

Patients' experiences with a new, self-managing, group-based approach to diabetes care: Recovery Circle in the Neighbourhood

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Abstract

Background & objective: In the Netherlands, the current primary care system for people with type 2 diabetes has led to unsatisfactory diabetes management and high healthcare costs. The new diabetes-care approach '*Recovery Circle in the Neighbourhood*' (RCIN) aims to improve diabetes management through self-managing groups of diabetes patients. Although this approach has shown clinical improvements in patients, their experiences with RCIN are as yet unknown. In the hope of improving RCIN in the future, this study aims to explore the experiences of patients with RCIN.

Methods: A qualitative study was performed using semi-structured interviews with twenty patients who participated in RCIN for 12-months. A thematic analysis was conducted using Atlas.ti software (version 8.0).

Results: In looking at patients' experiences with RCIN, our study identified five themes: (1) Taking responsibility for diabetes management, including the necessity of knowledge and the influence of personal factors; (2) Raising awareness about patients' own influence on diabetes, particularly regarding the effects of a healthy diet and self-monitoring of glucose levels; (3) Increased confidence in diabetes self-management, concerning medication management and maintaining lifestyle changes; (4) The need for appropriate support, including the role of general practitioners (GPs), general practice nurses (GPNs) and the lifestyle coach, the importance of group interaction, and the contribution of patient's social network; and (5) Acceptability of RCIN's format, with a focus on the feasibility of the self-managing approach as well as group size and diversity.

Conclusions: Our study provides insight into a variety of patient experiences with RCIN. RCIN contributed to diabetes self-management by acting on patients' perception of responsibility, awareness, and confidence. Various experiences were found regarding the need of support and the acceptability of RCIN's format. Since these experiences appears to be influenced by patients' individual needs and capabilities, we advise to personalize the approach with more focus on individual needs and capabilities.

Introduction

Diabetes is an increasingly prevalent chronic disease in the Netherlands. Between 2003 and 2017, the diabetes rate increased over 50%, from an estimated 400,000 people with diabetes to almost 1 million^{1, 2}. Type 2 diabetes is the leading contributor to this increasing prevalence, comprising 85%–95% of all cases^{3, 4}. The probability of developing type 2 diabetes rises with age, poor diet, low physical activity and obesity^{2, 4}. With the Netherlands's ageing population and high prevalence of unhealthy lifestyle behaviours, it is thus estimated that the number of Dutch people with Type 2 diabetes will increase to 1.2 million by 2030^{2, 5}. This poses a major challenge to the national healthcare system, which makes effective diabetes management essential^{2, 4}.

Clinical diabetes guidelines recommend multiple interventions for the management of diabetes, including regular screening for complications, drug therapy (e.g. insulin or metformin), the promotion of healthy lifestyles (e.g. healthy diet and physical activity) and patient education to facilitate self-monitoring (e.g. measuring glucose levels)⁶⁻⁸. In the Netherlands, these interventions are included as part of diabetes patients' four routine annual check-ups with a GP or GPN, wherein these professionals interact with patients on a one-to-one basis⁶.

This current diabetes care approach does not result in optimal diabetes management; although it leads to active prescription of medication and lifestyle advice, it seems to be insufficient to address the behavioural changes that contribute to healthy lifestyles⁹⁻¹¹. As a result, less than 50% of Dutch patients achieve satisfactory diabetes control (i.e. a fasting plasma glucose between 4.5–8.0 mmol)^{6, 12}. Most are therefore at increased risk of developing long-term complications such as cardiovascular diseases or kidney failure, contributing in turn to high healthcare costs^{13, 14}.

Given the ineffective diabetes management, researchers and clinicians have become increasingly interested in new approaches to managing type 2 diabetes more effectively. One such approach is self-management, defined as 'individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and life style changes inherent in living with a chronic condition'¹⁵. Extensive research has already shown that self-management is essential for diabetes management¹⁶ and that 95% of effective diabetes management is handled by patients themselves¹⁷⁻¹⁹. However, most patients struggle to self-manage their diabetes²⁰.

One way to address the struggle of patient to self-manage diabetes is Diabetes Self-Management Education (DSME). DSME helps patients acquire the skills and confidence to manage their disease, aiding in medication adherence, self-monitoring of glucose levels and lifestyle adjustment^{21, 22}. Research on the effectiveness of DSME interventions on people with Type 2 diabetes has shown that group-based DSME is the most effective form²³⁻²⁵. For example, a recent review of Odgers-Jewell,

Ball, Kelly, Isenring, Reidlinger & Thomas (2017) found that group-based DSME is more effective than one-on-one interventions or usual diabetes care in improving clinical outcomes and lifestyles in people with type 2 diabetes. Moreover, this study suggests that group-based DSME is more cost-effective than individual education due to the reduced time and funding required²⁴.

This research into group-based DSME has been used to establish RCIN, a new care approach for people with type 2 diabetes in the Netherlands. RCIN aims to improve diabetes management by replacing the current diabetes treatment protocol with a self-managing, group-based approach. Within this self-managing group, patients are expected to take responsibility for organising activities to improve their diabetes management rather than being led by a professional²⁶. To the best of the researchers' knowledge, RCIN appears to be the first diabetes intervention to make patients in a self-managing group responsible for their own diabetes management²⁶.

A recent quantitative study (2018) on the effectiveness of RCIN, found that patients ($n = 20$) who had been participating in RCIN for twelve months showed improvements in clinical outcome measurements (e.g. Body Mass Index), lifestyle changes and medication use²⁷. However, this quantitative study did not identify patients' individual experiences. The aim of our qualitative study, therefore, is to gain insight into the experiences of patients with participating in RCIN. The knowledge we gain may help to improve this new approach of diabetes care.

Methods

Study design

We performed a qualitative study using semi-structured interviews to gather insight into the experiences of patients who had participated in RCIN^{28, 29}. Interviews were conducted between one and two months after the end of RCIN so that participants would still remember their experiences in detail. The Medical Ethics Committee of Radboud University Medical Center Nijmegen declared that ethical approval was not necessary for this study. A statement was requested (ref. number 2016/2565).

Intervention

Over a twelve-month period, twenty patients with type 2 diabetes participated in RCIN's self-managing group. Within this group, patients were expected to take initiative in organising activities to improve their diabetes management and were challenged to support one other and solve problems together. The creators of RCIN tried to reduce the influence of primary healthcare by making the appointments every three months optional. Instead, the patients were asked to self-monitor clinical outcomes such as weight, blood pressure and blood glucose levels and report them to their GP or GPN via an application. Patients were asked to adapt and/or reduce their diabetes medication (e.g. insulin or tablets) on their own, and to pursue personal goals related to diet, physical activity and medication use. RCIN was facilitated by two lifestyle coaches who helped patients set goals, and by providing group and individual support, to encourage them to internalise and sustain their behavioural changes.

Study setting

This qualitative study was part of a mixed-method pilot study in which people with type 2 diabetes participated in RCIN from September 2016 to September 2017³⁰. This pilot study was implemented in two general practices, both located in predominantly middle-to high-income neighbourhoods in a medium-sized city in the eastern part of the Netherlands³¹.

