



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

University of Wollongong
Research Online

Faculty of Science, Medicine and Health - Papers

Faculty of Science, Medicine and Health

2017

A mixed-methods feasibility study of routinely weighing patients in general practice to aid weight management

Andrew D. Bonney

University of Wollongong, abonney@uow.edu.au

Duncan MacKinnon

Bega Valley Medical Practice, University of Wollongong

Stephen Barnett

University of Wollongong, Illawarra and Southern Practice Research Network,, sbarnett@uow.edu.au

Darren J. Mayne

University of Wollongong, University of Sydney, dmayne@uow.edu.au

Bridget R. Dijkmans-Hadley

University of Wollongong, bdh@uow.edu.au

See next page for additional authors

Publication Details

Bonney, A., MacKinnon, D., Barnett, S., Mayne, D. J., Dijkmans-Hadley, B. & Charlton, K. (2017). A mixed-methods feasibility study of routinely weighing patients in general practice to aid weight management. *Australian Family Physician*, 46 (12), 928-933.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

A mixed-methods feasibility study of routinely weighing patients in general practice to aid weight management

Abstract

Background and objectives The optimal role of general practice in population weight management remains unclear. The aim of this mixed-methods study was to test the feasibility of routinely weighing all adult patients attending their general practice as an intervention to aid weight management in clinical practice. **Methods** Consenting patients in six general practices were weighed at each presentation over a 12-month period. Data were analysed using linear mixed growth models. Participants' interviews at the completion of the study were thematically analysed. **Results** The overall weight loss in patients who completed the study ($n = 217$) was 0.51 kg ($P = 0.26$; not significant); in patients who were obese ($n = 106$) there was a greater weight loss of 1.79 kg ($P = 0.04$). Patients were receptive to the intervention; however, there was disruption to clinical workflow. **Discussion** Routinely weighing adult patients in general practice is feasible, requires resources and may be associated with weight loss in patients who are obese. Further research is required to inform support for implementation within practices.

Disciplines

Medicine and Health Sciences | Social and Behavioral Sciences

Publication Details

Bonney, A., MacKinnon, D., Barnett, S., Mayne, D. J., Dijkmans-Hadley, B. & Charlton, K. (2017). A mixed-methods feasibility study of routinely weighing patients in general practice to aid weight management. *Australian Family Physician*, 46 (12), 928-933.

Authors

Andrew D. Bonney, Duncan MacKinnon, Stephen Barnett, Darren J. Mayne, Bridget R. Dijkmans-Hadley, and Karen E. Charlton

A mixed-methods feasibility study of routinely weighing patients in general practice to aid weight management

Andrew Bonney, Duncan MacKinnon, Stephen Barnett, Darren J Mayne, Bridget Dijkmans-Hadley, Karen Charlton

Background and objectives

The optimal role of general practice in population weight management remains unclear. The aim of this mixed-methods study was to test the feasibility of routinely weighing all adult patients attending their general practice as an intervention to aid weight management in clinical practice.

Methods

Consenting patients in six general practices were weighed at each presentation over a 12-month period. Data were analysed using linear mixed growth models. Participants' interviews at the completion of the study were thematically analysed.

Results

The overall weight loss in patients who completed the study ($n = 217$) was 0.51 kg ($P = 0.26$; not significant); in patients who were obese ($n = 106$) there was a greater weight loss of 1.79 kg ($P = 0.04$). Patients were receptive to the intervention; however, there was disruption to clinical workflow.

Discussion

Routinely weighing adult patients in general practice is feasible, requires resources and may be associated with weight loss in patients who are obese. Further research is required to inform support for implementation within practices.

