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HIV prevention through sport: the case of the Mathare Youth Sport Association in Kenya.

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ABSTRACT

Sport has become a popular tool for HIV prevention, based on claims that it can foster life skills that are necessary to translate knowledge, attitudes and behavioural intentions into actual behaviour. Empirical evidence of the effectiveness of sport-based HIV prevention programmes is, however, sorely lacking. We therefore conducted a cross-sectional survey assessing sexual behaviour and the determinants thereof among 454 youth of the Mathare Youth Sport Association (MYSA) in Kenya and a control group of 318 non-MYSA members. Multiple (ordinal) logistic regression models were applied to measure the association between MYSA membership and attitudes, subjective norms and self-efficacy related to condom use as well as sexual experience, age at sexual debut, condom use, history of concurrent relationships, and number of partners in the last year. MYSA members were more likely to use condoms during the first sex act (odds ratio (OR)=2.10; 95% CI: 1.10–3.99). Consistent condom use with the current/last partner was 23.2% (36/155) among MYSA members versus 17.2% (17/99) among the control group. Even after adjusting for media exposure – a factor associated with both MYSA membership and higher frequency of condom use – MYSA members were still found to use condoms more frequently with their current/last partner (adjusted OR=1.64; 95% CI: 1.01–2.68). Nevertheless, levels of condom use remain disturbingly low. More rigorous evaluations of sport programmes for HIV prevention are needed. When possible, programmes should be preceded by baseline assessments, trends in risk behaviour of the intervention group should be compared with those of a control group, and protocols for data collection and analysis should include measuring of and adjusting for potentially confounding factors.

Keywords: HIV prevention, sport, youth, Kenya, East Africa

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INTRODUCTION

In Kenya, the prevalence of HIV among adults declined from 10% in the late 1990s to under 7% in 2003 (Cheluget et al., 2006). A downward trend in HIV prevalence among female sex workers was also observed over the period 1985-2005 (Kimani et al., 2008). Peer-mediated interventions in these groups have shown to result in a reduction in unprotected sex (Luchters et al., 2008). However, high HIV incidence rates continue to affect young people and other vulnerable populations in Kenya, and the most recent figures from the Kenya AIDS Indicator Survey (KAIS) show an increased HIV prevalence among 15-49 year olds from 6.7 % in 2003 to 7.8 % in 2007. The risk for infection is highest among young women and girls. Young women aged 15 to 24 are 4 times more likely to be infected than young men (6.1 percent compared to 1.5 percent) (Ministry of Health Kenya, 2008). Biological factors, large age differences between young women and their sexual partners, as well as the low likelihood of condom use in such relationships, may explain this disparity in the risk of HIV infection between the sexes. (Brabin, 2001; Chersich & Rees, 2008; Hargreaves et al., 2009; Luke, 2005).

The Mathare Youth Sport Association (MYSA) has been on the forefront of grassroots HIV prevention for vulnerable young people. Established in 1987, this non-governmental organisation has been active in and around Mathare Valley – one of the poorest slum areas in Africa. The population of Mathare Valley is estimated at 180 000 people, living in an area of less than five square kilometres. There are only a few schools for the 70 000 children in Mathare Valley, and more than one in five people in Mathare is thought to be HIV positive. (Médecins Sans Frontières, 2008).

MYSA links sports with environmental clean-ups, HIV prevention, leadership training, awareness raising and other community service activities. Over the years, it has grown to be the largest self-help youth sports and community service organisation in Africa, with approximately 14 775 male and 4 275 female members in 2008 (Mathare Youth Sport Association, 2009). MYSA's strategy to prevent new HIV infections is grounded in the Social Learning Perspective (Bandura, 1977). Social Learning Theories claim that people

acquire and maintain certain behavioural patterns through a constant interaction between three factors: the individual, his environment, and his behaviour. Behaviour is not simply the result of the environment and the individual, just as the environment is not simply the result of the individual and his behaviour. The environment provides models for behaviour (Glanz, Rimer, & Lewis, 2002). MYSA uses peer educators to spread information and creates a healthy environment in which behaviour change can take place. To that end, MYSA employs a scheme that integrates sport and life skills through peer education, peer counselling, games, music, drama, puppetry and other cultural and recreational activities. Children may choose which activities they wish to join and MYSA meetings have an open door policy.

Within the sport-for-development movement, a loosely connected coalition of organisations promoting development through sport, sport is generally perceived as a valid instrument in the fight against HIV and AIDS. The rationale behind the use of sport in HIV prevention programmes is based on claims that sport can provide an attractive and accessible platform to disseminate health information, and that it can foster life skills that are necessary to translate knowledge, attitudes and behavioural intentions into actual behaviour (Koss & Alexandrova, 2005).

