

## Methodology and Baseline Results from the Evaluation of a Sexuality Education Activity in Mpumalanga and KwaZulu-Natal, South Africa

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### **Abstract**

In South Africa, adolescents and young adults (ages 15–24) are at risk of HIV, sexually transmitted infections, and unintended pregnancies. Recently, the Department of Basic Education has revised its sexuality education content and teaching strategies (using scripted lessons plans) as part of its life orientation curriculum. This paper presents the methodology and baseline results from the evaluation of the scripted lesson plans and supporting activities. A rigorous cluster-level randomized design with random assignment of schools as clusters is used for the evaluation. Baseline results from grade eight female and male learners and grade 10 female learners demonstrate that learners are at risk of HIV and early and unintended pregnancies. Multivariable analyses demonstrate that household-level food insecurity and living with an HIV-positive person are associated with sexual experience and pregnancy experience. Implications are discussed for strengthening the current life orientation program for future scale-up by the government of South Africa.

**Key Words:** adolescents, school-based curriculum, HIV, pregnancy, sexually transmitted infections, South Africa

## INTRODUCTION

Adolescents and young adults (ages 15–24) in South Africa, especially females, are at high risk of HIV acquisition and other negative sexual and reproductive health outcomes. South Africa’s General Household Survey in 2016 found that 1.7 percent of 15-year-old females and 10.7 percent of 19-year-old females were pregnant during the 12 months preceding the time of the survey (Stats South Africa, 2017). The Demographic and Health Survey conducted in 2016 found that 16 percent of females ages 15–19 have had a live birth or were pregnant during the survey, with a steep increase from 4 percent among 15-year-old females to 28 percent among 19-year-old females (NDoH, Stats SA, SAMRC, et al., 2017). A 2012 national survey from South Africa demonstrated that HIV rates rise from 2.4 percent among girls ages 14 years and below, to 5.6 percent among adolescent girls ages 15–19 years, and then jumped sharply to 17.4 percent in young adult women ages 20–24 years (Shisana, et al., 2012). Among female learners in 14 high schools in KwaZulu-Natal (KZN) province, the prevalence of HIV and herpes simplex virus-2 (HSV-2) were 6.4 percent and 10.7 percent, respectively, and the prevalence of pregnancy was 3.6 percent (Abdool Karim et al., 2014). These high rates of HIV, HSV-2, and pregnancy among school-aged learners demonstrate the importance of undertaking school-based sexual and reproductive health education and services (Abdool Karim et al., 2014).

Gaining the knowledge and skills necessary to make healthy choices about sexual behavior as school-age adolescents transition to young adulthood is key to controlling the HIV/AIDS epidemic. Prior research on the effect of school-based sexuality and HIV education programs on young people demonstrates significant effects on self-reported knowledge, attitudes, and behaviors, such as sexual experience, condom use, and self-reported sexually transmitted infections (STIs) (Kirby and Laris, 2009; Kirby, Laris, Rolleri, 2007; Kirby, Obasi, Laris, 2006; Speizer, Magnani, Colvin, 2003; McQueston, Silverman, Glassman, 2013; Ross et al., 2007; McCoy, Kangwende, Padian, 2010; Laud, 2016; Lopez, Bernholc, Chen, Tolley, 2016). In South Africa, an evaluation of the Stepping Stones program, an intensive 50-hour sexual health education activity aimed at changing gender norms and HIV risk behaviors, found a 33 percent decrease in HSV-2 incidence among participants ages 16–23 years in the

intervention group compared to the control group (Jewkes et al., 2008). Apart from the Stepping Stones evaluation, the evidence of the effectiveness of school-based programs on HIV prevalence, STI prevalence, and/or pregnancy rates is lacking. A recent global systematic review of six school-based sexuality programs showed no significant impacts of the programs on HIV, HSV-2, Syphilis, and pregnancy as measured through blood or urine biomarkers (Mason-Jones, Sinclair, Mathews, Kagee, Hillman, Lombard, 2016).

#### South Africa's Sexuality Education Activity

Since 2000, South Africa's Department of Basic Education (DBE) has contributed towards HIV prevention efforts among in-school adolescents through its life orientation curriculum that sought to increase knowledge of HIV among school-going learners. Earlier reviews of the life orientation activity suggested that the curriculum improved knowledge and attitudes, and reduced or modified sexual behavior, but implementation by educators was not uniform, resulting in uneven coverage and uneven effects of the program (Department of Basic Education, 2010). DBE, with support from the United States Agency for International Development (USAID)/President's Emergency Plan for AIDS Relief (PEPFAR), assessed its curriculum against international standards and identified strengths and gaps for improvement toward behavior change and better health outcomes (Kirby, 2011). To address identified gaps, the DBE has invested in developing scripted lesson plans related to the sexuality educational content paired with supporting activities to improve uniformity and rigor in the curriculum's delivery. The new scripted lesson plans (SLPs) are integrated into the existing life orientation curriculum to strengthen the quality of sexuality education in schools. To support national scale-up of the new SLP, since 2015, USAID/PEPFAR has been providing technical support to DBE for activities in prioritized provinces and districts based on the greatest burden of people living with HIV. Support includes training life orientation educators on sexuality education and how to use the SLP, and strengthening basic education systems to implement, monitor, and evaluate the new sexuality and HIV prevention education activity through a whole-school approach. Recommendations from

initial rollout will be provided to DBE to inform broader scale-up. The initial phase of implementation and testing is being led by Education Development Center (EDC).

