

## Using sport to promote HIV/AIDS education for at-risk youths: an intervention using peer coaches in football

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The purpose of this study was to investigate the effectiveness of an ongoing AIDS education intervention program (EMIMA) using peers in a sport context. A secondary purpose was to determine whether a mastery-based motivational strategy would enhance the effectiveness of the peer coaches. A quasi field experimental study was employed in which at-risk children in Dar es Salaam in Tanzania ( $N=764$ ) were recruited (average age = 13.6 years) and were randomly grouped into two treatment groups and two control groups. The treatment groups were peer coaches conducting the AIDS education to the children within sport, one with mastery coaching strategies and one without. The two control groups

were in-school children, who received traditional AIDS education, and out-of-school children, who received no education at all. The intervention lasted for 8 weeks. The results indicated that the intervention using peers in sport was more effective in transmitting HIV prevention knowledge, cognitions and perceived behaviors than the control groups. The mastery-based motivational strategies were effective in influencing some of the variables. Contrary to expectation, the school-based HIV education was no more effective than the informal education obtained by the out-of-school children. The use of peer coaches within the EMIMA program was reliably the most effective means for HIV/AIDS education for these at-risk children.

In 2005, the number of people living with human immunodeficiency virus (HIV) worldwide was estimated to be 38.6 million with 28.5 million living in Sub-Saharan Africa, and there were 3.2 million new infections in 2005 (UNAIDS, 2006). Adolescents in Sub-Saharan Africa increasingly face the risk of contracting HIV infections, with women being far more likely than men (Glynn et al., 2001; Stover, 2004; UNAIDS, 2004). Tanzania has a national HIV prevalence estimate of 9% among youths aged 15–25 years who comprise 36% of the population, but account for approximately 60% of all the new HIV infections each year [National AIDS Control Programme (NACP) et al., 2004]. Unfortunately, as people do not get tested on a regular basis, many young Tanzanians are unaware that they are HIV-infected (Sangiwa et al., 2000). Among young people in Tanzania, the predominant mode of transmission is unprotected heterosexual intercourse (UNAIDS, 2005). Studies show that young people are sexually active at a young age and these early sexual experiences have been associated with the inadequate use of condoms and having multiple sexual partners (Klepp et al., 1997; UNAIDS & WHO, 2000; NACP et al., 2004). The consequences are quite profound. Not only is there a high rate of HIV infections among

adolescents, but unwanted teenage pregnancies are also high (UNAIDS, 2005).

There is neither a vaccine nor a cure for AIDS; therefore, efforts to reduce the incidence of HIV/AIDS have been focused on at-risk behaviors. As a response to the growing infections among youths, following recommendations from the World Bank, the Tanzania government developed HIV/AIDS educational packages for schools and the school-based HIV/AIDS education program has been implemented since the early 1990s (World Bank, 1992; Ministry of Health, 1995; Mgalla et al., 1998). The focus on knowledge about HIV/AIDS is given priority on the assumption that it is ignorance that leads to risky sexual behaviors and the spread of AIDS, and that increased knowledge will elicit the expected preventive actions. In other words, individuals will reduce the risk of infection by personal application of the information (Choi & Coates, 1994; Lindegger & Wood, 1995; Bujra & Baylies, 2000). Formal settings such as churches, hospitals, schools, homes and political arenas (rallies) are being used to deliver the educational messages for prevention. Typically, the information is given by adults such as nurses, doctors, teachers and parents (NACP et al., 2004). Many campaigns are conducted through TV

and the printed media outlets, including informational leaflets.

Although it is feasible to train local teachers and health workers to provide HIV/AIDS education to Tanzanian primary school children (Klepp et al., 1997; Mgalla et al., 1998), many adults in Sub-Saharan Africa believe AIDS education in schools is inappropriate and it is often not implemented (Ijsselmuiden et al., 1993). One study conducted among primary school pupils showed that schools were believed to be the least-rated source for AIDS information and school teachers were rated as significant others who pupils had talked to least about AIDS (Ndeki et al., 1994). Consistent with this, the National policy on AIDS refrained from emphasizing condom use for young people in primary school for moral reasons (MoH, 1995). In Tanzania, conventional adult institutions such as religious bodies, schools and families generally do not acknowledge that adolescents are sexually active and thus HIV/AIDS prevention strategies become controversial issues (e.g., recommending the use of condoms). For example, as late as 1998, it was admitted that a national AIDS curriculum for all primary schools in Tanzania had yet to be implemented (NACP, 1998).

Therefore, despite being in place for over a decade, the National policy on AIDS in Tanzania has not been successful in decreasing the rate of HIV infection in youths (Sangiwa et al., 2000; NACP et al., 2004; UNAIDS, 2005, 2006). Although awareness of the modes of HIV transmission is high in that over 90% of individuals aged 15–49 have heard of HIV/AIDS and know how HIV is transmitted (Tanzania Commission for AIDS [TACAIDS], 2005), HIV knowledge is still low (Schueller et al., 2003; NACP et al., 2004). Thus, HIV education and prevention strategies conducted through conventional adult-directed institutions such as schools, families and religious bodies have proven to be ineffective in reducing the rate of infection.

There is a further complicating factor. In Tanzania, the proportion of primary school-aged children attending school has steadily declined since 1991 (Family Health International [FHI], 2004; NACP et al., 2004). The reasons are varied, one is financial in that all pupils must pay fees, but a recent report indicated an increase in AIDS orphans, and that 50% of children (aged 10–14) who have lost both parents, and 30% who have lost one parent are not attending schools in Tanzania (UNICEF, 2004). As families break down, and many children become orphans (one in every seventh child in Tanzania is an orphan), and drop out of school, the efficacy of the AIDS education programme through conventional adult institutions decreases dramatically. Thus, new approaches are needed that are effective for young people (Schueller et al., 2003; NACP et al., 2004) and

there is a need to target youths through avenues other than traditional institutions.

