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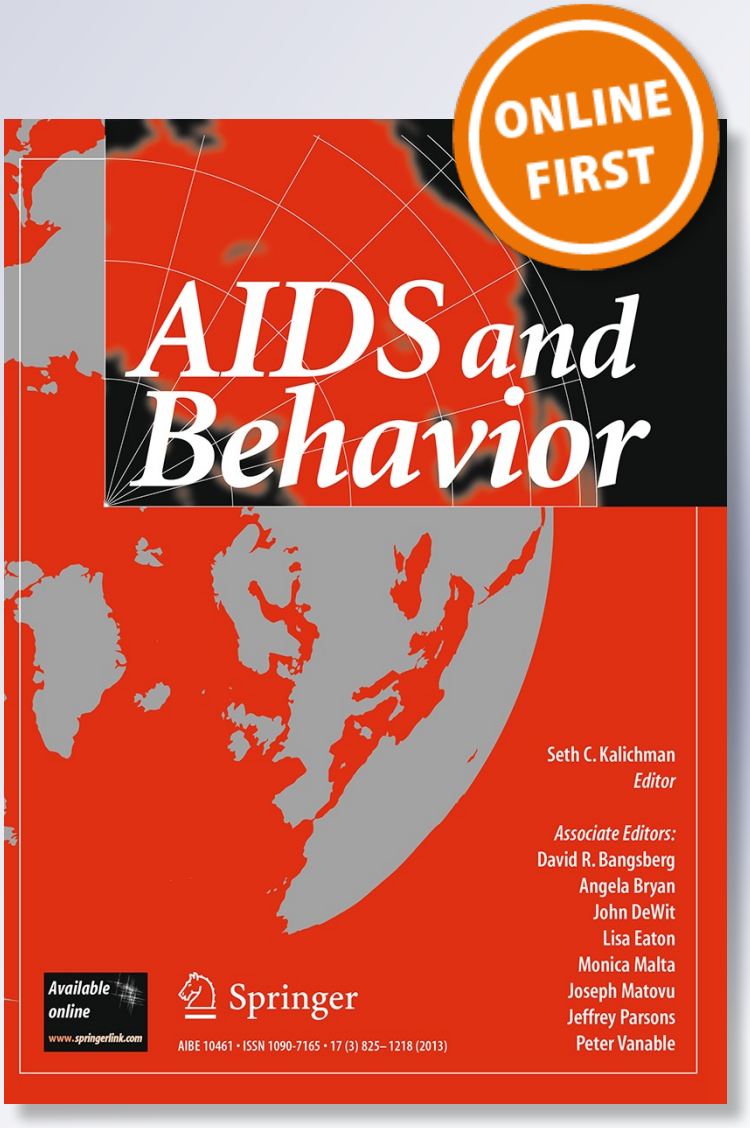

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ORIGINAL PAPER

HIV Prevention in Action on the Football Field: The Whizzkids United Program in South Africa

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Abstract The Africaid Trust is a grassroots South African non-profit organization that engages youth in HIV prevention by harnessing the popularity of football (i.e. soccer). WhizzKids United, the organization's primary program, operates a 12-week program in elementary schools in Pietermaritzburg, South Africa, which aims to impart knowledge and life skills critical to HIV prevention. The goal of this research was to compare elementary school youth who received the program to youth who only received traditional classroom-based HIV education on health behaviors and HIV-related knowledge and stigma. A secondary objective was to evaluate HIV knowledge, sexual behaviors, attitudes towards HIV and health care seeking behaviors among South African youth in grades 9–12. Elementary students who participated in the program reported greater HIV knowledge and lower HIV stigma ($p < .001$) than those who had not. The majority of youth in grades 9–12 report having sexual relations (55.6 %), despite low levels of HIV testing (29.9 %) in this high HIV prevalence region of South Africa. The results highlight the importance of supporting community-based HIV educational initiatives that engage high-risk youth in HIV prevention and the need for youth-friendly health services.