Empirical evidence of the effectiveness of sport-based HIV prevention programmes is, however, sorely lacking, and efforts to scale up these programmes are mainly based on the intuitive judgement of sport enthusiasts, rather than sound monitoring and evaluation (Delva & Temmerman, 2006). In order to address this research gap, we conducted a cross-sectional survey assessing sexual behaviour and determinants thereof among MYSA members and a control group of non-MYSA members. In addition, we determined whether there is a dose-effect of exposure to MYSA's HIV prevention activities on indicators of risky sexual behaviour.

METHODS

The intervention

The MYSA HIV/AIDS Prevention and Awareness Project consists of several components; the main components are the Rotational Facilitation, School Outreach Programme, Movement Games and the Resource Centre. The main facilitators in all of these programmes are MYSA-trained volunteer peer educators and peer counsellors.

In the Rotational Facilitation, peer educators and peer counsellors visit teams in one of the 16 MYSA zones to educate youth about topics affecting people in that particular zone. The peer educators talk for 10 to 30 minutes in an interactive way to the youngsters. In the School Outreach Programme, the peer educators mainly use group discussions as a tool to deliver their message. Each session in a school takes two to three hours. The topics of discussion are chosen in dialogue with the pupils. The Movement Games are done with younger children up to the age of 14. In this component of the HIV/AIDS Prevention and Awareness Project, sport and play are used in a more direct way. Through various forms of play knowledge is conveyed to youngsters and awareness is created about HIV and AIDS. A peer counsellor is always present in the Resource Centre to provide individual information and advice. Books and videos about sexual and reproductive health issues including HIV, gender, drugs and teenage pregnancy are available for consultation. Lastly, the volunteers from the HIV/AIDS Project often take the opportunity to give information and education during MYSA football tournaments.

Effectiveness assessment

Study design

The impact of the MYSA HIV/AIDS Prevention and Awareness Project was assessed using a cross-sectional study design with an intervention and control group. Participants were eligible if they were between 12 and 24 years old. For the intervention group, people from all the MYSA zones and all MYSA programmes were eligible for participation and candidate respondents were approached during different MYSA activities.

In order to reduce socio-demographic differences between the intervention and the control group, the control respondents had to live in the same geographical region. To

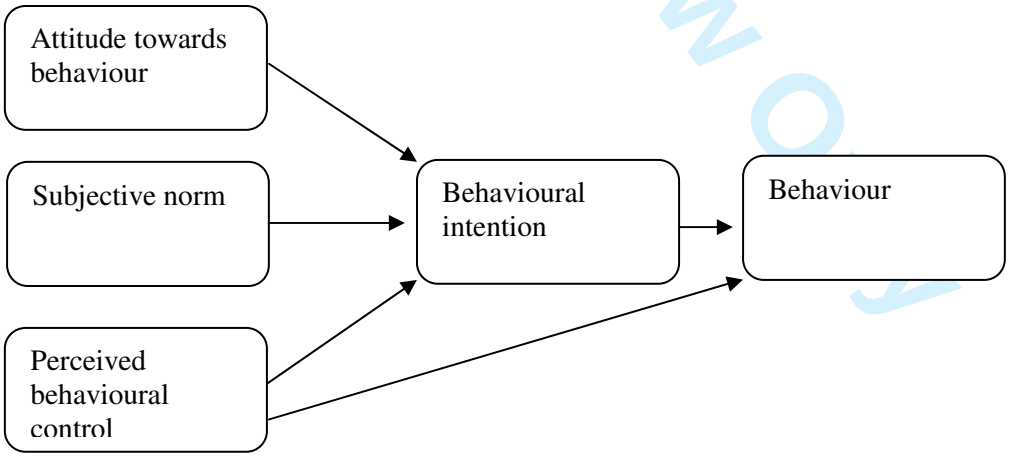
select the control respondents, venues and locations where youth meet (i.e. youth clubs, schools, social organisations) were selected in the 16 MYSA zones. In these sites, all young people within the age range of 12 to 24 were invited to participate. Data collection was done from July to October 2007. Data collection took place in private rooms of the participating organisations and no person who could be perceived as an authority by the young people was present during survey administration.

All subjects were asked to sign an informed consent in which they confirmed that their participation in the study was voluntary and anonymous. In the case of a subject being younger than 18 years, a supervisor (e.g. MYSA peer educator) was asked to sign as well.