Recruitment of participants

We selected our participants using convenience sampling, because we considered motivation to be an essential characteristic for participation in our pilot study^{28, 32}. The GPs and GPN of two general practices asked patients to participate in person. Inclusion criteria were as follows: a diagnosis of type 2 diabetes, residency in the medium-sized city in eastern part of the Netherlands and between

35 and 75 years old. Exclusion criteria were mental disorders or other cognitive disabilities and insufficient mastery of the Dutch language. The GPs and GPNs preselected 32 patients who were approached via telephone by the project leader with more information about the pilot study. After this call, 12 patients refused to participate due to a lack of time, irregular working hours or other factors (Figure 1). The sampling process stopped once we reached the predetermined group size of 20 participants. Figure 1 provides an overview of the sampling process for the pilot study.

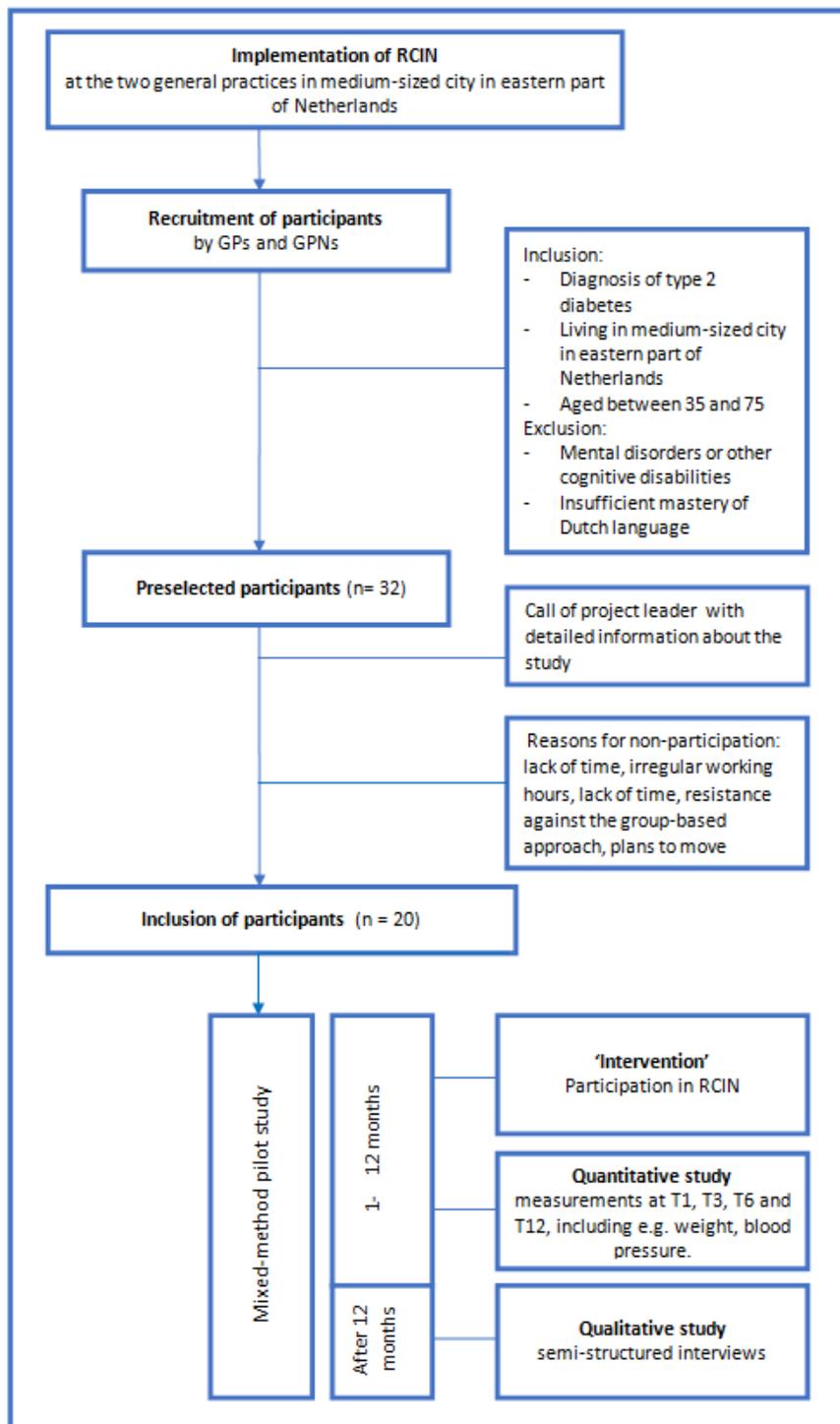


Figure 1. Flowchart of mixed-method pilot study

Data collection

Researcher AK developed an interview guide that aimed to answer the following research question: *'What are patients' experiences with participating in RCIN?'* Questions were asked related to the different elements of RCIN, such as the self-managing, group-based approach; self-management; the role of professionals; and lifestyle changes. Finally, all participants were asked to discuss what they felt was successful about RCIN. Table 1 shows examples of interview questions.

Interviews were conducted at the place and time convenient to the participants. Prior to each interview, written informed consent was obtained from each participant, including his or her consent for us to audio-record the interview. The interviews were conducted by MdK, who at the time had 22 years' experience with patient conversations and anamneses. The first interview was evaluated by AK, a trained interviewer with a degree in biomedical sciences, focusing on the quality and depth of questions and participants' answers. This feedback was used in performing the subsequent interviews. The questions were mostly open-ended, with some closed questions to encourage the participants to expand on an initial answer³³.

Table 1 Examples of interview questions

Did you change your diet during the RCIN? Why (not)? How have you experienced that change? What factors have influenced your diet change?
How did you experience the self-managing group setting? Did the group members contribute to something? What?
What were your experiences with self-monitoring? Did this have any added value?
What preconditions are essential for the success of RCIN? Which factors influenced the success of RCIN? What was difficult during RCIN?

Data analysis

The interviews were transcribed verbatim by two student assistants, using a guideline for transcribing interviews to increase consistency in the data preparation³⁴. HJH and MdK compared nine transcripts with the original audio records to check the accuracy of the transcript²⁸.

After all of the interviews had been conducted, we began a thematic data analysis using the software program Atlas.ti, version 8.0²⁸. We decided to use this inductive approach, to gain an in-depth understanding of patients' experiences. The analysis consisted of three steps^{28,35}.

Firstly, HJH closely read and re-read each transcript to become familiar with the data. Thereafter, two researchers (HJH and MdK) independently coded transcripts at the level of patients' statements or meaning units, such as words and sentences describing participants' experiences with RCIN. After

analysing two transcripts, they compared and discussed their codes until they reached agreement and were able to make write a first draft of the coding list. They used this list to analyse the remaining transcripts and iteratively compared, discussed, merged codes, and added new codes to the coding list after every fifth transcript. Secondly, after analysing all of the transcripts, HJH organised the codes into a mind map to identify categories. Based on this map, HJH and MdK discussed their preliminary conclusions as to which codes could be ordered differently.

