



OPEN ACCESS

# 'FIFA 11 for Health' for Europe. 1: effect on health knowledge and well-being of 10- to 12-year-old Danish school children

Colin W Fuller,<sup>1</sup> Christina Ørntoft,<sup>2</sup> Malte Nejst Larsen,<sup>2</sup> Anne-Marie Elbe,<sup>2</sup> Laila Ottesen,<sup>2</sup> Astrid Junge,<sup>3,4</sup> Jiri Dvorak,<sup>3,4</sup> Peter Krstrup<sup>2,5</sup>

<sup>1</sup>Colin Fuller Consultancy Ltd, Sutton Bonington, UK  
<sup>2</sup>Department of Nutrition, Exercise and Sports, Copenhagen Centre for Team Sport and Health, University of Copenhagen, Copenhagen, Denmark

<sup>3</sup>FIFA Medical Assessment and Research Centre, Zurich, Switzerland

<sup>4</sup>Schulthess Clinic, Zurich, Switzerland

<sup>5</sup>Sport and Health Sciences, Faculty of Life and Environmental Sciences, University of Exeter, Exeter, UK

## Correspondence to

Dr Colin W Fuller, Colin Fuller Consultancy Ltd., Main Street, Sutton Bonington, Loughborough, LE12 5PE, UK; ColinFullerConsultancy@gmail.com

Accepted 31 March 2016  
 Published Online First 29 April 2016

## ABSTRACT

**Aim** To modify the 'FIFA 11 for Health' programme to the European situation, and to assess its effects on health knowledge and well-being in Danish school children.

**Method** A two-cohort study with seven intervention and two control schools. Of the 546 Danish children (boys 269; girls 277) of mean age 11.1 ( $\pm 0.4$ ) years from five city and four country-side schools, 402 undertook the 'FIFA 11 for Health' programme and 144 acted as controls. As part of each school's PE curriculum, seven intervention schools received a 45 min Play Football period (football skills and 3 vs 3 games) and a 45 min Play Fair period (health issues and football drills) on a weekly-basis for 11 weeks. Control participants continued with their regular school PE activities. Participants completed preintervention and postintervention health knowledge and well-being questionnaires.

**Results** Overall, health knowledge increase was significantly ( $p < 0.05$ ) greater for the intervention group (11.9%) than the control group (2.6%). Significant ( $p < 0.05$ ) between-group differences were obtained for 8 of 10 health topics (6.1–20.2%) related to physical activity, nutrition, hygiene and well-being. The social dimension of the well-being questionnaire was significantly ( $p < 0.05$ ) improved in the intervention group compared to the control group, but there were no significant between-group effects for the physical, emotional and school dimensions. Positive reporting about the programme was given by 72.4% of the children and only 4.8% reported negatively.

**Conclusions** The 'FIFA 11 for Health' programme modified for Europe demonstrated positive effects on children's health knowledge and social dimension of well-being, thereby providing evidence that the football-based health education programme can be used effectively within a European school's curriculum to increase physical activity, well-being and health knowledge.

## INTRODUCTION

Worldwide, non-communicable diseases (NCD) are responsible for more deaths (68%) than all other diseases combined: cardiovascular disease, cancer, chronic respiratory disease and diabetes are responsible for 82% of these NCD-related deaths.<sup>1</sup> Only in the WHO African Region are communicable diseases responsible for more deaths than NCDs and it is predicted that, even in this Region, NCDs will become the most common cause of death by 2030.<sup>2</sup> In Western European countries,

the probability of dying from one of the 4 NCDs listed above ranges from 9.1% (Switzerland) to 13.3% (Denmark).<sup>1</sup> Many NCDs are a consequence of being overweight and obesity, the prevalence of which as a function of gender and age across the whole of Western Europe is: men ( $\geq 20$  years)—61.3%; women ( $\geq 20$  years)—47.6%; men ( $< 20$  years)—24.2%; and women ( $< 20$  years)—22.0%.<sup>3</sup> Overweight and obesity generally result from poor diet and inadequate levels of physical activity: in Western European countries, prevalence of physical inactivity ranges from 15.5% (Netherlands) to 37.3% (UK).<sup>1</sup> Being overweight and obesity are contributory factors for national health expenditure in most Western European countries and these constitute  $> 10\%$  of national GDP.<sup>4</sup>

Owing to concerns about NCDs, WHO published a Global Action Plan for the period 2013 to 2020. This included nine targets:<sup>5</sup>

1. A 25% relative reduction in premature mortality from cardiovascular diseases, cancer, diabetes and chronic respiratory diseases
2. A 10% relative reduction in the harmful use of alcohol
3. A 10% relative reduction in the prevalence of insufficient physical activity
4. A 30% relative reduction in the mean population intake of salt/sodium
5. A 30% relative reduction in the prevalence of tobacco use in persons aged 15+ years
6. A 25% relative reduction in the prevalence of raised blood pressure
7. A halt to the rising levels of diabetes and obesity
8. At least 50% of eligible people should receive drug therapy and counselling to prevent heart attacks and strokes
9. A 80% availability of affordable technologies and essential medicines for people with major NCDs.

