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Boosters, anyone? Exploring the added value of booster sessions in a self-management intervention

F. M. Kroese*, M. A. Adriaanse and D. T. D. De Ridder

Department of Clinical and Health Psychology, Utrecht University, P.O. Box 80.140, 3508 TC Utrecht, The Netherlands

***Correspondence to: F. M. Kroese. E-mail: f.m.kroese@uu.nl**

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Abstract

The current study explored the benefits of adding booster sessions to a validated and successful self-management intervention for type 2 diabetes patients (i.e. Beyond Good Intentions). Although the addition of booster sessions to self-management interventions is often recommended, it has not been empirically established to what extent booster sessions are in fact appreciated by participants. Participants in the current study ($N = 129$) followed the Beyond Good Intentions program and were offered a series of three booster sessions at 1, 3 and 5 months afterwards. Primary outcome variables included participants' attendance and evaluations of the booster phase. In addition, self-management behavior was assessed at baseline (T1), after the initial phase (T2) and after the booster phase (T3). Results showed that more than one-fourth of participants who completed the initial phase dropped out during the booster phase, and those who did complete both phases evaluated the booster phase significantly less positive as compared to the initial phase. With regard to the behavioral outcomes, we replicated previous findings showing positive effects on all measures during the initial phase. The booster phase, however, did not result in further improvements. It was concluded that the added value of booster sessions was, at best, questionable.

Introduction

Besides medical treatment and emotional coping, dealing with chronic diseases often involves making lifestyle adjustments. For example, patients diagnosed with type 2 diabetes are advised to incorporate a balanced and healthy diet as well as regular physical exercise into their daily routines. Yet, despite understanding the medical benefits of a healthy lifestyle, few patients by themselves succeed to implement this new self-management behavior [1–3].

To help patients get on the right track, self-management interventions have gained popularity over the past decades. In general, self-management programs have been found to be effective in inducing behavioral changes [4–6]. However, maintenance of the acquired changes has turned out to be much more difficult. A number of scholars have therefore suggested that booster sessions should be added to self-management interventions to uphold the initial beneficial effects [2, 5, 7–9]. In addition, the notion that 'ongoing support is critical to sustain progress (. . .)' has been one of the guiding principles for the Task Force that was convened by the American Association of Diabetes Educators and the American Diabetes Association to determine the national standards for self-management education programs [10]. Moreover, it has been reported that patients themselves as well indicated to prefer booster sessions to maintain their acquired improvement [11].

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Although the suggestion to include booster sessions within self-management interventions has been adopted by several researchers (e.g. [12, 13]), few studies have reported on the effectiveness of this approach. In different domains, studies testing the effects of reinforcement efforts in a self-management program for arthritis patients [14] and in an intervention aimed at increasing factory workers' use of hearing protection [15] reported no additional improvement of outcomes. Furthermore, recent work suggests that the booster phase of an intervention may suffer from additional high drop-out of participants (Vinkers *et al.*, under review). Hence, the limited empirical studies that are available tend to raise reasonable doubt with regard to the frequent, but mere intuitive, recommendations that prevail in the literature regarding the addition of booster sessions to self-management programs.

Furthermore, besides the obvious question of the additional effectiveness of booster sessions compared to a basis program only, a first step should be to establish whether patients are in fact responsive to this prolonged treatment. It speaks for itself that patients' willingness to attend additional booster sessions and their satisfaction with the extended program are essential prerequisites for booster sessions to have real added value (cf. [4]).

The aim of the current study, therefore, is to investigate the added value of booster sessions in an effective self-management intervention by shedding light on the participants' perspective: First, we will explore the attendance rates of participants to the booster sessions. Second, participant evaluations of both the initial phase as well as the booster sessions will be assessed, to consider participants' view on the added value of the extended course. Finally, as a secondary outcome measure we will briefly discuss the additional effectiveness of the booster sessions in terms of behavioral self-management outcomes.

