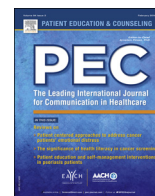


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Intervention

Feasibility and potential impact of the adapted SLIM diabetes prevention intervention in a Dutch real-life setting: The SLIMMER pilot study

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ABSTRACT

Objective: Pilot-testing of the adapted Study on Lifestyle intervention and Impaired glucose tolerance Maastricht (SLIM) and to determine its feasibility and likelihood of achieving desired impact.**Methods:** Pilot intervention study (a 10-month combined lifestyle intervention) using a one group pre-test post-test design with on-going process measures (i.e. reach, acceptability, implementation integrity, and applicability) and several health outcomes (e.g. body weight).**Results:** In total, 31 subjects participated in the SLIMMER (SLIM iMplementation Experience Region Noord- en Oost-Gelderland) intervention. Participant weight loss was -3.5 kg ($p = 0.005$). Both participants and health care professionals (i.e. practice nurses, dieticians, and physiotherapists) were satisfied with the intervention. The intervention was implemented as planned and appeared to be suitable for application in practice. Refinements have been identified and will be made prior to further implementation and evaluation.**Conclusion:** Implementation of the SLIMMER intervention is feasible in a Dutch real-life setting and it is likely to achieve desired impact. Practising and optimising the intervention creates local support for SLIMMER among stakeholders.**Practice implications:** Performing a pilot study on the basis of a structured approach is a meaningful step in the process of optimising the feasibility and potential impact of an evidence-based intervention in a real-life setting.

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1. Introduction

Many experimental studies, such as the Finnish Diabetes Prevention Study (DPS), the US Diabetes Prevention Program (DPP), and the Dutch Study on Lifestyle intervention and Impaired glucose tolerance Maastricht (SLIM), have shown that moderate changes in diet and physical activity (PA) lead to a substantial and sustained reduction in the incidence of type 2 diabetes mellitus for individuals with impaired glucose tolerance (IGT) [1–8]. This evidence calls for an increase in the implementation of lifestyle interventions in public health practice in order to maximise possible

health gains for individuals with IGT in society. Interventions which have been developed in experimental settings, however, are not necessarily suitable for implementation in real-life settings because these settings differ substantially [9–11]. Translation of lifestyle interventions from research to practice is, therefore, needed whereby effectiveness must be preserved. On the other hand, adaptations are inevitable within this translational process from research to practice, and this may have unknown consequences for the effectiveness of the intervention.

Translations from experimental interventions to real-life settings have previously been shown to be feasible. However, they appeared to have limited clinical benefits, possibly due to less control, less intensive methods, or practical issues of non-compliance [11,12]. No experimental interventions have to date been translated to real-life settings in The Netherlands. For this project, the evidence-based SLIM intervention was translated into

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the SLIMMER intervention, which is designed to be applicable in a Dutch real-life setting [13]. To this end, the five-step guidance of McKleroy et al. has been applied, providing a systematic approach to adapt the intervention to and imbed it in a real-life setting while maintaining the scientific integrity that makes the intervention effective [14]. Firstly, core elements of the SLIM intervention were identified (*step 1: assess*) and consensus on suggested adaptations was achieved between SLIM intervention developers and local health care professionals in a joint decision making process (*step 2: select*). These adaptations were then incorporated in the new SLIMMER manual (*step 3: prepare*). These first three steps of McKleroy's guidance [14] have been described in detail elsewhere [15]. The next step in the adaptation process is to pilot-test the adapted intervention. The aim of this article is to describe the pilot-testing of the adapted SLIM intervention and to determine its feasibility (i.e. reach, acceptability, implementation integrity, and applicability) and likelihood of achieving desired impact. This was done in a 10-month lifestyle intervention, guided by process and outcome evaluation. The results from this pilot-test will be used to refine the adaptation and will serve as input for McKleroy's final and fifth step [14] of implementation and evaluation.

2. Methods

This pilot study is part of a larger project called SLIMMER (SLIM implementation Experience Region Noord- en Oost-Gelderland (formerly called Region Gelre-IJssel)), which aims to implement an effective diabetes prevention intervention in a Dutch real-life setting.

