



'11 for Health', a football-based health education programme for children: a two-cohort study in Mauritius and Zimbabwe

Colin W Fuller,¹ Astrid Junge,¹ Cadrivel Dorasami,² Jeff DeCelles,³ Jiri Dvorak¹

¹FIFA-Medical Assessment and Research Centre, Zurich, Switzerland

²Ministry of Youth and Sport, Port Louis, Mauritius

³Grassroot Soccer Inc, Cape Town, South Africa

Correspondence to

Dr Colin W Fuller, FIFA-Medical Assessment and Research Centre, FIFA Strasse 20 PO Box 8044 Zurich, Switzerland; colin.fuller@f-marc.com

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ABSTRACT

Objectives To implement and assess Fédération Internationale de Football Association Medical Assessment and Research Centre's '11 for Health' football-based health education programme for children.

Design Prospective, 2-cohort study.

Setting In-school groups (Mauritius); out-of-school groups (Zimbabwe).

Participants Mauritius: 389 children, aged 12–15 years; Zimbabwe: 395 children, aged 10–14 years.

Intervention Eleven 90-min sessions, each divided into two 45-min halves of Play Football (focusing on one football skill) and Play Fair (focusing on one health issue).

Main outcome measures 30-item questionnaire implemented pre and postintervention to assess children's health knowledge; six-item questionnaire implemented postintervention to assess children's views about the '11 for Health' programme.

Results Mean pre and postintervention health knowledge scores were greater in Mauritius (pre: 69.3%; post: 87.1%) than Zimbabwe (pre: 57.8%; post: 76.2%) but the mean gain in health knowledge was greater in Zimbabwe (18.4%) than Mauritius (17.8%). There were few significant differences in the outcomes for boys and girls in both countries. The '11 for Health' programme was received positively by the children in both countries and there were no significant differences in the views of boys and girls in either country.

Conclusions The study demonstrated that it was possible to achieve significant increases in children's knowledge for all health messages by implementing the '11 for Health' programme in a school-based setting in collaboration with a national Football Association and in an out-of-school setting in collaboration with a non-government organisation. Based on these positive results, the authors recommend that the programme be widely implemented in Africa in co-operation with government and non-government organisations.

INTRODUCTION

Moeti¹ described the African Region as suffering a double health burden: the highest rate of death in the world from communicable diseases and an increasing rate of death from non-communicable diseases. The WHO² estimated that although communicable diseases caused the majority of deaths in Africa at the present time, non-communicable diseases would become the major cause by 2030. The first International Conference on Health Promotion³ resulted in a Charter that encouraged international organisations to 'support countries in setting up strategies and programmes for

health promotion' (p5). The fourth in this series of International Conferences³ produced a consensus that included the statement 'Health promotion requires partnerships for health and social development between the different sectors at all levels of governance and society. Existing partnerships need to be strengthened and the potential for new partnerships must be explored' (p20). WHO⁴ also launched a 'Global School Health Initiative' in order to promote and improve health education for children at local, regional and national levels: a primary aim of the initiative being to enhance the capacity of the schools to provide a setting for healthy living, learning and working. The strategy promoted by WHO included identification of relevant health issues, development of health education programmes and collaborations between health and education agencies to implement such programmes. International organisations such as UNICEF, UNESCO, ILO and WHO⁵ acknowledge that physical activity is 'an effective method of disease prevention for the individual and, for nations, a cost-effective way to improve public health' (p5). Translating these global statements and strategies into appropriate, workable, cost-effective programmes for children remains the main challenge to everyone working in health promotion.

