

Subjects' experiences of a nutrition education programme: a qualitative study of adults with type 2 diabetes mellitus living in a rural resource-limited setting in South Africa

Jane Muchiri,¹ Gerda Gericke,¹ Paul Rheeder^{2*}

¹Department of Human Nutrition, University of Pretoria, Pretoria, South Africa

²Department of Internal Medicine, University of Pretoria, Pretoria, South Africa

*Corresponding author, email: Jane.Muchiri@up.ac.za

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Abstract

Objective: The objective of the study was to explore the views and experiences of adults with type 2 diabetes mellitus on a nutrition education programme.

Design: Interpretative phenomenological design.

Setting: The setting was two community health centres in Moretele, North West province, South Africa.

Subjects and outcome measures: The study subjects were adults with type 2 diabetes mellitus ($n = 41$, aged 40–70 years) participating in a nutrition education intervention (one-year randomised controlled trial). The intervention was based on the assessed nutrition education needs of the target group, and included the provision of nutrition education materials. Data were collected at the end of the training intervention (eight weeks) and at the end of the study (12 months). A self-administered, open-ended questionnaire was used at eight weeks ($n = 31$). Five focus group discussions were conducted at 12 months. A framework thematic analysis technique was employed.

Results: The majority of participants indicated that they enjoyed the nutrition education programme at the two time periods. They were satisfied with its content and delivery. The education materials (pamphlet and fridge or wall poster) were seen as useful for the whole family, and as constant reminders of positive behaviour. Benefits indicated by the participants included a gain in health knowledge and skills, positive dietary changes, and improved health and family support. Participants also recommended the programme to other people with diabetes mellitus. Positive educator characteristics, such as competence, patience, being respectful and approachable, were cited as desirable.

Conclusion: Participant-customised nutrition education can contribute to programme satisfaction, perceived benefits and adherence to the programme. The provision of education materials should form part of such programmes. Facilitators of nutrition education programmes should take responsibility for employing desirable personal attributes as this can enhance client participation.

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Introduction

There is global recognition of the need to effectively manage diabetes mellitus in the wake of the rising burden of this condition. Patient education is a core component of diabetes mellitus management and care.¹ Such education aims to empower the patient with knowledge, skills and the motivation necessary for appropriate self-care.¹ People with diabetes mellitus have to engage with self-care practices that relate to dietary choices, physical activity, blood glucose monitoring and foot care on a daily basis. Thus, they need to be adequately equipped to handle these activities. Dietary self-care is cited by patients as one of the most difficult of the self-care activities.² Interventions aimed at improving dietary self-care are invariably necessary since diet plays a significant role in metabolic control.³ Such interventions may be needed particularly in

populations with low socio-economic status, observed to have poor long-term diabetes mellitus management outcomes.⁴ Furthermore, the challenge of appropriate dietary self-management for people with diabetes mellitus appears to be greater in those with limited resources than it is for their counterparts with more resources.⁵

Although randomised controlled trials (RCTs) are considered to be the gold standard for evaluating interventions, certain factors which could influence an intervention's delivery and performance, including aspects relating to the participants' experiences, cannot be evaluated in this way. Therefore, process evaluation is considered an important component of an RCT, as among other assessments, it allows exploration of participants' perceptions of an intervention.⁶

Participants' judgement of a programme can influence their participation and consequent achievement of the intended goals.

The information obtained from evaluating participants' experience of a programme forms the basis for improving ongoing or future interventions and interpreting study outcomes.

Qualitative research has widely been used in diabetes mellitus healthcare research,⁷ including an exploration of participants' needs and preferences for education programmes^{8,9} and their perceptions of such programmes.¹⁰ Despite qualitative research being documented as adding value to RCTs,¹¹ very few diabetes mellitus dietary-focused interventions have utilised qualitative methods alongside RCTs. In addition, there are limited data on the experiences of people with diabetes mellitus with regard to participation in dietary interventions.

The aim of this study was to explore and describe the experiences of a nutrition education programme of adults with type 2 diabetes mellitus in a rural, resource-limited South African community.

Method

Participants and setting

Men and women aged 40–70 years, with uncontrolled type 2 diabetes mellitus ($\geq 8\%$ haemoglobin A_{1c}) and diabetes mellitus duration of at least one year, and who participated in the intervention arm of a RCT of a nutrition education intervention, were included.¹² All intervention participants ($n = 41$ at 8 weeks, and $n = 38$ at 12 months) were invited to participate. A convenience sample of participants who were available on the days of data collection was used.

