

Journal Code: NBU	Proofreader: Mony
Article No: NBU12117	Delivery date: 30 Sep 2014
Page Extent: 5	

## CONFERENCE REPORT

DOI: 10.1111/nbu.12117

# Weight management in the digital age

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## Symposium Report: European Congress on Obesity, 29 May 2014, Sofia, Bulgaria

This symposium was chaired by Dr Toine Hulshof (Kellogg's Europe) who introduced the topic by giving a whirlwind tour through dieting strategies since the 1970s. Forty years ago, losing weight was all about pills, followed in the 1980s by strenuous exercise, but now it is mostly about a healthy lifestyle and positive nutrition. Since the Internet now plays a huge role in our daily lives, how can this new global tool impact weight management strategies today?

The first presentation by Dr David Johns [Medical Research Council-Human Nutrition Research (MRC-HNR), Cambridge, UK] was timely given the day before (28 May 2014) the National Institute for Health and Care Excellence (NICE) released its guidance on behavioural weight management services. This new guidance makes recommendations on the provision of effective multi-component lifestyle weight management services for adults who are overweight or obese using, among other evidence, the systematic review evidence that Dr Johns presented at this symposium. The NICE guidance is aimed at commissioners, health professionals and providers of lifestyle weight management programmes. It includes 19 recommendations covering topics such as awareness of services, referral, components of effective programmes, training and monitoring, and evaluation (NICE 2014).

The systematic review (Hartmann-Boyce *et al.* 2014), a collaboration between Cambridge MRC-HNR and Oxford University, started with a search for randomised controlled trials of multi-component behavioural weight management programmes. Two reviewers extracted data on programme delivery and intervention format,

and coded each intervention against a taxonomy of behavioural change techniques. For all analyses, weight change was recalculated as Baseline Observation Carried Forward. Fifty-three references met the inclusion criteria, representing 37 studies. Thirty studies included a non-behavioural weight management programme, 29 of which had sufficient outcome data to be included in a meta-regression, representing 40 intervention vs. control comparisons. A total of 13 453 individuals were included in the primary meta-analysis. To be included in the primary analysis, interventions had to include a description of their approach to diet and physical activity and include details of the behaviour change techniques used. As would be expected, the programmes varied in their approach to these components.

When carrying out this kind of work, it is important to understand the weight loss of those in control groups before considering the effectiveness of programmes in comparison. Results indicated the amount of weight lost in the 'usual care' comparators was, at 12 months, on average,  $-0.76$  kg [95% confidence interval (CI)  $-1.14$  to  $-0.39$ ]. Comparing all behavioural weight management programme interventions to 'usual care' control arms, the additional pooled mean weight loss over 12 months was  $-2.59$  kg (95% CI  $-2.78$  to  $-2.41$ ). Over 18–24 months, it was  $-2.16$  kg (95% CI  $-3.04$  to  $-1.27$ ) and over 36 months it was  $-2.18$  kg (95% CI  $-2.99$  to  $-1.37$ ).

In meta-regression, calorie counting ( $-3.3$  kg, 95% CI  $-4.6$  to  $-2.0$ ,  $P = 0.027$ ), contact with a dietitian ( $-1.5$  kg, 95% CI  $-2.9$  to  $-0.2$ ,  $P < 0.001$ ) and use of behaviour change techniques that compare participants' behaviours with others ( $-1.5$  kg, 95% CI  $-2.9$  to  $-0.1$ ,  $P = 0.032$ ) were associated with greater weight loss. Direct comparisons showed behavioural weight management programmes using a combination of diet and exercise led to greater mean weight loss than diet-only programmes ( $-1.72$  kg, 95% CI  $-2.80$  to  $-0.64$ ) and greater mean weight loss than exercise-only programmes at 12 months ( $-6.29$  kg, 95% CI  $-7.33$  to

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1 -5.25). The average rate of weight regain at the end of  
2 behavioural weight management programmes was  
3 0.04 kg/month (95% CI 0.036–0.052). Weight loss  
4 during the behavioural weight management pro-  
5 grammes and the characteristics of the same were not  
6 associated with changes in the rate of weight regain.  
7 Behaviour change techniques, including those directly  
8 addressing regain prevention, were not associated with  
9 rate of weight regain after behavioural weight manage-  
10 ment programmes ended.