Keywords WhizzKids United · Youth · HIV prevention · HIV education · South Africa

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Introduction

The World Health Organization (WHO) estimates that of the 33.4 million people living with HIV, 67 % reside in sub-Saharan Africa [1]. African youth are disproportionately affected by the disease, with half of all new infections in Africa occurring in those aged 15–24 [2]. Therefore, for most African countries, national HIV prevention strategies must target youth in order to be effective in reducing the burden of this disease. Research suggests that interventions aimed at HIV prevention will be most effective in influencing sexual behaviors associated with HIV if targeted at youth prior to sexual debut and before patterns of risky sexual behavior are established [3, 4]. South Africa is one of the countries hardest hit by HIV, and recent South African national surveys indicate that 12.6 % of youth have initiated sex before age 14 [5]. As a result, Banakole et al. [6] suggest that developmentally appropriate sex education be offered as early as age 10.

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In recent years, a number of organizations have harnessed the popularity of football (i.e. soccer) in Africa to engage youth in HIV prevention strategies [7–9]. One such non-profit organization, The Africaid Trust, has been operating a 12-week educational soccer program "On The Ball" (OTB) since 2006. This program operates in elementary schools in Pietermaritzburg, KwaZulu-Natal, South Africa in partnership with the local Department of Education, as a component of the Life Orientation public school curriculum. The OTB program is delivered by trained coaches from Africaid's flagship program "WhizzKids United" (WKU), who provide the equipment and a rigorous soccer coaching program in the schools. Using the game of soccer as an analogy for life (e.g., not using a condom during sex is like playing soccer without a goalkeeper); the trainers are able to impart knowledge and life skills critical to HIV prevention during this school program. The main components of WKU OTB program are detailed in the methods section of this paper and additional program information can be accessed on the WKU website (http://www.whizzkidsunited.org). Importantly, the program offered by the WKU moves beyond existing classroom-based HIV education already being offered in the schools to interactive exercises aimed at changing attitudes towards HIV and fostering self-efficacy to make healthy choices, including the uptake of sexual health services. The OTB program is delivered by WKU coaches in elementary schools that are in close proximity to the WKU clubhouse, which is located adjacent to the Edendale Hospital, an 850-bed public facility in Edendale Township, Pietermaritzburg within Umgungundlovu District Municipality of South Africa.

Despite the devastating impact of HIV on South African youth, there is a lack of youth-centered health care clinics in South Africa, which may limit the impact of HIV prevention strategies. With the aim to both evaluate its OTB program and inform future programs related to health service delivery, a health survey was undertaken by WKU in 2010 in a representative sample of schools in Pietermaritzburg, South Africa. The survey was administered in the schools using a novel, cell phone based technology that allowed for the secure reporting and uploading of sensitive information. To determine the value-added of the OTB HIV prevention program as a component of the Life Orientation curriculum, WKU compared HIV knowledge, stigma and health care seeking behaviors of elementary youth (grades 5–8) who had received the WKU OTB program in addition to traditional classroom-based HIV education to students who had only received traditional HIV education. A secondary objective of the health survey was to establish the baseline level of HIV knowledge, sexual behaviors and health seeking behaviors of older youth in grades 9–12, with the aim to inform the development and integration of a youth-friendly health care clinic affiliated with the WKU program. Herein we present the results of this survey, administered to 972 students in grades 5–12 in 10 schools in Pietermaritzburg, South Africa, in May of 2010. We hypothesized that, among youths from grades 5 through 8 who participated in the WKU OTB program in addition to traditional classroom-based HIV education would demonstrate greater HIV knowledge and lower HIV stigma. We also expected that older adolescents (i.e. participants in grades 9 through 12) would demonstrate high levels of self-reported sexual activity and low levels of HIV testing.

Methods

Participants

A total of 972 participants (99 % South African black, 498 boys and 472 girls, with 2 missing data on sex) who attended grades 5–12 across 10 schools in Edendale Township, Pietermaritzburg, South Africa were included in the current study. WKU has significant outreach in this district of South Africa, which has an HIV prevalence of 42.3 % among pregnant women presenting at antenatal clinics (the highest rate in all of the country's 52 districts) [10]. The provincial prevalence rate of HIV in KwaZulu-Natal is estimated at 25.8 % in the 15–49 age group [10].