The WHO Regional Office for Europe published a 10-year strategy to address these targets as they impacted on European countries.<sup>6</sup> The strategy highlighted six issues that were focused specifically on targets 1, 3, 6 and 7:

- Address the ever-decreasing levels of physical activity
- Promote a life-course approach
- Empower people and communities through health-enhancing environments and participation
- Promote integrated, multisectorial, sustainable and partnership-based approaches



CrossMark

**To cite:** Fuller CW, Ørntoft C, Larsen MN, et al. *Br J Sports Med* 2017;**51**:1483–1488.

- ▶ Ensure adaptability of physical activity interventions to different contexts
- ▶ Use evidence-based strategies to promote physical activity and to monitor the ongoing implementation and impact.

In addition, the WHO Regional Office for Europe identified challenges created by the high prevalence of mental health disorders; one of the key actions identified was the development of school-based mental health promotion programmes that would address emotional issues and bullying.<sup>7</sup> WHO claimed that their Global Action Plan provided a cost-effective solution to the problem of NCDs as the estimated cost is approximately US\$1 billion for the 8-year period as compared to the estimated loss of approximately US\$47 trillion associated with NCDs and mental health disorders.<sup>5</sup>

The 'FIFA 11 for Health' football-based programme was developed in 2009 as a way to engage with 10 to 13-year-old children in sub-Saharan Africa in order to increase their levels of physical activity and health knowledge.<sup>8</sup> The programme consists of eleven 90 min sessions, each focused on a single health message related to a communicable or NCD and each message is linked to a football skill. Trained schoolteachers deliver the sessions in an age, gender and culturally sensitive engaging format. The programme has been translated into 6 languages and delivered successfully in 12 countries in Africa,<sup>8–10</sup> 3 in Latin America,<sup>11</sup> 3 in the Caribbean, 3 in South-east Asia and 2 in Oceania. Implementations follow a standardised protocol based on collaborations between FIFA, national Football Federations and Government Ministries of Health, Education and Sport. All of these implementations are routinely monitored to assess their impact on children's health knowledge.<sup>12</sup>

School-based health education programmes were identified by WHO as cost-effective and efficient intervention strategies that helped to deliver public health policies.<sup>13</sup> While the health messages encapsulated within 'FIFA 11 for Health' were originally designed to address the health situation in sub-Saharan Africa, the programme contains many messages related to NCDs and aims to increase children's level of physical activity. The authors, therefore, considered that the 'FIFA 11 for Health' programme had, with some modifications, the potential to address health concerns associated with NCDs in Europe. The aims of this project were, therefore, to modify the 'FIFA 11 for Health' programme for Europe with the focus on increasing children's levels of physical activity and knowledge about NCDs; to implement the programme in a range of Danish schools in collaboration with the Danish Football Association (DBU) and the Danish Ministries of Health, Education and Sport; and to assess and report the programme's impact on children's health knowledge and well-being. A separate report describes the impact of the programme on physiological parameters related to children's physical fitness and health profile.<sup>14</sup>

## METHOD

The project was divided into two phases: the first involved critically reviewing the existing 'FIFA 11 for Health' programme and adapting the content and implementation strategy to the European situation; the second involved implementing and evaluating the modified programme within Danish schools.

### Programme modification

The structure, content and implementation protocol for the original 'FIFA 11 for Health' programme have been described in detail previously.<sup>8–9</sup> It was considered that the existing general framework, involving eleven 90 min sessions consisting of a 45 min Play Football period (teaching football skills) and a

45 min Play Fair period (teaching health messages and healthy behaviours), and the in-school delivery strategy were as appropriate for children in Europe as these have been in other regions of the world. It was recognised that while some messages included in the programme, such as 'Eat a balanced diet' and 'Avoid drugs, alcohol and tobacco', were relevant in the European context, other messages, such as 'Use a treated bed net' and 'Drink clean water' were not. The philosophy adopted during the modification stage, therefore, was to focus the programme's content on NCDs, while retaining the existing two-step delivery strategy of physical activity (Play Football) linked to health education (Play Fair).