In many countries, the use of mass media might be one way to target at-risk youths. But in Tanzania this is not viable. Tanzanian people who are exposed to various media outlets are a small percentage of the population (newspapers: 11% women, 16% men; radio; 34% women, 44% men; TV: 14% women, 20% men). Exposure to the media has decreased among young people aged 15–24 years with the lowest levels of exposure among women (NACP et al., 2004). Coupled with the fact that children have an increased likelihood to be orphaned, and thus do not attend school, more and more children are at risk. Thus, there is an urgent need to re-think educational strategies aimed for at-risk youths (e.g., Klepp et al., 1997; Schueller et al., 2003; FHI, 2004; NACP et al., 2004; UNICEF, 2004). Recommendations for HIV/AIDS educational programs for Tanzania suggest that to be effective, any new approach must involve youths in the delivery of services, development of the learning materials and evaluation. In addition, programs should reach out to youths where they spend most of their time and use activities that youths are familiar with and value. Programs should recognize the role of peers and include employing peers as role models to serve as HIV/AIDS educators (e.g., Lugoe, 1996; Klepp et al., 1997; Downer et al., 2003; Schueller et al., 2003; NACP et al., 2004; UNICEF, 2004). In areas where young people have been so involved, the incidence of HIV cases has declined (UNICEF, 2004).

Therefore, the present study utilized the context of sport to conduct an experimental AIDS education project with at-risk youths. Sport is rapidly gaining recognition worldwide as an effective means of promoting education and health, which led the United Nations General Assembly to adopt resolution 58/5 and proclaimed 2005 the International Year of Sport and Physical Education (UNGAOR, 2003). In particular, the United Nations has named sport as an effective platform to increase HIV/AIDS knowledge and awareness (United Nations, 2003). Sport is meaningful for children, they experience the benefit of membership and affiliation and in general children enjoy playing sport and being on a sport team (Roberts, 1984; Siedentop, 1996).

Based on these contentions, the first author initiated an experimental community-based sport program called EMIMA<sup>1</sup> designed for disadvantaged youth in Dar es Salaam, Tanzania, in 2001. The

<sup>1</sup>EMIMA stands for Swahili words for Elimu, Michezo Na Mazoezi, which is a program that educates youths from poor communities through sport by using peers as coaches. This is a community-based organization long known for its services to youths in schools, out of schools and orphans. The AIDS education project was initiated to utilize peer coaching in education, building skills and attitudes necessary to address AIDS issues (see [www.emima.org](http://www.emima.org)).

program utilizes peers as coaches for soccer skills and as a source of information, skills and attitudes related to HIV/AIDS education. Thus, the program used a popular youth activity to attract at-risk youths and used peer coaches as the instructors to deliver the educational information, knowledge and skills through the sport program (see [www.emima.org](http://www.emima.org)). In 2004, we decided to conduct an evaluation of the effectiveness of the EMIMA program. Thus we initiated an experimental field study where we investigated the impact of the use of peer coaches to deliver HIV/AIDS education and the use of safe sex behaviors to at-risk youths.

The major purpose of this research was to investigate the relative effectiveness of the peer coach intervention through sport within the EMIMA program. We predicted that relative to a control group of at-risk youths who did not experience the EMIMA program, and who were not within the school system in Dar es Salaam, the participants in the EMIMA group would increase their HIV-related knowledge, risk perceptions and behavioral intentions while reducing HIV-risk-related behavioral practices. We added a second control group. In order to determine whether the EMIMA program was more effective than the normal practice of giving HIV/AIDS education in the school system, we recruited a group of youths who were educated about HIV/AIDS and safe sex practices within the normal school system. These youths were typical of the youths in Tanzania who are educated about HIV/AIDS through the normal educational practice in schools. We predicted that the participants in the EMIMA group would have greater HIV-related knowledge, risk perceptions, and behavioral intentions than the participants in the regular school environment.

We decided to add a second intervention group. In order to make the intervention more effective, we utilized some motivational enhancement strategies. As suggested by previous research (e.g., Carey & Lewis, 1999), motivational enhancement approaches improve behavioral skill-based interventions and have been successful in behavior change and risk reduction in several contexts (Miller, 1985, 1989; Miller & Rollnick, 1991; Miller et al., 2005; Lemyre et al., 2006). Therefore, we gave additional training in motivational strategies to some of the peer coaches to facilitate the HIV/AIDS intervention. Thus, a second purpose of the investigation was to determine whether the EMIMA program could be enhanced were we to introduce motivation strategies to the intervention.

The motivation strategies we decided to implement emanated from the social cognitive approach that has dominated research on motivation in sport over the past 30 years. The specific theory that informed our research in sport was achievement goal theory (e.g., Roberts, 2001; Roberts et al., 2007). In particular, we

used the research that has investigated the impact of the motivational climate on cognition, affect and behavior (e.g., Ames, 1992). Thus, we had an additional EMIMA group of peer coaches who underwent additional training on how to implement mastery-oriented strategies in the peer coaching environment. With youth in HIV/AIDS crisis who often lack motivation to do many youth activities, and are pressed with many life events and stressors, introduction of motivational procedures in an AIDS intervention program in EMIMA may augment the regular skill-based interventions through sport (see Carey & Lewis, 1999; Beatty et al., 2004) and enhance risk reduction among youths (see Miller & Rollnick, 1991).

Therefore, the current study had two purposes: first, we wished to determine the efficacy of the EMIMA program with peer coach intervention through sport to deliver HIV/AIDS education and knowledge about the use of safe sex behaviors to at-risk youths. Second, we wished to determine whether a mastery-based motivational strategy would enhance the effectiveness of the peer coaches to deliver HIV/AIDS education and knowledge.

## Method

### Participants

A total of 950 participants aged 12–15 years were recruited for this study and responded to the questionnaires. The participants were recruited in three different ways. First, one hundred trained peer coaches (75 boys, 25 girls) from EMIMA were recruited for the study and randomly divided into two groups. The first group was termed “regular,” and this was the normal EMIMA program as had been practiced since 2001, and the second group was termed “mastery,” where we implemented the motivational enhancement strategies. With the 50 regular peer coaches, 252 children were recruited and these were formed into 18 teams, each with 14 participants. With the 50 mastery peer coaches, 228 children were recruited and 19 teams were formed, each with 12 participants. Each team had at least two peer coaches. For the participants who were in the “in school” group, we selected five primary schools and 250 children were recruited, 50 from each school. For the “out of school” group, 220 children who were not in the EMIMA program and who were not attending school were recruited from the community for the study. For convenience, at the end of the intervention and after the second assessment (i.e., time 2 assessment), we randomly selected 600 children who had completed both assessments so that we had 200 in the mastery, regular and in-school groups. However, the out-of-school groups were more difficult to follow up and only 164 completed both assessments. Therefore, we had 764 children in the sample. There were 555 boys and 209 girls. Participants’ mean age was 13.7 years ( $SD = 1.07$ ; range 12–15). The mean level of education was 5.5 years ( $SD = 1.37$ ); (mastery 5.5; regular 5.4; in-school 6.5 years) and out-of-school youths had the lowest level (4.3 years)

### Research setting

Three communities of Buguruni, Vingunguti and Mtoni in Dar es Salaam, Tanzania, where the EMIMA program

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operates were involved in the study. These are communities where EMIMA programs have been active since 2001. Compared with other communities in Dar es Salaam, these communities are among the poorest, by all criteria. Social and health problems such as HIV, STDs, etc., are very common. School drop out rate is also high in these communities. Many households are headed by a single parent, most often a woman but sometimes a child is the head of the household.

