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What We Know, Think We Know, or Are Starting to Know

Weight-neutral approaches to health, and as dietary interventions, have met with much cognitive dissonance from the nutrition and medical professions, and other healthcare disciplines. Indeed, "calorie deficit" appears to be the intellectual high watermark of the fitness industry's approach to improving cardio-metabolic health. However, the evidence in relation to causal risk factors like LDL-cholesterol has been underwhelming. Weight loss of 10kg, which would require substantial levels of said "calorie deficit", result in a mere 0.2mmol/L [8mg/dL] lower LDL-C levels, a minuscule return on investment ⁽¹⁾.

This is not to suggest that other causal risk factors, hypertension in particular, do not more consistently improve with weight loss: they do ⁽²⁾. But the framing of reduced cardio-metabolic risk as a zero-sum binary contingent on the net loss or gain of body weight is one of the most pervasive myths in the nutrition and health world. Thus, weight-neutral approaches are often considered to perhaps improve psychosocial health, but not clinical risk factors, assumptions which are grounded in bias^{* (3)}.

So, what is meant by the term 'weight-neutral'? In this paradigm, bodyweight is not viewed as a behaviour and does not prioritise weight loss as an outcome; conversely, weight-neutral interventions are *process-focused* and emphasise behaviours that are actionable for the individual; eating nutritious food, eating guided by internal cues, physical activity and exercise for enjoyment, and other behaviours including adequate sleep and rest ⁽⁴⁾.

The broad umbrella term of 'weight-neutral' or 'non-diet nutrition' includes a number of concepts, some of which overlap; Health at Every Size is a conceptual model for healthcare, while Intuitive Eating is model that may be deployed as a specific intervention, and also provides a validated scale for investigating eating behaviours. There are also other concepts, including Mindful Eating and the Eating Competence Model. Emerging prospective data indicates that the more intuitive eating scores correlate with earlier establishment of health-promoting behaviours, and less unhealthy weight control behaviours, in young adults ^(5,6) (see this recent Deepdive).

One way to further tease out zero-sum assumptions underpinning health improvements related to bodyweight is to compare two interventions head-to-head. The present study did exactly that.

*Geek Box: Weight Bias & Weight Stigma

Part of the impetus for the emergence of the 'non-diet' or 'weight-normative' paradigm was not simply the lack of robust evidence for long-term weight loss maintenance and long-term health outcomes related to weight loss, but particularly the negative consequences of weight bias experienced by persons with obesity in healthcare. We can distinguish weight bias as the negative behaviours, attitudes, and assumptions, toward individuals who have overweight or obesity. Weight stigma is the negative psychosocial and physiological effects of experiencing weight bias. Weight bias is pervasive in wider society and in healthcare, as body image ideals are propagated through the popular media and marketing, while in healthcare negative assumptions that an individual with obesity must not be personally responsible for, or care about, their health, must eat a poor diet, overeat, is lazy, etc. The presence of this bias among healthcare professionals represents a major barrier to accessing healthcare for persons with obesity. One reason for this, beyond wanting to avoid stigmatising treatment, is the problem of internalised weight bias and stigma, where an individual comes to believe they are deserving of stigmatising treatment due to their size. This correlates with high levels of disordered eating and eating disorders, binge eating in particular. It is important to note that the effects of weight stigma are not confined to adverse psychosocial effects, although stress, depression, anxiety, low self-esteem, and negative body image have all been identified as consequences of weight stigma. However, there are physiological responses to stress associated with weight stigma, in particular cortisol reactivity. These adverse consequences are crucial to understand as measurable and documented outcomes, given that "tough love" type thinking still abounds in the medical, nutritional, and fitness industries. For a thorough discussion of the evidence in relation to adverse consequences of weight bias and weight stigma, check out this episode of Sigma Nutrition Radio which Danny and myself recorded earlier in the year.

