

Original Article

Body weight and weight loss: are health messages reaching their target?

Lynnette J Riddell PhD and Victoria Inman BAppSci (Hons)

School of Exercise and Nutrition Sciences, Deakin University, Victoria, Australia

Objective: To investigate lay peoples' knowledge of health risks of overweight, accuracy of self-perception of body weight and perceived benefits of weight loss. **Method:** A nine item questionnaire was administered to a cross sectional survey of adults in metropolitan shopping centres, height and weight were measured. **Results:** Two hundred and nine (57% female) adults completed the survey. Thirty eight percent had a healthy BMI (18.5-24.9), 38% were overweight (BMI 25-29.9) and a further 22% were obese (BMI>30). However only 46% perceived themselves 'overweight', 50% considered themselves 'just about right' and 4% considered themselves 'underweight'. Of those with a BMI of 25 or greater 28% considered their weight 'just about right'. Over 80% thought 'being overweight' was 'likely' or 'very likely' to be a risk factor for cardiovascular disease, hypertension, diabetes and stroke; however 20% of overweight or obese individuals did not think their health would improve if they lost weight. **Conclusion:** A significant proportion of overweight or obese individuals do not accurately perceive their body weight and do not recognise the health advantages of weight loss despite recognising excess body weight as a risk factor for chronic diseases. **Implications:** Increasing the awareness of an individual's BMI and promoting the benefits of modest weight loss maybe two underutilized strategies for population level weight control.

Key Words: BMI, overweight, obesity, weight loss, chronic disease, public health

INTRODUCTION

Several reports have demonstrated that many overweight and obese individuals are not aware of their body weight status as defined by the Body Mass Index (BMI),¹⁻⁸ despite being able to fairly accurately report their weight and height.⁹ Within Australia as many as 50% of overweight men and 25% of overweight women consider their body weight to be acceptable.⁶ While ethnicity, education level and gender^{1,5} have all been shown to influence a person's perception of their body weight, the level of misinterpretation of body weight within the Australian population^{4,6,7} is comparable to international studies. With increasing emphasis in recent years on the importance of healthy lifestyles and the achievement and maintenance of a healthy body weight^{10,11} it is of interest to determine if these messages have enhanced awareness of BMI and health consequences of overweight or obesity within the general population. Equally it is relevant to determine if people are aware that health risks can be reduced by modest weight loss. This study set out to determine in a sample of adults attending shopping centres within metropolitan Melbourne, Australia if people are aware of their body weight, the health risks associated with overweight and if health can be improved with weight loss.

METHODS

Subjects

Adults in two shopping centres in the South-Eastern suburbs of Melbourne, Australia were approached at random and asked to complete a questionnaire and have their height and

weight measured. These shopping complexes service large areas of South-East Melbourne which encompasses people from a range of socioeconomic and ethnic backgrounds.¹² Data was collected on three separate week days and men and non-pregnant women aged ≥ 18 years of all ethnicities were approached and invited to participate. The response rate was 20% (209 completed questionnaires of 1052 people approached). Ethical approval was obtained from the Deakin University Human Research Ethics Committee.

A questionnaire containing nine questions was developed. Perception of body weight and health was assessed using the questions: 'Do you consider yourself to be overweight, underweight, or just about right?';^{1,2} 'In general would you say your health is excellent, very good, good, fair or poor?';¹³ and 'Do you think your health would change if you lost weight?', rated on a 5 point Likert scale with 1 being improve a lot, 3 neutral, and 5 decline a lot. Using a Likert scale, the participants' knowledge of overweight as a risk factor for chronic diseases was assessed by indicating how likely they thought being overweight was a risk factor for heart disease, stroke, hypertension, type II diabetes and cancer. Responses were rated as 1 (very likely) through to 5

Corresponding Author: Dr Lynnette Riddell, Lecturer, School of Exercise and Nutrition Sciences, Deakin University, 221 Burwood Highway, Burwood, Victoria 3135, Australia
Tel: +61 3 9251 7270; Fax: +61 3 9244 6017
Email: lynn.riddell@deakin.edu.au

Manuscript received 13 December 2006. Initial review completed 2 March 2007. Revision accepted 12 April 2007.