The final phase of the analysis was performed during several team meetings (HJH, MdK, MD, HS) until agreement was reached. The researchers searched for relations by constantly comparing codes within and between the interviews²⁸. Eventually, the researchers identified and formulated themes, which they ordered into a conceptual framework of the participants' experiences with RCIN. The decisions we made during data analysis were documented in memos in order to ensure the study's transparency and to improve its reliability.

Results

Characteristics

From October to November 2016, a total of 20 semi-structured interviews were conducted, each lasting between 30 and 90 minutes. The interviews were largely conducted at participants' homes, except for one interview which took place in a restaurant at the request of the participant. During three of the interviews, non-participating partners were present.

Table 2 shows characteristics of the participants obtained from questionnaires used in the quantitative study on effectiveness of RCIN. The participants included 13 males and 7 females with ages ranging from 44 to 75 years old. The time elapsed since each patient's diagnosis with type 2 diabetes ranged from 1 to 46 years.

Table 2. Characteristics of participants in semi-structured interviews ($n = 20$)

Participant number	Gender (M/F)	Age (in years)	Time since diagnosis with type 2 diabetes (in years)	Education (high, intermediate, low)	Employment (Yes/No/Retired)
1	M	67	9	High	Retired
2	M	58	3	Intermediate	Yes
3	F	75	17	High	Retired
4	M	71	11	Intermediate	Retired
5	M	71	4	Intermediate	Retired
6	M	71	47	Intermediate	Retired
7	M	62	5	High	Retired
8	F	56	4	High	Yes
9	M	72	6	Intermediate	Retired
10	M	47	3	Intermediate	Yes
11	M	67	11	High	Retired
12	F	55	8	High	Yes
13	F	55	5	High	Yes
14	F	46	9	Intermediate	Yes
15	M	67	13	High	Retired
16	M	69	15	Low	Retired
17	M	67	18	High	Yes
18	M	67	14	High	Retired
19	F	44	1	High	Yes
20	F	53	2	Unknown	Yes

M = male; F= Female

high = graduated at college or university, intermediate = secondary vocational education, low = below secondary vocational education

Experiences with Recovery Circle in the Neighbourhood

Participants described a variety of experiences with RCIN, but our analysis revealed five main themes: (1) Taking responsibility for diabetes management; (2) Raising awareness about patients' own influence on diabetes; (3) Increased confidence in diabetes self-management; (4) The need of appropriate support; and (5) Acceptability of RCIN's format. Although each of these themes are described distinctly, three of the themes (Taking responsibility, Raising awareness and Increased confidence) were nevertheless closely related, centring on the personal impact of RCIN on participants. The other two themes (Appropriate support and Acceptability of format) corresponded to experiences with the organisational context of RCIN. Figure 2 shows the interrelation between the five themes. Table 3 presents an overview of the themes and categories, which are explained in more detail below along with by quotations from participants. These quotations were translated from Dutch into English and were edited to make them readable without loss of meaning.

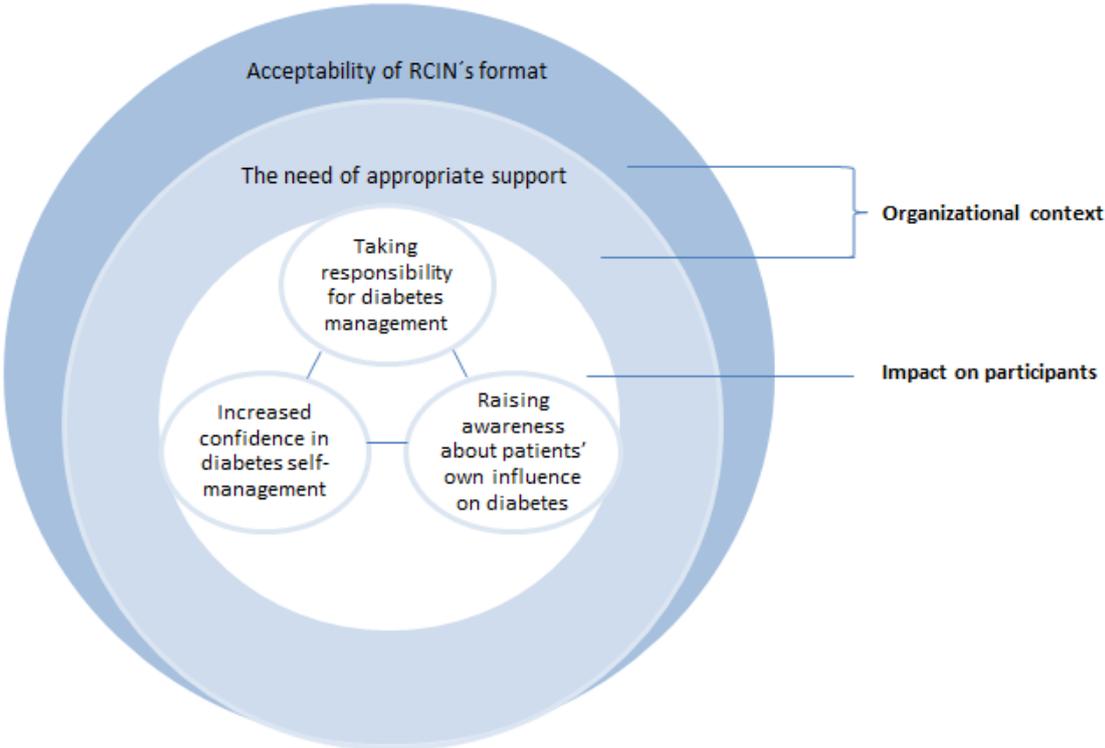


Figure 2. Conceptual framework of participants' experiences with RCIN

Table 3. Overview of themes and categories representing participants’ experiences with RCIN

Themes	Categories
1. Taking responsibility for diabetes management	Necessity of knowledge Influence of personal factors
2. Raising awareness about patients’ own influence on diabetes	Insight into healthy diet Effect of self-monitoring blood glucose levels
3. Increased confidence in diabetes self-management	Decision-making in medication management Maintaining lifestyle changes
4. The need of appropriate support	The role of GP and GPN Lifestyle coach as stimulator Importance of group interaction The contribution of social networks
5. Acceptability of RCIN’s format	Feasibility of self-managing approach Group size and diversity

Theme 1: Taking responsibility for diabetes management

The first theme covers participants’ experiences with taking responsibility for their own diabetes management via RCIN, focusing on the necessity of knowledge and the influence of personal factors.

Necessity of knowledge. Participants reported that knowledge about diabetes was necessary to take responsibility for their own diabetes management, and that participation in RCIN increased their knowledge about a healthy diet, the causes and consequences of diabetes, and interpreting blood glucose levels. Most of this information came from the dietician, interactions with other participants and information sessions during group meetings.

P16: 'I: Eh, what makes that you can do it yourself now? And not before? P: Knowing about it. That you know what's going on, and what happens, [...] which I did not know before. I: Definitely knowledge. P: Yes. Yes.'

Some participants, however, still felt that they lacked the knowledge to manage their diabetes and noted that RCIN should provide them with more information .

P13: 'I: The participants have to do it all themselves. That is too much to ask? P: Sure. Yes, because also as you have too little knowledge, you do not know what to do.'

Influence of personal factors. Participants also stated that their ability to manage diabetes was influenced by personal factors. For example, physical restrictions limited physical activity, impulsive behaviour negatively influenced diet change and perseverance helped to positively change behaviour.