The main component of the new life skills activity is the sexuality and HIV education component targeted to school-based learners in grades 4–6, 7–9, and 10–12; at the launch of the program, material for grades 7–9 was initially prioritized. The newly designed SLPs were developed from an extensive review of existing life skills curricula and were enhanced with interactive pedagogies. The SLPs are delivered by life orientation educators trained by EDC. In addition to the SLPs, the program includes supportive activities including mobilization, engagement, and sensitization of parents; orientation of school management teams and school governing bodies to sexuality education; strengthening of existing peer education programs with a focus on sexual and reproductive health and gender-based violence; and strengthening of linkages and referrals to health and social services for vulnerable learners. The SLPs are embedded into the existing South Africa Life Orientation curriculum. Eight lessons on sexuality and HIV education are undertaken in grade seven, eight lessons in grade eight, and then 11 relevant lessons are provided for grade nine learners. Many of the sexuality and HIV education lessons fall within the first two quarters of the school year as dictated by the Life Orientation curriculum.

Before scaling up nationwide, DBE requested that the sexuality education activity through the SLPs and the other supporting activities be evaluated for the impact on sexual risk behaviors, STIs (i.e., HSV-2), and pregnancy. The evaluation aims to provide DBE, PEPFAR South Africa, and USAID/Southern Africa with evidence of the effectiveness of the South Africa School-Based Sexuality Education and HIV Prevention Activity by estimating the impact of the SLP and supporting activities on the incidence of HSV-2 and pregnancy prevalence among girls in secondary schools in two provinces of South Africa. The two provinces selected for the evaluation, KwaZulu-Natal and Mpumalanga, were chosen because they have the highest HIV prevalence in the country and are priority areas for USAID. The primary outcome of interest is the effect of the program on HSV-2 incidence or prevalence of pregnancy

among a cohort of female learners in grade eight in 2016 who are being followed for two years. HSV-2 was included as the primary outcome for a number of reasons. First, the prevalence of HSV-2 is expected to be higher than HIV among young people in South Africa (Abdool Karim et al., 2014). Second, for this study, if HIV testing had been performed the study team would have been required to undertake counseling and testing; there was a concern that this would bias the effect of the school-based intervention that was being examined. Finally, HSV-2 can be assessed with dried blood spots that are easier to collect and store than the approaches used to test other sexually transmitted infections. In addition to the primary outcome, this evaluation examines the effects of the program on knowledge, attitudes, school retention, self-reported risk behavior, and HIV testing. The evaluation will add to the body of knowledge on effective in-school programs on sexuality education, which is currently scanty. Evidence-based programming is particularly relevant now, as the DBE implements its new *National Policy on HIV, STIs and TB for All Learners, Educators, School Support Staff and Officials in South African Schools* (Kish, 1965).

Here, we describe the methodology for the impact evaluation of the South African school-based sexuality education activity and present results from the baseline data collection completed between August and October 2016. These results demonstrate that school-based learners in the study provinces have sexuality risk prevention needs that can and should be addressed by the SLPs and supporting activities.

## **METHODOLOGY**

The evaluation employs a two-arm, cluster-randomized design, where a secondary school is a cluster and a learner is the unit of observation/analysis. Schools were sampled from five education districts in two provinces of South Africa—Bohlabela and Gert Sibande districts in Mpumalanga province, and King Cetshwayo, Pinetown and Umlazi districts in KwaZulu-Natal province. The schools eligible for selection were based in the above target districts, included grades 8–10, and were secondary schools that served lower-income communities (i.e., non-fee paying schools). Prior to selection, all schools

that met these selection criteria were reviewed by the provincial Department of Education to determine if there were any reasons to eliminate any of the eligible schools (e.g., other interventions in the schools). Schools in the final sampling frame were stratified by district prior to selection. In total, we randomly selected 115 schools (58 intervention and 57 control schools) to include in the study. In the intervention arm, life orientation educators were trained to provide sexuality and HIV prevention education using the SLPs and additional activities, while in the control arm the existing life skills curriculum was continued. Within selected study schools, all grade eight female and male learners were eligible for baseline interview, as were grade 10 female learners, if they received parental consent. Learners under age 18 were asked to take consent forms home for parent/guardians to consent; thereafter, learner assent was obtained from all learners with parental/guardian consent. Any learner who was age 18 or older was able to provide consent without parental involvement.

The impact of the new activity will be estimated using study measurements collected in the third term of the 2016, 2017, and 2018 school calendars among a longitudinal sample of female learners in intervention and control schools who were enrolled in grade eight in 2016 and will be followed through 2018 (whether in school or out of school). Data are also being obtained from cross-sectional samples of intervention and control school learners (girls and boys) in grade eight in 2016, grade nine in 2017, and grade 10 in 2018; these data will be compared at each time point to determine if there are differences by study arm. At the end of 2018, we will also compare self-reported outcomes (self-efficacy, knowledge, attitudes, and behaviors) of the cross-section of grade 10 female learners who were in intervention and control schools in 2018 to the cross-section of grade 10 female learners interviewed in intervention and control schools in 2016.

The goal of the sample size calculation was to power the statistical analysis on the primary outcome, i.e., the incidence of HSV-2 or the prevalence of pregnancy among the cohort of grade eight female learners. The sampling plan was designed to recruit 2,500 female learners in grade eight in each of the two arms (5,000 female learners in total) from 115 schools.

