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High perceived social support protects against the intergenerational transmission of obesity: The Cardiovascular Risk in Young Finns Study

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ABSTRACT

Aims. Our aims were to assess whether offspring social support moderates the relationship between parental body mass index (BMI) and offspring BMI.

Methods. A prospective design was used with an analytic sample of 1049 participants from Finland (the offspring) who were 35–50 years old in 2012 when adulthood BMI was measured. Parental BMI was self-reported at baseline in 1980. Offspring social support was measured in 2007 when participants were 30–45 years old. Linear and logistic regression was used to examine whether there was an interaction between parental BMI and offspring social support when predicting offspring BMI in adulthood. An analysis of simple slopes and multilevel growth curve modeling were used to further examine the interaction.

Results. The interaction between maternal BMI and offspring social support was significantly and negatively related to offspring BMI in adulthood ($\beta = -0.068$, R^2 change $= 0.005$, $p = 0.015$) in the fully adjusted model which also adjusted for parental occupational status and offspring depressive symptoms. The logistic regression supported these results, with the interaction between maternal overweight (BMI ≥ 25 kg/m^2) and offspring social support negatively associated with offspring overweight in adulthood (odds ratio = 0.74, 95% confidence interval, 0.56 to 0.98). The growth curve analysis further demonstrated that high maternal BMI predicts more rapidly rising offspring BMI in those reporting low social support compared to high social support.

Conclusions. Our results suggest that social support protects against the intergenerational transmission of obesity and therefore presents an important opportunity for obesity prevention efforts.

1. Introduction

The prevalence of obesity is continuing to increase throughout the world (NCD Risk Factor Collaboration, 2016; Stevens et al., 2012), contributing to the obesity epidemic and increasing the risk for chronic illnesses including cardiovascular disease and Type 2 diabetes (Prospective Studies Collaboration, 2009). It is now well established that parental obesity is a risk factor for offspring's obesity; both in childhood and in adulthood (Linabery et al., 2013; Whitaker et al., 1997). Thus, understanding the underlying causes of the transmission of obesity from parents to their children (i.e. intergenerational transmission) becomes increasingly important in order to intervene and prevent the spread of obesity from one generation to the next.

The reasons behind the intergenerational transmission of obesity are poorly understood, but possible contributing factors include the prenatal environment, genetic factors, and a shared environment between

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parents and offspring (Huang et al., 2007; Maes et al., 1997; Whitaker et al., 1997). The shared environment includes aspects such as shared lifestyle and health behaviors like diet and exercise which directly impact on body mass index (BMI) and obesity, as well as psychosocial aspects such as childhood socioeconomic status, depression or psychosocial stress which may also further exacerbate the risk for intergenerational transmission of obesity (Costa-Font and Gil, 2013; Gundersen et al., 2011; Topham et al., 2010). Another psychosocial factor which may play a role in the intergenerational transmission of obesity is social support. Social support has consistently shown to be protective against a wide range of health conditions, in particular cardiovascular disease (Cohen and Wills, 1985; Lett et al., 2005). As obesity is a risk factor for cardiovascular disease, it is possible that the health benefits provided by high levels of social support may also be applicable to protecting against the transmission of obesity and their development over the lifespan.

It is useful to distinguish between the two main categories of social support that have been examined in relation to health outcomes. Social support is usually separated into its structural components (i.e. the social network) and its functional components, including the types of social support received and the perception or satisfaction with this support. Studies examining social support and obesity have primarily focused on how structural social support influences weight gain or obesity, with findings demonstrating that different types of social networks can both benefit and hurt weight loss efforts (Wang et al., 2014). In contrast, only a handful of studies have examined the impact of functional social support (i.e. perceived social support) on obesity, with most of these studies assessing central adiposity. Lower levels of perceived support have been associated with a higher waist to hip ratio (a measure of central adiposity) among Swedish women (Wing et al., 1991) and among US adolescents (Midei and Matthews, 2009). Higher perceived social support was also prospectively associated with lower levels of central adiposity in adolescents and young adults from Finland (Ravaja et al., 1998).

Although a small number of studies have examined the association between social support and adiposity, we were unable to find any studies examining social support in the context of the intergenerational transmission of obesity. In this study we wanted to explore whether social support could possibly play a protective role in the transmission of obesity from parents to their children. We used data from the longitudinal Cardiovascular Risk in Young Finns Study (Young Finns Study), which has been following the development of BMI in a population-based cohort of Finns from early childhood into adulthood. This dataset also has prospective data from the cohort's parents on multiple measures including parental BMI, thus enabling a prospective examination of intergenerational transmission of BMI. The objectives of our study were to examine three questions: 1) whether parental BMI predicts lifespan patterns of offspring BMI, 2) whether perceived social support in the offspring (the Young Finns cohort) was moderating the relationship between parental BMI and offspring BMI in adulthood, and 3) whether the moderating effect was associated with different lifespan patterns of offspring BMI. We hypothesized that higher levels of perceived social support in offspring would act as a buffer against the intergenerational transmission of obesity and that higher levels of social support would be associated with more favorable lifespan patterns of BMI in the offspring.

