

Article

Sex Education and Sexual Knowledge, Attitudes, and Behavior Among Florida College Students: Exploring the Impact of Curriculum Theme

Amber Whitmer ¹, Tiffany Chenneville ^{1,2,*}, Joseph Marshall ¹, Elham Azamian Jazi ¹ and Ananda Myers ¹

¹ Department of Psychology, University of South Florida, St. Petersburg, FL 33701, USA; alwhitmer@usf.edu (A.W.); josephbrantmarshall@usf.edu (J.M.); elhamazamianjazi@usf.edu (E.A.J.); anandamyers@usf.edu (A.M.)

² Faculty of Health Sciences, University of Witwatersrand, Johannesburg 2050, South Africa

* Correspondence: chennevi@usf.edu

Abstract

Despite widespread support for comprehensive sex education (CSE), abstinence-focused education is the legally mandated standard in Florida public schools. Using a cross-sectional survey design, this study examined the relationship between sex education content and sexual knowledge, attitudes, and behaviors among 117 college students aged 18 to 25 attending predominantly one large Florida public university. Participants completed an anonymous online survey assessing demographics, sex education history, HIV/STI knowledge, sexual attitudes, and condom use. Contrary to expectations and some prior findings, there were no significant differences in HIV/STI knowledge, sexual attitudes, or condom use between students who reported receiving predominantly abstinence-only education (AOE) and those who reported receiving predominantly CSE. While challenging assumptions about the long-term effectiveness of CSE compared to AOE, the data suggest, in part, that the CSE label may be secondary to local implementation, personal experiences, and broader sociopolitical context, in influencing outcomes. Given Florida's restrictive sex education and reproductive health policies, findings highlight the urgent need for more nuanced, context-sensitive research. Findings also emphasize the importance of evaluating not only the stated content but also the delivery, quality, and accessibility of sex education programs to better support youth sexual health.

Keywords: sexuality education; college students; condom use; abstinence-only education; sexual risk avoidance; comprehensive sex education; sexual health; HIV prevention; sexually transmitted infections; unintended pregnancy



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1. Introduction

Sexually transmitted infections (STIs) continue to pose serious public health challenges in the United States (U.S.), with the southeastern region—including Florida—experiencing some of the highest rates, particularly among youth [1]. Despite ongoing efforts to reduce negative sexual health outcomes, Florida remains a hotspot for rising STI rates, including gonorrhea and chlamydia, particularly among adolescents and young adults [2]. Although unintended pregnancies in the U.S. decreased from 2010 to 2019, owing to the availability of high-quality reproductive services [3], 28% of all pregnancies in Florida were unintended in 2022 with an estimated 53% of unintended pregnancies among women 19 and younger and 41% among women aged 20 to 24 [4]. The conservative political environment in Florida,

characterized by policy frameworks that emphasize parental rights, restrict reproductive healthcare access, and increase legislative oversight of educational content related to sexual health, gender identity, and reproduction, may contribute to higher unintended pregnancy rates and poorer STI outcomes by limiting access to comprehensive sexual health information across both K–12 and higher education settings [5,6].

Sex education is well established as a critical tool for reducing STIs and unintended pregnancies, with debates over instructional approach affecting U.S. education policy for many decades. In the late 1990s, as part of welfare reform legislation, the federal government began funding abstinence-only-until-marriage programs, shaping sex education policy nationwide. Although this framework was later defunded, abstinence-focused programs continue to receive federal support under sexual risk avoidance funding streams, while comprehensive sex education (CSE)—which includes a focus on contraception, STI prevention, sexual consent, and healthy relationships—remains inconsistently funded and largely determined by policies at the state and local level [7,8].

Seminal evaluations of sex education programs in the U.S. have consistently demonstrated that CSE more effectively improves sexual health outcomes than abstinence-only education. Note that we use the term *abstinence-only education (AOE)* rather than *sexual risk avoidance* to align with established scholarly terminology and to emphasize continuity with prior research demonstrating that these programs prioritize abstinence while excluding comprehensive information about contraception and STI prevention, regardless of rebranding [7]. Early comparative syntheses and national reviews found associations between CSE programs and delayed sexual initiation, increased condom and contraceptive use, and reduced sexual risk, whereas AOE programs showed no evidence of effectiveness in preventing sexual activity or reducing STIs or pregnancy [9,10]. Population-level analyses further demonstrated that adolescents who received CSE, compared to those who received AOE or no sex education, reported lower rates of unintended pregnancy and STIs [11].

More recent research continues to support the relative effectiveness of CSE in promoting condom use, delaying sexual initiation, and increasing sexual health knowledge [12,13]. However, findings across studies remain mixed. For instance, in a retrospective study, Walcott et al. [14] found that while college students who reported receiving CSE demonstrated more positive attitudes toward safer sex and increased HIV knowledge, there were no significant differences in actual condom use when compared to students who received AOE. Subsequent reviews and empirical studies have likewise noted variability in behavioral effects, suggesting that program content, implementation quality, and developmental timing may moderate outcomes [15,16]. This, combined with methodological limitations of existing sex education research (e.g., short follow-up periods, pretest–posttest designs), underscores the need for continued investigation.

Importantly, access to sex education and instructional content vary substantially across U.S. states. Nelson et al. [17] found that most states mandate abstinence-focused education with few requiring instructional content outside of sexual abstinence. Further, fewer than half of states require medically accurate, inclusive, or comprehensive instruction [17,18].