We made four assumptions and specifications of sampling parameters to calculate the sample size. First, we specified the minimum detectable change in the primary outcomes based on the assumed incidence rate of HSV-2 or pregnancy of 0.04 in the intervention arm versus 0.08 in the control arm over two school years at the significance level ( $\alpha$ ) of 0.05 (two-sided). Next, we adjusted the sample size for the following: (1) design effect, to account for elevated standard errors in a cluster sample design; (2) baseline prevalence of the primary outcome, to account for loss of units available to estimate the incidence rate;<sup>1</sup> and (3) nonresponse of schools and female learners. The design effect from clustering is approximated as  $1+ICC \times (M-1)$ , where ICC is intraclass correlation and  $M$  is the average cluster size (19). We assumed an ICC of 0.03 and an average of 50 female learners per school, implying a design effect of 2.47. Next, we assumed the prevalence at 1 percent of HSV-2 and 0 percent of pregnancy at baseline. Finally, we accounted for potential nonresponse in schools (15 out of 115 schools) and assumed a response rate of 70 percent for grade eight female learners at baseline. With a total sample size in both arms together of 3,500 female learners successfully interviewed at baseline, we estimated a statistical power ( $1-\beta$ ) of 88 percent.

Larger schools contributed more participants and smaller schools fewer. Data were analyzed, using Stata statistical software version 14, by applying sampling weights to account for the sampling design and nonresponse. All analyses adjust for clustering at the school level.

Baseline data were collected in the third term in the 2016 school year (August–October).<sup>2</sup> Baseline data collection involved collecting dried blood spots (DBS) by trained nurses and audio assisted self-administered survey data from the cohort of grade eight female learners as well as survey data (only) from grade eight male learners and grade 10 female learners. DBS samples were dried for four hours and transported within a week of collection for storage. DBS from baseline are being stored at -80 degrees Celsius until 2018. DBS will also be collected from the cohort at endline in 2018. Any girl who

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<sup>1</sup> The HSV-2 status at baseline will be assessed for those with positive biomarker test results at endline. Those who contracted HSV-2 prior to study enrollment will be excluded from data analysis at endline.

<sup>2</sup> In some intervention schools, the SLP were rolled out prior to baseline data collection in grade eight, whereas in other intervention schools, learners may not have received the SLP curriculum in the grade eight school year because teachers were trained after the allotted time in the school year to deliver the lessons. As part of the analysis, we will control for whether the school was “exposed” in the 2016 school year.



tests positive for HSV-2 in 2018 will have her DBS from baseline (2016) analyzed to determine if she has an incident HSV-2 infection (i.e., since 2016) or was already positive for HSV-2 prior to the program launch. At the time of baseline data collection, all grade eight girls who provided DBS were asked 10 questions to screen for common symptoms of an STI. Those who reported any symptoms of an STI were referred to a health center; referral letters were provided as a supplementary document in a sealed envelope given to all grade eight girls to thank them for their participation. Midline data collection was conducted in 2017 (August–September), and endline data will be collected in 2018.

The analysis below presents baseline HIV-related attitudes and behaviors of the learners surveyed in 2016. Demographics are provided for the full sample by sex, grade, and province. For the more detailed analyses of behaviors, the sample was reduced to a subsample of learners whose age was no more than two years over the typical age for grade (i.e.,  $\leq 16$  years old for grade eight girls and boys;  $\leq 18$  years old for grade 10 girls). This restriction was made since all grades included learners up to age 25. Thus, to avoid biasing the results with the older learners who are likely to have different behaviors than most of the learners in the grade group, learners outside of the typical or normal age range were dropped. This reduced the sample size by dropping 72 grade eight boys, 59 grade eight girls, and 142 grade 10 girls who were older than their grade peers.<sup>3</sup> In the baseline report, tabulations are presented for all learners surveyed (i.e., including these older youth); the baseline report also includes detailed information on learner's knowledge, attitudes, self-efficacy, and behaviors not included in this paper (Anonymous, 2017). Finally, for the questions about pregnancy experience and perceived chance of getting pregnant, the sample size for this analysis is further reduced, since the sex of some learners was misreported and these learners did not answer the appropriate pregnancy/contraception questions for their sex. All tables show the unweighted number of observations to help provide clarity on when the sample size is reduced due to age group restrictions, missing data, or the sex correction.

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<sup>3</sup> For the impact evaluation that will include the panel data, all female learners will be included to permit an assessment of how the program affected the full cohort of grade eight learners in 2016 and not just those representing the typical age for grade.

The study protocol including consent forms and questionnaires was approved by the home institution's Institutional Review Board. In addition, the same protocol was approved by an Ethics Committee in South Africa. The study was registered on the South African National Health Research Database.

## RESULTS

We completed data collection in 106 (92.2 %) of the 115 selected schools: 55 of 58 intervention schools and 51 of 57 control schools. Two schools were determined to be ineligible after selection because they no longer included grades eight through 10. The reasons for nonresponse among the remaining selected schools were refusal (n=4) and inaccessibility owing to security concerns (n=3). Overall, among grade eight female learners, a total of 3,606 learners were surveyed across the provinces. Nonresponse was largely a consequence of lack of parental consent due to limited time for data collection. Any bias from lower participation than expected is likely related to those who were able to get parental consent quickly and those who were not able (or didn't want) to get parental consent. In the descriptive tables presented below, we do not show distinctions by intervention and control group; however, the baseline report and multivariable analyses demonstrate that randomization was effective such that there are no differences between the two groups (Anonymous, 2017). Learner-level response rates were calculated based on the lists of the number of learners by grade provided by the schools.<sup>4</sup> In both provinces, response rates for intervention and control schools were higher for the grade eight girls (range: 67%-77.6%), our primary target group, than the grade 10 girls (range: 57.2-62.8%) and the grade eight boys (range; 43.2%-66.1%). For grade eight learners, response rates were slightly higher in Mpumalanga than in KZN; however, this pattern was reversed for the grade 10 learners.

