



Quantifying the impact of Body Mass Index on employment: A brief report

Report authors:

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Key messages

- There is evidence from many studies that Body Mass Index (BMI)/weight change is linked to some labour market outcomes, but there is limited evidence to show that changes in weight *cause* changes in labour market outcomes.
- From **intervention studies**, that typically explore the impacts of bariatric surgery, we found evidence that losing weight increases the chances of gaining or retaining employment, but we can't precisely quantify this relationship for the following reasons:
 - There isn't enough evidence.
 - What evidence there is comes from studies with different designs and sizes, from different countries, with people of different ages and starting BMIs, making it hard to combine the data. Most of the studies lacked a control group, so we can not be sure that the weight loss increased the chance of gaining or retaining employment.
- From five **longitudinal observational studies**, three indicated that having a higher BMI was associated with higher unemployment; the other two studies found no effect.
- Intervention and longitudinal studies that looked at sex differences, found stronger links between having a higher BMI and adverse employment outcomes for women. This may be partly explained by evidence showing women face greater levels of discrimination if they have excess weight.
- Findings should be interpreted with caution, not only because there isn't much evidence but because:
 - We did not formally assess the quality of included studies, some of which may be biased.
 - The most compelling evidence came from studies of bariatric surgery, where starting BMI is very high; it may not be appropriate to extrapolate the findings to people with a lower starting weight and there is some evidence to suggest less strong associations for people with healthy weight or less severe overweight/obesity.
 - The longer-term effects of weight loss on employment outcomes are unclear.

Introduction

Having excess weight/higher BMI is linked with unemployment, sick leave, and lower productivity; however, people with obesity often face discrimination in the workplace, which may contribute to these associations. The relationships between having a higher BMI and labour market outcomes are complicated. For example, they might both have a shared underlying cause, such as low education. Being unemployed might also increase the chance of having a higher BMI through stress, loss of income or reduction in physical activity for example.

Why is this work important?

Making sense of the evidence in relation to BMI and labour market outcomes is particularly important for policy makers so that the wider costs of obesity i.e., the social and economic costs, can be better understood and quantified. Given that relevant evidence has not been explored or well described, The Department of Health and Social Care and the analytical team at the Office for Health and Improvement Disparities asked the Obesity Policy Research Unit to scope the literature before synthesising the most relevant evidence.

Research questions

This brief report presents findings in relation to two policy relevant research questions:

- RQ1: What is the relationship between BMI (or change in BMI) and the probability of being employed?
- RQ2: What is the size of the impact of weight loss on getting people back into employment? (e.g. for each unit of reduction BMI, what is the increased probability of getting back into work)

What we did

We initially completed a scoping review that included any study that quantified the relationship between BMI/weight change and employment status, absenteeism, presenteeism, productivity, work ability (333 studies). Given the focus of RQs 1 and 2, we then identified studies that reported on BMI/weight change and employment status specifically (125 studies). Given the complexities outlined in the introduction, we finally identified studies that considered employment status as the outcome and were longitudinal in nature so better able to assess causation (14 studies). We divided these studies into two groups: observational studies with BMI or change in weight as the exposure (5 studies), and those that studied an intervention that sought to reduce weight (e.g. bariatric surgery).

What we found

From the broad scoping review, we found a wealth of cross-sectional evidence that links BMI/weight change with labour market outcomes. These studies may overestimate of the effect of BMI on employment outcomes and cannot show whether BMI or changes in weight specifically affect labour market outcomes. By further restricting studies based on design, we were able to draw on evidence from more robust studies conducted over time, and that also attempted to control for other factors.

Of the nine **intervention studies**, seven took place in western Europe and two in the US/Canada. Eight were in relation to bariatric surgery and one was in relation to a lifestyle intervention. The samples for each study ranged from 165 to 19,454 and patients' BMI at baseline was typically very high. Seven out of nine studies found that weight loss was linked to maintaining, gaining or retaining employment. These associations tended to be stronger for females, but sex differences were not always explored.

Of the five **longitudinal studies**, two were in South Korea, two in Western Europe and one in Canada. Study samples ranged from 3,993 to 230,097, study populations varied by age and typically had lower starting BMIs than the intervention studies (generally healthy weight/marginally overweight). Evidence was mixed; three studies found higher BMI was linked to lower employment/higher unemployment, with stronger effects for females, while two studies found no associations.

- **RQ1. What is the relationship between BMI (or change in BMI) and the probability of being employed?**

Evidence suggests that a higher BMI is linked to a lower likelihood of employment, but the evidence was mixed, and we were not able to pool effect sizes. The best single study for quantifying the effect in the UK is a large UK-based study of the general population in mid to later life (Campbell, 2021), which estimated that each 1 kg/m² increase in Body Mass Index was associated with an increased odds of unemployment due to sickness/disability of 1.076 (95% confidence intervals 1.039-1.114). This estimate is an average and the relationship was not the same at all levels of BMI, i.e., it was stronger for people with higher BMI scores.

- **RQ2. What is the size of the impact of weight loss on getting people back into employment?**

Evidence suggests that losing weight probably does increase the chances of getting back into employment but there are issues in quantifying the size of the impact. We found two studies that are relevant in answering this question, but both have limitations. Courtney (2018), in the UK, found that the rate of employment for patients following bariatric surgery went up from 59.5% before surgery to 69.6% after surgery. However, the authors do not say how much weight was lost by participants and the long-term effects are unclear. If we assumed that patients lost an average 12.5 kg/m² (a typical change for bariatric surgery), then each 1kg/m² would equate to 0.8 percentage point increase in employment.

Considerations of this work

- Employment/unemployment rates varied between studies as did the underlying BMI status of the participants/population. Care should be taken when generalising estimates to populations with different underlying rates of employment and/or BMI distributions.
- There was little evidence as to the long-term effects of BMI on employment. The one study that looked longer term after bariatric surgery found employment levels returned to baseline levels after seven years.
- Less than half of the intervention studies had a control group and instead used before/after designs, which are less robust.
- We did not assess study quality and cannot account for potential bias in reported findings.
- The strongest evidence comes from studies of bariatric surgery, but we do not know if the effects would be consistent for people who have less severe obesity or have overweight. Evidence from studies that looked at the general population found greater associations for those with higher BMIs.
- Studies used different approaches to adjust for different confounding variables and it is very difficult to accurately account for important factors, like socio-economic status (SES). Not adjusting for SES may overestimate the effect of BMI on employment status, while adjusting for SES may underestimate the effect.

Next steps

We will produce an academic paper. We will either focus on the broad literature and present a scoping/mapping of relevant evidence, or we will focus on studies with robust design that may be most informative of the relationship between BMI/weight change and labour market outcomes.

Intervention studies

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