2.1. Study design

This 10-month pilot intervention study ran from August 2010 until July 2011, using a one group pre-test post-test design with on-going process measures. Both qualitative and quantitative data collection approaches were used to investigate the feasibility of SLIMMER and the likelihood of achieving its desired impact. The study received ethical approval from the Medical Ethical Committee of Wageningen University.

2.2. Participants

Participants for the pilot study were recruited from August to September 2010 by three general practitioners (GPs) in the municipality of Apeldoorn from their patient registration database. Each GP selected a random sample of patients from the database aged 40 through 65 years with impaired fasting glucose (finger prick fasting capillary blood glucose >5.6 and <6.0 mmol/l or fasting venous plasma glucose >6.1 and <6.9 mmol/l [16]). Exclusion criteria were: not being able to speak and understand the Dutch language; cognitive dysfunction; or any comorbidity that made participation in a lifestyle intervention impossible. Recruitment of the participants has been described in detail elsewhere [13]. In short, GPs sent eligible patients a letter and flyer to inform them about the SLIMMER intervention and to invite them to an information meeting in their neighbourhood with all health care professionals involved (GP, practice nurse, dietician, and physiotherapist). Two weeks after sending the invitation letter, practice nurses called the patients to invite them to the information meeting again, and to motivate them to participate if necessary. During the information meeting, patients were given all details of the programme and afterwards they gave their written informed consent. A short non-response survey was conducted in case patients were not willing to participate.

2.3. Lifestyle intervention programme

The SLIMMER intervention resembled the SLIM intervention [17] and consisted of a dietary and physical activity component. In addition, the SLIMMER intervention fitted in with daily routines of Dutch GPs, practice nurses, dieticians, and physiotherapists. Therefore, only minimal training, provided during a special two-hour SLIMMER kick-off training, was required to assure adequate delivery of the intervention by the health care professionals. Relevant details of the SLIMMER intervention are described below and additional details can be found elsewhere [13,15].

2.3.1. Dietary intervention

Dietary recommendations were based on Dutch dietary guidelines [18]. A dietician gave tailored dietary advice during six individual consultations within the 10-month intervention period (30–60 min per consultation; in total 4 h per participant). If desired, spouses could join consultations. In addition, the dietician organised one group session aimed at sharing experiences, motivating each other, and discussing the topic of label reading. Subjects were encouraged to drink less alcohol, quit smoking if necessary, increase daily physical activity, and to participate in the physical activity intervention. The dietician, trained in motivational interviewing [19], assisted individuals to achieve a positive attitude towards changes in diet and physical activity. Goals for behaviour change were set every consultation, evaluated in the next consultation, and if necessary adjusted. The objective of the dietary intervention was to adopt, step by step, a sustainable healthy dietary pattern according to Dutch dietary guidelines.

2.3.2. Physical activity intervention

The physical activity intervention consisted of a combined aerobic and resistance exercise programme (proportion 2:1) at the physiotherapist's practice. Weekly training sessions with a duration of 1 h were group-based and supervised by a skilled physiotherapist. Sports groups were formed based on day and time preferences of the subjects and availability of the physiotherapists. Subjects had free access to the training sessions and were stimulated to participate for at least 1 h per week. In addition, the physiotherapist gave tailored advice on how to increase physical activity in daily life (e.g. bicycling, walking, gardening) and goals were set. The objective of the physical activity intervention was to increase the physical activity level of the participants to at least 30 min a day during at least five days a week.

2.4. Outcome and process measures

An outcome and process evaluation was performed to investigate feasibility and likelihood of the intervention. Several health outcomes and four process measures commonly used in process evaluations were included: reach, acceptability, implementation integrity, and applicability [20–23]. Process evaluation data were collected and used to optimise the intervention programme. Outcome and process measures are described below. A detailed evaluation plan including measures and time points of data collection is provided in Additional file 1.

