

# **A social marketing approach to tackle childhood obesity: a report of four European countries intervention programs (DG HEALTH -2012 12 19)**

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## **ABSTRACT**

Obesity is a serious worldwide public health problem and prevention is the priority. This report is a review of the results of school- and community- based interventions, campaigns or/and programs of four European countries (United Kingdom, Czech Republic, Portugal and Spain), which include social marketing principles in their design, and aim to promote healthy lifestyles through dietary and physical activity recommendations to tackle obesity in children and adolescents.

From this report, it is concluded that a possible method to effectively combine social marketing with school- and community- based interventions is:

- The inclusion of the 8 benchmark criteria of Social Marketing during the design of the interventions to induce an optimal change of behaviour in the participants.
- The inclusion of a control group is suggested to better identify the effects of the intervention.
- The combination of physical activity and nutritional interventions is recommended and parenteral cooperation is required.
- The duration of the intervention should be of at least one weekly session of 1h and 45min for a minimum period of 10 weeks to achieve anthropometric, physical activity and dietary improvements.
- The standardization of methods is a helpful device for lifestyle programs to tackle obesity in children and adolescents in Europe.

## INTRODUCTION

Obesity (OB) is a worldwide public health problem that brings long-term adverse consequences that are substantial and well-documented. The prevalence of excess weight among children and adolescents is increasing in different countries at different rates. According to the World Health Organization, in Europe the prevalence of overweight (including OB) ranged from 19% to 49 % among boys and 18% to 43% among girls, and the prevalence of OB ranged from 6% to 26.6% among boys and from 5% to 17% among girls (based on the 2007 WHO growth reference) in the last decade (1). This increasing tendency of excess weight prevalence in childhood and adulthood [2] observed in some countries (United Kingdom, France, Korea, United States and Spain) is stable despite the absolute taxes are cause of concern [1]. In Europe, OB prevalence in children and adolescent are higher in south regions [3-4].

OB, once established, is difficult to treat, thus prevention is the main priority (2). However, few prevention strategies have been successful. Different attempts are ongoing and it is necessary to increase knowledge of these determinants and interventions. It is also important to translate this knowledge into effective intervention strategies and policy measures. These attempts should take into account the greater need for OB prevention among the lower socioeconomic groups (3). Nutritional education, decreasing sedentary behaviour and increasing physical activity are the basis for behavioural modifications that can prevent or correct risk factors for OB. Behaviour change in children and adolescents is the cornerstone of any preventive intervention. School-based intervention programs have increasingly emerged as an important strategy in OB prevention at this life stage (5).

In recent years, new approaches have been used to develop the promotion of nutrition and physical activity in community and school programs. One of these new tools is social marketing, defined by Kotler and Zaltman as the “design, implementation, and control of programs calculated to influence the acceptability of social ideas, and involving considerations of product, planning, pricing, communication, distribution and marketing research” (6). As a health promotion tool, it has a driving concern of achieving social benefits through the use of ethical approaches that engage, mobilize and empower individuals and communities with behavioural changes, going beyond simple message-based communications to find ways to help people achieve and sustain positive behaviours (7). Social marketing is used in the context of community-based OB prevention programs to promote behaviours. Social marketing can be used in two ways. On the one hand, as a set of concepts and principles used to inform the development and implementation of strategies aimed at behaviour change; that is a theory for helping examine, understand and provide insight into issues and enhance impact and effectiveness of health interventions aimed at behaviour change. On the other hand, as a specific intervention, method or planned process, social marketing needs to achieve targeted behavioural goals. With both uses, behavioural change is a central and desirable option for tackling OB (8).

The National Social Marketing Centre (NSMC), based in the United Kingdom (UK) originally set up by the UK Government in 2006, and now a Community Interest Company, created benchmark criteria (building on Alan Andresen’s 6-point essential guide marks) (9). The NSMC’s 8-point benchmark criteria (10) are those elements to look for in an intervention to

determine whether it is consistent with social marketing or not (11). Some studies confirm that a campaign can deliver effective results (2,12) if it uses social marketing strategies to modify behaviours, lifestyle and factors relevant to diet and physical activity with the aim of reducing the prevalence of overweight and OB among children and adolescents.