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<sup>4</sup> In three schools, we were unable to receive the number of learners; the response rates presented do not account for these three schools.

## Demographics

Table 1 presents the demographic characteristics of the full sample of learners included in the study by grade, sex, and province. Of note, learners had a wide age range: girls and boys were 11–25 years old, with a mean age of 13.6 years for grade eight girls, 14.3 years for grade eight boys, and 16 years for grade 10 girls.<sup>5</sup> Among all learners, the mother was most frequently reported as the primary caregiver. Among boys the next most frequently reported primary caregiver was the father, followed by a grandparent; among girls it was the grandparent, followed by the father. Around 40 percent of the sample were either single or double orphans. Grade 10 girls from KZN were the most likely to be single or double orphans. Among girls in both grade eight and grade 10, a significantly greater percentage of learners from KZN than Mpumalanga were single or double orphans. Overall, about a third of the sample were single orphans and about 10 percent were double orphans. This has implications for interventions targeting young people in schools, as well as for surveys such as this one that require parental or guardian consent.

All learners were asked for the number of days, of the last three days, with no food in the home; this was used as a measure of food insecurity and a proxy for socioeconomic status. Response options ranged from zero to three. One-quarter to one-third of the learners from both provinces and all grades reported any days without food, indicating that there was high food insecurity among the target population. There was significantly higher food insecurity among KZN learners compared to the Mpumalanga learners.

Table 1 also presents the learners' reported religion and religiosity. In Mpumalanga, more than three quarters of the learners were Christian and from 8 percent (grade 10) to 16 percent (grade eight boys) reported having a traditional religion. In KZN, about one-third of learners reported having a traditional religion and slightly more than half reported being Christian. Differences across the provinces were significant. Further, we saw that in all grade/province groups, more than half of the learners reported

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<sup>5</sup> The 148 learners with missing age information were recoded to the mean age for their grade and sex.

**Table 1. Demographic characteristics of learners included in the baseline survey, SAIE, 2016**

	Grade 8 Boys		Grade 8 Girls		Grade 10 Girls	
	KwaZulu-Natal (n=1,435) <sup>a</sup>	Mpumalanga (n=1,353) <sup>a</sup>	KwaZulu-Natal (n=1,988) <sup>a</sup>	Mpumalanga (n=1,618) <sup>a</sup>	KwaZulu-Natal (n=2,008) <sup>a</sup>	Mpumalanga (n=1,731) <sup>a</sup>
Mean age (range)	14.24 (11–25)	14.32 (11–25)	13.57 (11–25)	13.57 (11–25)	16.05 (11–25)	15.94 (11–25)
Primary caregiver (%)						
Mother	69.0	67.9	73.9	74.3	71.0	73.2
Father	12.5	12.7	5.3	6.4	7.3	5.6
Older sibling	3.6	3.9	3.5	3.7	3.9	3.8
Aunt and/or Uncle	2.6	2.9	3.5	2.4	4.1	3.3
Grandparent	10.9	10.0	12.0	11.5	11.3	12.3
Cousin	0.3	0.5	1.0	0.7	1.0	0.6
Other adult	0.8	1.0	0.5	0.5	1.1	0.8
Other child	0.1	0.6	0.1	0.1	0.2	0.2
Respondent	0.3	0.4	0.1	0.4	0.2	0.2
Orphanhood <sup>b</sup> (%)						
Not an orphan	54.6	59.6	55.9	61.5	50.0	59.6
Single orphan	33.7	29.7	31.2	28.8	35.4	29.8
Double orphan	11.7	10.7	12.9	9.7*	14.7	10.7***
Food insecurity (number of days in the last three days household went without food) (%)						
No days	64.6	69.6	68.1	75.7	64.9	76.5
Any days	35.4	30.4*	31.9	24.3**	35.1	23.5***
Religion (%)						
Christian	56.5	75.2	57.6	80.2	58.6	88.7
Traditional	30.5	16.1	28.9	13.2	31.5	8.1
Other <sup>c</sup>	12.9	8.7***	13.5	6.7***	9.9	3.2***
Religiosity (frequency attend religious services) (%)						
Usually 1 time/week	57.2	59.8	56.4	54.7	54.0	56.4
Usually 1–2 times/month	12.1	13.0	15.0	14.0	14.5	13.6
Usually a few times/year	13.0	15.7	13.6	17.8	16.4	20.1
Seldom	6.0	2.8	6.0	3.9	6.0	2.1
Never	11.7	8.8**	9.0	9.7*	9.2	7.8***
Anyone in household HIV positive? (%)						
Yes	10.3	8.3	15.4	11.2	21.4	12.9
No	66.7	66.8	58.4	59.4	54.8	63.4
Don't know	23.0	24.9	26.3	29.4*	23.8	23.7***

<sup>a</sup> Unweighted number of observations presented; weighted percentages presented. Some n's may be smaller than the total due to a small amount of missing observations.

<sup>b</sup> Child defined as orphan if s/he reported parent was not alive or did not know whether parent was alive.

<sup>c</sup> Other religion includes Jewish, Muslim, Hindu, and Ba'h'ai. \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001 from F-test of significance in distributions between provinces.

attending religious services at least once a week. For the multivariate analyses that follow, we included religiosity in the model as a representation of involvement in the religious community.

Finally, Table 1 shows whether anyone in the learner's household was HIV positive. About two-thirds of learners reported no one with HIV, another quarter reported that they did not know if someone was HIV positive, and the smallest percentage reported that they lived with someone HIV positive (varied from 8% to 21%). The percentage of learners reporting living with someone HIV positive were generally higher in KZN than in Mpumalanga; these differences were significant for the female learners.

