Health Education and Public Health
2024; 7(2): 566-570. doi: 10.31488/HEPH.188

Research article

Mental Health of Hospital Employees Over Time after the Covid-19 Pandemic

Daniel S WILLIAMS[1], Richard G KYLE[2], Stephen M JONES[3], Sandra ROYCROFT-DAVIS[4]

1. School of Health & Social Care, Edinburgh Napier University, UK
2. Independent Statistical Consultant, UK
3. Thinking Slimmer Ltd, UK

Corresponding author: Daniel Scott Williams, School of Health & Social Care, Edinburgh Napier University, UK.

Received: May 27, 2024; Accepted: June 19, 2024; Published: June 24, 2024

Abstract

Obesity is a global pandemic that threatens the health of the population and strains the ability of publicly funded healthcare. This RCT addresses the gap in the literature surrounding unconscious persuasion and its use in weight loss and weight management. Slimpod – a nine-minute audio recording listened to once a day for a minimum of 12weeks – is unlike anything else on the market. It is not a conscious diet and does not require willpower. Using breakthrough research in "nudge" thinking, Slimpod is designed to retrain an adult's habitual and emotional responses to foodstuffs. This therapeutic model allows unconscious thought to shape instinctive behaviour into a manner more consistent with a healthy lifestyle. Participants can then have control of their eating behaviours to induce an holistic state of wellbeing. Aims and Methods: To assess the effectiveness of an audio unconscious persuasion weight loss/weight management intervention (Slimpod) compared to an audio relaxation recording (control). 82 overweight adults were randomised to intervention (n=41) and control groups (n=41). Participants had their weight measured at the trial commencement, mid-trial (12 weeks) and trial end (24 weeks) periods. Secondary outcomes used the Eating Self-Efficacy Scale (ESES), Exercise Confidence Scale (ECS) and Quality of Life Index Generic Version III (QLI-G3) at the start and end of the trial.Results : A statistically significant difference in mean weight loss was found between the intervention group (1.7kg at 12 weeks and 4.3kg at 24 weeks) versus control (0.6kg and 1.2kg respectively) at $p<0.001$. ESES scores showed higher self-efficacy ($p=0.008$) in intervention at 24 weeks. No observed significant differences in ESES negative affect sub-scale score or ECS. Conclusion: Slimpod was effective at reducing weight and increasing eating self-efficacy in overweight adults.

Introduction

Obesity is a global pandemic that threatens the health of the population and strains many sectors of publicly funded healthcare systems. The United Kingdom (UK) incurs costs currently at £6 billion (Dobbs et al., 2014) and the World Health Organisation (WHO) has estimated that the directly attributable cost of obesity is between 2% and 7% of healthcare spending in developed economies (Wang et al., 2011). Obesity links to many life-limiting conditions that can lead to individuals requiring lifelong treatments. These conditions include COVID-19 (Caussy et al., 2020) as well as type 2 diabetes (Mokdad et al., 2003), Alzheimer's disease (Harvey, 2010; Kanoski and Davidson, 2011), cancer (Pan et al. 2004, Renehan et al., 2008) and heart disease (Lu et al., 2014).

Because of the excessive ease and availability of food and the constant evolution of the agricultural industry since the industrial revolution and the modernisation of agriculture in developed countries, food consumption and food surplus has reached excessive amounts (Yang and Zhu, 2013; Zayed, Bolton and Baker, 2016; Huang, Liu and Hsu, 2020). Our society now produces more food than is needed; to exacerbate that, one-third of produced food in our community is thrown away (Blakeney, 2019). The constant upscale of technology has allowed humans to surround themselves in a food-rich environment, where adapted traits from our ancestors presently reside in our genetics, becoming harmful. Technology is out-competing our evolution.

Humans' adaptive traits and ability to change their environment have given rise to a positive obesity environment, seeking psychological highs of eating akin to psycho-active drugs, creating a complex mixture of behavioural, genetic, environmental and psychological factors (Williams et al., 1996). The obesity epidemic requires multi-factor biopsychosocial interventions as evidenced by current responses centring around social impacts

(such as the UK sugar levy and drug interventions) proving inadequate. Unfortunately, these existing methods have not made the desired impact as obesity is predicted to be set to double by 2030 (Dobbs et al., 2014) with more recent predictions still showing an upwards trends across Europe (Pérez-ferrer et al., 2018). The intervention should promote behaviour change among individuals alongside policy changes directing to obesogenic environments.

