Like parent like child? Associations between parental body mass index (BMI), parents' own weight perception and underestimation of child weight status

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Abstract

About one in three children aged 10 to 11 are classified as overweight or obese in England. Childhood obesity is indeed a serious public health challenge because it has significant impact not only on both individual physical and mental health but also a considerable economic burden on societies. No doubt, parents play a crucial role in prevention and treatment of childhood obesity, but successful interventions require that parents recognise that their children are overweight or obese. However, recent studies show that the proportion of English adults who underestimate their overweight or obesity status have been increasing both in men and women. This raises a question whether parents' weight misperception also transmits to underestimation of their children's weight. This study exploits the Health Survey for England for the years 2012, 2013, 2015 and 2016 to analyse how parents' own weight perception influences the perception of their child's weight status, adjusting for parental body mass index (BMI) and other relevant socioeconomic and demographic characteristics. The preliminary results show that the majority of parents who are overweight or obese (64.5%) do not recognise the weight status of their overweight or obese child. Moreover, the proportion of parents who underestimate their child overweight and obesity status is significantly higher (77.7%, p=0.006) amongst overweight or obese parents who themselves underestimate their own weight. Furthermore, parents are less accurate at judging the overweight or obesity status of boys than girls (73.2% vs. 61.7%, p=0.002). These results are highly relevant since they show that parents' weight misperception could undermine the efforts to reduce childhood obesity in England.

Extended abstract

Introduction

The Sustainable Development Goals (SDG) 2, which aims to tackle malnutrition explicitly, mentions ending all forms of malnutrition including overweight and obesity as one key development agenda. In the United Kingdom (UK), where one-fourth and one-third of adults are overweight and obese, respectively, tackling childhood obesity is actually one primary strategy to prevent adult obesity since the risk of obesity in adulthood increases with obesity in childhood (Whitaker et al. 1997). With about one in three children aged 10-11 being classified as overweight or obese in England, increasing from 31.6% in 2006/07 to 34.3% in 2018/19 (NHS Digital 2019), childhood obesity is one of the most serious public health challenges in the country.

No doubt, parents play a crucial role in prevention and treatment of childhood obesity since parents are the core determinant of the family's lifestyle. The recognition of the child's actual weight status thus is fundamental for taking action in achieving a healthy weight (Regber et al. 2013). This consequently requires that parents accurately identify that their children are overweight or obese. However, in fact, parents tend to underestimate their children's overweight and obesity status. A recent meta-analysis of 69 studies reports that about half (50.7%) of parents underestimate their overweight/obese children's weight (Lundahl, Kidwell, and Nelson 2014). That the majority of parents fail to accurately perceive the overweight/obesity status of their child is found across various countries (Doolen, Alpert, and Miller 2009). Understanding what factors underlying parental misperception of their child weight is therefore crucial for prevention and intervention of childhood obesity.

Previous literature provides several suggestions for the underestimation of children's weigh by their parents. Some work focuses on weight and weight perception directly, but important insights are also provided by literature related to overconfidence in general health. A possible explanation for why overweight of children is often un-detected is given by the visual normalization theory, which states that weight status is assessed relative to prevalent body size norms (Robinson and Sutin 2017). Increasing prevalence of obesity among children and adults might have shifted weight norms upwards, leading to a raise in weight misperception (Muttarak 2018; Oude Luttikhuis, Stolk, and Sauer 2010; Parry et al. 2008). Underestimating weight when being morbidly overweight can also be interpreted as overconfidence, which is a well-established and well-documented concept in health research (Bago d'Uva, O'Donnell, and

Van Doorslaer 2008; Beaudoin and Desrichard 2011; Coman and Richardson 2006; Furnham 2001; Jürges 2007). Overconfidence also affects other life domains such as education and labour market outcomes (Reuben, Wiswall, and Zafar 2017), saving and investment choices (Anderson, Baker, and Robinson 2017) and political decisions (Ortoleva and Snowberg 2015). Individuals that overestimate their health not only have a higher probability of adverse health outcome (Sakurai et al. 2013), but also riskier health behaviour. Recent work shows, for example, that individuals who overestimate their health exercise less, drink more alcohol and sleep fewer hours (Arni et al. 2019). More importantly for the study at hand, overconfident individuals eat less healthy and have significantly higher BMIs than those who correctly assess their health. While the reasons for overestimating abilities are poorly understood, they could be linked to a person's desire to maintain a positive self-image (Brandtstädter and Greve 1994; Santos-Pinto and Sobel 2005) or be perceived positively by others (Burks et al. 2010).