P13: 'Yes, I see now and then myself going wrong, in food, so I have eh, I have very impulsive behaviour, I especially have that at night. [...] But for me, my impulse behaviour is very difficult to adjust and control.'

P1: 'I: Can you describe what exactly the trigger was? P: Well that's because of myself. I'm a bit of a nerd in that case. If I think that I should be able to do something, [...] I want to be able to do it myself. '

One woman said that the short-time period since she had been diagnosed with type 2 diabetes influenced her ability to manage diabetes; she therefore still appreciated the support from her GP or GPN:

P19: 'Eh I also have kept my controls, also because with the medication it did not go well, I found it important to eh discuss about that with the general practice nurse, because I only have diabetes since a few years so it is still searching for me and finding a way what suits me best.'

Theme 2: Raising awareness about patients' own influence on diabetes

Another theme that emerged was the awareness-raising effect of participating in RCIN, particularly with respect to healthy diet and the effects of self-monitoring blood glucose levels. Participants emphasised that RCIN generated an increased awareness of their influence on their own diabetes management, and even experienced RCIN as a 'wake-up call'.

P7: 'I: What are the positive factors for RCIN that make it successful? P: I think the awareness that you are diabetes patient, that you yourself can have a lot of control in deciding how you deal with it. I think that is a very positive point. And whether that is in physical exercise or in diet or in feelings, that does not matter.'

P5: 'What I am saying, I'm awakened by the RCIN. I started thinking different about everything. I am now more thinking about things, where I was used to think, I know everything, I have never thought about some things.'

Insight into healthy diet. Participants described various experiences with healthy eating due to participation in RCIN. Participants stated that they became aware of the positive influence of a low-carbohydrate diet on their diabetes.

P4: 'It's a revelation [...] to adjust your diet. That there was great profit to be gained with regard to your diabetes and your medicine use.'

Other participants stated that they had already been aware of the importance of a low-carbohydrate diet and had started to change their diets even before beginning RCIN; for these participants, RCIN did not significantly contribute to a change in diet.

P20: 'And I had been already on a low-carbohydrate diet for some time, so that was not such a big turnaround for me.'

Effect of self-monitoring blood glucose levels. The effect of self-monitoring blood glucose levels varied from positive to negative. The participants who experienced a positive effect emphasised that self-monitoring made them aware of the influence of diet on blood glucose levels and noted that they measured their blood glucose levels more frequently. Participants who had a negative experience stated that self-monitoring did not help them because it made them anxious. This anxiety was caused by the unpleasant feeling of a finger-prick test and/or fear of a high glucose level.

P20: 'I: Was it useful, that you could see those values yourself? P: Yes. Because it has given me more insight indeed in what is and what is not good for me. [...] But especially with, with food, I have at some point excluded certain things, that I can no longer take. [...]. So, yes, I got more insight from ahh that does increase my values.'

P12: *'When I went to blood sampling, I usually used to sample blood once in every three months, then I did that at the general practice, because I find that, I always find it a bit scary. A bit awful too, blood sampling by yourself.'*

Theme 3: Increased confidence in diabetes self-management

The third theme describes participants' confidence in self-managing diabetes, particularly in medication management and maintenance of lifestyle changes.

Decision-making in medication management. Experiences regarding decision-making in medication management varied widely among participants: from self-adaptation of medication to having all of the decisions made by their GP or GPN. Participants who experienced an increased confidence in making decisions about their medication management said that knowledge about their medication was an important factor.

P9: *'I did not go to the GP to discuss about medication reduction. I did that myself [...].'*

P17: *'With the knowledge of RCIN eh, I have gained more confidence that without the help of the doctor and medication, I can also have a better future than eh, than in the past without RCIN.'*

Other participants noted that they lacked the confidence to manage their medication themselves, and said that their GP or GPN made or supported decisions about medication management.

P12: *'Well, I listen to the general practitioner in that sense, I am not so eh outspoken, and then I think yes he will have the best intentions for me in that sense.'*

Maintaining lifestyle changes. The self-confidence of participants with regard to the maintenance of lifestyle changes ranged from confident to limited confidence. Some participants said that their increased confidence was related to the positive effect of the lifestyle changes on their mood, feelings and health.

P9: *'I feel, yes, I feel so, I feel so good. That is, yes that is it. I can really notice it in that way, really. [...] It is really great, I'm happy about it. So that's the reason I never give it away. I am really convinced about that.'*

Participants who described a lack of confidence in maintaining lifestyle changes felt that RCIN was a catalyst for a lifestyle change process, although the duration was too short and they therefore needed more time in the program to increase their confidence.

P2: *'Yes, what I just said. A kind of catalyst for a process. [...] It is a process with ups and downs. As far as my health and my diabetes is concerned, it is a bit less at the moment. But I still have the feeling that it is an ascending line. And yes, therefore, I find the one-year process too short for my specific situation. So I am still very curious how it will be in one, two or three years.'*

Theme 4: The need of appropriate support

The fourth theme concerns participants' experiences with appropriate support within RCIN, including support from the GP, GPN, lifestyle coach, group members and social network.

The role of GP and GPN. Participants stated different experiences regarding the need of support from GPs and general practice nurses during RCIN. Some participants still preferred to get support from these primary healthcare professionals and felt that connecting with the GP or GPN was still valuable.

P18: 'Well, well in collaboration, if you have doubts or whatever, I certainly do not want the general practitioner to leave [...]. Then that, you can approach him actually. And yes, and sometimes you actually want to go once a year or something, that you still talk about your health, what I said, kind of a check-up.'

P12: 'I would like to have a bit of support from the general practice nurse. [...] I'd prefer not to go there, but for me it is a reassurance [...] for the medical aspect.'

Other participants preferred to have support from RCIN's lifestyle coach in addition to their GP or GPN. They were unable to choose between the support from these two professionals because each has his or her own area of expertise.

P19: 'I think you have some moments when you can still have a need for a lifestyle coach and those things you do not speak so quickly about with a general practice nurse. The general practice nurse is more for medicines and real health and eh, a lifestyle coach focuses more on getting a better health and a better approach to get there.'

Some participants said that during RCIN they went either less frequently or not at all to their GP or GPN for their diabetes. They claimed, for example, that the support from the lifestyle coach was more valuable because he or she focused more on the mental instead of the medical aspects of diabetes.

P2: 'Before I started working with RCIN, I came to the general practice nurse every three months. Well, from my perspective [...], she just focused on medical values but not what was behind them. [...] I find that lifestyle coach had a lot more insight into that [...].'

Lifestyle coach as stimulator. On one hand, participants found that the RCIN lifestyle coach helped them to better understand diabetes by asking questions and making participants aware of their own influence on their disease. Most of this support was given during one-on-one conversations between the participant and the lifestyle coach.

P20: 'I: [...] What was the contribution of the lifestyle coach to all the changes you have been through during the last year? P: Yes, I liked that support because you're going to look at things differently. That really makes you think.'

On the other hand, some participants said that the lifestyle coach did not contribute to their lifestyle changes because they did not need his or her support in order to change their lifestyles.