2.4.1. Outcome measures

Health care professionals performed health measures at baseline (T_0) and at the end of the intervention (T_1) to assess likelihood of achieving desired impact. Fasting plasma glucose was measured by practice nurses using a finger prick according to guidelines of the Dutch College of General Practices [16]. Furthermore, practice nurses measured blood pressure twice on the left arm with an electronic monitor. The average of two

measurements was recorded. Dieticians measured body weight to the nearest 0.1 kg and height to the nearest 0.5 cm. Body Mass Index (BMI) was measured as the ratio of weight and height squared (kg/m^2). Waist and hip circumference were measured by dieticians to the nearest 0.5 cm. Waist circumference was obtained at the level midway between the lowest rib and the iliac crest. Hip circumference was measured as the maximum circumference over the buttocks. Waist and hip measurements were performed in duplicate and the average of two measurements was recorded. Medication use was recorded by practice nurses in each of the following categories: hypertension, hypercholesterolemia, hypertriglyceridemia, and cardiovascular diseases. Fitness was measured using the SteepRamp Test [24,25]. Physiotherapists performed this test on a calibrated cycle ergometer. After 3 min of unloaded cycling (at 25 W), the load was increased by 25 W every 10 s. Subjects were instructed to cycle with a pedal frequency between 60 and 80 rounds per minute (rpm). The test ended when pedal frequency fell below 60 rpm. Obtained maximal workload (the maximum short exercise capacity), time cycled at that load, and heart rate at the end of the test were reported. Maximal oxygen uptake (VO_2max) was estimated as follows: $\text{VO}_2\text{max} (\text{l}/\text{min}) = 0.0067 \text{ SteepRamp } W_{\text{max}} + 0.358$ [24,25]. Participants filled in questionnaires on perceived health, smoking, and physical activity. Perceived health was measured with the question “How would you rate your health, in general?” with answer categories poor, fair, good, very good, and excellent. This question was taken from the Short-Form Health Survey (SF-36), which has been shown to be a practical, reliable, and valid tool for both general and chronic disease populations in The Netherlands [26,27]. Smoking was measured with the question “Do you smoke (sometimes)?” with answer categories yes, no but I used to (more than 15 years ago), no but I used to (less than 15 years ago), and no I never smoked. Physical activity was measured with the question “On how many days per week are you usually physically active for at least 30 minutes?” with answer categories ranging from less than one day per week to 7 days per week. Questions on smoking and physical activity were measured according to standards of the national surveillance system for adults and the elderly in The Netherlands [28]. These national standards are based on best available scientific insights, experiences of local community health services, and expert opinions. Alcohol intake, fruit intake, and vegetable intake were assessed by a validated food frequency questionnaire [29].

2.4.2. Process measures

Reach was defined as ‘the proportion of intended target audience that participated in the intervention’. Data on socio-demographic characteristics of participants and non-participants were collected according to standards of the national surveillance system for adults and the elderly in The Netherlands [28].

Acceptability was defined as ‘the extent to which participants and health care professionals (i.e. practice nurses, dieticians, and physiotherapists) are satisfied with the intervention’. Participants’ acceptability was assessed using questionnaires and evaluation forms. Furthermore, a focus group meeting ($n = 10$, duration of 1.5 h) was conducted to collect more in-depth information on acceptability [30]. Two participants of each sports group were randomly selected and invited by one of the researchers (GD). In case a participant was not able or willing to participate, another randomly selected participant was invited. A semi-structured focus group guide was developed. An experienced focus group leader (CdR) guided the meeting and one of the researchers (GD) assisted the focus group leader and took notes. Acceptability of health care professionals was assessed using telephone semi-structured interviews (practice nurses, $n = 3$, average duration of 17 min) and face-to-face semi-structured interviews (dieticians,

$n = 3$, and physiotherapists, $n = 4$, average duration of 67 min). All health care professionals that implemented the SLIMMER intervention were invited to the interviews by one of the researchers (GD) and they were all willing to participate. A semi-structured interview guide was developed and all interviews were conducted by one of the researchers (GD).

Implementation integrity was defined as ‘the extent to which the intervention was implemented as planned’. Professionals’ implementation integrity was assessed by semi-structured interviews ($n = 10$), as described above. Furthermore, a structured observation method was developed to track several intervention activities and aspects. The observations were performed by one of the researchers (GD).

Applicability was defined as ‘the extent to which an intervention process can be implemented in the real-life setting’. Semi-structured interviews with professionals were conducted ($n = 10$), as described above.