Table 1. Sample Demographics

	Sample size	Underweight*	Normal*	Overweight*	Obese*
N (%)	209	3 (1.4)	79 (37.8)	82 (39.2)	45 (21.5)
Age(years):					
18-34	62 (29.7)	1 (1.6)	32 (51.6)	25 (40.3)	4 (6.5)
35-54	77 (36.8)	1 (1.3)	30 (39)	28 (36.4)	18 (23.4)
55+	70 (33.5)	1 (1.4)	17 (24.3)	29 (41.4)	23 (32.9)
Gender					
Male	89 (42.6)	1 (1.1)	21 (23.6)	43 (48.3)	24 (27)
Female	120 (57.4)	2 (1.7)	58 (48.3)	39 (32.5)	21 (17.5)
Ethnicity					
Australian/British	137 (65.6)	2 (1.5)	47 (34.3)	59 (43.1)	29 (21.2)
European	26 (12.4)	0 (0)	10 (38.5)	6 (23.1)	10 (38.5)
Asian	32 (15.3)	1 (3.1)	15 (46.9)	12 (37.5)	4 (12.5)

* BMI categories ≥ 18.5 kg/m² (Underweight), 18.5-24.9 kg/m² (Normal weight), 25-30 kg/m² (Overweight), ≥ 30 kg/m² (Obese)

Table 2. Accuracy of self-perception of body weight, n (%)

BMI category	Self perceived Body weight		
	Underweight	Just about right N (%)	Overweight
18.5-24.9	6 (8)	67 (85)	6 (8)
25-29.9	1 (1)	33 (40)	48 (59)
≥ 30	0 (0)	3 (7)	42 (93)

Pearson χ^2 (6,209) = 100.59 $p < 0.001$; data on 3 individuals with BMI < 18.5 not shown but included in the analysis.

(very unlikely).¹⁴ Participants' height and weight were measured using a portable stadiometer (Surgical Medical Product TM) and calibrated digital scales (AnD personal precision scale UC321).

Statistical analysis

BMI was calculated as weight (kg) divided by height (m) squared (kg/m²) and categorised as; underweight (≤ 18.49 kg/m²), normal weight (18.5-24.9 kg/m²), overweight (25-29.9 kg/m²) and obese (30+ kg/m²). Simple descriptive statistics were employed to describe the characteristics of the sample population. Pearson's chi-squares and Fishers exact test were used to conduct cross tabulations to determine the accuracy of self-perception of body weight. All analyses were conducted using SPSS 11.5 (Chicago, IL).

RESULTS

Table 1 describes the sample demographics. Although a convenience sample of shoppers, both genders and all age groups were well represented and the sample included people from different ethnic and education backgrounds. However, older adults and those with tertiary qualifications were over represented in the sample compared with the 2001 Census data for the area.¹² The mean BMI was 26.9 kg/m², and overall 61% were overweight or obese. There was an even distribution of participants within each age category and the group aged 55+ years had the greatest percentage (74%) of overweight or obese subjects. The majority of subjects identified themselves as Australian/British (66%), 49% had completed a university/tertiary qualification and a further 15% had completed some form of technical/trade school.

The relationship between the subjects perception of body weight and BMI was significant (Pearson χ^2 (6,209) = 100.59 $p < 0.001$) with 76% correctly valuating their

weight status ($p < 0.05$), (Table 2). However 24% of the study population misclassified their weight with 21% under assessing and 4% over assessing. Forty percent of the overweight participants under assessed their weight (considered themselves to be 'just about right') and a further 7% of the obese participants perceived their weight to be 'just about right'. Over half (54%) of men with a BMI 25-30 kg/m² perceived themselves as 'just about right' or 'underweight' compared with 39% of overweight women. Thirteen percent of obese men perceived their weight as 'just about right' while all obese women correctly classified their weight status. A greater percentage of men aged 35-54 years under assessed their weight compared with men aged 55+ years (73% and 60% respectively).

People who perceived themselves as 'overweight' were more likely to think their health would improve if they lost weight (92%), 44% of the subjects who perceived their weight as 'just about right' thought their health would improve if they lost weight and 43% thought it would stay the same (Figure 1). Of those who were considered normal weight according to BMI, 39% thought their health would improve, 42% thought it would stay the same and 19% thought it would decline with weight loss. When the overweight and obese categories were combined, 20% did not think their health would improve if they lost weight. Of these individuals, only just over half (55%) considered themselves overweight.

This sample accurately identified overweight as a risk factor for chronic diseases with 95% of the sample identifying overweight as a 'likely' or 'very likely' risk factor for heart disease, stroke (81%), hypertension (83%) and type II diabetes (88%). However only 37% believed overweight to be a risk factor for cancer with 43% reporting 'don't know' to this question.