In the tables that follow, the focus is on those learners who were no more than two years older than the typical age for grade. Table 2 present the learners' perceived chances of ever getting HIV in the learners' lifetime and the perceived chances of getting pregnant while in high school. Overall, about 55 percent to 65 percent of learners felt that they had no chance of getting HIV. That said, about a third reported that they had some chance and a tenth felt that they had a high chance. Among the grade eight girls and boys, learners from Mpumalanga were more likely to perceive any chance of getting HIV compared to learners from KZN. In terms of perceived chances of getting pregnant while in high school (or for boys getting a partner pregnant), about 50 percent of boys perceived no chance and another quarter reported some chance or a high chance. Among female learners, about a quarter reported a high chance of pregnancy and about 15 percent reported some chance in both provinces. Grade eight girls from Mpumalanga were significantly more likely to perceive a high chance of getting pregnant while in high school compared to their peers from KZN.

Also presented in Table 2 is the percentage of learners who reported ever having been tested for HIV. About half of grade eight boys (both provinces) and grade 10 girls (both provinces) had ever been tested for HIV. Among grade eight girls, the percentage who had ever been tested was lower and was the lowest among those from Mpumalanga.

**Table 2. Learners' perceived chances of getting HIV and becoming/getting someone pregnant, use of HIV testing services, and sexual experience, among learners no more than 2 years older than the typical age for grade, SAIE, 2016**

	Grade 8 Boys		Grade 8 Girls		Grade 10 Girls	
	KwaZulu-Natal	Mpumalanga	KwaZulu-Natal	Mpumalanga	KwaZulu-Natal	Mpumalanga
Chance that you will get HIV in your lifetime? (%)	(n=1,324)	(n=1,286)	(n=1,847)	(n=1,550)	(n=1,889)	(n=1,648)
No chance	61.1	55.0	64.9	58.3	60.8	57.8
Some chance	27.5	30.5	21.4	28.6	30.7	28.4
A high chance	11.5	14.5*	13.7	13.1**	8.5	13.8
Chance that you will fall pregnant (or get someone pregnant) before you finish school (%)	(n=973)	(n=1,186)	(n=1,371)	(n=1,399)	(n=1,474)	(n=1,555)
No chance	53.0	50.6	62.7	55.2	61.7	57.6
Some chance	26.1	24.9	15.7	15.0	17.0	15.8
A high chance	21.0	24.5	21.6	29.8**	21.3	26.6
Ever tested for HIV? (%)	(n=1,295)	(n=1,280)	(n=1,824)	(n=1,548)	(n=1,870)	(n=1,651)
No	47.2	50.2	58.2	65.1	44.9	50.7
Yes	52.8	49.8	41.9	34.9*	55.1	49.3
Ever had sex? (%)	(n=1,355)	(n=1,301)	(n=1,892)	(n=1,571)	(n=1,902)	(n=1,664)
No	77.0	80.9	90.2	90.7	76.0	68.6
Yes	23.0	19.1	9.8	9.3	24.0	31.5*
Ever pregnant (or partner pregnant) (including current pregnancy) (%)	(n=1,062)	(n=1,242)	(n=1,484)	(n=1,443)	(n=1,526)	(n=1,601)
No	96.6	95.2	96.5	97.6	93.0	93.7
Yes	3.4	4.8	3.5	2.4	7.0	6.3
<b>Among those who ever had sex</b>						
Used a condom at last sex? <sup>a</sup> (% yes)	(n=226)	(n=219)	(n=109)	(n=120)	(n=383)	(n=474)
	73.9	77.5	64.5	78.2**	60.6	72.6***
Used a condom every time in past 3 months? <sup>b</sup> (%)	(n=191)	(n=191)	(n=85)	(n=95)	(n=334)	(n=423)
Yes	63.1	72.3	52.5	71.2	54.1	66.2
No	28.4	19.4	29.3	14.9	41.3	29.2
Don't know	8.5	8.3	18.2	13.9	4.6	4.6
Ever pregnant (or partner pregnant) (including current pregnancy) (%)	(n=228)	(n=247)	(n=131)	(n=131)	(n=355)	(n=524)
No	83.9	73.8	62.6	71.6	69.4	79.8
Yes	16.1	26.2*	37.4	28.4	30.6	20.2**

Note, all n's are unweighted, and percentages are weighted. \*p<0.05; \*\*p<0.01; \*\*\*p<0.001 from F-test showing significant differences in distributions between provinces. <sup>a</sup> Only asked of those who had had sex in the last year; <sup>b</sup> Only asked of those who had had sex in the last 3 months.

Table 2 presents the sexual experience and pregnancy experience of the learners. The grade eight girls were the least likely to have ever had sex (about 9%–10%). The grade eight boys were higher at about 20 percent who had ever had sex. The grade 10 girls were the most sexually experienced. A significantly higher proportion of grade 10 girls had ever had sex in Mpumalanga (32%) than in KZN (24%). Among the grade 10 learners surveyed, 7.0 percent in KZN and 6.3 percent in Mpumalanga reported that they had ever been pregnant, including a current pregnancy. Grade eight male learners follow, with 4.8 percent in Mpumalanga and 3.4 percent in KZN reporting that they ever got a partner pregnant. In KZN, 3.5 percent of female grade eight learners and 2.4 percent in Mpumalanga reported pregnancy experience.