Overweight and obesity affect nearly two-thirds (63%) of Australian adults, contributing more to the national burden of disease than smoking.¹ The burden of overweight and obesity, along with associated chronic conditions, places significant demands on health system resources and the economy. It was estimated that the direct cost in Australia in 2005 due to overweight and obesity was \$18.8 billion.² Primary care is an important setting in which to address this epidemic health problem. In Australia, the National Health and Medical Research Council (NHMRC) recommends that all adult patients who attend general practice consultations should have their body mass index (BMI) routinely assessed and monitored. Discussions regarding weight management should be initiated by their health professional if the patient has a BMI in the overweight or obese range.³

Evidence suggests that the majority of Australian general practitioners (GPs) agree that patients who are overweight and obese should be offered treatment for weight loss.⁴ However, Australian and international research has found that documentation rates of overweight and obesity in primary care records are low.^{5,6} Despite survey results indicating theoretical assent to addressing overweight and obesity in primary care,⁴ qualitative research from the UK has found significant barriers to GPs bringing up the topic of weight loss, especially when weight is not directly related to the reason for the consultation.⁷ Key concerns raised by GPs and nurses include time pressures during the consultation and fear of disenfranchising the patient.⁷

At least from the patient's perspective, these fears may be partly misplaced. There is evidence from the US that patients are receptive to, and expect, weight loss assistance from their primary care physicians.⁸ While there is little research evidence to indicate that interventions undertaken solely in general practice achieve clinically significant weight loss,^{5,9} there is strong evidence that recognising obesity in primary care and supporting referral to weight management programs or services

can be effective.^{10,11} The reality is that such resources may not be available in all areas, such as rural Australia, or affordable for patients who are disadvantaged, who are more likely to need weight management support.¹² In this context, there are calls for further research to determine the optimal role of primary care in weight management.⁵

To date, there has been little research illuminating the guideline–practice gap in weight management in Australian general practice,⁶ or the outcomes of making weight measurement a routine component of adult attendances. As a step towards further elucidating the role of general practice in weight management, and to guide future research, this mixed-methods study aimed to establish the feasibility of weighing adult patients at every general practice attendance, followed by usual care regarding overweight and obesity.

Methods

Recruitment

Following approval from the Human Research Ethics Committee of the University of Wollongong (reference number: HE11/461), six practices were recruited by convenience sampling from the Illawarra and Southern Practice Research Network (ISPRN).¹³ Commencing from October 2012, each practice aimed to recruit 70 patients aged between 20 and 70 years over the course of the 12-month study period. GPs, practice nurses (PNs) and reception staff

in the participating practices promoted the project to a wide range of patients verbally and using study information leaflets. Patients were excluded if they were (or became) pregnant, had (or developed) a terminal illness, or were unable or unwilling to provide consent.

Intervention

Patients who consented were flagged in the practice software to have their weight measured at each regular consultation by the GP or PN during the study, followed by ‘normal care’. This meant that the GP might enquire, encourage or discuss the findings as they would normally. Specific training or advice for GPs regarding weight management for the study was avoided.

Data collection

A combined electronic scale and stadiometer was used in each practice for the measurements. The SECA 214 scales measured in 100 gram graduations and were independently calibrated at the commencement of the study. The participants’ height (without shoes) and weight (without shoes or excess clothing) were measured at the first intervention appointment. Thereafter, weight alone was measured. Height and weight data were entered into the practice software. At the conclusion of the study, these data were extracted, along with comorbid diagnoses. Participants who had not been weighed in the last month of the study were invited for follow-up weighing in October and November 2013.

At the conclusion of the study, consenting key informants and patients were invited to take part in a semi-structured telephone interview. The interview guide was developed by consensus in the research team, and aimed to evaluate the experiences and perceptions of key informants and patients to assess the feasibility of the intervention. Sample questions are listed in Table 1.

Analysis

On the basis of the reported annual weight gain in Australia,¹⁴ the study was powered to detect a change in weight of ± 0.42 kg, with a sample size of $n = 300$. Data were used for all patients who had two or more weight measurements. Weight change between the first and last measurements during the study period was analysed using linear mixed growth modelling, controlling for patient age, sex, number of visits and time in the study. Models were fitted for the cohort overall and then separate models for participants entering the study in the normal, underweight, overweight and obese World Health Organization (WHO) BMI categories.¹⁵ To account for the clustered study design, patient identification (ID) nested within practice ID was entered as a random effect. Data were analysed using R 3.1.2 (R Foundation for Statistical Computing, Vienna, Austria, 2017).

