
**TITLE:** **BMI Reduction and Chronic Disease Management: Clinical Evidence**

**DATE:** 17 April 2014

## RESEARCH QUESTIONS

1. What is the clinical evidence for BMI reduction to improve chronic health issues in obese patients?

2. What is the clinical evidence for BMI reduction to prevent chronic health issues in obese patients?

## KEY MESSAGE

Six randomized controlled trials and six non-randomized studies regarding the clinical evidence for BMI reduction to improve or prevent chronic health issues in obese patients were identified.

## METHODS

A limited literature search was conducted on key resources including Medline, PubMed, The Cochrane Library (2014, Issue 4), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to systematic reviews, randomized controlled trials and non-randomized studies. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and April 10, 2014. Internet links were provided, where available.

## RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and non-randomized studies.

Six randomized controlled trials and six non-randomized studies regarding the clinical evidence for BMI reduction to improve or prevent chronic health issues in obese patients were identified.

Additional references of potential interest are provided in the appendix.

**Health Technology Assessments**
No literature identified.

**Systematic Reviews and Meta-analyses**
No literature identified.

**Randomized Controlled Trials**

1. Jensen ME, Gibson PG, Collins CE, Hilton JM, Wood LG. Diet-induced weight loss in obese children with asthma: a randomized controlled trial. Clin Exp Allergy. 2013 Jul;43(7):775-84.
PubMed: PM23786284

2. Bliddal H, Leeds AR, Stigsgaard L, Astrup A, Christensen R. Weight loss as treatment for knee osteoarthritis symptoms in obese patients: 1-year results from a randomised controlled trial. Ann Rheum Dis. 2011 Oct;70(10):1798-803.
PubMed: PM21821622

3. Luley C, Blaik A, Reschke K, Klose S, Westphal S. Weight loss in obese patients with type 2 diabetes: effects of telemonitoring plus a diet combination - the Active Body Control (ABC) Program. Diabetes Res Clin Pract. 2011 Mar;91(3):286-92.
PubMed: PM21168231

4. Magrans-Court T, Wilborn C, Rasmussen C, Ferreira M, Greenwood L, Campbell B, et al. Effects of diet type and supplementation of glucosamine, chondroitin, and MSM on body composition, functional status, and markers of health in women with knee osteoarthritis initiating a resistance-based exercise and weight loss program. J Int Soc Sports Nutr [Internet]. 2011 [cited 2014 Apr 16];8(1):8, 2011. Available from:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3141631
PubMed: PM21689421

5. Riecke BF, Christensen R, Christensen P, Leeds AR, Boesen M, Lohmander LS, et al. Comparing two low-energy diets for the treatment of knee osteoarthritis symptoms in obese patients: a pragmatic randomized clinical trial. Osteoarthr Cartil. 2010 Jun;18(6):746-54.
PubMed: PM20206314

6. Foster GD, Borradaile KE, Vander Veur SS, Leh SK, Dilks RJ, Goldbacher EM, et al. The effects of a commercially available weight loss program among obese patients with type 2 diabetes: a randomized study. Postgrad Med. 2009 Sep;121(5):113-8.
PubMed: PM19820280

**Non-Randomized Studies**

7. Holm JC, Gamborg M, Neland M, Ward L, Gammeltoft S, Heitmann BL, et al. Longitudinal changes in blood pressure during weight loss and regain of weight in obese boys and girls. J Hypertens. 2012 Feb;30(2):368-74.
PubMed: PM22157326

8. Leao da Silva P, de Mello MT, Cheik NC, Sanches PL, Munhoz da Silveira Campos R, Carnier J, et al. Reduction in the leptin concentration as a predictor of improvement in lung function in obese adolescents. Obes Facts. 2012;5(6):806-20.
PubMed: PM23207491

9. Masuo K, Rakugi H, Ogihara T, Lambert GW. Different mechanisms in weight loss-induced blood pressure reduction between a calorie-restricted diet and exercise. Hypertens Res. 2012 Jan;35(1):41-7.
PubMed: PM21814218

10. Hendricks EJ, Greenway FL, Westman EC, Gupta AK. Blood pressure and heart rate effects, weight loss and maintenance during long-term phentermine pharmacotherapy for obesity. Obesity (Silver Spring). 2011 Dec;19(12):2351-60.
PubMed: PM21527891

11. Ingram DD, Mussolino ME. Weight loss from maximum body weight and mortality: the Third National Health and Nutrition Examination Survey Linked Mortality File. Int J Obes (Lond). 2010 Jun;34(6):1044-50.
PubMed: PM20212495

12. Ueki K, Sakurai N, Tochikubo O. Weight loss and blood pressure reduction in obese subjects in response to nutritional guidance using information communication technology. Clin Exp Hypertens. 2009 May;31(3):231-40.
PubMed: PM19387899