The important role that exercise plays in reducing risk factors associated with, for example, obesity, cardiovascular disease and diabetes is widely recognised,^{6–8} especially for children.^{9–11} Football, which is by far the most popular sport worldwide for adults and children, has been demonstrated to be an effective means of delivering exercise to all age groups.¹² In 2006, Fédération Internationale de Football Association (FIFA) recognised the unique role that football could play in the promotion of exercise and healthy behaviours, which in turn could reduce the burden from communicable and non-communicable diseases in many countries: this led to the development of the FIFA initiative entitled 'Football for Health'. Following two focus-group meetings in Zurich in 2007 involving a range of stakeholders,¹³ FIFA's Medical Assessment and Research Centre (F-MARC) developed a football-based health education programme for children in Africa entitled '11 for Health'. This programme, which was made up of eleven 90-min sessions and covered a range of football skills and health messages, was subjected to a pilot study during 2009 among 370 children aged 11–15 years in Khayelitsha township in



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South Africa.¹³ The results from the study demonstrated that it was possible to achieve significant increases in children's health knowledge and prevention strategies for communicable and non-communicable diseases. The recommendations from the study in South Africa were that the efficacy of the programme should be assessed further using larger sample sizes, different countries and alternate modes of delivery.¹³ Mauritius and Zimbabwe were selected as countries in which the '11 for Health' programme could be further evaluated because they provided contrasting socioeconomic-health conditions^{14–16}; in addition, the conditions in these countries spanned the conditions reported for South Africa, where the first study was conducted (table 1). The economic situation usually affects the standard of a country's health infrastructure, which impacts on indicators such as the under-5 mortality and life expectancy.¹⁷ Also of relevance to the evaluation of the '11 for Health' programme was the fact that the main health concerns in Mauritius relate to non-communicable diseases, such as diabetes and cardiovascular disease, while in Zimbabwe they relate more to communicable diseases, such as HIV/AIDS, tuberculosis and malaria. These differences, therefore, provided contrasting environments in which to evaluate various aspects of the '11 for Health' education programme.

The objectives of the present study were (1) to implement and evaluate the effectiveness of the '11 for Health' programme in two African countries with different socioeconomic and health standards (Mauritius and Zimbabwe); (2) to determine whether there were differences in the effectiveness of the '11 for Health' programme for delivering health education to boys and girls; and (3) to compare the efficacy of delivering the '11 for Health' programme through a non-government organisation and a national Football Association.

METHODS

The interventions in the two countries took place independently in the period February to June 2010. In Mauritius, the programme was delivered in collaboration with the Mauritius

Football Association with the support of the Mauritius Ministries of Health and Quality of Life, Education and Human Resources and Youth and Sport. In Zimbabwe, the programme was delivered in collaboration with Grassroot Soccer, a non-government organisation with an established history of delivering football-based HIV/AIDS prevention programmes in Zimbabwe.

The overall structure, content and implementation procedure for the '11 for Health' programme have been described in detail previously.¹³ In summary, the programme consisted of eleven 90-min interactive sessions, with each session made up of a 45-min Play Football period (football skills) followed by a 45-min Play Fair period (health education); see table 2. A male and female coach pair usually delivered each session to approximately 20 children (mixed boys and girls). In Mauritius, the programme was implemented as an in-school intervention to children at 11 secondary schools spread throughout the island using teachers recruited from each of the schools involved and qualified football coaches working at the Mauritius Football Association. In Zimbabwe, the programme was implemented as an out-of-school intervention to children using coaches recruited from the local Bulawayo community who had no previous teaching experience. All teachers and coaches taking part in the interventions were provided with a fully documented '11 for Health' guidance manual and attended a 5-day training programme prior to implementing the programme. Children's attendances at each session were recorded in order to determine the level of compliance with the programme. The children's health knowledge with respect to each of the 10 health issues was assessed before and after the intervention using a 30-item health knowledge questionnaire (three statements per health issue), which was an enhanced version of the 20-item questionnaire (two statements per health issue) used in the previous study in South Africa.¹³ Statements in the questionnaire were generally designed to elicit fixed-alternative responses of 'true', 'false' or 'don't know' from the children: the statements relating to each of the health issues were

Table 1 Socioeconomic comparisons for Mauritius, Zimbabwe and South Africa^{14–16}