To this end, we employ an existing validated self-management intervention aimed at type 2 diabetes patients (i.e. Beyond Good Intentions; [11]). The intervention teaches participants to set small, concrete goals and to take a proactive approach, based on a comprehensive five-step plan. Importantly, the program has been positively evaluated by previous participants, of whom 85% most certainly would recommend the intervention to someone else [11]. Moreover, the program was found to be successful, and to yield improved outcomes on cognitive, behavioral and medical measures over a period of 12 months [16, 17]. Finally, the authors reported that patients indicated to be interested in receiving follow-up meetings to further support their improved self-management behavior [11]. Noting that the initial intervention needs to be sufficiently strong for a booster phase to have potentially added value, this particular program represents an ideal candidate for the current study.

To increase the chances for the booster sessions to be effective two different booster conditions will be compared: one in which participants will continue to use the same approach as in the initial phase of the intervention (i.e. focus on setting small, concrete goals), and another condition in which participants will be challenged to use a new approach (i.e. change their focus toward their overarching goals, see Methods section). For all outcome measures it will be investigated whether specific patient characteristics [i.e. body mass index (BMI), sex, educational level, time since diagnosis, age), goal commitment and booster condition (i.e. how versus why) modulate the results.

Methods

Participants

Type 2 diabetes patients were recruited through general practitioners. Inclusion criteria were: (i) having received a diagnosis of type 2 diabetes; (ii) being below the age of 75 years and (iii) possessing sufficient conduct of the Dutch language. Patients with serious physical or psychiatric comorbidities were excluded. In total, 129 patients (67 men, 62 women) completed the baseline (T1) questionnaires. Participants' mean age was 60.3 years [standard deviation (SD) = 8.5], and on average, they had received their diagnosis of type 2 diabetes 4.0 years ago (SD = 5.7). A large majority of

Table I. *Participant attendance of sessions during the initial and booster phase*

Initial phase	Number of participants (%) ($N = 129$)		Cumulative percentage	
Dropout	46 (35.7)		35.7	
1 session	1 (0.8)		36.5	
2 sessions	9 (7.0)		43.5	
3 sessions	17 (13.2)		56.7	
4 sessions	56 (43.4)		100.0	
Booster phase	How ($N = 45$)	Why ($N = 41$)	How	Why
Non-attendees	13 (28.9)	5 (12.2)	28.9	12.2
1 session	2 (4.4)	4 (9.8)	33.3	22.0
2 sessions	13 (28.9)	14 (34.1)	62.2	56.1
3 sessions	17 (37.8)	18 (43.9)	100.0	100.0

77.3% used medication to treat their diabetes. Elementary school was the highest educational level for 10.1% of the sample, whereas 51.9% attended vocational education, and 38.0% received higher education. Participants' mean BMI was 31.3 (SD = 5.6), which is beyond the generally used cut-off criterion for obesity (i.e. a BMI of 30 or higher). In general, commitment to improve self-management behavior was high at baseline ($M = 5.7$, SD = 0.9) as well as after the initial phase ($M = 5.5$, SD = 1.1), indicating that patients were in fact ready to change. A repeated measures analyses revealed no change over time ($P = 0.13$).

From the total sample of 129 patients who completed the baseline questionnaires, one-third ($N = 43$) dropped out during the initial phase (i.e. did not return T2 questionnaires), which is comparable to previous self-management intervention studies (e.g. Vinkers *et al.* in preparation; [18]). Among the remaining participants ($N = 86$), a large majority of 88.4% ($N = 76$) attended at least three group sessions of the initial phase of the intervention. After the booster phase 55 participants returned T3 questionnaires, of whom 53 attended at least one booster session. From 62 participants, 58 of whom attended at least one booster session, we obtained evaluation questionnaires. The number of sessions attended during the initial and the booster phase is represented in Table I.

Procedure

Beyond Good Intentions

The intervention employed the Beyond Good Intentions program [11], which had been positively evaluated and proved to be successful in previous research. The initial phase consisted of one individual and four group sessions, delivered over a period of 6 weeks. Groups consisted of six to eight participants and were lead by instructed trainers. The core of the intervention is formed by a proactive five-step plan that teaches participants to set small, concrete goals; recognize conditions for and barriers to goal achievement; come up with problem solving strategies in specific challenging situations; formulate action plans, and evaluate their progress (see [11], for a detailed description of the intervention).