P1: *'I've actually done most of the changes more or less myself. I actually did not have any problems with it, so I could have probably managed it without a lifestyle coach.'*

Importance of group interaction. Some felt that the interaction with group members was the most important success factor; other participants, however, said that the group members did not contribute to their success. Participants who experienced the interaction as important stated that the group members provided support and contributed to their motivation. Other participants experienced no support from group members, because they found that the other group members had less knowledge of diabetes.

P13: *'[...] Eh that the power of working together with others is, I think, the most important success factor. People in the same situation, can learn from each other and eh, you feel supported. Eh motivated and eh, yes that is eh, yes you learn things from it. I think that is the most important and that is very valuable.'*

P10: *'Uh, from the start I already had more knowledge than the peers within the group. And maybe I was already, in terms of diabetes, a slightly heavier case because I injected a lot more and used more medication than most of them. I was also one of the younger ones. Eh and yes, the group did not contribute to anything.'*

The level of support that participants felt they had gained from the RCIN walking sub-group also varied. On one hand, participants found that the walking group did not contribute to increased physical activity, while other participants experienced the walking group as a motivator to increase physical activity.

P1: *'And in the walking group it's just that you talk to each other a lot and I like that and that's what actually makes it more pleasant to walk.'*

The contribution of social networks. On one hand, participants found that their social network contributed to positive lifestyle adaptations, including diet change and increased physical activity. Therefore, they advocated that relatives should be more involved in RCIN because they have an important role in diabetes management. On the other hand, some participants felt little or no support from their social network for several reasons, including having a small social network.

P9: *'Yes really, to be honest, [...] without my girlfriend, I would have had a difficult time and probably I did not succeed.'*

P10: *'1: Has your social network played a role in the past year? [...] P: Eh no, not really. My parents both still live and that is all I have here in the Netherlands.'*

Theme 5: Acceptability of RCIN's format

Our last theme covers the experiences of participants with the format of RCIN, including the feasibility of the self-managing approach as well as group size and diversity.

Feasibility of self-managing approach. In RCIN's self-managing approach, participants were expected to organise the group's activities on their own, rather than being guided by a professional or project leader. Opinions about this approach varied, with participants claiming that it encouraged them to take responsibility and others finding that the approach asked too much of them.

P8: 'I: What did you think about that approach of eh, a self-managing group? P: Well I liked that. I: In which way? P: That you decide together on things and do things together and that you are in the end responsible for your final goal.'

P13: '[...] I found more things really difficult, [...] but okay, actually I've already told you that too much must be addressed by yourself [...].'

The participants suggested several adjustments to the self-managing approach. Firstly, participants mentioned the importance of a leader within the self-managing group, either a group member or lifestyle coach who could help to structure group meetings. Secondly, participants felt that it was necessary for participants to learn how to formulate their own needs.

P17: '[...] I think the group eh, that we as a group are always approached with, say what your needs are and then we try to meet them, but I think that the group first should be explained, and must be guided in formulating needs. What are your needs, what would you want to use?'

Finally, participants suggested that the project coordinators provide a clear overview of RCIN's structure, focusing on the division of tasks and responsibilities, since these were not clear at the beginning. They said that this resulted in divergent expectations because people did not know what was expected from them.

P17: 'P: The structure, the structure of the project, was not clear to many people. I: No, so they could have given more clarity? P: Yes, if you write down a good organisational structure and, and just on one A4 sheet, you see exactly, oh this is the group, that's me, and, and, and this is how it works and this is how we will work together.'

Group size and diversity. Participants found that the composition of the self-managing group influenced its functionality; the group's large size hindered communication, although communication was improved by creating sub-groups.

P8: 'P: Yes, there are a number of people who find it difficult to talk in a large group. Subgroups can offer a solution for this.'

In addition, some participants felt that there were too many differences between the group members in, for example, in age or level of knowledge about diabetes. These participants noted that although this limited the added value of the group, they nevertheless tried to get in contact with group members that they liked.

P14: 'It was less successful for me to be in a group with 15 to 20 old men who do not have the information [...]. So the organisation could consider, who do you put together and who is where in the process and in the knowledge [...]. That would be more valuable.'

P13: '[...] Anyway, I was trying to create that I came to those people which made me feel comfortable and then it is fun. Good. Supporting.'

Discussion

Principal findings

To our knowledge, this is the first study to describe the experiences of patients with a self-managing, group-based approach to diabetes care. Their experiences were grouped into the following themes: (1) Taking responsibility for diabetes management, (2) Raising awareness about patients' own influence on diabetes, (3) Increased confidence in diabetes self-management, (4) The need of appropriate support, (5) Acceptability of RCIN's format. We discuss our findings regarding these themes below in the context of previous research.

Comparison of findings with previous research

First, we found that patients' ability to take responsibility for diabetes management via RCIN was affected by two factors: knowledge and personal factors. Obtaining new knowledge was perceived as most essential prerequisite for diabetes management. The importance of knowledge is also identified in a study by Rise, Pellerud, Rygg & Steinsbekk (2013), which noted that obtaining new knowledge is crucial for diabetes management³⁶. However, Rise et al. argued that increased knowledge and insight do not automatically lead to behavioural change. According to the 'stage of change' model, the patient must move through stages before he or she makes any behavioural change³⁷. The different 'stages of change' in the process of lifestyle change may explain why not all of the patients in our study were able to manage their disease. Therefore, we recommend that RCIN explore the stage of change that each patient has reached, including exploring what knowledge a patient needs to move through the stages of change. This would help to tailor information and education to patients' needs.

In addition, our study indicates that personal factors, such as time since diagnosis with type 2 diabetes, influenced patients' ability to manage diabetes. This is in agreement with the study of Schwennesen, Henriksen & Willaing (2016) identifying that a patient's time of diagnosis with diabetes can influence his or her feeling of competence³⁸. Moreover, we found that physical restrictions limited patients' ability to be physically active. This finding is confirmed by Booth, Lewis, Dean, Hunter & McKinley (2013), who showed that diabetes patients who have co-morbidities such as arthritis were limited in their ability to be physically active³⁹. Booth et al. also identified factors which limit diabetes management, such as psychological well-being and depression, but these were not explored in our study. Nevertheless, these findings indicate that individual circumstances should be considered when assessing patients' ability to self-manage their disease. We recommend an

assessment of these individual circumstances in the selection procedure for participants in RCIN, so that support can be tailored to their specific situations.

Second, our study shows that patients' awareness about their influence on diabetes was influenced by self-monitoring of blood glucose. Some patients felt that more frequent self-monitoring of glucose levels contributed to their awareness and understanding of diabetes and the effective management of their condition. This is in line with a systematic review by Cradock, Laighin, Finucane, Gainforth, Quilan & Ginis (2017), who found that self-monitoring resulted in improved disease control⁴⁰. Another study reported that insight into blood glucose levels resulted in a significantly better understanding of diabetes for patients⁴¹, which is also confirmed by our study.