Theoretical framework

The theoretic framework used for this evaluation and analysis is the Theory of Planned Behaviour (Ajzen, 2002). As illustrated by Figure 1, this model identifies behavioural intention as the main determinant of behaviour. Intention is in turn influenced by the person's attitude towards the behaviour, the subjective norm and his or her perceived behavioural control.

Figure 1. Path diagram of the Theory of Planned Behaviour (Ajzen, 2002).



Data collection method

Data were collected using a self-administered questionnaire of closed-ended questions in English. The questionnaire was based on existing and validated questionnaires and included sections about the demographic profile of the respondents, exposure to MYSA activities, knowledge about HIV/AIDS, attitudes and perceptions towards HIV/AIDS, sexual behaviour, VCT experience, sexual intentions, social capital and perceptions of body and health (Harvey, Stuart, & Swan, 2000; Iriyama, Nakahara, Jimba, Ichikawa, & Wakai, 2007; James, Reddy, Taylor, & Jinabhai, 2004; O'Leary, Maibach, Ambrose, Jemmott III, & Celentano, 2000; Olley & Rotimi, 2003; Slaymaker, 2004; UNAIDS, 2001; Visser, 2005). The questionnaire was divided into two sections: one section to be answered by all subjects, the other to be answered only by those who reported to have previously had sexual intercourse. The questionnaire was piloted among 25 MYSA members. Following this pilot study small corrections were made in layout and answer categories and a translation was provided in Kiswahili for specific terms. Self-administration of the questionnaire took between 20 and 45 minutes.

Statistical methods

Data analysis was performed with R version 2.9.0 (Ihaka & Gentleman, 1996; R Development Core Team, 2005). First, chi²-tests were used in bivariate analyses to compare attitudes, norms, self-efficacy, intentions and sexual behaviour between MYSA members and youth from the control group, and to identify factors associated with MYSA membership. Sexual behaviour was measured by several outcome variables: sexual experience (having had vaginal and/or anal intercourse), age at sexual debut, condom use at first/last sex act, history of concurrent relationships, condom use with current/last partner and number of partners in the last year. Next, the potentially confounding effects of age, sex, religion, ethnicity, exposure to media, social capital and perceptions of body and health on the association between MYSA membership and the outcome variables of interest status were assessed via multiple (ordinal) logistic regression models. Lastly, we constructed a MYSA activity score, ranging from 0 (no participation in any of the HIV prevention activities) to 12 (intensive participation in all components of the project), to measure to which degree individuals had been exposed to the MYSA HIV/AIDS Prevention and Awareness Project. For outcome variables

associated with MYSA membership, the MYSA activity score was included in a secondary regression analysis to assess the evidence for a significant dose-effect of the project.

RESULTS

Data from 892 questionnaires were considered: 474 in the MYSA group and 418 in the control group. Subjects from the control group who had been involved in the MYSA School Outreach programme (93 subjects) were excluded from the analysis. After filtering for age inclusion criteria and inconsistent responses, 772 questionnaires were used for further analysis: 318 control and 454 MYSA.

Socio-demographic characteristics

Respondents had a mean age of 16.2 years. Both groups had a similar mean age: 16.1 years in the MYSA group and 16.4 years in the control group (p=0.18). The MYSA group contained significantly more male respondents than the control group (73.6% versus 57.6%; p<0.001). Christianity was by far the dominant religion in both groups: 90.5% in the MYSA group and 93.9% in the control group (p=0.15). Schooling levels in respondents in the MYSA group (80.5%) were comparable to those in the control group (79.5%) (p=0.81). The MYSA group contained significantly more respondents of the Luo ethnic group, while Kikuyu were more present in the control group (p<0.001). The socio-economic situation of the respondents was assessed through questions regarding the roofing and flooring material of the houses the respondents were living in and no significant differences between the MYSA and control group were found.

Table 1. Socio-demographic characteristics of the respondents.