The Study

80 female participants were randomised in a 1:1 manner [40 in each intervention group]. The study was conducted as a parallel arm [both groups ran at the same time] trial comparing two 6-month interventions:

- Weight-Neutral [WN]: This intervention employed the *HUGS* [an acronym for *Health-focused, Understanding lifestyle, Group supported, and Self-esteem building*] *Program for Better Health.* The program emphasises principles of intuitive eating, body and size acceptance, and physical activity for enjoyment. In this group, food intake was based on internal cues for hunger and satiety, and body size acceptance was an explicit goal in lieu of weight loss.
- Weight-Loss [WL]: This intervention employed the *LEARN* [an acronym for *Lifestyle, Exercise, Attitudes, Relationships, and Nutrition*] *Program for Weight Management.* The program emphasises diet and lifestyle changes to facilitate and maintain weight loss and gain skills to overcome weight loss barriers. In this group, food intake was based on external prescriptions, i.e., energy reduction, and weight loss was an explicit goal.

After the intervention, participants were followed up again at 24-months for further assessments.

Both interventions were led by healthcare professionals, and participants in both interventions were divided into two focus groups of 20 participants, which met for weekly 90min sessions for the duration of the 6-month intervention. After the intervention, participants were encouraged to utilise the social support group developed during the intervention.

Outcome measures were body weight, blood cholesterol levels, blood pressure and blood glucose. Additional outcomes included measures of psychological well-being, physical activity, diet and intuitive eating behaviours.

Results: Of 80 female participants randomised, 72 completed the 6-month intervention and 40 were available at 24-months for follow-up. Average age of the participants was 39yrs, and BMI of 38kg/m2.

• **Body Weight:** In the WN group baseline bodyweight was 102.1kg, which did not change significantly at 6-months [101.6kg] or 24-months [101.3kg]. In the WL group baseline bodyweight was 105.3kg, which decreased to 100.7kg after the 6-month intervention and remained at 101.6kg at 24-months follow-up.

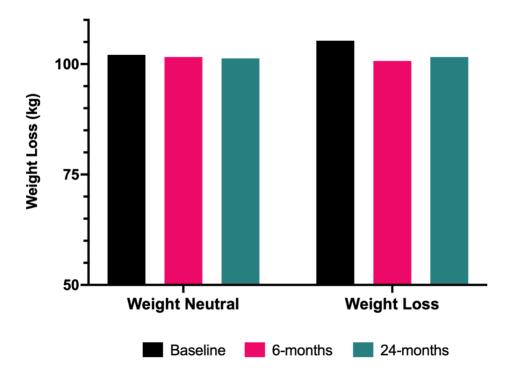
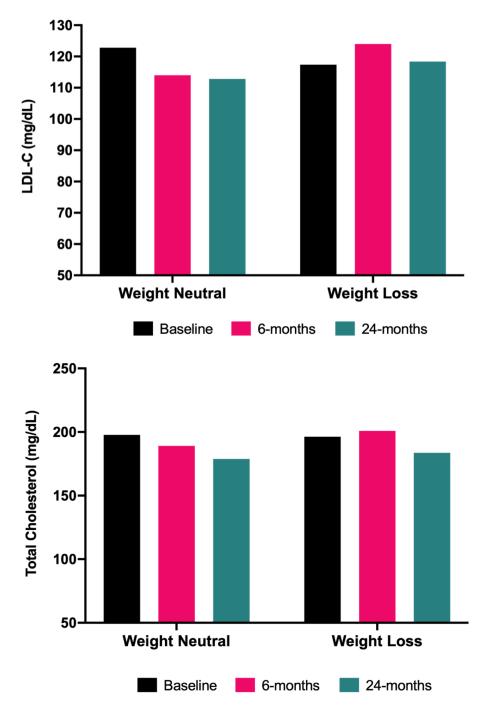
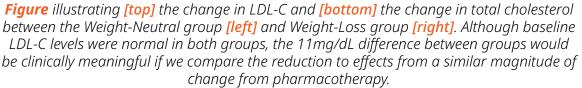


Figure created by yours truly using GraphPad Prism v9.0, illustrating the change in body weight [kg] from baseline in both the Weight-Neutral group **[left]** and Weight-Loss group **[right]**. Weight remained stable in the Weight-Neutral across the intervention and follow-up period, while the Weight-Loss group lost 4.6kg over the 6-month intervention period, and maintained a weight loss of 3.7kg at 24-months follow-up.

