-acting contraception options such as IUDs at SBHCs not only increases contraception use, but these options also increase contraception compliance and continued use over time when compared to OCPs and other forms of contraception (Fisher et al., 2019; Stein et al., 2020).

SBHCs and Pregnancy.

Adamji and Swartwout (2010) found that advanced provision of emergency contraception resulted in an increased use of emergency contraception in adolescents, thus helping prevent unintended pregnancies in this population. While advanced provision of emergency contraception did result in increased use of emergency contraception, it did not increase reported

high risk sexual behavior or decrease reported hormonal birth control use (Adamji & Swartwout, 2010). This increased emergency contraception use would, in theory, decrease unintended adolescent pregnancy without increasing other risk factors for pregnancy in this population (Adamji & Swartwout, 2010).

Fisher et al. (2019) estimated prevented pregnancies between 2008 and 2017 in New York City adolescents with access to SBHCs. These SBHCs all provided on site contraception, including IUD placement. Fisher et al. (2019) found that an estimated 5,376 pregnancies were adverted by providing students with contraception on-site at SBHCs. This number includes an estimated averted 2,104 births and 3,085 abortions. This number accounts for an estimated 26-28% of the decline in adolescent pregnancy in NYC during this time (Fisher et al., 2019).

Impact of LARCs in SBHCs.

Inserting LARCs on site increases access to long lasting, highly effective contraception and increases use of these devices in adolescents (Fisher et al., 2019; Stein et al., 2020). Fisher et al. (2019) found that in NYC, where SBHCs are offering on-site LARC placement, 14% of sexually active adolescent females with access to a SBHC used LARCs. This number is compared to only 2% of sexually active adolescent females in NYC without access to SBHCs who used LARCs. Stein et al. (2020) found that at a single SBHC in NYC, 92% of students who received an IUD placement on site were still using this form of birth control 6 months later.

Quality Indicators

The association of SBHCs and increased contraception use is well documented (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). The correlation of on-site contraception distribution in SBHCs and

increase in contraception use is also well supported by quality evidence (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). Studies reviewed for this paper include reviews of randomized controlled studies as well as descriptive and quasi-experimental studies. These types of studies provide good evidence for the relationship between increased contraceptive use and SBHCs that provide on-site contraception.

Sample sizes for the studies ranged from 75 students to 84,401 students. Most studies had samples sizes between 2,000-11,000 students. Most studies also focused on multiple SBHCs within a specific city or region (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020).

Gaps in Literature

The evidence regarding pregnancy rates and on-site contraception provision at SBHCs was quasi-experimental where the researchers estimated the number of pregnancies avoided. There were no studies found that provided actual numbers of pregnancies in schools with SBHCs that provide on-site contraception compared to schools that don't have SBHCs or have SBHCs that do not provide on-site contraception. While the evidence found does estimate the number of avoided pregnancies, the strength of this data compared to a correlational or experimental study is weaker. More studies that focus on pregnancy data would be helpful for answering the question, *Do school-based health centers that provide on-site contraception access have lower adolescent pregnancy rates and higher reported contraception use when compared to school-based health centers that do not provide on-site contraception?*

Most studies in this review focused on urban-based SBHCs making the results harder to generalize to the entire adolescent population in the US. Many studies were from the same regions including NYC and large cities on the west coast of the US. Studies that focus on a broader area or more studies based in different parts of the US would help close this gap.

Only one study had less than 2,000 students as a sample size (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). This study was a survey-based study of 75 students at a single SBHC (Stein et al., 2020). Having a broader and larger sample size would help strengthen this study's findings.