	All	MYSA	Control
Age (mean) (2-sample t-test: p=0.18)	16.2	16.1	16.4
Gender (% male) (Chi²-test: p<0.001)	67.0% (514/767)	73.6% (332/451)	57.6% (182/316)
Religion (Chi²-test: p=0.15)			

Christian	91.9% (696/757)	90.5% (401/443)	93.9% (295/314)
Muslim	7.1% (54/757)	8.1% (36/443)	5.7% (17/314)
Other	0.9% (7/757)	0.3% (1/443)	1.4% (5/314)
Ethnic group (Chi²-test: p<0.001)			
Kikuyu	43.2% (325/753)	36.9% (163/442)	52.1% (162/311)
Luo	24.0% (181/753)	28.1% (124/442)	18.3% (57/311)
Luhya	13.8% (104/753)	15.2% (67/442)	11.9% (37/311)
Kamba	11.2% (84/753)	12.0% (53/442)	10.0% (31/311)
Other	7.8% (59/753)	7.9% (35/442)	7.7% (24/311)
Schooling: in school (Chi²-test: p=0.81)	80.1% (594/742)	80.5% (350/435)	79.5% (244/307)
Living situation			
Floor (Chi²-test: p=0.55)			
Concrete, cement, tiles, brick, vinyl	76.8% (562/732)	77.7% (334/430)	75.5% (228/302)
Wood, cane, earth, sand	23.2% (170/732)	22.3% (96/430)	24.5% (74/302)
Roof (Chi²-test: p=0.12)			
Concrete or tiles	36.9% (272/737)	33.9% (145/428)	41.1% (127/309)
Metal	56.3% (415/737)	58.6% (251/428)	53.1% (164/309)
Grass or wood	6.8% (50/737)	7.5% (32/428)	5.8% (18/309)

Sexual activity

Table 2. Differences in sexual activity between MYSA respondents and control group.

	All respondents	**MYSA**	**Control group**
Sexually active (p=0.23)	36.7% (262/714)	38.6% (160/414)	34.0% (102/300)
Girls (p=0.24)	26.3% (64/243)	22.3% (25/112)	29.8% (39/131)
Boys (p=0.18)	42.1% (197/468)	44.5% (134/301)	37.7% (63/167)
Partners in last year* (p=0.58)			
0 partners	13.7% (35/256)	16.0% (25/156)	10.0% (10/100)
1 partner	41.4% (106/256)	39.7% (62/156)	42.0% (42/100)
2 partners	18.6% (48/256)	18.6% (29/156)	19.0% (19/100)
>2 partners	27.0% (69/256)	25.6% (40/156)	29.0% (29/100)
Concurrent partners* (p=0.23)	27.0% (65/241)	29.6% (42/142)	23.2% (23/99)
Boys (p=0.29)	27.5% (50/182)	30.3% (37/122)	21.7% (13/60)
Girl (p=0.79)	25.4% (15/59)	25.0% (5/20)	25.6% (10/39)
Mean age at sexual debut* (p=0.08)	14.7	14.4	15.2

* among those reporting ever having had sex

The fraction reporting to have ever had sex was similar in the MYSA (38.6%; 160/414) and control (34.0% (102/300) group (p=0.23). Furthermore, in both groups boys reported more frequently to have had sex than girls. The mean age at sexual debut was 14.4 years for the MYSA group and 15.2 years for the control group (p=0.08). Within the sexually active group of the respondents, no significant differences were found in the number of sexual partners between MYSA members and subjects of the control group (p=0.58). Among the sexually active members of MYSA, 55.8% (87/156) reported to have had no or one sexual partner during the last year, versus 52.0% (52/100) of the subjects in the control group. The percentage of respondents reporting to have ever had concurrent relationships was not significantly different either for MYSA members compared to their counterparts in the control group (p=0.23). Among MYSA respondents however, boys reported concurrent partners more frequently than girls, while the opposite was true in the control group.

Condom use

Table 3. Differences in condom use between MYSA respondents and control group.

	All respondents	MYSA	Control group
Condom use first sex* (p=0.033)	25.5% (61/239)	30.6% (45/147)	17.4% (16/92)
Condom use last sex* (p=0.040)	50.8% (123/242)	56.4% (84/149)	41.9% (39/93)
Frequency of condom use with current/last partner* (p=0.037)			
Always	20.9% (53/254)	23.2% (36/155)	17.2% (17/99)
Most of the time	15.4% (39/254)	17.4% (27/155)	12.2% (12/99)
Sometimes	29.1% (74/254)	31.6% (49/155)	25.3% (25/99)
Never	34.6% (88/254)	27.7% (43/155)	45.5% (45/99)

* among those reporting ever having had sex

Significantly more MYSA members (30.6%) reported to have used a condom during the first sexual intercourse compared to respondents from the control group (17.4%)

(p=0.033). A slightly smaller yet still significant relative difference was observed for condom use during the last sexual intercourse (56.4% for MYSA members and 41.9% for members of the control group) (p=0.040). The frequency of condom use with the current or last partner was also higher among MYSA members than among subjects from the control group (p=0.037), but the prevalence of *consistent* condom use was only marginally higher among the MYSA group (23.2% versus 17.2%; p=0.31).