The strategies reviewed in this report can include (according to MeSH (Medical Subject Headings) definitions:

- a) Intervention studies: Epidemiologic investigations designed to test a hypothesized cause-effect relation by modifying the supposed causal factor(s) in the study population.
- b) Health promotion campaigns: Encouraging consumer behaviors most likely to optimize health potentials (physical and psychosocial) through health information, preventive programs, and access to medical care.
- c) Programs: The process of formulating, improving, and expanding educational, managerial, or service-oriented work plans.

There is insufficient literature about the inclusion of social marketing in European health interventions, campaigns or programs. There are many campaigns that use the social marketing basis without knowing it. This is the reason why it is important to base actions to create an intervention on existing evidence, and conduct a systematic review about this issue. In this way we can avoid mistakes and reproduce successful campaigns.

### **Aim**

To determine the effectiveness of school- and community-based interventions following the social marketing benchmark criteria to improve healthy lifestyles, as dietary and physical activity, for young people between 4 to 17 years on OB prevention.

### **Methodology**

We conducted a systematic review of the results of school- and community- based interventions that included social marketing principles in their design in four European countries (United Kingdom, Czech Republic, Portugal and Spain) aimed at prevention of overweight and OB through the improvement in physical activity, healthy lifestyles and dietary behaviour in children and adolescents between 4 and 17 years old.

### **Search Strategy**

A three-phase search strategy was employed to select the widest possible scope of literature for this analysis.

1. The first phase consisted on a comprehensive search by each country research team about the school- and community-based interventions undertaken children and adolescents to prevent OB and overweight in their particular countries.
2. In the second phase, the Spanish team made a screening of each intervention sent by the rest of the teams, using the following electronic databases: MEDLINE (PubMed; <http://www.ncbi.nlm.nih.gov/pubmed>), CENTRAL

(<http://www.thecochranelibrary.com/>). The initial search string was developed using the following combination of keywords: “school-based intervention”, “community-based intervention”, “obesity”, “social marketing”, “adolescents”, “children”, “overweight”, “United Kingdom”, “Czech Republic”, “Portugal” and “Spain”. If the study met these criteria, the Spanish team proceeded to look for social marketing and benchmark criteria strategies within the study. Additionally, all the campaigns were divided into two groups: the ones with no scientific reports and the ones with scientific reports. Only the interventions with scientific results published are considered in this report.

3. Finally, in the third phase, research was conducted about the articles and reports on the reference lists of all the potential relevant articles using the same methodology as in the second phase to confirm the relevant literature for the review.

All the searches mentioned above were conducted between October 21<sup>st</sup>, 2013 and January 20<sup>th</sup>, 2014.

### **Eligibility criteria**

This report was limited to studies published in English, Czech, Spanish and Portuguese, with no timeframe established. The first intervention identified was developed in 2006. The major language was English in MEDLINE, Cochrane.

To be eligible for inclusion, studies had to:

1. be conducted in United Kingdom, Czech Republic, Portugal or Spain;
2. be conducted in a school or community setting;
3. include healthy, overweight and obese children or adolescents from 4 to 17 years;
4. focus on primary and secondary prevention of OB and through dietary and/or physical activity and/or physical activity behaviour;
5. include measurements of dietary, physical activity and lifestyles behaviour outcomes and/or anthropometric outcomes;
6. studies targeting parental or teacher behaviour were eligible just if the outcome data was measured in children and/or adolescents.

### **Exclusion Criteria**

The following studies were excluded:

- 1) the lack of one or more inclusion criteria;
- 2) the studies with no results published;
- 3) The review studies, book chapters, dissertations, conference proceedings, abstracts and correspondence letters.

