



Editorial

Appreciating the Importance of Unmet Needs Associated With Obesity in Cardiac Rehabilitation: A Call for Critical Improvement in Program Availability

Tavis Campbell, PhD,^a Joshua A. Rash, PhD,^b and Michael Vallis, PhD^c

^a Department of Psychology, University of Calgary, Calgary, Alberta, Canada

^b Department of Psychology, Memorial University of Newfoundland, St John's, Newfoundland and Labrador, Canada

^c Department of Family Medicine, Dalhousie University, Halifax, Nova Scotia, Canada

See article by Terada et al., pages 712–720 of this issue.

We're only as needy as our unmet needs.

—John Bowlby, *Attachment*

Complexities of Addressing Obesity in Cardiac Rehabilitation

Numerous countries recognize obesity as a chronic disease.¹ Although not officially recognized at the federal level, the American and Canadian medical associations voted to recognize obesity as a disease in 2013 and 2015, respectively. The disease process is initiated through excess adipose tissue that impairs health via metabolic and inflammatory consequences resulting from the oversecretion of peptides by enlarged fat cells, along with ectopic deposition of lipids (eg, in the liver).² Like many other chronic diseases, obesity has a multifactorial etiology including genetic, epigenetic, physiological, behavioural, sociocultural, and environmental factors that influence energy intake/expenditures.³

The article in this issue of the *Canadian Journal of Cardiology* by Terada et al.⁴ is a strong reminder that obese individuals who undergo cardiac rehabilitation are faced with the struggle of overcoming 2 comorbid chronic medical conditions and might require a greater level of individualized treatment to optimize recovery and longevity. Terada et al. evaluated whether engagement in cardiac rehabilitation provided comparable improvement in cardiometabolic risk factors, mood, and quality of life among patients with varying body mass index (BMI). Medical records of 582 patients (117

classified as normal weight, 264 as overweight, 126 as obese, and 75 as severely obese) who completed a 3-month outpatient program in cardiac rehabilitation were examined. Patients with severe obesity were characterized by lower physical health, higher cardiometabolic risk factor profile, and greater symptoms of depression and anxiety at baseline relative to their normal-weight counterparts. Greater weight loss, smaller improvements in physical function, and comparable change in cardiometabolic risk factors were observed among patients with obesity and severe obesity after cardiac rehabilitation relative to normal-weight counterparts.⁴ Achieving greater weight loss with smaller improvements in physical function might be the result of requiring greater energy expenditures to move the obese body combined with greater “wear and tear” in doing so. It should also be recognized that individuals with obesity and severe obesity reported higher rates of chronic pain at baseline.

Although the results are encouraging, patients reported poorer psychosocial and cardiometabolic health at baseline and presumably post cardiac rehabilitation. This is an important consideration because bidirectional associations likely exist between psychological distress (ie, depression and anxiety), obesity,⁵ and cardiovascular disease.^{6,7} Psychological distress among cardiac patients also contributes to poor adherence in rehabilitation⁸ and might represent an often overlooked target for therapeutic intervention during cardiac rehabilitation that is particularly relevant to patients who experience obesity.⁹

Limitations Associated With Assessment of Initial Weight Loss in Completers

The initial results reported by Terada et al.⁴ are encouraging and significant weight loss among individuals with obesity after cardiac rehabilitation aligns well with the observed 10.6-kg weight loss after diet and physical activity lifestyle interventions observed in a recent systematic review

Received for publication March 25, 2019. Accepted April 3, 2019.

Corresponding author: Dr Tavis Campbell, Department of Psychology, 2500 University Dr NW, Calgary, Alberta T2N 1N4, Canada. Tel.: +1-403-998-0706.

E-mail: t.s.campbell@ucalgary.ca

See page 686 for disclosure information.

and meta-analysis of 45 randomized controlled trials of nonsurgical weight loss interventions that reported on 7788 obese adults.¹⁰ Unfortunately, weight loss is usually transient after such interventions if further support is not offered.¹¹ All else being equal, long-term weight loss represents a greater challenge among individuals who experience obesity because of genetic and physiological dysregulation of weight. Although estimates vary, twin, family, and adoption studies indicate that BMI has a heritability ranging between 10% and 70%.¹² When it does occur, weight loss among individuals with obesity results in adaptations in their dysregulated homeostatic system that controls body weight, promoting overeating and return to obesity.¹³ Adipose tissue itself is obesogenic and weight loss results in changes that prime adipose tissue to store ingested energy,⁵ presenting significant challenges to weight maintenance. Moreover, mediators of appetite that encourage weight regain (eg, postprandial leptin, ghrelin, peptide YY, gastric inhibitory polypeptide, pancreatic polypeptide, amylin, and cholecystokinin) are elevated after weight loss and remain elevated after 12-month follow-up.¹⁴

