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ORIGINAL ARTICLE

Trends in socioeconomic costs of morbid obesity among Korean adults, 2009—2013: Data from National Health Insurance Service

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Summary   As the prevalence of morbid obesity increased in Korea, the estimation of the accurate socioeconomic costs by morbid obesity was required; we analysed national medical costs through the big data.

From 2009 year to 2013 year, Direct Costs (DC) for medical costs, transit costs and nursing costs and Indirect Costs (IC) for Future Income Loss (FIL) and Productivity Loss (PL) of morbid obesity (BMI $\geq$ 30) were calculated, and socioeconomic costs were estimated by applying Population Attributable Risk (PAR) proportion according to obesity related diseases.

From 10 year follow up research, Relative risk (RR) for morbid obesity related disease was analysed in comparison with control group. The high RR disease were congestive heart failure (RR 3.204 CI 2.421—3.987), hypertension (RR 3.13 CI 3.058—3.202), type 2 DM (RR 3.112 CI 2.973—3.251), pulmonary embolism (RR 2.969 CI 1.812—4.126), dyslipidemia (RR 2.283 CI 2.221—2.345) and ischaemic heart disease (RR 2.187 CI 2.068—2.306) in order. The socioeconomic costs by morbid obesity tended to increase 1.47 times from 2009 year (492 billion KRW) to 2013 year (726.2 billion KRW).

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The growth of the prevalence and the socioeconomic costs by morbid obesity in Korea are required not only the personal care issue but also social and national strategies for the future morbid obesity control.

Introduction

Obesity in adults may cause high blood pressure and metabolic complications, and those diseases may induce cancer, cardio-cerebrovascular disease and type 2 DM. It is also known that these diseases increase mortality [1,2]. Obesity is increasing in recent western and also in Asia including Korea [3]. The increasing of obesity leads to increasing in obesity-related disorder, and that will cause the growth of socioeconomic burden [4]. It is also reported that morbid obesity, which is the second degree of obesity, is likely to be accompanied by various chronic diseases and adversely affect the quality of life and lifespan if it progresses severely [5].

The study of socio-economic costs, known as cost of illness, is an analytical method that calculates adverse effects caused by diseases, injuries, health risk factors, etc. in monetary units and may be used as an important indicator in decision-making process of health care policy. In general, the socioeconomic costs can be divided to Direct Costs (DC) for hospitalisation, outpatient visits, medication and examination as the purpose of prevention or treatment and Indirect Costs (IC) that quantify the reduced productivity due to disease [6—8].

The socioeconomic costs of obesity in Korea were reported for the first time in 2002 [9] and estimated to be about 205 billion to 423 billion (KRW) based in 1998. In the subsequent study reported in 2011, the socio-economic cost of obesity as of 2005 was reported to 1320 billion (KRW) and the morbid obesity was reported to 344 billion (KRW) [10]. Recently, the prevalence of obesity and morbid obesity has been increasing not only in developed countries but also in Asia and Korea, therefore a social attention is required. [11] However, the trend of socioeconomic costs of morbid obesity has not yet been analysed in Korea.

In this study, we estimate the socioeconomic costs of morbid obesity in the recent 5 years (2009—2013) in Korea through by calculating the Relative risk (RR) and Population Attributable Risk proportion (PAR) for obesity related diseases. We also tried to investigate the incidence of obesity related diseases and socioeconomic cost issues by morbid obesity.

Materials and methods

The prevalence of morbid obesity

The prevalence of morbid obesity was analysed by using the raw data provided by the Korean National Health and Nutrition Examination Survey (KNHANES) which is a nationwide survey in Korea. The prevalence for those aged 20 years or older was 2.93% in 2009, 2.85% in 2010, 2.86% in 2011, 3.08% in 2012 and 3.39% in 2013, respectively. In this study, based on the criteria presented in the World Health Organization-Western Pacific Region (WHO-WPRO), morbid obesity is defined in the case that BMI is more $30\,kg/m^2$ [12].

Population Attributable Risk proportion (PAR) and Relative risk (RR)

PAR was determined by the size of prevalence (P) and disease RR [13,14], and it was calculated as following estimation formula; $PAR = P \times (RR - 1)/[P \times (RR - 1) + 1]$.

In order to calculate RR for obesity related diseases, 10 years (2002 year—2013 year) follow-up research was conducted on subjects who underwent biennial national health check-ups provided by Korean National Health Insurance Corporation in 2002 and 2003. With reference to the previous study [14—18], we checked the occurrences of obesity related disease during the 10 years