Discussion

Based on the evidence found in this systematic review, school-based health centers that provide on-site contraception have higher student reported contraception use when compared to school-based health centers that do not provide on-site contraception (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). SBHCs that provide on-site contraception can see up to 77% greater reported contraception use when compared to SBHCs that do not provide on-site contraception (Bersamin et al., 2018). This increase in contraception use is seen with all forms of contraception, including emergency contraception, barrier methods, OCPs, and LARCs (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). Evidence suggests that in order to increase contraception use in adolescents, contraception should be available on-site at SBHCs. Ideally, a wide variety of contraception options should be available on-site at SBHCs to appeal to each individual student's contraception preference (Adamji & Swartwout, 2010; ACOG, 2017; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). This includes advance provision of emergency

contraception (Adamji & Swartwout, 2010; ACOG, 2017). Providing emergency contraception on-site at SBHCs is associated with increased use but is not associated with increased negative sexual behaviors or a decrease in other forms of contraception use (Adamji & Swartwout, 2010).

There is also data that supports the idea that on-site contraception provision at SBHCs is associated with reduced adolescent pregnancies (Adamji & Swartwout, 2010; Fisher et al., 2019). Fisher et al. (2019) estimated that provision of on-site contraception at SBHCs prevented over 5,000 pregnancies in NYC adolescents over the course of 9 years. "When comprehensive reproductive health services are available at SBHCs, teenagers use them, resulting in substantially fewer pregnancies, abortions and births, and lower costs to public health systems" (Fisher et al., 2019, p. 201).

In order to prevent adolescent pregnancies, contraception must be accessible, affordable, and reliable. The adolescent must be educated on proper use and must be motivated to use a given form of contraception correctly with every sexual encounter. Recent guidelines support the use of LARCs in adolescent females as a first line option for contraception (ACOG, 2017). "Long-acting reversible contraceptive (LARC) methods have higher efficacy, higher continuation rates, and higher satisfaction rates compared with short-acting contraceptives. Because LARC methods are safe, they are excellent contraceptive choices for adolescents" (ACOG, 2017, p.1). There is a trend in recent research that supports implementing SBHC programs that insert LARCs on site (Fisher et al., 2019; Stein et al., 2020). LARCs can be less accessible than other forms of contraception to adolescents due to cost, confidentiality, misconceptions, and lack of awareness (Stein et al., 2020). SBHCs can help bridge this gap in access to LARCs and can help support implementation of up-to-date, evidence-based adolescent reproductive services (ACOG, 2017; Fisher et al., 2019; Stein et al., 2020).

Implications

Recommendations for Practice

APRNs who practice in SBHCs should be providing reproductive services to adolescents who present to their clinics within their scope of practice. They should encourage the use of contraception in sexually active adolescents and should provide counseling on options for contraception including hormonal and barrier methods. All APRNs should be knowledgeable in current recommendations for contraception options for adolescents, including the role of LARCs and advanced provision of emergency contraception (ACOG, 2017).

Recommendations for Future Research

Future research should focus on broader populations of adolescents. Current evidence comes from large urban areas mostly on the west coast of the US or NYC. More data is needed from areas in different regions of the US as well as suburban and rural settings.

There is a need for more evidence regarding pregnancy rates and SBHCs that provide on-site contraception. Future research could include descriptive correlation studies that compare pregnancy rates from schools with SBHCs that provide on-site contraception and SBHCs that do not provide on-site contraception or schools without SBHCs. Ethically, it may be difficult to do an experimental study that explores pregnancy rates and SBHCs that provide on-site contraception. However, there is a need for more data in this area, and future studies could provide quality evidence that helps explore the relationship between providing contraception at SBHCs and pregnancy rates.

Future research could also explore the role of LARCs in SBHCs. LARCs provide safe and highly effective contraception. They are associated with good compliance and overall high

satisfaction. They do not require daily dosing or return visit to the clinic for effectiveness which provides a more convenient and effective form of birth control for adolescents (ACOG, 2017; Stein et al., 2020). Future studies could explore the pregnancy rates or continued reported use of contraception over time in adolescents who receive LARCs at SBHCs versus students who receive other forms of contraception at SBHCs.

