Perceived weight status may contribute to education inequalities in five-year weight change among mid-aged women

Abstract

Objectives: To examine education differences in five-year weight change among mid-aged adults, and to ascertain if this may be due to socioeconomic differences in perceived weight status or weight control behaviours (WCBs).

Methods: Data were used from the Australian Diabetes, Obesity and Lifestyle Study. Mid-aged men and women with measured weights at both baseline (1999-2000) and follow-up (2004-2005) were included. Percent weight change over the five-year interval was calculated and perceived weight status, WCBs and highest attained education were collected at baseline.

Results: Low-educated men and women were more likely to be obese at baseline compared to their high-educated counterparts. Women with a certificate-level education had a greater five-year weight gain than those with a bachelor degree or higher. Perceived weight status or WCBs did not differ by education among men and women, however participants that perceived themselves as very overweight had less weight gain than those perceiving themselves as underweight or normal weight. WCBs were not associated with five-year weight change.

Conclusions and Implications: The higher prevalence of overweight/obesity among low-educated women may be a consequence of greater weight gain in mid-adulthood. Education inequalities in overweight/obesity among men and women made be due (in part) to overweight or obese individuals in low-educated groups not perceiving themselves as having a weight problem.

Key words: weight control, weight change, body mass index, education

Jessica Siu, Katrina Giskes
School of Public Health and Institute of Health and Biomedical Innovation, Queensland University of Technology

Jonathan Shaw
Baker IDI Heart and Diabetes Institute, Victoria

Gavin Turrell
School of Public Health and Institute of Health and Biomedical Innovation, Queensland University of Technology

Socioeconomically disadvantaged groups have a higher prevalence of overweight and obesity compared to their more-advantaged counterparts, and this association has been documented more consistently among women. \(^{1,2}\) Overweight and obesity are most prevalent among mid-aged adults\(^ {3}\) and are thought to be major contributing factors to the higher morbidity and mortality from chronic conditions seen among socioeconomically disadvantaged groups, such as cardiovascular diseases, type 2 diabetes, and some cancers. \(^ {4,5}\) While there is extensive literature documenting socioeconomic inequalities in overweight and obesity, less is known about the factors contributing to this relationship\(^ {6}\), and the existing literature is limited by cross-sectional study designs.

Perceptions of weight status may be an important determinant of dietary and physical activity behaviours. \(^ {7,9}\) Some evidence suggests that socioeconomic groups differ in their perceived weight status and higher socioeconomic groups are more likely to perceive themselves as overweight or obese compared to their less-advantaged counterparts. \(^ {10,11}\) Misperceptions of weight status among overweight or obese individuals may be potentially problematic, as they may fail to act on health messages related to weight maintenance/loss, or diet and lifestyle changes promoting a healthy weight. \(^ {12}\) Given the rising prevalence of overweight and obesity and the consequent norm that a higher weight status is acceptable, \(^ {13,14}\) perceptions of weight status may be an increasingly important point of focus for the design and implementation of clinical and public health initiatives to decrease socioeconomic inequalities in overweight/obesity. Additionally, research has shown a strong association between self-perceived weight status and weight control behaviours (WCBs). \(^ {3,6}\) However, no known Australian study has examined socioeconomic differences in engaging in WCBs among mid-aged adults, and whether WCBs may contribute to inequalities in overweight/obesity among this age group.

The conceptual framework of this study is outlined in Figure 1. Associations between SEP, weight status, weight change and health have been well established, previous research
has also examined associations between perceived weight status and WCBs. Using data from mid-aged adults participating in the five-year prospective Australian Diabetes, Obesity and Lifestyle (AusDiab) Study, the focus of the current study was to examine associations between education, weight change, perceived weight status and WCBs. This is the first known Australian and international study among mid-aged men and women that has looked at the role of perceptions of weight status and WCBs to socioeconomic differences in overweight/obesity using data on weight change.