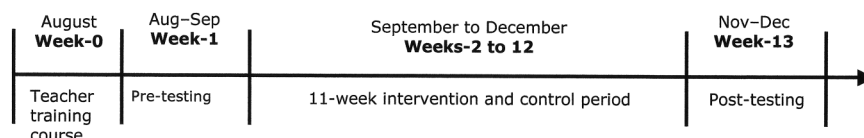
### Programme implementation

In Denmark, it is obligatory for school children to have an average of 45 min of physical activity per day. Each 'FIFA 11 for Health' session could, therefore, be conveniently delivered within two of these designated periods, separated by at least 1 day, within the school's curriculum. Eleven Danish schools that expressed interest were contacted and provided with information about the study. Of these schools, nine agreed to take part: five in the capital municipalities of Frederiksberg and Copenhagen and four in the countryside municipalities of Frederikssund and Roskilde (population <50 000). Each school had 2–4 fifth grade classes for children aged 10–12 years. Block randomisation of participating schools was performed with 1 school from the Capital and 1 from the countryside regions assigned to the control group, and 4 schools from the Capital and 3 from the countryside regions assigned to the intervention group.

The study, which was carried out in the period August to December 2015, began with a training course for teachers during week-0 followed by a 13-week intervention period. During week-0, two or three teachers (at least 1 female and 1 male) from each participating school, together with support football coaches from the Danish Football Association and University of Copenhagen, were taken through a 2½-day interactive training course. Participants received a detailed course manual that outlined the programme's philosophy of health enhancement through education and physical activity, discussed the presentational skills required to deliver the programme in an entertaining but informative way, described the content and timing of each aspect of the programme, discussed the health knowledge associated with each session, demonstrated the football skills, and finally tested participants' ability to deliver the sessions using a series of teach backs. Week-1 was used for pre-intervention testing at both the intervention and control schools, when children responded to questionnaires about health knowledge and well-being. Each week from week-2 to week-12, the seven intervention schools completed the two parts of one session during two scheduled 45 min physical education periods; in this same time period, the two control schools undertook their normal physical education classes. Finally, in week-13, the children from both intervention and control schools completed the same questionnaires as in week-1 (see figure 1).

Sessions began at each of the intervention schools during the third to sixth week of the 2015/2016 academic year; during this period, the two control schools continued with their standard school curriculum, which included a similar number of physical activity lessons. One teacher usually delivered each session to classes of 20 to 25 children (mixed boys and girls). During the intervention period, the school's head-teacher was responsible for ensuring that the programme remained on schedule and that

**Figure 1** 'FIFA 11 for Health' intervention time scales.



sufficient support was provided to the teachers delivering the programme. All assessments were performed by staff from Copenhagen University with support from the school teachers.

The Committees on Biomedical Research Ethics for the Capital Region of Denmark (J.nr. H-15008117) approved the study; child assent and written informed parental consent were obtained for participants included in the study. Those children whose parents did not provide consent also received the programme each week as it was delivered as part of the formal school curriculum; however, these children were not asked to complete the preintervention and postintervention questionnaires.

### Monitoring the intervention

Teachers recorded the children's attendance at each session. Children's views on football were recorded preintervention and postintervention, and views on the 'FIFA 11 for Health' programme recorded postintervention using a 5-point Likert-type scale with values of 1 and 2 representing positive views, 3 a neutral view and 4 and 5 negative views.

### Health knowledge

Children's pre-intervention health knowledge, with respect to each of the 10 health issues, was assessed using a 34-item health knowledge questionnaire. Statements in the questionnaire were presented in one of 2 formats: (1) statements eliciting responses of 'true', 'false' or 'don't know' with correct responses coded as '2' and 'incorrect' and 'don't know' responses as '1'; and (2) statements providing four response options (only 1 of which was correct) with 'correct' responses coded as '2' and all other responses as '1'. Statements were distributed randomly within the questionnaire. Children's learning outcomes from the intervention programme were assessed post-intervention using the same knowledge questionnaire. The mean percentage and standard deviation of correct responses to each health message were based on all individual responses for that health message.

### Well-being

It is recognised that there are discussions about the definitions, differences and use of the terms 'quality of life' and 'well-being'<sup>15</sup>; however, it is not the intention of the current authors to discuss the advantages and disadvantages of either term here. The authors chose to use the term 'well-being', as this was considered more appropriate in the context of the aims of the current intervention. The PedsQL questionnaire for children aged 8–12 years was applied during week-1 and week-13 to assess children's preintervention and postintervention health-related well-being scores.<sup>16</sup> Prior to use in this study, the questionnaire had been translated into Danish by using the back-translation method,<sup>17</sup> and the reliability and validity of the questionnaire was also previously checked with 212 Danish school children of the same age.<sup>18</sup> PedsQL has four multidimensional scales: physical functioning (8 items, eg, 'I have low energy'), emotional functioning (5 items, eg, 'I feel sad or blue'), social functioning (5 items, eg, 'I have trouble getting along with other kids') and school functioning (4 items, eg, 'It is hard to pay attention in class'). The children were asked to rate the items on a 5-point Likert scale from 1—never to 5—almost

always; hence, the higher the score, the worse the reported well-being assessment.