Information on intervention optimisation was obtained from the collected process data as described above. Refinements in the adaptation process will be made prior to further implementation and evaluation in a real-life setting, the fifth step of McKleroy’s guidance [14].

2.5. Analyses

Quantitative data were analysed using IBM SPSS Statistics version 19. Non-participants were compared with participants for gender, age, perceived health, and education level, using an independent samples *t*-test. Ten-month changes in health outcomes were assessed using paired samples *t*-tests for continuous variables, McNemar’s chi-square tests for categorical variables, and Wilcoxon signed-rank tests for ordinal variables. Relative effect sizes were calculated using Cohen’s *d* [31]. Qualitative data were analysed using an inductive approach [32]. The focus group discussion with participants and interviews with dieticians and physiotherapists were tape-recorded and transcribed. During interviews with practice nurses and observations, notes were taken and then transcribed. Transcripts were coded into topics and read multiple times by the first author until themes emerged.

3. Results

3.1. Reach

The SLIMMER pilot study included a total of 31 participants (i.e. a response rate of 57%), with an average of 10 patients per GP practice (range 6–13). On average, participants were 54 years old, had a low level of education (46%), and a family history of diabetes (63%; see Table 1). Twenty of the 54 patients did not respond to the invitation (Fig. 1). Reasons for this non-response were lack of time (28%), lack of interest (24%), reporting of ‘I already have a healthy lifestyle’ (17%), not reached by practice nurse (14%), not able due to physical or mental problems (10%), and reporting of ‘It is of no importance to me’ (7%). Three more patients were excluded because they no longer had impaired fasting glucose. Non-participants were slightly older, perceived their health as being better, and were lower educated than participants (Table 1). During the SLIMMER pilot study, two participants dropped out (i.e. a drop-out rate of 7%) because of personal circumstances and health constraints. In total, 13 health care professionals worked together to implement the SLIMMER intervention: three GPs, three practice nurses, three dieticians, and four physiotherapists. They jointly organised three information meetings, at which 23 participants were present (i.e. a participation rate of 74%). On average participants received 5.2 (SD 1.7; range 0–6) consultations by dieticians and 34.1 (SD 16.7; range 0–64) sports lessons.

Table 1
Baseline characteristics of participants ($N=31$) and non-participants ($N=23$) of the SLIMMER pilot intervention.^{a,b}

	Participants	Non-participants
Gender	($n=31$)	($n=23$)
Male	15 (48)	10 (43)
Female	16 (52)	13 (57)
Age (mean (SD))	($n=31$)	($n=23$)
	54.1 (8.5) years (range 36–68y)	58.3 (4.6) years (range 48–66y)
Perceived health	($n=28$)	($n=16$)
Poor/fair	9 (32)	2 (12)
Good	19 (68)	11 (69)
Very good/excellent	0 (0)	3 (19)
Education level ^c	($n=28$)	($n=14$)
None/primary education	2 (7)	3 (22)
Low education	11 (39)	8 (57)
Intermediate education	6 (22)	2 (14)
High education	9 (32)	1 (7)
Ethnicity	($n=27$)	
Native	25 (93)	
Non-native	2 (7)	
Marital status	($n=28$)	
Married/cohabitating	25 (89)	
Unmarried	1 (4)	
Divorced	2 (7)	
Widowed	0 (0)	
Employment status	($n=28$)	
Fulltime job	13 (47)	
Part time job	6 (21)	
No paid job	9 (32)	
Family history of diabetes	($n=27$)	
Yes	17 (63)	
No	10 (37)	
History of hyperglycaemia	($n=15$)	
Yes	7 (47)	
No	8 (53)	

^a Data are n (%) unless otherwise indicated.

^b Missing values because of incomplete measurements and drop-out of $n=2$.

^c Education level was based on the highest level of education completed and divided in four categories: none/primary (primary school or less), low (lower vocational education), intermediate (medium vocational education, high school), and high (higher vocational education, university).

Dietitians organised three group meetings at which 21 participants were present (i.e. a participation rate of 68%).