Performance indicator	Mauritius	Zimbabwe	South Africa	World
Demographics				
Population; millions	1.3	12.6	50.5	6910
Birth rate; per 1000/year	15	28	23	20
Death rate; per 1000/year	7	19	17	9
Growth rate; %	1.0	1.4	1.7	1.4
Economic				
Gross national income/capita; US\$	5450	340	5760	7952
Environment				
Access to improved drinking water sources; %	100	81	93	87
Access to improved sanitation facilities; %	94	46	59	62
Education				
Youth literacy (15–24 years); %	96	99	96	88
Adult literacy; %	87	91	88	81
Survival to last primary education grade; %	99	79	77	90
Health				
Life expectancy at birth; years	73	43	50	68
Under-5 years mortality; deaths/1000 births	15	90	59	68
Child immunisation; %				
Measles	98	66	83	82
Polio	96	66	97	82
Tuberculosis	98	76	99	89
Adult HIV/AIDS prevalence; %	1.7	15.3	18.1	0.8
Diabetes prevalence (20–79 years); %	17.0	3.4	4.5	6.6

distributed randomly within the questionnaire. Children's views on the programme were assessed using the same six-item postintervention questionnaire as that used in the previous study¹³; statements in this questionnaire were designed to elicit a response on a Likert scale of 'strongly agree', 'agree', 'neither/nor', 'disagree', or 'strongly disagree'.

Using the results from the study in South Africa¹³ and the educational standards in Mauritius and Zimbabwe, it was assumed that approximately 60% of children taking part in the study would provide the correct response to the health questions at the preintervention stage and 80% at the postintervention stage. Based on these figures, a sample size of approximately 400 children would be required in each sample to identify, with 95% confidence and 90% power, a 10% difference in pre and postintervention responses to the health statements. Percentages of children providing the correct response to each statement at the pre and postintervention stages were compared using a z test for proportions.¹⁸ Numbers of children in groups were compared using a χ^2 test. Because of the number of statistical tests conducted on the results, significance was accepted at $p < 0.01$, unless stated otherwise. All participating children and their parents provided informed consent to take part in the studies. The University of Nottingham Medical School Ethics Committee approved both interventions; the school-based study in Mauritius was also approved by the Mauritius Department of Health and Quality of Life.

RESULTS

Average attendance levels recorded for the children attending each of the '11 for Health' sessions were 92.3% (range: 87.0–99.0%) in Mauritius ($n=400$) and 86.6% (range: 74.3–96.0%) in Zimbabwe ($n=422$). Attendances in Zimbabwe were affected during sessions 3, 4 and 5 by a national school teachers' strike that resulted in some children not being aware that the '11 for Health' sessions were still taking place despite schools being closed. The demographic data and health questionnaire results reported relate only to those children who completed both the pre and postintervention questionnaires. On this basis, the percentages of children retained in the study were 97.3% in Mauritius and 93.6% in Zimbabwe: figure 1 shows the number of valid questionnaires completed and included and the number of dropouts at each stage of the study. Data summarising the demographics of the children in each group are shown in table 3: there were no statistically significant differences between the numbers of boys and girls included in the cohorts in either country (Mauritius: $p=0.723$; Zimbabwe: $p=0.580$).

Table 2 The '11 for Health' messages and linked football skills

Session	Play Football (football skill)	Play Fair (health message)
1	Playing football	Play football (physical exercise)
2	Passing	Respect girls and women
3	Heading	Protect yourself from HIV
4	Dribbling	Avoid drugs and alcohol
5	Shielding	Use treated bed nets
6	Defending	Wash your hands
7	Trapping	Drink clean water
8	Building fitness	Eat a balanced diet
9	Shooting	Vaccinate yourself and your family
10	Goalkeeping	Take your prescribed medication
11	Teamwork	Fair play

The percentages of correct responses given for each of the 30 health-related statements in each country at the pre and postintervention stages of the study are summarised in table 4.

