

A cross-sectional study of sexual health knowledge, attitudes, and reported behavior among Zambian adolescent girl participants in a football program

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ABSTRACT

Limited research has assessed whether sports participation can be linked to decreasing risky sexual behavior among adolescent girls in sub-Saharan Africa. The current study aimed to assess whether participation in a football league that provides sexual and reproductive health and rights lessons before each football match strengthened adolescent Zambian girls' sexual health knowledge, attitudes, and behavior. Adolescent female participants in the girls-only football league run by the organization Futebol dá Força (FDF, n=120) completed a questionnaire assessing sexual health knowledge, reported attitudes, and reported behavior. Logistic regressions were used to assess associations between participants' self-reported program exposure and their sexual health knowledge, reported attitudes, and reported behavior. After examining all exposure levels and adjusting for age, participants with at least six months of reported exposure to the FDF program had better sexual health knowledge and attitudes compared to those reporting less than six months exposure (AOR 4.74, 95% CI 1.70-13.19). Those in the more exposed group also had higher odds of reporting using a condom at last sex (AOR=11.64, 95% CI=1.08-124.57). These findings suggest that sports-based educational programs may improve sexual health knowledge and attitudes among African adolescent girls, potentially reducing the risk of sexually transmitted disease and early aged pregnancy.

INTRODUCTION

Social, economic, and cultural factors play an influential

role in shaping adolescents' sexual behavior (Viner et al., 2012). For females, adolescence is a critical period of exposure to sexual and reproductive health risks with potentially serious health outcomes and higher risks of mortality. The World Health Organization (WHO) encourages research to help identify effective interventions for adolescents that prevent early pregnancy and other adverse sexual health outcomes by influencing key factors such as early marriage, coerced sex, and contraceptive access and usage (WHO, 2011).

Adolescence is regarded as a particularly vulnerable period for African girls due to gender discrimination in forms of limited education, early marriage, limited access to health services, sexual violence, and other factors that in turn lead to unplanned pregnancies (WHO Regional Office for Africa, 2012). Regionally, sub-Saharan Africa (SSA) has the highest rate of teenage pregnancy and the highest proportion of women and girls among people living with HIV, with Zambia among the top five in the region (Central Statistical Office of Zambia, 2014; Wamoyi et al., 2014; WHO Regional Office for Africa, 2016). Previous research has found that social, cultural, and economic structural barriers to condom usage in Zambia result from a high degree of stigma due to religion, social and gender norms, lack of knowledge of how to use condoms, and barriers in accessing condoms by adolescents (Benefo, 2010; Pinchoff, Boyer, Mutombo, Chowdhuri, & Ngo, 2017; Yakubu & Salisu, 2018; Kailbala & Drosin, 2011). The abundance of complex factors contributing to SRHR issues creates a demand for quality interventions that can address the many aspects affecting Zambian adolescent girls' sexual health.

Keywords: Zambia, football, adolescent girls, sexual and reproductive health and rights

In Zambia, some of the current public health challenges among adolescents are high rates of early and unprotected sex, early unwanted pregnancies, and sexually transmitted infections (Central Statistical Office of Zambia, 2014; Kailbala & Drosin, 2011). A 2013-14 nationwide demographic and health survey sampling 3,686 girls aged 15-19, found that 89.4% of girls reported not using any form of contraceptive during sex (Central Statistical Office of Zambia, 2014). The same survey also found that one in three women reported having given birth to their first child by the age of 18 (Central Statistical Office of Zambia, 2014). Despite efforts from various SRHR organizations in the local communities to increase sexual health knowledge among adolescent, condom use remains lower compared to other age groups (Pinchoff et al., 2017), suggesting the need to investigate whether other methods to promote condom use could be more effective for this key population.

The traditional setting for providing reproductive health education has primarily been the school classroom. However, not all children in low- to middle-income countries are attending school, leaving some without access to such lessons (World Bank Group, 2017). Sports can be used as an additional tool with other community-based programs to provide an alternative educational platform to the traditionally school-based educational settings. As reported by the United Nations Office on Sport for Development and Peace and found in numerous studies over the last decade, sports can be a positive tool in health education and disease prevention (Kaufman, Spencer, & Ross, 2013; Sport for Development and Peace International Working Group, 2007; United Nations Office on Sport for Development and Peace, 2014). Not only can sports be utilized for sexual health education for all youth, but sports can also be used as an opportunity for adolescent girls to develop a social network and safe place to confront the daily problems in their lives (Brady, 2005; Hershow et al., 2015; Jeanes & Magee, 2013).