It is important to realize that the results reported by Terada et al.⁴ likely represent a “best case scenario,” because the authors reported on a sample with the highest likelihood to achieve meaningful effects (ie, individuals who completed cardiac rehabilitation) at a follow-up time when effects are likely to be observed (ie, 3 months after initiation of treatment, likely before the first weight plateau). Data from more than 12,000 patients indicated that adults with obesity are 56% less likely to be optimally adherent to cardiac rehabilitation than their nonobese counterparts.¹⁵ Moreover, a systematic review of randomized controlled trials that evaluated multicomponent behavioural/lifestyle interventions among people with cardiovascular disease and/or type 2 diabetes indicate that weight regain between 3 and 12 months post-intervention is the rule rather than the exception.¹⁶ Because of such considerations, the Canadian Task force on Preventive Healthcare recommends that adults with obesity be offered structured behavioural interventions aimed at weight loss to manage obesity in primary care.¹⁷

Weight Loss Maintenance in Cardiac Rehabilitation: What Could Work?

The results observed by Terada et al.⁴ make it abundantly clear that a single approach to cardiac rehabilitation will not work similarly for every patient. Rather, efforts should be made to move toward the precision treatment of cardiac patients by providing interventions that are individually tailored to the patient’s unique risk factor profile and preferences. The focus might need to change from targeting weight loss to improvement in physical function and mental well-being, in a manner analogous to the focus on physical function when improving outcomes among adults who live with chronic pain. The selective focus on weight as the most important outcome is at odds with the evidence of the powerful metabolic counter-regulatory response to weight loss, and to the fact that weight is not a behaviour (although having strong behavioural determinants) and therefore not under behavioural control. This latter point is critical for clinical management. When the focus of obesity management is on weight loss and the individual hits the inevitable weight plateau this is

interpreted by the patient and provider as failure. Patients often respond to failure by abandoning their behavioural efforts and reverting to preintervention (weight-gaining) behaviours. Best weight is the weight achieved through sustained positive health behaviours and is defined as whatever weight a person can achieve while living the healthiest lifestyle they can truly enjoy.¹⁸

Behavioural weight loss therapy is a lifestyle intervention that involves the application of goal setting, self-monitoring, stimulus control, and often cognitive restructuring to improve eating behaviour and physical activity level. This is largely achieved by controlling cues and stimuli in the environment that trigger eating or sedentary behaviour. For example, the Diabetes Prevention Program (DPP¹⁹) is an intensive lifestyle-change behavioural weight loss program that is feasible, safe, and effective in achieving a minimum of 7% weight loss and a minimum of 150 minutes of physical activity similar in intensity to brisk walking among participants.²⁰ The core components of the DPP are presented in [Table 1](#). Effects in the original DPP study persisted throughout the program, which was terminated because of significant benefit in the intervention group, and then began to attenuate until 10-year follow-up.²¹ The methods used to achieve these lifestyle goals include individual case managers or “lifestyle coaches,” frequent contact with participants, behavioural self-management strategies for weight loss and physical activity, supervised physical activity sessions, and a flexible maintenance intervention tailored to the needs of the individual. In addition, successful methods of improving weight loss maintenance include facilitating long-term patient-provider contact in person or via the Internet or telephone; promoting higher levels of physical activity; and combining behavioural interventions with medication. Finally, bariatric surgery is widely considered the most effective way to achieve and sustain effective weight loss, resulting in a mean 28.9% weight loss at 1-year postsurgery with 66.1% of patients no longer requiring medication for type 2 diabetes.²² Preliminary evidence suggests that bariatric surgery is effective in elderly individuals²³ and among individuals with cardiomyopathy.²⁴