Recommendations for Education

Education for APRNs should include recommendations for adolescent reproductive services based on current evidence. This includes recommending on-site contraception availability at SBHCs in order to encourage contraception use in the adolescent population. APRNs should be taught that provision of contraception is not associated with increased risky sexual behaviors in this population but is associated with increased use of contraception.

APRNs should have a good understanding of adolescent reproductive health, including the consequences of unintended adolescent pregnancy. APRNs should be taught how to address reproductive health in a non-judgmental and open approach in this population. They should also have a good foundation on the contraception recommendations for adolescents which includes using LARCs as a first line option (ACOG, 2017). The right birth control for adolescents is the option that they are comfortable with and will use as directed. APRNs should understand how to counsel and educate adolescent patients on contraception (ACOG, 2017).

Recommendations for Policy

Currently, many SBHCs are limited in the services they can provide. This may be due to lack of funding, lack of trained providers, school district policies, or local laws (Daley, 2012). APRNs should advocate for change at all levels to ensure adolescents have access to convenient,

affordable, and discreet reproductive services. Changes to policies and laws that support on-site distribution of contraception, including LARCs, at SBHCs should be encouraged where there are current restrictions. APRNs should also encourage confidentiality laws for adolescents seeking reproductive care in all of the US (ACOG, 2017).

APRNs can also advocate for the funding of SBHCs in order to better serve adolescents and their families. SBHCs are affordable and accessible primary care models that eliminate many of the barriers of traditional primary care centers (Daley, 2012; Fisher et al., 2019; URSA, 2017).

Conclusion

Adolescent pregnancy continues to be a major public health concern in the US of America (Daley, 2012; Fisher et al., 2019; Kaneshiro & Darroch, 2017; Tebb et al., 2018). Having affordable and accessible contraception options is key to preventing adolescent pregnancies (ACOG, 2017; Daley, 2012; Kaneshiro & Darroch, 2017). SBHCs are ideal settings for providing confidential, affordable, and accessible reproductive services for adolescents (Daley, 2012; Fisher et al., 2019; URSA, 2017). However, there is a wide variety of reproductive services offered at SBHCs. These services range from no reproductive care or abstinence only counseling to provision of a variety of on-site contraception, including LARCs (Daley, 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020).

Overall, on-site dispensing of contraception is associated with higher reported use of contraception in students seeking care at SBHCs (Adamji & Swartwout, 2010; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020). On-site contraception dispensing at SBHCs is also associated with an estimated reduction in adolescent pregnancies (Fisher et al., 2019). On-site advanced provision of emergency contraception is

associated with increased use of emergency contraception without an associated increase in high-risk sexual behaviors or decrease use of other forms of contraception (Adamji & Swartwout, 2010). Therefore, SBHCs should provide on-site access to a variety of contraception options, including advanced provision of emergency contraception and LARCs, in order to increase contraception use and decrease unintended pregnancies in adolescents (Adamji & Swartwout, 2010; ACOG, 2017; Bersamin et al., 2018; Blank et al., 2012; Ethier et al., 2011; Fisher et al., 2019; Stein et al., 2020).

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Appendix

Table 1

Database Search Description

Database (or Search Engine)	Restrictions Added to Search	Dates Included in Database	General Subjects Covered by Database
1. Academic Search Premier	Full Text; English Language; Peer Reviewed	2010 through 2020	Covers a broad range of academic subjects including nursing
2. CINAHL	Full Text; English Language; Peer Reviewed	2010 through 2020	Nursing and allied health
3. HealthSource: Nursing/Academic Edition	Full Text; English Language; Peer Reviewed	2010 through 2020	Medical sciences with emphasis on allied health and nursing
4. PubMed	Full Text; English Language; Peer Reviewed	2010 through 2020	Nursing, medicine, dentistry, veterinary medicine, and preclinical sciences

Table 2

Data Abstraction Process

Date of Search	Key Words	Results in Academic Search Premier	Results in CINAHL	Results in HealthSource	Results in PubMed
10/8/20	"School-based Health"	230	180	156	634
	"Pregnancy"	54,140	40,167	13,544	247,616
10/8/20	"Contraception"	4,982	2,970	1,049	12,737
10/15/20	"Birth control"	4,592	1,789	548	1,078