Procedures

Sampling Strategy

A total of 21 schools (10 elementary schools and 11 secondary schools) in Pietermaritzburg are located within a 5 km radius of WKU clubhouse, which is the defined area chosen for the sampling strategy. No secondary schools received the WKU OTB, because it is a program which targets younger youth in elementary schools. Due to operational limitations at WKU, class scheduling, and OTB program roll-out, only 6 of the 10 elementary schools had received the WKU OTB program by the time of data collection for the current survey study.

For the current survey study, a total of 10 schools (5 elementary and 5 secondary schools) were chosen for inclusion by random sampling. The random sampling was stratified to include five elementary schools and five secondary schools (out of the total 21 schools in the district), to address the primary and secondary objectives of the survey. The elementary schools were stratified to include three of the 6 schools who participated in OTB program and two who had not yet participated in the OTB program.

Within each sampled school, three classes were chosen at random to participate in the survey, and all assenting students in the selected samples participated.

The intervention: 12-week WKU "On The Ball" program

The WKU program model is based on the social cognitive theory of behavior, which emphasizes self-efficacy as an important predictor of risk behavior [11]. As such, WKU programming in HIV prevention goes beyond knowledge and attitudes and seeks to foster self-efficacy to make healthy choices. With respect to HIV prevention, youth need good self-efficacy to withstand peer pressure to have sex before feeling ready, to insist on condom use when partners dismiss the need for condoms, and to access HIV counseling and sexual health care services. Briefly, the OTB WKU program consists of eight, 90-min sessions each connecting soccer fundamentals, such as attacking the goal and controlling the game, to learning outcomes critical to HIV prevention, such as setting healthy goals and controlling emotions. The program is delivered in the public elementary schools by WKU counselors trained to use the detailed WKU OTB manual. Each session has five different types of activities: pictures, question and answers, key statements, group activities, and soccer coaching. The program is designed for up to 50 elementary youth at a time, with equal numbers of girls and boys. The content of the WKU OTB programming focuses on disseminating important HIV knowledge, building self-esteem and helping to develop healthy coping strategies to deal with peer pressure regarding alcohol and drug use. The WKU OTB program was delivered as a component of the Life Orientation public school curriculum in grades 5–7. In schools where it was offered, the WKU OTB program supplemented existing classroom-based HIV awareness programming received in all public schools in South Africa as part of HIV education.

Measures

The survey package included 56 items administered to elementary school students in grades 5–7 and 72 items administered to high school students in grades 8–12. Elementary school children did not receive sixteen items that contained sexual content. Questionnaire items included: demographics; use of leisure time; experience with, and knowledge of, the WKU OTB program; sexual behaviors; access to, and attitudes towards, health services and HIV testing; and alcohol and drug use. Nine items assessing HIV knowledge were also included in the survey, consisting of four items of general HIV knowledge administered to all participants (e.g. "Are antiretroviral medications an effective treatment for people with HIV/AIDS?"); and 5 items including sexual content which were only administered to high school students (e.g. "Can HIV be passed on from unprotected oral sex?"). HIV knowledge items on the HIV knowledge scale were scored as correct or incorrect, and a percent correct score was calculated for each participant. Finally, a nine-item validated AIDS-related stigma scale [12] was administered to participants. The scale was made up of statements of stigma toward people living with HIV, such as "People with HIV should be isolated." Following the scoring procedure defined by Kalichman et al. [12], items were scored dichotomously as agreeing or disagreeing with a statement of stigma. For each participant, the proportion of stigma laden statements to which they agreed was used as a measure of the level of stigma they held toward people living with HIV.

