Preventive Medicine 77 (2015) 17–22

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Psychological distress as a determinant of changes in body mass index over a period of 10 years

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ARTICLE INFO

Available online 30 April 2015

Keywords:
Mental health
Body weight
Body mass index
Cohort studies

ABSTRACT

Objective. To examine the longitudinal relationship between psychological distress and body mass index (BMI) changes over a period of five and ten years.

Method. Data were used from the Dutch, prospective, population based Doetinchem Cohort study over the period 1995/1999 until 2005/2009 (N = 5504). Psychological distress was assessed using the Mental Health Inventory (MHI-5). BMI (kg/m^2) was calculated from measured body height and body weight. GEE analyses were used to examine the relationship between psychological distress at baseline and BMI change, and the development of overweight over five years. Linear and logistic regression analyses were used to examine these relations over ten years.

Results. Psychological distress predicted an extra overall increase in BMI of 0.14 kg/m^2 (95% CI 0.03–0.25) over five years and an increase of 0.18 kg/m^2 (95% CI 0.01–0.35) over ten years, when comparing psychologically distressed participants to psychologically healthy participants. This was especially the case among persons with normal weight (five years; B = 0.26 kg/m^2, 95% CI = 0.12–0.40/ten years; B = 0.32 kg/m^2 95% CI = 0.11–0.53) and moderate overweight (five years: B = 0.18 kg/m^2, 95% CI = 0.02–0.35) at baseline. Psychological distress did not predict the development of overweight five and ten years later.

Conclusion. The results in this study indicated that psychological distress predicted an increased risk in gaining weight, but did not result in an increased risk for developing overweight.

Introduction

Both obesity and mental health problems represent important public health challenges (Mathers and Loncar, 2006). In 2008 approximately 1.5 billion adults were overweight globally, of whom more than 200 million men and nearly 300 million women were obese, as shown by the World Health Organization's (WHO) numbers (World Health Organization, 2011). There is a large body of evidence that indicates that obesity leads to several chronic health complications, such as cardiovascular disease, diabetes type II and certain types of cancer (World Health Organization, 2011; Li et al., 2005) and also a poorer quality of life (Larsson et al., 2002; Fontaine and Barofsky, 2001) and mental health (Gariepy et al., 2010; Luppino et al., 2010). Most studies on the relationship between mental health and overweight/obesity focus on the more severe end of the mental health continuum, i.e. specific mental health disorders including depression and anxiety. To illustrate, the meta-analytic review of Luppino et al. (2010) summarised the available longitudinal studies on the relationship between depression and overweight/obesity. Based on ten longitudinal studies, they concluded that depressed persons have a 58% increased risk to develop obesity, compared to those without depression, and obese persons had a 55% increased risk of developing depression. A recent study also found that weight gain was associated with a history of anxiety or depression (Grundy et al., 2014). In addition, a review on the association between obesity and anxiety suggested a positive association with a pooled odds ratio of 1.4 from cross-sectional studies (Gariepy et al., 2010). Although more than half of the (mainly cross-sectional) studies showed higher odds of anxiety disorders in the obese compared to the non-obese, the strength of evidence was moderate, due to methodological limitations of the studies. Also the relationship of overweight/obesity and the less severe end of the mental health continuum – e.g. psychological distress – is relevant, because the prevalence of psychological distress is also high. Measured using the Mental Health Inventory (MHI-5), almost 14% (point prevalence) of the Dutch population deals with psychological distress, which is comparable to other European countries (TNS eurobarometer 2006). Previous studies on the association between psychological distress and overweight/weight gain were

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http://dx.doi.org/10.1016/j.ypmed.2015.04.020
0091-7435/

mostly cross-sectional (Garcia-Mendizabal et al., 2009; Han et al., 1998; Huang et al., 2006; Lopez-Garcia et al., 2003; Vasiljevic et al., 2008) and used different measurements to assess for psychological distress (Istvan et al., 1992; Martin-Lopez et al., 2011; Rumpel et al., 1994). One longitudinal study examined whether weight gain was related to the development of psychological distress (MHI-5) (Fine et al., 1999). This longitudinal study of Fine et al. concluded that weight gain of 9.0 kg or more over a 4 year period, was associated with about a 2-point reduction in mental health score among women with overweight. As to the relation the other way around, e.g. psychological distress as a determinant of weight change, only one longitudinal study was found (Verschuren et al., 1994). That study showed that the lowest score category on the MHI-5 (i.e. the highest levels of psychological distress) at baseline was significantly associated with greater increases in BMI over the following five years (Cameron et al., 2012).

To date, longitudinal studies on the relationship between psychological distress and changes in body mass are lacking. Therefore, the present study examines the longitudinal association between psychological distress and changes in body mass index over a period of five and ten years.

Methods

Study population

Data from the Doetinchem Cohort Study were used, a Dutch, prospective, population-based study with five rounds of data collection, with a five year interval period. The first round of data collection took place between 1987 and 1991, as part of the Monitoring Project on Cardiovascular Disease Risk Factors (Verschuren et al., 1994) (response rate 62%), among an age–sex stratified random sample of the population register of Doetinchem with equal numbers per 10 year age group and sex. In the following four waves of data-collection response rates varied from 75% to 79% (Fig. 1). All participants gave written informed consent and the study was approved according to the guidelines of the Helsinki Declaration. Detailed information about the design can be found elsewhere (Verschuren et al., 2008).