Key psychological advancements will be integral in controlling the obesity epidemic, allowing our citizens access to the tools to create a sustainable equilibrium within their environment without surplus.

While humans like to think of themselves as logical creatures, emotion drives a significant portion of our unconscious behaviour (Briner and Totterdell, 2002; Fessler and Haley, 2003; Phelps and LeDoux, 2005; Watson and Spence, 2007; Teper, Zhong and Inzlicht, 2015) including eating (Altheimer and Urry, 2019). The brain creates "shortcuts" to reduce processing time within our environment (Medina-Pradas et al., 2011; Calvo and Beltrán, 2014; Pessoa and Adolphs, 2014; McFadyen, Dolan and Garrido, 2020) that lead us to buy and consume popular products. Within the food industry, these tend to be higher calorific items (Laran and Salerno, 2013; de Vries et al., 2020). The Slimpod tool – a nine-minute audio recording listened to once a day for a minimum of 12 weeks -– is unlike any current interventions available on the market. Using similar principles of reputable institutions such as the Cabinet Office Behavioural Insights Unit, the public is “nudged” towards more useful behaviours in several ways. Requiring no willpower, Slimpod is also free of other expenses associated with the pharmaceutical industry.

The Slimpod similarly influences the choices of a listener by nudging them towards a better relationship to food, based on the psychological principle of priming. Priming allows our mind to summon useful items to consciousness by triggers in our environment – which is useful and why branded foods are at eye level to attract buyers (Silvester, 2010). Slimpods use the principles of unconscious persuasion to prime the listener to notice the things that lead towards their goals, removing barriers that oppose the goals and persuading changes to happen. The listener is empowered subtly into becoming self-supporting, creating a food positive environment.

The Slimpodbrings together a host of clinically proven ideas. Stemming from research into the principle of Nudge, a participant's environment is shaped through "choice architecture" (Thaler and Sunstein, 2008); and Wordweaving (Silvester, 2003, 2006) which maps out vital environmental cues drawing attention to a specific process similar to treating OCD. Other research avenues (Tosey and Mathison, 2010; Sturt et al., 2012; Arno and Thomas, 2016) support Slimpod’s therapeutic model that will allow participants to take unconscious control of their eating behaviours; to induce a holistic state of wellbeing, and decrease susceptibility to COVID-19 and other life-limiting conditions.

Aim

To assess the effectiveness of an audio unconscious persuasion weight loss/weight management intervention (Slimpod) compared to an audio relaxation recording (control).

Methods

Trial design

The study design was an interventional two-arm pilot RCT—reported trial procedures and results per CONSORT guidelines (Schulz, Altman and Moher, 2010).

Participants

Participants were eligible for inclusion in the trial if they were over 18 years of age and had a self-reported BMI ≥ 25.0. BMI is an index defined as weight (in kilograms) divided by height (in meters, squared) (i.e., BMI = kg/m2) used to classify overweight and obesity. This cut-off was selected as it reflects the World Health Organisation (WHO) definition of overweight in adults.

Participants were excluded from the trial if they were pregnant (due to the known risks associated with weight loss in pregnancy) or diagnosed with a mental health condition. Prospective participants seeking medical advice for existing medical conditions were requested to obtain the agreement of their medical practitioner before participation in the trial to minimise potential harms or unintended consequences of trial participation. There was no restriction on geographic location placed on participants.

Study settings

Recruited participants came via a paid advert on the social media platform Facebook and were then directed to the study website (www.weightlosstrial.org.uk). The site provided further information about the study and included the participant information sheet and the consent form; alternatively, they were invited to contact the study researcher directly via email. Interested participants completed a contact form on the study website.