### **Study Selection and Data extraction**

The title and abstracts of the pre-selected articles were screened to choose the studies based on the inclusion criteria. If the information in this section was not sufficient the entire article was read. The full text of the selected studies was then retrieved and read to determine whether the inclusion criteria were met.

Data extracted included:

- Intervention type,
- Title,

- Authors,
- Intervention aim,
- Target audience,
- Participants,
- Setting,
- City and country,
- Method to assess overweight and OB,
- Activities undertaken,
- Social marketing characteristics (described below),
- Outcome or evidence of success or impact,
- Date of start and finish of the campaign/research and sponsors of the intervention.

### **Social Marketing Benchmark Criteria (BC)**

The BC used in this review is described previously by Gracia-Marco (12).

The Social Marketing National BC are as follows:

1. Customer orientation: understanding the target audience (children and adolescents)
2. Behaviour: changing or reinforcing behaviours (lifestyles and nutritional behaviours)
3. Theory: using a theoretical framework
4. Insight: focusing on children and adolescents' motivation
5. Exchange: considering the costs and benefits of the behaviour changes
6. Competition: analysing the barriers
7. Segmentation: using a segmentation approach
8. Method mix: using a mix of methods

### **Quality of the studies included and systematic review**

The methodological quality of studies was determined by the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies (13), and the quality of the systematic review by PRISMA (14).

### **Data synthesis**

A meta-analysis was not suitable considering that there was heterogeneity in the studies in terms of participants, design of the interventions and outcome measures. That is the reason why we performed a systematic review.

## RESULTS

### Data Synthesis and general characteristics

The systematic search strategy identified 220 unique references, of which 30 articles were included for full-text review. After full-text screening of these articles, 15 intervention studies (presented in 16 references, because one of the studies has a follow up after two years of intervention) met the inclusion criteria and were included for quality appraisal and analysis (Fig. 1).

#### 1. Country

From the 16 selected publications:

- 1 was from Portugal (15),
- 5 were from the United Kingdom (16-20),
- 2 from Czech Republic (21,22) and
- 8 from Spain (23-30).

#### 2. Setting

From the 16 selected publications:

- 11 were developed in a school-based setting (15,20-27,29,30),
- 1 was developed in an after-school setting (28),
- 3 were developed in community-based settings (16,17,19), and
- 1 was a community-based intervention developed at a hospital (18).

#### 3. Parents and/or family involvement

From the 16 selected publications:

- 9 involved parents and/or family members (16-20,26-29).

#### 4. Scholar activities or homework

From the 16 selected publications:

- 4 needed an extra scholar activities or homework (21,27-29).
- 2 studies (25,30) provided food for the children, the rest of the studies provided nutritional education or physical activity sessions as the intervention strategy, which were implemented by the researchers, teachers or health promoter agents.

#### 5. Participants

The number of participants ranged from 27 to 1939. Nine of the 16 studies included less than 500 children and/or adolescents in the study population (16,18-23,25,26,28).

#### 6. Type of Intervention

From 15 the obesity prevention campaigns:

- 3 of the included a fully physical activity intervention (21-23) exclusively, - 3 included a nutritional intervention (16,18,27) exclusively,
- Just 1 included a behavioural- conductual therapy combined with physical activity (15), - 8 of the 15 campaigns used a combined physical activity and nutrition intervention (17,20,24-26,28-30).

#### 7. *Duration*

- The average duration of the interventions was 16.5 weeks,

#### 8. *Target audience and gender*

- The range of ages of the studies was from 4 to 17 years and all the campaigns targeted both sexes.

#### 9. *Parental cooperation*

- 10 of the 15 campaigns included parental cooperation (16-20, 26-29).

No interventions reported adverse effects.

### **Effectiveness of the interventions**

Anthropometric outcomes were measured in 11 studies (16-22,24,25,28-30), nutritional outcomes were measured in four studies (17, 27,29,30), and physical activity outcomes were measured in six studies (15,17,21-23,29,30). Two campaigns reported no significant changes in any outcome measured (18,28) and rest reported one or more beneficial changes in target populations.