At the bottom of Table 2, we present condom use and pregnancy experience among those learners who reported to have ever had sex. Condom use at last sex was reported by about two-thirds of the female learners and three-quarters of the male learners. A lower percentage (65% among male learners and about 58% among female learners) reported consistent condom use in the past three months. Of note, the sample sizes were small among the learners reporting about last and recent sex, particularly among the female grade eight learners.

Finally, Table 2 shows that among the sexually experienced learners, 37 percent of the female grade eight learners from KZN and 28 percent from Mpumalanga had ever been pregnant or were currently pregnant. Among grade 10 learners the percentages were lower at 31 percent and 20 percent, respectively. Among grade 8 male learners, 16 percent in KZN and 26 percent in Mpumalanga reported having ever gotten a partner pregnant. Notably, while the percentages were lower for grade 10 girls compared to grade 8 girls, the actual number of grade 10 pregnancies represented more pregnancies, since a greater number of grade 10 learners were sexually experienced.

#### Factors Associated with Ever Having Sex

Table 3 presents the multivariable logistic regression odds ratios and 95 percent confidence intervals for the analysis of factors associated with ever having sex among learners no more than two years

**Table 3. Multivariable logistic regression odds ratios (95% confidence intervals) of sociodemographic factors associated with ever having had sex and ever being pregnant among learners no more than 2 years older than the typical age for grade, SAIE, 2016**

Respondent's Characteristics	Ever had sex			Ever pregnant
	Grade 8 Boys	Grade 8 Girls	Grade 10 Girls	All learners
Age	1.36 (1.21–1.53)***	1.58 (1.39–1.840)***	1.32 (1.17–1.49)***	1.57 (1.35–1.83)***
Province				
Mpumalanga (ref)	1.0	1.0	1.0	1.0
KwaZulu-Natal	1.30 (1.02–1.66)*	1.01 (0.66–1.53)	0.60 (0.45–0.80)***	0.93 (0.65–1.32)
Study group				
Intervention	0.95 (0.75–1.21)	0.70 (0.42–1.18)	1.00 (0.71–1.39)	0.79 (0.55–1.16)
Control (ref)	1.0	1.0	1.0	1.0
Orphanhood status				
Not an orphan (ref)	1.0	1.0	1.0	1.0
Single orphan	0.81 (0.64–1.03)	0.86 (0.67–1.11)	1.08 (0.89–1.32)	1.04 (0.75–1.45)
Double orphan	0.90 (0.64–1.28)	0.81 (0.52–1.24)	1.21 (0.90–1.63)	1.11 (0.80–1.55)
Food insecurity				
No days without food (ref)	1.0	1.0	1.0	1.0
Any of last 3 days without food	1.61 (1.30–2.00)***	1.65 (1.29–2.12)***	1.31 (1.09–1.56)**	1.79 (1.30–2.45)***
Religiosity				
Usually 1 time/week	1.07 (0.75–1.53)	0.70 (0.47–1.05)	0.68 (0.47–0.97)*	0.70 (0.48–1.01)+
Usually 1–2 times/month	0.77 (0.42–1.43)	0.87 (0.58–1.32)	0.63 (0.44–0.89)**	0.78 (0.53–1.15)
Usually a few times/year	0.82 (0.52–1.28)	1.13 (0.74–1.74)	0.69 (0.47–1.01)	0.66 (0.42–1.03)+
Seldom	1.24 (0.59–2.58)	1.35 (0.52–3.50)	0.59 (0.33–1.04)	0.47 (0.21–1.03)+
Never (ref)	1.0	1.0	1.0	1.0
Anyone in household who is HIV positive				
Yes	1.32 (0.85–2.06)	1.45 (0.92–2.28)	1.84 (1.51–2.48)***	1.78 (1.33–2.38)***
No (ref)	1.0	1.0	1.0	1.0
Don't know	1.04 (0.81–1.34)	1.03 (0.76–1.40)	1.01 (0.79–1.28)	1.03 (0.77–1.39)
Grade/gender group				
Male grade 8 (ref)	NA	NA	NA	1.0
Female grade 8				1.16 (0.77–1.75)
Female grade 10				0.85 (0.53–1.36)
Unweighted number of observations	2,590	3,399	3,513	8,195

\*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001. MV models use weights and adjust for clustering by school. NA – not applicable



older than the typical age for grade by grade and sex group. Among the grade eight male learners, those who were older, those from KZN, and those who had any food insecurity in the last three days were significantly more likely to have ever had sex compared to their peers who were younger, from Mpumalanga, or had no food insecurity. Among the female learners in grade eight, similar results were found with respect to age, food insecurity, and sexual experience. For the grade 10 female learners, we found age, being from KZN, and food insecurity associated with sexual experience. In addition, among the grade 10 learners, those who had someone who was HIV positive in the household were more likely to be sexually experienced compared to those who did not have someone HIV positive in the household. Further, those grade 10 learners who were more religious (e.g., attended place of worship once a week or one to two times a month) were less likely to be sexually experienced than those who never attend a place of worship. No difference was found in any of the strata in sexual experience by orphanhood; this was the case, even when we removed the food insecurity variable that was correlated with orphanhood. There was no difference in sexual experience at baseline between the intervention and control groups.