A surprising finding in our study was that self-monitoring caused anxiety in some patients, which limited their ability to self-monitor their glucose levels. This is confirmed by a Randomized Controlled Trial by O'Kane, Bunting, Copeland & Coates (2008) which found that patients in a self-monitoring group reported to feel more anxiety compared to patients who did not self-monitoring. In addition, O'Kane et al. found higher levels of distress and depressive symptoms in patients who self-monitor blood glucose levels and a limited effect of self-monitoring on glycemic control. They suggest that these negative effects may be related to a lack of knowledge about how to react on deviant blood glucose levels⁴². Based on these findings, our recommendation is to further investigate why patients in RCIN are anxious about self-monitoring of glucose levels and how this anxiety can be resolved or reduced.

Third, our study explored patients' experiences regarding their confidence in self-manage diabetes medication, including insulin and tablets. Some patients appreciated the continued support of their GP or GPN, but others reduced or even stopped their medication by themselves. However, we were unable to find any literature on perspectives of patients and professionals on self-adjustment of diabetes medication. A small amount of literature is available on self-adjustment of insulin dosage in people with type 2 diabetes. For example, Kramer, Kuniss, Kloos, Lehmann, Müller, Sanow & Lorkowski (2016) compared patients who self-adjusted their insulin dosage by following rules with those who adjusted their insulin using personal feelings or experiences. This study found that people in both groups were able to adjust their insulin dosages and that no difference was found in blood glucose levels between the two groups⁴³. Moreover, a review of Powell & Gibson (2003) on self-management education for adults with asthma found no significant differences between patients who had adjusted their medication using a written action plan (i.e. an individualised plan for self-management during asthma exacerbations) and those whose dosages were adjusted by their doctor. This suggests that both methods can be used in medication management of asthma, although Powell

et al. wrote that the choice of approach should depend on patient preferences and capabilities⁴⁴. This literature indicates that self-adjustment of medication can work in practice. However, as we were unable to find any literature on perspectives of patients and professionals on self-adjustment of diabetes medication (including reduction), we recommend that further research investigate their perspectives on self-adjustment of medication in diabetes patients. This research might also investigate whether an individualised written action plan (describing, for example, when and how to modify medication and when to access the GP or GPN in response to worsening symptoms) would be helpful for self-adjustment in diabetes patients.

Fourth, other important findings were related to the need of appropriate support, including support from group members, social networks and lifestyle coaches. Patients who experienced interaction with group members as important said that this interaction contributed to increased motivation, knowledge and lifestyle changes. These findings are in line with those of previous studies of diabetes patients, which report that support from others in similar situations helps to strengthen self-management, improves physical activity and reduces insecurity^{45, 46}. Moreover, a recent systematic review of Odgers-Jewell et al. (2017) reported that a benefit of peer support is that patients with Type 2 diabetes are able to share knowledge and disease experiences, which are not usually provided by healthcare professionals. These findings might explain the added value of group interaction within RCIN.

By contrast, we found that other patients experienced limited or no support from the group members because they felt that the group members' characteristics were either too diverse or the group was too large. This finding is consistent with a study by Borek and Abraham (2018) which reports that people who are markedly different from others are unlikely to participate in groups; however, the same study shows that diversity within the group can support sharing of knowledge and skills among group members⁴⁷. In line with our results, previous studies have shown that group size can influence group functioning; groups with twenty or more members can reduce direct interaction between group members, which may result in non-optimal group functioning^{48, 49}. We therefore recommend that the current group size of 20 people is maintained, since this size allows for more homogeneous sub-groups.

Moreover, support from relatives was perceived as important because it positively influenced patients' adherence to diet and physical activity recommendations. Several studies have shown that support from social networks, provided by family, friends, neighbours or others, maximises the effect of self-management interventions on people with type 2 diabetes⁵⁰. However, our study found that although not all patients had support from their relatives, this was not generally experienced as a

problem. In line with this finding, Lidegaard, Schwennesen, Willaing & Faerch (2016) reported that support from relatives is not necessarily needed because patients might prefer to be involved in a network with their peers⁵¹. Thus, the active involvement of relatives in RCIN should be considered carefully and may be an important area of concern. Our recommendation is to allow patients to invite their relatives to one or two group sessions and to inform relatives at the beginning of RCIN about their potential influence on patients' behaviour.

Additionally, patients considered the lifestyle coach's support important, appreciated one-on-one conversations with their coach about coping with the disease, including its mental health aspects, while their GP or GPN focused mainly on its medical aspects. The importance of mental support is confirmed by Young-Hyman, Groot, Hill-Briggs, Gonzalez, Hood & Peyrot (2016), who write that diabetes has a major impact on people's lives and psychosocial care is therefore essential to diabetes treatment. Still, some patients in our study stated that they did not need the lifestyle coach's support. Thus, we recommend that RCIN provide the option of one-on-one psychosocial care, ideally from a professional such as a lifestyle coach who focuses on the disease's psychosocial aspects⁵².

In the fifth theme, patients described a diversity of experiences concerning the self-managing approach of RCIN. Some felt that they had been given too much responsibility, while others stated that the approach encouraged them to take responsibility for their diabetes management. This result is in agreement with findings from various studies which indicate that patients tend to have different positions regarding responsibility for their disease management, ranging from full responsibility for their own disease management to leaving, for example management of medication to health professionals^{36, 53}. Previous studies have reported that patients' ability to take responsibility for their own diabetes management depends on several patient characteristics. Gorter, Tuytel, Leeuw, Bensing & Rutten (2011) found that people with type 2 diabetes who suffer from complications or mobility problems are less willing to take responsibility for their diabetes; however, this study also reported that women with higher education are more willing to take responsibility⁵³. Although these relationships were not found in our study, more knowledge concerning which patients do or do not profit from this approach is needed, since considering patients' distinct characteristics may help to provide more individualised care.

Strengths and limitations

A major strength of our study is that it is the first explorative study in the Netherlands on patients' experiences with a self-managing, group-based approach to Type 2 diabetes management. Besides, participants were interviewed shortly after the end of the project, which may have reduced recall bias. Another strength is that the study's validity was increased through independent transcript

coding by two researchers, which enhanced the consistency and reliability of this process. Codes and themes were discussed by the research team, contributing to inter-observer reliability and decreasing the risk of research bias. Finally, to increase the study's internal validity, several transcripts were checked for accuracy against the corresponding audio recordings,.

One important limitation of our study is that the interviews and data analysis were not iteratively conducted. This may have limited the exchange of information, ideas and perspectives from the data analysis, which were explored in subsequent interviews. Consequently, this may have decreased the richness of the data. A second limitation is that the validity of our findings was not improved by conducting a member check, which asks the participant whether our interpretation of the interview is correct²⁸. This check was not conducted because the time between the interview and possible member check was too long (almost six months); this would have made any proposed additions or changes questionable^{28, 54}. Furthermore, the recruitment of participants via convenience sampling may have contributed to selection bias, increasing the likelihood that more motivated and enthusiastic participants were included in our study. Moreover, the diversity of the sample could be limited since the participants came from only two general practices, their family status was unknown and most of them were highly educated. A final limitation is that our interview guide was not organised by topic and no emerging questions were added to the interview guide during the interview process. This could have limited our in-depth insight into the experiences of patients.