In the United States, general sports participation among adolescent girls has been linked to decreased risky sexual behavior, such as less frequent sexual activity, delayed sexual debut, lower rates of pregnancy, and higher rates of condom usage (Dodge & Jaccard, 2002; Hershow et al., 2015; Lehman & Koerner, 2004; Miller, Sabo, Farrell, Barnes, & Melnick, 1999; Sabo, Miller, Farrell, Melnick, & Barnes, 1999). However, there is limited research investigating whether general sports participation can play a similar role for girls in sub-Saharan Africa (Hershow et al., 2015). Within the past decades, the use of sports for development has grown, with sport being used as a platform for many health promotion/educational interventions (Sport for Development and Peace International Working Group,

2007). For this study, the terms sports for development and sports-based educational programs are used interchangeably and are defined as programs that use sports and physical activity to promote education, health, and social connections (Kidd, 2008). As SRHR encompasses a range of complex issues due to the highly sensitive nature of the topic and related stigma, using a friendly popular platform may be an effective way to promote such sensitive information. As found in a study in South Africa, a girls sports-based health promotion intervention could aid in improved adolescent girls HIV related knowledge and attitudes, although limitations exist concerning the effects that sports for development interventions might have on sexual behavior change (Hershow et al., 2015). Due to complexities and interconnectedness of SRHR challenges, social change among sports interventions could support and link with other SRHR interventions within the family, church, school, and other community settings (Hershow et al., 2015; Kaufman et al., 2013).

Most research conducted on sports-based educational program in sub-Saharan Africa has focused primarily on prevention of HIV through sexual health education. A 2013 systematic review of effectiveness of sports-based HIV prevention interventions concluded that there is strong evidence of at least short-term effects on HIV related knowledge, self-efficacy, along with reported recent condom usage, and that there is strong evidence that a well-designed and sports-based HIV prevention intervention can increase related knowledge, self-efficacy, and condom usage by 20 to 40% (Kaufman et al., 2013). This review found that most evaluations of sports-based HIV prevention interventions had been done in sub-Saharan Africa, commensurate with it being one of the most affected regions in the world, accounting for *66% of all new HIV infections globally* (Kaufman et al., 2013; UNAIDS, 2018).

One of the most popular sports played around the world is football (Lee & Kim, 2016). Its popularity and low cost make it attractive and easy to implement in Zambia and throughout SSA (Maro, Roberts, & Sorensen, 2009). Previous research conducted on different football interventions in SSA has found an increase in levels of HIV knowledge and behavior change among at-risk youth (Balfour et al., 2013; Maro et al., 2009). Various grassroots football organizations in SSA are using football as a platform to deliver sexual and reproductive health education with focus primarily on HIV prevention (Balfour et al., 2013; Kaufman et al., 2013; Maro et al., 2009). This study focused on a program run by an international organization called Futebol dá Força (FDF) that, through its football-based platform in Zambia, promotes education for girls focused on sexual and reproductive health and rights.

The Futebol dá Força SRHR Football Program in Zambia

FDF's Zambian division of its football program operates under the name Southern Province Girls League (SPGL). SPGL was established in Livingstone district in 2014, followed by Choma in 2015. The league is open to all girls free of charge. Girls are typically recruited via word of mouth or through friends who play. The FDF coaches' role within the SPGL is to create a safe meeting place where girls learn about SRHR and encourage girls to exercise their rights on a daily basis. One of the organization's main objectives is community involvement in the promotion of SRHR through attitudinal and structural change. In Zambia, FDF recruits coaches and volunteers from the community by word of mouth. Before each SPGL game, FDF provides facilitated lessons on SRHR, using the football field as the classroom for players and the community spectators. Every game includes one lesson for the girls only (before the game), followed by a lesson for the community spectators (during the warm-up and/or the beginning of each match). Elements of community involvement are important in SRHR programs, as community support and understanding of SRHR services for adolescents help to break down the stigma and religious and community norms that affect adolescent sexual health (Kesterton & Cabral de Mello, 2010).

Like several sports for development programs, FDF is rooted within learning theories such as Robert Bandura's Social Cognitive Theory (SCT) (Kaufman et al., 2013). This theory indicates that learning is a process that occurs in a social context that involves five main elements: knowledge, perceived self-efficacy, outcome expectations, goal formation, and perceived facilitators (Bandura, 2004).

In line with the SCT, the SPGL's typical lesson or elements of knowledge includes a brief lecture and interactive discussions with the participants based on FDF's weekly topics (organized pre-season by FDF). Examples of the SPGL discussion topics include: sexuality, reproductive and sexual health, sexual and reproductive rights, sexual violence and abuse, pregnancy, and menstruation. The lessons are conducted on the side of the football field where the girls sit with the facilitator who lectures on the specific topic of the week and after which questions and discussion are encouraged. Exposure to the football lessons on SRHR and the importance of the role of the coach fall under the SCT theory of increasing knowledge and motivation of the health behavior. First, verbal persuasion through group-based events in which people can discuss health behavior (Bandura, 2004; Wight, Plummer, & Ross, 2012) takes

place during the FDF SRHR lessons on the field and with the coach and facilitators throughout the football league. Moreover, the facilitators' component of the theory includes the FDF coaches who are sports leaders who facilitate not only the sports activities but also set examples and become role models for the players by demonstrating the positive behavior through role playing, demonstrations, and discussions from the lessons. Facilitation from the coaches and by watching others perform the positive behavior reflects aspects of the SCT such as outcome expectations and goal formation. Vicarious experience is gained during participation in sports activities, as Bandura states that people learn how to act by observing others and follow through with actions considered appropriate according to what they have previously observed (Bandura, 2004). It can be assumed that from these experiences one has when participating in the activity, if positive behavior is being demonstrated, it can potentially lead to positive action by the participants observing the behavior. Outcome expectations such as setting goals for oneself, which is encouraged by coaches, along with the motivation to play football, may encourage girls to stay in school and to avoid pregnancy, thus contributing to behavior change in these players. Contextual factors that include gender norms, poverty, family, and religion also shape one's agency with regards to meeting goals and outcome (Wight et al., 2012).

