

Prevention of overweight and obesity: a Spanish approach

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Abstract

Background: Obesity is considered a major public health issue in most developed countries nowadays. This paper provides an overview of current population data available in Spain and the approach to develop preventive strategies in the country.

Methods: Review of population data available is based on individually measured weight and height as well as determinants. On this basis, the approach used in the country to develop preventive strategies is discussed.

Results: According to the DORICA study, the prevalence of obesity (BMI $\geq 30 \text{ kg m}^{-2}$) is 15.5% in Spanish adults aged 25–60 years (13.2% in men and 17.5% in women). Obesity rates are higher among women aged 45 years and older, low social class, living in semi-urban places. Population estimates for the prevalence of obesity in Spanish children and young people based on the enKid study are 13.9% for the whole group. In this study, overweight and obesity is related to absence of breastfeeding, low consumption of fruit and vegetables, high consumption of cakes, buns, softdrinks and butchery products, low physical activity levels and a positive association with time spent watching TV.

In 2005, the Spanish Ministry of Health jointly with the Spanish Agency for Food Safety and Nutrition launched the multifaceted NAOS strategy for nutrition, physical activity and the prevention of obesity. The important role of the family and the school setting as well as the responsibility of the Health Administration and Pediatric Care in the prevention of obesity is highlighted in the document. The need for environmental actions is recognised. The PERSEO programme, a multicomponent school-based intervention project is part of the strategy currently in place.

Conclusion: Obesity is a public health issue in Spain. A national multifaceted strategy was launched to counteract the problem. Environmental and policy actions are a priority. Young children and their families are among the main target groups.

Keywords
Overweight
Obesity
Prevalence
Population studies
Determinant factors
Preventive strategies

Obesity is a chronic disease of a multifactorial origin. Both genetic and environmental factors are involved in its development. It appears as an alteration of body composition with an increase in the fat compartment. This increase in the deposits of adipose tissue, in most cases, goes together with an increment of body weight and a considerable increase in the risk of comorbidities that affect the quality and life expectancy^{1–4}.

Evidence shows that a clear environmental component is involved in the development in 95% of the cases of obesity, linked to a sedentary lifestyle and dietary habits

that favour a positive energy balance and, as a consequence, a gradual deposit of fat mass⁵.

The International Obesity Task Force (IOTF) and the World Health Organization (WHO) have qualified obesity as the epidemic of the 21st century for the dimensions acquired, the impact on morbidity/mortality, quality of life and health costs⁶. The problem is not restricted to industrialised societies; developing countries and particularly those undergoing transition situations experience the same, often coexisting with malnutrition. Of special concern is the increasing numbers of overweight children

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and adolescents in many countries⁷. Major environmental and lifestyle changes related to diet and physical activity have been implicated in the increasing trends of overweight⁶.

The WHO report on diet and health recognises the impact of obesity in the development of the most prevailing chronic diseases, namely type 2 diabetes, cardiovascular diseases, muscle–skeletal pathology and several types of cancer⁸.

The increase in body volume also causes dysfunctions of body image, self-esteem and in the interaction with the environment, thus generating important economic, direct and indirect costs, as well as an important health and social demand (clinical consultation, work absenteeism, disability, special care needs, etc.)⁶.

The prevalence of obesity in Spain

Prevalence of obesity in Spain has been estimated on the basis of individual measurements of body weight and height on countrywide random population samples⁹.

Current data show a prevalence of obesity (body mass index (BMI) $\geq 30 \text{ kg m}^{-2}$) in the Spanish adult population aged 25–60 years of 15.5% (13.2% in men and 17.5% in women)¹⁰. In this age group, the prevalence of obesity increases with age, is significantly higher in women than in men and is inversely related with the educational level and socio-economical situation¹¹. Women 45 years and older with a low educational level are the subgroup showing the highest prevalence of obesity.