Methods

Data source

Data were collected as part of the Australian Diabetes, Obesity and Lifestyle (AusDiab) Study conducted in 1999-2000 (baseline) and 2004-2005 (follow-up). Detailed information on the methods of the AusDiab Study have been published elsewhere.15

Study scope

Men and women aged 45 to 60 years at baseline (n = 2,787) who completed both baseline and follow-up were included in the current study. This age group was selected as the prevalence of overweight and obesity in Australia is greatest among mid-aged adults; and neither weight status nor socioeconomic position (SEP) are influenced by growth, development or ageing at this life stage.16,17

Sampling and data collection

Stratified cluster sampling of areas was used to select participants at baseline. A total of 42 census collectors districts (CCDs) were selected, i.e. six CCDs randomly selected within every State and the Northern Territory. CCDs are the smallest area-level unit used for the collection of census data by the Australian Bureau of Statistics.15 The probability of selection of each CCD was proportional to its population size.15

Data were collected by household interviews conducted at baseline, and from physical examinations undertaken at both baseline and follow-up. The baseline household interview ascertained sociodemographic characteristics of participants (i.e. age, gender, country of birth). Physical examinations were conducted at a local testing site; at this appointment weight was measured, and a questionnaire was interviewer-administered to collect data on education, perceptions of weight status, WCBs and chronic medical conditions.

A total of 20,347 participants from 11,479 households completed the household interview; 5,650 households refused participation. Therefore, household response in the AusDiab Study was 67.0%. Of those that completed the household survey, 11,247 attended the physical examination at baseline (response rate 55.3%; 11,247/20,347). At follow-up study, 6,400 participants attended the physical examination (response rate 59.3%, 6,400 of 10,788 eligible participants).18

Measures

Measured weight status and five-year weight change

At baseline and follow-up, weight was measured using a beam balance scale, and was recorded to the nearest 0.1 kg. Participant’s height was measured (without shoes) using stadiometers mounted onto a stable board on a flat surface. Measured weight status was categorised into the National Health and Medical Research Council Body Mass Index (BMI) categories of underweight (< 18.5 kg/m²), healthy weight (18.5 to 24.9 kg/m²), overweight (25 to 29.9 kg/m²) and obese (≥30.0 kg/m²).20 Consistent with previous research,21 percentage weight change was calculated by subtracting baseline weight from weight at follow-up, then dividing by baseline weight and multiplying by 100.

Perceived weight status

Perceived weight status was ascertained at baseline by asking participants, “With regard to your weight, do you consider yourself to be: underweight, the right weight, slightly overweight or very overweight?”

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Figure 1: Conceptual framework for this study.
**Weight-control behaviours**

At baseline, participants were asked about their current WCBs by the following question: “Which of the following best describes you at the moment?” Response options were: ‘I am actively doing things to try to ‘gain weight’, ‘avoid gaining weight’, ‘try to lose weight’, and ‘not doing anything in particular’.

**Education**

Participants’ education was ascertained by the following question: “Which of these describes the highest qualification you have received?” Response options were: 1) secondary school qualification or lower, 2) nursing qualification, 3) teaching qualification, 4) trade certificate/apprenticeship, 5) technician’s certificate/advanced, 6) certificate, 7) certificate other than above, 8) associate diploma, 9) undergraduate diploma, 10) bachelor degree, 11) post-graduate diploma, and 12) masters degree/doctorate. These were re-categorised into four education levels: 1) secondary school qualification or lower (response option 1), certificate (options 2-7), diploma (options 8-9), and bachelor or higher (options 10-12).