Understanding the real-world impact of sex education is especially urgent in Florida where abstinence-focused instruction is legally mandated in public school health education [19,20]. According to national advocacy reporting, Florida received an overall grade of F for its sex education policies, which do not mandate medically accurate, consent-based education and allow parents to opt out of reproductive health or disease instruction (see 2025 SEICUS state profiles) [21]. The state’s increasingly restrictive policies on sexual and reproductive health—including limitations on gender identity instruction and abortion access—further complicate the educational landscape [5,6]. These sociopolitical factors raise

important questions about how education policies shape young people's sexual knowledge, beliefs, and behaviors in practice.

Within the current national and policy context, college students represent a particularly valuable population for examining the longer-term effects of sex education, as they can retrospectively reflect on the instructional approaches they experienced while navigating increased autonomy and sexual decision-making during and before adolescence. The present study examines how the dominant theme of sex education received, defined as the primary instructional emphasis as either CSE or AOE, is associated with college students' STI and HIV knowledge, attitudes toward safer sex, and condom use behaviors. This approach acknowledges that students may have been exposed to multiple sources and messages, but that perceived emphasis may shape how sexual health information is internalized. By focusing on college students in Florida, this study offers an illustrative case of young adults educated in a state that mandates abstinence-focused instruction, contributing empirical insight into how such policies may manifest in later sexual health outcomes. Building on prior research, including Walcott et al. [14], this study offers updated data within the contemporary Florida context and aims to inform both policy discussions and public health strategies related to sexual health education.

2. Materials and Methods

2.1. Study Design

This study employed a cross-sectional, observational design using convenience sampling. Data collection occurred at a single point in time to examine associations among study variables without manipulation or intervention.

2.2. Participants and Setting

Eligible participants were college students aged 18 to 25 enrolled in a Florida college or university at the time of the study. With alpha set at 0.05, power set at 0.80, and an effect size of 0.25, consistent with the small effect size reported in Walcott et al. [14], findings from an a priori power analysis suggested a minimum sample size of 128. To account for potential attrition or incomplete responses, the target sample size was increased by approximately 20%, resulting in a recruitment goal of 154 participants.

2.3. Procedures

The University of South Florida (USF) Institutional Review Board approved this study. Participants were recruited using a convenience sampling approach, primarily from USF's SONA Systems [22] online research participation platform, administered through the psychology department. SONA is commonly used by psychology departments to manage student subject pools and facilitate participation in research studies. Additional participants were recruited through social media posts and flyers distributed in the local community.

After reading a consent page, eligible participants were required to respond "yes," "no", or "cannot say either way" to a question asking about their willingness to provide thoughtful answers to questions in the survey as a validity check. Research suggests that such commitment requests are more effective than traditional attention checks in promoting participant engagement and data reliability [23]. Only participants who responded "yes" proceeded to an anonymous survey administered using Qualtrics survey software. Consistent with the USF Psychology Department's SONA policy, participants taking psychology courses received extra credit for their participation in this study. We used ChatGPT 4.5 [24] to assist with idea generation and exploration related to the interpretation and communication of findings, not for data collection, entry, coding, or analyses.

2.4. Measures

The survey contained five sections: (1) demographics; (2) Sexuality Education Scale [14]; (3) an adapted version [14] of the Assessment of Knowledge and Beliefs about HIV/AIDS Scale [25]; (4) the Sexually Transmitted Disease Knowledge Questionnaire (STD-KQ) [26]; and (5) an adapted version of the Sexual Risk Scale (SRS) [27].

2.4.1. Demographic Questionnaire

The demographic questionnaire contained 11 items to gather data on age, gender identity, sexual orientation, race, ethnicity, country of origin, university affiliation, year in college, major in college, primary language, and religious affiliation.

2.4.2. Sexuality Education Scale

A 22-item scale developed by Walcott et al. [14] was used in this study to assess participants' sex education experience, including the primary theme (CSE or AOE, operationally defined in the scale) and amount of sex education received, when and where it was received, and the perceived depth and quality of the sex education received. For example, participants responded to items such as "Where did you receive your sex education?". Response options varied by question. In the example above, participants were asked to mark all options that applied among the following: "School", "Home", "Community Organization (e.g., Boys & Girls Club, YMCA, after school clubs, etc.)", "Church or Church-affiliated Youth Groups", "Other; please specify" (with text entry option), and "No formal lessons or discussions". As another example, participants were asked, "To what extent did the sex education you received answer your questions about sex and sex-related practices?" and required to choose among the following five response options: "answered all of my questions," "answered most of my questions," "answered some of my questions," "answered none of my questions," and "no formal sex education lessons or discussion."

2.4.3. Assessment of Knowledge and Beliefs About HIV/AIDS Scale

An adapted version [14] of the Assessment of Knowledge and Beliefs about HIV/AIDS Scale [25] was used in this study. The scale contains 29 true/false/I don't know items designed to assess participants' knowledge about HIV/AIDS (e.g., "A baby born to a mother with HIV infection can get HIV"). Walcott et al. [14] reported adequate content validity and internal consistency ($\alpha = 0.72$). Individual items are scored as correct (1 point) or incorrect (0 points) with "I don't know" scored as incorrect. Items are summed to compute a total score ranging from 0 to 29 with higher scores indicating higher knowledge and more positive beliefs about HIV/AIDS.

2.4.4. Sexually Transmitted Disease Knowledge Questionnaire (STD-KQ)

The STD-KQ [26] is a 27-item scale designed to assess STI knowledge (e.g., gonorrhea, chlamydia, HPV). For example, participants responded "True", "False", or "Don't Know" to items such as "Genital herpes and HIV are caused by the same virus." Individual items are scored as correct (1 point) or incorrect (0 points) with "I don't know" scored as incorrect. Items are summed to compute a total score ranging from 0 to 27 with higher scores indicating higher knowledge about STDs. The original analysis of the STD-KQ yielded an internal consistency score of $\alpha = 0.86$ [26].