In the classrooms, the study research assistants distributed mobile cell phones to all students. The survey was administered using Mobile Researcher (which has since been renamed Mobenzi Researcher—see www.clyral.com), a specialised software program. Students responded to all questionnaire items on their pre-programmed mobile phones. The survey took $\sim$20–40 min to complete. Upon survey completion, responses were automatically uploaded over Vodacom's GPRS wireless network to a secure server, and deleted from the cell phone.

Data Analyses

Descriptive demographic information was recorded by grade and compared between youth who had taken part in the WKU OTB program in addition to traditional classroom-based HIV education to those who had not participated in the WKU OTN program by using one-way Analysis of Variance (ANOVA) and Chi Square tests, as required. To address the primary objective of the survey, an ANOVA was conducted to evaluate levels of HIV knowledge and HIV stigma between WKU OTB participants and those that had not received the WKU OTB program, after first exploring the potential impact of time since program participation (1–4 years) on the outcome variables using Pearson correlations. This analysis was limited to grades 5–8, as students in grades 9–12 were unlikely to have been exposed to the WKU OTB program, since the program is only offered in elementary schools. Finally, to evaluate binary behavioral outcomes, including drug and alcohol use between those that did and did not take part in the WKU OTB program, logistic regression was employed, controlling for grade. We also conducted exploratory analyses using Pearson correlations to determine if differences in HIV knowledge would be reflected in attitudes and behaviors associated with a decreased risk of HIV

infection, such as lower reported drug and alcohol use and higher levels of condom use, greater use of sexual and health services and feelings about testing positive for HIV. These exploratory analyses were limited to grade 8 students for whom self-reported sexual behaviors had been collected, and for whom adequate comparable numbers had participated in the WKU OTB program ($n = 41$) versus those who had not participated in WKU OTB ($n = 46$).

To address the second survey objective, we examined response patterns to items on HIV knowledge, sexual behaviors, attitudes towards HIV and health care seeking behaviors of survey respondents in grades 9–12. In addition, we explored self-report data on behaviors such as alcohol and drug use, as well as participants' knowledge and awareness of the availability of local health services and of the WKU afterschool soccer league and clubhouse location. We aimed to identify the need for healthcare services available to older South African youth, and the potential role of WKU to fill any gaps in health care services.

Results

A total sample of 972 youth completed this questionnaire survey, of which 267 (27.5 %) had received the WKU OTB program ($n = 148$ boys; $n = 119$ girls). Of the youth sampled, 3 students (1.1 %) completed the WKU OTB program in the same year as participating in the survey; 95 (35.6 %) students completed the WKU OTB program 1 year prior to participating in the survey; 83 (31.3 %) students participated in the program 2 years prior to the survey; 34 (12.7 %) students participated in the program 3 years prior to the survey; and 3 (1.1 %) students had completed the WKU OTB program 4 years prior to participating in the survey. 49 students did not remember what year they participated in WKU OTB (18.3 %). Demographic information for survey participants is presented in Table 1. Not surprisingly, few of the survey respondents in grades 9–12 participated in the WKU OTB program, as the program targeted grade school students. Although only implemented for grades 5–7, almost equal numbers of grade 8 students surveyed did and did not take part in the WKU OTB program in previous years. Importantly, survey participants that participated in the WKU OTB program did not differ significantly from participants that did not receive the WKU OTB program on any of the identified demographic characteristics listed in Table 1, including household living arrangement. Of note, the proportion of students in single or no parent households (e.g. grandmother or older sibling as primary caregiver) among our survey respondents is typical of the Umgungundlovu district in KwaZulu-Natal, South Africa.

