

# Recommendations for obesity prevention among adolescents from disadvantaged backgrounds: a concept mapping study among scientific and professional experts

D. A. Kornet-van der Aa<sup>1</sup>, C. H. van Randeraad-van der Zee<sup>1</sup>, J. Mayer<sup>2</sup>, J. M. Borys<sup>3</sup> and M. J. M. Chinapaw<sup>1</sup>

<sup>1</sup>Department of Public and Occupational Health, Amsterdam Public Health research institute, VU University Medical Center, Amsterdam, The Netherlands; <sup>2</sup>Proteines Paris, Paris, France; <sup>3</sup>EPODE European Network, Paris, France

Address for correspondence:  
 Professor Mai Chinapaw, Department of Public and Occupational Health, Amsterdam Public Health research institute, VU University Medical Center, Amsterdam, The Netherlands.  
 E-mail: m.chinapaw@vumc.nl

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## Summary

The present study aimed to enrich the scientific evidence on obesity prevention programmes for adolescents from socio-economically disadvantaged backgrounds with practice-based experiences from both scientific and professional experts in the field of youth obesity prevention. We used the participatory method of concept mapping. Two concept mapping sessions were conducted: one with programme coordinators of national/regional obesity prevention programmes across Europe ( $n = 8$ ) and one with scientists participating in European obesity prevention projects ( $n = 5$ ). Five recommendations were extracted from both concept maps: (1) involve adolescents in the design and delivery of the programme, (2) invest in family/parental capacity building, (3) provide and support a healthy school food and physical activity environment, (4) regulate exposure to unhealthy messages/advertising and (5) facilitate safe and active travel. These recommendations can be used as a conceptual framework for programme development for preventing obesity in adolescents.

**Keywords:** concept mapping, low SES, overweight, youth.

## Introduction

The high prevalence of childhood and adolescent obesity poses a major public health problem globally (1–3). In developed countries, obesity is more prevalent among adolescents from socio-economically disadvantaged backgrounds (4). We recently performed a systematic literature review summarizing the scientific evidence on potential effective interventions targeting disadvantaged adolescents (5), concluding that effective interventions for this target group are scarce. The present study aimed to enrich the abovementioned summary of published evidence on obesity prevention programmes for adolescents from disadvantaged backgrounds with practice-based experiences from both scientific and professional experts in the field of youth obesity prevention.

## Methods

This study was embedded in a European Union funded project (OPEN) (6). We used the participatory method of concept mapping, a group process for exploring the content of a concept (7,8) combining quantitative and qualitative techniques. Two concept mapping sessions were conducted in 2014: (1) a session with programme coordinators of national/regional obesity prevention programmes in Europe participating in OPEN ( $n = 8$ ), led by M. C.; (2) a session with scientists participating in European obesity prevention projects ( $n = 5$ ), led by C. R. Z. and M. C. The programme coordinators were working in the field of obesity prevention across Europe, namely, EPODE (France), MUN-SI (Portugal), PAIDEIATROFI (Greece), Healthy Eating (Malta), SETS (Romania), Salud Madrid (Spain), SPORTTUBE (Slovakia) and

VIASANO (Belgium). The scientific experts worked on European research projects in the field of obesity prevention: ENERGY (9), SPOTLIGHT (10), IDEFICS (11), HEALTH25 (12) and TEMPEST (13).

Concept mapping includes six steps: (1) developing a focus statement and selecting participants, (2) generating ideas, (3) structuring the statements, (4) concept mapping analysis, (5) interpretation and (6) implementation (5,7). During phase 1, the direction of the process is established through the formulation of a focus statement. The focus statement in this study was: 'Think about obesity prevention with a focus on how to address adolescents living in deprived areas: What are your science/practice-based recommendations to target adolescents living in deprived areas?' On the basis of this statement, participants were asked to associate freely and generate as many statements as possible, with each statement

containing one idea (phase 2). All participants individually generated ideas and returned them by e-mail. For each stakeholder group separately, we collected all statements and removed duplicates to form a final set of statements. In the third phase, participants received all statements from their own peer group online and individually sorted them in groups on the basis of content. They were instructed to sort the statements in a way that made sense to them and to name each group. Next, participants rated the statements both on importance and feasibility on a scale of 1 to 5. In phase 4, clusters were generated by multidimensional scaling and hierarchical cluster analysis, using concept mapping software (Ariadne) (14). This resulted in a concept map: a two-dimensional graphical representation of the views of the group on the subject, in which closer proximity of clusters represents a stronger perceived relationship between concepts. In