### Statistics

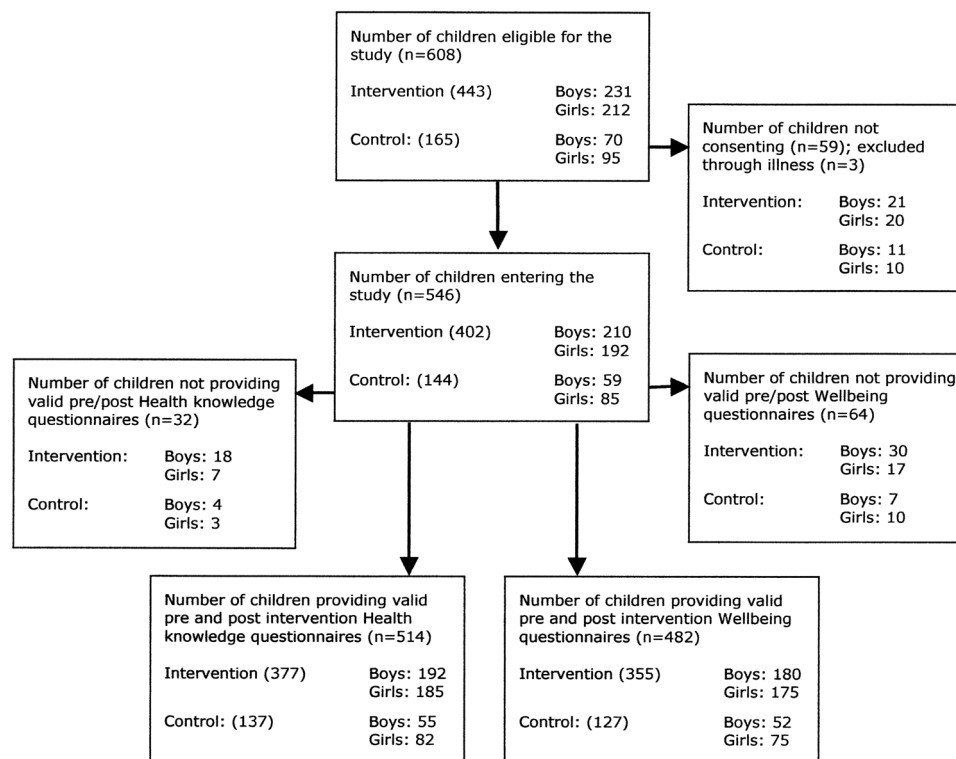
Previous studies have shown that minimum sample sizes of 110 children in the intervention and control groups are required to identify a 20% change in health knowledge from preintervention to postintervention.<sup>8</sup> Statistical analyses were conducted using IBM SPSS (V.23). For health knowledge data, a descriptive analysis of the sample was conducted using all participants' data where there were valid replies at both preintervention and post-intervention measuring points ( $n=514$ ). Between-group differences in  $\delta$  values were tested using the independent unpaired  $t$  test. For well-being data, a descriptive analysis of the sample was conducted with data from all participants who had given valid replies to all four scales at both preintervention and post-intervention measuring points ( $n=482$ ). Multivariate analysis of variance tests were conducted on measures at pretest, post-test, and the mean difference in scores between the pre and postmeasurements. Significance was accepted at  $p<0.05$ .

### RESULTS

In total, 546 pupils in 26 classes participated in the study (intervention 402; control 144); mean age of the children was 11.1 years ( $\pm 0.4$ ). Overall, 522 children answered the preintervention questionnaires (intervention 387; control 135); 525 children answered the postintervention questionnaires (intervention 382; control 143); and 514 children (intervention 377; control 137) provided valid health questionnaire responses at both measuring points (see figure 2). A total of 482 children (intervention 355; control 127) also provided valid replies to the well-being questionnaires. Children's mean attendance (SD) recorded at the 'FIFA 11 for Health' sessions was 98.5% ( $\pm 1.1$ ). At preintervention, 68.1% of the children in the intervention group reported a positive view about football while 9.8% reported a negative view; postintervention, 73.9% of the children responded positively and 8.8% responded negatively. Postintervention, 72.4% of the intervention group expressed a positive view (scale values 1 and 2) of the programme and 4.8% gave a negative view (scale values 4 and 5).