Differences Between WKU and Non-WKU Participants: Grades 5–8

Despite the variability in elapsed time (i.e. 1–4 years) from the WKU OTB program delivery to survey administration, time-lag was not significantly associated with any of the study outcomes among the grade 5–8 survey respondents (effect size <0.3). As such, for all analyses data were combined for all grades, regardless of the time since program participation. As detailed in Table 2, there was a significant effect of receiving the WKU OTB program on HIV stigma scores among grades 5–8 (F (2, 601) = 10.74, $p < 0.001$), with WKU OTB program participants demonstrating lower HIV stigma scores (M = 27 %, SD = 21) compared to non-WKU OTB participants (M = 33 %, SD = 23). There was also a significant effect of WKU OTB training on general HIV knowledge (F (2, 608) = 12.44, $p < 0.001$); WKU OTB program participants correctly responded to the general HIV knowledge items at a higher rate (M = 49 % correct, SD = 28) than non-participants (M = 37 % correct, SD = 28). Participation in the WKU OTB program was also associated with a significantly reduced likelihood of engaging in drug use (OR = .463, 95 % CI: 0.31–0.70; $p < 0.001$) as well as alcohol use (OR = 0.486, 95 % CI: 0.31, 0.76; $p = .002$), after controlling for grade.

Differences Between WKU and Non-WKU Participants: Grade 8 Sexual and Non-sexual Measures

Subgroup Chi square analyses of Grade 8 survey participants yielded non-significant differences in HIV knowledge and attitudes towards HIV, likely due to small numbers. In addition, reported sexual behaviors among grade 8 survey respondents were too low in frequency to carry out any between group analyses. However, when examining grade 8 students that participated in the WKU OTB program, there was a significant negative correlation between participants' reported feelings of shame regarding a positive HIV test and HIV knowledge ($r = -0.32$, $p = 0.04$). This suggests that those with higher HIV knowledge reported less shame associated with an HIV diagnosis. There was no significant correlation for grade 8 students who had not participated in WKU OTB. Finally, knowledge scores were also negatively correlated with the reporting of symptoms indicative of sexually transmitted infections ($r = -0.33$, $p = 0.04$), suggesting that higher HIV knowledge was associated with fewer STI symptoms. This correlation was not significant for grade 8 students who had not participated in WKU OTB. All remaining analyses were non-significant.

Notably, while there was a non-significant effect of the WKU OTB program on total HIV knowledge scores for

Table 1 Demographic characteristics by grade of participants who received WKU program and those who did not ($N = 972$)

Grade	Received WKU OTB program			Sex	Guardian status (%)		
		n	%	%Males	Both parents	Single parent	Other
5	Yes	42	19.6	64.2	50	33	17
	No	172	80.4	51.2	50	28	22
6	Yes	44	33.5	63.6	52	30	14
	No	87	66.5	51.7	48	36	15
7	Yes	104	54.5	52.9	40	37	22
	No	87	45.5	56.3	38	38	24
8	Yes	41	47.1	53.7	34	36	30
	No	46	52.9	63.0	37	37	26
9	Yes	8	12.5	75.0	25	13	62
	No	56	87.5	42.9	18	43	39
10	Yes	19	25.6	36.8	32	36	32
	No	55	74.4	50.1	24	51	25
11	Yes	7	6.4	42.9	57	43	0
	No	103	93.6	45.6	24	47	28
12	Yes	1	1.0	0	100	0	0
	No	93	99.0	49.5	25	50	25

A total of 267 (27.5 %) participants received the WKU program ($n = 148$ boys, $n = 119$ girls). No significant differences between WKU participants and non-WKU participants by sex or guardian status ($p > 0.05$)

Table 2 Differences between WKU and non-WKU participants in grades 5–8 ($n = 629$)

Outcomes	Received WKU program		Did not receive WKU program		*p* value
Grades 5–8	Mean (%)	SD (%)	Mean (%)	SD (%)	
HIV stigma	27	21	33	23	<0.001*
HIV general knowledge	49	28	37	28	<0.001*
Grade 8 participants only	($n = 41$)		($n = 46$)		
HIV general knowledge	70	24	66	29	0.074
HIV sex-related knowledge	59	27	49	26	0.014*

Means for HIV knowledge are presented as mean percent correct

* Statistical significance

grade 8 participants (F (2, 84) = 2.69, $p = 0.074$) there was a significant effect of the WKU OTB program on percent of correct responses related to HIV sexual knowledge (F (2, 84) = 4.53, $p = 0.014$). WKU OTB participants scored significantly higher (M = 59 % correct, SD = 27) than non-WKU OTB participants (M = 49 % correct, SD = 26) than on HIV sexual knowledge.