3.2. Health outcomes

At the end of the intervention, self-reported days of physical activity (i.e. at least 30 min/day physically active) increased from four to five ($p=0.005$; Table 2). No changes in alcohol, fruit, and vegetable intake were observed. Minor changes in medication use were observed. On average, body weight was 3.5 kg lower and significant reductions in waist and hip circumference were noted. Fasting glucose increased slightly, albeit non-significantly. Diastolic blood pressure, but not systolic blood pressure, was significantly reduced. VO_2 max significantly improved after the intervention ($p < 0.001$). Perceived health increased significantly ($p=0.005$).

3.3. Acceptability, implementation integrity, applicability, and intervention optimisation

The participants' questionnaire on acceptability was completed by 90% at baseline and 77% at follow-up and all attending participants filled in the short evaluation form after the group

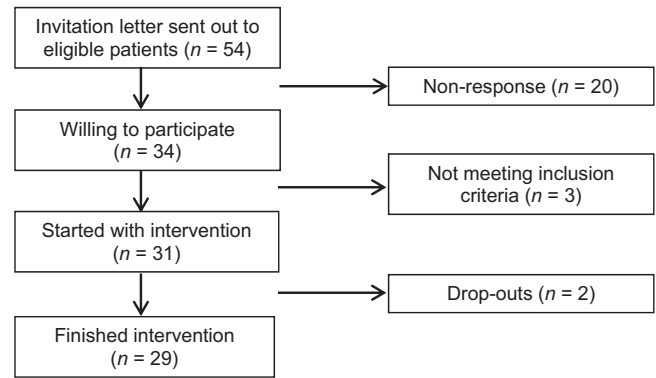


Fig. 1. Participant flow diagram of the SLIMMER pilot intervention.

meeting with the dietician. On average, participants evaluated the overall intervention programme with a 7.7 (SD 0.6) out of 10 and the individual intervention elements were positively evaluated by most participants (Table 3).

In general, participants and professionals were satisfied with the intervention programme, although some improvements were mentioned. Overall, the intervention was implemented as planned. Some parts of the protocol, however, were omitted or adjusted by health care professionals. This mostly concerned measurements and planning aspects regarding intervention elements. The intervention appeared suitable for application in practice as most health care professionals indicated that it was not very different from their regular functioning and professional performance. However, there were some organisational difficulties.

Looking in detail at acceptability, implementation integrity, and applicability, seven themes emerged. Most of these themes were related to intervention elements (i.e. information meeting, physical activity intervention, dietary intervention). In addition, the themes measurements and the need for a coordinating professional were identified. Additional file 2 provides a detailed overview of all seven themes. Based on these themes, improvements will be made to refine the adaptation process. Both the themes and the improvements are described below.

1. The information meeting was positively evaluated by both participants and professionals, but the organisation of such a meeting proved to be time-consuming and costly for both participants and professionals. The information meeting will be replaced by brochures, providing all details of the SLIMMER intervention programme.
2. The formation of physical activity groups was an important aspect of the physical activity intervention. In practice, the formation of these groups was logistically more difficult than expected. Therefore, instead of forming groups based on day and time preferences of participants, groups will be formed based only on the availability of physiotherapists. It is expected that limiting the options for participants will speed up the formation of physical activity groups.
3. The nutrition intervention included a fixed number of six consultations but it appeared that more flexibility in the number of consultations was desired by both participants and dietitians. More flexibility, therefore, will be provided by determining a minimum of five and a maximum of eight consultations with a maximum of 4 h per participant.
4. Several important findings were related to measurements conducted by health care professionals. It appeared that in practice, some measurements were not performed according to the protocol or not easily applicable, and that different devices

Table 2
Ten-month changes in health outcomes of the SLIMMER pilot intervention (N=31).