There are statistically significant differences in the distribution of BMI by region, both in men and women. In the female subgroup, the prevalence of obesity is higher in the northwest (21.8%), south (23%) and the Canary Islands (22.2%) compared to the North-East and Central (14.3%) regions of the peninsula. The regional distribution of obesity across the country in the male subgroup follows a similar pattern, with higher rates in the South (19.9%) and Northwestern (19%) region compared to the North-East (8.9%).

In the population older than 60 years, the estimated prevalence of obesity is 35%: 30.9% in men and 39.8% in women^{12,13}.

Results from the enKid study – a cross-sectional survey performed between 1998 and 2000 on a random sample of the Spanish population aged 2–24 years including measured body weight and height¹⁴ – estimate a prevalence of obesity in this age group of 13.9%, 12.4% for overweight. Cutoffs were defined based on BMI, considering the 85th percentile for overweight and the 97th percentile for obesity of the Spanish reference distribution and growth charts¹⁵. Overall, overweight and obesity account for 26.3%. Obesity is higher in the male subgroup (15.6%) compared to females (12.0%). Among boys, prevalence rates were highest between 6 and 13 years.

In the female subgroup prevalence rates were highest between 18 and 24 years¹⁴.

Logistic regression analysis of sociodemographic determinants of obesity in the enKid study showed that low education level of the mother, low socio-economic family background and living in the South of the country or in the Canary Islands increased the likelihood of being obese¹⁶.

Regarding lifestyle factors, breastfeeding for at least 3 months had a protective effect in young children together with the consumption of ≥ 4 portions fruit and vegetables everyday, and a dietary pattern providing $<35\%$ energy from fat and being physically active, that is practice a sport activity regularly ≥ 2 days per week. Conversely, high consumption of cakes and buns, softdrinks and butchery products, a dietary pattern with $\geq 38\%$ energy from fat and low physical activity levels, including spending ≥ 3 hours per day watching TV, increased the likelihood of being obese (Table 1).

Low physical activity has been directly related to a higher prevalence of obesity¹⁷. In the last decades, the urbanisation process in western societies has been associated with lower energy output at work, in household tasks and increased use of public transportation, cars and lifts, among other factors¹⁸. Children games and other leisure time activities are often sedentary, such as watching TV or computer games. On the other hand, outdoor playing opportunities are limited and time devoted to physical activity in the school curriculum has decreased. In recent years, many studies have reported a positive association between the number of hours watching TV daily and the prevalence of overweight in children¹⁹.

In recent decades, some countries have experienced a decrease in total fat intake, but at the same time there is a clear increase in energy density in the food model due to lower consumption of fruit, vegetables and pulses²⁰.

In this stage of life, overweight is not associated with higher mortality rates in the short term, but with increased risk in adult life. However, childhood obesity has an impact on the child's quality of life, favours a low self-esteem and poses a risk of discrimination and stigmatisation^{21,22}. Long-term follow-up studies in children and adolescents show that the likelihood of being obese in adulthood is two-fold in obese children compared to the non-obese, particularly among those considerably overweight and those who remain overweight over adolescence^{23,24}.

Prevention of overweight

Public Health strategies and the improvement in technologies and therapeutic procedures have contributed to a considerable reduction in mortality due to cardiovascular diseases over the last years. However, this trend can

Table 1 Predictors of obesity in Spanish children and young population aged 2–14-year-old in the enKid study. Odds ratio of prevalence of obesity

