The Cost of Obesity
The US Perspective

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Summary

Obesity is associated with an increased risk of many major chronic diseases. We estimated the economic costs of obesity-associated non-insulin-dependent diabetes mellitus, cardiovascular disease, gallbladder disease, cancer, and musculoskeletal disorders in 1990 US dollars, using a prevalence-based approach to cost-of-illness. In addition to direct costs, indirect costs were also estimated. The indirect cost of morbidity was estimated by calculating the costs associated with work days lost, and mortality costs were estimated on the basis of lifetime earnings lost.

In 1990, the direct cost of obesity-associated disease in the US was $US45.8 billion, and the indirect cost of obesity was estimated to be $US23.0 billion. Therefore the total economic cost of obesity was estimated to be $US68.8 billion in 1990.

Obesity is a major risk factor for many chronic diseases, including cardiovascular disease (CVD) and diabetes. Moreover, obesity may exacerbate many chronic diseases (e.g. hypertension, dyslipoproteinaemia, and osteoarthritis) [Anon 1988]. The prevalence of obesity in the US is higher than in Canada and the UK (Millar & Stephens 1987) and similar to that in many European countries (Seidell 1994). The health consequences of obesity, and the subsequent costs incurred are therefore important.

The National Center for Health Statistics defines overweight as body mass index (BMI) ≥ the 85th percentile for men and nonpregnant women aged 20 to 30 years. Obesity is defined as a BMI ≥ 27.8 kg/m² for men and ≥ 27.3 kg/m² for women. In 1980, approximately 34 million American adults were classified as obese by these criteria. Thus, many adults are at increased risk of disability, disease, and premature death because of being overweight.

The economic cost of illness plays an important role in health policy decision making (Rice et al. 1985). The annual economic impact of obesity, based on estimates of disease prevalence and the proportion of disease attributable to obesity, were analysed and the results are presented here. Indirect costs of obesity were estimated on the basis of the marginal number of work days lost that were due to obesity, by applying median daily wages from 1990, while mortality costs were estimated by the loss of lifetime earnings.

1. Economic Cost of Non–Insulin-Dependent Diabetes Mellitus

The incidence of non-insulin-dependent diabetes mellitus (NIDDM) increases with rising BMI (Colditz et al. 1990). The procedures used to estimate the cost of NIDDM in the US are presented in detail elsewhere (Huse et al. 1989). Costs include the following:

• routine care for uncomplicated NIDDM
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• costs related to morbidity and mortality from complications of NIDDM, such as diabetic retinopathy and diabetic neuropathy
• costs arising as a consequence of an increased prevalence of other disease conditions among persons with NIDDM, including peripheral vascular disease, cerebrovascular disease, coronary heart disease, skin disorders, etc.

We used the published estimates of the 1980 US healthcare expenditure (Hodgson & Kopstein 1984) as the basis for the estimation of 1990 costs. These estimates were adjusted to 1986 levels by inflating them in proportion to the increases in the US population and the per capita healthcare expenditures from 1980 to 1986. In 1986, direct costs accounted for $US11.6 billion, or $US15.5 billion when adjusted to 1990 dollars on the basis of the medical care component of the consumer price index.

Most cases of NIDDM are diagnosed among men and women who are obese. In the Nurses' Health Study, 61% of cases were diagnosed among women 30 to 64 years of age with BMI \( \geq 29 \text{ kg/m}^2 \) (Colditz et al. 1990); similar results were reported by other investigators (Melton et al. 1983). Among obese women, 94% of cases of NIDDM were attributable to obesity (Colditz et al. 1990). Therefore, 57% \((0.61 \times 0.94)\) of the total costs of NIDDM, or $US8.8 billion, are attributable to obesity.

2. Economic Cost of Gallbladder Disease

The incidence of clinically symptomatic gallbladder disease increases with increasing BMI. In the Nurses’ Health Study population, approximately 33% of cholecystectomies were performed on women whose BMI was \( \geq 29 \text{ kg/m}^2 \), and 90% of these cases were directly attributable to obesity (Stampfer et al. 1992). Hence, 30%, or $US3.2 billion, of the $US8 billion direct costs associated with gallbladder disease are due to obesity.

3. Economic Cost of Cardiovascular Disease

The risk of CVD increases with increasing BMI (Manson et al. 1990). The details of estimating the costs of CVD attributable to obesity are provided elsewhere (Colditz 1992).

On the basis of 1980 estimates, we assessed the direct cost of CVD in 1990 as being $US154.7 billion. If it is assumed that 27% of CVD is diagnosed among men and women with BMI \( \geq 29 \text{ kg/m}^2 \), and that among the obese 70% of the disease is directly attributable to obesity (Manson et al. 1990), then 19% \((0.27 \times 0.70)\) of the direct costs of CVD are attributable to obesity. Therefore, obesity-related CVD cost an estimated $US29.4 billion in 1990.

4. Economic Cost of Cancer

Prospective data from a 12-year follow-up of 750,000 US men and women who did not have cancer prior to study inclusion indicated that mortality from cancer increases with increasing weight in women (Lew & Garfinkel 1979). In men above the ideal bodyweight, the risk of mortality increases with weight. Increased mortality from colon and prostate cancer was observed among obese men, and from breast, endometrial, cervical, ovarian, and gallbladder cancer among obese women.

Therefore, if we ignore the confounding effect of cigarette smoking, the prevalence of obesity and relative risks of mortality (as a proxy for the incidence of mortality) can be used to estimate a population attributable risk of 2.3%. Thus, the direct cost of obesity-related cancer in 1990 was estimated as $US680 million.

5. Economic Cost of Musculoskeletal Disease

In 1980, the direct cost of musculoskeletal conditions was $US20.6 million (Rice et al. 1985). Conservatively, assuming 10% of the costs of musculoskeletal disease are attributable to obesity then the direct cost in 1990 was $US3.75 billion.