Booster sessions

The booster phase comprised three group sessions scheduled 1, 3 and 6 months after the end of the initial phase. Importantly, although people may be motivated to change their behavior at first, this initial motivation may not be carried forward to the long-term maintenance phase of behavioral change [19]. In this light, we incorporated suggestions from social psychology literature saying that, when making plans on how to deal with anticipated obstacles, having a clear picture of one's overarching goals, or the positive future in case of successfully dealing with these obstacles, could motivate participants to uphold their good behavior [20]. In particular, it has been suggested that people may bolster their commitment to their personal goals by elaborating on what makes them important (i.e. 'Why do I want to do this?'; [21]). Incorporating this proposition participants were, after the initial phase, randomly divided in two types of booster conditions, from now on referred to as the 'how' versus 'why' condition. The content of the 'how'-condition was identical to the initial phase of the intervention: Participants were instructed to step-by-step

transform their self-management goals to concrete subgoals (e.g. 'How are you going to get more exercise'). In the 'why'-groups, on the other hand, patients were challenged to consider their self-management goals in view of their higher-order overarching goals (e.g. 'Why are you going to get more exercise'; cf. [22]).

Measures

At baseline, patient characteristics (including demographic and anthropometric measures) were assessed. Measures of self-management behavior were taken at baseline (T1), after the initial phase (T2) and after the booster phase (T3). Finally, evaluations were collected 6 months after the booster phase had ended. The study was approved by the Medical Ethics Committee of the Utrecht University Medical Center, and registered in the Dutch Trial Register (#NTR2765; www.trialregister.nl). All participants signed informed consent forms before the start of the intervention.

Patient characteristics

Demographics included *age*, *sex* and *educational level*. Participants' height and weight were assessed by clinical nurses, and were used to compute BMI. Furthermore, *time since diagnosis* was assessed by self-report. *Goal commitment* was assessed at T1 and T2 with four items (e.g. 'How important is it for you to change your self-management behavior'; Cronbach's $\alpha = 0.75$ and 0.85 for T1 and T2, respectively) on five-point scales ranging from 1 *(not at all)* to 5 *(very much)*.

Attendance

Attendance was assessed by self-report and incorporated into the questionnaires at T2 (after the initial phase) and T3 (after the booster phase). Some participants did not return T3 data, but did complete the evaluation questionnaires in which attendance was also assessed. For this group, attendance as measured at the evaluation questionnaires was used in the analyses. Participants who did not return T3 nor evaluation questionnaires were considered non-attendees, which was corroborated by trainers' observations.

Evaluation

Course opinion with regard to both the initial phase and the booster phase of the intervention was assessed with four items (cf. [11]): 'To what extent do you think the initial phase/ the booster phase was educational/interesting/useful/enjoyable'. All items could be answered on five-point scales ranging from 1 (*not at all*) to 5 (*very much*) and average scores were computed for the two phases of the intervention separately (Cronbach's $\alpha = 0.91$ and 0.95 for the scale referring to the initial phase and the booster phase, respectively). An *overall evaluation score* of both the initial phase and the booster sessions was assessed by one item: 'How would you grade the initial phase/the booster sessions on a scale from 1-10'.

Effectiveness

Diabetes self-care. General self-care behavior was assessed using the revised summary of the Diabetes Self-Care Activities measure [23]. The scale consists of 10 items assessing diet, exercise, blood-glucose testing, and foot-care (Cronbach's $\alpha = 0.61$ and 0.64 at T2 and T3, respectively). Participants were asked to indicate for each domain *'Over the last 7 days, how often did you . . .'* resulting in a mean score of 0 to 7.

Medication adherence. The Medication Adherence Report Scale (MARS; [24]) was used to assess the degree to which patients did not take their medication as prescribed (i.e. changing doses, stopping or forgetting to take medication). The scale consists of five items with scores ranging from 1 (*always true*) to 5 (*never true*), such that higher scores indicate better adherence (Cronbach's $\alpha = 0.75$ and 0.65 at T2 and T3, respectively).

Lifestyle adherence. An adaptation of the MARS [25] was included to assess adherence to lifestyle recommendations (e.g. 'I forget to adhere to the lifestyle guidelines provided by my general practitioner'). The scale consists of 5 items with scores ranging from 1 (*always true*) to 5 (*never*

true), such that higher scores indicate better adherence (Cronbach's $\alpha = 0.87$ and 0.91 at T2 and T3, respectively).

