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Obesity: A major problem for Spanish minors

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1. Introduction

In the last three decades, overweight and obesity levels have more than doubled worldwide, to the point that, in 2014, 39% of the world population aged 18 and over had excess weight and 13% were obese (World Health Organization, 2015). Both overweight and obesity — associated with the deaths of at least 2.8 million adults annually — represent the fifth leading risk factor for death worldwide and are the source of 44% of the diabetes burden, 23% of the ischaemic heart disease burden and between 7% and 41% of certain cancer burdens (World Health Organization, 2012). This "pandemic of the new millennium" (Kimm and Obarzanek, 2002), which affects half of all adults in the WHO European region (World Health Organization, 2006), is responsible for up to 6% of public health expenditure in Europe, leaving aside indirect costs due to loss of life and erosion of productivity and income.

Data concerning overweight and obesity among children and adolescents are equally discouraging. In the past 30 years, childhood obesity worldwide has more than doubled in children and quadrupled in adolescents and continues to rise at alarming rates (Han et al., 2010; Ogden et al., 2014). In the USA, for example, the percentage of children aged 6 to 11 who were obese increased from 7% in 1980 to nearly 18% in 2012; over the same period the percentage of adolescents, ages 12–19, who were obese increased from 5% to nearly 21%; and 2012 estimates indicate that more than one-third of children and adolescents are either overweight or obese (Ogden et al., 2014). In Europe about one fifth of all children are overweight (World Health Organization, 2006) and worldwide about 43 million children aged 5 years and under are overweight: 35 million in developing countries and the remaining 8 million in developed countries (World Health Organization, 2012).

In view of this situation, public health policies in both developed and developing countries need to reckon with excess weight and obesity trends among children and to tackle their causes. Although genetic predisposition to obesity cannot be controlled, the factors responsible for environmental predisposition, including socioeconomic status, and demographic and cultural factors, are amenable to appropriate intervention in many cases. Focusing on obesity prevention among children and adolescents is not only strategically desirable — it will avoid obesity-related public health expenditure when today's obese children are adults in the future (Alter et al., 2012; Wright et al., 2014)[1] — but also plausibly more fruitful than focusing on prevention among adults, since key causes, such as eating habits, leisure pursuits and education, are more easily influenced than adults.

In their comprehensive survey of the literature on the reasons for childhood obesity, Papoutsi et al. (2013) discussed factors such as parental behaviour during pregnancy and infancy, increased fast

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[1] Although the correlations between anthropometric measures of obesity in childhood and those in adulthood varied considerably among studies, the associations were consistently positive. For all studies and across all ages, the risk of adult obesity was at least twice as high for obese children as for non-obese children (Serdula et al., 1993).

food consumption, and technological developments that encourage children to adopt more sedentary lifestyles (only higher-income parents seem able to provide their children with after-school sports activities). Another factor that may explain the continued rise in childhood (and adult) obesity is the evolution of food prices (Darmon and Drewnowski, 2008; Drewnowski, 2010; Drewnowski and Specter, 2004). The past three decades have also seen major structural changes in the labour market, with mothers increasingly present in the workforce and parents spending more time in the workplace. As a result, parents have less time to care for their children and prepare healthy food. Maternal employment, for instance, is consistently associated with less time spent on activities associated with children's diet and physical activity in leisure time (Cawley and Liu, 2012) and, consequently, with higher rates of children obesity (Anderson, 2012). As a result, four key arenas for preventive intervention are the home, school (where diet may be controlled, physical activity may be promoted, and dietary education may be provided), the "leisure space", that is, the set of leisure activities to which the child has access, and the media, most especially television.

In this study based on data from the Spanish National Health Surveys (SNHS) for the years 2003–2004, 2006–2007 and 2011–2012, we sought to identify the association between socioeconomic and demographic status and obesity prevalence in children aged 2–15 years in Spain. In particular, we concentrate on the home and leisure arenas, that is, the first and third of the arenas mentioned above. The issue is particularly worrying because latest estimates from the International Association for the Study of Obesity (IASO) (IASO, 2011) show that overweight and obesity rates for Spanish children aged 5–17 years amount to 23% for girls and 33% for boys. Jointly with Italy, Greece and the UK, Spain is one of the European countries with the highest levels of prevalence of obesity among children.[2] And this in spite of the fact that Spain is a country with a universal healthcare system and easy access to healthy foods.