Intervention

The intervention was Slimpod®; a nine-minute digital audio recording focused on changing behaviours and attitudes related to diet and weight. The intervention group listened to Slimpod once a day for 24 weeks, choosing when to listen. Recordings were available in two formats: digital file (.MP3) and compact disc (CD); participants could select their preference. Slimpod aimed to guide listeners towards healthier eating behaviours that would lead to weight loss (primary outcome) by increasing self-efficacy (secondary outcome), thereby creating a self-supporting cycle that would interrupt addictive patterns of eating behaviour. Supplementary Table 1 describes the intervention using the Template for Intervention Description and Replication (TIDieR) checklist (Hoffmann et al., 2014).

The control group listened to a nine-minute long recording informed by the principles of relaxation therapy once a day for 24 weeks. The control recording did not include a focus on the change of dietary or other behaviours.

Outcomes

Primary outcome

The primary outcome was body weight in kilograms. Participant interviews occurred via Skype at three-time points: trial commencement (0 weeks), mid-trial (12 weeks), and end of the trial (24 weeks). During the Skype meeting participants stood on scales to ensure that the reading was visible on camera to enable the researcher to record participants' weight. The initial weight reading at trial commencement and participants’ self-reported

height measurement was used to calculate BMI and confirm trial eligibility.

Secondary outcomes

Three secondary outcomes were measured: (1) eating self-efficacy; (2) exercise confidence; (3) quality of life. Secondary outcome measures were transcribed at baseline and 24 weeks.

Eating self-efficacy

Eating self-efficacy was assessed using the Eating Self-Efficacy Scale (ESES) (Glynn & Ruderman, 1986). The ESES is a 25-item self-report questionnaire that comprises two subscales designed to assess self-efficacy to control overeating when experiencing negative affect, such as depression, stress or low mood, and in socially acceptable situations. ESES items accrued scoring on a 7-point Likert scale ranges from 1 (no difficulty controlling eating) to 7 (most difficulty controlling consumption). High overall ESES scores indicate greater reported difficulty controlling the consumption of food and lower self-efficacy.

Exercise confidence

Exercise confidence assessments used the Exercise Confidence Scale (ECS) (Sallis et al. 1988). The ECS is a 12-item self-report questionnaire divided into two subscales to assess self-efficacy for resting relapse (6 items) and making time (6 items). ECS scores arise from on a 5-point Likert scale that ranges from 0 (I know I cannot) to 5 (I know I can). Higher overall ECS scores indicate higher self-efficacy.

Quality of life

Quality of life assessments used the Quality of Life Index Generic Version III (QLI-G3) (Ferrans and Powers, 1985). The QLI-G3 is a 66-item self-report questionnaire divided into two subscales to assess satisfaction and importance of different aspects of an individual's life and scored through a 5-point Likert scale that ranges from 0 (very dissatisfied/very unimportant) to 5 (very satisfied/very important). Higher overall QLI-G3 score indicates a higher quality of life.

Sample size

Due to the absence of previous trial data to inform sample size calculations based on either outcome measures or accrual and attrition rates, a pragmatic approach was adopted, and trial recruitment was open for three months.

Randomisation

Simple randomisation occurred to allocate participants to the intervention or control groups using a 1:1 allocation ratio. A computer run programme generated a random number to assign each participant to a trial arm. The trial statistician was not involved in the process of recruitment, randomisation, or group assignment.

Blinding

It was not possible to blind participants to their group allocation. Participants became aware of their distribution on first listening to the audio recording they had received as the recording for those in the intervention group included weight loss messages, whereas the control group recording did not.

Statistical methods

R version 3.4.3 ensued, data analysis occurred. Baseline characteristics: mean and standard deviation (SD) for continuous data and n (%) for categorical data. Baselines were collected and defined as the values stated before the commencement of randomised therapy. Analysis of covariance (ANCOVA) ensued comparison of the control and intervention groups. The change from baseline at each post-baseline assessment was noted separately, with the baseline fitted as a covariate; the interaction between baseline and treatment was assessed but removed from the model as not statistically significant.

Ethics

The trial was reviewed and approved by the research ethics committee in the Department of Psychology at City University London (PSYETH (UPTD) 12/13 71). The study obtained informed written consent from participants, and each received a £25 high street voucher on completion of the trial.

Results

Participant flow

Supplementary Figure 1 shows the participant flow. Of the 249 individuals who responded to the study advert, 168 (67.5%) consented to participate in the study, and completed baseline assessments after which randomisation occurred. Data to assess differences between the intervention and control group were available at 12 weeks for 121 (72%) and 24 weeks for 82 (48.8%). Reasons for loss to follow-up are not known.