**Recruitment**

Through the EMIMA centers, the school head teachers, and the heads of street children organizations/drop-in centers, participants were informed and recruited to take part in the research study. To be eligible, children who were to participate in the EMIMA program had to voluntarily join one of the teams under a peer coach who had already been recruited and trained. The normal procedure is to ask the trained peer coach to go into the community and recruit a group of children (boy peer coaches recruited boys, girls peer coaches recruited girls). These children then become a team, and participated in the soccer training program provided by EMIMA. In the schools, after obtaining consent from their parents/guardians, pupils had to voluntarily agree to participate by responding to the appropriate questionnaires within a class that included AIDS education. The questionnaire was given before and after the module on HIV/AIDS education. The out-of-school children were the most difficult to obtain and were recruited in the following way: we set up informal soccer games in and around the popular garbage collection points/places locally known as “dampo.” The street children and orphans usually gather in these places to collect dumped materials such as plastic bottles and other things to sell. Soccer is a popular game in Africa, and after the games we talked to the children and tried to recruit them into responding to the questionnaire. Children were excluded if they had participated in AIDS intervention through sport before in any EMIMA program, or through the school system, or if afflicted with reading and/or writing problems.

**Research design**

Thus, the research project had four groups of children involved in the investigation in a quasi field experimental study. We had two treatment groups within the EMIMA program (received AIDS education using trained peer coaches in football), and two control groups (children who had school-based AIDS education; and out-of-school children who had received no AIDS education at a formal level)(see Fig. 1).

**EMIMA Regular Group:** within the EMIMA program, we had one group of children who were subjected to the regular EMIMA program as it has been conducted since 2001 (see www.emima.org).

**EMIMA Mastery Group:** we had a second group of EMIMA children where we added a procedure aimed at enhancing the mastery perceptions of the children receiving AIDS education. This was done through a procedure designed to increase the frequency and quality of children’s mastery experiences in AIDS education sessions.

**In-School group:** as a control group, we included a group of children who received AIDS education only through the school system, the more traditional approach.

**Out-of-school group:** finally, we included a group of children who experienced neither the EMIMA program nor the traditional classroom educational program of AIDS prevention conducted through the school system.

**Training of peer coaches for the EMIMA program**

To be able to conduct effective skill training sessions in their communities, peer coaches were trained before this investigation. The training of the peer coaches in soccer skills and strategies and in how to conduct HIV/AIDS prevention sessions is facilitated by trained soccer coaches and the staff of the EMIMA program. This facet is aided by a professional football club in Norway (see www.lynfootball.no), which conducts training sessions for the EMIMA staff each year. In addition to the training in soccer skills and strategies, the mission of EMIMA is to use soccer training to facilitate education about HIV/AIDS prevention. For HIV/AIDS prevention, the training of peer coaches was conducted by

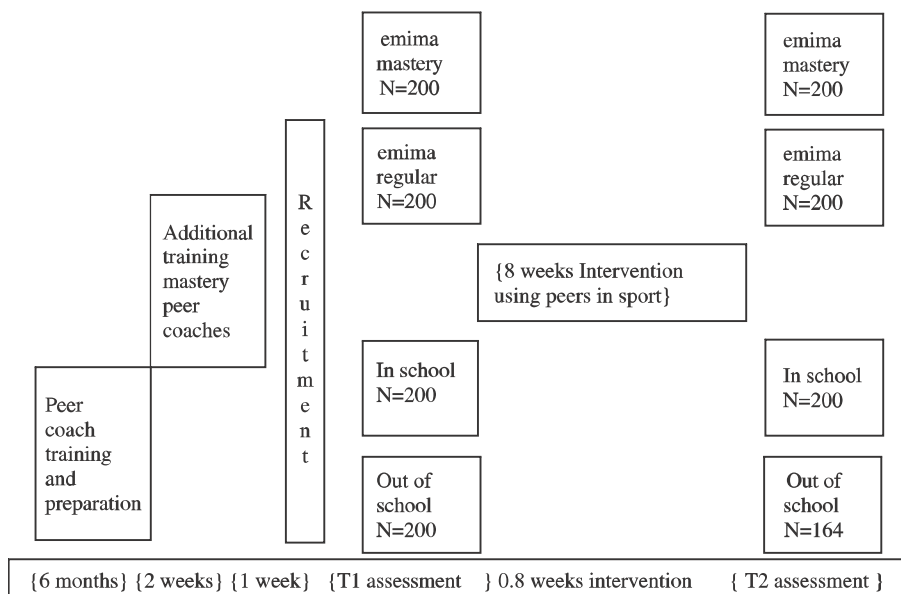


Fig. 1. Research design.

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EMIMA-qualified staff according to the guidelines and manuals of the “Kicking AIDS Out” network (ref. [www.kickingaidsout.net](http://www.kickingaidsout.net)). The training comprises seminars and activities and peer coaches qualify to become peer coach level 1. The peer coaches in this study were fully trained Kicking AIDS Out peer coaches at level 1. Therefore, we had a group of 100 peer coaches who were trained in using the sport context to foster life skills related to AIDS prevention. The life skills are incorporated into the practice activities of the participants, and the peer coaches are instructed on how to coach football skills practice sessions that contains life skills messages.

### Additional training of mastery peer coaches

The peer coaches in the mastery motivation intervention received 2 weeks additional training in mastery enhancement techniques (see [Treasure & Roberts, 2001](#)). We followed the guidelines based on the TARGET principles (Epstein, 1989) to guide motivational enhancement components of the intervention ([Ames, 1992](#); [Lloyd & Fox, 1992](#); [Treasure & Roberts, 1995](#)). These coaching climate structural features have been consistently identified as influencing a wide variety of motivational processes ([Roberts et al., 2007](#)). These peer coaches were introduced into activities, coaching and instructional strategies that increases mastery engagement in soccer and AIDS education activities.