Prior to this study, FDF had no explicitly defined objectives regarding the lessons, other than to distribute information about sexual health, nor had there been monitoring of outcomes. The overall aim of this study was to assess if participation in FDF's football league improved the sexual health knowledge, attitudes, and reported behavior in adolescent Zambian girls. To do this, we examined differences in sexual health knowledge, attitudes, and reported behavior between girls with longer participation in Futebol da Força's girls' football league and those with shorter participation.

METHODOLOGY

Study Design

The study used a cross-sectional design with data obtained from a self-administered English questionnaire designed specifically for FDF's participants by the first author with feedback from the other authors. The questionnaire contained 77 structured items covering sociodemographic information, sexual health knowledge and attitudes, reported sexual behavior, and self-esteem that were modified from previous established questionnaires (Family Health International, 2000; Hanna & Tompkins, 1999;

Sayles et al., 2006). Prior to conducting the study, the instrument was piloted with nine school girls aged 12 to 16 to improve its format and relevance as well as the wording and comprehensibility of the questions. FDF was involved in the development of the questionnaire to ensure the topics covered aligned with lecture content.

Sampling and Data Collection Procedures

In February 2017, questionnaires were completed by 120 girls in two urban districts (Livingstone and Choma) of the Southern Province of Zambia where the SPGL has been running for the past four years. According to FDF, 655 girls ages 10 to 24 played in the SPGL in Livingstone and Choma as of 2016 (n=384 and 271, respectively). To determine the sample size needed from this study population, a sample size calculation was done using a 95% confidence level and a margin of error of 5% (Survey Monkey, 2017). We estimated that the study would need 243 participants for all outcomes to have a margin of error of 5%. Participants were selected using convenience sampling among girls participating in the local SPGL training sessions and games. For invitations to take part in the study, participants were contacted through the program director and coaches, who were first notified of the study and who then established a time during their normal training sessions for questionnaires to be completed. Prior to the recruitment of participants, written parental consent was obtained by the coaches for girls under 18. In all, 250 parental consent forms were distributed within 24 teams in the league. Parents who received forms were those who were present at the training session or in close proximity that could receive the information and sign prior to the training session when surveys were administered. At the survey administration session, all players who were present were informed about the study and invited to participate. Those who wished to participate gave their consent at that time, and if under 18, participation was contingent upon having received written parental consent. Participants completed paper questionnaires on the football fields away from distractions and nonconsenting team members during their practice session. Nearby classrooms were used during two of the 24 survey administration sessions due to overcrowding on the field. When finished, participants dropped the surveys in a secure box and returned to their practice session. On average, participants took approximately 90 minutes to complete the questionnaire.

Inclusion Criteria

Adolescent girls aged 12-24 playing football in the SPGL at the time of the study were invited to participate.

Study Measures

Table 1 displays the study measures in detail with descriptions of post hoc dichotomized values for analysis. The exposure measure of length of time playing in the SPGL was dichotomized as six months or more (defined as the more exposed group) and less than six months (defined as the less exposed group). The less exposed group was the reference category. This particular cut off point was determined post hoc by an examination of the distribution of the responses to selected knowledge items according to exposure group. Sexual health knowledge and attitudes outcome measures (Family Health International, 2000; Hanna & Tompkins, 1999) and reported sexual behavior outcome measures were analyzed individually and in aggregate. A filter was used to obtain data concerning reported sexual behavior, whereby participants were first asked to respond to the question "Have you ever had sexual intercourse?" with four response items: "Vaginal," "Anal," and "Oral," with "yes" or "no" response items followed by a single response item of "None of the above." If they answered "yes" to any of the first three items, they were then asked to continue with the sexual behavior questions; those who responded "none of the above" were asked to skip this section.