### **Duration of intervention**

The intervention with the least duration (17) was 10 weeks. This combined intervention reported an increase in physical activity of 2.9 h/week, a decrease in sedentary activities of 4.1 h/week, Body Mass Index (BMI) of 0.5 kg/m<sup>2</sup>, waist circumference of 0.9 cm, and z-scores by 0.20 units. There was a study of 7-weeks (26) but it only reported improvements in biochemistry parameters.

### **Nutritional interventions results**

From the interventions that measured dietary outcomes, two (27,28) from four reported an increased intake of fruit, vegetables, or both after the intervention. One of the studies (16) showed a significant reduction in overweight, with this reduction being greater in girls, and one of the studies (18) did not show any significant results in the anthropometric results.

### **Physical activity interventions results.**

The interventions that used physical activity as primary resource to prevent obesity reported a rise in the time of performance (15), and an increase in step count (21,22) of the participating population. In one of the interventions (23), by duplicating the number of physical education sessions at school per week, the aerobic fitness, maximal oxygen consumption, and flexibility of participants was improved. In this same intervention speed and agility were significantly increased by increasing the intensity of sessions. Only one of the interventions reported that the probability of presenting overweight or OB in the intervened children were almost three times lower than that of control children (20,21).



### **Combined Interventions (Nutritional and physical activity Intervention)**

Nine of the campaigns (17,19,20,24-26,28-30) with a combined nutritional and physical activity intervention, reported results with anthropometric measurements:

- a) Six reported a BMI reduction (17,20,24,25,29)
- b) One (29) showed a lower increase of BMI and the prevalence of overweight and OB in these children increased 4.8% and 0.7% in in the group that received the intervention.
- c) One (24) of the campaigns showed a bigger BMI reduction in girls.
- d) One (30) reported a significant reduction in OB prevalence only in boys.
- e) Three studies reported an important decrease in the BMI Z-score (17,18,30), and a small reduction in waist circumference (17,18).
- f) One (30) of the campaigns concluded that fish consumption was a protective factor against OB, while “fast-food” consumption was a risk factor for childhood OB. Physical activity increased 2.9h/week (17) and more than 5h/ week (30) in the participating population. Sedentary lifestyles decreased by 4.1 h/week in one of the campaigns (17).
- g) One of the studies (26) reported a decrease in the body fat percentage, total cholesterol, cholesterol linked to low-density lipoproteins and blood pressure, together with an increase in cholesterol linked to high-density lipoproteins, and an improvement in the maximum oxygen uptake and another study (28) showed no significant changes in the biochemistry parameters of the participating children.

### **Social Marketing Results**

Only one (30) of the 15 interventions met seven from eight social marketing benchmark criteria, four (15,16,19,28) of them met six of eight, and the rest of interventions met five of the eight benchmark criteria.

- From the benchmark criteria: The insight, theory and exchange criteria were the least identified criteria in the 16 studies included in this report.
- The exchange criteria was identified in only three campaigns (16,28,30).
- None of the interventions mentioned the social marketing approach as a tool in the design of the intervention.

The interventions that improved physical activity as an objective presented positive results (21-23), even though 2 of 16 studies of them did not report insight, exchange and theory criteria. One of 16 studies did not report insight and exchange, but reported theory, and also had positive results in the physical activity time performance after the intervention (15).

From the interventions that targeted the improvement of dietary habits:

- Just one (27) had positive results by increasing the fruit and vegetable consumption inside and outside school.
- The impact of nutritional habits reduced prevalence of overweight in one study. In combined interventions (physical activity +Nutritional Intervention), the ones that did not report insight, reduced only BMI z-score.
- The ones that did not report insight and exchange showed improved anthropometric measures, biochemistry parameters, and nutritional habits.
- Finally, the ones that did not present theory had positive results in anthropometric, nutritional habits and physical activity (measured by hours per week).