The study was performed in two primary community health centres (CHCs) in Moretele subdistrict, North West province, South Africa. The CHCs are nurse managed. The nursing professionals conduct most of the health education, including nutrition education, at the CHCs, because only one dietician serves the entire Moretele subdistrict. At the time of the study, structured diabetes mellitus education was not being offered at the CHCs. The subdistrict is characterised by a high unemployment rate (45%), low income and low literacy levels [$\sim 5\%$ of adults aged ≥ 20 years had achieved an educational level beyond matriculation (grade 12) in 2011].¹³ The study site is referred to as a resource-limited setting owing to the aforementioned factors, and the lack of a highly skilled labour force, such as health professional specialists.

The intervention

Details of the intervention have been reported elsewhere.¹² Briefly, the nutrition education programme (intervention) was implemented over 12 months in 2010/2011. The implementation was staggered and based on the time of participant recruitment.

The nutrition education programme comprised four components:

- Eight-weekly curriculum sessions of 2.0–2.5 hours each.
- Follow-up sessions, i.e. four monthly and two bi-monthly, each lasting 1.5 hours.
- Vegetable gardening demonstrations.
- Education materials (pamphlets, and fridge or wall posters).

The nutrition education sessions were conducted at the CHCs in five groups of 6–10 participants. The sessions' facilitators were mainly from the study setting [the subdistrict dietician, a food science

and nutrition university student from the study site (appointed as a fieldworker), and the subdistrict horticulturist]. The majority (90%) of the sessions were facilitated in the local language (*isiTswana*), with the rest facilitated in English by the principal investigator, with local language translations conducted by nursing professionals from the CHCs.

The nutrition education programme was developed on the basis of previously assessed needs and preferences for nutrition education in the target group.⁹ Some of the suggestions by the target group were incorporated into the developed nutrition education programme, and an endeavour was made to address some of the identified problems and barriers to dietary adherence. The content of the curriculum included the basics of diabetes mellitus (its pathophysiology, risk factors, symptoms, complications, treatment goals and modalities), dietary principles (food groups and the principles behind a balanced meal, portion control, planning meals on a limited budget and a cooking session) and the improvement of vegetable supply through gardening. The sessions were offered in an interactive manner and incorporated group discussions, hands-on activities, demonstrations and food displays based on culturally appropriate examples.

Study design and data collection

This was a qualitative study embedded in an RCT, in which interpretative phenomenological study design was utilised.¹⁴ Data were collected at two time periods, i.e. at the end of the curriculum (eight weeks) and at the end of the study (12 months), within one week of the outcome assessment.

A short questionnaire with open-ended questions and one closed-ended question was used at the end of the eight weeks. This assessment aimed to evaluate participants' satisfaction with the curriculum component, to gauge if they had benefited from attending, and to elicit suggestions for the remainder of the programme (monthly and bi-monthly meetings). Data were collected in a group setting. The fieldworker explained each question to the participants in the local language, after which each participant completed the questionnaire. Those who had difficulties with writing were assisted.

The aim of the assessment at 12 months was to gain insight into whether or not participants had benefited from the programme, their overall experience of the programme, and to seek suggestions as to how the programme could be improved. Focus group discussions were conducted in the five groups that were used for the nutrition education sessions. A semi-structured interview guide was used. The focus group discussions were facilitated in the local language by the fieldworker who was experienced in focus group processes. Two trained university students from the study site took notes. The FGDs lasted between 1 and 1.5 hours and all of the sessions were audio-recorded.

Data from the questionnaires were translated into English by the fieldworker. Data from the focus group discussions were transcribed verbatim in *isiTswana* by the same fieldworker (moderator), who also translated the transcripts into English. An independent *isiTswana*-fluent-speaking dietician transcribed one audiotape and also checked two of the five translated scripts. The handwritten field notes were also used to confirm the data and complement the text.

Data handling and analysis

The data were analysed using framework analysis, according to the thematic approach by Rabiee, in combination with that of Ritchie and Spencer.^{15,16} The trustworthiness of the data was ensured by using an independent person who confirmed the transcribed and translated data. Audiotapes or digital recordings and field notes were used as additional sources of referential adequacy. A representation of the participant quotes was also used to support the data.

Ethical approval

Ethical approval was obtained from the Research Ethics Committee, Faculty of Health Sciences, University of Pretoria (number 215/2009). Study participants provided written informed consent or verbal consent, documented in the presence of a witness.