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**Table 1: Sociodemographic, weight status and weight-control characteristics of respondents at baseline compared with non-respondents to follow-up.**

|                              | Respondents | Non-Respondents | p value* |
|------------------------------|-------------|-----------------|----------|
|                              | Men (n = 1278, 46.4%) | Women (n = 1475, 53.6%) | Men (n = 642, 46.0%) | Women (n = 754, 54.0%) | 0.05 |
| **Age – Mean (sd)**          | 52.0 (4.4) | 52.0 (4.4) | 51.8 (4.5) | 51.7 (4.5) | 0.05 |
| **Country of birth**         |             |                 |           |           | 0.03 |
| Australia                    | 73.8        | 75.2            | 71.3      | 71.4      | 0.03 |
| United Kingdom & Northern Ireland | 13.0      | 12.0            | 13.7      | 11.8      | 0.03 |
| Other                        | 13.2        | 12.8            | 15.0      | 16.8      | 0.03 |
| **Education**                |             |                 |           |           | <0.01 |
| Secondary school or lower    | 27.7        | 44.7            | 31.4      | 51.2      | <0.01 |
| Certificate                  | 40.9        | 33.4            | 41.9      | 31.5      | 0.03 |
| Diploma                      | 8.4         | 5.3             | 8.3       | 4.6       | 0.03 |
| Bachelor or higher           | 23.0        | 16.6            | 18.4      | 12.7      | 0.03 |
| **Measured weight status**   |             |                 |           |           | <0.01 |
| Underweight                  | 0.3         | 0.9             | 0.3       | 1.6       | <0.01 |
| Healthy weight               | 26.7        | 38.8            | 23.0      | 35.0      | 0.03 |
| Overweight                   | 50.3        | 34.8            | 50.0      | 34.2      | 0.03 |
| Obese                        | 22.7        | 25.4            | 26.7      | 29.1      | 0.03 |
| **Perceived weight status**  |             |                 |           |           | 0.53 |
| Underweight                  | 3.1         | 1.8             | 3.4       | 2.4       | 0.53 |
| Right Weight                 | 23.3        | 20.7            | 25.9      | 19.5      | 0.03 |
| Slightly Overweight          | 53.4        | 46.2            | 49.2      | 45.9      | 0.03 |
| Very Overweight              | 12.1        | 22.4            | 11.4      | 19.5      | 0.03 |
| Missing                      | 8.0         | 8.9             | 10.1      | 12.7      | 0.03 |
| **Weight-control behaviour** |             |                 |           |           | 0.19 |
| Actively gaining weight       | 0.7         | 0.7             | 1.2       | 0.9       | 0.19 |
| Trying to avoid gaining weight| 21.8        | 26.9            | 19.6      | 22.0      | 0.19 |
| Trying to lose weight         | 18.1        | 26.4            | 17.1      | 27.2      | 0.19 |
| Not doing anything           | 51.4        | 37.1            | 51.9      | 37.1      | 0.19 |
| Missing                      | 8.0         | 8.8             | 10.1      | 12.7      | 0.19 |

* p value for differences between respondents and non-respondents to follow-up. Those with missing data on perceived weight status, accuracy of perceived weight status and weight-control behaviour were excluded from analyses examining differences between respondents and non-respondents. Differences were considered statistically significant if p ≤ 0.05 (two-tailed).
Table 2: Bivariate associations between education, measured weight status, perceived weight status and weight-control behaviour among men and women.