### Programme modification

Although the original 'FIFA 11 for Health' programme was designed to increase children's level of physical activity, the main focus of the programme was to provide health education about communicable and NCDs.<sup>8</sup> This programme delivered effective interventions in many countries in sub-Saharan Africa and subsequently, in other regions of the world where communicable diseases presented a major threat.<sup>9–11</sup> For this project, each session was reviewed critically during the modification stage, and the physical activity and health topic modified or replaced where necessary: in total, four of the original health messages ('Protect yourself from HIV/STDs'; 'Use a treated bed net'; 'Get vaccinated'; 'Take your prescribed medication') were replaced with new NCD-focused messages (see table 1). Two of the new messages ('Be active' and 'Keep fit') were directed towards increasing levels of physical activity; 1 towards diet



**Figure 2** Flow chart mapping the number of children involved with the study at each stage.

(‘Drink water’) and 1 towards increasing self-esteem (Think positively). In addition, 3 versus 3 football games were introduced into the Play Football periods in order to deliver a higher intensity physical activity.<sup>18 19</sup> Play Fair periods of the

programme retained the two key concepts of linking health messages with a football skill and providing periods when children could actively discuss with their teachers specific aspects of the health issue, the potential consequences of developing risky lifestyle behaviours and the benefits of adopting healthy behaviours.

The overall health knowledge increased significantly by 11.9% (preintervention 54.6%; postintervention 66.5%;  $p < 0.05$ ) in the intervention group, which was significantly ( $p < 0.05$ ) more than in the control group (preintervention 57.2%; postintervention 59.8%; difference 2.6%;  $p > 0.05$ ; see table 2).

### Well-being

Reliability of the well-being score was tested on the entire sample population both at the preintervention and postintervention stages (see table 3). Three scales showed reliability around the acceptable level of 0.70.<sup>20</sup> The four-item ‘school functioning’ scale did not show acceptable reliability, with values close to 0.50. One item was, therefore, removed in order to improve reliability: the resulting three-item scale (referred here to as the ‘modified-school’ scale), which produced acceptable reliability with a score close to 0.70, was used in the subsequent analyses.

Within group analysis revealed that the modified-school scale improved for the intervention group while a decrement was observed for the control group in the social and modified-school well-being scales (table 4). Between-group analyses revealed significant ( $p < 0.05$ ) positive intervention effects on participants’ perceived social dimension of well-being. No significant between-group effects were observed for the other three well-being subscales.

### DISCUSSION

The ‘FIFA 11 for Health’ programme modified for Europe (table 1) contains three health messages related to physical

**Table 1** ‘FIFA 11 for Health’ programme: session content and health issues addressed

Session	‘Play Football’ activity	‘Play Fair’ health message	Issues addressed in session
1	Warming up	Play football*	Prepare for exercise and sport
2	Passing	Respect others*	Respect and help others, and avoid bullying
3	Goalkeeping	Eat a balanced diet*	Eat a full range of food types
4	Dribbling	Avoid drugs, alcohol and tobacco*	Avoid developing unhealthy addictions
5	Shielding	Be active	Walk, cycle, use the stairs in daily life
6	Controlling	Control your weight*	Control the quantity of food eaten
7	Defending	Wash your hands*	Develop good hygiene practices
8	Building fitness	Keep fit	Undertake sufficient vigorous exercise
9	Trapping	Drink water	Drink water and skimmed milk
10	Shooting	Think positively	Make friends and have a positive body image
11	Team working	Fair play*	Review all health issues discussed in sessions 1–10

\*Health message retained from the original ‘FIFA 11 for Health’ programme.



**Table 2** Pre and post intervention health knowledge for the Intervention (n=377) and Control (n=137) groups

Session	Proportion of correct responses, % (SD)				Difference $\Delta$ ,% (Post—Pre values)		Difference in $\Delta$ , % (Intervention—Control values)
	Control group		Intervention group		Control group	Intervention group	
	Pre	Post	Pre	Post			
1. Play football	64.9 (27.3)	64.0 (26.4)	58.5 (29.1)*	65.9 (27.9)	−0.9	7.4†	8.3‡
2. Respect others	75.2 (19.2)	77.8 (19.6)	75.6 (19.4)	78.3 (20.1)	2.6	2.7	0.1
3. Eat a balanced diet	48.9 (26.9)	52.0 (25.1)	42.6 (25.6)*	64.0 (26.2)*	3.1	21.4†	18.3‡
4. Avoid drugs, alcohol and tobacco	72.5 (21.2)	76.8 (20.2)	71.6 (20.5)	76.9 (19.8)	4.3	5.3	1.0
5. Be active	47.8 (22.3)	51.5 (19.9)	42.0 (21.5)*	51.8 (21.0)	3.7	9.8†	6.1‡
6. Control your weight	57.7 (25.9)	60.7 (28.2)	51.2 (27.6)*	68.5 (25.1)*	3.0	17.3†	14.3‡
7. Wash your hands	61.7 (27.1)	68.8 (23.7)	65.4 (26.3)	83.3 (23.6)*	7.1†	17.9†	10.8‡
8. Keep fit	20.7 (25.8)	24.1 (26.2)	20.8 (25.7)	44.4 (34.1)*	3.4	23.6†	20.2‡
9. Drink water	54.2 (26.8)	55.6 (27.8)	51.9 (28.4)	60.1 (26.0)	1.4	8.2†	6.8‡
10. Think positively	68.8 (16.8)	66.7 (19.1)	66.2 (17.0)	71.9 (20.1)*	−2.1	5.7†	7.8‡
Total	57.2 (23.9)	59.8 (23.5)	54.6 (22.9)	66.5 (24.2)	2.6	11.9†	9.4‡

\*Significant between-group difference at pre or postintervention.