Since data on psychological distress were available from 1995 onwards, the data collected in years 1995–1999 was considered the baseline measurement (R1) for the present analyses of this study, and the data collected 2000–2004 (R2) and 2005–2009 (R3), as first and second follow-up (Fig. 1).

Psychological distress

Psychological distress was assessed using the Mental Health Inventory (MHI-5), which is a subscale of the RAND-36 questionnaire (Van der Zee and Sanderman, 1995). The MHI-5 measures the occurrence and extent of psychological distress during the past month (Sihvonen, 2008) and has been found to be a valid and reliable measure of mental health status (Ware and Gandek, 1998). The MHI-5 consists of five questions, answered on a six-point scale ranging from 'all of the time' to 'none of the time' (Van der Zee and Sanderman, 1995). The MHI-5 sum score (ranging from 0 to 100) was dichotomised, using a cut-off point of 60 and lower, indicating psychological distress (MHI-5 ≤ 60) versus psychological healthy (MHI-5 > 60) (Van der Zee and Sanderman, 1995; Driessen, 2011). There are several cut-off points used in the literature, including the cut-off point of 60 (Kelly et al., 2008). We used the cut-off point of 60, as this in line with the Netherlands Statistics office, and based on a

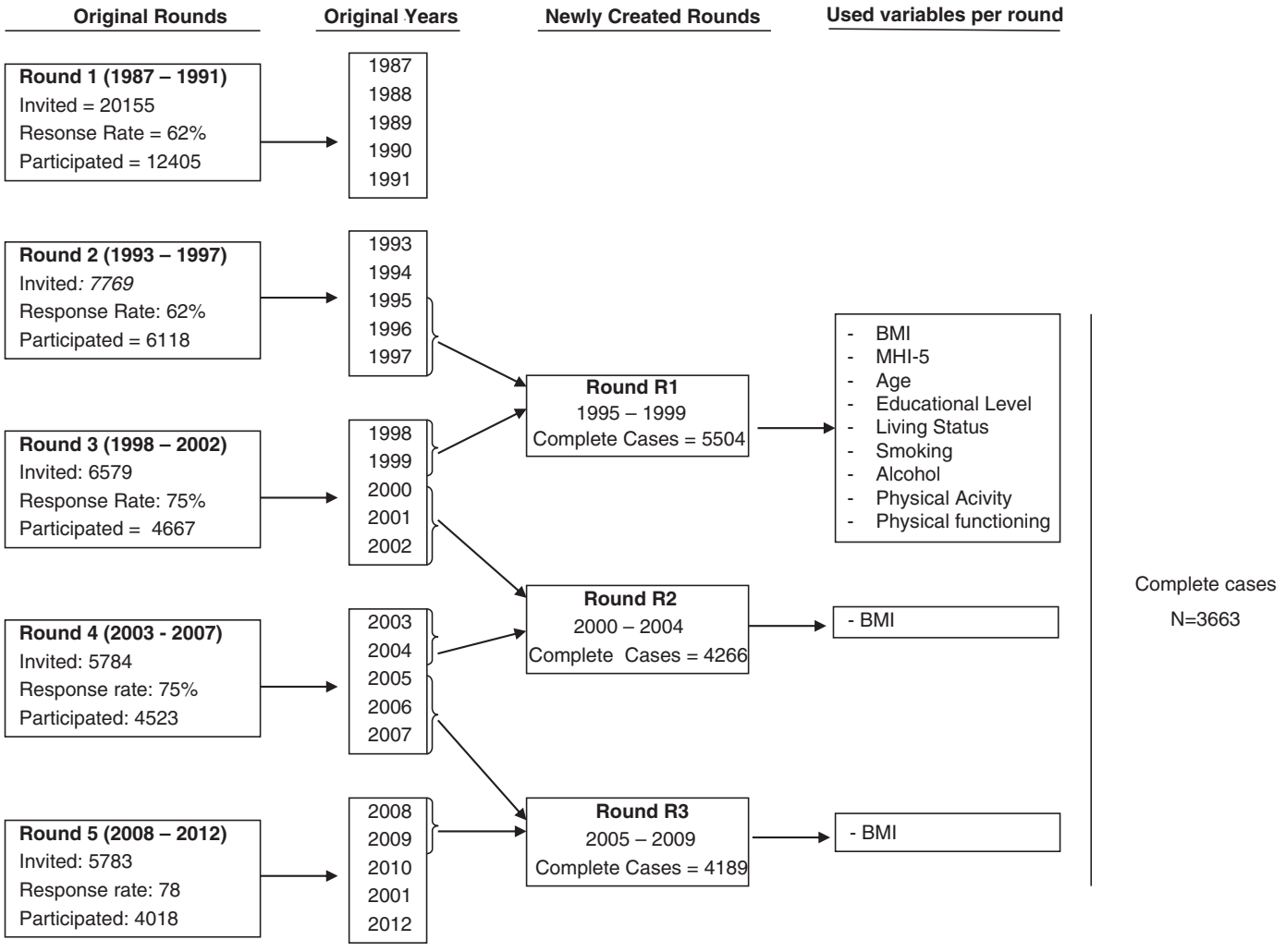

Fig. 1. Flowchart of Doetinchem Cohort study and analysis rounds (R) for present study.