**Table 1** Cluster names and item examples of recommendations for targeting adolescents living in deprived areas by programme coordinators

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Cluster 1: Targeted education materials and communication
In schools, interventions should be continued without interruption for at least 4 schools years
Tailor-made approach and activities appealing to the target group (social marketing)
Identify specific communication channels preferred by adolescents that live in these deprived areas
Cluster 2: Identify and involve local structures
Prioritize the development of healthy lifestyle projects in the area
Collaborate with local structures (e.g. stakeholders, community settings, youth organizations, local council)
Create a coordination group for the different obesity prevention programmes in the area
Cluster 3: Co-creation without discrimination
Integrate religious, social or cultural dimensions in the design of intervention/activities
Involve pupils and teachers supported by parents and local communities in project development to improve ownership and tailoring to students' interests and capabilities
Empower the target group by giving them a role and ownership
Cluster 4: Engage the social environment, including training and support for teachers and parents
Train community leaders that work with adolescents living in deprived areas in healthy lifestyle promotion
Organization of meeting with parents in order to give them better parenting skills
Train student mediators for promoting activities, messages and information on healthy eating
Cluster 5: Creating an enabling environment for healthy lifestyle
Open lessons with adolescent role models (singers, actors, bloggers, sportspeople) carrying on programme messages
In schools daily access to fruits and vegetables including recipes
Use the Internet to create competition between adolescents
Cluster 6: Physical activity and healthy diet promotion events
Create a floor for several public events per year engaging adolescents from deprived areas in city halls
Implement healthy, inexpensive cooking workshops targeting adolescents and their families
Implementation of physical activity on a regular basis (free, available, no competition)
Cluster 7: Financial incentives for healthy lifestyle
Subsidize activities aimed at promoting physical activity habits targeting adolescents and their families living in deprived areas
Subsidize activities aimed at promoting healthy eating habits targeting adolescents living in deprived areas
Financial help from cities to organize active holidays

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phase 5, each of the two groups met in person to discuss the clustering of their ideas, agree on the number of clusters and agree on final cluster labels. During the session with the scientific experts, the concept map of the programme coordinators was also discussed and both concept maps were summarized leading to a final labelling and number of clusters. Additionally, the axes of the graph were named. Finally, researchers (M. C. and C. R. Z.) and scientific experts extracted overarching recommendations for future programmes.

## Results

In the programme coordinator session ( $n = 8$ ), six participants were involved in each step, whereas two participants were only involved in the rating of statements. The programme coordinators generated 98 unique statements, resulting in a final set of seven clusters (Table 1): (1) targeted education materials and communication, (2) identify and involve local structures, (3) co-creation without discrimination, (4) engage the social environment, including training and support for teachers and parents, (5) creating an enabling environment for a healthy lifestyle, (6) physical activity and healthy diet promotion events and (7) financial incentives for a healthy lifestyle.