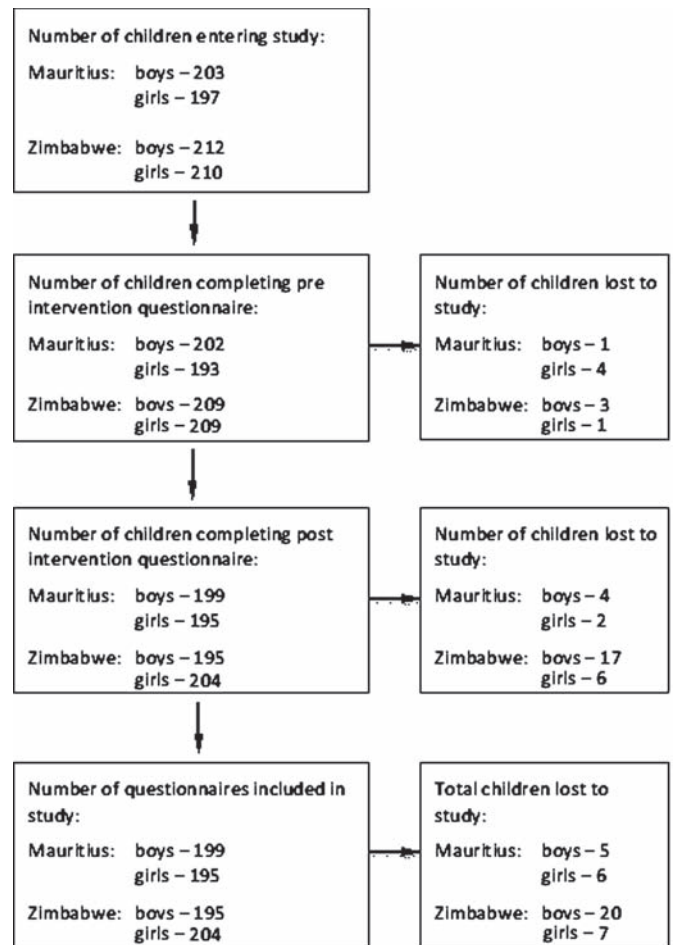


Figure 1 Flow of children completing health knowledge questionnaires through the study.

Table 3 Demographic data for the children included in the Mauritius and Zimbabwe interventions at the start of each study

	Group/gender			
	Mauritius (n=389)		Zimbabwe (n=395)	
	Boys	Girls	Boys	Girls
Number in group	198	191	192	203
Age, years				
Mean	12.9	13.0	11.6	11.4
SD	0.80	0.79	0.99	0.89
Range	12–15	12–15	10–14	10–14
Accommodation, n (%)				
House	194 (98.0)	180 (94.2)	184 (97.4)	200 (98.5)
Other	4 (2.0)	11 (5.8)	5 (2.6)	3 (1.5)
Number of co-occupants				
Mean	4.1	4.2	4.9	4.8
SD	1.9	1.7	2.1	2.1
Range	1–11	1–14	1–13	1–11
Favourite sport, n (%)				
Football	162 (82.2)	48 (25.3)	157 (82.2)	21 (10.4)
Volleyball	1 (0.5)	34 (17.9)	0 (0)	1 (0.5)
Netball	0 (0)	0 (0)	1 (0.5)	126 (62.7)
Other	34 (17.3)	108 (56.8)	33 (17.3)	53 (26.4)