The probability of overestimating health in general differs substantially by age (Spitzer and Weber 2019; Srisurapanont et al. 2017), education (Bago d'Uva et al. 2008), race (Jackson et al. 2017) and country of residence (Jürges 2007; Spitzer and Weber 2019). Small effects were also found for gender (Merrill et al. 1997; Schneider et al. 2012). Similar characteristics appear to be important in explaining parental misperception of their child's weight status, which is also associated with demographic and socioeconomic characteristics both of a child, for example gender and age, and of the parent, for example body mass index (BMI), education and ethnicity (Doolen et al. 2009; Lundahl et al. 2014; Robinson and Sutin 2017). The association between parental BMI and the likelihood of misperceiving their child's weight is particularly worrying. Given that adult overweight and obesity is on the rise in the UK, does this mean that more parents will fail to recognise their child overweight/obesity status and consequently inhibit efforts to tackle childhood obesity? Likewise, a recent study has shown that the proportion of English adults who underestimate their overweight or obesity status have been increasing over time between 1997 and 2015 (37% to 40% in men; 17% to 19% in women) (Muttarak 2018). If parents fail to recognise their own weight status, it is plausible that this also translates into underestimation of their child weight. If this is true, this calls for urgent public health interventions since this pattern reinforces the childhood obesity vicious cycle.

To our knowledge, there is no empirical study that investigates the relationship between parents' misperception of their own weight and misperception of their child weight. To this end, this study aims to explore how parents' own weight perception influences their perception of their child's weight status,

adjusting for parental body mass index (BMI) and other relevant socioeconomic and demographic characteristics.

Data and measurement

The empirical analysis is based on the Health Survey for England (HSE) – a nationally representative annual survey designed to provide regular information on the health of people in England. Data collection involves both face-to-face interviews and a self-completion questionnaire. Apart from information on health and health-related behaviors, information on socioeconomic factors, physical measurements, and biological samples is also collected.

Of a particular interest to our research question is the information on weight perception. The HSE asks survey participants about how they perceive their own weight. Respondents were asked, "Given your age and height, would you say that you are…" with possible answers: (1) about the right weight, (2) too heavy, (3) too light, and (4) not sure. We combine this self-perception variable with the BMI status calculated from a person's weight and height to create a variable (com_ob) that allows distinguishing the population according to their BMI status and self-perception of weight. We then exclude parents that are not overweight from the main analysis, since by definition, their weight cannot be underestimated; thus, our main explanatory variable of interest has the following four categories:

1. Overweight/correct assessment
2. Overweight/underestimate
3. Obese/correct assessment
4. Obese/underestimate

HSE also asks parents about how they perceive the weight of their children aged 16 and younger. Respondents were asked, "Given your child's age and height, would you say that your child is …" with possible answers (1) about the right weight, (2) too heavy, (3) too light, and (4) not sure. Similar to the explanatory variable described above, we combine the parent's perception of their child's weight with their child's BMI and removed children that are not overweight. The BMI status for children, however, does not distinguish obesity from overweight; thus, our outcome variable (underest_kid) is binary and consists of the following two categories:

1. Overweight or obese child / correct assessment of parent
2. Overweight or obese child / parent underestimates

The dataset is created on the parent level, meaning that we link every child with his or her parents. If both parents participate in the survey, the child appears twice in the responding sample. Hence, we cluster standard errors on the family level to account for these duplications.

For the preliminary analysis, we pool HSE for the years 2011 and 2012 (n=646). Note that we are currently in the process of obtaining the data for the years 2015 and 2016, which have restricted public access. Once we receive these additional data, we will conduct logit analyses to estimate the effect of parental weight misperception on their perception of child weight status accounting for a rich set of potential cofounders. Moreover, we will conduct relative importance analyses to investigate how important parents' weight perception is relative to other characteristics in explaining perception of child weight status (Luchman 2013, 2014).

Preliminary results

We present preliminary results in Table 1, which shows the proportion of parents that underestimate their children weight according to a selection of characteristics. A first highlight from our preliminary analysis is that the number of parents that underestimate their child's weight is substantial. Overall, 68% of the overweight parents that have overweight children underestimate the weight of their child. In addition, parents that underestimate their own weight are more likely to do so than parents that assess their own weight correctly (78% vs 64%). Among those who underestimate their own weight, interestingly, underestimating children's weight is also more common for parents that are overweight that for those who are obese (79% vs 69%). Preliminary results show few differences by parental age, sex, and education.

When analysing children's characteristics, however, significant differences are found for both sex and age, with higher proportion of misperception for boys than girls (73% vs 62%), and higher numbers of misperception for younger children than for older ones (96% for the age group 0-4 vs 58% for age group 10-14). Children's life habits are also associated wight parents' weight perception, as indicated by the finding that those children who follow a diet are much less likely to have their weight underestimated by their parents (45% vs 82%). These findings are highly relevant in the context of tackling child obesity in England.

Table 1 - Proportion of parents that underestimate their kid's weight

	% that underestimates their kid's weight	Chi square (p)
Total	68%	
Age of kid		
0-4	96%	
5-9	72%	0.000
10-14	58%	
Own-weight/perception		
Overweight/Right view	62%	
Overweight/underestimate	79%	
Obese/Right view	65%	0.040
Obese/underestimate	69%	
Self-perception of weight		
Right view	64%	0.007
Underestimate	78%	
Kid follows diet		
No	82%	0.000
Yes	45%	
Sex of kid		
Male	73%	0.002
Female	62%	

Next steps

We are in a process of obtaining the HSE data for the years 2015 and 20176. This will increase the sample size allowing us to perform multivariate analyses. In particular, we will employ logit regression and relative importance analyses to further investigate the effect of parental weight misperception on their perception of child weight status.

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