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Short Communication

A 16-month follow-up after a youth-led social marketing intervention to encourage healthy lifestyles in children (aged 9 at baseline and 11 at follow-up) from disadvantaged neighbourhoods: the European Youth Tackling Obesity-Kids project

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ABSTRACT

Objectives: The objective of this study was to assess the influence of the European Youth Tackling Obesity-Kids (EYTO-Kids) 10-month intervention, based on social marketing and peer-led methodologies, at 16 month of its ending.
Study design: Children (aged 9 at baseline and 11 at the follow-up) from disadvantaged neighbourhoods who participated in the 10-month EYTO-Kids parallel-cluster randomised controlled intervention study in Reus (Spain) were included. The number of participants was 252 (retention rate: 67.2%) in the intervention group (7 schools) and 226 (retention rate: 69.1%) in the control one (8 schools). Primary (physical activity and fruit consumption) and secondary (screen time; and vegetables, fast food, and sugary drink consumption) outcomes were assessed.
Results: At follow-up, consumption of ≥1 fruit per day increased in girls (odds ratio [OR] (95% confidence interval [CI]) = 2.28 (1.2; 4.2), $P = 0.012$) and all children (OR (95%CI) = 2.28 (1.0; 2.6), $P = 0.044$) in the intervention group vs. the control one. Physical activity ≥6 h/week similarly increased in both groups.
Conclusion: At long-term effectiveness of a 10-month intervention on improving fruit consumption in children was observed. Therefore, peer-led and social marketing methodologies enhance healthy lifestyles by conveying children towards healthy choices.

Introduction

Unhealthy lifestyles cause chronic diseases, particularly in low-socioeconomic-status families and ethnic minority children.[1] A low fruit and vegetable intake, as well as an increasing sedentaryism, are some reasons for the global increases in childhood obesity and other metabolic diseases.[2]

The European Youth Tackling Obesity (EYTO) project was performed in four European countries to encourage a healthy lifestyle among youth (12–14 years) in disadvantaged neighbourhoods.[3] From our EYTO participation, the EYTO-Kids project in Reus (Spain) emerged to be applied to scholars aged 9 years to improve lifestyles before starting adolescence.

Given the high prevalence of unhealthy lifestyle behaviours among socially disadvantaged children in Europe, preventive interventions are highly warranted,[1] and the long-term follow-up assessment to establish whether healthy lifestyle changes are sustained over a longer period.[1]

After a 10-month intervention, EYTO-Kids showed a reduction in screen time on weekdays, and fast-food and sugary drinks consumption in the intervention group compared to those in the control one.[4] The present study aimed to perform a 16-month follow-up, after the end of the EYTO-Kids intervention, to assess its long-term effect on children, who at follow-up, aged 11 years, were still in primary school.

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Methods

Study design

The EYTO-Kids intervention was a 10-month school-based, parallel-cluster randomised controlled study, performed in Reus, Spain. The protocol has been previously published.[3] The study, registered at ClinicalTrials.gov (NCT02702336), was developed according to the Helsinki Declaration and the guidelines of good clinical practice of the International Conference on Harmonization (ICH GCP) and conducted following the Consolidated Standards of Reporting Trials 2010 extension for clustered randomised trials.

Then, 16 months after the cessation of the EYTO-Kids intervention, a follow-up of the participants in the EYTO-Kids intervention study was done. Inclusion criteria for the EYTO-kids follow-up study were to attend the fifth or sixth grade (primary school, mean age 11 years) in one of the participating EYTO-Kids schools; provide a signed informed consent by parents or legal tutors; and have answers from parents or legal tutors for the main outcomes (children's fruit consumption and PA) at all evaluated times.

Characteristics of the trial, tools to assess each of the outcomes, sample size calculation, statistical analyses, and baseline characteristics are described in Supplementary material. Supplementary Fig. 1 included a detailed description of the activities of the intervention.