Attitudes, norms, self-efficacy and intentions

Attitudes, norms, self-efficacy and intentions, considered to be associated with sexual behaviour according to the Theory of Planned Behaviour, were measured using 4-point Likert-scales. Each factor was measured by two questions, which resulted in sum scores between 0 and 8. Wilcoxon tests showed no significant differences between the MYSA group and the control group on compiled factors for attitudes towards risk avoiding behaviour (median score=6, p=0.97), subjective norms on virginity and responsibility (median score=6, p=0.49), nor for behavioural intentions concerning condom use and remaining faithful to a partner (median score=6, p=0.22). For behavioural control concerning condom use (having one or more condoms with and not having difficulty finding a place to buy a condom) respondents from the MYSA group scored better than their counterparts from the control group (median MYSA score=4, median control group score=3, p=0.003).

Confounding factors

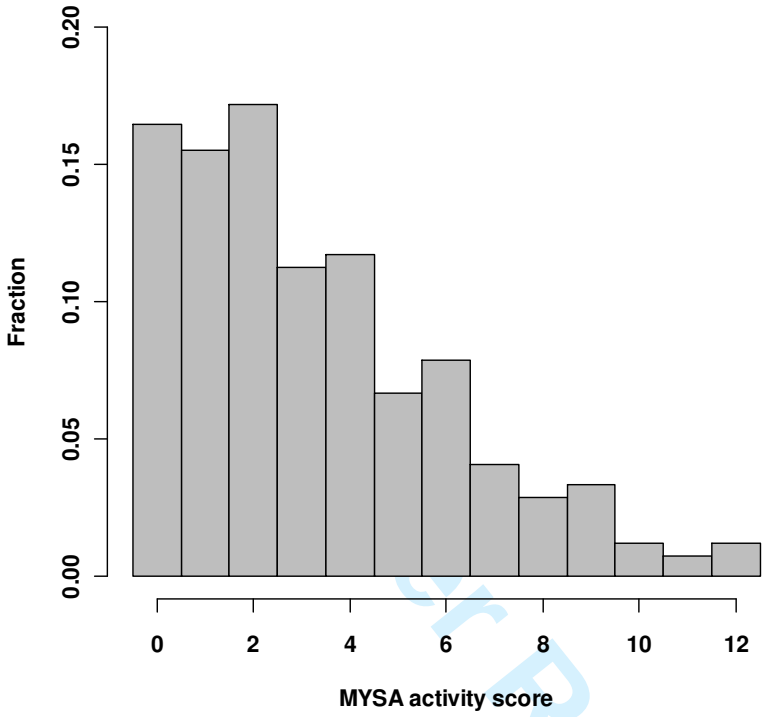
As shown in Table 1, the MYSA group contained significantly more boys than the control group, and there were also ethnic differences between the two groups. Furthermore, MYSA members were found to have greater exposure to media (newspapers, television, radio), had a greater social capital and were more aware of the importance of taking care of their body and health. We performed multivariate regression analyses to control for these potentially confounding variables. The associations between MYSA membership and ever having had sex, number of sexual partners in the last year, history of concurrency and age of sexual debut remained statistically insignificant when adjusted for these candidate confounding factors. Adjusting for the effect of MYSA

(OR=2.10; 95% CI: 1.10–3.99), none of the candidate confounding factors were independently associated with condom use at first sex. For condom use at last sex and frequency of condom use with the current or last partner, we found that the positive effect of MYSA was reduced after adjusting for exposure to media, rendering it insignificant for the former (from the unadjusted OR=1.79; 95% CI: 1.06–3.02 to the adjusted OR=1.56; 95% CI: 0.90–2.71) and borderline significant for the latter (from the unadjusted OR=1.86; 95% CI: 1.17–2.98 to the adjusted OR=1.64; 95% CI: 1.01–2.68).

Dose-effect

As evident from Figure 2, only a minority of MYSA members had been maximally exposed to the organisation's HIV prevention activities while about one in six (69/419) had not participated in any of these.

Figure 2. Exposure to the MYSA HIV/AIDS Prevention and Awareness Project among MYSA members.



We performed additional regression analyses to investigate whether MYSA members with higher activity scores were more likely to use condoms at first sex and to use condoms more frequently. The analyses showed a lack of evidence for a dose-effect of the project. For condom use at first sex, the OR for the dose-effect, adjusted for the effect of MYSA membership, was 1.00; 95% CI: 0.87–1.14. The OR for the dose-effect on the frequency of condom use with the current/last partner, adjusted for media exposure and MYSA membership, was 0.97; 95% CI: 0.62–1.50.