Date of Search	Key Words	Results in Academic Search Premier	Results in CINAHL	Results in HealthSource	Results in PubMed
10/8/20	"School-based health" AND "Pregnancy" AND "Contraception"	**3**	**2**	**2**	**23**
10/8/20	"School-based health center" OR "SBHC" AND "Pregnancy" AND "Contraception"	**1**	**1**	**1**	**14**
10/8/20	"School-based health" AND "Contraception"	**4**	**5**	**3**	**30**
10/8/20	"School-based health center" OR "SBHC" AND "Contraception"	**2**	**4**	**2**	**16**
10/15/20	"School-based health" AND "Pregnancy" AND "Birth control"	**2**	**1**	**0**	**2**
10/15/20	"School-based health center" OR "SBHC" AND "Pregnancy" AND "Birth Control"	**1**	**0**	**0**	**1**
10/15/20	"School-based health" AND "Birth control"	**3**	**4**	**0**	**3**
10/15/20	"School-based health center" OR "SBHC" AND "Birth Control	**2**	**0**	**0**	**1**
11/12/20	"School-based health center" OR "SBHC" AND "Pregnancy rates" AND contracept* AND access	**0**	**0**	**0**	**0**
11/12/20	"School-based health" AND "Pregnancy rates" AND contracept* AND access	**0**	**1**	**0**	**0**

***BOLD** = articles reviewed for match with systematic review inclusion criteria

Table 3

Characteristics of Literature Included and Excluded

Reference	**Included or Excluded**	**Rationale**
Moriarty Daley, A., & Polifroni, E. C. (2018). "Contraceptive Care for Adolescents in School-Based Health Centers Is Essential!" The Lived Experience of Nurse Practitioners. *The Journal of School Nursing*, *34*(5), 367-379.	Excluded	Discusses lived experiences of NPs working in SBHC. Study gives light to consequences of not supplying contraception in schools. Does not provide data on pregnancy rates or contraception use.
Bersamin, M., Paschall, M. J., & Fisher, D. A. (2018). Oregon school-based health centers and sexual and contraceptive behaviors among adolescents. *The Journal of School Nursing*, *34*(5), 359-366.	**Included**	Discusses reproductive behaviors of adolescents based on what type of services provided by SBHC and schools.
Denny, S., Robinson, E., Lawler, C., Bagshaw, S., Farrant, B., Bell, F., ... & Ameratunga, S. (2012). Association between availability and quality of health services in schools and reproductive health outcomes among students: A multilevel observational study. *American Journal of Public Health*, *102*(10), e14-e20.	Excluded	Discusses reproductive outcomes of adolescents with access to SBHC. Study focuses on types providers at SBHC and not on availability of contraception on site. Does not distinguish between SBHC that provide on-site contraception and those that do not.
Chen, C. C., Yamada, T., & Walker, E. M. (2011). Estimating the cost-effectiveness of a classroom-based abstinence and pregnancy avoidance	Excluded	Focuses on cost effectiveness of reproductive education in schools. Does not focus on SBHC or reproductive outcomes.