Results

The profile of the intervention group participants ($n = 41$), assessed at baseline, is presented in Table 1. Thirty-one (75%) and 35 (85%) patients in five groups participated in the nutrition education programme assessments at eight weeks and 12 months, respectively.

The results of the enquiry are presented as per the four broad themes generated from the research questions, as well as from the participants' narratives or written statements. The results of the participants' experience with the nutrition education programme at

eight weeks are presented for individuals, and those at 12 months for the groups ($n = 5$). A selection of participants' written statements or quotes is given to augment the results.

Programme satisfaction and benefits

At the end of eight weeks (Table 2), all of the participants ($n = 31$) indicated they had enjoyed the nutrition education programme "very much", in response to the closed-ended question.

They also reported that they had gained new knowledge: "I have learnt that potatoes and sweet potatoes are starchy foods" (woman aged 57 years); "I have learnt the importance of eating vegetables" (man aged 69 years) and "I have learnt about diabetes and its dangers, and how to correct them with food" (woman aged 60 years).

A female participant, aged 61 years, reported feeling "empowered to take charge" of her condition through the knowledge gained.

Some participants reported health benefits relating to blood glucose control: "I am satisfied with the lessons. I am so happy my sugar levels have gone down" (man aged 56 years) and "I am happy. I even saw the benefits. My sugar is now 6–8 mmol/l" (woman aged 65 years).

Two participants suggested that the education should be extended to others: "I wish the lessons could be extended to others" (woman, aged 61 years) and "I wish others with diabetes could have the same education" (woman aged 57 years).

At 12 months (Table 3), participants reported that they had enjoyed the programme, and were satisfied with its content and delivery: "We enjoyed very much everything" [all participants in group number 2 (G2), group number 3 (G3) and group number 4 (G4)]; "We enjoyed everything" [G1; participant 1 of 6 in the group (1/6); woman aged 58 years] and "I am very happy with the programme. We are sad it is ending" (G5; 1/4; woman aged 48 years).

Participants in all of the groups also indicated that the programme had had a positive effect on their overall health, including diabetes mellitus control, improved quality of life and family support: "I now feel healthy and look better" (G2; 4/8; man aged 64 years); "(My) high blood (pressure) and urinating frequently has decreased. I can sleep the whole night. I used to wake and eat at night" (G3; 2/7; woman aged 63 years); "I now do not live with fear of death. I know I can control diabetes" (G5; 1/4; woman aged 60 years); "My blood sugar reduced from 20 mmol/l to less than 10 mmol/l" (G5; 3/4; male aged 67 years) and "I feel much better. I even lost some weight. I used to weigh 130 kg. Now I am 120 kg" (G4; 1/9; woman aged 56 years).

Participants indicated they had gained new knowledge as a result of participating in the programme. Some felt empowered to share their knowledge with others: "I now know which level our blood sugar should be, 4–8 mmol/l; not more or less" (G5; 2/4; woman aged 47 years); "Now I am able to read food labels" (G1; 2/6; woman aged 63 years); "(The importance of) eating more vegetables than starch" (G2; 4/8; man aged 66 years); "I know how much to dish up" (G2; 3/8; woman aged 58 years); "I never knew we should remove the fat from meat and the skin from chicken" (G4; 8/9 and woman aged

Table 1: The profile of the study participants ($n = 41$)

Characteristics	Values
Mean age (years)	59.4 ± 6.9
Diabetes duration, median (range)	5 (3–9) years
Gender, n (%)	Female, 36 (95)
Diabetes mellitus treatment, n (%)	
Diet plus oral hypoglycaemic agents	41(100)
Marital status, n (%)	
Single	6 (15)
Married	25 (61)
Widowed	6 (15)
Separated or divorced	4 (10)
Living situation, n (%)	
Live with family	37 (90)
Education level, n (%)	
No formal education	2 (5)
Grades 1–6	11 (27)
Grades 7–9	18 (44)
Grades 10–12	7 (17)
Post grade 12	3 (7)
Employment status, n (%)	
Unemployed	39 (95)
Clinical status	
Haemoglobin A _{1c} (%)	10.8 ± 1.8
Body mass index (kg/m ²)	31.5 ± 7.0

Table 2: Summary of participants' perceptions of the nutrition education programme at the end of 8 weeks