Physical activity. Physical activity was assessed using the Physical Activity Scale for the Elderly [26]. The 15-item scale yields a composite score between 0 and 800 reflecting the total energy expenditure.

Dietary habits. Diet was measured using the Kristal food habits questionnaire [27], which consists of 20 items assessing how often patients employ specific activities to reduce fat intake (e.g. 'How often do you use fat-free diary products').

Analyses

For all outcome variables hierarchical regression analyses were performed (i.e. logistic regression for attendance and linear regressions for evaluations and effectiveness). In the first step, all patient characteristics (i.e. age, sex, educational level, time since diagnosis and BMI) were included, adding T2 commitment to change self-management behavior in Step 2. In Step 3, booster condition (i.e. 'how' versus 'why') was entered, and Step 4 included the interactions of booster condition with all patient characteristics and commitment. For the analyses of booster effectiveness and evaluations, only data from participants who attended at least one booster session were included. Any additional analyses are described in the Results section.

Results

Attendance

Out of the 86 participants that were still included in the study after the initial phase, 18 (20.9%) did not attend any booster sessions and 6 patients (7.0%) attended only one session during the booster phase (see Table I).

It was investigated whether attendance at the booster phase could be predicted by patient characteristics, goal commitment, or booster condition. Attendance was included as a dichotomous measure (i.e. non-attendance versus attending at least one session). The logistic hierarchical regression analysis yielded no significant effects in Steps 1 and 2. Booster condition was included as a third step, although it is noted that participants who did not show up at the first booster sessions did not know in which condition they were. Still, the step was significant and an effect of condition on attendance emerged ($B = 2.91$, $P = 0.048$), indicating that participants in the why-condition were more likely to attend the booster sessions.

For those who did attend at least one booster session, an analysis of variance showed that the number of sessions attended did not differ between the two booster conditions (i.e. how versus why); $F < 1$. (A multinomial logistic regression analysis including the number of sessions attended rather than the dichotomous measure of attendance versus non-attendance yielded the same conclusions.)

Evaluation

Overall, participants' evaluations of the initial phase as expressed in the course opinion measure ($M = 4.0$, $SD = 0.8$, as assessed on a five-point scale) as well as the overall evaluation scores ($M = 7.6$, $SD = 1.0$, as assessed on a 10-point scale) were quite positive. For the booster phase, evaluation scores were somewhat reduced on both the course opinion items ($M = 3.3$, $SD = 1.3$) and the overall evaluations ($M = 6.7$, $SD = 1.4$).

First, it was tested whether participants' evaluations of the initial phase and the booster phase were indeed statistically different. *Course opinion* scores of the initial phase and the booster sessions were submitted to a repeated measures analysis. A significant difference emerged; $F(1, 50) = 29.02$, $P < 0.001$, $p\eta^2 = 0.37$, indicating that participants gave more positive evaluations to the initial phase as compared to the booster sessions. A similar effect was found on the same analysis including *overall evaluation scores* as the dependent variable; $F(1, 56) = 27.34$, $P < 0.001$, $p\eta^2 = 0.33$, that also yielded higher scores for the initial phase as compared to the booster sessions. No interactions with booster condition (i.e. how versus why) were found in either analysis ($Ps > 0.11$), indicating that the reduced

Table II. *Participants' scores on behavioral measures at baseline (T1), after the initial phase (T2) and after the booster phase (T3)*

	T1 ($N = 129$)	T2 ($N = 86$)	T3 ($N = 24 + 29$)	
			How	Why
Diabetes self-care	3.49 (1.07)	4.07 (0.99)	4.26 (0.89)	3.79 (1.13)
Lifestyle adherence	3.76 (0.97)	4.02 (0.63)	4.13 (0.78)	4.03 (0.81)
Medication adherence	4.65 (0.57)	4.79 (0.32)	4.83 (0.30)	4.76 (0.30)
Dietary habits	2.57 (0.35)	2.69 (0.35)	2.74 (0.29)	2.56 (0.29)
Physical activity	119 (65)	154 (90)	149 (91)	151 (79)

For T3 outcome measures, only data from participants who attended at least one booster session are reported.

evaluations of the booster phase as compared to the initial phase of the intervention were not different for the two booster conditions.