11 In view of the symposium topic, Dr Johns showed  
12 that meta-analysis of studies comparing in person  
13 contact with identical programmes delivered remotely  
14 found no difference in weight loss. However, only three  
15 studies met the inclusion criteria: two telephone-based  
16 services and one online programme. While other  
17 research exists on the impact of remote contact via  
18 telephone and web-based programmes on weight loss,  
19 studies were not considered sufficient to be included in  
20 accordance with the criteria agreed prior to beginning  
21 the review (*e.g.* they were not randomised controlled  
22 trials).

23 Dr Johns concluded that behavioural weight manage-  
24 ment programmes with diet and exercise combined were  
25 most effective for weight loss maintenance. Behavioural  
26 weight management programmes that set participants a  
27 calorie target or include a dietitian may also be more  
28 effective, but the programme characteristics explaining  
29 success are mainly unknown. No programme character-  
30 istics were found to be associated with a change in the  
31 rate of weight regain, which implies it may be most  
32 fruitful to maximise weight loss when designing behav-  
33 ioural weight management programmes.

34 Dr Margaret Ashwell (Ashwell Associates, Ashwell,  
35 UK) then summarised a UK trial, funded by the Kellogg  
36 Company, which tested the hypothesis that promoting  
37 breakfast cereal consumption as part of a web-based  
38 programme can result in loss of body mass. This trial  
39 was set up because there was reasonable evidence from  
40 observational studies that adults (de la Hunty &  
41 Ashwell 2007) and children (de la Hunty *et al.* 2013)  
42 who regularly eat ready-to-eat cereals are slimmer than  
43 those who don't. Furthermore, there was some evidence  
44 that weight management interventions using motiva-  
45 tional websites could be helpful. Unfortunately, there  
46 was limited evidence from randomised controlled trials  
47 (Arem & Irwin 2011).

48 Therefore, a single centre, single-blind, randomised  
49 parallel study was conducted which entailed a compari-  
50 son of a test group, who followed a fully interactive  
51 website (B) with 'prescribed' breakfast cereals, with a  
52 control group, who followed website (A), which gave

53 standard weight loss advice and could therefore be con-  
54 sidered a 'partial attention' control group. Women  
55 ( $n = 180$ ) were randomly allocated to two equal groups  
56 ( $n = 90$  per group). All subjects were in good health,  
57 aged 19–50 years, with a body mass index (BMI)  
58 ranging from 25 to 40 kg/m<sup>2</sup>. Study site visits by par-  
59 ticipants were made at 0, 4, 12 and 24 weeks to allow  
60 for the measurement of height, weight, skinfold thick-  
61 ness, body fat, waist and hip circumference. At baseline,  
62 there was no difference in mean age or BMI between the  
63 two groups. The weight loss programme provided  
64 customisable goals based on lifestyle choice linked to a  
65 designated and flexible meal plan with detailed recipes  
66 and full ingredient information. Healthy lifestyle tips  
67 were also provided and progress could be tracked, and if  
68 wanted, shared with friends.

69 Analysis was performed using both the intention to  
70 treat (ITT) method and completers method. The ITT  
71 method entails everyone who is randomised in the trial  
72 being considered as part of the trial regardless of  
73 whether or not they completed the trial. Completers  
74 analysis is based on those who complete the trial. In this  
75 particular trial, ITT match was based on the 90 subjects  
76 in each group who started the trial; completers analysis  
77 was based on 62 subjects who completed the trial by  
78 following standard weight loss advice (website A) and  
79 64 subjects who completed the trial by following the  
80 interactive site (website B) with 'prescribed' breakfast  
81 cereal. The results showed that the percentage change in  
82 body mass loss was greater when following website B  
83 [2.4% with a standard deviation (SD) of 4.0%] than  
84 website A (1.1% with SD 3.4%). ITT repeated measures  
85 analysis of variance (ANOVA) showed a significant dif-  
86 ference ( $P = 0.013$ ). For completers, the percentage  
87 change in body mass loss was also greater for website B  
88 (3.1% with SD 4.5%) than website A (1.5% with SD  
89 3.1%) ( $P = 0.023$ ). The difference in fat mass loss was  
90 borderline significance between groups. However, this  
91 still showed that the body mass loss was not just due to  
92 water loss.

