The role of schooling and comprehensive sexuality education in reducing HIV and pregnancy among adolescents in South Africa

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Abstract

Background: Comprehensive sexuality education (CSE) seeks to reduce risky sexual behaviour and subsequent incidence of unintended pregnancy and HIV among school going adolescents. This study estimates the association between exposure to CSE and key biomedical and behavioural indicators among adolescent girls in South Africa.

Setting: Four DREAMS implementation districts in Gauteng and KwaZulu-Natal provinces in South Africa.

Methods: Data from a household-based representative sample of adolescent girls (between the ages 12–18 years) (n=9 673) was undertaken. Independent variables included school attendance and exposure to CSE, with outcome variables measuring prevalence of HIV, pregnancy and sexual behaviour, including condom use, incidence of age disparate relationships and transactional sex.

Results: Adolescent girls in school and who had attended CSE in the previous 12 months were associated with reduced adjusted odds of being HIV positive (Full sample: AOR: 0.76, 95% CI: 0.61–0.95, p < 0.05; sexually active sample: AOR: 0.62, 95% CI: 0.40–0.96, p < 0.05). Those in school who attended CSE in the previous 12 months were also more likely to get tested for HIV (AOR: 1.48, 95% CI: 1.32–1.65, p <0.001).

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Conclusions—Results indicate that school attendance and exposure to CSE is associated with a reduction in risky sexual behaviours. Exposure to CSE is also associated with increased access to HIV testing for adolescent girls both in and out of school. Keeping adolescent girls in school produces the greatest positive sexual behavioural effect, this coupled with the delivery of quality CSE, is a key strategy for reducing HIV risk.

Keywords

HIV/AIDS; HIV prevention; adolescent girls; Comprehensive sexuality education; Determined; Resilient; Empowered; AIDS-free; Mentored and Safe; South Africa

Introduction

The South African (SA) National HIV Prevalence, Incidence, Behaviour and Communication Survey undertaken in 2017 revealed that 13.6% of youth aged 15–24 engaged in sex before the age of 15 years [1]. This figure represents an upward trend from an initial rate of 8.9% in the 2002 national survey[1]. Condom use amongst this same aged cohort remains sub-optimal, with less than 60% of respondents reporting using a condom at last sexual intercourse[1]. These risky sexual behaviours are key drivers of the HIV epidemic in South Africa and manifest in high levels of HIV incidence and unintended pregnancies amongst adolescents.

South Africa's HIV incidence rates are highest amongst adolescent girls and young women (AGYW), accounting for an estimated 29% of all new infections in 2018 [2], with HIV prevalence among adolescents girls aged 15–19 years at 5.8%, and 4.7% amongst boys in 2017 [1]. According to Statistics South Africa (StatsSA) (2018) birth rates among adolescent girls have decreased moderately from 78 births per 1000 in 1996 to 65 births per 1000 in 2016 among the 15–19 year age group. However, these birth-rates remain high with data revealing that the majority of young girls who become pregnant while attending school often do not return post child birth, and in instances where young girls do return to school, they face challenges balancing school and childcare [3,4].

In response, the SA Department of Basic Education (DBE) developed the HIV, STI and TB policy which included the call to educate young girls and boys about sexuality and sexual behaviour in an effort to reduce both unintended pregnancy and HIV rates [5]. One of the key interventions pronounced within this policy is the provision of comprehensive sexuality education (CSE). The aim of CSE, as specified by the DBE, is to build and shape learners' understanding of concepts, content, values and attitudes around sexuality and sexual behaviour [6].

Research has established that CSE can improve sexual and reproductive health knowledge [5], and be effective in reducing risky sexual behaviour[7,8]. Studies in sub-Saharan Africa have to an extent affirmed these results, indicating that changes in adolescents' sexual behaviour after exposure to these programmes are modest, but achievable, while positive improvements in adolescents' attitudes and knowledge were consistently produced[9–11].

Studies undertaken in South Africa, focusing on implementation, have revealed challenges at the individual, interpersonal, school and community levels [12]. Some educators remain uncomfortable teaching the sensitive subject matter whilst many schools lack the teaching support materials required by educators to deliver CSE lessons effectively [12]. To ensure a standardised approach to the delivery of CSE and to improve the teaching quality, structured activity plans and training were recommended to advance the content knowledge and pedagogy of educators [13].