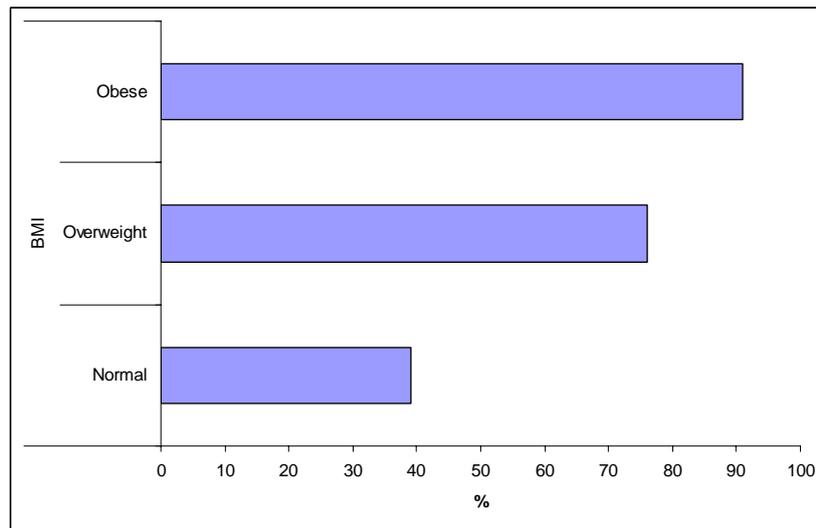


Figure 1

DISCUSSION

The findings from this study are consistent with Australian data from the previous decade^{6, 7, 15} indicating that many overweight and obese men and women still do not consider themselves to be overweight. The strength of this study is that it did not rely on self-reported weight and height information but measured these parameters thus allowing an accurate calculation of BMI. While these data indicate little shift in understanding of BMI in the general population over the previous decade they do provide an indication that the large majority of people recognize the health risks associated with excess body weight. Considerably less degree of certainty was evident regarding the role of body weight and cancer risk. Although small the current sample is broadly comparable with the wider Melbourne population¹² and provides some assurance that overweight is recognised as a health risk for major diseases.

Previous publications have suggested that a large proportion (~90%) of the population consider that the health of overweight people would improve with weight loss.^{16, 17} To our knowledge this is the first study which specifically asked if overweight and obese individuals thought 'their' health would change with weight loss. While it is encouraging that 80% of overweight and obese individuals thought their health would improve with weight loss, 20% still did not consider weight loss to be advantageous to their health despite recognising excess body weight as a health risk. Given that most people entering weight loss programs have unrealistic expectations of the amount of weight loss they would like to achieve,^{18, 19} people may consider the amount of weight loss required for health benefits to be much larger than the recognized 5-10% body weight.^{20, 21} The perception that weight loss efforts are 'expensive', 'boring hard work', 'take pleasure out of meals', requires 'intensive exercise' and that modest activities such as walking were considered 'ineffective'¹⁶ may provide a further disincentive to engage in healthy weight control behaviours. Despite the knowledge that significant health advantages result from modest weight losses resulting from modest lifestyle changes,^{22, 23} it appears that an important proportion of at risk individuals

not fully aware of these benefits and may be unnecessarily confused as to the lifestyle changes required to see these benefits. Further information is required about overweight and obese individuals' perception of the amount of weight they would need to lose to observe health benefits. By placing increased emphasis on modest weight loss goals within the general population it may be possible to engage more of the community in weight loss lifestyle activities. Furthermore, the continued lack of awareness of personal BMI would suggest that greater routine monitoring and interpretation of body weight by qualified personnel is required and could present an important step in managing the obesity epidemic.²⁴

Combining routine monitoring of body weight with enhanced emphasis on the benefits of modest weight loss and continued emphasis on healthy lifestyle choices to encourage weight control may be a useful under utilized strategy for engaging the wider population in weight control.

ACKNOWLEDGEMENTS

Financial support for this research was provided by the School of Exercise and Nutrition Sciences, Deakin University. We would like to thank all of the participants for their contribution.

AUTHOR DISCLOSURES

The authors do not have any industrial affiliations or conflict of interest.

REFERENCES

1. Paeratakul S, White MA, Williamson DA, Ryan DH, Bray GA. Sex, Race/Ethnicity, Socioeconomic Status, and BMI in Relation to Self-Perception of Overweight. *Obes Res.* 2002;10:345-350.
2. Chang V, Christakis N. Self-perception of weight appropriateness in the United States. *Am J Prev Med.* 2003;24:332-339.
3. Kuchler F, Variyam J. Mistakes were made: misperception as a barrier to reducing overweight. *Int J Obes.* 2003;27:856-861.
4. Crawford D, Campbell K. Lay definitions of ideal weight and overweight. *Int J Obes Relat Metab Disord.* 1999;23:738-745.