Conclusions

This study identified multiple experiences of patients with a group-based self-managing approach of diabetes care, defined as RCIN. In general, the results provide evidence that RCIN encouraged patients to self-manage diabetes by acting on their perception of responsibility, awareness, and confidence. Confirmed by previous research, obtaining new knowledge about diabetes during RCIN was perceived as an important prerequisite to take responsibility for diabetes management. A balance issue is important in weighing the value of the lifestyle coach, focusing on psychosocial support, against the support on medical aspects from primary healthcare professionals. Moreover, self-adaptation of diabetes medication and self-monitoring of glucose levels appeared not self-evident for several reasons. Therefore, further research should explore more specifically the in-depth perspectives of patients' and healthcare professionals on self-adaptation of diabetes medication and self-monitoring of glucose levels. Finally, since experiences regarding the need of support and the self-managing approach of RCIN appears to be influenced by patients' individual needs and capabilities, we advise a to personalize the approach by focusing on their individual needs and capabilities.

Recommendations for practice

The most important recommendations for practice is that RCIN should identify individuals' capabilities, pre-existing knowledge, circumstances and needs, because our study indicates that it is important to provide more personalized support and information. A possible validated tool to assess these diabetes patients' needs is the LMG Skills, Confidence and Preparedness Index (SCPI) ⁵⁵. Another possible tool is the structured diabetes consultation model, which facilitates a person-centred approach of care ⁵⁶. These tools can help professionals to identify which knowledge, support and education a patient needs to make behaviour changes. Second, we recommend that the group size of 20 people is maintained, because this size creates the opportunity to make sub-groups with more homogeneity of people with an interest for a certain subject. Within the group and these sub-groups, more attention should be paid on group coherence, including a pleasant atmosphere and high levels of trust in the group will contribute to an optimal group functioning ⁵⁷. Finally, we recommend to allow patients to invite their relatives to one or two group sessions and to inform relatives at the beginning of RCIN about their potential influence on patients' behaviour.

Recommendations for further research

Since no literature was found on experiences with self-adjustment of diabetes medication, we recommend that further research should investigate more specifically the perspectives of patients and healthcare professionals regarding self-adjustment of diabetes medication. This research could also investigate whether an individualized written action plan, wherein for example is described when and how to modify medication and when to access the general practice nurse or GP in response to worsening diabetes, would be helpful for self-adjustment and reduce medication in diabetes patients. Second, it is recommended to identify why patients are anxious for self-monitoring of glucose levels and how this can be reduced or resolved. This could help to improve self-management of diabetes. Third, more knowledge is needed concerning which patients do or do not profit from RCIN, because taking into account patients' characteristics (e.g. family status) may help to provide more individualized support within RCIN. Finally, there is also a need for further research on RCIN's format. The findings from this study suggest that patients can benefit from a self-managing approach, although this is the first study on the experiences of patients with regard to this innovative approach of diabetes care. Hence, further research should identify the long-term experiences and effects of RCIN on patients.

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Authors' contributions

AK and HS conceptualised the pilot study and MK did the fieldwork. HJH and MK analysed the data under the supervision of MD. HJH wrote this article with input and feedback from HS, MD and MG. The author declared no potential conflicts of interest with respect to the research and authorship of this article.

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References

1. International Diabetes Federation. IDF Atlas diabetes. 2003.
2. International Diabetes Federation. IDF Diabetes Atlas. 8th ed2017.
3. Volksgezondheid en Zorg. Diabetes Mellitus 2016 [cited 2018 01-02]. Available from: <https://www.volksgezondheidenzorg.info/onderwerp/diabetes-mellitus/cijfers-context/huidige-situatie#node-prevalentie-diabetes-naar-leeftijd-en-geslacht>.
4. World Health Organization. Global report on diabetes: World Health Organization; 2016.
5. Rijksinstituut voor Volksgezondheid en Milieu. Verkenning Toekomst Volksgezondheid: Een gezonder Nederland. Bilthoven, The Netherlands: Rijksinstituut voor Volksgezondheid en Milieu2014.
6. Rutten G, De Grauw W, Nijpels G, Houweling S, Van de Laar F, Bilo H, et al. NHG-Standaard Diabetes mellitus type 2 (derde herziening). Huisarts Wet. 2013;56(10):512-25.
7. Dutch Diabetes Federation. NDF Standard of Care-adults with type 2 diabetes [NDF Zorgstandaard–diabetes type 2 volwassenen]. Amersfoort: Dutch Diabetes Federation; 2015.
8. American Diabetes Association. Standards of medical care in diabetes—2017. Diabetes care. 2017;36(Suppl 1).
9. Trento M, Passera P, Bajardi M, Tomalino M, Grassi G, Borgo E, et al. Lifestyle intervention by group care prevents deterioration of Type II diabetes: a 4-year randomized controlled clinical trial. Diabetologia. 2002;45(9):1231-9.
10. Elliott AJ, Harris F, Laird SG. Patients' beliefs on the impediments to good diabetes control: a mixed methods study of patients in general practice. Br J Gen Pract. 2016;bjgpdec-2016-66-653-elliott-fl-p.
11. Rushforth B, McCrorie C, Glidewell L, Midgley E, Foy R. Barriers to effective management of type 2 diabetes in primary care: qualitative systematic review. Br J Gen Pract. 2016;66(643):e114-e27.
12. García-Pérez LE, Álvarez M, Dilla T, Gil-Guillén V, Orozco-Beltrán D. Adherence to Therapies in Patients with Type 2 Diabetes. Diabetes Therapy. 2013;4(2):175-94.
13. Peters ML, Huisman EL, Schoonen M, Wolffenbuttel BHR. The current total economic burden of diabetes mellitus in the Netherlands. The Netherlands journal of medicine. 2017;75(7):281-97.
14. King DE, Mainous AG, Carnemolla M, Everett CJ. Adherence to healthy lifestyle habits in US adults, 1988-2006. The American journal of medicine. 2009;122(6):528-34.
15. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions: a review. Patient education and counseling. 2002;48(2):177-87.
16. World Health Organization. Therapeutic patient education: continuing education programmes for health care providers in the field of prevention of chronic diseases: report of a WHO working group. 1998.
17. Glasgow RE, Hampson SE, Strycker LA, Ruggiero L. Personal-model beliefs and social-environmental barriers related to diabetes self-management. Diabetes care. 1997;20(4):556-61.
18. Jarvis J, Skinner TC, Carey ME, Davies MJ. How can structured self-management patient education improve outcomes in people with type 2 diabetes? Diabetes, obesity & metabolism. 2010;12(1):12-9.
19. Funnell MM, Anderson RM. Empowerment and self-management of diabetes. Clinical diabetes. 2004;22(3):123-7.
20. Vermeire E, Van Royen P, Coenen S, Wens J, Denekens J. The adherence of type 2 diabetes patients to their therapeutic regimens: a qualitative study from the patient's perspective. Practical Diabetes. 2003;20(6):209-14.
21. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the chronic care model, Part 2. Jama. 2002;288(15):1909-14.
22. Funnell MM, Brown TL, Childs BP, Haas LB, Hoseney GM, Jensen B, et al. National standards for diabetes self-management education. Diabetes care. 2009;32(Supplement 1):S87-S94.