• **Blood Cholesterol:** In the WN group, LDL-C decreased from 122.8mg/dL to 114.0mg/dL after the 6-month intervention, and further to 112.8mg/dL at 24-months follow-up. In the WL group, however, LDL-C increased from 117.4mg/dL at baseline to 124.0mg/dL after the 6-month intervention, and remained at 118.4mg/dL at 24-months follow-up. Total cholesterol decreased from 197.7mg/dL to 1891mg/dL after 6-months in the WN group, and to 178.8mg/dL at 24-months. In the WL group, total cholesterol increased from 196.3mg/dL to 200.9mg/dL after 6-months, and declined to 183.6mg/dL at 24-months.





• **Psychological Well-being:** In the WN group, LDL-C decreased from 122.8mg/dL to 114.0mg/ dL after the 6-month intervention, and further to 112.8mg/dL at 24-months follow-up. In the WL group, however, LDL-C increased from 117.4mg/dL at baseline to 124.0mg/dL after the 6-month intervention, and remained at 118.4mg/dL at 24-months follow-up. Total cholesterol decreased from 197.7mg/dL to 1891mg/dL after 6-months in the WN group, and to 178.8mg/dL at 24-months. In the WL group, total cholesterol increased from 196.3mg/dL to 200.9mg/dL after 6-months, and declined to 183.6mg/dL at 24-months.

There were no significant differences in other markers of cardio-metabolic health, i.e., blood pressure or fasting glucose levels.

The Critical Breakdown

Pros: The randomisation process was fully described and was appropriate [computergenerated. Participants were not informed of the difference between the programs, an approach which may be useful to minimise the introduction of bias between groups. All analyses were conducted using the intention-to-treat principle, which is a form of analysis which includes all participants that were randomised in the study, irrespective of whether they dropped out or not. To do this, the investigators take the last value recorded for that participant forward into the analysis, as if that value represented the data point the participant finished the trial with. Intention-to-treat is recommended in any trials comparing the effects of a treatment, because if the intervention and control arm are not balanced, it may lead to bias in the results. The 2-year follow-up period is also a strength of the trial to provide insight into sustained effects of the intervention over time.

Cons: Although not necessarily 'a diet', given that weight-neutral approaches have been shown to correlated with better diet quality and food variety, a more comprehensive dietary assessment would have been more valuable to determine whether particular changes in diet correlated with lower blood lipid levels. While the follow-up period is a 'Pro', only half of the participants who completed the initial 6-month intervention were available at 2-years, which although intention-to-treat analysis was used still weakened the power to detect true differences between groups. Finally, and this is a criticism that applies to the entire literature on weight-neutral interventions, but the cohort was predominantly well-educated, well-off White females and there remain generalisability questions to be addressed with more inclusive further research.

Key Characteristic

The head-to-head comparison provided a more robust intervention than comparisons to a habitual control diet. Bear in mind that unlike many nutrition comparative trials with a 'usual care' type of control, which stack the cards in favour of a given intervention, the support for both groups in this study were remarkably similar. Both groups were given two sets of reading materials and accompanying cd's to understand their respective programs. Both groups had healthcare professional-led program implementation, and support groups of equal size with whom they were encouraged to engage for social support. This allowed for one fundamental distinction between interventions: the explicit energy reduction and outcome-orientated weight loss of the WL program vs. the internalised cue-focused eating behaviour and body size acceptance of the WN program. Thus, the findings cannot simply be explained as a comparison to a poor control arm, but come in the context of comparison to an active weight-loss focused intervention arm.