2.4.5. Sexual Risk Scale (SRS)

The SRS [27] is a 38-item scale aimed to assess attitudes and beliefs toward safer sex practices and related activities across six subscales: perceived susceptibility to HIV/AIDS, substance use, normative beliefs, attitudes about safer sex, intention to practice safer sexual behavior, and expectations regarding the feasibility of practicing safer sexual behaviors.

For example, participants responded to items such as “Sex is more enjoyable without a condom” on a 5-point Likert scale where 1 = “Strongly Disagree” and 5 = “Strongly Agree”. Low mean scores suggest more permissive or accepting attitudes toward sexually risky behaviors and greater sexual risk tolerance. High scores suggest more cautious or risk-adverse attitudes toward sexually risky behaviors, stronger beliefs in safer sex practices, and greater perceived susceptibility to HIV. This scale demonstrated evidence of internal reliability (ranging from $\alpha = 0.76$ to 0.88 on subscales and $\alpha = 0.86$ on total scale [27]).

Matching Walcott et al.’s [14] study, we added four items assessing condom use behaviors. These items were used as a criterion measure in DeHart and Birkimer’s [27] validation study and included: (1) “When I had sex with a steady partner in the past year, we used a condom ___”; (2) “When I had sex with someone in the past year who was not a steady partner, we used a condom ___”; (3) “When I had sex in the past two weeks, we used a condom ___”; and (4) “How many times in the last month have you had sex without a condom?”. For items 1–3, participants were asked to choose “never”, “rarely”, “sometimes”, “very often”, “always” or “N/A (I have not had sex with a steady/non-steady partner in the past year)”. For item 4, response options were: “Never, I have not had sex in the last month”; “I have had sex in the past month, but always used a condom”; “Once without a condom”; “2 times without a condom”; “3 times without a condom”; “4 times without a condom”; “5–10 times without a condom”; “11–15 times without a condom”; “16–20 times without a condom”; and “More than 20 times without a condom”.

2.5. Data Analysis

We used descriptive statistics to describe the sample and responses to measures and Cronbach’s alpha to assess the internal consistency of measures. We conducted *t*-tests to examine the differences between groups based on sex education theme (as measured by the Sexuality Education Scale) on STI knowledge (as assessed by the STD-KQ and HIV/AIDS measures), sexual attitudes (as measured by the SRS), and sexual behavior (as measured by the four condom use items added to the SRS). We used Cohen’s *d* to determine effect size. We used SPSS version 29 for all data analyses.

3. Results

3.1. Participant Demographics

Although recruitment was set at 154 participants, as described above, only 129 college students entered the online study. After excluding participants who did not meet age minimum inclusion criteria ($n = 1$) or pass the validity check ($n = 11$), participants were 117 college students aged 18 to 24 ($M = 19.21$; $SD = 1.18$) from predominantly one large, public Florida university. Most participants were White (67.52%), non-Hispanic (77.79%), cisgender women (67.52%) born in the United States (88.03%) and raised in Florida (69.30%), with English as their primary language (75.22%). Participants identified as straight/heterosexual (54.70%), followed by bisexual/pansexual (24.79%) and gay/lesbian/homosexual (7.69%). Additionally, 12.82% of the sample identified as transgender, genderqueer, or non-binary/third gender. Most participants attended the University of South Florida (97.16%). Year in college varied among participants with Sophomore or second-year students comprising the largest group in the sample (30.77%) and Seniors or fourth-year students comprising the smallest group (12.82%). The most frequently reported religious affiliation was agnostic (32.48%), followed by Christian (29.92%) and Atheist (12.82%). See Table 1.

Table 1. Participant characteristics.

Characteristic	Frequency	Percent
Years of Age (<i>n</i> = 117)		
18–21	114	97.44
22–25	3	2.56
No Response	0	0.00
Gender (<i>n</i> = 117)		
Non-Binary/third gender	7	5.98
Transgender woman	1	0.86
Transgender man	2	1.71
Cisgender woman	79	67.52
Cisgender man	19	16.24
Genderqueer	3	2.56
Other	6	5.13
No Response	0	0.00
Sexual Orientation (<i>n</i> = 117)		
Straight/heterosexual	64	54.70
Gay or lesbian/homosexual	9	7.69
Bisexual/pansexual	29	24.79
Asexual	5	4.27
Queer	4	3.42
Other	6	5.13
No Response	0	0.00
Race (<i>n</i> = 117)		
Asian	17	14.53
Black or African American	5	4.27
White	79	67.52
Multiracial	8	6.84
Other	8	6.84
No Response	0	0.00
Hispanic, Latino/a/x, or of Spanish origin (<i>n</i> = 117)		
Yes	26	22.22
No	91	77.79
No Response	0	0.00
Born in the US (<i>n</i> = 117)		
Yes	103	88.03
No	14	11.97
No Response	0	0.00
Year in College (<i>n</i> = 110)		
Freshmen	35	29.92
Sophomore	36	30.77
Junior	24	20.51
Senior	15	12.82
No Response	7	5.98
Is your Primary Language English (<i>n</i> = 110)		
Yes	88	75.22
No	22	18.80
No Response	7	5.98
Religious Affiliation (<i>n</i> = 108)		
Agnostic/non-practicing	38	32.48
Atheist	15	12.82
Buddhist	3	2.56
Christian	35	29.92
Jewish	4	3.42
Other	13	11.11
No Response	9	7.69

Note. Although 129 participants accessed the survey, 12 were excluded due to not meeting eligibility requirements (*n* = 1), validity concerns (*n* = 3), or not completing any items (*n* = 8), leaving 117 eligible participants. Sample sizes for demographic categories vary due to nonresponse.