23. Deakin T, McShane CE, Cade JE, Williams R. Group based training for self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database Syst Rev.* 2005;2(2).
24. Odgers-Jewell K, Ball LE, Kelly JT, Isenring EA, Reidlinger DP, Thomas R. Effectiveness of group-based self-management education for individuals with Type 2 diabetes: a systematic review with meta-analyses and meta-regression. *Diabetic medicine : a journal of the British Diabetic Association.* 2017;34(8):1027-39.
25. Steinsbekk A, Rygg LO, Lisulo M, Rise MB, Fretheim A. Group based diabetes self-management education compared to routine treatment for people with type 2 diabetes mellitus. A systematic review with meta-analysis. *BMC health services research.* 2012;12:213.
26. ter Haar H, Schers, H.J., Stoteler, P., Kuijpers, A. . Projectplan Recovery Circle in the Neighbourhood [Projectplan Herstelcirkel in de Wijk] [unpublished].
27. Kuijpers A, Schers, H.J. Research report pilot study Recovery Circle in the Neighbourhood [Onderzoeksrapport pilot studie Herstelcirkel in de Wijk]. [unpublished].
28. Green J, Thorogood N. *Qualitative methods for health research: Sage;* 2014.
29. Lucassen PLBJ, olde Hartman T. *Qualitative research [Kwalitatief onderzoek]: Bohn Stafleu van Loghum;* 2006.
30. Kuijpers A, Schers, H.J. Study protocol Recovery Circle in the Neighbourhood [Onderzoeksprotocol Herstelcirkel in de Wijk] [unpublished].
31. Municipality of Nijmegen. *City and district monitor [Stads- en wijkmonitor]. Nijmegen, (O&S) Oes;* 2016.
32. Martinez-Mesa J, Gonzalez-Chica DA, Duquia RP, Bonamigo RR, Bastos JL. Sampling: how to select participants in my research study? *An Bras Dermatol.* 2016;91(3):326-30.
33. Rubin HJ, Rubin IS. *Qualitative interviewing: The art of hearing data. 3rd edition ed: Thousand Oaks: Sage;* 2012.
34. Radboud umc. *Manuel for transcribing interviews [Handleiding voor het uitwerken van interviews]. Nijmegen*2016.
35. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative research in psychology.* 2006;3(2):77-101.
36. Rise MB, Pellerud A, Rygg LØ, Steinsbekk A. Making and maintaining lifestyle changes after participating in group based type 2 diabetes self-management educations: a qualitative study. *PLoS one.* 2013;8(5):e64009.
37. Prochaska JO, DiClemente CC, Norcross JC. In search of how people change: Applications to addictive behaviors. *American psychologist.* 1992;47(9):1102.
38. Schwennesen N, Henriksen JE, Willaing I. Patient explanations for non-attendance at type 2 diabetes self-management education: a qualitative study. *Scandinavian journal of caring sciences.* 2016;30(1):187-92.
39. Booth AO, Lowis C, Dean M, Hunter SJ, McKinley MC. Diet and physical activity in the self-management of type 2 diabetes: barriers and facilitators identified by patients and health professionals. *Primary health care research & development.* 2013;14(3):293-306.
40. Craddock KA, G OL, Finucane FM, Gainforth HL, Quinlan LR, Ginis KA. Behaviour change techniques targeting both diet and physical activity in type 2 diabetes: A systematic review and meta-analysis. *The international journal of behavioral nutrition and physical activity.* 2017;14(1):18.
41. Heisler M, Piette JD, Spencer M, Kieffer E, Vijan S. The relationship between knowledge of recent HbA1c values and diabetes care understanding and self-management. *Diabetes care.* 2005;28(4):816-22.
42. O'kane MJ, Bunting B, Copeland M, Coates VE. Efficacy of self monitoring of blood glucose in patients with newly diagnosed type 2 diabetes (ESMON study): randomised controlled trial. *bmj.* 2008;336(7654):1174-7.
43. Kramer G, Kuniss N, Kloos C, Lehmann T, Müller N, Sanow B, et al. Principles of self-adjustment of insulin dose in people with diabetes type 2 and flexible insulin therapy. *Diabetes research and clinical practice.* 2016;116:165-70.

44. Powell H, Gibson PG. Options for self-management education for adults with asthma. *Cochrane Database Syst Rev.* 2003(1):Cd004107.
45. Rygg LO, Rise MB, Lomundal B, Solberg HS, Steinsbekk A. Reasons for participation in group-based type 2 diabetes self-management education. A qualitative study. *Scandinavian journal of public health.* 2010;38(8):788-93.
46. Ferrand C, Perrin C, Nasarre S. Motives for regular physical activity in women and men: a qualitative study in French adults with type 2 diabetes, belonging to a patients' association. *Health & social care in the community.* 2008;16(5):511-20.
47. Borek AJ, Abraham C. How do Small Groups Promote Behaviour Change? An Integrative Conceptual Review of Explanatory Mechanisms. *Applied psychology Health and well-being.* 2018;10(1):30-61.
48. Blenko MW, Mankins MC, Rogers P. *Decide & deliver: 5 steps to breakthrough performance in your organization:* Harvard Business Press; 2010.
49. Jaques D, Salmon G. *Learning in groups: A handbook for face-to-face and online environments:* Routledge; 2007.
50. Koetsenruijter J, van Eikelenboom N, van Lieshout J, Vassilev I, Lionis C, Todorova E, et al. Social support and self-management capabilities in diabetes patients: An international observational study. *Patient education and counseling.* 2016;99(4):638-43.
51. Lidegaard L, Schwennesen N, Willaing I, Færch K. Barriers to and motivators for physical activity among people with type 2 diabetes: patients' perspectives. *Diabetic Medicine.* 2016;33(12):1677-85.
52. Young-Hyman D, de Groot M, Hill-Briggs F, Gonzalez JS, Hood K, Peyrot M. *Psychosocial Care for People With Diabetes: A Position Statement of the American Diabetes Association.* *Diabetes Care.* 2016;39(12):2126-40.
53. Gorter KJ, Tuytel GJ, de Leeuw RR, Bensing JM, Rutten GE. Opinions of patients with type 2 diabetes about responsibility, setting targets and willingness to take medication. A cross-sectional survey. *Patient education and counseling.* 2011;84(1):56-61.
54. Koelsch LE. Reconceptualizing the member check interview. *International Journal of Qualitative Methods.* 2013;12(1):168-79.
55. Aronson R, Brown RE, Jiandani D, Walker A, Orzech N, Mbuagbaw L. Assessment of self-management in patients with diabetes using the novel LMC Skills, Confidence and Preparedness Index (SCPI). *Diabetes research and clinical practice.* 2018;137:128-36.
56. Rutten GE, van Vugt HA, de Weerd I, de Koning E. Implementation of a Structured Diabetes Consultation Model to Facilitate a Person-Centered Approach: Results From a Nationwide Dutch Study. *Diabetes care.* 2018:dc171194.
57. Vissenberg C, Nierkens V, van Valkengoed I, Nijpels G, Uitewaal P, Middelkoop B, et al. *The impact of a social network based intervention on self-management behaviours among patients with type 2 diabetes living in socioeconomically deprived neighbourhoods: a mixed methods approach.* SAGE Publications Sage UK: London, England; 2017.