### Assignment to groups

Children were enrolled into the teams with peer coaches. The peer coaches did most of the recruiting within the communities, and this is the normal EMIMA practice. The children could enroll with any peer coach. After a peer coach had reached 15 children, the roll was closed and children were requested to join the next peer coach. When each peer coach had enrolled his or her team, the teams and their peer coaches were randomly assigned to one of the two intervention conditions: the regular EMIMA intervention through sport (referred to as “regular”), and a motivationally enhanced intervention with mastery criteria specifically built in to the program (referred to as “mastery”). Likewise, after permission was granted by the head teacher, the children in the classes who were undergoing traditional classroom AIDS education in the appropriate age category were referred to as “in school”. Orphan and street children institutions that responded to the letters were approached for a meeting about the study. Some children were recruited with the help of these institutions, and some were recruited from the streets and nearby garbage collection points. These children were referred to as “out of school”.

### Procedures

The participants were informed about the objectives of the study and their freedom to choose to participate in the study.

#### *Pre-assessment*

Before any intervention activities with the children, all children in the treatment and control groups completed the questionnaires, termed as Time 1 assessment. Each participant was given a numeric code to maintain confidentiality. The code allowed participants to be linked to their data in each assessment.

#### *The intervention*

Peer coaches, under supervision of the first author, conducted the intervention activities (i.e., AIDS education through sport

sessions) over an 8-week period. This is the regular procedure and inter-club matches are arranged and played during the practice sessions. It was possible to arrange short 7- or 5-a-side competitions after the soccer training and AIDS life skills learning to make it more fun and exciting. Children were encouraged to join and form the teams with friends in order to maximize the positive social influence and foster social support in using peer norms to promote risk reduction. In order to assist the peer coaches in the intervention activities, the first author visited the training sessions and talked to the peer coaches as they were working with the children. A program of seminars, meetings and regular communication was enacted to assist the peer coaches in their tasks during the project. In addition, special seminars and meetings were organized with the peer coaches who were assigned to the mastery groups to facilitate the mastery character of the training sessions. The first author also attempted to attend many of the training sessions to encourage the use of the motivational enhancement techniques.

The children in the schools continued to receive AIDS education in the traditional manner. Nothing new was introduced with these groups. The out-of-school children continued to forage in the dampos, no education was offered to these children.

#### *Post-assessment*

The first author visited the EMIMA centers, the schools and the orphan and street children institutions before the scheduled appointment to remind them of the second round of assessment. The second assessment (termed Time 2 assessment) took place after the eighth week of the EMIMA intervention sessions, and after the school had completed educational modules on HIV/AIDS education. Letters of appreciation were sent to the schools, centers and institutions, thanking them for participating in the research study. Participants were given 1 packet of biscuits, a pencil and a bottle of water and thanked for each assessment they completed. Following the study, children in the control groups (the school and street children) were invited to attend “Kicking AIDS Out sessions” that educate children about AIDS through sport at their nearby EMIMA centre. After the Time 2 assessment, for convenience, we randomly selected 200 children from each of the EMIMA and the in-school groups.

One note should be added to the assessment of the out-of-school children. While we were able to follow up with the intervention and in-school participants, many of the street children who were assessed at Time 1 were not available for assessment at Time 2. They simply did not attend the informal football games, nor was it possible to locate them through the orphan community institutions. Only 164 children were available for the follow-up assessment.

#### *Measures*

For the present paper, participants completed questionnaires that asked basic demographic information, HIV-related knowledge, beliefs, attitudes and risk behaviors. Such measures include attitude to an exclusive sexual partner, attitude to condom use, condom knowledge and experience, subjective norms about condom use, abstinence, having an exclusive sexual partner, perceived behavior control in using condom, and behavioral intention (intended condom use). These questions and scales were from a long set of questionnaires adapted from the Family Health International behavioral surveys and World Health Organization’s (WHO) knowledge, attitudes, beliefs, and practices survey instruments for adolescents (WHO, 1989). We used the above questions only, the other

questionnaires were not used in this study. In addition, we asked selected demographic characteristics including sport participation, age, education, orphanage and sexual debut.

The instruments originally written in English were translated and back-translated from English to Swahili (national language in Tanzania) by experts in both languages before being used in the field. The final translated version was submitted for peer review to EMIMA staff members and colleagues at the University of Dar es Salaam for content and face validity before being used for this study. The items have been previously used with students in East and Southern Africa (Wilson et al., 1992; Lugoe, 1996). All responses were anonymous and only the principal investigator knew the code in order to match pre- and post-treatment questionnaires where appropriate.

*HIV-knowledge questionnaire (HIV-K-Q).* This was a modified version of the HIV-knowledge questionnaire (Carey et al., 1997a, b) and was used to assess the knowledge related to HIV transmission and prevention. An example of an item is: "Can a person get HIV by sharing a glass of water with someone who has HIV?" The HIV-K-Q has good internal consistency ( $\alpha = 0.91$ ) and is stable over 2-week ( $r = 0.91$ ) and 12-week ( $r = 0.90$ ) intervals (Carey et al., 1997a, b). As in previous studies (e.g., Carey et al., 1997a, b), factor analyses indicated that the scale contained a single factor and was internally reliable with a Cronbach  $\alpha$  coefficient of 0.81 and 0.87 at Time 1 and 2, respectively.

*Intention to use condom.* The participants responded to one item assessing behavioral intention to engage in safe sexual behavior (Rigby et al., 1993; Lugoe et al., 1996). This question has previously been used with school pupils in Tanzania (Lugoe & Rise, 1996). The participants responded to a statement: "I intend to use a condom at the first/next sexual intercourse." A five-point Likert scale ranging from 1 (very uncertain) to 5 (very certain) was used.

*Attitude to exclusive sexual partner.* To measure attitude, participants were asked to rate their attitudes toward exclusive sexual relationships on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Four items based on previous studies (Ajzen & Fishbein, 1980; Rigby et al., 1993) were used for this measure: an example of an item is: "Sticking to one sexual partner for life is very difficult." Negative items were reverse scored. Attitude to exclusive sexual partner for this sample achieved an adequate level of internal reliability ( $\alpha = 0.70$ ) (Tabachnick & Fidell, 2001).