†Significant within-group increase from pre to postintervention.

‡Significant difference in  $\delta$ -scores for intervention group compared to control group.

activity (1, 5 and 8), three to diet (3, 6 and 9), two to well-being/mental health (2 and 10), one to drug, alcohol and tobacco use (4), and one to hygiene (7). Nine of these messages are aimed at NCDs, but one message (hygiene) relating to communicable diseases was retained because of its fundamental importance to health. Overall, it was considered that these messages provided a balanced education programme, and when taken with the high level of physical activity involved in each of the sessions also adequately reflected the main health issues affecting European countries.<sup>6,7</sup>

Differences between the preintervention and postintervention health knowledge for the intervention group revealed significant increases in children's health knowledge from 8 of the 10 messages; notably, three messages related to physical activity (Play football 7.4%; Be active 9.8%; Keep fit 23.6%), three to diet (Drink water 8.2%; Control your weight 17.3%; Eat a balanced diet 21.4%), one to well-being (Think positively 5.7%), and one to hygiene (Wash your hands 17.9%). The messages that did not achieve significant improvements in knowledge postintervention ('Respect others' and 'Avoid drugs, alcohol and tobacco') did, however, record the two highest scores at the preintervention stage, which demonstrates the existing high level of children's knowledge in these areas. These two messages, which were retained from the original 'FIFA 11 for Health' programme, have consistently shown significant postintervention increases in knowledge in Africa and Latin America.<sup>8–11</sup> The relatively higher baseline score for the message 'Respect others' may reflect differences in the status of women in Denmark and the focus of the session for Europe (respect and help others, avoid bullying) compared to the status of women and the content of

the 'Respect women and girls' session used in previous interventions. For example, the lifetime prevalence of physical and/or sexual violence against women reported for Denmark was 28%, whereas in Brazil it was 39%, and in the five African countries this varied from 43% (Namibia) to 60% (Tanzania).<sup>21</sup> For the message 'Avoid drugs, alcohol and tobacco', the situation appears to be far more complex and the reason for the intervention not achieving an increase in children's knowledge remains puzzling considering the role of alcohol, for example, in the national cultures. For example, in the five African countries, alcohol consumption (L/capita per year) ranges from 2.5 in Malawi to 10.8 in Namibia and 8.7% in Brazil; whereas in Denmark, alcohol consumption is higher at 11.4 L/capita per year.<sup>22</sup>

Scores for the PedsQL questionnaire identified significant improvements in the social and school dimension of well-being for the intervention group, but not for the control group. These results give further support to previously reported benefits of physical activity. In particular, it has been reported that 9- to 11-year-old children who meet the recommended daily physical activity guidelines exhibit higher well-being scores for satisfaction, comfort, resilience, achievement, self-esteem and social acceptance than children who do not.<sup>23</sup>

There are many intervention programmes designed to increase physical activity or health knowledge of children, but only few programmes that attempt to increase both and none that has evaluated a combined physical activity and health education programme.<sup>24,25</sup> The closest in concept to the modified

**Table 3** Reliabilities of the well-being subscales

Scale	Reliability, preintervention	Reliability, postintervention
Physical	0.71 (n=506)	0.73 (n=532)
Emotional	0.71 (n=505)	0.74 (n=532)
Social	0.68 (n=518)	0.72 (n=532)
School (4 items)	0.51 (n=511)	0.51 (n=531)
Modified-school (3 items)	0.68 (n=520)	0.70 (n=532)

**Table 4** Effect of 'FIFA 11 for Health' programme on children's physical, emotional, social and school-related well-being scores

Scale	Mean (SD)			
	Intervention, Pre (n=359)	Intervention, Post (n=359)	Control, Pre (n=123)	Control, Post (n=123)
Physical	1.82 (0.44)	1.79 (0.46)	1.78 (0.47)	1.78 (0.52)
Emotional	2.05 (0.66)	2.00 (0.65)	2.12 (0.63)	2.13 (0.69)
Social	1.53 (0.51)	1.50 (0.50)†	1.43 (0.46)	1.51 (0.55)‡
Modified-school	2.12 (0.73)	2.06 (0.69)*	1.92 (0.66)	2.03 (0.67)‡

\*Significant within-group improvement.

†Significant difference in  $\delta$ -scores for intervention group compared to control group.

‡Significant within-group decrement.