|                          | Education |          |          |          |
|--------------------------|-----------|----------|----------|----------|
|                          | Secondary school or lower | Certificate | Diploma | Bachelor or higher |
| **Men n = 1,278**        |           |          |          |          |
| Measured weight status   |           |          |          |          |
| Underweight/ Healthy weight | 24.9     | 27.0     | 25.2     | 32.5     |
| Overweight               | 47.2      | 48.7     | 60.7     | 52.5     |
| Obese                    | 28.0      | 24.3     | 14.0     | 14.9     |
| **p-value**              | <0.01     |          |          |          |
| Perceived weight statusa |           |          |          |          |
| Underweight/ Right weight | 25.4      | 26.4     | 22.4     | 28.8     |
| Slightly overweight      | 48.9      | 56.1     | 60.7     | 51.5     |
| Very overweight          | 13.8      | 11.9     | 8.4      | 11.9     |
| Missing                  | 11.9      | 5.6      | 8.4      | 7.8      |
| **p-value**              | 0.04      |          |          |          |
| Weight-control behaviourb |           |          |          |          |
| Trying to avoid gaining weight | 20.1   | 23.2     | 19.6     | 22.4     |
| Trying to lose weight    | 19.8      | 14.4     | 19.6     | 22.4     |
| Not doing anything       | 48.0      | 55.7     | 52.3     | 47.1     |
| Missing                  | 11.6      | 5.6      | 8.4      | 7.8      |
| **p-value**              | 0.01      |          |          |          |
| **Women n = 1475**       |           |          |          |          |
| Measured weight status   |           |          |          |          |
| Underweight/ Healthy weight | 36.4     | 39.2     | 48.7     | 48.6     |
| Overweight               | 36.1      | 35.0     | 25.6     | 33.9     |
| Obese                    | 27.6      | 25.8     | 25.6     | 17.6     |
| **p-value**              | <0.01     |          |          |          |
| Perceived weight statusa |           |          |          |          |
| Underweight/ Right weight | 20.6      | 23.2     | 20.5     | 26.5     |
| Slightly overweight      | 48.0      | 45.1     | 44.9     | 44.1     |
| Very overweight          | 22.1      | 24.4     | 20.5     | 20.0     |
| Missing                  | 9.2       | 7.3      | 14.1     | 9.4      |
| **p-value**              | 0.39      |          |          |          |
| Weight-control behaviourb |           |          |          |          |
| Trying to avoid gaining weight | 26.8   | 26.6     | 30.8     | 26.5     |
| Trying to lose weight    | 27.0      | 27.4     | 26.9     | 22.9     |
| Not doing anything       | 35.9      | 38.0     | 29.5     | 40.8     |
| Missing                  | 9.2       | 7.3      | 12.8     | 9.4      |
| **p-value**              | 0.68      |          |          |          |

* Category for perceived ‘Underweight’ is collapsed with perceived ‘Right weight’ due to small number of participants in this group (men n = 40; women n = 26).
* Analyses have included participants who responded ‘Actively doing things to gain weight’, however are not included in this table due to small number of participants in this group (men n = 9, women n = 11).
Other covariates

Age

‘Age’ in years at baseline was measured as a continuous variable.

Country of birth

Country of birth was included as a covariate as it may be related to both SEP and perceptions of weight status. Participants were asked “In which country were you born?” Responses were categorised as ‘Australia/New Zealand’, ‘United Kingdom and Northern Ireland’, and ‘other’.

Chronic health conditions

Chronic health conditions was also adjusted for as it may be related to SEPs, weight status and weight change. Participants responded in a yes/no format to a list of medical conditions, including gout, angina, heart attack, stroke, hypertension and diabetes. The total number of chronic health conditions was calculated for each participant, and summarised as a continuous variable.

Analyses

There were 2,787 participants in the selected age range. Those with missing data on their country of birth, education level, height and weight were excluded from the analyses (1.2%, n=34), resulting in an analytical sample of 2,753 participants.

Linear regression was used to ascertain differences in five-year weight change by education. Multinominal logistic regression was used to examine education differences in perceived weight status and WCBs. To take account of the clustered sampling design and minimise the likelihood of correlation between individuals inducing type I error, all analyses were conducted using a multilevel analytical package (MLwiN version 2.01). In these analyses, individuals were level-1 observations and CCDs were level-2 units. All multivariable analyses were adjusted for age, country of birth, and number of chronic health conditions, and stratified by gender. Analyses examining weight change were additionally adjusted for baseline BMI.

Results

Table 1 shows the sociodemographic characteristics (at baseline) of the respondents and non-respondents to follow-up. The respondents had a greater mean age, a higher proportion were born in Australia, a greater percentage had a bachelor degree or higher and a lower proportion had a measured BMI in the obese range compared with non-respondents. There was no difference between respondents and non-respondents in perceived weight status or WCBs.