DISCUSSION

This survey showed no significant differences between MYSA and non-MYSA members regarding attitudes towards risk avoiding behaviour, subjective norms on virginity and

responsibility, and behavioural intentions concerning condom use and remaining faithful to a partner. Vis-à-vis behavioural control concerning condom use, however, MYSA members reported stronger habits of having one or more condoms with them and had less difficulty finding a place to buy condoms. These results seem consistent with the initial bivariate analysis of sexual behaviour and MYSA membership. This analysis indicated that the sexual behaviour of MYSA members did not differ significantly from that of non-MYSA members, except that MYSA members were more likely to use condoms at first and last sex and that they used condoms more frequently with the current or last sexual partner. In the multivariate analysis none of the candidate confounding factors were independently associated with condom use at first sex after adjusting for the effect of MYSA. Adjusting for exposure to media reduced the effect size of MYSA membership on condom use at last sex and the frequency of condom use with the current/last partner, rendering the former association statistically insignificant. However, the respective point estimates for the effect sizes (OR=1.56 and OR=1.64) were still relatively large, and the wide confidence intervals around these estimates may be due to insufficient statistical power rather than lack of effect.

These findings concur with the results of a previous study in a South African mining community, which showed that young women who belonged to sports clubs were more likely to use condoms with casual partners than non-members (Campbell, Williams, & Gilgen, 2002). To our knowledge – our study is the first to report differences in frequency of condom use associated with an HIV prevention programme through sports as the two previously published evaluations of soccer-based programmes merely reported on changes in knowledge, attitudes and intentions (Clark, Friedrich, Ndlovu, Neilands, & McFarland, 2006) or used a composite scale to describe changes in *condom experience* (Maro, Roberts, & Sorensen, 2009). The analysis presented in this paper begs two key questions: Does the association of MYSA membership with increased condom use point to a causal effect? And if so, are the observed differences large enough to confer a sizeable impact on HIV incidence (averted HIV infections)?

If higher condom use in MYSA members was caused by the MYSA HIV/AIDS Prevention and Awareness Project, we would expect a dose-effect of the project according to Hill's criteria for causation (Hill, 1965). In contrast, we found that respondents who had been highly exposed to the programme were not more likely to use condoms than those who reported never having participated in the programme.

A first explanation for this may be self-selection bias (Westhoff, 1995). Individuals who are more likely to avoid unprotected sex, may be guided to do so by a greater sense of control over their own future or stronger feelings of responsibility towards the health of themselves and their sexual partners. The decision to join MYSA may be driven by the same underlying motives. This corresponds with the finding that MYSA members had a significantly higher perceived behavioural control than control respondents. Interestingly, attitudes towards avoiding risk behaviour, subjective norms on virginity and responsibility and intention concerning condom use and faithfulness were not significantly different between study groups as the median scores for these variables were very high (6/8 for all variables) in both groups. This could mean that there is a high awareness of the consequences of risky sexual behaviour and an acceptance of protective behaviour in the general population, but that the MYSA members have less difficulty putting these beliefs into practice. Our study attempted to measure and adjust for the potentially confounding effects of differential exposure to media, social capital, and perceptions of body and health. It is possible however, that other, unmeasured confounding factors explain the association between MYSA membership and condom use at first sex and higher frequency of condom use with the current/last partner.

Alternatively, it may be so that the mere fact of becoming a MYSA member, and not the specific HIV/AIDS prevention and awareness programme, influences condom use. A longitudinal cohort study measuring indicators of sexual behaviour in the MYSA and control group before and after implementation of the MYSA HIV/AIDS Prevention and Awareness Project would have been more appropriate to investigate causal effects of the project. However, such a study design was impossible, as MYSA's HIV prevention project was established in 1994.

Despite significantly higher condom use at first sex and with the current/last partner in the MYSA group compared to the control group, levels of condom use remain disturbingly low. Only 30.9% of the MYSA respondents say to have used a condom at first sex and consistent condom use with their last/current partner was reported by only 23.2% of MYSA members. Studies from Uganda and South Africa demonstrated the effectiveness of consistent condom use in reducing HIV infections and other sexually transmitted infections. In contrast, irregular condom use did not protect against HIV and other sexually transmitted infections and was associated with an increased risk of gonococcal and chlamydial infections (Ahmed et al., 2001; Katz & Low-Beer, 2008; Pettifor et al., 2005). Our results indicate that the goal of consistent condom use among youth in Mathare is far from reached, and that more is needed to effectively reverse the HIV epidemic.