Reference	Included or Excluded	Rationale
program targeting preadolescent sexual risk behaviors. *Journal of Children and Poverty*, *17*(1), 87-109.		
Summit, A. K., Friedman, E., Stein, T. B., & Gold, M. (2019). Integration of onsite long-acting reversible contraception services into school-based health centers. *Journal of School Health*, *89*(3), 226-231.	Excluded	Focuses on how to provide training and education for providers in SBHC in order to implement LARCs into contraceptive options. Does not focus on reproductive outcomes of adolescents with access to these options.
Fisher, R., Danza, P., McCarthy, J., & Tiezzi, L. (2019). Provision of Contraception in New York City School-Based Health Centers: Impact on Teenage Pregnancy and Avoided Costs, 2008–2017. *Perspectives on Sexual and Reproductive Health*, *51*(4), 201-209.	**Included**	Focuses on integration of on-site contraception in NYC schools. Outcomes studied include contraception use and avoided pregnancies.
Garnett, C., Pollack, L., Rodriguez, F., Renteria, R., Puffer, M., & Tebb, K. P. (2020). The Association Between Nonbarrier Contraceptive Use and Condom Use Among Sexually Active Latina Adolescents. *Journal of Adolescent Health*.	Excluded	Study does not focus on SBHC and reproductive outcomes associated with adolescents with access to contraception. Study focuses on different types of contraception use among Latina adolescents.
Gilmore, K., Hoopes, A. J., Cady, J., Oelschlager, A. M. A., Prager, S., & Vander Stoep, A. (2015). Providing long-acting reversible contraception services in Seattle school-based health centers: key themes for facilitating implementation. *Journal of Adolescent Health*, *56*(6), 658-665.	Excluded	Focuses on factors that eased implementation of LARCs access in SBHCs. Does not focus on reproductive outcomes of students with access to these services.

Reference	**Included or Excluded**	**Rationale**
Shakibnia, E. B., Timmons, S. E., Gold, M. A., & Garbers, S. (2018). "It's pretty Hard to tell your mom and dad that you're on a method": exploring how an app could promote adolescents' communication with partners and parent (s) to increase self-efficacy in long-acting reversible contraception use. *Journal of pediatric and adolescent gynecology*, *31*(2), 116-121.	Excluded	Focuses on use of SmartPhone application for ease of communication for patients using LARCs. Does not focus on access to contraception and reproductive outcomes.
Stein, T. B., Summit, A. K., Louis, M. S., & Gold, M. (2020). Patient Satisfaction with IUD Services in a School-Based Health Center: A Pilot Study. *Journal of Pediatric and Adolescent Gynecology*.	**Included**	Focuses on satisfaction and continued use of IUDs that were placed in SBHCs. Outcomes include continued use of IUD at 6 months post-insertion.
Daley, A. M. (2014). What influences adolescents' contraceptive decision-making? A meta-ethnography. *Journal of Pediatric Nursing*, *29*(6), 614-632.	Excluded	Focuses on positive and negative influences on adolescents' decisions to use contraception. Does not focus on SBHC.
Blank, L., Baxter, S. K., Payne, N., Guillaume, L. R., & Squires, H. (2012). Systematic review and narrative synthesis of the effectiveness of contraceptive service interventions for young people, delivered in health care settings. *Health education research*, *27*(6), 1102-1119.	**Included**	Focuses on SBHC and availability of contraception on site and its influence on pregnancy rates and use of contraception.
Sangraula, M., Garbers, S., Garth, J., Shakibnia, E. B., Timmons, S., & Gold, M. A. (2017). Integrating long-acting reversible contraception services into New York City school-based health centers: quality improvement to ensure provision of youth-friendly services. *Journal of pediatric and adolescent gynecology*, *30*(3), 376-382.	Excluded	Focuses on quality improvement for delivery of LARCs to adolescents in SBHC. Does not focus on reproductive outcomes.