*Attitude to condom use scale.* Based on previous studies (Sheeran et al., 1990; Rigby et al., 1993), five items scored on a five-point scale from strongly agree = 5 to strongly disagree = 1 were used to assess attitude to condom use. An example of an item is: "Condoms reduce people's pleasure in having sex." The negatively attitudinal items were reverse scored before all items were summed for an overall measure in which higher mean scores represented a more positive attitude to condom use. The exploratory factor analysis revealed that all items contributed to the final score and the scale had an acceptable internal consistency coefficient ( $\alpha = 0.70$ )

*Direct experience with condom.* A six-item scale was used to determine whether condoms were used during sexual intercourse (Fishbein & Ajzen, 1975). An example of an item is: "I used a condom during my last sexual intercourse." A five-point Likert scale ranging from 1 (never) to 5 (always) was

used. Condom knowledge and experience was reliable at post-intervention ( $\alpha = 0.81$ ).

*Subjective normative belief about condom use, abstinence and exclusive sexual partner.* Respondents were asked how likely they thought the named significant others were in favor of them using a condom during first/next sexual intercourse (Ajzen & Fishbein, 1980; Rigby et al., 1993). An example of an item is, "My fellow players would approve of my using a condom at the first/next sexual intercourse." Similar questions were asked for abstinence and for having an exclusive sexual partner, with the appropriate wording. The significant others were fellow players, peer coaches, my best friends and present partner (if any). Responses were scored on a five-point scale from very likely = 5, to very unlikely = 1. The internal reliability coefficients of the scales were satisfactory,  $\alpha = 0.89$ , 0.90 and 0.90, for condom use, abstinence and having an exclusive partner scales, respectively.

*Perceived behavior control for condom use.* Respondents were asked whether they perceived themselves as being in control of their condom use. An example of an item is: "How certain are you that you will use a condom at your next sexual intercourse?" The responses ranged from very uncertain = 1 to very certain = 5. Ten items indicating different situations were used. The questionnaire was based on the methodology described by Fishbein and Middlestadt (1989). The questionnaire has good reliability (Terry et al., 1993) and the items have been crosschecked with relevant studies in Eastern and Southern Africa (Wilson et al., 1992; Lugoe et al., 1996). The exploratory factor analysis within the present study revealed that all items contributed to the final score and the scale had an acceptable internal reliability coefficient ( $\alpha = 0.85$ ).

## Statistical procedures

The descriptions of the scales are provided in Table 1, and includes the internal reliability coefficient  $\alpha$ s. Because many of these scales were adapted to the sport context, and were translated into Kiswahili, we conducted exploratory factor analyses on each scale to determine whether the items contributed to the factors they were intended to represent. The factor analyses showed that most items loaded on the construct they were supposed to represent. If an item cross-loaded on two factors, that item was eliminated. Further, an item discrimination procedure was used, and if any item improved the  $\alpha$  coefficient of the scale when it was eliminated, then that item was not used in the main analyses. When we followed these procedures, all scales were included as they all had adequate internal reliabilities ( $\alpha > 0.70$ , Tabachnick & Fidell, 2001).

The demographic comparisons of the four groups at Time 1 are shown in Table 2 and shows how the groups differed at the start of the study. To determine whether differences occurred over the course of the intervention, we used a repeated measures multivariate analysis of variance (MANOVA) procedure over the variables used in the study (Table 3). The independent variables were the four groups, and Time 1 and Time 2 assessments were the repeated measures factor. The mean factor scores for the scales were the dependent variables. Thus, we had a  $2 \times 4$  design. The findings showed we had two main effects. Examination of the simple main effects (Tukey post-hoc tests) revealed that the groups were reliably different at Time 1. We therefore decided to use the normalized residual scores at Time 2 that controlled for the differences at Time 1. We then conducted a MANOVA procedure using the normalized residual scores at Time 2. Following a reliable multivariate effect, we followed up with analysis of variance

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Table 1. Description of scales and mean scores for the sample at time 1

	Range of scores	No. of items	$\alpha$	Means (SD)
HIV knowledge (mean correct out of 25)	0–25	25	0.80	8.99 (2.7)
Direct condom experience	1–5	6	0.81	2.59 (0.92)
Attitude to condom use	1–5	5	0.70	2.92 (0.77)
Attitude to exclusive sexual partner	1–5	4	0.70	3.35 (0.71)
Subjective norm – condom use	1–5	5	0.89	3.29 (1.0)
Subjective norm – abstinence	1–5	5	0.90	3.63 (0.62)
Subjective norm – exclusive sexual partner	1–5	5	0.90	3.62 (0.71)
Intention to use condom	1–5	1	NA	2.27 (1.2)
Perceived behavior – control in condom use	1–5	10	0.85	2.57 (0.77)

$P < .05$ .

Table 2. Demographic comparison of the four study arms at time 1

	Mastery ( $N = 200$ )	Regular ( $N = 200$ )	In-school ( $N = 200$ )	Out-of-school ( $N = 164$ )
Sport participation (%)	97.5	97	71.5	74.4
Sexually active (%)	16	11	4.5	11
Father not alive (%)	18.5	13.5	13.5	60.4
Mother not alive (%)	12.5	18	11	60.4
Not living with father (%)	20.5	17.5	22	82.9
Not living with mother (%)	14	18	15.5	73.8
Age (mean and SD)	13.8 (1.1)	13.5(1.1)	13.6 (1.0)	13.8 (0.98)
Years of education	5.5 (1.4)	5.4 (1.4)	6.5 (50)	4.3 (1.0)
Sex				
Male	164	163	99	129
Females	36	37	101	35

Total  $N = 764$ .