Theme	Sub-theme	Ethnographic description
Programme satisfaction	Enjoyment Liked/not liked	<i>"Enjoyed very much"</i> <i>"Liked everything"</i>
Knowledge gained	New information	<i>"I have learnt potatoes and sweet potatoes are starchy foods"</i> [Female (F), 57] <i>"I have learnt how much to dish up"</i> (F, 45) <i>"I did not know rice is starch"</i> (F, 61) <i>"I have learnt I should use less sugar, salt and fats"</i> (F, 58) <i>"I have learnt about diabetes and its dangers and how to correct them with food"</i> (F, 60) <i>"I have learnt the importance of eating vegetables"</i> [Male (M), 69] <i>"I have learnt how to cook lentils"</i> (F, 47) <i>"Removing fat from meat before cooking"</i> (F, 64)
Experience of the curriculum sessions	Positive experience/ negative	<i>"... very happy about what we have learnt, I wish others with diabetes can have the same education"</i> (F, 57) <i>"Empowered to take charge of my condition; I wish the lessons could be extended to others"</i> (F, 61) <i>"... satisfied with the lessons; I am so happy my sugar levels have gone down"</i> (M, 56) <i>".. happy, I even saw the benefits, my sugar is now 6 to 8"</i> (F, 65)
Recommendations for monthly and bi-monthly meetings	Addition/removal of content/ activities	<i>"We must repeat all the lessons"</i> (M, 66) <i>"Lessons should be repeated so that we may refresh and not forget"</i> (F, 44) <i>"We wish to learn more about diabetes, ... dangers and insulin"</i> (F, 60) <i>"Session about amount of food to eat"</i> (F, 44) <i>"... discuss more about hypertension"</i> (F, 57)

69 years) and "It is no use taking pills only. You need to eat healthily also" (G3; 2/8; woman aged 58 years).

The participants reported that they had made positive dietary and related behaviour changes based on the information received: "I reduced my intake of fatty foods" (G1; 6/6; man aged 59 years); "We exercise more" (G4; 6/9; woman aged 63 years); "I did not like eating beans and cucumbers, but now I eat lots of them" (G1; 1/6; woman aged 58 years); "I boil food, rather than fry it" (G2; 4/8; man aged 64 years); "I eat more vegetables and fruit almost daily" (G3; 2/7; woman aged 58 years) and "I now eat less starch. I measure one fist" (G5; 1/4; woman aged 64 years).

Perceptions of programme delivery

At the end of the programme (12 months), and in response to questions about their experience of the delivery of the programme, participants reported viewing the group delivery format positively (Table 3). They received support and learnt from one another, worked together and shared problems: "We enjoyed working in a group. Everybody was very supportive" (G4; 2/9; woman aged 63 years); "We learnt from others" (G2; 4/8; man aged 64 years); "We shared problems" (G5; 4/4; woman aged 60 years); "I realised I am not alone. I accepted my condition" (G1; 2/6; woman aged 63 years) and "If one did not understand something, others helped" (G3; 7/7; woman aged 63 years).

Participants deemed the number of nutrition education sessions to be adequate, except for one participant in one group who thought that the number of meetings was inadequate: "They were right. We were looking forward to the meetings" (G1; 6/6; man aged 56 years); "They were adequate; not too few, nor too many" (G5; 1/4; woman aged 60 years); "They were not enough" (G1; 3/6; woman aged 46 years) and "Just right" (all participants in G2 and G3).

The timing and duration of the meetings was reported to be appropriate, as participants could attend to other matters after the sessions: "Just right. We never took more than two hours. I had time to do other things after the meeting" (G1; 3/6; woman aged 58 years); "We never got bored or impatient" (G5; 1/4; woman aged 48 years); "If the lessons were too short, we could have been dissatisfied" (G2; 8/8; woman aged 65 years); "We never took long" (G3; 4/7; woman aged 55 years) and "The time for lessons was enough" (G4; 1/9; man aged 69 years).

Education materials used during the group meetings were viewed informative by participants as useful, easy to follow. The education materials, given as handouts, were seen as valuable resources for participants and their families. The participants referred to these often, and applied the information with respect to dietary self-management: "Very clear. Easy to follow, as they were explained" (G5; 4/4; woman aged 60 years); "(They) act as a reminder. I often refer to the poster" (G1, 2/6, woman aged 63 years; G3, 2/7, woman aged 63 years; G5, 4/4, woman aged 64 years); "(They were) helpful not only for ourselves, but for the whole family, including children" (G1, 2/6, woman aged 63 years; G3, 1/7, woman aged 58 years); "We put the poster on the fridge. I use it to explain to the family" (G4; 6/9; woman aged 63 years) and "I am able to refer to them now and again" (G2; 1/8; woman aged 54 years).