93 Dr Ashwell concluded that the advice and motivation  
94 offered by an interactive website (website B), including  
95 specific provision and consumption of breakfast cereals,  
96 can result in a significantly greater loss of body mass  
97 compared with the use of a standard weight loss  
98 website. However, three factors could have been respon-  
99 sible for the difference obtained:

- 100 • an interactive and motivating website vs. a non-  
101 interactive website;
- 102 • the prescription of ready-to-eat cereals within the  
103 advice vs. not doing this;
- 104



- the provision of ready-to-eat cereals vs. not providing ready-to-eat cereals.

Because it was not possible to determine between these factors, the results can only be assumed to be a combination of all three factors (Ashwell *et al.* 2014).

Dr Francis Bornet (NEALTH, Toulouse, France) then described a similar web-based weight management programme trial, which had been carried out in France (Bornet *et al.* 2014). Its purpose was to determine whether the effectiveness of the weight loss programme, as found in the UK, would also be evident in a country with a different dietary culture. The objective of the study was to assess the efficacy of the weight loss and weight loss maintenance website programme in overweight women without co-morbidity. In contrast to the UK study which had two groups of women, the French trial was designed to be a single arm study to recruit and examine the effect of a 6-month website programme in healthy overweight women ( $n = 70$ , mean age 33 years). Participants were asked to follow the recommendations of the website programme to include the provision of nutritionally balanced controlled meal plans to help them lose weight during the first 3 months and advice to help them maintain their weight loss during the subsequent 3 months. Assessments were made at baseline, at the end of the intervention period (3 months) and 3 months post intervention (6 months). Main outcome variables included changes in body weight, waist and hip circumferences, and fat mass. The main characteristics of the participants at baseline (mean and SD) were as follows: age (years): 33.4 (SD 8.6); weight (kg): 77.0 (SD 6.9); BMI ( $\text{kg}/\text{m}^2$ ): 28.4 (SD 0.9); waist and hip circumferences (cm): 92.6 (SD 5.9) and 109.8 (SD 5.9).

Results showed that changes in body weight and body circumferences measured between baseline and 3 months, and baseline and 6 months for participants in the ITT ( $n = 70$ ) and completer ( $n = 49$ ) populations were significantly reduced. At 3 months, the completer population showed a significant reduction in body weight compared with baseline [2.7 (2.3) kg;  $t = -7.96$ ,  $P < 0.0001$ ]. During the subsequent 3-month weight maintenance period, participants maintained their weight, hip and waist circumferences so that 6-month measures did not vary significantly from 3-month measures.

Dr Bornet concluded that the moderate but maintained reduction in body weight and waist and hip circumference suggests that a website programme that includes a nutritionally balanced, controlled eating plan can be a good approach to help in weight management in overweight women without any co-morbidities.

Although the UK and French trials had a similar approach, there were several differences between them, as shown in Table 1. The main difference was that the UK study was a single-blind study and included a 'partial attention' control group. Further ready-to-eat cereals were not only prescribed but were also supplied to the participants in the UK trial. Both trials assessed body weight and fat mass and the results showed that the use of an interactive website produced positive results on each. Dr Bornet finished by saying that the results from France and UK suggest that strong differences in dietary culture, as experienced between these two countries, do not seem to have a large impact on the effectiveness of a web-based weight loss intervention programme. However, more research is needed to perform larger trials to investigate the motivating factors in websites for weight loss.

Dr Nicola Lasikiewicz (James Cook University, Australia) then presented the results of a recent systematic review exploring the psychological benefits of weight loss following participation in behavioural or dietary-based interventions with or without exercise (Lasikiewicz *et al.* 2014). Contrary to what would be expected, very few studies include psychological improvements as markers of successful weight loss interventions in addition to the more obvious change in weight. The perceived success of a weight loss intervention is often hinged almost entirely on the amount of weight lost rather than any improvement in psychological wellbeing.