Since 2015, the DBE have been developing and piloting Scripted Lesson Plans (SLPs) across five provinces (KwaZulu-Natal, Free State, Gauteng, Mpumalanga and Western Cape) in order to strengthen the teaching of CSE in schools. SLPs are learner and teacher support materials (LTSMs) designed to aid educators and improve the effectiveness of CSE lessons [6]. This formed part of the Determined, Resilient, Empowered, AIDS-free, Mentored and Safe (DREAMS) initiative which aimed to reduce HIV infection among young women. The delivery of CSE using SLPs, forms part of the DREAMS package of 'layered' evidence-based HIV prevention interventions targeting—biological, behavioural, and structural factors to reduce AGYW vulnerability to HIV with the aim of reducing HIV incidence by 40% among AGYW over a two-year period (2016–2018) [14].

In this study we present data collected as part of the DREAMS evaluation to determine the effect of schooling, exposure to CSE has had on HIV prevalence, pregnancy, risky sexual behaviour and uptake of HIV testing in a sample of adolescent girls. This study adds to a limited knowledge base on school-based HIV programming and their effect on biological outcomes [15]. We hypothesize that young women in school will exhibit lower levels of HIV prevalence and risky sexual behavior, consistent with other studies [9–14,16,17], whilst the additional exposure to CSE is expected to have a compound effect, reducing risky behavior and exposure to risk of HIV acquisition. The aim of the study is therefore to estimate the association between exposure to CSE and key biomedical and behavioural indicators among adolescent girls in South Africa.

Methods

Study setting

The study was undertaken in South Africa in the districts of Ekurhuleni and City of Johannesburg in the Gauteng province (GP) and the Districts of uMgungundlovu and eThekwini in the province of KwaZulu-Natal (KZN). Data were collected from March 13, 2017 to June 22, 2018. More information on the districts has been described in the study's protocol paper [14].

Study design

A cross-sectional survey targeted 18 500 AGYW (aged between 12 and 24 years old) was undertaken. The study sampling method used a multistage cluster design. The districts were considered as the primary strata. The sample size per district was designed to be proportional to the estimated number of AGYW in DREAMS sub–districts. Only small area layers (SAL) where DREAMS was implemented were included in the sampling

frame. SALs were selected proportional to size from the sampling frame. Households were randomly selected and all AGYW residing in the household that met the requirements for study were enrolled. For our analyses, data were restricted to all adolescent girls aged 12 to 18 years old (n=9 673).

Data collection

Household composition forms were completed for 63 618 houses, of which 18 424 households met the enrolment criteria, while 16 845 households agreed to join the study. Both a caregiver and AGYW questionnaire were completed.

Ethical considerations

Written consent was obtained from all individuals 18 years old and parental or guardian consent and individual written assent was obtained from all individuals who were younger than 18 years. The study was approved by the University of KwaZulu-Natal Biomedical Research Ethics Committee (BFC 198/16) and the Provincial Department of Health in both KZN and GP.

Measures

Three independent variables were used in the study. The first was current school attendance. The second was whether respondents, currently out of school, had attended CSE classes in the previous 12 months (responses to the original question regarding number of sexuality education lessons attended ranged from 0 to 99 and was coded into binary of 0 if they did not attend CSE, 1 = did attend one or more CSE lessons in the previous 12 months). The third independent variable assessed whether for those respondents who were currently in school, had attended at least 1 CSE lesson in the previous 12 months, coded as 1; and 0 for individuals who were in school but had not attended at least 1 CSE lesson in the previous 12 months.

There were ten dependent variables. HIV status was determined from finger-prick blood samples into BD Microtainer® (Becton Dickinson, South Africa) blood collection tubes for laboratory measurements of HIV antibodies. Sexual activity (defined as inserting an object, finger or penis into the person's vagina or anus), was measured by asking if respondents had ever had sex. Sexual debut was measured by asking at what age respondents started engaging in sexual activity. Seven questions regarding transactional sex covered the different types of material goods respondents received for engaging in sex with a partner in the previous 12 months. These items were collapsed into a binary variable. Age disparate sex was measured by asking respondents if any of their sexual partners in the past 12 months were 5 or more years older than them in-line with the UNAIDS definition [18]. Condom use was measured by asking how often respondents used condoms with their sexual partners in the previous 12 months. We recoded those that said 'sometimes' or 'never' as inconsistent users and those that said they 'always', as consistent users of condoms. Multiple sexual partners was measured by asking how many partners individuals had in the past 12 months in an open ended format, with responses coded into a binary. We asked respondents if they had ever been pregnant. Respondents were asked whether they had ever been tested for HIV.