5. Chang V, Christakis N. Extent and determinants of discrepancy between self-evaluations of weight status and clinical standards. *J Gen Intern Med.* 2001;16:538-543.
6. Donath S. Who's overweight? Comparison of the medical definition and community views. *Med J Aust.* 2000;172:375-377.
7. Paxton S, Sculthorpe A, Gibbons K. Weight loss strategies and beliefs in high and low socioeconomic areas of Melbourne. *Aust J Public Health.* 1994;18:412-417.
8. Yancey AK, Simon PA, McCarthy WJ, Lightstone AS, Fielding JE. Ethnic and sex variations in overweight self-perception: relationship to sedentariness. *Obesity.* (Silver Spring) 2006;14:980-8.
9. Truesdale KP, Stevens J. Do the obese know they are obese? *FASEB.* 2006;20:A1313.
10. NHMRC. Acting on Australia's Weight: a strategic plan for the prevention of overweight and obesity. Canberra, 1997
11. NHMRC. Dietary Guidelines for Australian Adults: A guide to healthy eating. Canberra, 2003
12. Australian Bureau of Statistics. 2001 Census of population and housing. Commonwealth of Australia, Canberra, 2002
13. Heidrich J, Liese A, Lowel H, Keil U. Self-rated health and its relation to all-cause and cardiovascular mortality in Southern Germany. Results from the MONICA Augsburg cohort study 1984-1995. *Ann Epidemiol.* 2002;12:338-345.
14. Consedine NS, Magai C, Conway F, Neugut AI. Obesity and Awareness of Obesity as Risk Factors for Breast Cancer in Six Ethnic Groups. *Obes Res.* 2004;12:1680-1689.
15. Crawford D, Worsley A. Present and desirable body weights of Australians: a cause for concern? *Community Health Stud.* 1987;11:62-67.
16. Timperio A, Cameron-Smith D, Burns C, Crawford D. The public's response to the obesity epidemic in Australia: weight concerns and weight control practices of men and women. *Pub Health Nutr.* 2000;3:417-424.
17. Hankey C, Leslie W, Lean M. Why loose weight? Reasons for seeking weight loss by overweight but otherwise healthy men. *Int J Obes.* 2002;26:880-882.
18. Foster G, Wadden T, Phelan S, Sarwer D, Sanderson R. Obese patients' perceptions of treatment outcomes and the factors that influence them. *Arch Intern Med.* 2001;161:2133-2139.
19. Foster G, Wadden T, Vogt R, Brewer G. What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *J Consult Clin Psychol.* 1997;65:79-85.
20. National Heart Lung and Blood Institute. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report. *Obes Res.* 1998;6:51-210S.
21. Tuomilehto J, Lindström J, Eriksson JG, Valle TT, Hämäläinen H, Ilanne-Parikka P, Keinänen-Kiukaanniemi S, Laakso M, Louheranta A, Rastas M, Salminen V, Uusitupa M. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med.* 2001;344:1343-50.
22. Lindstrom J, Louheranta A, Mannelin M, Rastas M, Salminen V, Eriksson J, Uusitupa M, Tuomilehto J. The Finnish Diabetes Prevention Study (DPS): Lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care.* 2003;26:3230-6.
23. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, Nathan DM. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med.* 2002;346:393-403.
24. Linde JA, Jeffery RW, French SA, Pronk NP, Boyle RG. Self-weighing in weight gain prevention and weight loss trials. *Ann Behav Med.* 2005;30:210-6.

Original Article

Body weight and weight loss: are health messages reaching their target?

Lynnette J Riddell PhD and Victoria Inman BAppSci (Hons)

School of Exercise and Nutrition Sciences, Deakin University, Victoria, Australia

體重與減重：健康訊號是否傳達到標的？

目的：研究一般大眾對過重的健康風險知識、自我認知體重的準確性，以及減重益處的認知。**方法：**在都會區的購物中心對成年人所進行的橫斷性調查，問卷包含九個項目，並測量身高及體重。**結果：**209 名成年人(57%女性)完成此調查。38%有健康的 BMI (18.5-24.9)、38%過重(BMI25-29.9)以及 22%肥胖 (BMI>30)。然而只有 46%自認為「過重」、50%認為自己「剛剛好」，4%認為他們自己「過輕」。BMI 大於等於 25 者，有 28%認為他們的體重「剛剛好」。超過 80%認為「過重」「可能是」或「很有可能」是心血管疾病、高血壓、糖尿病以及中風的危險因子；然而，20%過重或肥胖的人並不認為減重會改善他們的健康。**結論：**有極大一部份的過重或肥胖的人無法精準的知道他們自己的體重，並且不認為減重對健康的益處，儘管他們知道體重過重是慢性疾病的危險因子。**意涵：**增加個人對 BMI 的知覺以及宣傳適度減重的益處，或許是兩個在族群層次控制體重尚未被充分利用的政策。

關鍵字：BMI、體重過重、肥胖、減重、慢性疾病、公共衛生。