3.2. Sexuality Education

Data were missing for 20 (17.09%) participants on the Sexuality Education Scale. Therefore, findings reported here are based on a sample size of $n = 97$. Most participants (55.67%) reported CSE as the primary theme of formal sexual education received compared to 38.14% who reported AOE. Few (6.18%) reported no history of formal sex education. Most participants reported first receiving formal sex education lessons during K-12 schooling. See Table 2.

Table 2. School-based sex education theme.

	Primary Theme of School-Based Sex Education			
	Abstinence-Only ($n = 37$)	Comprehensive ($n = 54$)	No Sex Education ($n = 6$)	Total ($n = 97$)
Timing of Initial School-Based Sex Education (%)				
K-12	94.60	98.15	0	90.72
College	0.00	0.00	33.33	2.06
No Specific Lessons	5.40	1.85	66.67	7.22

Most participants reported receiving lessons in school (85.57%) although only occasionally and as a part of other courses (67.01%). Most (53.61%) said the sex education they received answered some of their questions with only 10.31% reporting it answered all of their questions. Nearly half (44.33%) described the sex education they received as somewhat helpful with few (5.15%) describing it as extremely helpful. Nearly half (46.38%) described their sex education teachers as less than adequately trained with few (6.19%) describing their sex education teachers as extremely well trained. See Supplemental Table S1 for more detailed information about participants' sex education experiences.

3.3. Knowledge and Beliefs About HIV/AIDS

Data were missing for 22 (18.80%) participants on the Assessment of Knowledge and Beliefs about HIV / AIDS Scale. Therefore, findings reported here are based on a sample size of $n = 95$. Cronbach's alpha for the current sample was $\alpha = 0.75$, indicating acceptable internal consistency. In the current sample, total scores ranged from 7 to 28 with a mean score of 20.85 ($SD = 4.17$), indicating that, on average, participants showed moderately high knowledge about HIV / AIDS. See Table 3.

Table 3. Descriptive statistics for Assessment of Knowledge and Beliefs about HIV / AIDS Scale ($n = 95$).

Item	Frequency (Percent)	
	Correctly Responded	Incorrectly Responded
1. A baby born to a mother with HIV infection can get HIV. (T)	74 (77.89)	21 (22.11)
2. One way that HIV is carried is through the blood. (T)	86 (90.53)	9(9.47)
3. One way HIV is carried is in men's cum (semen). (T)	74 (77.89)	21 (22.11)

Table 3. *Cont.*

Item	Frequency (Percent)	
	Correctly Responded	Incorrectly Responded
4. People can get HIV from toilet seats. (F)	68(71.58)	27 (28.42)
5. You can get HIV if you only have intercourse with one person for the rest of your life. (T)	78 (82.11)	17 (17.89)
6. It is a good idea to ask someone about his/her past sexual activities before having sex with them, even though some partners may lie to you. (T)	93 (97.89)	2 (2.11)
7. Men are more likely to get HIV from having sex with a woman than from having sex with a man. (F)	55 (57.89)	40 (42.11)
8. Using a condom will lessen the chance of getting HIV. (T)	91 (95.79)	4 (4.21)
9. Women are more likely to get HIV from having sex with men who only have sex with women than with men who have/had sex with both men and women. (F)	46 (48.42)	49 (51.58)
10. It is safe to have intercourse without a condom with a person who shoot (or uses injection) drugs as long as you don't shoot (or use injection) drugs. (F)	81 (85.26)	14 (14.74)
11. People can get HIV from a swimming pool used by someone with HIV or AIDS. (F)	68 (71.58)	27 (28.42)
12. People of any race can get HIV and develop AIDS. (T)	95 (100.00)	0 (0.00)
13. People are likely to get HIV by tongue kissing a person infected with HIV. (F)	59 (62.11)	36 (37.89)
14. Getting HIV depends on whether or not you practice safer sex, not the group you hang out with. (T)	78 (82.11)	17 (17.89)
15. People can get HIV from insect bites. (F)	54 (56.84)	41 (43.16)
16. To prevent HIV, it is safer not to have sexual intercourse at all than to have sexual intercourse using a condom. (T)	68 (71.58)	27 (28.42)
17. You only need one HIV test to come out positive to be sure that you are infected. (F)	38 (40.00)	57 (60.00)
18. Pregnant women cannot get HIV infection. (F)	83 (87.37)	12 (12.63)
19. A vaccine has recently been developed that prevents people from getting HIV infection. (F)	31 (32.63)	64 (67.37)
20. HIV can be passed by an infected person even though that person isn't sick. (T)	82 (86.32)	13 (13.68)
21. If you are really healthy, then exercising daily can prevent getting HIV. (F)	81 (85.26)	14 (14.74)

Table 3. *Cont.*

Item	Frequency (Percent)	
	Correctly Responded	Incorrectly Responded
22. If the person you are now having sex with has been tested and does not have HIV infection, it means that you are not infected. (F)	70 (73.68)	25 (26.32)
23. People can get HIV by eating at a restaurant where a worker has HIV. (F)	69 (72.63)	26 (27.37)
24. When using condoms, it is better to use one with a spermicide like Nonoxynol-9. (F)	9 (9.47)	86 (90.53)
25. You can get HIV through an open cut or wound. (T)	70 (73.68)	25 (26.32)
26. You are safe from contracting HIV if you have oral sex (with mouth to penis or mouth to vagina) without a condom. (F)	76 (80.00)	19 (20.00)
27. You can get HIV by donating blood. (F)	49 (51.58)	46 (48.42)
28. Using drugs like marijuana, alcohol, cocaine, crack makes it more likely that you may have unsafe sex. (T)	74 (77.89)	21 (22.11)
29. You can get HIV by getting tested for it. (F)	81 (85.26)	14 (14.74)

Note. Correct responses scored as 1. Incorrect responses and “I don’t know” scored as 0.