Statistical Analysis

Data was manually entered into a spreadsheet and transferred into SPSS by the main author. A subsample of the data was selected at random and reviewed for errors. Correction of the eight errors within the complete data set was done prior to analysis by the main author. Descriptive statistics were used to summarize the data and comparisons between all levels of exposure, followed by further analysis of associations between the study outcomes and reported intervention exposure. Logistic regression was used to calculate crude odds ratios (OR) with 95% confidence interval (CI) for the association between the individual knowledge, reported attitudes, and reported sexual behavior items in relation to exposure to the SPGL. Multivariate logistic regression was then conducted to compute age-adjusted odds ratios for associations between the individual knowledge, reported attitudes and reported sexual behavior items, and exposure to the SPGL. Persons with missing values for explicit measures were not included in the statistical analysis concerning that specific measurement. In addition, an aggregate index was created representing the knowledge and reported attitude items combined. Reported sexual behavior items were not included in this index due to many missing values discovered post hoc. An examination of the frequency distribution of the index yielded a cut-off

Table 1. Description of study measures

Study Measures	Dichotomized values determined post hoc for analysis
Exposure measure	
How long have you been playing in the SPGL (Southern Province Girls League)? <input type="checkbox"/> I've never played in the SPGL <input type="checkbox"/> Less than 6 months <input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1-2 years <input type="checkbox"/> More than 2 years	Less than 6 months (<i>reference category</i>) ^a <ul style="list-style-type: none"> • I've never played in the SPGL; Less than 6 months More than 6 months <ul style="list-style-type: none"> • Less than 1 year; 1-2 years; More than 2 years
Sexual health knowledge and attitudes outcome measures	
I think it's ok to have sex without a condom the first time you have sex with a person. <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is it important to test yourself for STIs? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Do you know where the closest STI clinic is? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Have you ever encouraged someone to a sexual health service? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Most people who are important to me say it's good to use condoms. <input type="checkbox"/> Yes <input type="checkbox"/> No	
I am confident I can ask to use a condom if I wanted to. <small>(Hanna & Tompkins, 1999.)</small> <input type="checkbox"/> Yes <input type="checkbox"/> No	
Have you ever heard of diseases that can be transmitted through sexual intercourse? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Can a person protect themselves from HIV and STIS by using a condom correctly every time they have sex? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Do you know of any place or person from which you can obtain condoms? <small>(Family Health International, 2000)</small> <input type="checkbox"/> Yes <input type="checkbox"/> No	
Reported sexual behaviour outcome measures	
Have you ever had sexual intercourse? (Fill in all that apply) <input type="checkbox"/> Vaginal (penetration of vagina by penis) <input type="checkbox"/> Anal (penetration of anus by penis) <input type="checkbox"/> Oral (stimulation of genitals with mouth, lips or tongue) <input type="checkbox"/> No	
At what age did you have sexual intercourse for the first time? <input type="checkbox"/> 11 or younger <input type="checkbox"/> 12-13 <input type="checkbox"/> 14-15 <input type="checkbox"/> 16-17 <input type="checkbox"/> 18-19	15 or younger 16 or older
How many sexual partners have you had during the last 12 months? <small>(Family Health International, 2000)</small> <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 or more	1 or none 2 or more
Did you use a condom the last time you had sexual intercourse? <small>(Family Health International, 2000)</small> <input type="checkbox"/> Yes <input type="checkbox"/> No	

Note. Only items from the questionnaire that were used in this study are presented.

^aThis particular cut-off point was determined post hoc by an examination of the distribution of the responses to selected knowledge items according to exposure group.

Table 2. Demographic and background characteristics of participants for total sample and exposure-level subgroups

	Total n=120 (100%)	Never played in SPGL n=17 (14%)	Less than 6 months n=16 (13%)	Less than 1 year n=17 (14%)	1-2 years n=36 (30%)	More than 2 years n=34 (28%)
Mean age in years (SD)	14.8 (2.6)	13.2 (4.0)	14 (1.4)	14.2 (1.6)	15.7 (2.6)	15.4 (2.2)
Living status^a						
Mother	32 (28)	7 (21.9)	6 (18.8)	5 (15.6)	8 (25.0)	6 (18.8)
Father	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (100.0)
Both parents	62 (52)	8 (12.9)	7 (11.3)	8 (12.9)	18 (29)	21 (33.9)
Grandparents	16 (13)	2 (12.5)	0 (0)	1 (6.3)	4 (25)	9 (56.3)
Guardians	16 (13)	2 (12.5)	4 (25.0)	3 (18.8)	6 (37.5)	1 (6.3)
Other adults	3 (3)	1 (33.3)	1 (33.3)	0 (0)	1 (33.3)	0 (0)
Education						
Less than primary school	29 (24)	10 (34.5)	5 (17.2)	6 (20.7)	6 (20.7)	2 (6.9)
Primary school	40 (33)	4 (10)	5 (12.5)	5 (12.5)	12 (30.0)	14 (35.0)
Secondary school	50 (42)	3 (6)	6 (12.0)	6 (12.0)	18 (36.0)	17 (34.0)
Where players get sexual health information^a						
Coach	65 (54)	13 (20.0)	9 (13.8)	7 (10.8)	22 (33.8)	14 (21.5)
Family	29 (24)	2 (6.9)	4 (13.8)	7 (24.1)	11 (37.9)	5 (17.2)
Friends	25 (21)	3 (12.0)	3 (12.0)	4 (16.0)	10 (40.0)	5 (20.0)
School	66 (55)	6 (9.1)	8 (12.1)	9 (13.6)	20 (30.3)	23 (34.8)
Health Center	48 (40)	1 (2.1)	7 (14.6)	9 (18.8)	21 (43.8)	10 (20.8)
Social Media	18 (15)	1(5.6)	2 (11.1)	5 (27.8)	8 (44.4)	2 (11.1)
Football Ground	26 (22)	3 (11.1)	4 (14.8)	2 (7.4)	10 (37.0)	8 (29.6)
Participated in sexual health lessons from FDF						
Yes	110 (92)	13 (11.8)	13 (11.8)	17 (15.5)	33 (30)	34 (30.9)
No	10 (8)	4 (40.0)	3 (30.0)	0 (0)	3 (30)	0 (0)
Sexual Intercourse^a						
Vaginal	25 (20.8)	3 (12.0)	4 (16.0)	2 (8.0)	12 (48.0)	4 (16.0)
Anal	3 (2.5)	1 (33.3)	1 (33.3)	1 (33.3)	0 (0)	0 (0)
Oral	7 (5.8)	1 (14.3)	1 (14.3)	1 (14.3)	3 (42.9)	1 (14.3)
None	84 (70)	12 (14.3)	12 (14.3)	13 (15.5)	21 (25.0)	26 (31.0)