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## APPENDIX – FURTHER INFORMATION:

### Systematic Reviews and Meta-analyses

*Study Population Not Restricted to Obese Patients*

13. Adeniyi FB, Young T. Weight loss interventions for chronic asthma. Cochrane Database Syst Rev. 2012;7:CD009339.
PubMed: PM22786526

14. Trunk-BlackJuel C, Ali Z, Nilas L, Suppli Ulrik C. Asthma and obesity: does weight loss improve asthma control? a systematic review. J Asthma Allergy [Internet]. 2012 [cited 2014 Apr 16];5:21-6. Available from:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3392696
PubMed: PM22791994

### Randomized Controlled Trials

*Fat Loss Without Significant BMI Reduction*

15. Lim JY, Tchai E, Jang SN. Effectiveness of aquatic exercise for obese patients with knee osteoarthritis: a randomized controlled trial. PM R. 2010 Aug;2(8):723-31.
PubMed: PM20709301

*Study Population with Unclear BMI or Not Restricted to Obese Patients*

16. Look AHEAD Research Group, Wing RR, Bolin P, Brancati FL, Bray GA, Clark JM, et al. Cardiovascular effects of intensive lifestyle intervention in type 2 diabetes. N Engl J Med. 2013 Jul 11;369(2):145-54.
PubMed: PM23796131

17. Messier SP, Mihalko SL, Legault C, Miller GD, Nicklas BJ, DeVita P, et al. Effects of intensive diet and exercise on knee joint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: the IDEA randomized clinical trial. JAMA. 2013 Sep 25;310(12):1263-73.
PubMed: PM24065013

18. Scott HA, Gibson PG, Garg ML, Pretto JJ, Morgan PJ, Callister R, et al. Dietary restriction and exercise improve airway inflammation and clinical outcomes in overweight and obese asthma: a randomized trial. Clin Exp Allergy. 2013 Jan;43(1):36-49.
PubMed: PM23278879

19. Caterson ID, Finer N, Coutinho W, Van Gaal LF, Maggioni AP, Torp-Pedersen C, et al. Maintained intentional weight loss reduces cardiovascular outcomes: results from the Sibutramine Cardiovascular OUTcomes (SCOUT) trial. Diabetes Obes Metab. 2012 Jun;14(6):523-30.
PubMed: PM22192338

20. Shea MK, Nicklas BJ, Houston DK, Miller ME, Davis CC, Kitzman DW, et al. The effect of intentional weight loss on all-cause mortality in older adults: results of a randomized

controlled weight-loss trial. Am J Clin Nutr [Internet]. 2011 Sep [cited 2014 Apr 16];94(3):839-46. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3155925 PubMed: PM21775558

21. Shea MK, Houston DK, Nicklas BJ, Messier SP, Davis CC, Miller ME, et al. The effect of randomization to weight loss on total mortality in older overweight and obese adults: the ADAPT Study. J Gerontol A Biol Sci Med Sci [Internet]. 2010 May [cited 2014 Apr 16];65(5):519-25. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3107029 PubMed: PM20080875

**Non-Randomized Studies**

*Implied BMI Reduction*

*22.* da Silva PL, de Mello MT, Cheik NC, Sanches PL, Correia FA, de Piano A, et al. Interdisciplinary therapy improves biomarkers profile and lung function in asthmatic obese adolescents. Pediatr Pulmonol. 2012 Jan;47(1):8-17. PubMed: PM22170805

*Study Population With Unclear BMI or Not Restricted to Obese Patients*

23. Kowall B, Rathmann W, Heier M, Holle R, Peters A, Thorand B, et al. Impact of weight and weight change on normalization of prediabetes and on persistence of normal glucose tolerance in an older population: the KORA S4/F4 study. Int J Obes (Lond). 2012 Jun;36(6):826-33. PubMed: PM21863002

24. Laiyemo AO, Doubeni C, Badurdeen DS, Murphy G, Marcus PM, Schoen RE, et al. Obesity, weight change, and risk of adenoma recurrence: a prospective trial. Endoscopy. 2012 Sep;44(9):813-8. PubMed: PM22926666

25. Michels KB, Terry KL, Eliassen AH, Hankinson SE, Willett WC. Adult weight change and incidence of premenopausal breast cancer. Int J Cancer [Internet]. 2012 Feb 15 [cited 2014 Apr 16];130(4):902-9. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3245343 PubMed: PM21413008

*26.* Shantha GP, Kumar AA, Kahan S, Cheskin LJ. Association between glycosylated hemoglobin and intentional weight loss in overweight and obese patients with type 2 diabetes mellitus: a retrospective cohort study. Diabetes Educ. 2012 May;38(3):417-26. PubMed: PM22508341