Second, two separate hierarchical regression analyses were conducted with course opinion and overall evaluation scores as dependent variables. None of the steps was significant in either analysis (Ps > 0.17). Looking at individual predictors for the *course opinion* ratings, booster condition was a significant predictor in Step 3 ($\beta = 0.37$, $P = 0.022$), such that patients in the how-condition were more positive as compared to patients in the why-condition. No significant interaction effects were observed in Step 4.

In a similar analysis with *overall evaluation* scores of the booster phase as dependent variable, a marginally significant effect of sex was observed in Step 1 of the analysis ($\beta = -0.34$, $P = 0.06$), such that men were more positive than women. The subsequent steps yielded no additional significant predictors (Ps > 0.24), except for a marginally significant effect of condition in Step 3 ($\beta = 0.29$, $P = 0.08$), again showing that participants in the how-condition were somewhat more positive compared to those in the why-condition.

Finally, exploring the relation between evaluations and attendance, Pearson's correlations revealed that participants' *course opinion* ratings of the *initial* phase ($r = 0.38$, $P = 0.004$) as well as *course opinion* ratings ($r = 0.30$, $P = 0.03$) and *overall evaluation* scores of the booster phase ($r = 0.32$, $P = 0.02$) were positively associated with the number of booster sessions attended.

Effectiveness

First of all, the positive outcomes of the initial phase on psychological as well as behavioral measures of the intervention were replicated and are described elsewhere (Kroese *et al.*, in preparation). Descriptives of participants' scores on behavioral outcome measures on each time point can be found in Table II.

Second, we tested for any additional effectiveness of the booster sessions (i.e. on top of the initial phase) on the behavioral measures. Repeated measures analyses were conducted including Time (T2—after initial phase versus T3—after booster) as within subjects variables, and booster condition as between subjects factor. T1 assessments were included as covariates. Neither main effects of time, nor interaction effects between time and booster condition were found on any measure (all Ps > 0.14), indicating that participants in neither condition on average improved or regressed during the booster phase.

Furthermore, similar to the analyses on attendance and evaluations, it was tested whether change scores on behavioral measures may have been dependent on patient characteristics, goal commitment, or booster condition. Hence, five hierarchical regression analyses were conducted with change scores during the booster phase (i.e. Δ T2 – T3) on each behavioral measure as dependent variables. None of the models was significant for any of the behavioral outcome measures (Ps > 0.36). Also, none of the individual predictors reached significance upon being entered in the analyses. Only on

diabetes self-care a marginally significant effect of BMI was observed in Step 1 ($\beta = 0.37$, $P = 0.05$), such that among patients with higher BMI's the difference between T3 and T2 was greater. In other words, the higher the BMI, the more patients regressed on diabetes self-care during the booster phase.

Finally, we tested for any relations between the effectiveness of the booster phase on behavioral measures, attendance rates and evaluation scores. Pearson's correlations showed that change scores on behavioral measures during the booster phase (i.e. ΔT2 – T3) were not correlated to booster attendance rates or booster evaluations (Ps > 0.31).

Discussion

The current study explored the added value of booster sessions to an effective self-management intervention aimed at type 2 diabetes patients based on three criteria: (i) attendance, (ii) participant evaluations and (iii) effectiveness. Even though the intervention was positively evaluated in line with previous findings [11], attendance numbers showed that an additional 28% of participants did not attend the booster phase or attended only one session. Whereas dropout at the start of an intervention is often due to hesitancy towards research or practical barriers [18], these typical reasons are less likely to play a role in the booster phase when participants have already shown to be willing and capable to attend the group sessions in the initial phase. In that light, non-attendance during the booster phase in the current study may be considered rather high. Moreover, those who completed the program (and who may be considered the most enthusiastic participants, as corroborated by the correlations between evaluations of the initial and the booster phase and attendance) evaluated the booster sessions significantly less positive as compared to the initial phase.

Depending on the aim of the booster sessions, the effectiveness remains ambiguous. That is, patients did not further improve but neither did they show any decline over the course of the booster period (i.e. 8 months). Although it may be promising to see that participants following the extended program did not show any regression to the mean, it is noted that patients participating in the Beyond Good Intentions program in a previous study did not decline over a period of 12 months without the addition of booster sessions [16, 17].