Tables 2 and 3 shows the bivariate and multivariate associations between education, measured weight status, five-year weight change, perceived weight status and WCB. Lower-educated men and women were more likely to be obese than their higher-educated counterparts. Almost all education groups had significant weight gains over the follow-up period. There was no association between education and weight change among men, however women with certificate-level education had a greater weight gain than their counterparts with a bachelor degree or higher. There were no education differences in perceived weight status or WCBs among men or women.

Table 4 summarises the associations between perceived weight status, WCBs and five-year weight change. Perceived weight status was associated with weight change; men and women perceiving themselves as very overweight had smaller weight change than those perceiving themselves as underweight/the right weight. WCBs were not associated with five-year weight change among men or women.

Discussion

This study showed that among this sample of mid-aged Australian adults, lower-educated men and women were more likely to be obese compared to their more advantaged counterparts, and low-educated women had greater five-year weight gains compared to those with a bachelor degree or higher. Despite this, there were no education differences in perceived weight status and WCBs among men and women. Perceiving oneself as very overweight was associated with a lower five-year weight gain, however engaging in WCBs was not associated with five-year weight gain.

Table 4: Five-year weight change (%) by perceived weight status and weight-control behaviour among men and women.a

| Perceived weight status | Five-Year Weight Change Percentage (95% CI) |
|-------------------------|------------------------------------------|
|                         | Men                                      |
|                         | (n = 1278)                               |
|                         | Women                                    |
|                         | (n = 1475)                               |
| Underweight/right weight| 2.2 (1.6-2.9)                            |
| Slightly overweight     | 1.5 (0.8-2.2)                            |
| Very overweight         | 0.6 (-0.5-1.7)                           |
| Missing                 | 1.4 (0.2-2.6)                            |
| p value                 | 0.03                                     |
|                         | 0.01                                     |
| Weight-control behaviourb|                                        |
| Avoid gaining weight    | 1.9 (-2.1-5.3)                           |
| Trying to lose weight   | 1.6 (-2.1-5.3)                           |
| Not doing anything     | 1.4 (-2.3-5.1)                           |
| Missing                 | 1.4 (0.3-2.6)                            |
| p value                 | 0.67                                     |
|                         | 0.55                                     |

a) Analyses adjusted for BMI at baseline, age, number of chronic health conditions and country of birth. Differences were considered statistically significant if p ≤ 0.05 (two-tailed).

b) Analyses have included participants who responded ‘Active doing things to gain weight’, however are not included in this table due to small number of participants in this group (men n = 9, women n = 11).

c) Category for perceived ‘Underweight’ is collapsed with perceived ‘Right weight’ due to small number of participants in this group (men n = 40; women n = 26).
Table 3: Multivariable associations between education, five-year weight change, measured weight status, perceived weight status and weight-control behaviour among men and women.

| Education                        | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
|----------------------------------|-------------|-------------|-------------|-------------|
| Secondary school or lower        | 1.5 (0.7 to 2.4) | 1.6 (0.8-2.4) | 1.8 (0.5-3.0) | 1.4 (0.7-2.10) |
| Certificate                      | 0.79 (0.55-1.12) | 0.82 (0.60-1.12) | 0.73 (0.44-1.21) | 1.00 (reference) |
| Diploma                          | 0.79 (0.58-1.09) | 0.85 (0.64-1.14) | 1.40 (0.90-2.21) | 1.00 (reference) |
| Bachelor or higher               | 1.97 (1.30-2.98) | 1.93 (1.17-2.54) | 0.89 (0.45-1.63) | 1.00 (reference) |

Men n = 1278

Five-year weight changea (%, 95% CI) 1.5 (0.7 to 2.4) 1.6 (0.8-2.4) 1.8 (0.5-3.0) 1.4 (0.7-2.10)

p-value 0.90

Measured weight statusb

Underweight/ Healthy weight 0.79 (0.55-1.12) 0.82 (0.60-1.12) 0.73 (0.44-1.21) 1.00 (reference)

Overweight 0.79 (0.58-1.09) 0.85 (0.64-1.14) 1.40 (0.90-2.21) 1.00 (reference)