Discussing the results of the review, Dr Lasikiewicz stated that improvements in psychological wellbeing, specifically self-esteem, depressive symptoms, body image and vitality (as a subscale of health-related quality of life), are frequently observed. Of notable interest was that improvements in self-esteem and depressive symptoms were not always tied to actual weight loss, meaning that a person may feel better following the intervention, despite losing little or no weight. Improvements in vitality and body image, however, did seem to be dependent on the amount of weight lost. For these particular outcomes, seeing physical change may facilitate psychological change and this was often observed following interventions that focused on diet and exercise. However, the effectiveness of behavioural interventions may be due to their inherent aims to target the triggers of eating behaviours, changing attitudes towards food and eating (*e.g.* disentangling eating and emotions), increasing self-acceptance and social support. Often offered in combination with nutritional education and exercise programmes, behavioural interventions may also include an element of self-

**Table 1** Comparison of the UK and French website trials

	UK	France
Number of subjects	<i>n</i> = 180 women	<i>n</i> = 70 women
Mean age (years)	38	33
Mean BMI (kg/m <sup>2</sup> )	31	28.5
Study performed	Summer 2011	Summer 2012
Weight loss websites	Two websites for two groups in trial: <ul style="list-style-type: none"> <li>• Website A – a website that gave standard advice on weight loss</li> <li>• Website B – an interactive website that included 'prescribed' ready-to-eat cereals (including supply)</li> </ul> Note: The control website (website A) had less interaction and was without the ready-to-eat cereal focus and supply	Specific cereal-based website adapted for French consumers (4 meals per day and French cooking recipes)
Length of trial	6-month intervention	3-month intervention plus 3-month weight maintenance period
Foods provided during intervention period	Supplies of ready-to-eat cereal as prescribed by website B during trial	None prescribed
Measurements taken during trial	BMI Fat mass Waist circumference Hip circumference	BMI Fat mass Waist circumference Hip circumference
Percentage of participants who completed the study at 6 months	70%	70%
Percentage change in body mass loss when following test website compared with control website (ITT analysis)	<i>n</i> = 90 in both groups Repeated measures ANOVA showed a significant difference between groups across all time points up to 6 months ( <i>P</i> = 0.013)	<i>n</i> = 70 One-sided <i>t</i> -test showed a significant difference between baseline and 3 months, and between baseline and 6 months ( <i>P</i> < 0.0001)
Comparison of percentage change in body mass loss when following test website compared with control website (completers analysis)	<i>n</i> = 62 controls vs. <i>n</i> = 64 test group Repeated measures ANOVA showed a significant difference across all time points up to 6 months ( <i>P</i> = 0.023)	<i>n</i> = 49 One-sided <i>t</i> -test showed a significant difference between baseline and 3 months, and baseline and 6 months ( <i>P</i> < 0.001)
Fat mass loss as measured by bio-impedance	Loss (borderline statistical significance <i>P</i> = 0.056) of fat mass to show body mass loss was not due to water loss	Significant loss in fat mass without loss of muscle mass ( <i>P</i> > 0.001)

ANOVA, analysis of variance; BMI, body mass index; ITT, intention to treat.

monitoring, which may serve as an empowering element and may actually underpin the improvement in psychological wellbeing.

Despite the consistent and positive outcomes, a number of methodological limitations in the studies contained in the review were noted by Dr Lasikiewicz. Each study included in the review was quality assessed for study aims, design, sampling, intervention, analysis and outcomes. Although most studies met an adequate standard of quality, a distinct lack of randomised controlled trials or comparison groups was noted. Furthermore, adherence and compliance were not typically monitored. To further validate the findings of the review and promote the inclusion of psychological outcomes in measuring intervention effectiveness, more research is

therefore required. Dr. Lasikiewicz summarised by saying that understanding the changes a person goes through psychologically may be key to understanding successful weight loss following implementation of a weight loss intervention, specifically one that is behavioural in nature. Essentially, if people feel better about themselves and lose weight following an intervention, then this may promote future weight loss success or weight loss maintenance. Although not directly assessed, the findings of this review have implications for the design of emerging interventions, which utilise technology in the form of web-based programs. Particularly, in terms of inclusion and evaluation of components, which may promote psychological wellbeing and, in turn, successful weight loss.

1

2 Finally, Dr Hulshof drew the meeting to a close by  
3 remarking that the digital age brings much potential in  
4 the field of weight management. Not only in the  
5 improvement of interactive and motivating websites to  
6 convey and record information during weight loss but  
7 also in digital techniques to improve psychological well-  
8 being during this time, which could influence outcomes  
9 dramatically.

### 10 Conflict of interest

11 The symposium was sponsored by Kellogg's Europe.  
12 However, the views expressed in this symposium and  
13 article are those of the speakers and authors alone.  
14

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