#### Factors Associated with Pregnancy

The last column of Table 3 presents the multivariable logistic regression results for all grades and sexes together to examine factors associated with ever being pregnant or getting a partner pregnant. The sample size for this analysis does not include all learners since some were dropped because of miscoding on sex. The results demonstrate that among surveyed in-school learners, those who were older were more likely to have ever been pregnant (or gotten someone pregnant) than their younger peers. Further, those who had any food insecurity were significantly more likely to have ever been pregnant. In addition, those with an HIV-positive person in the household were also more likely to have ever been pregnant than those without an HIV-positive person in their household. Going to a place of worship was protective against a prior pregnancy compared to learners who never went to a place of worship. Notably, when the sample was reduced to only those learners who had ever had sex,

**Table 4. Multivariable logistic regression odds ratios (95% confidence intervals) of factors associated with ever being tested for HIV among learners no more than 2 years older than the typical age for grade, SAIE, 2016**

<b>Respondent's Characteristics</b>	<b>Grade 8 Boys</b>	<b>Grade 8 Girls</b>	<b>Grade 10 Girls</b>	<b>Grade 8 Boys and Girls</b>
Age	1.11 (1.04–1.18)**	1.10 (1.03–1.17)**	1.16 (1.09–1.23)***	1.10 (1.05–1.15)***
Province				
Mpumalanga (ref)	1.0	1.0	1.0	1.0
KwaZulu-Natal	1.16 (0.91–1.48)	1.32 (1.07–1.63)**	1.24 (0.99–1.55)	1.23 (1.03–1.47)*
Study group				
Intervention	1.06 (0.79–1.43)	1.22 (0.95–1.56)	0.98 (0.78–1.23)	1.13 (0.91–1.41)
Control (ref)	1.0	1.0	1.0	1.0
Orphanhood status				
Not an orphan (ref)	1.0	1.0	1.0	1.0
Single orphan	1.02 (0.88–1.19)	1.15 (0.96–1.37)	1.19 (1.02–1.39)*	1.08 (0.95–1.23)
Double orphan	0.85 (0.57–1.27)	1.17 (0.92–1.49)	1.31 (1.03–1.67)*	1.00 (0.78–1.28)
Food insecurity				
No days without food (ref)	1.0	1.0	1.0	1.0
Any of last 3 days without food	0.91 (0.72–1.14)	1.12 (0.93–1.35)	1.13 (0.96–1.32)	1.00 (0.86–1.17)
Religiosity				
Usually 1 time/week	1.17 (0.75–1.82)	0.80 (0.58–1.10)	0.96 (0.72–1.28)	0.99 (0.73–1.34)
Usually 1–2 times/month	1.36 (0.82–2.23)	0.94 (0.65–1.35)	1.18 (0.86–1.61)	1.15 (0.84–1.58)
Usually a few times/year	1.29 (0.87–1.91)	0.74 (0.49–1.11)	0.93 (0.68–1.260)	1.00 (0.77–1.30)
Seldom	0.94 (0.49–1.79)	0.73 (0.45–1.17)	0.83 (0.53–1.30)	0.83 (0.56–1.24)
Never (ref)	1.0	1.0	1.0	1.0
Anyone in HH who is HIV positive				
Yes	1.38 (0.96–1.97)	1.59 (1.24–2.05)***	1.44 (1.14–1.83)**	1.49 (1.24–1.80)***
No (ref)	1.0	1.0	1.0	1.0
Don't know	0.76 (0.61–0.95)*	0.86 (0.72–1.03)	0.91 (0.76–1.09)	0.81 (0.71–0.92)**
Ever had sex: No (ref)	1.0	1.0	1.0	1.0
Yes	1.41 (1.13–1.76)**	1.58 (1.20–2.07)***	1.72 (1.46–2.03)***	1.45 (1.20–1.74)***
Gender: Female (ref)				1.0
Male	NA	NA	NA	1.44 (1.21–1.72)***
Unweighted # of observations	2,495	3,289	3,459	5,784

\*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001.

the factors associated with pregnancy experience were the same, with similar odds ratios and significance levels, with the exception of religiosity, which was not significant (data not shown).

#### Factors Associated with HIV Testing

Table 4 presents the multivariable logistic regression analysis results to determine factors associated with ever being tested for HIV. Stratified analyses are presented by grade and sex group. In addition, the last model includes the grade eight female and male learners in a joint model to determine whether, after controlling for demographic factors, males were still more likely to have been tested than females. In this joint model, the odds ratio for males is 1.44 indicating that males were significantly more likely to have ever been tested than females ( $p < 0.001$ ). Consistent across all grade and sex groups is that older learners were more likely to have ever been tested than younger learners. In addition, those learners who had ever had sex were significantly more likely to have ever been tested than those who had never had sex. Across most of the groups, those learners who had an HIV-positive person in their household were also more likely to have ever been tested than those without an HIV-positive person in the household. Moreover, among male youth (and the joint female and male model), those who did not know if there was an HIV-positive person in their household were less likely to have ever been tested than those who reported that there was no HIV-positive person in their household. The other statistically significant result is that female grade eight learners who were from KZN were significantly more likely to have ever been tested than their counterparts from Mpumalanga. Finally, among the grade 10 female learners, those who were single or double orphans were significantly more likely to have ever been tested than those who were not orphans.

#### **DISCUSSION**

The evaluation of the South African revised sexuality education activity that uses scripted lesson plans and targeted activities in schools uses a rigorous study design with randomly assigned intervention and control schools, as well as biobehavioral outcomes (HSV-2 or pregnancy experience; and self-reported behaviors). This study presents baseline data collected from 106 schools and more than

10,000 learners across three groups—grade eight male learners, grade eight female learners, and grade 10 female learners. The grade eight female learners represent a cohort that will be followed for two years.

Baseline results demonstrate that these young learners were at risk of HIV and early and unintended pregnancies. About half of the sample perceived some risk of HIV and pregnancy (before leaving high school) and about half had ever tested for HIV. In addition, those who were sexually experienced were not consistently using condoms and more than one-fifth of the sexually experienced youth had ever been pregnant (or gotten a partner pregnant). This suggests that these young people have a need for guidance and support in relation to their sexual and reproductive health experiences.