We asked individuals how sure they were in their ability to obtain condoms if needed. All the sexual risk, linkage to services and pregnancy variables were self-constructed.

We included six control variables in our regression models: age, province, total household income, self-reported caregivers' HIV status, orphan status, we also included a measure for overall exposure to HIV prevention interventions that was only included in the school attendance model as some of HIV interventions may overlap with sexuality education, such as HIV testing campaigns.

Data analysis

Only data from adolescent girls younger than 19 years old were analysed as the majority would be in school and are the target group for CSE. Data analysis was undertaken using SPSS version 27. Our analysis used descriptive statistics and multiple logistic regressions. We present Adjusted Odds Ratios (AOR) with 95% confidence intervals (CI) for the multiple logistic regressions. To adjust for the study design and non-response, sampling weights were used. The final sampling weight was the product of the SAL weight, household weight, adjusted for individual non-response. The final individual weights were benchmarked against the 2018 Statistics South Africa mid-year population estimates by age group and province [19]. In all analyses, standard errors were adjusted for clustering by SAL and stratification by district. Taylor series linearization methods were used to estimate standard errors

Results

The study response rate at an individual level was 97.8% (409 AGYW refused to partake in the study). More than half of the sample was from Gauteng (58.5%) (see Table 1). The median age in the sample was 15 years old (IQR: 13–17). The majority (89.4%) of respondents were currently in school. Nearly two-thirds (59.9%) of respondents had attended CSE lessons at school in the previous 12 months. More than a quarter (27.9%) of respondents indicated they were a single orphan (i.e., one parent is no longer alive). Less than one-tenth (8%) of caregivers reported they were HIV positive. Overall, 5.1% of all respondents were HIV positive. Nearly one-third (30.8%) of respondents had previously been pregnant. Approximately one quarter (25.8%) of respondents who were sexually active had at least one sexual partner that was 5 or more years older than them. Few (6.8%) sexually active respondents had engaged in transactional sex. More than a third (39.8%) of sexually active respondents indicated they had two or more lifetime sexual partners.

The relationship between school attendance and HIV status was not significant for the full or sexually active only sample (see Table 2). However, school attendance is associated with a number of sexual risk variables. Attending school is associated with reduced adjusted odds of having engaged in sexual activity (AOR: 0.58, 95% CI: 0.48–0.70, $p < 0.001$); early sexual debut (AOR: 0.62, 95% CI: 0.46–0.83, $p < 0.01$); engaging in transactional sex (AOR: 0.57, 95% CI: 0.37–0.90, $p < 0.05$); engaging in age disparate sex (AOR: 0.58, 95% CI: 0.45–0.75, $p < 0.001$); using condoms inconsistently in the previous 12 months (AOR: 0.48, 95% CI: 0.34–0.65, $p < 0.001$); having 2 or more sex partners in the previous

12 months (AOR: 0.72, 95% CI: 0.57–0.92, p < 0.05); and having ever been pregnant (AOR: 0.41, 95% CI: 0.32–0.52, p <0.001).

Adolescent girls in school and who had attended CSE in the previous 12 months were associated with reduced adjusted odds of being HIV positive (Full sample: AOR: 0.76, 95% CI: 0.61–0.95, p < 0.05; sexually active sample: AOR: 0.62, 95% CI: 0.40–0.96, p < 0.05). Those in school who attended CSE in the previous 12 months were more likely to get tested for HIV (AOR: 1.48, 95% CI: 1.32–1.65, p <0.001) and confident of obtaining condoms (AOR: 1.52, 95% CI: 1.32–1.74, p <0.001).

Adolescent girls currently not in school, but who had attended CSE in the previous 12 months, had an increased adjusted odds of undergoing a HIV test (AOR: 1.72, 95% CI: 1.25–2.37, p < 0.01) and were confident they could obtain condoms (AOR: 2.17, 95% CI: 1.57–3.00, p <0.001).

Discussion

This study shows a negative association between select biological and sexual behaviour indicators and schooling and exposure to CSE amongst adolescent girls 12–18 years across four DREAMS districts in South Africa. Adolescent girls in school were less likely to be engaging in sexual activity, whilst for those that had, were less likely to have started prior to the age of 15. Adolescent girls in school were also less likely to have been pregnant. Attending school, independent of additional exposure to CSE, was associated with the adoption of less risky sexual behaviour, specifically lower rates of transactional and age-disparate sex, inconsistent condom use and engagement in multiple partnerships. These results affirm several studies which have found a positive correlation between school attendance and increased educational attainment and lower HIV incidence in South Africa[8–13,17,20]. Identifying the precise causal effect remains challenging,[14] with some studies suggesting that adolescent acquire sexual health guidance, regardless of dedicated curricula covering the subject [16,21], with attending school potentially disrupting sexual networks [22].