The Need for Dissemination of Treatment

Unfortunately, intensive, multicomponent weight loss interventions are unavailable to most overweight or obese individuals. A nationally representative survey conducted in 2011 indicated that there are approximately 9 weight management programs per 1 million overweight or obese Canadians, and many programs do not meet standards for best practice in the prevention and treatment of obesity.²⁵ Obesity Canada published a report card on access to obesity treatment for adults in Canada in 2017 which showed that of 80,544 MDs in Canada only 40 had obtained certification through the American Board of Obesity Medicine, that no province covered antiobesity medication, all provinces except Quebec were given an “F” in access to bariatric surgery, and that individuals have to pay out of pocket for programs such as supervised meal replacement programs.²⁶ Traditionally successful, rigorous lifestyle interventions use dietitians, psychologists, physicians, and other professionals who have specific expertise in the behavioural, pharmacological, and

Table 1. Primary components of the Diabetes Prevention Program's Intensive Lifestyle Intervention

Component	Description
Goal-setting: weight loss	A weight loss target of 7% of initial body weight within the first 6 months of the trial was set with the goal to maintain this weight loss throughout the trial
Goal-setting: exercise	A goal of achieving ≥ 150 minutes of moderate physical activities similar in intensity to brisk walking per week was set. Brisk walking was stressed as the means of achieving this physical activity goal. Encouragement was provided to distribute activities throughout the week with a minimum exercise frequency of 3 times per week, with at least 10 minutes per session. A maximum of 75 minutes of strength training could be applied to the 150-minute weekly physical activity goal
Individual case managers or "coaches"	An individual lifestyle coach was assigned to each person who would be responsible for delivering the core curriculum, conducting maintenance sessions, and eliciting motivation from patients
Intensive ongoing intervention	Sixteen-session core curriculum to be completed within 24 weeks. The first 8 sessions focused on nutrition, physical activity, self-monitoring, and behavioural weight management. The second 8 sessions focused on psychological, social, and motivational challenges involved in maintaining healthy lifestyle behaviours in the long term
Adherence/maintenance	In-person sessions once every 2 months to engage in problem-solving with issues surrounding adherence. Given option to attend group sessions during maintenance phase that spanned 4-8 weeks and focused on physical activity, healthy eating, or motivation
Supervised activity session	Provided option of attending supervised physical activity sessions that occurred twice per week during the intervention (eg, community walking group, enrollment in cardiac rehabilitation, personal training).
Individualization through toolbox	Up to \$100 was available per year to incorporate individualized programming to overcome barriers (eg, enrollment in community exercise class or cardiac rehabilitation).

surgical treatment of obesity; however, there are insufficient numbers of these health care providers to treat the growing need among individuals who would benefit from weight loss intervention. It seems imperative, therefore, that innovative ways to adapt these approaches to reach a larger proportion of the population be developed. The use of Internet technology²⁷ and building competency of health care providers in cardiac rehabilitation/secondary prevention settings represent 2 methods for achieving such goals. In particular, despite the clear benefits of weight loss among individuals with obesity for

numerous cardiovascular conditions, cardiac rehabilitation programs in Canada do not typically include a targeted weight loss component, and cardiac rehabilitation often has negligible effects on BMI.²⁴ Because clinically relevant improvements in prognosis might be achieved through moderate body weight loss among patients with obesity, the additional use of behavioural weight loss therapy with cardiac rehabilitation might be crucial for improving outcomes in this population. The results from Terada et al.⁴ highlight an urgent need for greater accessibility to guidelines-based weight loss programs for those who would benefit from such treatment.

Disclosures

The authors have no conflicts of interest to disclose.