Recruitment

Recruitment lasted three months between October 2013 and January 2014. Baseline data collection occurred between October 2013 and January 2014, mid-intervention (12 weeks) outcome assessment happened between January and April 2014, and end of trial (24 weeks) outcome assessment finished between April 2014 and July 2014.

Supplementary Table 2 shows the baseline socio-demographic and clinical characteristics for participants in each group for which a full set of trial data are available for analysis. The age of trial participants was between 25 and 70, with a mean age of 42.7 years (SD=9.16). Most trial participants were women (91%) and of white ethnic origin (78%).

Outcomes

Supplementary Table 3 shows the change in outcomes from baseline to 12 and 24 weeks.

Primary outcome

Participants in the intervention group lost, on average, 1.7kg in weight between baseline and 12 weeks, and 4.3kg between baseline and 24 weeks; statistically significant vs control groups at 24 weeks ($p<0.001$) (Supplementary Table 3 and Figure 2). In the control group, smaller decreases of 0.6kg at 12 weeks and 1.2kg at 24 weeks.

Secondary outcomes

Eating self-efficacy

Eating self-efficacy scores in the intervention group decreased by, on average, 12.6 between baseline and 24 weeks compared to a decrease of 1.4 in the control group. Statistically significant differences in the intervention vs control groups at 24 weeks ($p=0.008$) (Supplementary Table 3).

Similar results were observed for each of the subscales of the ESES. Eating self-efficacy in negative affect situations decreased by, on average, 6.3 in the intervention group, compared to a decrease of 1.2 in the control group. There was no statistically significant difference between the intervention and control groups for negative effect situations at 24 weeks (p=0.083). Eating self-efficacy in socially acceptable conditions decreased by 3.7 in the intervention group, compared to an increase of 1.9 in the control group. Statistically significant differences were observed between the intervention and control groups for socially acceptable situations at 24 weeks (p=0.006) (Supplementary Table 3).

Exercise confidence

Exercise confidence scores increase by, on average, 1.2 in the intervention group between baseline and 24 weeks, compared to an increase of 2.6 in the control group. No statistically significant difference observed between the intervention and control group for exercise confidence at 24 weeks (p=0.130) (Supplementary Table 3).

Quality of life

Quality of life scores increased in the intervention group by 1.6, and by 2.7 in the control group between baseline and 24 weeks. Quality of life was statistically significantly higher in the control group at 24 weeks (p=0.017) (Supplementary Table 3).

Discussion

Slimpod® is a tool that significantly reduces weight and improves eating self-efficacy among overweight adults (BMI ≥ 25.0), losing on average 4.3kg in the 24 weeks. The underpinning of Wordweaving, Nudge and NLP in an unconscious audio recording is effective in reducing weight compared to a control group. Furthermore, the techniques have altered the clients' lifestyle bringing long-term changes to their eating behaviour shown in the self-efficacy reporting amongst social situations, with no harmful side-effects such as depression, stress or low moods. This suggests that Slimpod® can manage, modify and improve a person's state of holistic well-being, resulting in sustainable weight management and achievement of personal and global goals.

Though Slimpod® is a relatively-new weight management tactic that has proven significant, there are other weight loss alternatives. Though a systematic review would provide increased validity, there is not the data available for a fair comparison. However, upon a small literature search including systematic reviews and meta-analysis, mean weight loss after six months seems to favour Slimpod®. Interventions such as other web-based weight products, dieting alone, dieting plus exercise, motivational interviewing, family interventions, drug interventions such as Orlistat and counselling all reported lower mean weight losses than the present study (Dansinger et al., 2007; Wu et al., 2009; Arem and Irwin, 2011; Armstrong et al., 2011; Booth et al., 2014; Dombrowski et al., 2014; LeBlanc et al., 2018; Ogata et al., 2018; Madjd et al., 2020). However, further Slimpod® studies would allow greater accuracy of the assessment.