Obese 1.97 (1.30-2.98) 1.93 (1.17-2.54) 0.89 (0.45-1.63) 1.00 (reference)

Men n = 1278

Five-year weight changea (%, 95% CI) 2.5 (1.5-3.6) 3.1 (2.0-4.1) 1.5 (-0.3-3.3) 1.1 (0.2 to 2.1)

p-value <0.01

Measured weight statusb

Underweight/ Healthy weight 0.70 (0.51-0.96) 0.73 (0.54-1.00) 1.07 (0.63-1.82) 1.00 (reference)

Overweight 1.13 (0.82-1.54) 1.06 (0.76-1.48) 0.68 (0.39-1.21) 1.00 (reference)

Obese 1.52 (1.03-2.25) 1.52 (1.01-2.30) 1.55 (0.83-2.91) 1.00 (reference)

Women n = 1475

Five-year weight changea (%, 95% CI) 2.5 (1.5-3.6) 3.1 (2.0-4.1) 1.5 (-0.3-3.3) 1.1 (0.2 to 2.1)

P-value <0.01

Measured weight statusb

Underweight/ Healthy weight 0.70 (0.51-0.96) 0.73 (0.54-1.00) 1.07 (0.63-1.82) 1.00 (reference)

Overweight 1.13 (0.82-1.54) 1.06 (0.76-1.48) 0.68 (0.39-1.21) 1.00 (reference)

Obese 1.52 (1.03-2.25) 1.52 (1.01-2.30) 1.55 (0.83-2.91) 1.00 (reference)

Perceived weight statusb,c,d

Underweight/ Right weight 0.91 (0.64-1.29) 0.91 (0.67-1.25) 0.73 (0.43-1.25) 1.00 (reference)

Slightly overweight 0.87 (0.63-1.18) 1.17 (0.88-1.56) 1.43 (0.91-2.24) 1.00 (reference)

Very overweight 1.09 (0.67-1.77) 0.97 (0.62-1.52) 0.63 (0.29-1.38) 1.00 (reference)

Missing 2.01 (1.19-3.42) 0.79 (0.45-1.36) 1.17 (0.55-2.52) 1.00 (reference)

Perceived weight statusb,d

Underweight/ Right weight 0.91 (0.64-1.29) 0.91 (0.67-1.25) 0.73 (0.43-1.25) 1.00 (reference)

Slightly overweight 0.87 (0.63-1.18) 1.17 (0.88-1.56) 1.43 (0.91-2.24) 1.00 (reference)

Very overweight 1.09 (0.67-1.77) 0.97 (0.62-1.52) 0.63 (0.29-1.38) 1.00 (reference)

Missing 2.01 (1.19-3.42) 0.79 (0.45-1.36) 1.17 (0.55-2.52) 1.00 (reference)

Weight-control behaviourb,c

Trying to avoid gaining weight 0.84 (0.58-1.24) 1.04 (0.74-1.47) 0.84 (0.48-1.46) 1.00 (reference)

Trying to lose weight 0.78 (0.53-1.15) 0.54 (0.37-0.78) 0.80 (0.46-1.40) 1.00 (reference)

Not doing anything 1.10 (0.81-1.51) 1.46 (1.09-1.95) 1.26 (0.81-1.97) 1.00 (reference)

Missing 1.75 (0.99-3.09) 0.77 (0.43-1.39) 1.15 (0.50-2.62) 1.00 (reference)

Weight-control behaviourb,c

Trying to avoid gaining weight 0.84 (0.58-1.24) 1.04 (0.74-1.47) 0.84 (0.48-1.46) 1.00 (reference)

Trying to lose weight 0.78 (0.53-1.15) 0.54 (0.37-0.78) 0.80 (0.46-1.40) 1.00 (reference)

Not doing anything 1.10 (0.81-1.51) 1.46 (1.09-1.95) 1.26 (0.81-1.97) 1.00 (reference)