The interviews were recorded and transcribed verbatim. Initial codes for the transcripts were developed by BDH and DM, and discussed and revised by the research team. These codes were

Table 1. Sample interview questions

Sample interview questions	
Key informants – General practitioners, practice nurses, practice managers and receptionists	<p><i>Firstly, I am interested to know what your overall impression of the weight maintenance intervention has been?</i></p> <p><i>In your experience, what did you like about the study?</i></p> <p><i>What did you find difficult or might have worked better?</i></p>
Patient participants	<p><i>Can you talk about your experience in participating in the study?</i></p> <p><i>How did it affect your consultation?</i></p> <p><i>How did it affect your relationship with your GP?</i></p> <p><i>Was the approach in this study helpful?</i></p>

applied to several transcripts, followed by discussion and comparison. Any differences in coding were discussed until consensus was reached. The emerging coding frame was applied to the remaining transcripts by DM and BDH. Themes were compared across participants and within individual accounts.¹⁶

Results

Two hundred and forty-five patients were recruited into the study. Twenty-two participants (8.9%) had only one weight recorded during the study and were considered lost to follow-up. Fifteen (68%) of those lost to follow-up were female. In addition, three participants became pregnant and three died during the study. This left a final sample size of $n = 217$ for analysis. Fifty-nine per cent ($n = 145$) were female. Forty-two participants had a diagnosis of diabetes recorded in their medical file; one had cardiac failure; 13 had ischaemic heart disease; and seven had chronic kidney disease. At baseline, half of the participants were obese ($n = 106$; 49%); 34% ($n = 74$) were overweight; and 17% ($n = 37$) were normal or underweight according to WHO criteria.¹⁵ The number of participants per practice ranged from 13 to 63 (mean: 36; median: 31). Cohort characteristics are summarised in Table 2.

The mean overall weight change in the fully adjusted growth model was not significant (-0.51 kg). When analysed according to BMI categories, there was a significant weight change of -1.79 kg in participants who were in the obese BMI category on study entry. The bivariate and fully adjusted growth models are presented in Table 3, and analyses by BMI category in Table 4.

Between March 2014 and May 2014, 10 key informants (two practice managers, two reception staff, two PNs and four GPs) and nine patients were interviewed. The interviews lasted between 13 and 35 minutes. The key themes identified from the interviews were: 'Opportunities'; 'Disruption'; 'GPs' valid role in weight maintenance'; and 'Behaviour change is individual'.

Table 2. Cohort characteristics

	Range	Mean (SE)
Age (years)	22–82	56.6 (0.9)
Entry weight (kg)	39.0–159.0	88.9 (2.4)
Exit weight (kg)	48.4–159.9	88.4 (2.2)
Weight change (kg)	–44.4–23.1	–0.5 (0.4)
Number of visits	2–11	4.3 (0.5)
Time in study (days)	6–442	319.0 (17.7)

SE, standard error

Opportunities

Key informants perceived a particular strength of the intervention to be the opportunity to build patient awareness of their weight and to provide GPs opportunities for intervention with individual patients.

It made them think about their weight a bit more and, actually, just be aware that their weight was perhaps higher than they thought it was and it probably has flowed on post the study into me thinking about weight more often and just trying to encourage me to get people to stand on the scales rather than to self-report ... their weight.

– Key informant 5

Disruption

The intervention did cause disruption to workflow in some practices. The way a practice organised the implementation was important to the integration of the intervention into everyday practice.

Initially, the first part of it was time-consuming, but overall, I think it was a good result. – Key informant 2

The other issue is just, in a large practice, where the standardised scales are positioned. – Key informant 5

Patient willingness to participate may have been affected by the stigma associated with being overweight.

There was a feeling from the receptionist ... that people sometimes got upset when we asked them to be in a weight program because they thought

that the receptionist was deciding they had a weight problem and accusing them of being fat essentially. – Key informant 9

Not all patients had weight recorded at every consultation. In addition, GP consultation times were reported as being increased because some patients wished to discuss more about their weight, and this was perceived as detracting from the reason why the patient presented.

... specific patients that I had become quite emotional about the change in their weight or the perceived change in their weight even when it wasn't a major operation [sic]. Seeing a number there that was larger than what they'd hoped for ... so it was discussing their weight and what they can do about it was another consultation basically.