Table 4 Pre and postintervention health knowledge, as a function of country

Session number and health statement	Group and stage of intervention (correct responses given, %)					
	Mauritius (n=389)			Zimbabwe (n=395)		
	Pre	Post	Change	Pre	Post	Change
1	97.9	98.5	0.6	79.4	95.2	15.8****
Regular exercise helps to prevent being overweight	88.4	96.6	8.2****	77.2	91.4	14.2****
Minimum amount of exercise required daily to stay healthy	74.2	93.8	19.6****	52.0	84.8	32.8****
2	58.0	83.0	25.0****	37.6	67.8	30.2****
Important for boys to listen to girls	89.9	96.4	6.5****	78.5	88.2	9.7****
Boys should help to protect girls from harm	92.3	98.7	6.4****	77.4	94.1	16.7****
Football is just for boys	80.2	94.6	14.4****	67.0	84.1	17.1****
3	68.4	86.6	18.2****	68.4	83.5	15.1****
You can get HIV by touching someone	65.8	87.6	21.8****	42.6	52.7	10.1***
Not having sex is an effective way to avoid getting HIV/AIDS	68.1	91.8	23.7****	59.7	74.9	15.2****
You can tell whether people have HIV by the way they look	55.7	82.2	26.5****	36.6	57.9	21.3****
4	64.0	77.2	13.2****	39.7	49.5	9.8**
It is possible to become addicted by starting to smoke marijuana	77.5	95.4	17.9****	94.9	96.9	2.0
Drinking alcohol can make you feel sad/lonely	83.5	94.6	11.1****	81.1	96.2	15.1****
It is my choice whether or not I take drugs	87.3	95.3	8.0****	71.9	83.1	11.2****
5	90.7	97.9	7.2****	81.5	91.3	9.8****
Mosquitoes spread malaria	91.0	90.7	-0.3	81.0	85.8	4.8
Using a bed net at night helps to prevent getting malaria	33.7	83.5	49.8****	21.2	75.7	54.5****
People with malaria can die if they do not get treatment	91.0	96.9	5.9****	90.5	93.3	2.8
6	93.0	96.1	3.1	81.9	91.9	10.0****
After washing, it is OK to dry my hands on my shirt	31.8	84.8	53.0****	28.1	64.6	36.5****
Less likely to become ill if hands are washed before eating	38.0	67.7	29.7****	37.3	81.7	44.4****
How long should I wash my hands to remove germs	76.9	88.7	11.8****	32.3	70.0	37.7****
7	91.5	97.4	5.9****	12.0	34.2	22.2****
Drinking dirty water causes diarrhoea	88.2	96.9	8.7****	62.1	61.6	-0.5
It is OK to drink water taken straight from a river	37.7	70.2	32.5****	10.3	38.5	28.2****
How long should water be boiled before it is safe to drink	34.9	28.6	-6.3	44.9	63.2	18.3****
8	58.4	94.1	35.7****	54.8	79.5	24.7****
A balanced diet contains food of many colours	15.8	58.4	42.6****	54.5	66.3	11.8****
Obesity can lead to diabetes	55.9	89.4	33.5****	77.4	89.1	11.7****
You can become obese if you eat too many chips	69.3	87.1	17.8****	57.8	76.2	18.4****
9	37.7	70.2	32.5****	10.3	38.5	28.2****
Vaccinations are dangerous	34.9	28.6	-6.3	44.9	63.2	18.3****
My parents/guardians have to pay for my vaccinations	58.4	94.1	35.7****	54.8	79.5	24.7****
A vaccination is a type of health food	15.8	58.4	42.6****	54.5	66.3	11.8****
10	55.9	89.4	33.5****	77.4	89.1	11.7****
I can stop taking my medication as soon as I begin to feel better	69.3	87.1	17.8****	57.8	76.2	18.4****
There is no cure for tuberculosis						
The right medication can help people with HIV to live longer						
Average						

Statistical tests refer to comparisons between the post and preintervention values for the same country: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.005$; **** $p \leq 0.001$.

At the preintervention stage, responses to 20 statements were significantly higher in Mauritius and four were significantly higher in Zimbabwe. At the postintervention stage, responses to 21 statements were significantly higher in Mauritius and two were significantly higher in Zimbabwe. The average knowledge-enhancement was similar, however, in both countries (Mauritius: 17.8%; Zimbabwe: 18.4%). Comparing the percentage of correct responses at the pre and postintervention stages showed that there were significant increases in health knowledge for 26 of the 30 statements in both Mauritius and Zimbabwe. Table 5 presents the responses to the health statements as a function of gender in each country. In Mauritius, there were only two statements that resulted in significant differences in responses between boys and girls at the preintervention stage – both of these related to the health message ‘respect for girls and women’; postintervention, there was only one statement where there was a significant difference between boys and girls – this related to the health message ‘protect yourself from HIV’. In Zimbabwe, there were no statements that resulted in significant differences in responses from boys and girls at the preintervention stage; postintervention, there were three statements where there was a significant difference between boys and girls – these related to the health messages ‘eat a balanced diet’, ‘vaccinate yourself and your family’ and ‘take your prescribed medication’. There were, however, a

number of statements at the pre and postintervention stages, in both Mauritius and Zimbabwe, where differences between boys and girls health knowledge were significant at the $p < 0.05$ level. The children’s views on the ‘11 for Health’ programme are presented by gender in both countries in table 6.