Descriptive Statistics: Grades 9–12

Descriptive data for survey respondents in grades 9–12 ($n = 342$) include the following. As expected, a large percentage of survey respondents in grades 9–12 reported being sexually active (55.6 %). Importantly, in this high HIV prevalence province of South Africa, self-reported use of a condom during the most recent sexual encounter was low (29 %) among grade 9–12 survey respondents, and HIV counseling within the last 6 months was uncommon (31 %). Further, although many survey respondents reported being aware of health clinics offering free HIV testing, less than one-third of survey respondents were tested for HIV in the past 6 months. While the reported uptake of available health services was low, most survey respondents (>90 %) answered that they would use a youth friendly health clinic affiliated with the WKU clubhouse if one became available.

Discussion

As compared to grade 5–8 students who did not participated in the WKU OTB program, WKU OTB participants had higher levels of HIV knowledge and lower levels of HIV stigma. These results demonstrate the potential impact of interactive HIV education and prevention programs such as WKU OTB and point to their added value over existing classroom-based HIV education as an HIV prevention strategy. Our results add to the existing evidence that has emerged from the evaluation of similar programs. Maro et al. [8] found that an AIDS education intervention using peer coaches within a sports program when added to the traditional classroom-based education was more effective than the traditional AIDS education alone in imparting HIV-prevention knowledge, cognitions and perceived behaviors among 764 Tanzania youth (mean age 13.6 years $\pm$ 1.07, range 12–15). Our results are also consistent with research on the benefits of interventions targeting younger youth on HIV knowledge and risk reduction [9]. For example, Clark et al. [9] examined a four-session intervention provided by professional soccer players to grade 7 youth in South Africa ($N = 304$). Specifically, they found significant increases in HIV knowledge and attitudes from pre- to post-intervention for youth who received the HIV curriculum on the soccer field, compared to youth who did not receive the HIV curriculum [9].

Since WKU targeted younger students in grade schools, it is not surprising that few of our survey respondents in the older grades were exposed to the WKU OTB program. However, many students knew of the WKU after-school mixed-sex soccer league and could identify the location of the WKU clubhouse. Consistent with previous research with older adolescents [10, 13], many survey respondents reported being sexually active, however less than a third of survey respondents had recently been tested for HIV and only 29 % reported using a condom during their most recent sexual encounter. The low percentage of grade 9–12 students responding correctly to sexual HIV knowledge questions, such as "Can men get HIV from other men by having anal sex?" (60 % correct) and "Does an HIV infected male's semen carry the virus?" (70 % correct), suggests that traditional classroom-based HIV awareness and education programs offered as part of South Africa's regular Life Orientation school curriculum may be insufficient sources of information regarding HIV prevention.

The ultimate goal the WKU OTB program is to empower youth with knowledge and confidence to make healthy choices and behave in a way that limits their risk of acquiring HIV. While the low number of sexually active grade 8 survey respondents prevented evaluation of the impact of the WKU OTB program on sexual behaviors, our preliminary results suggest that higher HIV knowledge and lower HIV stigma among grade 5–8 WKU OTB participants may have a positive impact on other behaviors. Notably, the likelihood of alcohol and drug use, which are known to be associated with an increased risk of acquiring HIV [14, 15], was lower among WKU OTB participants compared to non-WKU OTB participants. While overall HIV knowledge did not differ between groups of grade 8 survey participants based on WKU OTB participation, knowledge on HIV sexual health items was significantly higher among WKU OTB participants compared to non-WKU OTB participants. Among WKU OTB participants, higher HIV knowledge was also associated with lower levels of shame in the event of a positive test—a relationship that was not evident among non-WKU OTB participants—suggesting that WKU OTB participants have a better understanding of the disease, which may have important consequences for subsequent health-seeking behavior.