'FIFA 11 for Health' programme is the school-based two-stage 'Dutch Obesity Intervention in Teenagers' (DOiT) programme: stage-1 is aimed at raising awareness about dietary energy balance and stage-2 is aimed at improving children's food choices and level of physical activity.<sup>26</sup> This programme achieved significantly lower levels of body fat, lower consumption of sugary drinks, and lower screen-viewing times among children aged 12–14 years.<sup>26 27</sup>

Given the social, environmental, educational and financial situation in Europe, communicable diseases generally do not threaten the population to the extent that these do in other regions of the world. In Europe, NCDs are the major health threat due to consumption of unhealthy, convenience foods, and limited time spent on physically challenging activities: a situation of particular concern among children.<sup>28</sup> The current recommendation for physical activity is 60 min of moderate to vigorous activity daily for children<sup>5</sup>; however, evidence shows that large proportions of children in Europe do not achieve this.<sup>1</sup> It has long been recognised that being overweight during childhood is a risk factor for being overweight in adulthood;<sup>29–31</sup> therefore, it is essential to address the problem of being overweight at school age in order to reduce the threat from NCDs in later life. The children's positive views about the programme together with the observed increases in health knowledge, and the social and school dimensions of well-being indicate that the proposed modified 'FIFA 11 for Health' programme could support the WHO regional campaign against NCDs in Europe.<sup>6</sup>

### What are the findings?

- ▶ The 'FIFA 11 for Health' education programme has been modified for the European setting.
- ▶ The modified programme focuses on physical activity and health knowledge related to non-communicable diseases among school-aged children.
- ▶ The modified programme increased levels of knowledge about non-communicable diseases among 10- to 12-year-old Danish school children.
- ▶ Children's scores on the social dimension of well-being were enhanced following participation in the programme.

### How might it impact on clinical practice in the future?

- ▶ Children in Europe show a high prevalence of overweight and obesity.
- ▶ National Governments are seeking cost-effective initiatives to reduce the economic and health burden associated with overweight and obese children.
- ▶ The 'FIFA 11 for Health' programme for Europe can be easily assimilated into school curricula to provide children with effective health education and physical activity.

**Acknowledgements** The authors acknowledge the financial support from FIFA, Switzerland, to modify and implement the 'FIFA 11 for Health' programme in Denmark. The Copenhagen Centre for Team Sport and Health is supported by a grant from the Nordea Foundation (Nordea-fonden), Denmark. The authors would also like to acknowledge the support given by Kenneth Reeh, Tina Enestrøm and Kenneth Grønland Rasmussen (Danish Football Association). The authors are grateful for the assistance with the preintervention and postintervention

questionnaires provided by Johan Wikman, Line Sandager, Ida Lundager, Stine Nylandsted Jensen, Andreas Møller and Mads Madsen (Copenhagen Centre for Team Sport and Health, University of Copenhagen). In addition, the authors would like to thank the 9 schools in Frederikssund, Roskilde, Frederiksberg and Copenhagen Municipalities and the 22 individual teachers who delivered the programme in their schools, without whose support the interventions would not have been possible. Last, but not the least, the authors would like to thank the children who participated in the study.

**Contributors** CWF modified the FIFA 11 for Health programme for the European context, analysed the data, prepared the first draft of the paper, revised the manuscript and approved the final submission. CO modified the FIFA 11 for Health programme for the European context, implemented the intervention, analysed the data, revised the manuscript and approved the final submission. MNL implemented the intervention, revised the manuscript and approved the final submission. A-ME implemented the programme, provided statistical analysis of the data, revised the manuscript and approved the final submission. LO implemented the programme, revised the manuscript and approved the final submission. AJ and JD modified the FIFA 11 for Health programme for the European context, commented on the manuscript and approved the final submission. PK modified the FIFA 11 for Health programme for the European context, implemented the intervention, analysed the data, revised the manuscript and approved the final submission.

**Funding** FIFA Medical Assessment and Research Centre.

**Competing interests** J Dvorak is the FIFA Chief Medical Officer.

**Ethics approval** Committees on Biomedical Research Ethics for the Capital Region of Denmark (J.no. H-15008117).

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Open Access** This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