^aMeasure with multiple response alternatives.

point, whereby persons with up to three “no” responses were categorized as having adequate knowledge and reported attitudes, and those with four or more “no” responses as having poor knowledge and attitudes. Crude and age-adjusted odds ratios were used to examine the association between index response subgroups (up to three vs. four or more) and exposure to the SPGL.

Ethical Considerations

The ERES COVERGE Institutional Review Committee in Zambia granted ethical approval for this study. Participation was voluntary and based on informed consent from the participant and, for those under 18, written consent from a parent or guardian. Confidentiality and anonymity were ensured throughout the study.

RESULTS

Social Demographic Characteristics

Out of 250 participants invited to participate, 129 participants (51.6%) were eligible for the study by means of signed parental consent. An additional 12 girls over the age of 18 participated. After further refusal (n=15 among those under 18 years whose parents gave consent) and age criteria not met (n=6), a final total of 120 participated in the study, yielding a 48% response rate (120/250). The sample represented 18% of the total FDF program population (120/655).

Table 2 displays the demographic and background characteristics for the entire sample and for the different

Table 3. Knowledge, attitude, and reported behavior items with odds ratios among all levels of participant exposure

	Outcome N (%)	OR	95% CI	AOR	95% CI
Knowledge and Attitude Variables					
Knowledge of sexual diseases (Yes)					
Never played in SPGL	12 (11.7)	1		1	
Less than 6 months	14 (13.6)	2.92	.48 - 17.86	2.7	.43 - 16.87
Less than 1 year	13 (12.6)	1.35	.29 - 6.26	1.2	.26 - 5.89
1 to 2 years	34 (33.0)	7.08	1.21 - 41.46	5.8	.92 - 36.63
More than 2 years	30 (29.1)	3.13	.72 - 13.67	2.6	.55 - 12.37
Encouraged someone to a sexual health service (Yes)					
Never played in SPGL	7 (9.3)	1			
Less than 6 months	8 (10.7)	1.43	.361 - 5.66	1.18	.25 - 5.57
Less than 1 year	9 (12.0)	1.61	.414 - 6.24	1.29	.28 - 5.88
1 to 2 years	26 (34.7)	4.13	1.21 - 14.09	1.98	.48 - 8.19
More than 2 years	25 (33.3)	3.97	1.16 - 13.58	1.97	.47 - 8.20
Important to test yourself for HIV/STIs (Yes)					
Never played in SPGL	11 (10.7)	1		1	
Less than 6 months	13 (12.6)	2.36	.48 - 11.73	2.3	.46 - 11.55
Less than 1 year	15 (14.6)	4.09	.69 - 24.24	3.96	.66 - 23.81
1 to 2 years	35 (34.0)	19.09	2.07 - 176.26	17.66	1.81 - 172.56
More than 2 years	29 (28.2)	3.16	.80 - 12.51	2.96	.70 - 12.55
Knowledge of where STI clinic is (Yes)					
Never played in SPGL	13 (12.9)	1		1	
Less than 6 months	12 (11.9)	.923	.188 - 4.54	.79	.15 - 4.07
Less than 1 year	13 (12.9)	1.00	.205 - 4.88	.83	.16 - 4.3
1 to 2 years	33 (32.7)	3.39	.66 - 17.25	2.36	.42 - 13.44
More than 2 years	30 (29.7)	2.30	.50 - 10.67	1.67	.33 - 8.58
Confident to ask to use condoms (Yes)					
Never played in SPGL	10 (10.5)	1		1	
Less than 6 months	10 (10.5)	1.17	.29 - 4.73	.98	.23 - 4.21
Less than 1 year	16 (16.8)	11.2	1.19 - 105.13	9.4	.97 - 91.63
1 to 2 years	32 (33.7)	5.6	1.36 - 23.14	3.38	.75 - 15.25
More than 2 years	27 (28.4)	2.7	.76 - 9.66	1.7	.43 - 6.66
Condoms usage protects against HIV/STI (Yes)					
Never played in SPGL	10 (14.5)	1		1	
Less than 6 months	9 (13.0)	.90	.23 - 3.58	.77	.19 - 3.22
Less than 1 year	9 (13.0)	.79	.20 - 3.06	.66	.16 - 2.66
1 to 2 years	20 (29.0)	.88	.27 - 2.82	.54	.15 - 1.93
More than 2 years	21 (30.4)	1.13	.35 - 3.71	.76	.21 - 2.70