To perform our analysis, we consider — according to standard international criteria (Lobstein et al., 2004) — obesity in terms of body mass index (BMI), i.e. weight in kilogrammes divided by squared height in metres. We also used a methodological approach similar to that to studying the impact of socioeconomic factors influencing the obesity risk in Spanish adults aged 18 and over, as suggested by Van Doorslaer et al. (2004) and later used, among others, by Costa-Font and Gil (2008), Costa-Font et al. (2014), and Merino Ventosa and Urbanos-Garrido (2016). In this regard, the latest studies show that, despite a general increase in adulthood obesity prevalence across all socioeconomic and demographic groups, prevalence tends to be higher for lower socioeconomic strata, with lower income and lower educational background (Gutiérrez-Fisac et al., 2003). The effects of socioeconomic status on obesity among Spanish adults have recently been disentangled by Merino Ventosa and Urbanos-Garrido (2016), who found a significant pro-wealthy inequality in obesity distribution, particularly among women, and a modest effect of socioeconomic status on obesity transmitted via mediator variables.

The distinctive feature of studying the effects of socioeconomic status on the risk of childhood obesity rather than adulthood obesity arises from the fact that, unlike adults, young people are not decision makers properly and rarely work. Furthermore, in our econometric specification of the probability of child obesity we considered non-linear effects of both the age of the young people and the income level of the main breadwinner, which, in the context of childhood obesity, may be relevant, given that children

may start to take some decisions when they become teenagers. In fact, we find evidence of such non-linearities in the current paper. Taking both features into account, it seems that the impact of socioeconomic and demographic status on obesity prevalence in children compared to adults can vary considerably.

We contribute to the current obesity debate by showing that childhood obesity is a non-linear function of age; namely, the prevalence of obesity among children increases up to the age of 5 years, decreases between the ages of 5 and 14 years and increases again thereafter, with a turning point at 11 years. This non-linear pattern may reflect children's awareness of the role of physical appearance in interactions with their peers and their resulting interest in avoiding obesity. The most important socioeconomic determinants of childhood obesity risk were income and the educational level of the main breadwinner. Other socioeconomic and demographic factors influencing the probability of obesity were sex, hours of sleep, dietary habits, physical activity in leisure time, household size and parental educational level. Overall, the observed prevalence was 10.6%, which agrees with the finding that obesity prevalence among pre-school children is higher in the Mediterranean region and the British Isles than in Middle, Eastern and Northern Europe (Cattaneo et al., 2009). This rather high figure for Spain is nevertheless surprising, given that is a country with a universal health system and a basically Mediterranean diet that prioritizes high-quality natural food.

Our results may contribute to better understanding and addressing inequalities in obesity risk among children, as well as serving as an aid to the design and tailoring of programming and interventions for children, as well as for the anticipatory guidance offered to parents and educators. Indeed, our analysis suggests that policies aimed at preventing childhood obesity risk and/or those aimed at reducing inequalities in childhood obesity risk should preferentially target families with children aged under 10 years and lower-income households with less well-educated parents and less healthy lifestyles.

The remainder of this article is organised as follows. In Section 2 we describe data collection and the statistical model employed; in Section 3 we report obesity rates and the results of applying the proposed models to the data; and in Section 4 we summarize the most important implications of our results for public health policies aimed at combating child obesity and mitigating inequalities in child obesity.

2. Data and methods

2.1. Data

For the present study, we analysed data from the SNHS for the years 2003–2004, 2006–2007 and 2011–2012 (retrieved from http://www.ine.es on 17 February 2014), conducted by the Spanish Ministry of Health, Social Services and Equality and the Spanish Statistics Institute through personal interviews in the home. These two-yearly, cross-sectional surveys, representative at the country level and based on three-stage stratified sampling, screened information on health status, social and environmental characteristics, and utilization of health services. Data for children aged 2–15 years, including height and weight, were obtained from interviews with parents or wards in the household. Our sample included a total of 4917 individuals for 2003–2004, 5159 individuals for 2006–2007 and 2837 individuals for 2011–2012, for which we have full information regarding socioeconomic variables.[3] We treated these cohorts as mutually independent, as the probability of

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[2] The impact on the burden of disease in childhood, adolescent and adulthood is well documented (Wright et al., 2001; WHO, 2012).

[3] The size of the sample amounts to 17,370 individuals (5301 individuals for 2003–2004, 7304 for 2006–2007 and 4765 for 2011–2012).