Outcomes and data collection

Primary outcomes were 1) to assess changes in % of children consuming ≥1 portion/day of fruit, and in practicing ≥6 h/week of moderate to vigorous physical activity (PA). Secondary outcomes were to assess changes in percentage of children who 1) consume ≥1vegetable serving/day; 2) spent screen time ≤2 h/day (weekdays and weekends); 3) visited a fast-food centre ≤ once/week); and 4) consumed ≤1 sugary drinks every day.

Results

At the 16-month follow-up, retention rates (RRs) were 67.2% (252/375) in the intervention group and 69.1% (226/327) in the control one (Supplementary Fig. 2). The fact that RR was >60% supports the validity and reliability of the data obtained.[5] No differences were observed in baseline characteristics between follow-up participants and the lost ones (Supplementary Table 1).

Outcomes after a 10-month *intervention:* consumption of ≥1 fruit/day increased in all children in the intervention group compared to that in the control group (odds ratio [OR] [95% confidence interval {CI}] = 1.74 [1.1–2.8], $P = 0.023$). PA of ≥6 h/week increased in the control group in boys ($P = 0.013$), and in all children ($P = 0.008$) (Table 1), compared to that in the intervention group (OR [95%CI] = 0.248 [0.10–0.61], $P = 0.006$, and OR [95% CI] = 0.490 [0.25–0.96], $P = 0.040$, for boys and all children, respectively) (Table 1). No inter-treatment differences were observed for screen time use of ≤2 h/day (weekdays and weekends), except a decrease in girls on weekdays (OR [95%CI] = 0.300 [0.12–0.74], $P = 0.013$). Concerning sugary drinks, the percentage who consumed commercial juice ≤once/week increased ($P < 0.05$) for all populations in the intervention group without changes in the control group (Supplementary Table 2).

Outcomes at the 16-month *follow-up:* Consumption of ≥1 fruit/day in the intervention group was higher than that in the control one for girls (OR [95%CI] = 2.28 [1.2–4.2], $P = 0.012$) and all children (OR [95%CI] = 1.62 [1.0–2.6], $P = 0.044$). PA practice ≥6 h/week increased in all populations, both in intervention and control groups ($P < 0.05$) without inter-treatment differences (Table 1). In the control group, there was a decrease in screen time use of ≤2 h/day at weekends ($P < 0.001$) in boys, the last reflected in all children groups ($P = 0.005$) without inter-treatment differences (Supplementary Table 2). Concerning sugary drinks, commercial juice consumption decreased in the intervention group (all categories) without changes in the control group, whereas consumption of sweet and carbonated drinks increased at follow-up in all evaluated groups ($P < 0.001$) both for intervention and control (Supplementary Table 3).

Discussion

Globally, there was an increasing trend in consumption of ≥1 fruit/day from baseline to 10-month and 16-month follow-ups in girls in the intervention group, whilst an opposite pattern was observed in the control group. Although the trend was not observed for all children groups, changes in fruit consumption were higher in the intervention group than in the control one at follow-up. Daily consumption of fruit and vegetables in European adolescents has been reported to be around 200 g/day,[6] which is half of that is recommended by the World Health Organization.[7] For each piece of fruit or vegetable (106g serving) consumed daily, there is a 4% decrease in cardiovascular risk according to the European Heart Network.[8] Thus, the maintenance of the trend to consume ≥1 fruit/day is a success of the intervention.

PA increased in both intervention and control groups at follow-up. This fact disagrees with the PA decline observed in childhood and adolescence,[9] and our results point out an external factor for explaining this dual increase. From 2015, and for 1 month (March)

Table 1
Changes in primary outcomes throughout the study.