The teaching aids, such as empty food containers and real food displays (raw and cooked), were reported to facilitate the understanding of information: "The examples explained more (G4; 1/9; man aged 69 years); "It was helpful to see, rather than being told only" (G1; 6/6; man aged 56 years); "(They were) very practical. They made us understand better" (G2, 5/8, man aged 57 years; G2, 6/8, woman aged 60 years) and "(They) helped us to see what to look for when buying food" (G3; 1/7; woman aged 56 years).

Table 3: Summary of participants' perception of nutrition education programme at 12 months

Theme	Sub-theme	Ethnographic descriptions
Programme satisfaction	Enjoyed/liked/did not like	<p>"We enjoyed everything" (G1, 1/6; F58)</p> <p>"Very happy with the programme; we are sad it is ending" (G5, 1/4; F48)</p> <p>"...disliked nothing about the programme" (G2, G5)</p>
Impact of the NE programme	Health & quality of life	<p>"I now feel healthy and look better" (G2, 4/8; M64)</p> <p>"High blood and urinating frequently has decreased, I can sleep the whole night... I used to wake and eat at night" (G3, 2/7; F63)</p> <p>"I now do not live with fear of death... I know I can control diabetes" (G5, 1/4; F60)</p> <p>"Blood sugar reduced from 20 to less than 10 8" (G5, 3/4; M67)</p>
	Behaviour changes	<p>"I reduced intake of fatty foods and lost some weight" (G1, 6/6; M59)</p> <p>"I now remove fat from meat and skin from chicken" (G3, 3/8; F61)</p> <p>"We exercise more" (G4, 6/9; F63)</p> <p>"I did not like eating beans and cucumbers but now I eat lots of them" (G1, 1/6; F58)</p>
	Knowledge/skills gained	<p>"I now know which levels our blood sugar should be, 4 to 8; not more or less" (G5, 2/4; F47)</p> <p>"Now I am able to read food labels" (G1, 2/6; F63)</p> <p>"It is no use taking pills only, you need to eat healthily also" (G3, 2/8; F58)</p> <p>"To eat more vegetables than starch" (G2, 4/8; M66)</p> <p>"I know how much to dish up" (G2, 3/8; F58)</p>
Programme delivery perceptions	Meetings number & frequency	<p>"They were right, we were looking forward to the meetings" (G1, 6/6; M56)</p> <p>"They were adequate; not too few nor too many" (G5, 1/4; F60)</p> <p>"They were not enough" (G1, 3/6; F46)</p>
	Meetings time & duration	<p>"Just right we never took more than two hours, I had time to do other things after the meeting" (G1, 1/6; F58)</p> <p>"We never got bored or impatient" (G5, 1/4; F48)</p>
Programme delivery perceptions	Group format	<p>"We enjoyed working in a group, everybody was very supportive" (G4, 2/9; F63)</p> <p>"We learnt from others..." (G2, 4/8; M64)</p> <p>"We reminded each other..., some of us are slow to learn" (G4, 1/9; M69)</p> <p>"We shared problems" (G5, 4/4; F60)</p> <p>"I realised I am not alone, I accepted my condition" (G1, 2/6; F63)</p>
	Teaching aids/materials -Flip chart -Fridge/wall poster & pamphlet	<p>"Very helpful and informative" (G5, 1/4; F48)</p> <p>"Very clear...easy to follow as they were explained" (G5, 4/4; F60)</p> <p>"Set as a reminder, I often refer to the poster" (G1, 2/6; F63); (G3, 2/7; F63; G5, 4/4; F64)</p> <p>"Helpful not only for ourselves, but for the whole family including children" (G1, 2/6; F63); G3, 1/7; F58)</p> <p>"Help you to see how much to eat" (G2, 4/8; M64)</p>
	Food displays Food containers	<p>"The examples explained more" (G4, 1/9; M69)</p> <p>"It was helpful to see rather than being told only" (G1, 6/6; M56)</p>
Recommendations for future programmes	Changes	<p>"No need for change,.....do to others as you did for us" (G3, 5/8; F59)</p> <p>"You can have the family attendance open, ... they can come when they are available" (G4, 2/9; F63)</p> <p>"Pamphlets should also be in both languages as the posters... not everyone understands English" (G2, 5/8; F57)</p>
	Educator characteristics	<p>"Knowledgeable person; like you people" (G2, 6/8; F60)</p> <p>"Approachable and professional like you..." (G3, 5/8; F59)</p> <p>"You were patient with us" (G4, 6/9; F63)</p> <p>"Very respectful and considerate" (G5, 2/4; F47)</p>
	General recommendations	<p>"Please also do this to others; many people with diabetes need such programmes" (G2, All)</p> <p>"We feel the programme should continue, if not here somewhere else to help others with diabetes" (G1, 2/6; F63)</p>
Persistent programme participation	Reasons/motivation for programme attendance	<p>"..I saw a lot of improvement in my health" (G1, 5/6; F53)</p> <p>"Needed more information about diabetes" (G1, G2 G5)...my husband died from it" (G5, 1/4; F64)</p> <p>"Educative lessons" (G4, 4/9; F63)</p> <p>"I did not worry about transport" (G1, 1/6; F58)</p> <p>"...the way you treated us, very kind and respectful; you showed you really care" (G4, 8/9; F69)</p>
Prior attendance of diabetes education programme	Attended/not attended	<p>"No...we never had such lessons before" (All groups)</p> <p>"Previously nurses would give us information at the waiting rooms for no more than 15 minutes" (G1, 5/6; F53)</p>