DISCUSSION

The sample populations in Mauritius and Zimbabwe were of a similar age and lived in similar sized households to those included in the previous South Africa study¹³; however, higher proportions of children lived in formal housing in both Mauritius and Zimbabwe than the informal housing¹⁹ studied in South Africa. Football was again the most popular sport for boys in both countries and also for girls in Mauritius; the most popular sport for girls in Zimbabwe was netball, which was a similar situation to that found in South Africa.¹⁵ Preintervention levels of health knowledge in Zimbabwe (58%) were similar to those observed in South Africa (53–57%), whereas the baseline levels of health knowledge in Mauritius (69%) were higher. In the few cases where health knowledge was significantly higher in Zimbabwe than in Mauritius, statements related to knowledge about communicable diseases that were of more concern in Zimbabwe than they were in Mauritius; namely, ‘mosquitoes spread malaria’; ‘cure for tuberculosis’; and ‘the right medication can help people with

Table 5 Pre and postintervention health knowledge as a function of gender

Session number and health statement		Group and stage of intervention (correct responses given, %)							
		Mauritius (n=389)				Zimbabwe (n=395)			
		Boys (n=198)		Girls (n=191)		Boys (n=192)		Girls (n=203)	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	Playing football will help to keep me healthy	99.0	99.0	96.9	97.9	84.0	95.3	75.2*	95.1
	Regular exercise helps to prevent being overweight	86.3	94.4	90.6	99.0*	80.6	89.5	73.9	93.1
	Minimum amount of exercise required daily to stay healthy	76.0	92.9	72.2	94.7	57.0	88.0	47.4	81.8
2	Important for boys to listen to girls	42.6	80.3	74.1****	85.9	37.8	64.6	37.5	70.8
	Boys should help to protect girls from harm	91.9	95.4	88.0	97.4	80.4	89.9	76.6	86.6
	Football is just for boys	87.8	98.5	96.9****	98.9	75.8	94.2	78.8	94.0
3	You can get HIV by touching someone	76.1	93.9	84.3*	95.3	65.2	82.3	68.7	85.9
	Not having sex is an effective way to avoid getting HIV/AIDS	64.6	82.2	72.3	91.1**	71.1	85.8	66.0	81.3
	You can tell whether people have HIV by the way they look	62.2	84.2	69.5	91.1*	48.7	58.3	36.9*	47.3*
4	It is possible to become addicted by starting to smoke marijuana	70.1	89.9	66.1	93.7	59.5	77.5	59.9	72.4
	Drinking alcohol can make you feel sad/lonely	61.1	81.8	50.0*	82.5	38.9	57.1	34.5	58.7
	It is my choice whether or not I take drugs	59.0	73.1	69.1*	81.5*	40.1	50.5	39.3	48.5
5	Mosquitoes spread malaria	80.7	94.4	74.2	96.3	94.7	96.8	95.0	97.0
	Using a bed net at night helps to prevent getting malaria	86.3	94.4	80.6	94.8	81.1	96.9	81.2	95.5
	People with malaria can die if they do not get treatment	86.9	94.8	87.8	95.8	73.7	82.0	70.3	84.2
6	After washing, it is OK to dry my hands on my shirt	87.3	97.4	94.2*	98.4	83.6	89.9	79.5	92.6
	Less likely to become ill if hands are washed before eating	93.4	87.2	88.5	94.2*	82.8	89.0	79.2	82.8
	How long should I wash my hands to remove germs	33.2	81.3	34.3	85.9	23.5	75.1	19.2	76.2
7	Drinking dirty water causes diarrhoea	87.8	96.4	94.2*	97.4	88.4	92.0	92.5	94.6
	It is OK to drink water taken straight from a river	90.4	95.4	95.8*	96.8	80.7	90.6	82.9	93.0
	How long should water be boiled before it is safe to drink	26.2	80.7	37.9*	88.9*	29.3	63.3	26.9	65.8
8	A balanced diet contains food of many colours	39.9	66.0	36.1	69.5	36.3	76.3	38.3	86.7**
	Obesity can lead to diabetes	76.8	86.9	77.0	90.5	38.3	71.4	26.7*	68.7
	You can become obese if you eat too many chips	92.4	97.0	90.6	97.9	15.7	39.6	8.4*	29.1*
9	Vaccinations are dangerous	89.4	95.4	86.9	98.4	60.3	56.5	63.9	66.3***
	My parents/guardians have to pay for my vaccinations	43.1	69.2	31.9*	71.2	8.9	36.6	11.6	40.3
	A vaccination is a type of health food	38.1	30.9	31.6	26.3	46.6	61.1	43.3	65.2
10	I can stop taking my medication as soon as I begin to feel better	63.1	93.4	53.4	94.8	54.2	73.0	55.4	85.6***
	There is no cure for tuberculosis	16.9	56.2	14.7	60.7	51.6	65.8	57.2	66.8
	The right medication can help people with HIV to live longer	59.4	89.8	52.4	89.0	76.4	85.8	78.3	92.1*
Average		68.9	85.7	69.7	88.5	58.8	75.8	56.8	76.6