It is worth commenting on the advantages afforded by the data collection methodology employed in the present study. Given their popularity and ease of use in many developing countries, cell-phones are increasingly being used in research for data collection by research personnel [16], for the dissemination of study information [17], and as a strategy to improve treatment adherence to medications such as antiretroviral therapy for HIV [18, 19]. In the current study, cell-phones in combination with mobile service technology was used to securely administer and upload sensitive data on sexual risk behavior and HIV stigma, thereby reducing the chance of bias in self-reported responses. The ease of data collection from survey respondents also enabled data collection from a broad range of both elementary and secondary schools in the Pietermaritzburg area over a very short timeframe, supporting the generalizability of the study's findings.

Limitations

While the size of the population studied and the scope and breadth of HIV related topics covered by the survey is notable, our study had a number of limitations. First, it is important to acknowledge the limitations of our study design. Program evaluation is ideally carried out based on pre and post intervention evaluations of the domains of interest targeted by the intervention. As with many NGOs in Africa, WKU historically focused on optimizing delivery and outreach of its WKU OTB program and after-school soccer league, leaving limited funding for program evaluation. The survey and results presented in this study were only made possible through partnerships between WKU and South African, American, and Canadian academic institutions interested in the evaluation of interventions targeting HIV prevention. These partnerships are now

affording the opportunity for on-going evaluations to inform future WKU programs.

Second, the nature of the population selected for data collection, in conjunction with the temporal roll-out of the WKU OTB program in Pietermaritzburg, provided a number of data analysis challenges which may have introduced bias and limited the interpretation of our results. Specifically, the limited number of survey respondents who participated in the WKU OTB program and completed the questionnaire items with sexual content did not allow for an in-depth examination of the impact of WKU OTB on risky sexual behaviors and health seeking behaviors. Further, given the lack of youth-friendly health services in the Pietermaritzburg area at the time of the survey, it is also difficult to determine the impact of the WKU program on the use of sexual health services. In addition, given the duration of the time elapsed between the implementation of the WKU OTB program in the elementary schools and the administration of the survey there is the potential for confounding by external influences. While allowing for an adequate number of schools and students to be exposed to the WKU OTB program and the necessary power to detect any effect of the intervention, time-dependent factors such as maturation or impact of other HIV awareness programs cannot be discounted for their effect on the study findings. In our study, time since the WKU OTB program was a non-significant predictor of between-group differences among grade 5–8 in HIV knowledge and HIV stigma. Further, given the randomized assignment of surveyed schools within the sampling frame, it is unlikely that external factors differed between those who received the WKU OTB program in addition to traditional classroom-based HIV education and those who only received traditional classroom-based HIV education. Finally, validation of these preliminary findings on a larger sample of youth is required.

Conclusions and Future Directions

On June 1st 2010, the WhizzKids United Health Academy (WKUHA) opened its doors, which was enabled through a partnership with the Edendale Hospital in Pietermaritzburg, South Africa and with support from the Department of Health in South Africa and FIFA, the governing body of international soccer that administers the World Cup. Importantly, the WKUHA is adjacent to the Edendale Hospital and the WKU clubhouse, and is beside the soccer pitch, making it highly accessible to youth. Services being offered at the new youth friendly health academy were in large part informed by the results of this study's school-based health survey and include sexual health education, counseling, and testing for all sexually transmitted infections, including HIV testing. Adolescents testing positive for HIV can also receive anti-retroviral treatment and on-going follow-up on site. The recent addition of the WKUHA has enabled The Africaid Trust to use its unique HIV prevention platform through the WKU program to engage youth and promote health care behaviors by removing barriers to youth accessing healthcare and providing services in a youth-friendly low-threshold environment. Notably, in its first 2 years of operation, ~8,000 adolescents received health services at the WKUHA. Innovative programs that support HIV prevention among youth will be critical to national strategies in developing countries in Sub-Saharan Africa. On-going support and evaluation of innovative and youth friendly HIV prevention programs and services such as those provided by the WKU OTB program are required to optimize health outcomes among vulnerable high risk youth.

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