	Intervention group ($n = 252$)					Control group ($n = 226$)					Intervention vs. control			
	Baseline	10 months[a]	*P*	16-month follow-up	*P*	Baseline	10 months[a]	*P*	16 month follow-up	*P*	Baseline to 10 months		Baseline to follow-up	
											Odds ratio (95%CI)	*P*	Odds ratio (95%CI)	*P*
≥1 Fruit per day, % (*n*)														
Boys	60 (46.5)	73 (56.6)	*0.053*	54 (41.9)	0.405	46 (42.2)	45 (41.3)	1	41 (37.6)	0.487	2.01 (0.91; 4.4)	0.080	1.13 (0.60; 2.1)	0.671
Girls	58 (47.1)	67 (54.5)	0.200	61 (49.6)	0.755	46 (39.3)	49 (41.9)	0.743	35 (29.9)	0.117	1.56 (0.85; 2.8)	0.137	2.28 (1.2; 4.2)	0.012
All	118 (46.8)	140 (55.6)	0.017	115 (45.6)	0.820	92 (40.7)	94 (41.6)	0.899	76 (33.6)	0.080	1.74 (1.1; 2.8)	0.023	1.62 (1.0; 2.6)	0.044
Physical activity ≥6 h per week, % (*n*)														
Boys	97 (75.2)	91 (70.5)	0.362	114 (88.4)	0.003	86 (78.9)	97 (90.0)	0.013	102 (93.6)	<0.001	0.248 (0.10; 0.61)	0.006	0.507 (0.16; 1.6)	0.223
Girls	75 (61.0)	76 (61.8)	1	103 (83.7)	<0.001	75 (64.1)	84 (71.8)	0.175	101 (86.3)	<0.001	0.715 (0.27; 1.8)	0.460	0.788 (0.34; 1.8)	0.547
All	172 (68.2)	167 (66.3)	0.630	217 (86.1)	<0.001	161 (71.2)	181 (80.1)	0.008	203 (89.8)	<0.001	0.490 (0.25; 0.96)	0.040	0.669 (0.35; 1.3)	0.209

Abbreviation: CI: confidence interval.

[a] End of the intervention. All, total population. *P* for intra-intervention comparisons by McNemar tests for related samples. *P* for inter-intervention changes by a multilevel model with the GLIMMIX SAS-Procedure by means of the Between-Within method. Model adjusted by age, school (random effect) baseline values, and also sex when all participants are included.

every year, the Olympic School Games are organised by the Reus Town Hall, with the participation of all area schools (https://olimpiadaescolar.jimdofree.com/, https://www.reusesport.cat/node/3409). In 2018, just when the follow-up was performed, EYTO-Kids participants were for the first time included in these games which promote all types of sports among youngsters. Given that they remain together at school, and in the neighbourhood, this could explain the increase of PA in both groups at the time of assessment. If our hypothesis is true, organising common activities for children at the town hall or neighbourhood level during the year could be a useful tool for stimulating PA practice in youth.

Although the decrease in commercial juice consumption observed at 10-month follow-up in the intervention group could have influenced that observed at follow-up, the concomitant increase in consumption of sweet and carbonated drinks in both groups points out a change of habits with the increase in participant's age. This fact has been described within the National Health and Nutrition Examination Survey (NHANES 2011–2016) with 9069 children aged 2–19 years.[10]

The present study has the following limitations: school children's survey was completed by parents; sample size does not account for a binary approach; and PA was not assessed by accelerometer. The main strength of the study, however, was that social marketing (SM) and peer-led methodologies ensured relevant content, given that peer leaders and participants were from the same low-income neighbourhoods.

In conclusion, the EYTO-Kids follow-up showed long-term effectiveness in improving fruit consumption in children. The dual increase of PA in both groups at follow-up cannot be related to intervention but to some external activity. Our results, although modest, encourage peer-led and SM intervention to convey healthy choices in children to improve their adolescent lifestyle and suggest that reinforcements at the community level would be useful. Further studies are warranted.

Author statements

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Ethical approval

EYTO-Kids protocol was approved by the Ethics Committee of the University Hospital of Sant Joan de Reus (Ref: 16-01-28/1prog1).

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Competing interests

None declared.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2024.04.008.

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