3.4. Sexually Transmitted Disease Knowledge

Data were missing for 28 (23.93%) participants on the STD-KQ. Therefore, findings reported here are based on a sample size of $n = 89$. Cronbach’s alpha for the current sample was $\alpha = 0.87$, indicating strong internal consistency. Total scores ranged from 0 to 24 with a mean score of 13.27 ($SD = 6.34$), indicating that, on average, participants had moderate knowledge about STIs, such as gonorrhea and chlamydia. See Table 4.

Table 4. Descriptive statistics for Sexually Transmitted Disease Knowledge Questionnaire ($n = 89$).

Item	Frequency (Percent)	
	Correctly Responded	Incorrectly Responded
1. Genital herpes is caused by the same virus as HIV. (F)	49 (55.06)	40 (44.94)
2. Frequent urinary infections can cause chlamydia. (F)	45 (50.56)	44 (49.44)
3. There is a cure for gonorrhea. (T)	36 (40.45)	53 (59.55)
4. It is easier to get HIV if a person has another sexually transmitted disease or infection. (T)	29 (32.58)	60 (67.42)
5. Human Papillomavirus (HPV) is caused by the same virus that causes HIV. (F)	43 (48.31)	46 (51.69)
6. Having anal sex increases a person’s risk of getting Hepatitis B. (T)	23 (25.84)	66 (74.16)

Table 4. Cont.

Item	Frequency (Percent)	
	Correctly Responded	Incorrectly Responded
7. Soon after infection with HIV a person develops open sores on his or her genitals (penis or vagina). (F)	32 (35.96)	57 (64.04)
8. There is a cure for chlamydia. (T)	44 (49.44)	45 (50.56)
9. A woman who has genital herpes can pass the infection to her baby during childbirth. (T).	47 (52.81)	42 (47.19)
10. A woman can look at her body and tell if she has gonorrhea. (F)	40 (44.94)	49 (55.06)
11. The same virus causes all of the sexually transmitted diseases or infections. (F)	71 (79.78)	18 (20.22)
12. Human Papillomavirus (HPV) can cause genital warts. (T)	47 (52.81)	42 (47.19)
13. Using a natural skin (lambskin) condom can protect a person from getting HIV. (F)	35 (39.33)	54 (60.67)
14. Human Papillomavirus (HPV) can lead to cancer in women. (T)	51 (57.30)	38 (42.70)
15. A man must have vaginal sex to get genital warts. (F)	64 (71.91)	25 (28.09)
16. Sexually transmitted diseases or infections can lead to health problems that are usually more serious for men than women. (F)	34 (38.20)	55 (61.80)
17. A woman can tell that she has chlamydia if she has a bad smelling odor from her vagina. (F)	30 (33.71)	59 (66.29)
18. If a person tests positive for HIV the test can tell how sick the person will become. (F)	64 (71.91)	25 (28.09)
19. There is a vaccine available to prevent a person from getting gonorrhea. (F) *	36 (40.45)	53 (59.55)
20. A woman can tell by the way her body feels if she has a sexually transmitted disease or infection. (F)	50 (66.29)	39 (33.71)
21. A person who has genital herpes must have open sores to give the infection to his or her sexual partner. (F)	46 (51.69)	43 (48.31)
22. There is a vaccine that prevents a person from getting chlamydia. (F)	36 (40.45)	53 (59.55)
23. A man can tell by the way his body feels if he has Hepatitis B. (F)	49 (55.06)	40 (44.94)

Table 4. *Cont.*

Item	Frequency (Percent)	
	Correctly Responded	Incorrectly Responded
24. If a person had gonorrhea in the past, then he or she is immune (protected) from getting it again. (F)	51 (57.30)	38 (42.70)
25. Human Papillomavirus (HPV) can cause HIV. (F)	39 (43.82)	50 (56.18)
26. A man can protect himself from getting genital warts by washing his genitals after sex. (F)	33 (37.08)	56 (62.92)
27. There is a vaccine that can protect a person from getting Hepatitis B. (T)	57 (64.05)	32(35.95)

Note. Correct responses scored as 1. Incorrect responses and “I don’t know” scored as 0. * At the time of data collection, the gonorrhea vaccination was unavailable.

3.5. Sexual Risk

Data were missing for 34 (29.06%) participants on the Sexual Risk Scale. Therefore, findings reported here are based on a sample size of $n = 83$. Cronbach’s alpha for the current sample was $\alpha = 0.91$ on the intentions subscale indicating excellent internal consistency; $\alpha = 0.93$ on the attitudes subscale indicating excellent internal consistency; $\alpha = 0.69$ on the peer norms subscale indicating questionable internal consistency; $\alpha = 0.76$ on the expectation subscale indicating acceptable internal consistency; 0.78 on the perceived susceptibility subscale indicating acceptable internal consistency; and $\alpha = 0.70$ on the substance use subscale indicating acceptable internal consistency. Cronbach’s alpha for the SRS total score was 0.80 indicating very good internal consistency.

On the 38-item SRS, mean scores across subscales ranged from 1.34 to 4.36, with higher scores indicating more cautious or risk-adverse attitudes toward sexually risky behaviors, stronger beliefs in safer sex practices, stronger intentions and expectations to practice safer sex, and greater perceived susceptibility to HIV: attitudes toward safer sex ($M = 3.97$; $SD = 1.10$); peer norms toward safer sex ($M = 3.06$, $SD = 1.22$); perceived susceptibility to HIV ($M = 1.43$, $SD = 0.81$); substance use ($M = 1.87$, $SD = 1.21$); intention to practice safer sex ($M = 4.17$, $SD = 1.05$); and expectation to practice safer sex ($M = 1.72$, $SD = 0.93$). See Table 5.