Narrowing in on a wide field of research, interventions considered closely associated to the programme, such as studies in Cognitive Behavioural Therapy (CBT), have been linked to helping obesity. CBT is currently a treatment approved and prescribed by the NHS (NHS, 2019). Most studies associated with using CBT as an intervention for weight loss focus on eating disorders and depression. CBT supports the client with their eating disorder leading to weight loss (Wade, 2007; Grilo et al., 2011; Castelnuovo et al., 2017). However, as the focus of these reviews is mental health reporting, mean weight loss data was not present. Reviews and case studies that have looked at the effectiveness of CBT at weight management report lower mean averages than Slimpod® (Arem and Irwin, 2011; Armstrong et al., 2011; Ogata et al., 2018; Madjd et al., 2020). This seems to show that the cue-based changes Slimpod® weaves into its programme are more effective than a CBT weight loss intervention, which currently is used to treat patients within the NHS.

Moreover, NLP interventions do have criticisms for being costly to the NHS without delivering results (Tosey and Mathison, 2010). A systematic review of NLP-based interventions (Sturt et al. 2012) assessed weight loss as an outcome (Sorensen et al. 2011). This Danish study involving 49 overweight or obese adults who lost at least 0.2kg of their body weight in 5 months following an initial gourmet cookery course or NLP therapy found that weight loss was maintained by the groups at two- and three-year follow-up (Sorensen 2011). In terms of Nudge research, the researcher could only find studies supporting the idea that Nudge helps the participant identify the healthier choices within the food, supporting secondary outcomes (Arno and Thomas, 2016; Bucher et al., 2016; Ledderer et al., 2020). Research into Nudge supports the current study with similar principles found within Slimpod®. In terms of data considering mean weight loss in Kg, the researcher could not find enough supporting information to have a plausible argument for Nudge.

Reviews cited within the paper are not an exhaustive list of systematic reviews and meta-analysis linked to weight loss; therefore, it is possible that reports stating the contrary may be found.

There are three main limitations of the study, which result from its recruitment strategy. First, Facebook advertising is debatably a limiting method of recruitment. Specific socio-demographic characteristics used by Facebook algorithms to target adverts are unknown to the trial researchers. Therefore, there could be potentially limiting generalisation and replication of findings. Second, due to the geographic distribution of study participants, the trial researcher could not visit each participant to take weight measurements using standardised processes and weighing equipment. Variation in equipment used by participants in their homes may, therefore, impact on the reliability of weight measurements. Future studies should work with geographically-bound groups of overweight adults to enable the use of standardised scales by a trained individual to reduce the variation introduced by reliance on self-report measures. Third, the overwhelming majority of the study sample was female. Future research should require that an equal or near equal number of male participants be recruited to determine whether the intervention is both acceptable and effective among men.

In terms of the primary outcome, Slimpod® has made aggressive and bold statements within the field of weight loss management. Future research will need to back up these claims set forth

within this initial study to further these claims; areas for future research should centre around longitudinal studies of at least a year to determine whether the product achieves sustainable weight-loss. Other areas that would continue to support Slimpod's claims would be its effects on food-related disorders such as type 2 diabetes or bulimia. Further research should examine Slimpod's physiological effect; also, the effects on insulin, ghrelin and leptin would make new lines of study to show physiological effects of the therapeutic model and how audio-cue changes can affect neural networks.

Conclusion

Slimpod® can manage, modify and improve a client's state of holistic well-being, resulting in sustained weight management and achievement of personal and governmental goals. It is shown as causing a significant drop in weight and an increase in self-reported eating efficacy for overweight adults. Current findings suggest an advantage to currently prescribed treatments within the NHS; Slimpod should therefore be included as part of the suite of interventions offered by healthcare professionals to those seeking to lose weight. However, the main disadvantage to the current study is that it is a self-contained study and though boasting promising findings, it needs an increased amount of evidence arguing the same results; with large scale longitudinal studies that other treatments have cited within this paper.