Table 3. Group means and standard deviations for the analyzed variables

Variable	Mastery ( $N = 200$ )		Regular ( $N = 200$ )		In-school ( $N = 200$ )		Out-of-school ( $N = 200$ )	
	$M$	SD	$M$	SD	$M$	SD	$M$	SD
HIV knowledge (mean correct out of 25)								
Time 1	9.75	2.48	9.26	3.05	8.44	2.21	8.42	2.76
Time 2	13.33	2.51	12.83	3.84	11.84	3.47	11.17	4.41
Direct condom experience								
Time 1	2.71	0.81	2.69	0.83	2.28	1.0	2.68	0.94
Time 2	2.99	1.0	2.95	1.1	2.31	0.99	2.72	0.10
Intention to use condom								
Time 1	1.90	1.20	1.98	1.29	2.65	1.1	2.53	1.0
Time 2	4.44	0.95	4.06	1.3	2.87	1.4	3.27	1.3
Subjective norm – condom use								
Time 1	3.68	0.61	3.78	0.56	2.82	1.2	2.73	1.1
Time 2	4.33	0.81	4.02	1.1	3.58	0.74	3.47	0.68
Subjective norm – abstinence								
Time 1	3.75	0.49	3.73	0.54	3.56	0.72	3.46	0.69
Time 2	4.58	0.73	4.28	0.99	3.65	1.3	3.79	1.1
Subjective norm – exclusive sexual partner								
Time 1	3.72	0.52	3.72	0.60	3.62	0.79	3.38	0.66
Time 2	4.56	0.70	4.44	0.85	3.99	1.1	4.02	0.89
Attitude to exclusive sexual partner								
Time 1	3.35	0.69	3.41	0.69	3.44	0.70	3.19	0.73
Time 2	4.04	1.1	3.69	1.1	3.45	0.97	3.34	0.90
Attitude to condom use								
Time 1	2.92	0.72	2.96	0.79	2.89	0.81	2.87	0.77
Time 2	2.95	0.81	3.10	0.88	2.60	0.75	2.87	0.80
Perceived behavior control to condom use								
Time 1	3.38	0.85	3.23	0.70	2.79	0.65	3.26	0.74
Time 2	3.43	0.85	3.27	0.69	2.79	0.65	3.23	0.79

Table 4. Standardized residual means and standard deviations for the groups

Variable	Mastery <i>N</i> = 200 <i>M</i> (SD)	Regular <i>N</i> = 200 <i>M</i> (SD)	In-school <i>N</i> = 200 <i>M</i> (SD)	Out-of-school <i>N</i> = 200 <i>M</i> (SD)	<i>F</i> (3, 760)
HIV knowledge	0.19 (0.77)	0.11 (0.97)	-0.08 (1.0)	-0.27 (1.2)	7.58
Direct condom experience	0.19 (1.0)	0.17 (0.85)	-0.31 (0.99)	-0.07 (0.99)	11.26
Attitude to condom use	0.11 (0.63)	0.32 (0.77)	-0.46 (1.5)	0.05 (0.41)	22.93
Attitude to exclusive sexual partner	0.37 (1.0)	0.05 (1.0)	-0.19 (0.93)	-0.28 (0.88)	17.32
Perceived behavior control in condom use	0.18 (1.3)	0.08 (0.77)	-0.23 (0.35)	-0.04 (1.3)	6.41
Intention to use condom	0.46 (0.88)	0.20 (0.66)	-0.49 (1.1)	-0.22 (0.99)	40.95
Subjective norm – abstinence	0.43 (0.67)	0.16 (0.91)	-0.39 (1.2)	-0.25 (0.98)	31.31
Subjective norm – exclusive Sexual partner	0.31 (0.75)	0.17 (0.88)	-0.30 (1.2)	-0.22 (0.95)	18.26
Subjective norm – condom use	0.46 (0.87)	0.11 (1.2)	-0.26 (0.82)	-0.38 (0.77)	30.33

(ANOVA) procedures on each dependent variable as part of the post-hoc tests (Table 4).

## Results

### Descriptive analyses

Mean values and standard deviations were calculated for each of the scales for the whole sample at Time 1 and are presented in Table 1. At Time 1, all of the scales were internally reliable. Table 2 illustrates the demographic differences between the groups. About 10% of the children reported to be sexually active, with the least active being the children in school. As can be seen, the EMIMA groups and the in-school group were relatively similar in reporting whether their parents were alive or dead, and whether they lived with one parent or the other. However, as one would expect, the out-of-school group was very different, with most of them reporting that at least one of their parents had died, and few were living with one of the other parent. In this sample, 7% of the children in EMIMA, 3% of the children in school and 51% of the children who were out-of-school were orphans. Clearly, the children we recruited for the out-of-school group were more likely to be an orphan, and by definition to be at risk in this community.

### Differences between the youth subgroups

#### Main analyses

A repeated-measures MANOVA was conducted over the Time 1 and Time 2 mean factor scores (Table 3) to determine whether the expected treatment effects were observed. The analysis produced two overall main effects: over Time 1 vs Time 2, and over the treatment groups. The post-hoc MANOVA at Time 1 showed that the groups differed at Time 1:  $F(9, 752) = 15.04$ ,  $P < 0.001$ ; Wilks'  $\lambda = 0.61$ ; partial  $\eta^2 = 0.15$ . Therefore, we decided to use MANOVA procedures at Time 2 using normalized residual difference scores. For each of the variables, the residual at Time 2 controlling for the difference at Time 1 was

entered into the analysis (Table 4). The MANOVA revealed a significant difference between the groups  $F(9, 752) = 11.63$ ,  $P < 0.001$ ; Wilks'  $\lambda = 0.68$ ; partial  $\eta^2 = 0.12$ . As post-hoc tests, we used univariate ANOVA procedures on each dependent variable and the  $F$  values are reported in Table 4.

#### HIV/AIDS knowledge

When we used Tukey honestly significantly difference (HSD) to determine where the significant differences were, we found that the two EMIMA intervention groups did not reliably differ from each other, but both were higher in HIV-K-Q knowledge scores than the in-school and out-of-school groups. Contrary to expectation, the in-school and out-of-school groups did not differ from each other (Table 4).

#### Condom experience

Using the Tukey HSD tests, we found that the two EMIMA intervention groups did not reliably differ from each other, but both reported more experience with condom use than the in-school and out-of-school groups who did not reliably differ from each other (Table 4).

#### Attitude to having an exclusive sexual partner

The Tukey HSD indicated that the in-school and out-of-school groups did not reliably differ from each other, and both were less likely to believe that having an exclusive sexual partner was a safe behavior against HIV infection than the EMIMA intervention groups. In addition, the mastery intervention group had a more positive attitude to the use of an exclusive sexual partner than the regular intervention group (Table 4).

#### Intention to use condom

The finding of the Tukey HSD test indicated that the in-school and out-of-school groups did not reliably differ from each other, but had less intention to use condom at the first/next sexual intercourse than the

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EMIMA intervention groups. The mastery intervention group had higher intention to use condom in the future than the regular group (Table 4).

### *Subjective normative beliefs about condom use, abstinence and having an exclusive sexual partner*

For subjective norms about condom use, and abstinence, the Tukey HSD showed that the in-school and out-of-school groups did not reliably differ from each other, but they had reliably lower subjective norms about condom use and abstinence than the two EMIMA intervention groups. The mastery group was significantly higher in normative beliefs about using condoms and abstaining than the other groups (Table 4).