Its ok to have sex without condom with a new partner (No)					
Never played in SPGL	14 (14.9)	1		1	
Less than 6 months	13 (13.8)	.93	.16 - 5.45	.93	.16 - 5.45
Less than 1 year	12 (12.8)	.51	.10 - 2.61	.51	.10 - 2.6
1 to 2 years	28 (29.8)	.75	.17 - 3.28	.75	.17 - 3.28
More than 2 years	27 (28.7)	.96	.21 - 4.45	.96	.21 - 4.45
Know where and/or from whom to obtain condoms (Yes)					
Never played in SPGL	9 (11.7)	1		1	
Less than 6 months	5 (6.5)	.40	.10 - 1.68	.40	.10 - 1.68
Less than 1 year	12 (15.6)	2.13	.52 - 8.76	2.13	.52 - 8.77
1 to 2 years	28 (36.4)	3.11	.91 - 10.69	3.11	.91 - 10.70
More than 2 years	23 (29.9)	1.86	.56 - 6.13	1.85	.56 - 6.13
People who are important, say to use condoms (Yes)					
Never played in SPGL	11 (10.8)	1			
Less than 6 months	10 (9.8)	.76	.18 - 3.27	.64	.14 - 2.93
Less than 1 year	16 (15.7)	7.28	.75 - 71.11	6.10	.60 - 61.78
1 to 2 years	32 (31.4)	3.64	.83 - 16.02	2.44	.50 - 12.02
More than 2 years	33 (32.4)	15.00	1.58 - 142.72	10.64	1.05 - 107.66
Reported Sexual Behavior Variables					
Sexual partners in last 12 months		NA	NA	NA	NA
Sexual debut (16 and above)					
Never played in SPGL	6 (31.6)	1			
Less than 6 months	1 (5.3)	.17	.01 - 2.98	.14	.01 - 2.76
Less than 1 year	4 (21.1)	.33	.04 - 2.77	.28	.03 - 2.67
1 to 2 years	3 (15.8)	.33	.04 - 3.2	.24	.02 - 3.2
More than 2 years	5 (26.3)	.42	.05 - 3.31	.32	.03 - 3.24
Condom used during last sexual activity		NA	NA	NA	NA

Note. OR = crude odds ratio; AOR = age-adjusted odds ratio; CI = confidence interval; NA = Not applicable due to too few responses.

levels of exposure groups. Age was normally distributed, with a mean age for respondents of 14.8 years (SD 2.63). Roughly half (52%) of the participants reported living with both parents. Those who lived with their mother only was second largest group with 28%. The majority of participants had completed a secondary school level education (42%), whereas a majority of the participants that completed less-than-primary-school never played in the SPGL (35%). Sixty-five players (54%) stated they received sexual health information from their coach, which was roughly equal to the proportion of players who stated they received sexual health information from school (N=66, 55%). A majority of participants (n=84) reported no form of sexual intercourse activity.

Sexual Health Knowledge, Attitude, and Behavior

Table 3 shows the results of logistic regressions for individual knowledge and attitude items with crude and age-adjusted ORs (AOR) among all levels of exposure (only items yielding evidence of association are shown). All results that had showed evidence of an association in the crude analysis maintained such evidence when adjusting for age, although the ORs were reduced in magnitude. Age was determined to be a confounder by calculating the magnitude of effect (crude OR - adjusted OR/adjusted OR). All variables that showed an evidence of association in the crude and adjusted analyses had a greater than 10% absolute difference between exposure groups. Compared to participants reporting playing in the SPGL less than six months, participants who reported playing in the SPGL more than two years had greater odds (AOR=10.64, CI 1.05-107.66) of reporting having people who are important to them tell them to use condoms. Participants who reported playing in the SPGL one to two years had greater odds (AOR=17.55, CI 1.81- 172.56) of valuing the importance of testing themselves for HIV/STIs. Reported sexual behavior items showed no evidence of association among any exposure levels.