– Key informant 4

Valid GP role in weight maintenance

Patients reported a number of positive outcomes from the intervention, including that their GP monitoring their weight motivated them to watch their weight.

It's having someone checking on you I think that sort of motivates you ... you don't want to go up there and have him say you've gained weight. – Female patient 3

Patients perceived that it is often the GP's role to help them keep their health on track and to assist them to find support if they require it.

Table 3. Unadjusted bivariate and fully adjusted growth models

	Unadjusted bivariate regression models			Fully adjusted model		
	Regression coefficient	95% CI	P	Regression coefficient	95% CI	P
Weight change in study (kg)	-0.51	-1.40, 0.38	0.26	-0.51	-1.40, 0.38	0.26
Age (years)	-0.20	-0.43, 0.03	0.09	-0.21	-0.43, 0.01	0.06
Sex (male)	13.17	1.73, 11.58	<0.001	12.99	7.79, 18.18	<0.001
Time in study (days)	0.02	-0.02, 0.05	0.31	0.00	-0.03, 0.04	0.77
Number of visits in study	1.44	0.0, 2.88	0.05	1.24	-0.23, 2.71	0.10

Table 4. Fully adjusted growth models by the World Health Organization's body mass index category

	Underweight and normal weight (BMI <25 kg/m ²)			Overweight (BMI 25–29.99 kg/m ²)			Obese (BMI ≥30 kg/m ²)		
	Regression coefficient	95% CI	P	Regression coefficient	95% CI	P	Regression coefficient	95% CI	P
Weight change in study (kg)	0.67	-0.36, 1.70	0.19	0.73	-0.16, 1.61	0.11	-1.79	-3.46, -0.12	0.04
Age (years)	-0.28	-0.43, -0.13	<0.001	-0.28	-0.43, -0.14	<0.001	-0.19	-0.47, 0.09	0.19
Sex (male)	14.52	10.75, 18.30	<0.001	12.54	8.84, 16.24	<0.001	11.96	5.65, 18.27	<0.001
Time in study (days)	-0.01	-0.03, 0.02	0.56	0.01	-0.01, 0.03	0.24	0.02	-0.03, 0.06	0.46
Number of visits in study	0.06	-0.98, 1.11	0.90	-0.54	-1.51, 0.44	0.27	1.60	-0.25, 3.46	0.09

BMI, body mass index; CI, confidence interval

I think it helps if people are just really honest and say what they mean. They say look your weight's not healthy and you're going to get really sick from it if you don't do something about it now and it gets harder and harder to lose weight the older you get. – Male patient 6

Behaviour change is individual

The intervention had variable influence on patient behaviour. Some patients described changes in diet and exercise. In addition, some patients now monitored their own weight.

I changed my diet slightly ... if I can walk rather than take the car, I do things like that. Now my weight has gone down ... I've lost about 7–8 kgs just doing these small changes. – Male patient 5

Some patients reported that the intervention had not influenced them to change their lifestyle, even though their doctor was involved in their weight management.

I know I'm overweight but it's not making me think I'm going to go on a diet, I'm going to get more exercise unfortunately. – Female patient 1

Discussion

This study demonstrated that introducing routine weighing of adult patients attending their general practice is achievable. The intervention seemed to be largely acceptable to consenting patients. However, it was considered to be disruptive in some practices and perceived to add to overall consultation times. There was no significant weight change in our

cohort overall. However, this pragmatic, non-controlled, practice-wide intervention was associated with a modest weight reduction of 1.79 kg (1.8%) in patients who were obese at study entry. To the authors' knowledge, this is the first report of the feasibility of routine weighing as an aid to weight management in Australian general practice.