Reference	Included or Excluded	Rationale
Fink, G. N., Dean, G., Nucci-Sack, A., Arden, M., & Lunde, B. (2019). Emergency contraception use in school-based health centers: a qualitative study. *Journal of pediatric and adolescent gynecology*, *32*(2), 175-181.	Excluded	Focuses on experiences of females who use emergency contraception. Does not focus on reproductive outcomes or reproductive services through SBHC.
Mendoza, R. M., Garbers, S., Lin, S., Stockwell, M. S., Warren, M., & Gold, M. A. (2020). Chlamydia Infection Among Adolescent Long-Acting Reversible Contraceptive and Shorter-Acting Hormonal Contraceptive Users Receiving Services at New York City School-Based Health Centers. *Journal of Pediatric and Adolescent Gynecology*, *33*(1), 53-57.	Excluded	Focuses on chlamydia infection rates in females using different types of contraception. Does not focus on contraception use and pregnancy rates.
Mesheriakova, V. V., & Tebb, K. P. (2017). Effect of an iPad-based intervention to improve sexual health knowledge and intentions for contraceptive use among adolescent females at school-based health centers. *Clinical Pediatrics*, *56*(13), 1227-1234.	Excluded	Focuses on contraception knowledge versus outcomes of adolescents at SBHC. Does not focus on reproductive outcomes.
Hoopes, A. J., Ahrens, K. R., Gilmore, K., Cady, J., Haaland, W. L., Amies Oelschlager, A. M., & Prager, S. (2016). Knowledge and acceptability of long-acting reversible contraception among adolescent women receiving school-based primary care services. *Journal of primary care & community health*, *7*(3), 165-170.	Excluded	Focuses on knowledge of LARCs of patients receiving reproductive services at SBHC. Does not focus on reproductive outcomes.
Peltzer, K., & Pengpid, S. (2016). Risk and protective factors affecting sexual risk behavior among school-aged adolescents in Fiji, Kiribati, Samoa, and Vanuatu. *Asia Pacific Journal of Public Health*, *28*(5), 404-415.	Excluded	Does not focus on SBHC or contraception use/accessibility.

Reference	Included or Excluded	Rationale
Adamji, J. M., & Swartwout, K. (2010). Advance provision of emergency contraception for adolescents. *The Journal of School Nursing*, *26*(6), 443-449.	**Included**	Focuses on use of emergency contraception and availability to adolescents including in school-based settings.
Daley, A. M. (2011). Contraceptive services in SBHCs: A community experience in creating change. *Policy, Politics, & Nursing Practice*, *12*(4), 208-214.	Excluded	Focuses on policy change to incorporate contraception availability at SBHC. Does not focus on outcomes in individual adolescents receiving contraception services through SBHCs.
Francis, J. K., & Gold, M. A. (2017). Long-acting reversible contraception for adolescents: A review. *JAMA pediatrics*, *171*(7), 694-701.	Excluded	Focuses on different types of LARCs. Does not focus on SBHCs or reproductive outcomes.
Comfort, A. B., Rao, L., Goodman, S., Barney, A., Glymph, A., Schroeder, R., ... & Harper, C. C. (2020). Improving capacity at school-based health centers to offer adolescents counseling and access to comprehensive contraceptive services. *Journal of Pediatric and Adolescent Gynecology*.	Excluded	Focuses on training SBHC staff how to insert LARCs. Does not focus on reproductive outcomes.
Finan, L. J., Zhang, L., Paschall, M. J., & Bersamin, M. (2018). Cognitive precursors to adolescents' reproductive health: Exploring the role of school-based health services. *Preventive medicine*, *116*, 75-80.	Excluded	Focuses on self-reported self-efficacy and attitudes towards using contraception. Does not focus on pregnancy rates and contraceptive use.
Potter, J., Rubin, S. E., & Sherman, P. (2014). Fear of intrauterine contraception among adolescents in New York City. *Contraception*, *89*(5), 446-450.	Excluded	Focuses on adolescents' attitudes towards IUDs. Does not focus on contraception use or pregnancy rates in SBHCs.
Chernick, L. S., Schnall, R., Higgins, T., Stockwell, M. S., Castaño, P. M., Santelli, J., & Dayan, P. S. (2015). Barriers to and enablers of contraceptive	Excluded	Focuses on barriers to contraception use in adolescents presenting to emergency department