Sociodemographic factors	Odds ratio (95% CI)	Lifestyle factors	Odds ratio (95% CI)
Age (years)			
6–9	1.47 (1.46–1.48)	Regular breakfast consumption	
10–13	1.37 (1.36–1.38)	Yes	0.73 (0.72–0.74)
Mother's educational level		Fruit and vegetable consumption	
Low	1.25 (1.23–1.27)	<2 portions per day	2.12 (2.10–2.14)
Family SES		Regular consumption of buns and snacks	
Low	1.27 (1.26–1.28)	≥5 portions per week	1.27 (1.25–1.28)
Region		Sugared drink consumption	
South	1.78 (1.77–1.80)	1–4 portions per week	1.56 (1.55–1.59)
Canary Islands	2.69 (2.65–2.74)	≥5 portions per week	1.71 (1.69–1.74)
Locality size		Time spent watching TV daily	
>350 000 inhabitants	1.19 (1.18–1.20)	>2 hours	1.68 (1.66–1.70)
Breastfeeding*		Regular sport practice	
1–3 months	0.68 (0.67–0.69)	≥3 times per week	0.64 (0.63–0.65)
≥3 months	0.57 (0.56–0.58)		

* Fitted for children under 6 years of age.

change unless the continuing increase in obesity, an independent risk factor for these processes, is reversed.

The development and implementation of obesity prevention strategies require the identification and understanding of determinant factors, particularly the environmental factors that can be influenced when addressed by effective action plans on a large scale over time.

There is a growing number of studies investigating the influence of environmental factors on obesity-related behaviours, such as dietary practices and physical activity in children and adolescents^{5,25}. Different frameworks and classifications have been suggested to order the complexity of potential environmental influences²⁶.

Effective weight management for individuals and groups at risk of developing obesity involves a range of long-term strategies: prevention, weight maintenance, management of co-morbidities and weight loss. They should be part of an integrated, multisectoral, population-based approach, which includes environmental support for healthy diets and regular physical activity^{5–7}.

Systematic reviews of effectiveness of intervention programmes highlight the difficulty of comparing results obtained in different intervention studies. Early literature reviews on effectiveness of school-based nutrition education programmes identified educational strategies directly relevant to a behavioural focus and theory driven among the elements conducive to successful programmes²⁷. Other features that contribute to gain effectiveness are the provision of adequate time and intensity for the intervention, involvement of families, particularly for younger children and incorporation of self-assessment and feedback in interventions for older children. Interventions that include actions to modify the school

environment and those that involve the larger community are more likely to be effective²⁷.

A number of authors have systematically reviewed the evidence of interventions aimed at preventing child obesity^{28–30}. The conclusions of these reviews have been consistent, in part due to the limited number of high-quality, medium-long term, randomised controlled trials. A recent review by Doak *et al.*³⁰ gave rise to some controversies. More of the non-effective studies in this review intervened both on diet and physical activity, included physical activity outside school as part of the intervention and targeted the physical environment as a strategy to increase access to healthy lifestyles for the intervention group. Furthermore, the non-effective interventions scored higher on sustainability of the programme. These findings highlight the difficulties in quantitative comparisons of school-based intervention studies. The quantitative comparisons in effectiveness reviews only consider whether a specific component has been included in the intervention or not, but do not take into account how this component was designed, how it was addressed or to what extent it was implemented³⁰. Difficulties in randomisation and control in complex community intervention trials, which happen in an everyday life context, have been argued and different approaches to overcome them have been suggested³¹.

All interventions that aimed to reduce television viewing as part of the intervention by different means, such as the Planet Health program³², were successful. It should be noticed that all these studies were conducted in the USA, where children spend more time viewing television, the number of television sets at home is higher and more advertisements are shown on television compared to other countries.

The contribution of family support and parental involvement to the effectiveness of interventions is not clear from this review. However, systematic reviews that addressed the environmental determinants of obesity-related dietary behaviours concluded that the family environment, including parental intake of fat and soft drinks, parental intake of fruit and vegetables, modelling behaviours, parenting styles, parental educational level as well as availability and access to fruit and vegetables at home, are relevant factors influencing children and adolescent eating practices²⁵. Thus, interventions should consider parents behaviour. The evidence regarding the influence of physical, sociocultural, economic and cultural factors in the school is limited.