Statistical tests refer to comparisons between the boys and girls responses at the pre and postintervention stages: *p<0.05; **p<0.01; ***p<0.005; ****p<0.001.

Table 6 Children's views about the '11 for Health' programme as a function of country and gender

Question	Group and gender									
	Mauritius					Zimbabwe				
	Boys (n=198)		Girls (n=191)		p Value	Boys (n=192)		Girls (n=203)		p Value
	Agreement, %	Average score	Agreement, %	Average score		Agreement, %	Average score	Agreement, %	Average score	
Sessions were easy to understand	99.5	4.6	97.4	4.6	0.091	88.4	4.4	89.2	4.4	0.816
Learnt about health issues	98.5	4.7	99.5	4.7	0.334	92.7	4.6	92.6	4.5	0.981
Attitude towards health issues changed	93.4	4.5	93.7	4.4	0.900	84.2	4.2	86.7	4.4	0.484
Sessions were enjoyable	88.4	4.5	91.6	4.6	0.288	95.3	4.6	94.6	4.6	0.759
Would recommend programme to friends	89.8	4.4	89.5	4.4	0.918	92.1	4.4	89.2	4.4	0.317
Overall rating of the programme	87.2	4.5	89.8	4.6	0.428	99.0	4.8	94.6	4.7	0.015
Average value	92.8	4.5	92.5	4.5		91.9	4.5	92.1	4.5	

'Agreement' equates to a response of 'agree' or 'strongly agree'.

'Average score' refers to the group's weighted average response (five-point scale: strongly disagree, disagree, neither/nor, agree, strongly agree).

p Values relate to comparisons of the percent 'agreement' recorded for boys and girls in the individual countries.

HIV to live longer'. Despite the differences between the two countries in preintervention health knowledge, similar levels of knowledge-enhancement (18%) were achieved with the programme in Mauritius and Zimbabwe, which was a higher level than that achieved in South Africa¹³ (14%). Although there were very few significant differences between boys and

girls in either pre or postintervention knowledge-levels, for the few statements where there were significant differences, girls scored higher than boys in both countries.

Three specific objectives linked to recommendations made by WHO were set for the study. The first objective, which was to implement and evaluate the '11 for Health' programme

in Mauritius and Zimbabwe, followed the recommendation from the first International Conference on Health Promotion for organisations to support countries in setting up strategies and programmes for health promotion.³ The intervention in Mauritius was achieved following discussions with and support from the Ministries of Health and Quality of Life, Education and Human Resources and Youth and Sport. This support facilitated the recruitment and training of physical education teachers from each of the participating schools and enabled the programme to be delivered within each school's timetable. Further government support was demonstrated as the Ministry of Education and Human Resources arranged for each child who completed the programme to attend a graduation ceremony at which ministers expressed their support for the continuation of the programme within Mauritius. The intervention in Zimbabwe extended the existing expertise and capacity of the non-government organisation to deliver football-based HIV/AIDS prevention programmes to a wider range of health issues. The '11 for Health' programme has now been shown to be an effective way of increasing children's awareness and knowledge about a range of health issues within three different socioeconomic settings in Africa, using both in-school and out-of-school implementation strategies.