The financial and human resources available for health care – and HIV prevention in particular – are not unlimited, and it is therefore crucial to prioritise and allocate resources according to the proven or estimated effectiveness of HIV prevention programmes (Creese, Floyd, Alban, & Guinness, 2002; Lasry, Zaric, & Carter, 2007; Zaric & Brandeau, 2001). A recent meta-analysis that combined results of 28 behavioural interventions for young people in sub-Saharan Africa showed only a significant impact on condom use at last sex among males (risk ratio: 1.46; 95% CI: 1.31-1.64) (Michielsen et al., 2010). Next to problems with implementation of interventions, the limited effectiveness might point to problematic underlying assumptions of HIV risk reduction interventions. Even though unprotected intercourse is the main mode of HIV transmission in sub-Saharan Africa, most intervention programmes use a reverse logic and assume that HIV-related knowledge and beliefs are the main determinants of sexual behaviour. However, many other factors on different levels influence sexual behaviour, including gender inequality, ethnicity, poverty, educational systems, policy and cultural practices (Bronfenbrenner, 1979).

Does this mean that we should reconsider investing in MYSA and other sport-based behavioural HIV prevention programmes? Not necessarily. Firstly, social and structural interventions such as the MYSA HIV prevention project may have long-term beneficial effects on the social cohesion and empowerment of its members, thus facilitating a shift towards social norms that foster the adoption of efficacious biomedical interventions (Delva, Pretorius, & Temmerman, 2009; Kippax, 2008). Secondly, MYSA may have a risk reducing effect through unmeasured variables: While the number of partners and the level of consistent condom use may stay relatively unchanged, it is possible that MYSA members make safer partnership choices, for instance by choosing partners within their own age group. Further evaluations are needed to explore this hypothesis. Thirdly, evidence which proves that sport-for-development initiatives like MYSA may have many other benefits to the individual and the society, beyond HIV prevention, is steadily increasing (Burnett, 2006).

Limitations of our survey mainly relate to the study design and validity constraints of self-reported sexual behaviour. Firstly, the survey adopted a cross-sectional study design, making it is difficult to draw causal links between MYSA membership and study outcomes. Given that MYSA's HIV prevention project was established in 1994 random assignment to the intervention and control conditions was impossible. Therefore, we cannot rule out pre-existing differences between the two groups on the outcome variables. The analysis took account of these issues through controlling for possible confounding factors. Secondly, no process evaluation was done. We therefore have no data on how well the programme was implemented on the field. Lastly, reported sexual behaviour might be different from the actual behaviour. However, it can be expected that reporting bias would be equally present in the intervention and the control group.

In conclusion, our study fills a gap in the evidence base for HIV prevention through sport. Although the MYSA HIV/AIDS Prevention and Awareness Project may have some positive effects on condom use, it is unlikely to result in a large reduction of the HIV incidence in youth in Mathare. Given a growing interest in HIV prevention through sport programmes, it is important that more rigorous evaluations of sport programmes are

conducted. When possible, programmes should be preceded by baseline assessments, trends in risk behaviour of the intervention group should be compared to those of a control group, and protocols for data collection and analysis should include measuring of and adjusting for potentially confounding factors.

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Table 1. Socio-demographic characteristics of the respondents.

	All	MYSA	Control
Age (mean) (2-sample t-test: p=0.18)	16.2	16.1	16.4
Gender (% male) (Chi²-test: p<0.001)	67.0% (514/767)	73.6% (332/451)	57.6% (182/316)
Religion (Chi²-test: p=0.15)			
Christian	91.9% (696/757)	90.5% (401/443)	93.9% (295/314)
Muslim	7.1% (54/757)	8.1% (36/443)	5.7% (17/314)
Other	0.9% (7/757)	0.3% (1/443)	1.4% (5/314)
Ethnic group (Chi²-test: p<0.001)			
Kikuyu	43.2% (325/753)	36.9% (163/442)	52.1% (162/311)
Luo	24.0% (181/753)	28.1% (124/442)	18.3% (57/311)
Luhya	13.8% (104/753)	15.2% (67/442)	11.9% (37/311)
Kamba	11.2% (84/753)	12.0% (53/442)	10.0% (31/311)
Other	7.8% (59/753)	7.9% (35/442)	7.7% (24/311)
Schooling: in school (Chi²-test: p=0.81)	80.1% (594/742)	80.5% (350/435)	79.5% (244/307)
Living situation			
Floor (Chi²-test: p=0.55)			
Concrete, cement, tiles, brick, vinyl	76.8% (562/732)	77.7% (334/430)	75.5% (228/302)
Wood, cane, earth, sand	23.2% (170/732)	22.3% (96/430)	24.5% (74/302)
Roof (Chi²-test: p=0.12)			
Concrete or tiles	36.9% (272/737)	33.9% (145/428)	41.1% (127/309)
Metal	56.3% (415/737)	58.6% (251/428)	53.1% (164/309)
Grass or wood	6.8% (50/737)	7.5% (32/428)	5.8% (18/309)