Missing 1.75 (0.99-3.09) 0.77 (0.43-1.39) 1.15 (0.50-2.62) 1.00 (reference)

a) Analyses adjusted for BMI at baseline, age, number of chronic health conditions and country of birth. Differences were considered statistically significant if confidence interval of the odds ratio was exclusive of 1.

b) Analyses adjusted for age, number of chronic health conditions and country of birth. Differences were considered statistically significant if confidence interval of the odds ratio was exclusive of 1.

c) Analyses have included participants who responded ‘actively doing things to gain weight’, however are not included in this table due to small number of participants in this group (men n = 9, women n = 11).

d) Category for perceived ‘Underweight’ is collapsed with perceived ‘Right weight’ due to small number of participants in this group (men n = 40; women n = 26).
Similar education inequalities in weight status as seen in the current study have been reported in other Australian and international research.1 Few studies, particularly among mid-aged Australian adults, have examined prospective weight changes using measured weight. However, international research has shown greater weight gains among lower-educated women.21,22 We did not find education differences in weight change among men; this gender difference may be due to reproductive history and menopause among mid-aged women, with these two factors being significant determinants of weight gain, and reproductive histories differing markedly among women from different socioeconomic backgrounds.23

Despite pronounced inverse inequalities in measured weight status, an interesting finding of the current study was that no education differences were seen in perceived weight status among men or women. Higher socioeconomic groups may be more aware of healthy weight recommendations than their socioeconomically disadvantaged counterparts,24,25 or may be more sensitive to body weight ideals1,10 and have higher levels of body dissatisfaction.26,27 Some Australian research has supported this assertion, showing that higher-educated groups have a tendency to overestimate their weight status, and lower-educated groups are more likely to underestimate their weight status.28

The above-mentioned factors may also explain why no association was found between education and WCBs among men and women in the current study, as research has shown that people are unlikely to engage in WCBs unless they perceive they have a weight problem.7,9 Previous Australian and international research has found mixed associations between WCBs and adults’ socioeconomic characteristics.29-31 These mixed findings may be due to the wide variation in the scope of WCBs considered in different studies. The fact that we found greater weight gains among low-educated women, but no difference in their self-reported WCBs, may suggest that the WCBs adopted by low-educated women may be less effective or sustained for a shorter period of time compared to those used by their higher-educated counterparts.

Other factors not measured in the current study may have also contributed to the differential weight gains by education seen among women. Some research suggests that socioeconomically disadvantaged women may have less access to healthy foods,32,33 opportunities and infrastructure for physical activity,32,33 or may experience more barriers to adhering to WCBs, such as cost,34 compared to their more advantaged counterparts. This may place advantaged women in a better position to adopt a lifestyle that prevents weight gain.

**Study strengths and limitations**

The strengths of the study include the prospective study design, large sample of mid-aged adults, use of measured weights to obtain weight change and the relatively long follow up period. A limitation of the current study was that lower-educated groups were more likely to be lost to follow up and were consequently under-represented in the current study relative to the Australian population.15,35 Therefore, the associations with education reported in the current study are likely to have under-estimated the magnitude of the ‘true’ inequalities among the population. Furthermore, only baseline measures of perceived weight status and WCB were examined in the current study, hence we did not assess how these factors may have differed across the two time points and how their change may have contributed to weight change. Moreover, data were also not collected on the types and duration of WCBs that participants engaged in. Additionally, social-desirability bias in perceptions of weight status and WCBs may have influenced the direction and magnitude of the associations reported.

**Conclusions/implications**

The higher prevalence of overweight/obesity among low-educated women may be a consequence of greater weight gain in mid-adulthood, therefore interventions targeting reductions in inequalities in weight-related chronic diseases in older age should address this differential weight gain at this life stage among women. Education inequalities in overweight/obesity among men and women are due (in part) to overweight or obese individuals in low-educated groups not perceiving themselves as having a weight problem. Further research needs to understand how different socioeconomic groups evaluate their weight status, and if they differ in the types and duration of WCBs they engage in.

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