Only a few studies assessed the potential for unhealthy outcomes, such as the impact on being underweight or overweight³². Of particular importance would be to assess the effect of obesity prevention programmes on underweight children, either by showing the frequency distribution for the outcome measures or by presenting results separately for overweight, normal and underweight children³³. The goal for primary prevention programmes would be to maintain a normal distribution of BMI in the intervention group. To achieve this, the intervention should be targeted to modify obesity-related behaviours without contributing to weight loss in other

healthy children³⁰. In the review conducted by Doak *et al.*³⁴, only the 'Planet Health' study assessed separately eating disorders, showing a beneficial effect.

The 'Know your Body' study focused on the potential stigmatisation of overweight children due to the intervention³⁵. Particular care should be placed when formulating messages and during the implementation of the program not to contribute to the emotional and mental distress of children who are already overweight or obese³².

Outcome measures in the evaluation of interventions that include a physical activity component cannot be assessed only by BMI because of an increase in lean body mass. It should include appropriate indicators of body fatness according to age, sex and ethnicity of the group^{30,33}.

Among the difficulties reported for the sustainability of the interventions in intervention studies were limited time in the school curriculum, burden of the teachers or even concern of parents, teachers and school staff about a negative impact on the academic performance of children due to the extra burden of the intervention^{30,36,37}.

There is sound evidence that positive changes in food habits and physical activity could contribute to prevent the problem³⁸. On this basis, the WHO approved in the 57th World Health Assembly in 2004 the Global Strategy

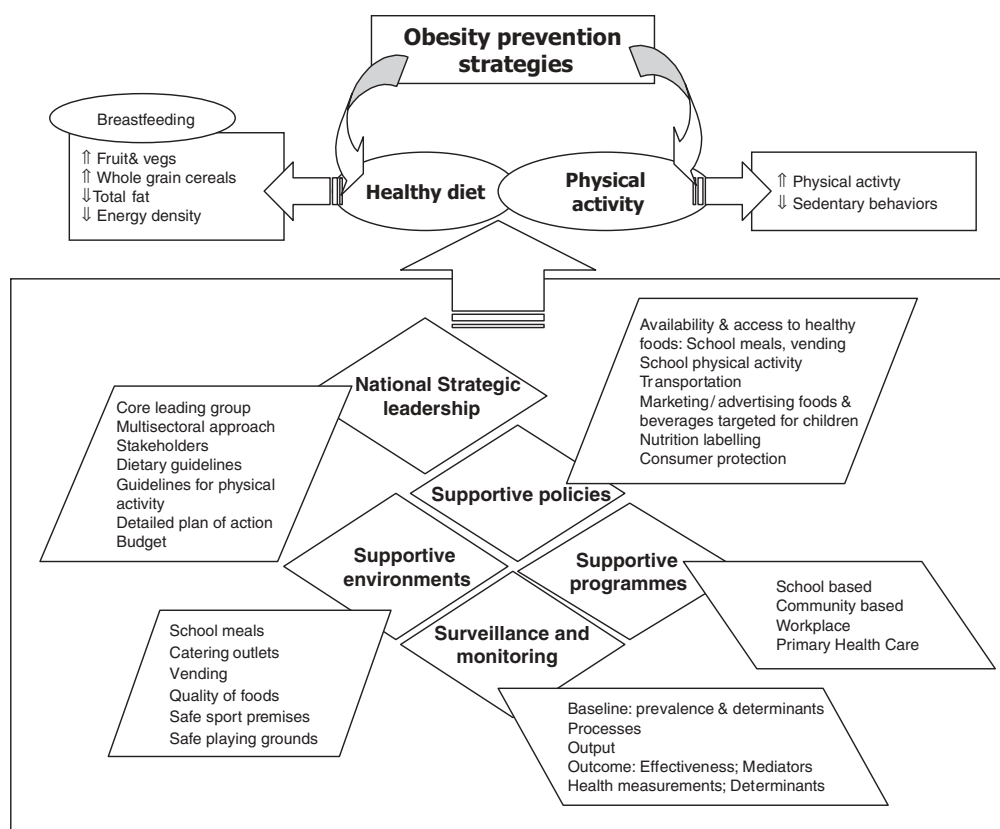


Fig. 1 Obesity prevention strategies: elements and actions to be considered

on Diet and Physical Activity encouraging all member states to develop and implement national action plans³⁹.