## DISCUSSION

This is the report of the existent literature of school- and community- based interventions for the prevention of OB in European children and adolescents from four different countries.

Sixteen studies, reporting on 15 campaigns, met the inclusion criteria for this report, and social marketing benchmark criteria strategies were identified within each study as a tool in the campaigns' design for the achievement of a behavioural goal.

The 16 interventions measured different aspects of each participating population that is the reason why a quantitative meta-analysis was not possible.

Of the 16 studies reporting useful data about the interventions, 87.5 % (14from16) had positive results in one or more of the outcomes described as anthropometric measures, dietary habits or physical activity. When these studies measured anthropometry in the intervened participating population, 75% (12 from 16 publications) had positive results; meanwhile the studies with a physical activity intervention and which measured physical activity outcomes had 100% effectiveness.

As Verstraeten mentioned, the effectiveness of multicomponent school- and community- based interventions, and especially those that involve parents, is common (11).The key question of this report relates to social marketing and its influence in increasing the effectiveness of interventions aimed at tackling childhood and adolescent OB.

A limitation of this report is the lack of standardization in the results of the scientific studies. It is also important to consider that many interventions use social marketing without knowing or mentioning it (12), but in this report none of the studies used or report the use of social marketing. The results of the current report showed that all the interventions include at least five social marketing benchmark criteria points, but the impact on the results is unknown.

Rayner (8) noted that not all interventions called “social marketing” by those undertaking the design of the intervention would meet the benchmark criteria, and conversely, that some interventions that are not called social marketing meet all the measures that are needed for a successful social marketing campaign. This same author considers that the underlying concepts of social marketing can be viewed as a specific intervention method for tackling OB.

## CONCLUSION

Social marketing can be an important tool for the design of school- and community-based interventions based on the eight benchmark criteria. In most of the studies reviewed at least five criteria were included in the interventions (customer orientation, behaviour, competition, segmentation and method mix) whereas theory, insight and exchange are frequently missing. Also the standardization of methods would be a helpful device for future systematic reviews and meta-analyses.

### **Proposal for the design of EYTO campaigns:**

*From this report, we conclude that a possible effective method to combine Social Marketing with school- and community- based interventions in a successful way is:*

- *The inclusion of the 8 benchmark criteria of Social Marketing during the design of the interventions, to induce an optimal change of behaviour in the participants.*

- *The use of validated tools for data collection methods of outcome measurements is recommended.*
- *The inclusion of a control group is suggested to better identify the effects of the intervention.*
- *The combination of physical activity and nutritional interventions is recommended; workshops of parental care, physical activity and nutrition activities for children.*
- *The intervention duration should be of at least one weekly session of 1h and 45min for a minimum period of 10 weeks, to achieve anthropometric, physical activity and dietary improvements.*
- *The parental cooperation is recommended to improve dietary habits in both children and parents.*

The methods' standardization is helpful device for lifestyle programs to tackle obesity in children and adolescents in Europe.