References

1. Altheimer G, Urry HL. Do Emotions Cause Eating? The Role of Previous Experiences and Social Context in Emotional Eating. 2019;28(3):234–40.
2. Arno A, Thomas S. The efficacy of nudge theory strategies in influencing adult dietary behaviour: A systematic review and meta-analysis. 2016;16(1):1–1.
3. Blakeney M. Food Loss and Food Waste: Causes and Solutions. 2019;.
4. Briner RB, Totterdell P. The experience, expression and management of emotion at work. 2002;:229–52.
5. Calvo MG, Beltrán D.Brain lateralization of holistic versus analytic processing of emotional facial expressions. 2014Jan1;92:237–47.
6. Caussy C, et al. Prevalence of obesity among adult inpatients with COVID-19 in France. 2020;8:pp. 562–564.
7. Dobbs R. Overcoming obesity : An initial economic analysis. 2014;.
8. Fessler DMT, Haley KJ.The strategy of affect: Emotions in human cooperation. :7–36.
9. Harvey J. UKPMC Funders Group Leptin : the missing link in Alzheimer disease ?. 2010;56(5):696–7.
10. Hoffmann TC, et al. Better reporting of interventions: Template for intervention description and replication (TIDieR) checklist and guide. 2014;.
11. Huang CH, Liu SM, Hsu NY. Understanding global food surplus and food waste to tackle economic and environmental sustainability. 2020;12(7):1–8.
12. Kanoski SE, Davidson TL. Western diet, cognitive impairment and hippocampal function. 2011;103(1):59–68.
13. Laran J, Salerno A.Life-History Strategy, Food Choice, and Caloric Consumption. 2013;24(2):167–73.
14. Lu Y, et al. Metabolic mediators of the effects of body-mass index, overweight, and obesity on coronary heart disease and stroke: A pooled analysis of 97 prospective cohorts with 1•8 million participants. 2014;383(9921):970–83.
15. McFadyen J, Dolan RJ, Garrido MI. The influence of subcortical shortcuts on disordered sensory and cognitive processing. 2020;21(5):264–76.
16. Medina-Pradas C. Further development of a scale of perceived expressed emotion and its evaluation in a sample of patients with eating disorders. 2011;190(2–3):291–6.
17. Mokdad AH. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. 2003;289(1):76.
18. Pérez-ferrer C, et al. Inequalities in smoking and obesity in Europe predicted to 2050 : Findings from the EConDA project Inequalities in smoking and obesity in Europe predicted to 2050 : Findings from the EConDA project. 2018;.
19. Pessoa L, Adolphs R. Emotion processing and the amygdala: from a "low road" to "many roads" of evaluating biological significance. 2014;23(1):1–7.
20. Phelps EA, LeDoux JE. Contributions of the amygdala to emotion processing: From animal models to human behavior. 2005;48(2):175–87.
21. Schulz KF, Altman DG, Moher D. CONSORT 2010 Statement: Updated guidelines for reporting parallel group randomised trials. 2010;.
22. Silvester T. Wordweaving volume 2 The question is the answer. 2006;2(1st edn).
23. Silvester T. Cognitive Hypnotherapy. 2010;.
24. Sturt J. Neurolinguistic programming: A systematic review of the effects on health outcomes. 2012;62(604).
25. Teper R, Zhong CB, Inzlicht M. How emotions shape moral behavior: Some answers (and questions) for the field of moral psychology. 9(1):1–4.
26. Thaler R, Sunstein C. Nudge: Improving decisions about Health, Wealth, and Happiness. 2008;1st edn.
27. Tosey P, Mathison J. Neuro-linguistic programming as an innovation in education and teaching. 2010;47(3):317–26.
28. de Vries R. Foraging minds in modern environments: High-calorie and savory-taste biases in human food spatial memory. 2020Apr1;152:104718.
29. Watson L, Spence MT. Causes and consequences of emotions on consumer behaviour: A review and integrative cognitive appraisal theory. 2007;41(5–6):487–511.
30. Williams GC. Motivational Predictors of Weight Loss and Weight-Loss Maintenance. 1996;70(1):115.
31. Yang DT, Zhu X. Modernization of agriculture and long-term growth. 2013;60(3):367–82.

To cite this article: Daniel S WILLIAMS, Richard G KYLE, Stephen M JONES, Sandra ROYCROFT-DAVIS. Revolutionising participants health and wellbeing through neuro-reprogramming by using breakthrough research in "nudge" thinking to retrain habitual and emotional responses to foodstuffs. Health Education and Public Health. 2024; 7(2): 566-570. doi: 10.31488/HEPH.188.