Table 2. Differences in sexual activity between MYSA respondents and control group.

	All respondents	MYSA	Control group
Sexually active (p=0.23)	36.7% (262/714)	38.6% (160/414)	34.0% (102/300)
Girls (p=0.24)	26.3% (64/243)	22.3% (25/112)	29.8% (39/131)
Boys (p=0.18)	42.1% (197/468)	44.5% (134/301)	37.7% (63/167)
Partners in last year* (p=0.58)			
0 partners	13.7% (35/256)	16.0% (25/156)	10.0% (10/100)
1 partner	41.4% (106/256)	39.7% (62/156)	42.0% (42/100)
2 partners	18.6% (48/256)	18.6% (29/156)	19.0% (19/100)
>2 partners	27.0% (69/256)	25.6% (40/156)	29.0% (29/100)
Concurrent partners* (p=0.23)	27.0% (65/241)	29.6% (42/142)	23.2% (23/99)
Boys (p=0.29)	27.5% (50/182)	30.3% (37/122)	21.7% (13/60)
Girl (p=0.79)	25.4% (15/59)	25.0% (5/20)	25.6% (10/39)
Mean age at sexual debut* (p=0.08)	14.7	14.4	15.2

* among those reporting ever having had sex

Table 3. Differences in condom use between MYSA respondents and control group.

	All respondents	MYSA	Control group
Condom use first sex* (p=0.033)	25.5% (61/239)	30.6% (45/147)	17.4% (16/92)
Condom use last sex* (p=0.040)	50.8% (123/242)	56.4% (84/149)	41.9% (39/93)
Frequency of condom use with current/last partner* (p=0.037)			
Always	20.9% (53/254)	23.2% (36/155)	17.2% (17/99)
Most of the time	15.4% (39/254)	17.4% (27/155)	12.2% (12/99)
Sometimes	29.1% (74/254)	31.6% (49/155)	25.3% (25/99)
Never	34.6% (88/254)	27.7% (43/155)	45.5% (45/99)

* among those reporting ever having had sex

Figure 1. Path diagram of the theory of planned behaviour (Ajzen, 2002).

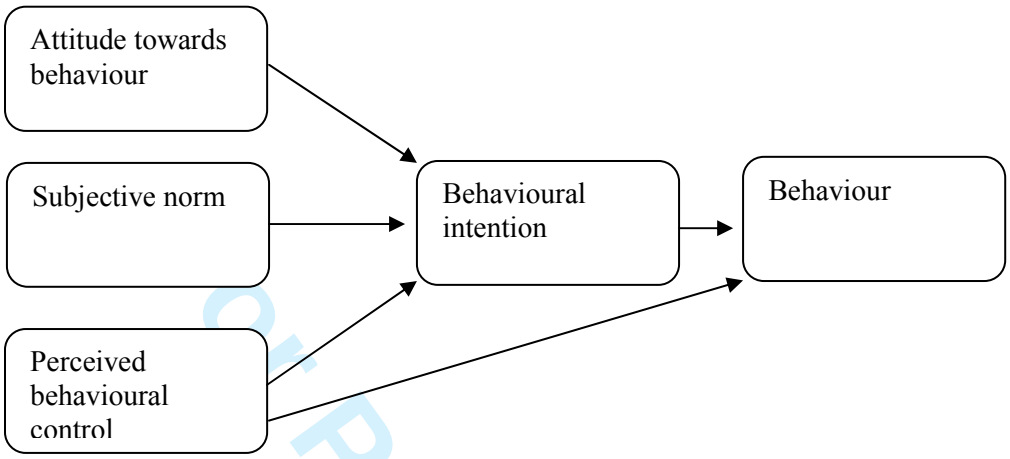

Figure 2. Exposure to the MYSA HIV/AIDS Prevention and Awareness Project among MYSA members.