Few differences were found between the 'how' and the 'why' condition, except for evaluations which were in favor of the how-condition. Though non-attendance in the how-condition was higher than in the why-condition, it is noted again that participants who did not attend a single session did not know what the content of the sessions would be. With regard to the reasons for participants' more negative evaluations of the 'why'-boosters we can only speculate. Overall, the booster conditions were evaluated less positively than the initial phase of the intervention. Apparently, participants in the current study did not much appreciate an extended course in general, and particularly disliked the shifted focus towards the overarching goal with regard to their self-management behavior (i.e. 'why'), as opposed to a focus on more specific subgoals (i.e. 'how'). Looking at the individual items of the course opinion measure through a multivariate analysis of variance, it is shown that participants in the why-condition, compared to those in the how-condition, were significantly more negative on each item (i.e. useful, educational, interesting, enjoyable). However, it is yet unclear whether participants' discontent was fueled by the broader why-focus itself, or by a mere shift in focus with respect to the initial phase.

Interpreting the current findings, some limitations should be kept in mind. First, the fact that patients in the current intervention did not further improve on behavioral outcomes during the booster phase could also be indicative of a ceiling effect: possibly, participants reached their best possible outcomes after the initial phase and no room for improvement was left. Indeed, this explanation could well apply to the measure of medication adherence on which participants on

average scored very high already at baseline. For the other measures, however, it seems that some room for improvement would still remain. Although as a consequence of the high drop-out of participants our sample size was reduced at T3, note that we still had sufficient power (i.e. 0.80) to detect medium effect sizes in our analyses. Nevertheless, the improvements of participants during the initial phase are noteworthy (Kroese *et al.*, in preparation) and maintenance of these effects can be deemed a satisfactory outcome. Yet, considering the maintenance of effects in a previous study that did not include booster sessions [16, 17], the question is whether booster sessions are actually necessary. Unfortunately, our analyses on the effectiveness of the booster phase suffered from a lack of data of participants who did not attend any booster sessions, such that it was statistically unfeasible to compare attendees to non-attendees.

A direction for future research is to investigate participants' reasons for (non-)attendance and dissatisfaction during the booster phase. Knowledge about the individual characteristics, psychological factors or practical boundaries that are associated with quitting the booster sessions is essential for future researchers to be able to find ways to keep up attendance. Also, participants' reasons for the reduced evaluations of the booster phase could provide valuable input to determine the most optimal content of the booster sessions, explicating for example whether it should most directly be focused on motivational or on practical issues. Finally, it would be worthwhile to investigate the optimal timing and frequency of booster sessions. Possibly, the booster sessions in the current intervention were too dilute (at 1, 3 and 6 months after the end of the initial phase). In that light, it is interesting to see that participants in a recent study on telephone booster sessions were rather positive about the frequency of weekly phone calls [28]. A booster frequency of once a week, however, would not be feasible in the case of group sessions, so the benefits of a higher frequency would have to be weighed against those of group meetings as opposed to phone calls.

Conclusion

Though widely called for, the added value of booster sessions remains to be established. The current findings demonstrate that, while the initial phase of the intervention was effective and well received, a large group of participants did not continue during the booster phase. Moreover, those who did continue were less positive about the booster phase as compared to the initial phase and did not show any further improvements. Hence, we must conclude that the addition of booster sessions cannot be recommended without some serious reservations. Although maintenance of improvements in self-management behavior remains an issue that should receive high priority, booster sessions are not necessarily the most sensible solution.

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Conflict of interest statement

None declared.

References

1. Kurtz SMS. Adherence to diabetes regimens: empirical status and clinical applications. *Diabetes Educ* 1990; **16**: 50–6.
2. Norris SL, Lau J, Smith SJ *et al*. Self-Management education for adults with type 2 diabetes. *Diabetes Care* 2002; **25**: 1159–71.
3. Delamater AM. Improving patient adherence. *Clin Diabetes* 2006; **24**: 71–7.
4. Norris SL, Engelgau MM, Venkat Narayan KM. Effectiveness of self-management training in type 2 diabetes. *Diabetes Care* 2001; **24**: 561–87.
5. Newman S, Steed L, Mulligan K. Self-management interventions for chronic illness. *Lancet* 2004; **364**: 1523–37.
6. Heinrich E, Schaper NC, De Vries NK. Self-management interventions for type 2 diabetes: a systematic review. *Eur Diabetes Nurs* 2010; **7**: 71–6.
7. Goodall TA, Halford WK. Self-management of diabetes mellitus: a critical review. *Health Psychol* 1991; **10**: 1–8.