Results of the Tukey HSD test on subjective norms about having an exclusive sexual partner indicated that the two EMIMA intervention groups did not reliably differ from each other, but both had higher subjective norms about having an exclusive sexual partner than the in-school and out-of-school groups, which did not reliably differ from each other (Table 4).

### *Attitude to condom use*

Result of the Tukey HSD test on attitude to condom use scores indicated that the two EMIMA intervention groups did not reliably differ from each other, and had more positive attitude to condom use than the two other groups. Surprisingly, the out-of-school group had a reliably more positive attitude to condom use than the in-school group (Table 4).

### *Perceived behavior control in condom use*

Using the Tukey test, we found that in-school and out-of-school groups did not reliably differ from each other, but perceived lower behavior control in condom use than the two EMIMA intervention groups. The Mastery EMIMA intervention group was reliably higher in perceived behavior control in condom use than all the other groups (Table 4).

## Discussion

In the present study, we report on the first experimental HIV/AIDS prevention program using peers in a sport context that targeted children in a developing country in Sub-Saharan Africa who are at-risk for infection. We investigated the efficacy of the EMIMA Kicking AIDS out program that has been in existence since 2001 in Dar es Salaam in Tanzania. The study focused on knowledge about HIV/AIDS, attitudes and implementation of safe sex knowledge and behaviors.

The important findings of the present study show that the use of peer coaches within the soccer coaching environment of the EMIMA program was effective in transmitting knowledge about HIV/AIDS and safe sex practices. Indeed, the EMIMA intervention soccer program was reliably more effective than the traditional HIV/AIDS education through the normal school system for all knowledge, attitudinal and behavioral variables investigated in this study. Relative to the in-school children and the out-of-school children in the second control group, children in the EMIMA intervention groups reported significantly greater beliefs and perceived control in condom use, abstinence, and in using exclusive sexual relationships to prevent HIV infection. In addition, children in the EMIMA intervention sport programs were significantly more likely than children in school who received AIDS education through the traditional approach to report reliably higher levels of HIV and condom use knowledge, more positive normative beliefs and perceived control in prevention of HIV infection. Clearly, the results demonstrate that HIV/AIDS education using peer coaches in sport can effectively reduce the risk of at-risk children from infection with HIV.

The current findings suggest that EMIMA-type interventions using peers in sport may serve as an approach for AIDS risk reduction interventions in Africa for at-risk youths who are similar to the youths in the present study: youths who are currently sexually inactive, many of them orphans, many not in school, in areas with limited resources, cultural taboos and a high prevalence of AIDS and HIV infection. Given the widely recognized potential risk of sexually transmitted HIV among disadvantaged youth (NACP et al., 2004; UNICEF, 2004), the findings of the present study suggest an alternative avenue to transmit the important messages behind HIV/AIDS education programs. The EMIMA program takes advantage of the fact that playing soccer is the most popular sport for youths in general in Africa, and disadvantaged youths in particular. By incorporating the HIV/AIDS messages into the practice sessions, we have demonstrated that this is an effective way of transmitting information, positive attitudes and behavioral intentions to at-risk youths.

The EMIMA program focuses on changing the social, cultural and peer norms associated with sexual activity and facilitates cognitive and behavioral skill acquisition through the regular practice of life skills through games in a fun, enjoyable and non-scary environment. At-risk youths with limited opportunities within the African cultural context need these programs for sustained behavior change for HIV prevention. Participation in sporting activities that also provide competencies in HIV prevention and enforce peer norms to facilitate sustained beha-

vioural change, and provide motivation to continue participation is a promising avenue for HIV/AIDS prevention (see Rotheram-Borus et al., 1991; Jemmott et al., 1992; Downer et al., 2003).

Similar to the rest of Sub-Saharan Africa, to a greater or lesser extent, the number of orphans in Tanzania is rapidly increasing (NACP et al., 2004) and the number of children who cannot afford to go to school is increasing (Ministry of Education and culture & Ministry of Science Technology and Higher Education, 1993; UNICEF, 2004). The need for an effective approach that targets children outside the school system is urgently required. Using sport, or at least soccer, as part of that approach may be effective on two counts. First, as demonstrated by this study, using peers within the sport context to disseminate information about appropriate prevention behaviors, and involving children in learning the skills in a non-scary environment by anchoring education within sport may help to reduce the normative and cultural barriers about sexual behavior within these at-risk groups. Second, by using sport in a systematic manner within this at-risk population, some of the concomitant learning that may come with participation in sport may ensue. We know that being an orphan in Africa, in particular an AIDS orphan, has a major negative psychological effect on the child (Sengendo & Nambi, 1997). We also know that participating in team sports has a positive psychological benefit for most of the participants (Siedentop, 1996). Therefore, participation in EMIMA-type intervention programs may have psychosocial benefits that are important for at-risk children living in areas highly affected by AIDS. At-risk children are able to belong to a group, make friends, enjoy being on a team, have fun and also get an opportunity to practice soccer skills and benefit from the HIV/AIDS messages within the practice environment. The sport context in itself may have been a major reason for the facilitation of individual change. The context and the training of the peer coaches facilitated the learning of life skills through providing an accepting context to discuss the risk behaviors, and importantly, had peers reinforcing each participant's efforts at risk reduction.

We were not surprised with the major finding that peer coaching in sport was the most effective strategy of HIV/AIDS education. However, we were surprised with some of the other findings. Based on the current approach of HIV education to youths being school based in Tanzania (MoH, 1995; Klepp et al., 1997; NACP et al., 2004), we expected the youths in schools to have higher knowledge, more positive attitudes and beliefs, and have lower at-risk behaviors than the youths we designated as being out-of-school children. This was not the case! We found that school-based HIV/AIDS education was

not more effective than the informal education obtained by the out-of-school children. This was not expected given the fact that children in schools are exposed to systematic information about HIV/AIDS through the school curriculum. We can only speculate on this finding. It may well be that the HIV preventive education in schools is implemented by adults in teacher-pupil relationships typical for academic subjects. Thus, the HIV preventive education in schools tends to be didactic by nature and taught in science lessons without actively engaging the pupils. Also, the strong message given in school is sexual abstinence (just say no!). Even though the school-based children did show greater knowledge than the out-of-school children, the knowledge about safe sex practices, especially condom use, was greater for the out-of-school children. The out-of-school children also had a more positive attitude than the in-school group toward condom use. However, when asked, neither the out-of-school children nor the school children were likely to use a condom in the next/first sexual intercourse.