2. Methods

2.1. Participants

The Cardiovascular Risk in Young Finns Study (Young Finns Study) is an ongoing longitudinal study which was initiated in 1980 to examine cardiovascular risk factors in a cohort of 3596 Finnish children aged 3–18 years old. The participants were randomly selected from the national register from five different regional areas in Finland. Follow-ups have occurred approximately every three years and the latest follow-up occurred in 2012. The current study (see Fig. 1) was comprised of an analytic sample of 1049 participants, who had outcome data available on parental BMI (measured at baseline in 1980), offspring BMI (measured at seven time-points between 1980 and 2012, the most recent examination being in 2012 when participants were aged between 35 and 50 years), and offspring social support in adulthood (measured in 2007 when participants were aged 30–45). Participants provided written informed consent and the study protocol was approved by the ethics committees of the participating universities.

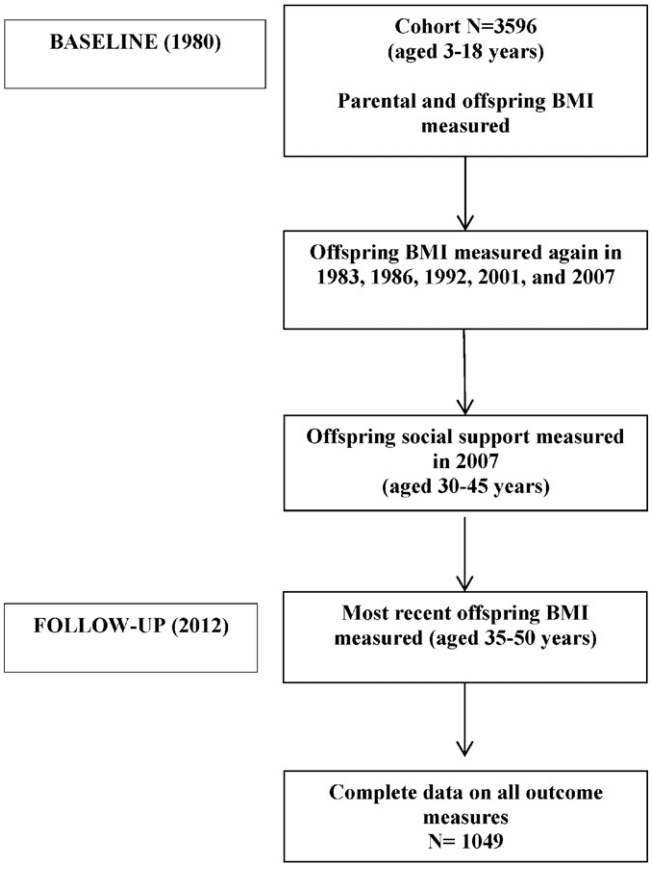

Fig. 1. Recruitment, follow-up and outcome data for current study participants from the Young Finns Study (1980–2012). Notes: For the supplementary analyses we also examined social support measured in 1989, 1992, 1997 and 2001. These time-points were not used in the primary analyses and therefore are not included in the above figure.

2.2. Measures

2.2.1. Offspring body mass index (BMI)

BMI was measured seven times (1980, 1983, 1986, 1992, 2001, 2007 and 2012) by trained personnel during the follow-up assessments. Weight was measured, in light clothing without shoes, using digital scales with an accuracy of 0.1 kg, and height was measured by a wall-mounted statiometer with 0.1 cm accuracy. BMI was calculated with the formula: BMI = weight (kg)/[height (m)]2.

2.2.2. Parental body mass index

Maternal and paternal height and weight were obtained by self-report questionnaires administered during the follow-up assessment in 1980. BMI was calculated using the above formula.

2.2.3. Offspring social support

Social support was measured using the Perceived Social Support Scale-Revised (Blumenthal et al., 1987) in 2007, when participants were aged 30–45 years. The scale measures functional social support and consists of 12 items which are rated on a 5-point Likert scale ranging from 1 to 5 (1 = totally disagree, 5 = totally agree). The items measure perceived social support from friends, family, and significant others (e.g. "I can discuss my problems with my friends"). The scale was negatively skewed and demonstrated lack of linearity. We corrected this by reversing the scale and applying a square root