The study extends previous research by describing the application of routine weight measurement in contemporary clinical practice. The project reflected the reality of implementing change into practice, by permitting practices to implement the intervention in ways that worked best for them. Such implementation was not without cost, and required dedicated planning and resources. The benefits for individual participants and the potentially

sensitive nature of discussing weight were evident in the interviews. The findings were clinically plausible:

- The observed weight loss in patients who were obese was consistent with that found in the 'minimal intervention' control arms of randomised controlled trials of behavioural interventions for weight loss.^{10,17}
- Regular weight monitoring has been identified as one of the key characteristics of people who successfully maintain weight loss.¹⁸
- Health professional advice to lose weight has been shown to be associated with patients wanting to weigh less, and actual weight loss attempts, in patients who are overweight and obese.^{19,20}

The results of this study should be interpreted within the limitations of a feasibility study design. The practices involved were members of a research network and may not be representative of the overall general practice population.

The study did not achieve target recruitment and was underpowered to detect the weight change for which it was designed, raising the possibility of type II error. Recruitment bias was possible as patients who were more open to weight management may have been more likely to consent to participate in the study. The number of patients referred for weight-loss assistance was not recorded.

The absence of controls in this study means that the observations should be viewed as associations with, rather than effects of, the intervention. For example, weight loss may have been due to sarcopenia in older patients or comorbid medical conditions. It is also well recognised that weight and BMI may be inaccurate measures of adiposity. Power calculations based on the overall weight change indicated a fully powered cluster-randomised control of the intervention would not be feasible because of the required sample size, and future studies should consider focusing on persons who are obese at baseline.

Given its population reach, primary care provides a critical setting for obesity intervention and prevention activities. While potentially beneficial at a population level, the magnitude of weight change we observed in patients who were obese in this study falls below the 2–3 kg loss required for a clinically meaningful reduction in systolic blood pressure, and well below that required for improving glycaemic control in those with type 2 diabetes.³

Research demonstrates that structured and scalable weight loss interventions are needed to support primary care within the larger healthcare system.¹⁰ Neither environmental changes, nor restructured primary care services offered in isolation of each other, are likely to successfully address the obesity epidemic. For maximum success, public health and clinical strategies need to become mutually reinforcing.

This study points to the potential challenges and benefits in primary care of implementing the NHMRC's *Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia*.³ The findings in this study should encourage general practices to seek ways to routinely weigh their patients. Whether this means at every consultation, or less frequently (ie every two years as recommended by The Royal Australian College of General Practitioners)²¹ remains to be elucidated. Implementation research is required to inform support for incorporation of routine weighing and to identify the optimal frequency for cost–benefit in terms of magnitude of weight loss. Follow-on clinical pathways that include assessment of health risk associated with overweight and obesity, provision of advice on weight loss within primary care⁵ and efficient coordination of care with existing and accessible weight management services need to be developed.

Authors

Andrew Bonney MBBS, MFM (Clin), PhD, DRANZCOG, FRACGP Roberta Williams Chair of General Practice, Director Illawarra and Southern

Practice Research Network, University of Wollongong, NSW. abonney@uow.edu.au

Duncan MacKinnon MBBS, MRCGP, FRACGP General Practitioner, Bega Valley Medical Practice, Illawarra and Southern Practice Research Network, University of Wollongong, NSW

Stephen Barnett BMed, PhD, DCH, MRCGP, FRACGP General Practitioner, Bowral Street Medical Practice, Illawarra and Southern Practice Research Network, University of Wollongong, NSW

Darren J Mayne BA (Hons), MPH (Hons), Epidemiologist, Public Health Unit, Illawarra Shoalhaven Local Health District, School of Medicine, University of Wollongong, NSW; School of Public Health, University of Sydney; Illawarra Health and Medical Research Institute, NSW

Bridget Dijkmans-Hadley BA(PopHlth), MMedSc(Res), Project Officer, Illawarra and Southern Practice Research Network, University of Wollongong, NSW

Karen Charlton PhD, AdvAPD, RPHNutr, Nutrition and Dietetics, School of Medicine, University of Wollongong, and Illawarra Health and Medical Research Institute, Wollongong, NSW

Competing interests: None.

Provenance and peer review: Not commissioned, externally peer reviewed.

Funding: This study was conducted by the Illawarra and Southern Practice Research Network (ISPRN), which is funded by the University of Wollongong's School of Medicine. This project was funded by the Department of Health and Ageing.

Acknowledgments

The authors would like to thank the participating practices and patients, and Ms Alyssa Horgan for program assistance.