The second objective of the study was to determine whether the football-based '11 for Health' programme was as effective in delivering health messages to girls as it was to boys to support the WHO Global School Health Initiative of developing school-based health promotion programmes for boys and girls.⁴ The results from this study together with those reported previously for South Africa¹³ showed that the programme was as effective among girls as it was for boys. The high level of satisfaction with which boys in both countries received the programme might have been expected, as football was their most popular sports activity and the interventions took place at a time when media attention throughout Africa was focused strongly on the FIFA 2010 World Cup taking place in South Africa. However, the programme was equally well-received by girls in both countries, which probably reflects the universal popularity of football among children and the ease with which the girls found they could learn football skills on an equal basis with the boys.

The third objective was to examine the potential for a non-governmental organisation and a national Football Association to deliver the '11 for Health' programme in support of the recommendation following the fourth International Conference on Health Promotion to develop new forms of partnership for delivering health promotion programmes.³ In this context, the study demonstrated that with the appropriate infrastructure and support a non-government organisation and a national Football Association implemented equally successful health education interventions.

There are strengths and weaknesses associated with this study. The studies in Mauritius and Zimbabwe involved sample populations that were four times larger than those used in South Africa, which demonstrated that the '11 for Health' programme can be scaled up, to accommodate large numbers of children. Higher proportions of children successfully completed the programmes in Mauritius and Zimbabwe than was achieved in South Africa.¹³ The low drop out of children from the programme in Mauritius (3%) reflected the benefit of presenting the programme within a formal school environment in a country that places a high priority on primary and secondary education.²⁰ Attendance levels at the weekly '11 for Health' sessions were also high in both countries (Mauritius: 92%;

Zimbabwe: 87%) and were similar to those reported previously for the study in South Africa¹³ (90–94%). These high attendance levels, especially in the out-of-school methodology adopted in Zimbabwe, are reflected in the high levels of satisfaction for the programme recorded in the postintervention course evaluations by both boys and girls. As discussed previously for the study in South Africa,¹³ implementing interventions of this nature as randomised control studies would be the preferred option; however, in a school environment this approach creates logistical and educational problems that are unacceptable for individual school governors at the local level and for governments at the national level. Despite this limitation, the results did provide positive outcomes, in terms of enhanced health knowledge, for each of the health issues covered in the '11 for Health' programme; in both countries, statistically significant increases in the children's health knowledge was recorded for 26 of the 30 health statements included in the evaluation questionnaire. The intention in this study was to implement the same '11 for Health' programme in both Mauritius and Zimbabwe; however, experience gained from this study indicated that in future interventions it would be beneficial to modify the programme content to match the major health concerns in individual countries. For example, in Mauritius malaria does not present a significant health concern whereas diabetes, and its associated sequelae of blood vessel, eye and kidney diseases, is a major concern. It was therefore concluded that, although the issue of diabetes was already included in the '11 for Health' programme within the sessions on physical activity and balanced diet, future interventions in Mauritius and similar countries should include a session focusing solely on diabetes. While health knowledge is an important prerequisite for achieving changes in behaviour it is often a poor indicator of actual behaviour changes; in this

What is already known on the subject?

- ▶ Communicable and non-communicable diseases are major causes of mortality in countries in Africa.
- ▶ Health knowledge supports changes in people's health behaviours.
- ▶ Few health education programmes have been evaluated for their effectiveness.
- ▶ The '11 for Health' programme increased health knowledge among children aged 11–15 years in a township in South Africa.

What this study adds

- ▶ The '11 for Health' programme was shown to be capable of successful implementation within school-based groups in collaboration with a national Football Association and within out-of-school groups in collaboration with a non-government organisation.
- ▶ The programme was shown to achieve significant increases in health knowledge among children aged from 10 to 15 years in Mauritius and Zimbabwe.
- ▶ Boys and girls benefited equally from the '11 for Health' programme.

context, it is intended in future studies to investigate changes in attitudes and intentions to change behaviour, as these are better indicators of future behaviour change.²¹

Having successfully scaled up the programme to accommodate several hundred children, the next stage in the evaluation of the '11 for Health' programme will be to assess ways of training larger numbers of teachers so that the programme can be delivered to thousands of children in nationwide health education programmes.

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