Table 4 details the sexual health knowledge, attitude, and reported behavior responses by item among all FDF participants in the SPGL study with less than six month and greater than or equal to six month exposure groups (less exposed and more exposed), n (%), crude and age-adjusted OR of the individual knowledge and attitude responses, knowledge and attitude index items, and self-reported sexual behavior items among the participants, along with the binary regression analysis of the crude and age-adjusted odds ratios of the sexual knowledge and attitude index and the sexual behavior outcomes are shown. Higher reported exposure to the FDF program was associated with increased odds of girls reporting having people important to them say

to use condoms (AOR=5.42, 95% CI 1.70-17.25). More exposed girls were almost three times more likely to report feeling confident in asking to use a condom when having sex (AOR=2.94, 95% CI 1.08- 8.01). More exposed girls were also three times more likely to endorse the importance of testing for STIs and HIV (AOR=3.19, 95% CI 1.07-9.55) and almost three times more likely to report knowing where to get condoms (AOR=2.94, 95% CI 1.22-7.12). The knowledge and reported attitude index results indicated that participants exposed to the FDF program for six months or more had almost five times higher odds of having adequate sexual knowledge and reported attitudes compared to the less-exposed group (AOR=4.74, 95% CI 1.70-13.19). For the reported sexual behavior measures, condom usage during last sex maintained an evidence of association after adjustment for age, showing that longer-exposed participants were 11 times more likely to report using a condom during their most recent sexual activity (AOR=11.61, 95% CI 1.08-124.57).

DISCUSSION

This study found strong evidence that among girls participating in the SPGL, exposure to longer involvement in the SPGL contributed to strengthened sexual health knowledge and improved attitudes. Girls who reported participating in the SPGL for six months or more had better sexual health knowledge, reported attitudes, and higher reported usage of condoms during their last sexual activity than those with less than six months of participation.

Based on the overall knowledge and reported attitudes findings, it can be inferred that exposure to FDF's sports-based educational program for six months or more may strengthen sexual health knowledge and attitudes. This improved knowledge may stem from more exposure to the sexual health lessons offered at the football field and/or influences from coaches and teammates. Another factor might have been the consistent exposure to the coach who is trained as a SRHR facilitator. Informal discussions with a coach during practices throughout the season could also have had an effect, as half of the participants stated that they received sexual health information from their coach.

The evidence of better knowledge and reported attitudes in the more exposed group could indicate that a sports-based platform for SRHR education might be a useful approach to improve sexual health among adolescents. Knowledge of where to obtain condoms, the importance of testing for STIs/HIV, and having people close to you encourage condom usage can be considered important elements in adolescents' sexual health knowledge and attitudes (Reid & Aiken, 2011). As these results demonstrate the importance

Table 4. Knowledge and attitude items and index and reported behavior items with odds ratios among dichotomized exposure levels of participants

	N (%)	OR	95% CI	AOR	95% CI
Knowledge and Attitude Variables					
People who are important to me say to use condoms (Yes)					
Total	102 (85)				
≥6 months	81 (93.1)	7.43	2.45 - 22.50	5.42	1.70 - 17.25
<6 months	21 (63.6)	1		1	
I am confident I can ask my partner to use a condom when having sex (Yes)					
Total	95 (79.2)				
≥6 months	75 (86.2)	4.28	1.68 - 10.86	2.94	1.08 - 8.01
<6 months	20 (60.6)	1		1	
It's important to test yourself for STIs (Yes)					
Total	103 (85.8)				
≥6 months	79 (90.8)	3.86	1.34 - 11.15	3.19	1.07 - 9.55
<6 months	24 (72.7)	1		1	
Knowledge where to obtain condoms (Yes)					
Total	77 (64.2)				
≥6 months	63 (72.4)	3.84	1.64 - 8.96	2.94	1.22 - 7.12
<6 months	14 (42.4)	1		1	
Knowledge and Attitude Index					
No to 0-3 items ^a					
Total	98 (81)				
≥6 months	68 (78)	5.63	2.111 - 15.04	4.74	1.70 - 13.19
<6 months	30 (90)	1		1	
Sexual Behavior Variables					
Condoms used in last sexual activity (Yes)					
Total	33 (27.5) ^b				
≥6 months	17 (70.8) ^b	19.43	2.03 - 185.72	11.61	1.08 - 124.57
<6 months	1 (11.1) ^b	1		1	

Notes. Only items yielding evidence of association are shown. OR = crude odds ratio; AOR = age-adjusted odds ratio; CI = confidence interval. 1 = reference category

^a No to 0-3 items is considered adequate knowledge/attitudes

^b n = (%) total number of responses and % of the proportion of those who responded to the questions, excluding missing values (%).

of prevention of sexual health risks, they also support one of the program's goals of encouraging safe sex practices in young adolescent girls. As discussed below, this study reinforced previous research suggesting that sport-based programs and using the football ground as a classroom for SRHR lessons can be an additional method for delivering important health messages in limited resource settings such as this one.

It is important to note that, although knowledge is considered the precondition for behavioral change, an increase of SRHR knowledge alone may not be sufficient to

affectively change behavior (Bandura, 2004; O'Leary, 2001). Elements of SCT such as individual self-efficacy in performing a behavior and sociostructural factors potentially play a greater role in the behavior change process (Burke et al., 2009; Kwasnicka, Dombrowski, White, & Sniehotta, 2016; Zimmerman, 2000). Longitudinal studies of sports-based educational programs might bring insights into where and when behavioral change succeeds, beyond only increasing knowledge. These may be complemented by qualitative studies exploring the complex relationship between the community and individual adolescent behavior change.