When asked about condom use with a steady partner within the past year ($n = 83$), 55.43% reported they had not had sex with a steady partner within the past year, 10.84% reported never using a condom, 6.02% rarely, 7.23% sometimes, 4.82% very often, and 15.66% always. When asked about condom use with a non-steady partner within the past year, 2.41% of participants reported never using a condom, 1.21% rarely, 1.20% sometimes, 3.61% very often, 14.46% always, and 77.11% had not had sex with a non-steady partner within the past year. When asked about condom use during sex within the past two weeks, 14.46% of participants reported never using a condom, 0.00% rarely, 2.41% sometimes, 2.41% very often, 19.28% always, and 61.44% had not had sex within the past two weeks. When asked about condom use in the past month, 57.83% of participants said they had not had sex in the past month; 21.69% said they always used a condom; and 20.28% reported condomless sex in the past month once to over 20 times.

Table 5. Descriptive statistics for Sexual Risk Scale ($n = 83$).

Item	<i>M (SD)</i>
Subscales	
<i>Attitude Subscale</i>	3.97 (1.10)
The proper use of a condom can enhance sexual pleasure.	3.23 (0.90)
* Condoms ruin the natural sex act.	3.99 (1.04)
* Condoms interfere with romance.	4.24 (0.89)
Generally, I am in favor of using condoms.	4.29 (0.97)
* Safer sex reduces the mental pleasure of sex.	4.14 (1.16)
The idea of using a condom appeals to me.	3.90 (1.19)
* The sensory aspects (smell, touch, etc.) of condoms make them unpleasant.	3.55 (1.13)
* With condoms, you can't fully give yourself over to your partner.	4.36 (0.92)
* I think safer sex would get boring fast.	4.33 (0.91)
* Condoms are irritating.	3.54 (1.12)
People can get the same pleasure from safer sex as from unprotected sex.	4.12 (0.99)
* Using condoms interrupts sex play.	3.96 (1.12)
* It is a hassle to use condoms.	3.77 (1.22)
<i>Peer Norms Subscale</i>	3.06 (1.22)
When I think that one of my friends might have sex on a date, I asked them if they have a condom.	3.16 (1.22)
My friends talk a lot about safer sex.	2.83 (1.28)
If a friend knows that I might have sex on a date, then he/she will ask me if I am carrying a condom.	2.84 (1.12)
If I thought that one of my friends had sex on a date or otherwise, then I would ask them if they used a condom.	2.99 (1.31)
* If a friend knew that I had sex on a date, he/she wouldn't care if I had used a condom or not.	2.35 (1.04)
If I have sex and I tell my friends that I did not use condoms, they would be angry or disappointed.	3.72 (1.03)
My friends and I encourage each other to practice safer sex.	3.54 (1.03)
<i>Perceived Susceptibility Subscale</i>	1.43 (0.81)
I may have had sex with someone who was at risk for HIV.	1.34 (0.69)
I am at risk for HIV.	1.51 (0.92)
There is a possibility that I have HIV.	1.25 (0.58)
* My sexual experiences do not put me at risk for HIV.	1.63 (0.96)
<i>Substance Use Subscale</i>	1.87 (1.21)
When I go out on a date, I usually do not drink alcohol or use drugs.	1.77 (1.12)
* When I socialize, I usually drink alcohol or use drugs.	1.98 (1.29)
<i>Intention Subscale</i>	4.17 (1.05)
If I were going to have sex, I would take precautions to reduce my risk of HIV.	4.51 (0.67)

Table 5. Cont.

Item	M (SD)
Subscales	
I try to use a condom when I have sex.	3.95 (1.25)
* I avoid using condoms if at all possible.	4.25 (1.09)
Safer sex is a habit for me.	3.72 (1.07)
I intend to follow safer sex guidelines within the next year.	4.24 (0.91)
I am determined to practice safer sex.	4.36 (0.89)
If I have sex in the next year, I plan to use condoms.	4.16 (1.22)
Expectation Subscale	1.72 (0.93)
* If my partner wants me to have unprotected sex, I will probably give in.	1.78 (1.05)
* If my partner wants me to participate in risky sex and I said that we need to be safer, then we will still probably end up having unsafe sex.	1.49 (0.74)
If my partner wants me to participate in risky sex and I suggested a lower risk alternative, we will have safer sex instead.	1.87 (0.84)
* If my partner wanted me to have unprotected sex and I make some excuse to use a condom, we will still end up having unprotected sex.	1.65 (0.92)
* If a sexual partner does not want to use condoms, then we will have sex without using condoms.	1.80 (1.03)

Note. Likert scale was from 1 to 5 where 1 = “strongly disagree”; 2 = “disagree”; 3 = “neutral”; 4 = “agree”; and 5 = “strongly agree”. Reverse-scored items are marked with an “*”.

3.6. Differences in STI Knowledge Between Groups

An unequal variance two-tailed independent samples *t*-test was computed to compare STD-KQ scores between the CSE and AOE groups, as measured by the item assessing predominant sex education theme on the Sexuality Education Scale. Findings revealed no significant difference in scores between the AOE ($M = 12.64$, $SD = 6.10$) and CSE ($M = 13.84$, $SD = 6.45$) groups; $t(74) = -0.86$, $p = 0.39$. Additionally, a two-tailed independent samples *t*-test was computed to compare scores on the HIV/AIDS knowledge scale between CSE and AOE groups. Findings revealed no significant difference in scores between the AOE ($M = 21.00$, $SD = 3.82$) and CSE ($M = 21.09$, $SD = 4.30$) groups; $t(81) = -0.11$, $p = 0.91$. See Table 6.