Interesting Finding

The effect on LDL-C and the magnitude of LDL-C lowering is certainly the standout finding of the study. And this is where it gets interesting, because in most domains - particularly the psychosocial and diet-related assessments - there was little difference of note between groups. That said, it is also not possible to rule out effects of dietary change, as the diet quality measure used in the present study is a basic and rather crude measure used for quick clinical assessments, rather than more thorough dietary analysis. Given the lack of meaningful difference in diet quality, however, the improvements in cardiovascular risk factors may have some relation to the differences between these two interventions on other physiological parameters.

What may these be? There is research that indicates the effects of the stress hormone cortisol on blood cholesterol levels ⁽⁷⁾. This has been proposed as a mechanism to explain the effects of psychosocial stress on blood cholesterol ⁽⁷⁾. It is also well-established that elevated cortisol levels are a consequence of internalised weight stigma ⁽⁸⁾. Catecholamines, i.e., adrenaline and noradrenaline [the 'flight or fight' responses] may also influence blood cholesterol levels. Thus, future research investigating the effects of weight-neutral interventions on cardiovascular risk factors should measure these potential mediating factors, to determine whether reductions in cortisol and/or modifications of catecholamines explain any effect on blood cholesterol levels.

Relevance

Both advocates of the weight-neutral paradigm and of the weight loss-centric paradigm are equally guilty of creating arbitrary dichotomies in this conversation: weight loss is/is not required for health; health can/cannot be improved without weight loss, etc. It is long past getting boring. The answer, as always for most exposures in nutrition, is that it depends.

For the population subgroup in the present study, it is important to stress this context; participants had total cholesterol, LDL-C, triglycerides, and blood pressure, all within normal ranges. Only fasting blood glucose levels were close to a threshold of impaired glucose tolerance. Thus, despite the BMI of 38kg/m2, the fact that this was an all-female group invites us to think of the sex differences in adipose tissue distribution that relate to cardio-metabolic risk factors in the pre-menopausal period ⁽⁹⁾. If you haven't <u>yet watched the Research Lecture on this topic</u>, then refer to that for further detail!

Nevertheless, the "lower is better" paradigm for treating LDL-C has gathered momentum from the linear reductions in risk associated with lower levels ⁽¹⁰⁻¹²⁾. Although slightly, the magnitude of LDL-C lowering in the WN group that occurred independent of weight loss is greater than the average LDL-C lowering of 8mg/dL which could be expected per 10kg of weight loss in individuals with obesity ⁽¹⁾. A previous intervention comparing a weight-neutral to traditional diet program found that LDL-C decreased from 116mg/dL to 93mg/dL over 24-weeks in the weight-neutral group, compared to no change in the traditional diet program ⁽¹³⁾.

Such magnitudes of LDL-C lowering could, if sustained over a period of up to 6-years, be expected to lower the relative risk for cardiovascular events by ~18-20% ^(11,14). Thus, the improvements in the study are not just a token change, and may have real clinical meaningfulness. The fact that the the WN group showed evidence not just of sustained LDL-C lowering, but a further reduction, may be evidence for greater sustainability of 'health gain' achieved within a weight-neutral approach.

Application to Practice

"But whatabout health tho" is about one of the most common statements made in criticism of non-diet approaches. Overall, the evidence for weight-neutral interventions shows a range of improvements in relevant cardio-metabolic risk factors that may be clinically meaningful ^(15,16). This fact appears to be conveniently glossed over by critics of the weight-neutral paradigm in favour of an unfounded assumption that the primary benefit relates to psychological wellbeing. This study must be considered in the context of the very narrow demographic in which it may apply. Nonetheless, it added to a wider body of evidence demonstrating in certain contexts, weight-neutral interventions are at least not worse, and in some cases superior to, explicitly weight loss-focused programs. Take that evidence for what it is, but try to avoid turning it into an arbitrary dichotomy of the effects of either weight-neutral or weight-loss interventions: context matters.

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