The results measuring participants reported sexual behavior showed that reported condom usage increased with more reported exposure to the program. However, results for measures concerning sexual debut and sexual partners showed no evidence of an association with increased exposure. The nonresponse of 72% of the participants to the reported sexual behavior items highlights an important limitation of this study in accurately measuring reported sexual behavior. The reason for the large number of missing responses is unknown and several factors may have influenced both the response rate and response accuracy due to risk of desirability, selection bias, and recall bias. The prominent role of the Christian faith and social-cultural norms in influencing SRHR education in Zambia could have played a part in the reported sexual behavior responses. As the sample consisted of young girls, these norms could have posed potential barriers to response due to the fear that their parents might inquire how they responded to the questions.

The findings from this study supplement previous research concerning sports-based educational programs targeting HIV in SSA, where improved sexual health knowledge and reported attitudes have also been indicated (Balfour et al., 2013; Kaufman et al., 2013; Maro et al., 2009; Woodcock, Cronin, & Forde, 2012). The current findings indicate the potential utility of using sports-based programs in SSA to promote SRHR among adolescent girls and perhaps particularly where access to adequate information might be limited.

LIMITATIONS

Important methodological limitations need to be considered. The cross-sectional study design can only describe associations between measures, and causation cannot be inferred. The small sample size of 120 participants is a limited representation of the program (18%) and a larger margin of error of 8% occurred than initially projected (5%) for the sampling size. This study did not conduct a power calculation for the minimum detectable effect on outcomes prior to analysis. Some results had broad confidence intervals due to the small number of participants who responded. Because exposure was self-reported, it is possible that the study over- or under-estimated the program's effects. Underreporting and misreporting of sexual behavior may have occurred due to desirability or recall bias. Selection bias might have influenced the results, since participants who were readily available might be the "ideal" participant for the program, and their responses might have been more positive than other participants who did not participate in the study, thus possibly leading to overestimates of associations.

Other methodological limitations included lack of information on sociodemographic measures such as family income and religious background as potential confounders or possible effect modifiers. Although information on education was available, this measure was not included in the analyses due to inconsistencies in the way participants had reported their level of education. Although the lack of background information is a limitation, age was adjusted for as an important confounder. Since exposure to the program was broadly defined, it was not possible to determine what aspect of the program was potentially most influential in increasing knowledge. It is also possible that the group with less than one year of exposure could have included participants in the group with less than six months exposure. Post hoc determination of the exposure level that was deemed to be important for the analysis is acknowledged as a major weakness in this study. However, the questionnaire did not include more detailed items concerning length of exposure, and the ability to analyze finer gradations of exposure length might have led to other results. Therefore, caution is warranted in the interpretation of the results and conclusions. Regarding the survey instrument, limitations in the validity of the indicators used to measure the sexual knowledge, reported attitudes, and reported behavior variables should be kept in mind. The index analysis included all persons regardless of missing responses in the eight knowledge and attitude questions; the effect of nonresponse was considered minimal due to few missing values (only three participants with one missing item).

The small number of participants reporting sexual activity might be due to the participants' young age (mean of 14.8 years, whereas the median reported age of first sexual intercourse for girls in Zambia is 17.3 years) (Central Statistical Office of Zambia, 2014). The administration of the questionnaire on the open football grounds near community members might have affected responses to certain items due to the inability to create a sufficiently private environment for answering sensitive questions. Off season posed challenges in securing a sufficient sample size. In addition, desirability bias may be present, in that participants who were fully committed to the FDF program may have preferentially agreed to participate. The presence of a male assistant knowing the participants well enough to identify them could also have caused a lack of confidence and trust in answering truthfully, potentially contributing to desirability bias. Requiring parental consent might have influenced these girls' responses and response rates and/or introduced selection bias into the study.

CONCLUSION

In conclusion, using sports as a platform for SRHR education may assist in improving sexual health knowledge, reported attitudes, and reported condom use among adolescent girls in Zambia and potentially in other parts of SSA where access to formal SRHR education might be limited. These findings support the use of public health interventions that attempt to promote sexual behavior change and knowledge among adolescent girls who are at risk of STIs and early pregnancy. Future evaluations should establish baselines, use a comparison group, and determine program participation based on objective monitoring data rather than self-reported exposure. Further in-depth qualitative and quantitative research is needed concerning the social and cultural factors influencing adolescent girls who participate in sports programs in sub-Saharan Africa and how sports participation might affect their sexual behavior. Understanding the social impact of sports on adolescent African girls through robust research would help future policy makers, researchers, and organizations understand the experiences and social impact of such projects.

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CONFLICT OF INTEREST STATEMENT

At the time of data collection and drafting the manuscript, Keeva Duffey was not employed by Futebol dá Força. Since submission of the manuscript for publication, she has become an employee working for their global program. All other authors have no conflict of interest.

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