27. Teras LR, Goodman M, Patel AV, Diver WR, Flanders WD, Feigelson HS. Weight loss and postmenopausal breast cancer in a prospective cohort of overweight and obese US women. Cancer Causes Control. 2011 Apr;22(4):573-9. PubMed: PM21327461

*28.* Bafadhel M, Singapuri A, Terry S, Hargadon B, Monteiro W, Green RH, et al. Body mass and fat mass in refractory asthma: an observational 1 year follow-up study. J Allergy

(Cairo) [Internet]. 2010 [cited 2014 Apr 16];2010:251758. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2995902
PubMed: PM21151697

29. Lavie CJ, Milani RV, Artham SM, Patel DA, Ventura HO. The obesity paradox, weight loss, and coronary disease. Am J Med. 2009 Dec;122(12):1106-14.
PubMed: PM19682667

*Study Population With Unclear BMI or Not Restricted to Obese Patients – Negative Outcomes Associated with Weight Loss*

30. Bell CL, Rantanen T, Chen R, Davis J, Petrovitch H, Ross GW, et al. Prestroke weight loss is associated with poststroke mortality among men in the Honolulu-Asia Aging Study. Arch Phys Med Rehabil. 2014 Mar;95(3):472-9.
PubMed: PM24113337

31. Franco M, Bilal U, Ordunez P, Benet M, Morejon A, Caballero B, et al. Population-wide weight loss and regain in relation to diabetes burden and cardiovascular mortality in Cuba 1980-2010: repeated cross sectional surveys and ecological comparison of secular trends. BMJ. 2013;346:f1515.
PubMed: PM23571838

32. Stevens J, Erber E, Truesdale KP, Wang CH, Cai J. Long- and short-term weight change and incident coronary heart disease and ischemic stroke: the Atherosclerosis Risk in Communities Study. Am J Epidemiol. 2013 Jul 15;178(2):239-48.
PubMed: PM23645623

33. Doehner W, Erdmann E, Cairns R, Clark AL, Dormandy JA, Ferrannini E, et al. Inverse relation of body weight and weight change with mortality and morbidity in patients with type 2 diabetes and cardiovascular co-morbidity: an analysis of the PROactive study population. Int J Cardiol. 2012 Dec 15;162(1):20-6.
PubMed: PM22037349

34. Myers J, Lata K, Chowdhury S, McAuley P, Jain N, Froelicher V. The obesity paradox and weight loss. Am J Med. 2011 Oct;124(10):924-30.
PubMed: PM21798508

35. Østergaard JN, Grønbaek M, Schnohr P, Sørensen TI, Heitmann BL. Combined effects of weight loss and physical activity on all-cause mortality of overweight men and women. Int J Obes (Lond). 2010 Apr;34(4):760-9.
PubMed: PM20065967

**Review Articles**

36. Ades PA, Savage PD. Potential benefits of weight loss in coronary heart disease. Prog Cardiovasc Dis. 2014 Jan;56(4):448-56.
PubMed: PM24438737

37. McAlindon TE, Driban JB, Lo GH. Osteoarthritis year 2011 in review: clinical. Osteoarthritis Cartilage. 2012 Mar;20(3):197-200.

PubMed: PM22266264

38. Sridhar MS, Jarrett CD, Xerogeanes JW, Labib SA. Obesity and symptomatic osteoarthritis of the knee. J Bone Joint Surg Br. 2012 Apr;94(4):433-40. PubMed: PM22434455

39. Mazza AD, Pratley RE, Smith SR. Beta-cell preservation…Is weight loss the answer? Rev Diabet Stud [Internet]. 2011 [cited 2014 Apr 16];8(4):446-53. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3359689 PubMed: PM22580726

40. Fujioka K. Benefits of moderate weight loss in patients with type 2 diabetes. Diabetes Obes Metab. 2010 Mar;12(3):186-94. PubMed: PM20151995

41. Anderson AS, Caswell S. Obesity management--an opportunity for cancer prevention. Surgeon. 2009 Oct;7(5):282-5. PubMed: PM19848061

42. Bales CW, Buhr GT. Body mass trajectory, energy balance, and weight loss as determinants of health and mortality in older adults. Obes Facts. 2009;2(3):171-8. PubMed: PM20054222

43. Bliddal H, Christensen R. The treatment and prevention of knee osteoarthritis: a tool for clinical decision-making. Expert Opin Pharmacother. 2009 Aug;10(11):1793-804. PubMed: PM19537998

44. Messier SP. Obesity and osteoarthritis: disease genesis and nonpharmacologic weight management. Med Clin North Am. 2009 Jan;93(1):145-59. PubMed: PM19059026