Reference	Included or Excluded	Rationale
use among adolescent females and their interest in an emergency department based intervention. *Contraception*, *91*(3), 217-225.		for emergency contraception. Does not focus on contraception use, pregnancy rates, or SBHCs.
Hoopes, A. J., Gilmore, K., Cady, J., Akers, A. Y., & Ahrens, K. R. (2016). A qualitative study of factors that influence contraceptive choice among adolescent school-based health center patients. *Journal of pediatric and adolescent gynecology*, *29*(3), 259-264.	Excluded	Focuses on adolescent females' attitudes towards LARCs not on reproductive outcomes.
Tebb, K. P., Trieu, S. L., Rico, R., Renteria, R., Rodriguez, F., & Puffer, M. (2019). A mobile health contraception decision support intervention for Latina adolescents: Implementation evaluation for use in school-based health centers. *JMIR mHealth and uHealth*, *7*(3), e11163.	Excluded	Focuses on implementation of mobile application to improve access and knowledge of contraception. Does not focus on SBHCs and reproductive outcomes.
Tebb, K. P., Rodriguez, F., Pollack, L. M., Trieu, S. L., Hwang, L., Puffer, M., ... & Brindis, C. D. (2018). Assessing the effectiveness of a patient-centered computer-based clinic intervention, Health-E You/Salud iTu, to reduce health disparities in unintended pregnancies among Hispanic adolescents: study protocol for a cluster randomized control trial. *BMJ open*, *8*(1), e018201.	Excluded	Focuses on pregnancy rates at different SBHCs. However, does not focus on provision of contraception. Focus is on educational services provided by SBHCs.
Timmons, S. E., Shakibnia, E. B., Gold, M. A., & Garbers, S. (2018). MyLARC: A theory-based interactive smartphone App to support adolescents' use of long-acting reversible contraception. *Journal of pediatric and adolescent gynecology*, *31*(3), 285-290.	Excluded	Focuses on implementation of mobile application to improve knowledge of LARCs. Does not focus on SBHCs and reproductive outcomes.
Ethier, K. A., Dittus, P. J., DeRosa, C. J., Chung, E. Q., Martinez, E., & Kerndt, P. R. (2011). School-based health center access, reproductive health	**Included**	Focuses on reproductive outcomes and contraception use amongst adolescents with and without access to SBHCs. Does not distinguish

Reference	Included or Excluded	Rationale
care, and contraceptive use among sexually experienced high school students. *Journal of Adolescent Health*, *48*(6), 562-565.		between schools that offer on-site contraception and those that do not.

Table 4

Literature Review Table of All Studies Included

Citation	**Study Purpose**	**Pop (N)/ Sample Size (n) /Setting(s)**	**Design/ Level of Evidence**	**Variables/ Instruments**	**Intervention**	**Findings**	**Implications**
Adamji, J. M., & Swartwout, K. (2010). Advance provision of emergency contraception for adolescents. *The Journal of School Nursing*, *26*(6), 443-449.	To evaluate the effects of advance provision of emergency contraception (EC) to adolescents in SBHC settings	3 studies	Review of experimental studies, **level I**	Negative sexual behaviors, usage of non-EC contraception, and use of EC contraception	Advance provision of EC along with education versus education alone	Advance provision of EC to adolescents does not result in a decrease of non-EC contraception or an increase of negative sexual behavior. Advance provision of EC increases its use and therefore prevents potential pregnancies	SBHCs that provide advance access to EC can potentially decrease adolescent pregnancy without negatively affecting sexual behaviors and non-EC contraception use.
Bersamin, M., Paschall, M. J., & Fisher, D. A. (2018). Oregon school-based health centers and sexual and contraceptive behaviors among	To evaluate the association between SBHCs and contraception use/sexual behaviors	134 schools (11,840 students) in Oregon	Descriptive correlational, **level IV**	Students at schools with and without SBHCs were sent a standardized survey about	NA	Schools that have SBHCs see a 31% increase in contraception use vs. those that do not. Within schools with SBHCs, schools that dispense contraception on site see 42% increase in contraception use than	Prescence of a SBHC increases contraception use. SBHC that provide on-site contraception see an even greater increase in contraception use.