### REFERENCES

- 1 World Health Organization. *Global status report on noncommunicable diseases 2014*. Geneva: World Health Organization, 2014.
- 2 World Health Organization. *Global status report on noncommunicable diseases 2010*. Geneva: World Health Organization, 2011.
- 3 Ng M, Fleming T, Robinson M, et al. Global, regional and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014;384:766–81.
- 4 World Health Organization. *World Health Statistics 2015*. Geneva: World Health Organization, 2015.
- 5 World Health Organization. *Global action plan for the prevention and control of noncommunicable diseases 2013–2020*. Geneva: World Health Organization, 2013.
- 6 World Health Organization. *Physical activity strategy for the WHO European Region 2016–2025*. Copenhagen: World Health Organization, 2015.
- 7 World Health Organization. *The European Mental Health Action Plan 2013–2020*. Copenhagen: World Health Organization, 2015.
- 8 Fuller CW, Junge A, DeCelles J, et al. 'Football for Health'—a football-based health-promotion programme for children in South Africa: a parallel cohort study. *Br J Sports Med* 2010;44:546–54.
- 9 Fuller CW, Junge A, Dorasami R, et al. '11 for Health', a football-based health education programme for children: a two-cohort study in Mauritius and Zimbabwe. *Br J Sport Med* 2011;45:612–18.
- 10 Fuller CW, Junge A, Amaning, et al. 'FIFA 11 for Health': implementation in five countries in sub-Saharan Africa. *Health Educ J* 2015;74:103–19.
- 11 Fuller C, Thiele E, Flores M, et al. A successful nationwide implementation of the 'FIFA 11 for Health' programme in Brazilian elementary schools. *Br J Sports Med* 2015;49:623–9.
- 12 Dvorak J, Fuller CW, Junge A. Planning and implementing a nationwide football-based health-education programme. *Br J Sports Med* 2012;46:6–10.
- 13 World Health Organization. *Improving health through schools: national and international strategies*. Geneva: World Health Organization, 1999.
- 14 Ørntoft C, Fuller C, Larsen MN, et al. 'FIFA 11 for Health' for Europe. II: effect on health markers and physical fitness of 10 to 12 year-old Danish school children. *Br J Sports Med* 2016;In press.
- 15 Galloway S, Hamilton C, Scullion A. *Well-being and quality of life: measuring the benefits of culture and sport: a literature review and thinkpiece*. Edinburgh: Scottish Executive Social Research, 2005. <http://www.gov.scot/resource/doc/89281/0021350.pdf> (accessed 15 Feb 2016).
- 16 Varni JW, Seid M, Rodeet C, et al. The PedsQL: measurement model for the pediatric quality of life inventory. *Med Care* 1999;37:126–39.

- 17 Brislin RW. Back-translation for cross-culture research. *J Cross-Cultural Psych* 1970;1:185–216.
- 18 Krstrup P, Hansen PR, Nielsen CM, *et al.* Cardiovascular adaptations to a 10-wk small-sided school football intervention for 9–10-year-old children. *Scand J Med Sci Sports* 2014;24:4–9.
- 19 Bendiksen M, Williams CA, Hornstrup T, *et al.* Heart rate response and fitness effects of various types of physical education for 8- to 9-year-old schoolchildren. *Eur J Sport Sci* 2014;14:861–9.
- 20 Nunnally JC. Assessment of reliability. In: *Psychometric theory*. 2nd edn. New York: McGraw-Hill, 1978.
- 21 UN Women. *Violence against women prevalence data: surveys by country*. UN Women, 2012. [http://www.endvawnow.org/uploads/browser/files/vawprevalence\\_matrix\\_june2013.pdf](http://www.endvawnow.org/uploads/browser/files/vawprevalence_matrix_june2013.pdf) (accessed 15 Feb 2016).
- 22 World Health Organization. *Global status report on alcohol and health*. Geneva: World Health Organization, 2014.
- 23 Breslin G, Gossrau-Breen D, McCay N, *et al.* Physical activity, gender, weight status, and wellbeing in 9- to 11-year-old children: a cross-sectional survey. *J Phys Activity Health* 2012;9:394–401.
- 24 Demetriou Y, Honer O. Physical activity interventions in the school setting: a systematic review. *Psychol Sport Exercise* 2012;13:186–96.
- 25 Lonsdale C, Rosenkranz RR, Peralta LR, *et al.* A systematic review and meta-analysis of interventions designed to increase moderate-to-vigorous physical activity in school physical education lessons. *Prev Med* 2013;56: 152–61.
- 26 Singh AS, Chin A Paw MJ, Kremers SPJ, *et al.* Design of the Dutch Obesity Intervention in Teenagers (NRG-DOIT): systematic development, implementation and evaluation of a school-based intervention aimed at the prevention of excessive weight gain in adolescents. *BMC Pub Health* 2006;6:304
- 27 Singh AS, Chin A Paw MJ, Brug J, *et al.* Dutch Obesity Intervention in Teenagers: effectiveness of a school-based program on body composition and behavior. *Arch Pediatr Adolesc Med* 2009;163:309–17.
- 28 World Health Organization. *Country profiles on nutrition, physical activity and obesity in the 53 WHO European Region Member States: methodology and summary*. Copenhagen: World Health Organization, 2013b.
- 29 Serdula MK, Ivery D, Coates RJ, *et al.* Do obese children become obese adults? A review of the literature. *Prev Med* 1993;22:167–77.
- 30 Singh AS, Mulder C, Twisk JW, *et al.* Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev* 2008;9:474–88.
- 31 Karnik S, Kanehar A. Childhood obesity: a global public health crisis. *Int J Prev Med* 2012;3:1–7.