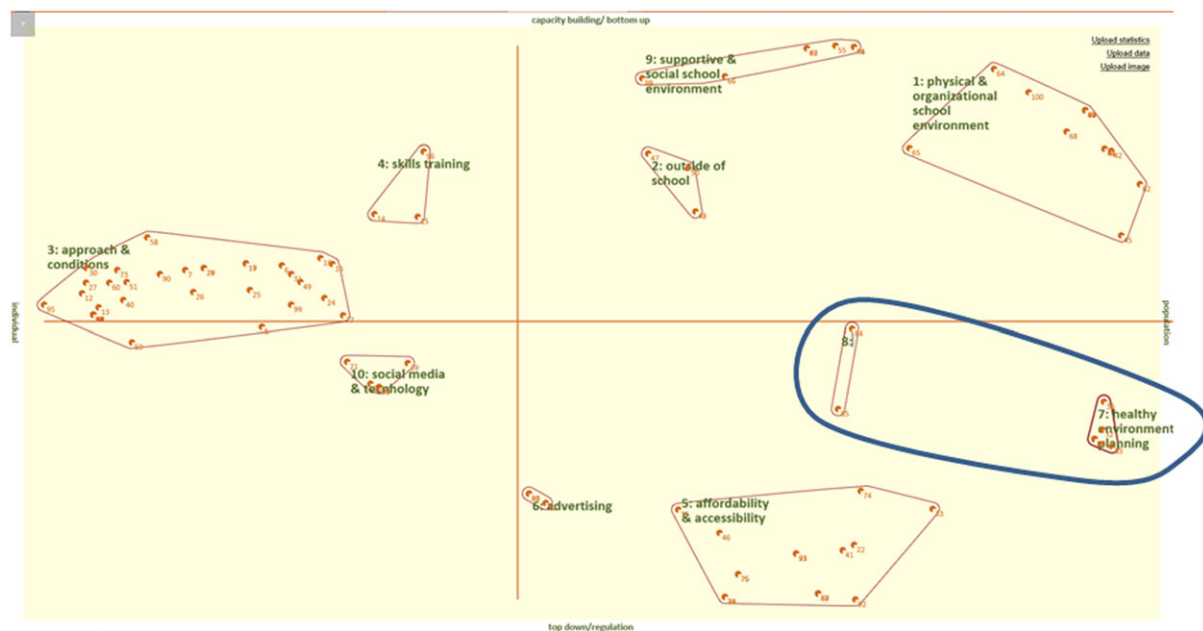
The scientific experts generated 100 unique statements resulting in nine clusters (Fig. 1): (1) supportive physical and organizational school environment, (2) outside of school, (3) approach and conditions, (4) skills training, (5) affordability and accessibility, (6) advertising, (7) healthy environmental planning, (8) advertising, (9) supportive and social school environment and (10) social media and technology.

advertising, (7) healthy environmental planning, (8) supportive and social school environment and (9) social media and technology. Initially, 10 clusters were formed, but based on content, we decided to merge clusters 7 and 8. The horizontal axis of the concept map was named 'individual' at the left side versus 'population' at the right side. The vertical axis was named 'capacity building/bottom up' at the top, versus 'top down/regulation' at the bottom.

Finally, five overarching recommendations were extracted from both concept maps: (1) involve adolescents in the design and delivery of the programme, (2) invest in family/parental capacity building, (3) provide and support a healthy school food and physical activity environment, (4) regulate exposure to unhealthy messages/advertising and (5) facilitate safe and active travel.

## Discussion

This study explored the ideas and recommendations on how to target adolescents from socio-economically disadvantaged backgrounds from both scientific and professional experts in the field of obesity prevention. Integrating the findings of two concept maps resulted in five final recommendations, aimed at increased engagement of adolescents and parents and creating an enabling environment for a healthy lifestyle. This is in line with a recent systematic review concluding that 'involving adolescents in the development and delivering of interventions, [...] and



**Figure 1** Concept map scientific experts.

involvement of parents seem to be promising strategies' (5). As recommended by the obesity prevention experts in this concept mapping study, taking into account adolescents' interests and needs in intervention development may lead to better tailored and thereby more successful obesity prevention in adolescents from disadvantaged backgrounds. Combining multiple recommendations in one intervention may be most successful, as multidimensional interventions, aimed at multiple settings (school, home, community, etc.) appear to have a more sustainable and beneficial effect (15,16). The recommendations resulting from this study can be used as a conceptual framework for programme development.

### Conflict of interest statement

No conflict of interest was declared.

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### Author contributions

D. A. drafted the manuscript and analysed the data. C. R. Z. collected and analysed the data. J. M. assisted in the data collection. M. C. designed the study, contributed to the data collection, data analysis, data interpretation and co-drafted the manuscript. All authors read and approved the final manuscript.

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