Citation	Study Purpose	Pop (N)/ Sample Size (n) /Setting(s)	Design/ Level of Evidence	Variables/ Instruments	Intervention	Findings	Implications
adolescents. *The Journal of School Nursing*, *34*(5), 359-366.	in adolescents			sexual behaviors.		SBHC that do not dispense.	
Blank, L., Baxter, S. K., Payne, N., Guillaume, L. R., & Squires, H. (2012). Systematic review and narrative synthesis of the effectiveness of contraceptive service interventions for young people, delivered in health care settings. *Health education*	To evaluate the effectiveness of different school-based contraceptive interventions	29 studies	Systemic review of experimental studies including RCTs, **Level I**	NA	NA	SBHCs that dispense contraception on-site saw higher rates of contraception use compared to schools that did not.	SBHCs that dispensed contraception on-site saw greater use of contraception.

Citation	Study Purpose	Pop (N)/ Sample Size (n) /Setting(s)	Design/ Level of Evidence	Variables/ Instruments	Intervention	Findings	Implications
research, *27*(6), 1102-1119.							
Ethier, K. A., Dittus, P. J., DeRosa, C. J., Chung, E. Q., Martinez, E., & Kerndt, P. R. (2011). School-based health center access, reproductive health care, and contraceptive use among sexually experienced high school students. *Journal of Adolescent Health*, *48*(6), 562-565.	To compare contraception use, reproductive care, and STD screening in adolescents with and without access to SBHCs	12 schools in urban Los Angeles (2,603 students total, 1,226 were males, 1,374 were females)	Descriptive correlational, **level IV**	Students were surveyed about access to SBHCs and reproductive health behaviors	NA	Access to SBHCs associated with increased contraception use and increased STD screening in females. However, even with SBHC presences, less than 20% of sexually active students used hormonal BC with last sexual encounter and 33% did not use condom or hormonal BC with last sexual encounter.	SBHCs access associated with increased hormonal contraception use in females but not males. However, rates of contraception use for females were still low.

Citation	Study Purpose	Pop (N)/ Sample Size (n) /Setting(s)	Design/ Level of Evidence	Variables/ Instruments	Intervention	Findings	Implications
Fisher, R., Danza, P., McCarthy, J., & Tiezzi, L. (2019). Provision of Contraception in New York City School-Based Health Centers: Impact on Teenage Pregnancy and Avoided Costs, 2008–2017. *Perspectives on Sexual and Reproductive Health*, *51*(4), 201-209.	To evaluate the impact of SBHCs on adolescent contraception use and pregnancy rates	84,401 NYC public school children age 15-19	Quasi-experimental, **level III**	City wide adolescent pregnancy rates and rates of contraception use in female clients at SBHCs	Provision of on-site contraception in SBHCs	Providing on-site contraception in SBHCs increases contraception use. Estimation of 5,376 everted adolescent pregnancies in NYC between 2008-2016 due to SBHCs offering on-site contraception, including LARCs.	SBHCs that offer on-site contraception increase contraception use and help reduce pregnancy rates. SBHCs that offer more effective contraceptive options, like LARCs, can increase contraception compliance and decrease unintended pregnancies.
Stein, T. B., Summit, A. K., Louis, M. S., &	To evaluate adolescent females'	75 females at a SBHCs	Descriptive longitudinal	Survey female students who received IUDs	NA	At 6 month follow-up, 91% of survey students	SBHCs that provide IUD services can see high levels of

Citation	**Study Purpose**	**Pop (N)/ Sample Size (n) /Setting(s)**	**Design/ Level of Evidence**	**Variables/ Instruments**	**Intervention**	**Findings**	**Implications**
Gold, M. (2020). Patient Satisfaction with IUD Services in a School-Based Health Center: A Pilot Study. *Journal of Pediatric and Adolescent Gynecology*.	satisfaction , including ongoing use at 6 months, with IUDs inserted in SBHCs		study, **level VI**	at SBHC at time of insertion and at a 6 month follow-up.		were still using their IUD as contraception.	satisfaction and continued contraception use.