Table 6. Differences in sexual knowledge between groups.

	AOE <i>n</i> = 36 and 34		CSE <i>n</i> = 53 and 50		<i>t</i>	<i>df</i>	<i>p</i>	Cohen’s <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
HIV Knowledge Total Score (<i>n</i> = 89)	21.00	3.82	21.09	4.30	−0.11	81	0.91	−0.02
STD-KQ Total Score (<i>n</i> = 84)	12.64	6.10	13.84	6.45	−0.86	74	0.39	−0.19

Note: Although HIV *n* = 95 and STD *n* = 89 in the survey, *t*-scores will be *n* = 89 and *n* = 84 because the “No Sex Education” cohort was excluded.

3.7. Differences in Sexual Attitudes and Beliefs Between Groups

A two-tailed independent samples *t*-test was computed to compare the means on each of the six SRS subscales between CSE and AOE groups. Findings revealed no significant difference between groups. See Table 7.

Table 7. Differences in sexual beliefs attitudes between groups.

SRS Subscales	AOE <i>n</i> = 31		CSE <i>n</i> = 47		<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Attitude	52.06	10.69	50.91	9.88	0.48	61	0.63	0.11
Peer Norms	20.71	4.72	21.70	4.72	−0.91	64	0.37	−0.21
Perceived Susceptibility	7.73	2.78	5.52	2.35	0.88	57	0.38	0.88
Substance Use	4.90	2.21	4.54	2.13	0.65	63	0.52	0.17
Intention	29.19	6.19	29.06	5.78	0.09	61	0.93	0.84
Expectation	8.48	3.90	8.55	3.18	−0.08	55	0.93	−0.02

Note. The “No Sex Education” cohort was excluded, which explains the variation in samples sizes compared to those reported above.

3.8. Differences in Sexual Behavior Between Groups

A two-tailed independent samples *t*-test was computed to compare the means on each of the four items assessing condom use behaviors between CSE and AOE groups. Findings revealed no significant difference between the groups. See Table 8.

Table 8. Differences in sexual behaviors between groups.

	AOE <i>n</i> = 31		CSE <i>n</i> = 47		<i>t</i>	<i>df</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
When I had sex with a steady partner in the past year, we used a condom X times.	4.74	1.91	4.66	1.75	0.19	60	0.85	0.05
When I had sex with someone in the past year who was not a steady partner, we used a condom X times.	5.81	0.48	5.38	1.26	2.09	64	0.04	0.41
When I had sex in the past two weeks, we used a condom X times.	5.23	1.54	4.70	1.93	1.32	73	0.19	0.29
How many times in the last month have you had sex without a condom?	2.13	2.17	2.60	2.51	0.87	70	0.39	−0.20

Note. Participants who reported “No Sex Education” were excluded from analyses.

4. Discussion

This study explored the relationship between the primary theme of sex education received—CSE or AOE—and college students’ sexual knowledge, attitudes, and behaviors in Florida. Contrary to widespread assumptions favoring CSE, findings revealed no significant differences in HIV/STI knowledge, sexual attitudes, and condom use between students who reported receiving primarily CSE and those who reported receiving predominantly AOE.

These findings are partially consistent with Walcott et al. [14] who found no differences in condom use between college students who received CSE versus AOE in a similar retrospective study. Current findings diverge from Walcott et al.’s [14] finding that CSE students demonstrated slightly higher HIV knowledge. There are several possible explanations for the lack of significant differences in knowledge in the current study. First, this finding may reflect broader access to informal or non-institutional sexual health information, such as online resources or peer discussions. It may also indicate that the delivery, depth, and quality of both CSE and AOE programs in Florida are insufficient to produce measurable differences. Further and importantly, even in states with restrictive sex education mandates,

local school districts and individual educators may vary considerably in how policies are interpreted and enacted, with some incorporating elements of more comprehensive instruction despite statutory constraints.

Current findings also diverge from Walcott et al.'s [14] finding that CSE students demonstrated more positive attitudes toward safer sex. The lack of differences in safer sex attitudes and sexual risk in the current study may reflect Florida's broader cultural and religious environment, which may exert a stronger influence on students' sexual attitudes than the specific content of their school-based sexuality education, meaning that both groups may ultimately reflect similar societal norms rather than distinct curricular effects. Alternatively, once in college, exposure to a shared campus culture, peer norms, and institutional health messaging may "level the playing field," minimizing earlier distinctions in sexuality education experiences and yielding similar attitudes toward risk and safer sex across curriculum types. Moreover, because sexual knowledge, attitudes, and behaviors are related but distinct constructs, individuals may recognize health risks while still holding ambivalent or conflicting attitudes toward sexual behaviors.

A notable feature of the present sample was the relatively high proportion of participants who identified as sexual and/or gender minorities, which is especially striking given that national data indicate smaller percentages of non-heterosexual/non-cisgender U.S. college students [28,29]. This pattern warrants careful consideration when interpreting current findings. Unfortunately, prior research has documented that many sex education programs—AOE and CSE—have historically centered cisgender, heterosexual experiences, often leaving sexual and gender minority students feeling invisible, underserved, or inadequately prepared to navigate their sexual health [30–32]. In this context, the finding that participants reported comparable perceived outcomes across CSE and AOE in this study may reflect a broader perception among sexual and gender minority respondents that neither approach adequately addressed their needs, rather than true equivalence in program effectiveness. Proulx et al. [33] found that adolescents who attended schools offering sex education inclusive of lesbian, gay, bisexual, transgender, and questioning identities reported better mental health and lower levels of school-based victimization than those in schools without such inclusive curricula.