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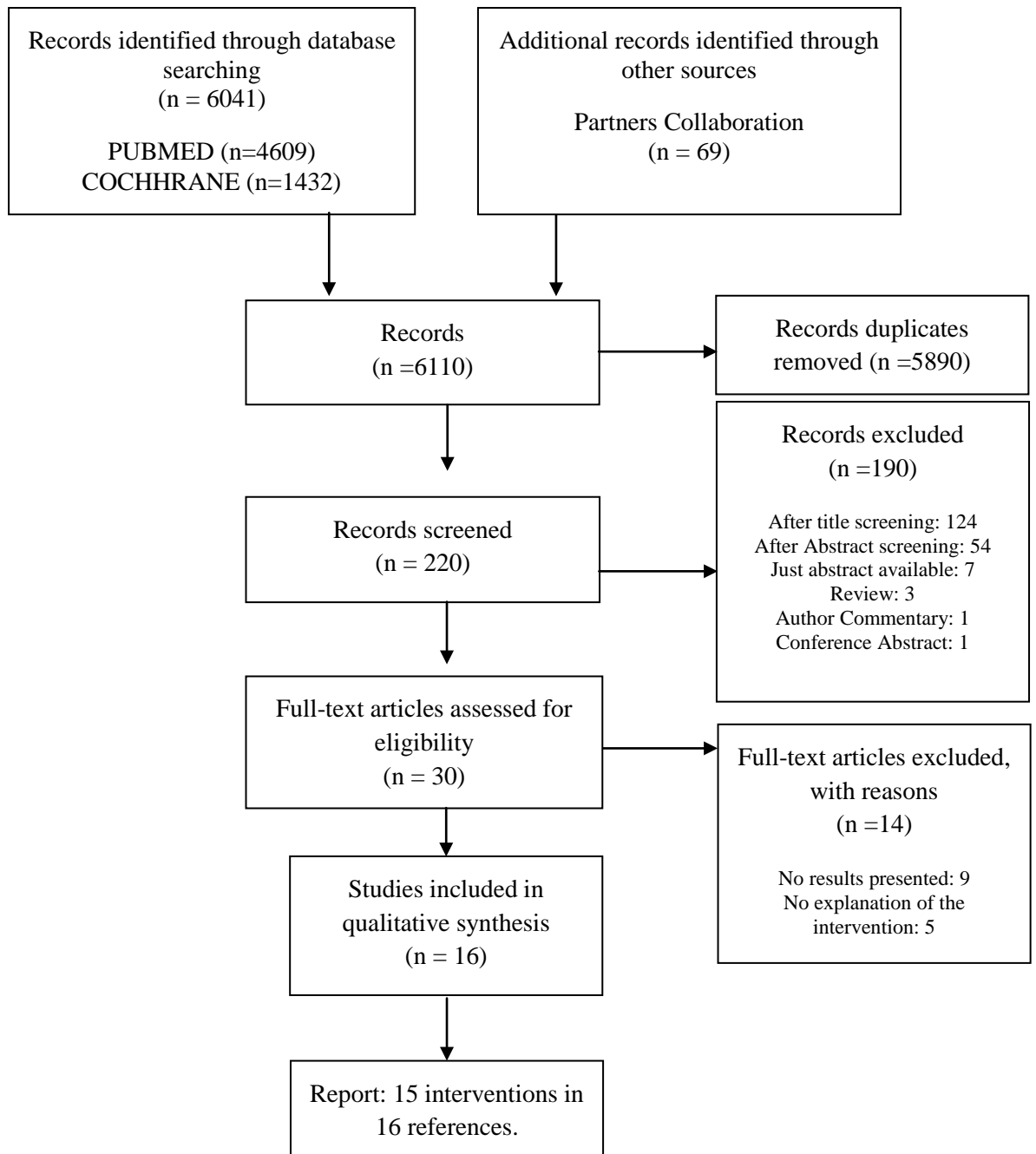
**PRISMA 2009 Flow Diagram**

Identification

Screening

Eligibility

Included



### **About the EYTO project**

This report arises from the project European Youth Tackling Obesity (EYTO) which has received funding from the European Union in the Framework of the Health Programme.

#### **The EYTO partnership includes:**

The National Children's Bureau; a leading research and development charity working in the UK to improve the lives of children and young people, reducing the impact of inequalities.

<http://www.ncb.org.uk>

The CTNS Technology Centre of Nutrition and Health in Spain which provides expertise in health education and nutrition and the healthy biological efficacy of functional foods, it is linked with the University Rovira i Virgili and the University Hospital Sant Joan de Reus.

<http://www.ctns.cat>

Komunikujeme; based in the Czech Republic and specialise in training and personal development programmes for children and young people across a range of health and educational themes.

<http://www.komunikujeme.eu>

Companhia de Ideias; a media and communications agency based in Portugal with experience of developing and delivering campaigns to promote healthy lifestyles and tackle obesity.

<http://www.companhiadeideias.com>