The AIDS policy in Tanzania from the early 1990s refrained from emphasizing the use of condoms in the school curriculum for religious and moral reasons (MoH, 1995). Although the policy has recently been reviewed, these findings are a clear indication of the consequences of such a policy. Some studies have argued that HIV/AIDS education in schools is a controversial issue as many adults in Sub-Saharan Africa do not acknowledge that youths engage in sexual activity (e.g., Ijsselmuiden et al., 1993). The findings that indicate that the differences between the out-of-school children and the in-school children are more toward the fact that the in-school children are more at risk for contracting HIV/AIDS is a clear call for more effective approaches for educating youths about safe sex practices. As this study illustrates, regardless of other programs that may be implemented, one effective approach that should be further investigated is an EMIMA-type program.

Another important component of the present study is that it integrated HIV/AIDS skills training with a motivational enhancement strategy to determine whether we could enhance the effectiveness of the HIV/AIDS intervention in sport (Carey et al., 1997a, b). Supplementing HIV/AIDS life skills with a motivational enhancement approach within the sport context has not occurred in prior applications. Thus, in the present study, we compared the group that had mastery enhancement strategies as part of the intervention with the normal EMIMA approach as practiced in the project. We wished to determine whether a mastery motivational strategy would enhance the effectiveness of the peer coaches to deliver HIV/AIDS education. The findings indicated that a mastery-based motivational strategy is effective in AIDS

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education, most of the time. We found no differences in knowledge, but the motivational enhancement groups were more effective in communicating and influencing attitudes and norms about condom use and abstinence, the intention to use condoms and increased perceived behavioral control in engaging in safe sex practices. These attitudinal and behavioral intention variables are proximal determinants of youth sexual behaviors and may mediate other determinants such as social norms. However, the important point is that the motivational enhancement approach is effective in changing the intentions to use safe sex practices (DiClemente et al., 1990; Norris & Ford, 1991; Braithwaite & Thomas, 2001).

The mastery motivation strategies were introduced to emphasize task involvement (see Ames, 1992). We trained the peer coaches to focus on encouraging effort, to enhance self-efficacy and autonomy. We deliberately refrained from emphasizing normative competence and superiority (e.g., see [Treasure & Roberts, 2001](#)). The mastery strategies were given in a 2-week extra-educational module to the peer coaches who were randomly selected into the mastery groups. This rather basic motivational strategy was sufficient to change the behavioral intentions of the participants. Even though this will have to be the focus of future research, we may argue that the motivational strategy enhanced the perception of the participants that they could carry out the intentions to use safe sex practices. In other words, we increased the efficacy of the participants to utilize the safe sex strategies we investigated in this study.

Even though we managed to make some changes in a positive direction, the findings of this study indicate that HIV knowledge among young people in Tanzania is generally low. The majority of youth in Tanzania have a limited understanding of how the HIV virus is transmitted and how it can be prevented, as well as knowledge of the virus itself. This is frightening as the participants in this study all reported relatively low HIV knowledge and experience about condom use. Unfortunately, the children who were educated in schools have the most unfavorable attitudes toward condom use. Clearly, there is a need for community programs such as EMIMA to target both the in-school and out-of-school youths as they are both equally at risk for HIV infection.

An important limitation of conducting research with disadvantaged participants who are traumatized and stigmatized by the AIDS epidemic is the question of accessibility. The out-of-school children were the most difficult individuals to recruit. They were recruited from orphan institutions in the same communities, as well as being recruited from garbage collection areas. Orphans and street children do not stay in one area or institution for a long time. Soccer played an important role in motivating the street

children to take part in the study that involved the EMIMA group. Furthermore, conducting field-based research on high-risk sexual behaviors of youths in an environment where many cultural taboos about sex poses a big challenge that must be recognized. We approached the vulnerable children through sport activities they are familiar with, and implemented a culturally sensitive peer-friendly recruitment approach. Using peer coaches provided fun and enjoyment throughout the sport team activities, and they conducted all intervention sessions in their local community facilities. The use of sport activities to attract adolescents was a useful intervention strategy to encourage involvement of the at-risk children in this study. This approach facilitated the smooth and easy atmosphere for the participants to disclose honestly sensitive information regarding their sex life.

The present study investigated behavior outcome measures including abstinence and condom use that are consistent with recommendations for effective interventions ([Jemmott & Jemmott, 2000](#)). Given that both in- and out-of-school children are equally at risk, effective HIV prevention interventions for young people should target the total population, not just the out-of-school children. Sexual activity among adolescents is very common in many Sub-Saharan African countries ([Meeckers, 1994](#)). The present study indicated that 95%, 89% and 86.5% of youths from out-of-school, in-school and in EMIMA, respectively, were not sexually active during the study. The intervention aimed at sexually inexperienced youths is effective because they are good candidates for HIV prevention and previous research has shown that it is more difficult to achieve behavior change in teens who have already initiated sex ([Kirby et al., 1991](#)).

Furthermore, because there is evidence of the role attitudes and norms play in the adolescent's decision to engage in safe sex practices ([Gallois & McCamish, 1989](#); [Leviton et al., 1990](#); [Kelly et al., 1991](#)), the intervention program of the present study specifically targeted young peoples' beliefs about condom use and created a supportive environment by using peers as the method of delivery of the information. Clearly, using peer coaches is a procedure to be further investigated.

## Perspectives

The results demonstrate that youth-friendly and community-based programs that use sport can assist in the process of reducing the risk of HIV/AIDS infections for youths. The results further demonstrate that mastery motivational procedures (e.g., [Treasure & Roberts, 2001](#)) may assist in this process. However, the real message of this research study is

that HIV/AIDS education that is delivered by peers is attended to by the at-risk participants, more so than the formal educational practices of AIDS education in Tanzania. In addition, the findings of this study reveal that the EMIMA-type program is successful and should not be supported only in the poorer communities of Dar es Salaam, but should be implemented nationwide, even Sub-Saharan Africa wide. Simply put, using trained peer coaches through sport may effectively help to reduce the risk of infection with HIV among young people. Anecdota-

tally, the records of EMIMA show that not one participant who has been through the EMIMA program (EMIMA, 2006, unpublished work) has been confirmed to contract HIV! Subsequent research should investigate the relative influence of the sport context and the use of peers on the variables under study, and to develop even more effective strategies to prevent the pandemic of AIDS.

**Key words:** peer coaching, mastery motivation, AIDS education through sport.

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