Current findings contribute to ongoing discussions regarding the relative effectiveness of sex education approaches. While CSE has been widely supported for its inclusive, medically accurate, and skill-based content [12], our findings suggest that educational delivery, instructor preparedness, and the broader sociopolitical environment may moderate its effectiveness. Indeed, Atkins and Bradford's [34] research highlights how state-level policy frameworks may be just as influential as curriculum content in shaping youth sexual behavior. In Florida, where sex education is largely abstinence-centered and curriculum oversight is minimal, even "comprehensive" programming may be inconsistently implemented, limiting its impact.

Furthermore, these findings add nuance to the debate by indicating that AOE may not uniformly produce different outcomes than CSE. However, it remains critical to understand that AOE often lacks content related to consent, identity, and long-term sexual health—areas well-supported by CSE frameworks. The current study emphasizes the need to move beyond binary comparisons and explore how local context, educator training, and student engagement influence outcomes.

Taken together, these findings underscore the importance of revisiting how sex education is delivered in Florida and similar states. As political discourse increasingly shapes what content can be taught in classrooms, understanding the implications for youth sexual health becomes essential. This study offers preliminary, context-sensitive findings that can inform both educational reform and public health strategies.

This study offers several strengths that enhance its relevance within the current public health and educational landscape. First, it provides recent empirical data from Florida, a state with a politicized and abstinence-centered sex education policy [35]. This policy context makes the findings particularly timely and important for informing debates about public health education. The study also utilized well-established and psychometrically supported instruments [14,26,27], which enhances the reliability of the measures and facilitates comparison to prior research. Additionally, the inclusion of students with diverse gender identities and sexual orientations contributes to a more inclusive understanding of sex education outcomes, aligning with the need for research that reflects marginalized populations [36].

However, several limitations must be acknowledged. The sample was drawn primarily from one urban public university, significantly limiting geographic and institutional generalizability [37]. Although power analysis guided the target sample size, the final analytic sample for many measures fell below the desired threshold due to missing data, which may have limited the detection of smaller effect sizes. While most participants reported being raised in Florida, the study did not collect data on where participants completed their K-12 education; therefore, some participants may have received formal sex education in other states, limiting conclusions about exposure to Florida-specific sex education policies. Further, the relatively high proportion of sexual and gender minorities in the current sample may reflect selection bias and calls into question the representativeness of this sample of college students. Although the present study was not powered to conduct subgroup analyses based on gender identity and sexual orientation, the demographic composition of the sample underscores the importance of examining heterogeneity in sex education experiences. Additionally, while this study focused on bivariate group comparisons, future studies would benefit from multivariate approaches to account for potential confounding variables such as religiosity, cultural background, or sexual experience [38,39].

5. Conclusions

This study offers new insights into the complex relationship between sex education content and college students' sexual behaviors and beliefs in a restrictive policy context although findings should be interpreted cautiously given concerns about the sample size and representativeness of the sample. Specifically, the finding that students who received abstinence-only education (AOE) were no different than those who received comprehensive sexuality education (CSE) in terms of HIV/STI knowledge and safer sex attitudes and behavior stands in contrast to assumptions about the long-term effectiveness of CSE based on the prevailing literature [11,12]. This finding raises important questions about how messaging may influence risk perception and behavior in particular contexts and how factors beyond curriculum type—such as delivery quality, accessibility, and informal education—may shape knowledge retention and application [34]. At the same time, as noted above, this finding may reflect the relatively high proportion of sexual and gender minorities in the current sample, supporting research documenting the ineffectiveness of both AOE and CSE for students who identify as LGBTQ+ or gender nonconforming [30–32] and calling for inclusive sex education [33].

These results highlight the need for future research that is methodologically rigorous, explicitly designed to disentangle which specific components of sex education programs matter for student outcomes, and that considers the broader context in which sex education is delivered, including sociopolitical, cultural, and institutional factors [8]. In particular, future studies should examine how variation in curriculum content, pedagogical approach, instructor training, and school climate shape students' perceptions and engagement with sex education. Longitudinal and experimental studies are needed to assess causal links

between sex education exposure and behavioral outcomes over time, including how timing, duration, and consistency of exposure influence knowledge, attitudes, and health behaviors. Additionally, comparative research across states with differing sex education mandates could help clarify the role of policy in shaping public health outcomes [40], while accounting for student mobility and where formal sex education is actually received. Future research is also needed to explicitly assess whether and how program evaluations differ by sexual orientation and gender identity and should prioritize inclusive, affirming measures that capture dimensions of relevance, representation, and applicability for sexual and gender minority youth.

As Florida continues to legislate restrictive policies around sexual health, education, and reproductive rights [5,6], evidence-based, inclusive, and context-sensitive approaches to sex education are increasingly urgent. Our findings indicate that students' evaluations of sex education are not adequately explained by categorical labels such as CSE or AOE alone. Binary comparisons between CSE and AOE may obscure key nuances related to how sex education is implemented, including delivery, content quality, and student perception, reinforcing the need for flexible and adaptive educational strategies. These implementation-level factors may be more salient to students than policy-defined program type. Identifying and measuring these nuanced dimensions of sex education delivery represents a critical direction for future research and is central to understanding how sex education policies translate into lived educational experiences.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/sexes7010008/s1>, Table S1: Sex Education Characteristics.

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Abbreviation

The following abbreviations are used in this manuscript:

AOE	Abstinence-only sexuality education
CSE	Comprehensive sexuality education
U.S.	United States

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