References

1. The Lancet Diabetes Endocrinology. Should we officially recognise obesity as a disease? *Lancet Diabetes Endocrinol* 2017;5:483.
2. Bray GA, Kim KK, Wilding JPH. Obesity: a chronic relapsing progressive disease process. A position statement of the World Obesity Federation. *Obes Rev* 2017;18:715-23.
3. Bray GA, Fruhbeck G, Ryan DH, Wilding JP. Management of obesity. *Lancet* 2016;387:1947-56.
4. Terada T, Chirico D, Tulloch HE, et al. Psychosocial and cardiometabolic health of patients with differing body mass index completing cardiac rehabilitation. *Can J Cardiol* 2019;35:712-20.
5. Heymsfield SB, Wadden TA. Mechanisms, pathophysiology, and management of obesity. *N Engl J Med* 2017;376:254-66.
6. Correll CU, Solmi M, Veronese N, et al. Prevalence, incidence and mortality from cardiovascular disease in patients with pooled and specific severe mental illness: a large-scale meta-analysis of 3,211,768 patients and 113,383,368 controls. *World Psychiatry* 2017;16:163-80.
7. Perez-Pinar M, Mathur R, Foguet Q, et al. Cardiovascular risk factors among patients with schizophrenia, bipolar, depressive, anxiety, and personality disorders. *Eur Psychiatry* 2016;35:8-15.
8. Pogossova N, Saner H, Pedersen SS, et al. Psychosocial aspects in cardiac rehabilitation: from theory to practice. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation of the European Society of Cardiology. *Eur J Prev Cardiol* 2015;22:1290-306.
9. Flynn M, Moran C, Rash JA, Campbell TS. The contribution of psychosocial interventions to precision medicine for heart health. *Prog Cardiovasc Dis* 2019;62:21-8.
10. Dombrowski SU, Knittle K, Avenell A, Araujo-Soares V, Snihotta FF. Long term maintenance of weight loss with non-surgical interventions in obese adults: systematic review and meta-analyses of randomised controlled trials. *BMJ* 2014;348:g2646.
11. American College of Cardiology/American Heart Association Task Force on Practice Guidelines, Obesity Expert Panel, 2013. Expert Panel Report: Guidelines (2013) for the management of overweight and obesity in adults. *Obesity (Silver Spring)* 2014;22(suppl 2):S41-410.
12. Bray MS, Loos RJ, McCaffery JM, et al. NIH working group report—using genomic information to guide weight management: from universal to precision treatment. *Obesity (Silver Spring)* 2016;24:14-22.

13. MacLean PS, Higgins JA, Giles ED, Sherk VD, Jackman MR. The role for adipose tissue in weight regain after weight loss. *Obes Rev* 2015;16(suppl 1):45-54.
14. Sumithran P, Prendergast LA, Delbridge E, et al. Long-term persistence of hormonal adaptations to weight loss. *N Engl J Med* 2011;365:1597-604.
15. Forhan M, Zagorski BM, Marzonlini S, Oh P, Alter DA. Predicting exercise adherence for patients with obesity and diabetes referred to a cardiac rehabilitation and secondary prevention program. *Can J Diabetes* 2013;37:189-94.
16. Gallagher R, Armari E, White H, Hollams D. Multi-component weight-loss interventions for people with cardiovascular disease and/or type 2 diabetes mellitus: a systematic review. *Eur J Cardiovasc Nurs* 2013;12:320-9.
17. Brauer P, Connor Gorber S, Shaw E, et al. Recommendations for prevention of weight gain and use of behavioural and pharmacologic interventions to manage overweight and obesity in adults in primary care. *CMAJ* 2015;187:184-95.
18. Freedhoff Y, Sharma AM. *Best Weight: A Practical Guide to Office-Based Obesity Management*. Edmonton, Alberta: Canadian Obesity Network, 2010.
19. Diabetes Prevention Program Research Group. The Diabetes Prevention Program (DPP): description of lifestyle intervention. *Diabetes Care* 2002;25:2165-71.
20. Ratner RE; Diabetes Prevention Program Research. An update on the Diabetes Prevention Program. *Endocr Pract* 2006;12(suppl 1):20-4.
21. Knowler WC, Fowler SE, Hamman RF, et al. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *Lancet* 2009;374:1677-86.
22. Welbourn R, Hollyman M, Kinsman R, et al. Bariatric surgery worldwide: baseline demographic description and one-year outcomes from the Fourth IFSO Global Registry Report 2018. *Obes Surg* 2019;29:782-95.
23. Vinan-Vega M, Diaz Vico T, Elli EF. Bariatric surgery in the elderly patient: safety and short-time outcome. A case match analysis. *Obes Surg* 2019;29:1007-11.
24. McCloskey CA, Ramani GV, Mathier MA, et al. Bariatric surgery improves cardiac function in morbidly obese patients with severe cardiomyopathy. *Surg Obes Relat Dis* 2007;3:503-7.
25. Rosa Fortin MM, Brown C, Ball GD, Chanoine JP, Langlois MF. Weight management in Canada: an environmental scan of health services for adults with obesity. *BMC Health Serv Res* 2014;14:69.
26. Network CO. Report card on access to obesity treatment for adults in Canada 2017. Edmonton, Alberta: Canadian Obesity Network, 2017.
27. Sherrington A, Newham JJ, Bell R, et al. Systematic review and meta-analysis of internet-delivered interventions providing personalized feedback for weight loss in overweight and obese adults. *Obes Rev* 2016;17:541-51.