This study did measure exposure to dedicated CSE curricula, however for adolescent girls still in school, this did not further amplify the effect on risky sexual behaviour, despite lower HIV prevalence rates within this cohort. Importantly, adolescent girls were no more likely to engage in risky sexual behaviour, countering concerns from teachers, parents and religious groups within the South African context, that exposure to sexuality education will accelerate adolescent interest in engaging in sex [23].

Results further indicate that adolescent girls displayed increased self-efficacy with respect to accessing condoms and HIV testing. However, having access to condoms has not translated into condom use in this, and other studies [8]. Whilst this study was not able to determine the causal link between reduced risky sexual behaviour and lower HIV prevalence rates, findings echo research in a similar context amongst youth, establishing that access to HIV testing was associated with lower rates of HIV prevalence [7,9–12,24]. Encouragingly,

the positive association between exposure to CSE and HIV testing rates were retained in out-of-school adolescent girls.

Evaluations of the effectiveness of CSE have to date revealed mixed results. Whilst for many adolescents, schools have become a primary site for learning about sex and HIV and AIDS [9], the translation of this knowledge into improved prevention behaviour has been somewhat inconclusive [10,11,24]. This could be as a result of the non-standardised delivery of CSE and the variable access to resources across schools [12]. The development and implementation of SLPs, as part of the DREAMS initiative, is expected to address some of these challenges.

Further research should account for the effect of CSE dosage on key biomedical and behavioural indicators. Sexuality education has formed part of the South African curriculum since 2000. Challenges in the delivery of CSE has been noted [12], however no research has managed to determine the effect of the provision of quality and compounded CSE teachings on adolescents. Adolescents, if retained within the schooling system, should be exposed to age-appropriate CSE lessons for eight years, beginning in grade 4 (approximately from age 10). The effect of this exposure is likely to differ based on a number of factors, including the skill of the educator, the pedagogy employed, and the attendance and attentiveness of adolescents during those lessons.

CSE within the schooling system should work in tandem with adolescent access to sexual and reproductive health services. Access to contraception and HIV and STI testing remains critical. Whilst schools are expected to have a referral process [6], the DBE HIV, STI and TB policy makes provision for schools to make condoms available, implementation could potentially reduce risky sexual behaviour, as has been found in a systematic review assessing the effects of condom availability in schools [25].

Limitations

Analysis for this paper has focused on adolescent girls' exposure to CSE in isolation to the potential positive impact other DREAMS interventions have had on the biological and behavioural indicators measured. Furthermore, the data used are cross-sectional and therefore causality is difficult to ascertain as young women may have been infected or fallen pregnant prior to attending CSE. Many of the study variables are self-reported and susceptible to socially desirable response sets. Future studies would benefit from using longitudinal data to assess the impact of prolonged exposure to CSE on risky sexual behaviour.

The ability to determine the fidelity of CSE implementation in schools is beyond the scope of this study. The quality of CSE lessons is likely to be differential across schools, districts and provinces, with other studies unearthing implementation challenges [26]. The fidelity of CSE implementation is likely to play an important role in preventing risky behaviour and linking adolescent girls to appropriate services and should be measured in future studies.

Conclusion

This is the first community-based study measuring the association between schooling and exposure to CSE and key biological and behavioural indicators amongst adolescent girls. This study has revealed positive evidence affirming that schooling and CSE are associated with a lower likelihood of HIV acquisition. Keeping adolescent girls in school is therefore paramount, whilst continued exposure to quality CSE is key increase health service utilisation, ensuring a further reduction in HIV risk and improved sexual and reproductive health management.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

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Table 1:

Description of DREAMS study sample (adolescent girls 12–18 years, n=9673)