8. Brown SA, Garcia AA, Kouzekanani K *et al*. Culturally competent diabetes self-management education for Mexican Americans. *Diabetes Care* 2002; **25**: 259–68.
9. Tudor-Locke C, Bell RC, Myers AM *et al*. Controlled outcome evaluation of the First Step Program: a daily physical activity intervention for individuals with type II diabetes. *Int J Obesity* 2004; **28**: 113–19.
10. Funnell MM, Brown TL, Childs BP *et al*. National standards for diabetes self-management education. *Diabetes Care* 2009; **32**(Suppl 1): S87–94.
11. Thoolen B, De Ridder D, Bensing J *et al*. Beyond good intentions: the development and evaluation of a proactive self-management course for patients recently diagnosed with type 2 diabetes. *Health Educ Res* 2008; **23**: 53–61.
12. Schwarz PEH, Schwarz J, Schuppenies A *et al*. Development of a diabetes prevention management program for clinical practice. *Public Health Rep* 2007; **122**: 258–63.
13. Steed L, Lankester J, Barnard M *et al*. Evaluation of the UCL Diabetes Self-Management Program (UCL-DSMP): a randomized controlled trial. *J Health Psychol* 2005; **10**: 261–76.
14. Lorig K, Holman HR. Long-term outcomes of an arthritis self-management study: Effects of reinforcement efforts. *Soc Sci Med* 1989; **29**: 221–4.
15. Lusk SL, Eakin BL, Kazanis AS *et al*. Effects of booster interventions on factory workers' use of hearing protection. *Nurs Res* 2004; **53**: 53–8.
16. Thoolen B, De Ridder D, Bensing J *et al*. Effectiveness of a self-management intervention in patients with screen-detected type 2 diabetes. *Diabetes Care* 2007; **30**: 2832–7.
17. Thoolen B, De Ridder D, Bensing J *et al*. Beyond good intentions: the role of proactive coping in achieving sustained behavioural change in the context of diabetes management. *Psychol Health* 2009; **24**: 237–54.
18. Thoolen B, De Ridder D, Bensing J *et al*. Who participates in diabetes self-management interventions? *Diabetes Educ* 2007; **33**: 465–74.
19. Rothman AJ. Toward a theory-based analysis of behavioral maintenance. *Health Psychol* 2000; **19**: 64–9.
20. Oettingen G, Pak H, Schnetter K. Self-regulation of goal-setting: turning free fantasies about the future into binding goals. *J Pers Soc Psychol* 2001; **80**: 736–53.
21. Fishbach A, Shah JY, Kruglanski AW. Emotional transfer in goal systems. *J Exp Soc Psychol* 2004; **40**: 723–38.
22. Freitas AL, Gollwitzer PM, Trope Y. The influence of abstract and concrete mindsets on anticipating and guiding others' self-regulatory efforts. *J Exp Soc Psychol* 2004; **40**: 739–52.
23. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care* 2000; **23**: 943–50.
24. Horne R, Weinman J. Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *J Psychosom Res* 1999; **47**: 555–67.
25. Theunissen MC, De Ridder D, Bensing JM *et al*. Manipulation of patient-provider interaction: discussing illness representations or action plans concerning adherence. *Patient Educ Couns* 2003; **51**: 247–58.
26. Schuit AJ, Schouten EG, Westerterp KR *et al*. Validity of the Physical Activity Scale for the Elderly (PASE): according to energy expenditure assessed by the doubly labeled water method. *J Clin Epidemiol* 1997; **50**: 541–6.
27. Kristal AR, Shattuck AL, Henry HJ. Patterns of dietary behavior associated with selecting diets low in fat: reliability and validity of a behavioral approach to dietary assessment. *J Am Diet Assoc* 1990; **90**: 214–20.
28. Wu L, Forbes A, While A. Patients' experience of a telephone booster intervention to support weight management in type 2 diabetes and its acceptability. *J Telemed Telecare* 2010; **16**: 221–3.