	n ^a	Baseline	$\Delta T_1 - T_0$ ^b	p-Value	Effect size
Physically active (number of days per week)	22	4 (2.2)	+1 (1.5)	0.005	0.49
Alcohol intake (g/day)	23	7.1 (8.5)	-0.82 (3.0)	0.206	-0.09
Dietary intake (g/day)	23				
Fruit intake		149.0 (103.9)	-1.23 (84.1)	0.945	-0.01
Vegetable intake		165.4 (90.7)	-20.6 (80.0)	0.231	-0.26
Smoking (n)	23	6	-2	0.500	-0.22
Medication use (n)	28				
Hypertension		18	0	1.000	0
Hypercholesterolemia		10	+1	1.000	0.06
Hypertriglyceridemia		0	+1	-	-
Cardiovascular diseases		6	-2	0.625	-0.19
Body weight (kg)	24	85.9 (17.9)	-3.5 (5.4)	0.005	-0.20
BMI (kg/m ²)	23	29.0 (4.1)	-1.2 (1.9)	0.006	-0.30
Waist circumference (cm)	23	104.4 (13.7)	-4.2 (5.1)	0.001	-0.31
Hip circumference (cm)	23	109.8 (7.9)	-2.8 (4.3)	0.005	-0.34
Fasting plasma glucose (mmol/l)	28	6.1 (0.5)	0.3 (0.8)	0.062	0.51
Blood pressure (mmHg)	28				
Systolic		134.9 (10.3)	-4.4 (14.5)	0.118	-0.36
Diastolic		84.6 (8.3)	-5.9 (8.8)	0.001	-0.74
SteepRamp Test	27				
VO ₂ max (l/min)		2.3 (0.6)	+0.4 (0.4)	<0.001	0.58
Perceived health (n)	23				
Poor/fair		8	-6	0.005	n.a. ^c
Good		15	+4		
Very good/excellent		0	+2		

^a Missing values because of incomplete measurements and drop-out of n=2.

^b Change between baseline (T₀) and follow-up (T₁), data are expressed as mean (SD) or n.

^c n.a.: not applicable.

were used. Therefore, measurements will be shifted from health care professionals to a research centre for the future cost-effectiveness evaluation study. Furthermore, fasting plasma glucose will be measured using a venepuncture because this might be more reliable than a finger prick [33], and the SteepRamp Test will be replaced by the six-minute walk test

Table 3
Participants' acceptability of SLIMMER pilot intervention elements (N=31).^a

Intervention elements	Mean participants' acceptability (SD)
Information meeting (n=21)	
Grade ^b	7.5 (0.8) (range 7–10)
The information meeting was very useful to me ^c	4.2 (0.4) (range 4–5)
I learned a lot from the information meeting ^c	3.2 (0.6) (range 2–4)
I understood the information I received ^c	4.0 (0.4) (range 3–5)
Consultations by dietician (n=24)	
By participating in SLIMMER...	
I had a motivation to start eating healthy ^c	3.7 (0.9) (range 2–5)
I could focus on eating more healthy ^c	3.7 (0.8) (range 2–5)
Group meeting by dietician (n=21)	
Grade ^b	8.2 (0.7) (range 7–9)
Sports lessons by physiotherapist (n=24)	
By participating in SLIMMER...	
I had a motivation to be physically active ^c	4.0 (0.9) (range 1–5)
I could be physically active with a goal ^c	3.8 (0.9) (range 1–5)
I liked to take part in sports together with others ^c	4.1 (0.7) (range 2–5)
Overall intervention (n=23)	
Grade ^b	7.7 (0.6) (range 7–9)

^a Missing values because of incomplete measurements and drop-out of n=2.

^b Grading on a scale ranging from 1 to 10.

^c Scale from 1 (I totally disagree) to 5 (I totally agree).

[34] because the SteepRamp Test was difficult to perform and was not suitable for all participants.

- It was identified that there was a need for an independent health care professional who could take action towards professionals and participants in case of difficulties. The practice nurse, therefore, will be designated as case manager of the project to motivate and stimulate participants and to facilitate contact between dietitians and physiotherapists.
- Monitoring (i.e. repeated measurements during the intervention) appeared to be important to both participants and professionals as it contributes to participants' motivation and professionals' evaluation purposes. Monitoring of behaviour change, therefore, will be expanded and described more explicitly in the SLIMMER manual.
- The importance of maintaining a healthy lifestyle and how to achieve this was recognised by both the participants and the professionals. Suggestions for a maintenance programme were provided by both participants and professionals and some health care professionals have already taken initiatives themselves. Therefore, a maintenance programme will be added to the lifestyle intervention programme to guide participants in the process of maintaining lifestyle behaviour change in an independent and sustainable manner.