Sample characteristics		n	%/Median
Household and Caregiver details			
Province	Gauteng	5010	58.5
	KZN	4663	41.5
Total family income per month (USD)[§]	= < $76	1544	16.7
	$76.1-$376	5538	59.5
	= > $376.1	1471	15.0
	Don't know	576	6.6
	Refused	210	2.2
Caregiver HIV status	caregiver HIV-/indeterminate/refuse	5063	52.8
	HIV +	824	8.0
	Data missing	3786	39.2
Adolescent girls' details			
Median age years (IQR)		9673	15 (13–17)
Currently in school	No	1010	10.6
	Yes	8663	89.4
Attended CSE in previous 12 mo.	No	3888	40.1
	Yes	5784	59.9
Attended CSE & currently in school	No	4266	44.0
	Yes	5406	56.0
Orphan status	Not an orphan	5928	61.3
	Single orphan	2728	27.9
	Double orphan	794	8.1
	Data missing	223	2.7
Ever been pregnant	No	1247	69.2
	Yes	582	30.8
Any sex part. 5 or more years older	No	1389	74.2
	Yes	476	25.8
Engaged in transactional sex	No	1733	93.2
	Yes	132	6.8
Number of lifetime sex partners	0–1 partner	1142	60.9
	2+ partners	723	39.1
HIV status	Negative	9156	94.9
	Positive	498	5.1

Notes

[§]1 United States Dollar equals 13.3 South African Rands (average for 2018).

Table 2:

Multiple logistic regression assessing the relationship between school attendance, CSE attendance and HIV status, sexual risk, pregnancy and access to services for adolescent girls 12–18 years old

	In schools vs. out of school	Out of school attended CSE vs. Out of School no CSE	In school and attended CSE vs. in school and no CSE
HIV positive vs. HIV negative	0.85 (0.63–1.14)	0.85 (0.51–1.42)	**0.76* (0.61–0.95)**
HIV positive vs. HIV negative (sexually active)	0.87(0.57–1.31)	0.97(0.52–1.82)	**0.62* (0.40–0.96)**
Had sex vs. did not have sex	**0.58*** (0.48–0.70)**	0.87(0.64–1.17)	1.06 (0.91–1.23)
Early sex debut (=< 15 years old) vs older sex debut (16–18 years old)	**0.62** (0.46–0.83)**	0.78 (0.49–1.25)	0.74 (0.54–1.00)
Engage in transactional sex vs. not engage in transactional sex	**0.57* (0.37–0.92)**	0.97 (0.47–2.01)	0.98 (0.59–1.62)
did engage in age disparate sex vs. did not engage in age disparate sex vs.	**0.58*** (0.45–0.76)**	0.65 (0.42–1.00)	0.82 (0.62–1.08)
inconsistent condom use vs. consistent condom use	**0.48*** (0.35–0.65)**	0.59 (0.35–0.99)	0.80 (0.61–1.05)
2 or more sex partners in the previous year vs. 0–1 sex partner in previous year	**0.72* (0.57–0.92)**	1.02 (0.69–1.51)	0.86 (0.66–1.13)
was/is pregnant vs. never been pregnant	**0.41*** (0.32–0.52)**	0.72 (0.48–1.08)	1.14 (0.84–1.54)
HIV tested vs not tested	0.84 (0.70–1.01)	**1.72** (1.25–2.37)**	**1.48*** (1.32–1.65)**
Sure about obtaining condoms vs unsure about obtaining condoms	0.85 (0.71–1.02)	**2.17*** (1.57–3.00)**	**1.52*** (1.32–1.74)**

Notes

*
p < 0.05

**
p <0.01

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p <0.001. AOR = adjusted odds ratios, 95% CI = 95% confidence interval for the AOR. All analysis was weighted. Dependent variables were coded in the following way: HIV status (0 =HIV negative, 1= HIV positive), Had sex (0 = did not have sex, 1 = have had sex), sexual debut (0 = older sex debut [16–18 years old], 1 = Early sex debut [=< 15 years old]), transactional sex (0 = did not experience transactional sex, 1 = experienced transactional sex), age disparate sex (0 = did not engage in age disparate sex, 1 = did engage in age disparate sex), inconsistent condom use in the previous 12 months (0 = consistent condom use, 1 = inconsistent condom use), 2 or more sexual partners (0 = 0–1 sex partner in previous year, 1 = 2 or more sex partners in the previous year), pregnancy (0 =never been pregnant, 1 = was/is pregnant), HIV test (0 =no, 1 = yes), obtain condoms (0 = Unsure, 1= Sure). Control variables are included in all models and are the following, age, province, total household income, caregivers HIV status, orphan status, overall exposure to HIV prevention interventions (only for the school attendance model). Not all models have the same number of control variables due to over-fitting of models. See appendix for full models with all control variables included.