References

1. Australian Institute of Health and Welfare. Overweight and obesity. Risk factors, diseases and death. Canberra: AIHW, 2017. Available at www.aihw.gov.au/overweight-and-obesity [Accessed 7 June 2017].
2. Colagiuri S, Lee CM, Colagiuri R, et al. The cost of overweight and obesity in Australia. *Med J Aust* 2010;192(5):260–64.
3. National Health and Medical Research Council. Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia. Canberra: NHMRC, 2013; p. 7–11. Available at www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n57_obesity_guidelines_140630.pdf [Accessed 7 June 2017].
4. Campbell K, Engel H, Timperio A, Cooper C, Crawford D. Obesity management: Australian general practitioners' attitudes and practices. *Obes Res* 2000;8(6):459–66.
5. Ossolinski G, Jiwa M, McManus A. Weight management practices and evidence for weight loss through primary care: A brief review. *Curr Med Res Opin* 2015;31(11):2011–20.
6. Turner LR, Harris MF, Mazza D. Obesity management in general practice: Does current practice match guideline recommendations? *Med J Aust* 2015;202(7):370–72.
7. Blackburn M, Stathi A, Keogh E, Eccleston C. Raising the topic of weight in general practice: Perspectives of GPs and primary care nurses. *BMJ Open* 2015;5(8):e008546.

8. Potter MB, Vu JD, Croughan-Minihane M. Weight management: What patients want from their primary care physicians. *J Fam Pract* 2001;50(6):513–18.
9. Carvajal R, Wadden TA, Tsai AG, Peck K, Moran CH. Managing obesity in primary care practice: A narrative review. *Ann NY Acad Sci* 2013;1281(1):191–206.
10. Aveyard P, Lewis A, Tearne S, et al. Screening and brief intervention for obesity in primary care: A parallel, two-arm, randomised trial. *Lancet* 2016;388(10059):2492–500.
11. Appel LJ, Clark JM, Yeh HC, et al. Comparative effectiveness of weight-loss interventions in clinical practice. *N Engl J Med* 2011;365(21):1959–68.
12. Bonney AD, Mayne DJ, Jones BD, et al. Area-level socioeconomic gradients in overweight and obesity in a community-derived cohort of health service users – A cross-sectional study. *PLoS One* 2015;10(8):e0137261.
13. Dijkmans-Hadley B, Bonney A, Barnett SR. Development of an Australian practice-based research network as a community of practice. *Aust J Prim Health* 2015;21(4):373–78.
14. Ball K, Crawford D, Ireland P, Hodge A. Patterns and demographic predictors of 5-year weight change in a multi-ethnic cohort of men and women in Australia. *Public Health Nutr* 2003;6(3):269–81.
15. World Health Organization. BMI classification – Global database on body mass index. Geneva: WHO, 2014. Available at http://apps.who.int/bmi/index.jsp?introPage=intro_3.html [Accessed 28 September 2017].
16. Boeije H. A purposeful approach to the constant comparative method in the analysis of qualitative interviews. *Qual Quant* 2002;36(4):391–409.
17. Johns DJ, Hartmann-Boyce J, Jebb SA, Aveyard P. Behavioural Weight Management Review Group. Weight change among people randomized to minimal intervention control groups in weight loss trials. *Obesity* (Silver Spring) 2016;24(4):772–80.
18. Wing RR, Phelan S. Long-term weight loss maintenance. *Am J Clin Nutr* 2005;82(1 Suppl):222S–25S.
19. Jackson SE, Wardle J, Johnson F, Finer N, Beeken RJ. The impact of a health professional recommendation on weight loss attempts in overweight and obese British adults: A cross-sectional analysis. *BMJ Open* 2013;3(11):e003693.
20. Rose SA, Poynter PS, Anderson JW, Noar SM, Conigliaro J. Physician weight loss advice and patient weight loss behavior change: A literature review and meta-analysis of survey data. *Int J Obes (Lond)* 2013;37(1):118–28.
21. The Royal Australian College of General Practitioners. Guidelines for preventive activities in general practice. 9th edn. East Melbourne, Vic: RACGP, 2016.