4. Discussion and conclusion

4.1. Discussion

In this pilot-test of the adapted SLIM intervention, the aim was to determine the feasibility and likelihood of achieving the desired impact. Several improvements in health outcomes were observed. Furthermore, as indicated in the findings, this SLIMMER pilot study was successful in both the inclusion and retention of patients from

a high-risk group for diabetes. Both participants and professionals were satisfied with the SLIMMER intervention. Overall, the intervention was implemented as planned and appeared to be suitable for application in practice. Some improvements regarding measurements, planning aspects of intervention elements, and organisational matters were mentioned. Refinements in the adaptation process will be made prior to further implementation and evaluation.

Results of this SLIMMER pilot study are comparable to results of the effective SLIM study [35]. Improvements in body weight, BMI, waist circumference, and VO_2 max were slightly higher in the SLIMMER pilot study than in the SLIM study, whereas fasting plasma glucose slightly increased in the pilot study compared to a decrease in the SLIM study (+0.3 mmol/l vs. -0.1 mmol/l) [35]. However, results of the SLIMMER study should be interpreted with caution as results are only based on a pilot study with a small sample size. The main goal of this pilot study was to test feasibility of the SLIMMER intervention in practice. Further investigation of effectiveness of the intervention is needed. The SLIMMER intervention may be more successful in primary health care than other interventions because of the intensity of this SLIMMER intervention, the deployment of health care professionals with specific expertise and skills rather than general lifestyle coaches, and the group-based sports lessons which contribute to social support.

Several lessons were learned based on the quantitative and qualitative results of this pilot study. Firstly, this pilot study showed that a structured approach with outcome and process measurements is appropriate to test and optimise the feasibility of an intervention. As indicated by Dombrowski et al., performing a pilot study is important and meaningful because challenges for refinement become clear [36]. Furthermore, a pilot study can be valuable as practising and optimising the intervention might increase chances for success [37]. Secondly, local support among stakeholders is created by initiating a local steering committee who takes responsibility for the implementation process of the intervention. Thirdly, a case manager should be appointed to enhance participant compliance and the feasibility of the implementation. A recent Dutch study showed that practice nurses are highly involved in diabetes care and that patients are satisfied with this care [38]. Because of this and the fact that general practices act as gatekeepers of the health care system and work together with allied forces [13,39], practice nurses seem to be in the best position to be case managers. Fourthly, monitoring appeared to be an important aspect of the intervention. The need for monitoring was also recognised in several other studies [36,40]. Fifthly, including a maintenance programme appeared to be important, as losing weight is relatively easy, whereas maintaining weight loss is a more difficult task [36,41,42]. Sixthly, it seemed that non-participants were slightly older, perceived their health as better, and were lower educated than participants. This indicates that special attention should be given to recruitment and retention of subjects with a lower socio-economic status. Furthermore, translating findings of this pilot study to other ethnic groups should be done with caution, as most participants were Dutch.

The small study size is a limitation, although this is acceptable for a pilot study [14,37]. Furthermore, all data were collected and analysed by one researcher which could cause subjectivity in qualitative data interpretation. The researcher, however, was aware of this, worked in a structured way, and discussed analyses and results with two co-authors.

4.2. Conclusion

This pilot study shows that implementation of the SLIMMER diabetes prevention intervention is feasible in a Dutch real-life setting

and that it is likely to achieve the desired impact. Moreover, practising and optimising the intervention creates local support among stakeholders. Results of this pilot study have led to several improvements regarding measurements, planning aspects of intervention elements, and organisational matters that facilitate the next step of implementation and evaluation of the SLIMMER intervention.

4.3. Practice implications

This study shows that performing a pilot study on the basis of a structured approach is a meaningful step in the process of optimising the feasibility and potential impact of an evidence-based intervention in a real-life setting. Implementation of the SLIMMER intervention in Dutch real-life setting is feasible and it is likely to achieve the desired impact.

Conflicts of interest

The authors declare that they have no competing interest.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.pec.2014.05.024>.

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