Multivariable analyses demonstrate that young people who had household-level food insecurity<sup>6</sup> and those who lived in a household with an HIV-positive person were more sexually experienced and had greater pregnancy experience. In these analyses, household-level food insecurity is a proxy for socioeconomic status, which suggests that the poorer youth were more sexually experienced than learners of a higher socioeconomic status. It is also worth noting that sexual experience and having an HIV-positive person in the household were positively associated with having ever been tested for HIV, which was a positive outcome. Religiosity was protective against sexual experience (grade 10 girls) and pregnancy experience (all groups combined).

These baseline results are similar to earlier studies of in-school learners. In our sample of in-school learners, we found that about 6-7 percent of the grade 10 female learners, 3.4 percent to 4.8 percent of the grade eight male learners and 2.4 percent to 3.5 percent of the grade eight female learners had ever been pregnant including a current pregnancy (or gotten partner pregnant). In their study of grade nine and 10 learners in 14 KZN high schools, Abdool Karim and colleagues (2014) found that 3.6

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<sup>6</sup> The sample of schools that were selected were non-fee-paying schools and in these schools, learners are provided free daily school meals through the DBE National School Nutrition Programme.

percent of learners were ever pregnant. Further, an analysis of General Household Survey data from the years of 2013–2015 found that about 3.8 percent of grade 10 female learners in South Africa had been pregnant (Department of Basic Education, 2017). In addition, our results demonstrate that between 8 percent and 21 percent of learners lived with someone who was HIV positive in their household and another quarter reported that they did not know if someone was HIV positive. These findings are consistent with the 2012 South Africa Prevalence and Incidence Survey that found that 27.9 percent of 15–49-year-olds were HIV positive in KZN and the corresponding figure was 21.8 percent in Mpumalanga (Shisana et al., 2014).

These findings can be used by the South African Department of Basic Education, the provincial Departments of Education, and Education Development Center to identify gaps in the developed curriculum and perhaps target groups that need special focus. For example, one strength of the current program is that they are targeting the non-fee-paying schools as our study demonstrates that the most food insecure learners were engaged in the higher risk behaviors. Further, our data demonstrate that the program needs to be relevant to sexually active and sexually inactive learners, as well as ever pregnant and never pregnant girls, since a number of young people had already had sex or a pregnancy. Topics addressing the sexual and reproductive health needs of those learners who are or have been pregnant should be covered in the SLP and these learners should be linked to accessible, nonjudgmental sexual and reproductive health services and commodities.

Baseline data demonstrate that most of the learners surveyed reported that they had learned the most about sex, sexuality, and HIV at school from the Life Orientation educator (Anonymous, 2017). The support and buy-in of parents and the school leadership through the principal and the Senior Management Teams (SMT) are critical in the provision of comprehensive sexuality education in schools. While not elaborated in this study, previous studies on the provision of life orientation have highlighted this aspect (Boonstra, 2015), which should not be overlooked in programming.

This study and the evaluation are not without limitations. First and foremost, we were only able to survey about 70 percent of the cohort of grade eight female learners at baseline. This means that if there is significant loss to follow-up over the two-year follow-up period, we may be underpowered for the main outcomes of incidence of HSV-2 and pregnancy. In the absence of the power for incidence comparisons, the study will include all grade 10 girls at endline using biomarkers to compare prevalence of HSV-2 (and HIV) across intervention and control schools. In addition, the evaluation will compare all secondary outcomes across intervention and control sites among boys and girls at each time point. While the study is not specifically powered for these secondary outcomes, larger changes are expected in these outcomes and therefore the identified sample size should be sufficient to examine secondary outcomes among girls and boys. Future rounds of data collection will engage schools and parents earlier to increase enrollment into the cross-sectional and cohort samples. A second limitation is that for this baseline paper, we are relying on self-reported data on the outcomes of interest (e.g., sexual experience and pregnancy). Young people may under- (or over-) report these outcomes because of social desirability bias. Using the biomarkers at endline will permit a better assessment of the level of bias in the self-reported data. Third, this analysis only includes those learners who are in school and for whom we received parental consent. If those learners who did not receive parental consent are different in some way, we are unable to control for this difference. This is a limitation of this analysis. Fourth, for this baseline paper that uses the sample as a cross-sectional observation of learners in grade eight and female learners in grade 10, we can only discuss associations. Once the longitudinal cohort data are available, it will be possible to speak to causal factors associated with sexual risk-taking among in-school learners. Finally, while the later impact analysis will use an intention-to-treat approach such that learners in intervention schools will be considered exposed and those in control schools will not be exposed, this may not be as clean as intended. This is because educators are often moved around, sometimes after being trained for the program; thus, it is possible that a trained intervention educator could find herself at a control school and use the materials in that setting. To help address this concern, questions are included in the

midline (and endline) survey to assess self-reported exposure from the learner perspective; this will help to strengthen the overall impact analyses.

## **CONCLUSION**

The scripted lesson plans and supporting activities addressing the sexual and reproductive health content of the life orientation curriculum are due to be scaled up by the DBE from pilot sites to a national program as part of the implementation of the DBE National Policy on HIV, STIs, and tuberculosis. By contributing to the country's evidence base of effective HIV programming for youth, the results of this evaluation will help to ensure that young people in South Africa receive high-quality sexuality and HIV prevention education while in school. This evaluation will inform institutionalization of sexual and reproductive health education in the South African school system, thereby helping to ensure that programs aimed at preparing the country's youth to address sexual health and HIV challenges are effective and sustainable.

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