The SEEDO 2000 Consensus also emphasised the need to develop and implement strategies for the prevention of obesity in Spain⁴⁰. A joint document issued in 2003 by the Spanish Society of Community Nutrition (SENC), the Spanish Association of Paediatrics (AEP) and the Spanish Society for the Study of Obesity (SEEDO) identified a list of recommendations for the prevention of obesity in children and young people⁴¹. The important role of the family and the school setting as well as the responsibility of the Health Administration and Paediatric care in the prevention of obesity was highlighted in the document.

In line with these, the Spanish Ministry of Health along the Spanish Agency of Food Safety and Nutrition encouraged the development of the NAOS strategy, a National Action Plan for Nutrition, Physical Activity and Obesity Prevention, as the result of the contributions of eight multidisciplinary working groups⁴². The strategy comprises a number of actions involving stakeholders in different sectors, policy measures and regulations pursuing a favourable environment. As part of the strategy, the PERSEO project is a multicomponent school-based intervention targeted to foster healthful dietary habits, decrease sedentary behaviours and increase physical activity among 6–10-year-old children. The intervention includes a school curriculum, changes in the school environment and a family component.

Obesity prevention must begin from early stages of life. In this sense, it is important to ensure an adequate nutritional status during pregnancy, not only for the benefit of the mother's health but also for the future of the newborn baby. Evidence of foetal programming has been emphasised in recent years. Nutritional factors *in utero* life, around birth and early life have been associated with the development of risk factors and chronic disease in adulthood, such as type 2 diabetes and obesity, especially in underweight newborn babies⁴³.

Diet is the main exogenous factor that influences children's growth and development. On the other hand, as children grow, they acquire dietary habits and lifestyles that will have an influence on his diet as an adult. Longitudinal studies in cohorts of children and youths are not conclusive regarding the tracking of dietary habits^{44,45}. It seems clear that it is easier to promote healthy eating practices and lifestyles during childhood than to change already structured habits in adulthood. Therefore, diet during the first year of life and along the whole childhood, school age and adolescence play a very important part in health prevention and promotion⁴⁶.

Public Health experts, academics and politicians agree that there is a need for action to prevent obesity. Evidence show that prevention is potentially more efficient than treatment alone against obesity⁴⁷. The controversy arises regarding what preventive measures should be taken and who are the target groups. More recently, the debate has

focused on the avoidance of the blaming and stigmatisation of the obese, and furthermore, on how to avoid unwanted harmful effects while taking action against obesity at the population level.

Population strategies aimed at the primary prevention of obesity should be multifaceted, actively involve stakeholders and major actors concerned and consider multiple settings for implementation. They should consider the promotion of healthy eating practices, which include adequate amounts of fruit and vegetables, enhancement regular practice of physical activity and a reduction of sedentary behaviours in order to avoid weight gain and maintain body weight in the healthy range³⁰.

Particular care should be placed when formulating messages to avoid unwanted harmful effects and to tailor them according to the characteristics and needs of the target population^{30,32}. Such action plans should consider components that directly influence the environment in order to make the healthier choice available and accessible to the population. Of special relevance is the quality and variety of food and drinks available or offered in schools, either as part of school meal programmes or as any other means and outlets^{18,37,39,41,48}.

Interventions that are incorporated into the school curriculum are more likely to be sustainable over time, thus being more likely to be effective^{30,37}. Figure 1 summarises a number of actions to consider in community-based interventions for the prevention of obesity.

Overall institutional support by means of health and nutrition policies, including the regulation of food marketing strategies, the quality of foods and drinks available in schools^{39,49}, and the provision of adequate resources devoted to school-based nutrition education and physical activity engaging actions are required for effective actions.

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