Reasons for participating in the programme

Participants provided a number of reasons for remaining in the nutrition education programme until its completion (Table 3). They viewed the programme as a positive experience, based on the facilitators' respectful approach, the perceived or real accrued benefits, and the quest for information about their condition. Some participants pointed out that reimbursement of the transport cost made it easy for them to attend the meetings. All of them indicated that they had never attended any other structured diabetes mellitus education programme: "I saw a lot of improvement in my health" (G1; 5/6; woman aged 53 years); "I needed more information about diabetes" (G1, G2 and G5); "My husband died from it" (G5; 1/4; woman aged 64 years); "I was sick and wanted to find out more about my condition" (G3; 2/7; woman aged 58 years); "(These were) educative lessons" (G4; 5/9; woman aged 44 years); "I did not worry about transport" (G1; 1/6; woman aged 58 years); "The way you treated us, very kind and respectful. You showed you really care" (G4; 8/9; woman aged 69 years) and "No. We never had such lessons before" (all groups).

Recommendations for follow-up sessions and the overall programme

The majority of participants (21/31) indicated at the end of the training intervention (eight weeks) that the topics which had been covered should be taught again in response to the request for suggestions of topics which could be discussed at the follow-up sessions (i.e. at the monthly and bi-monthly meetings). Some participants recommended that all of the topics should be repeated, while others referred to specific ones. Lessons on diabetes mellitus, insulin and food portion sizes were mostly suggested with regard to the latter. Only one participant mentioned the inclusion of a new topic. The motivating factor behind suggestions to repeat all of the lessons appeared to be the need to reinforce the content learnt at the curriculum sessions: "We must repeat all the lessons" (man aged 66 years); "The lessons should be repeated so that we may refresh and not forget" (woman aged 44 years); "We wish to learn more about diabetes, its dangers and insulin" (woman aged 60 years); "The session about the amount of food to eat" (woman aged 44 years) and "Discuss more about hypertension" (woman aged 57 years).

Some participants suggested that the same programme should be offered to other people with diabetes mellitus without any change to the programme duration or content. However, they recommended that the pamphlet, and the fridge or wall poster, should both be available in both English and the local language, and that attendance at sessions by family members should be open, and not restricted to specific sessions: "(There is) no need for change. Do to others as you did for us" (G3; 5/8; woman aged 59 years); "You can have the family attendance open" (G4; 2/9; woman aged 63 years); "The pamphlets should also be in both languages (like the posters were). Not everyone understands English" (G2; 5/8; woman aged 57 years) and "We learnt a lot from the programme. Please do not change" (G5; all participants).

Participants wanted the programme to be delivered by an approachable, competent educator, who could portray profession-

alism. In addition, they indicated that such a person should be kind, patient and treat the patients respectfully. Facilitators of the nutrition education sessions were said to have these desirable attributes: "A knowledgeable person, like you people" (G2; 6/8; woman aged 60 years); "Approachable and professional, like you" (G3; 5/8; woman aged 59 years); "You were patient with us" (G4; 6/9; woman aged 63 years); "Very respectful and considerate" (G5; 2/4; woman aged 47 years) and "I liked the fact that you treated us with respect" (G1; 5/6; woman aged 53 years).

Discussion

This study explored the perceptions, views and experiences of adults with type 2 diabetes mellitus about a nutrition education programme implemented over a year. The findings indicated high participant programme satisfaction, as well as perceived or real benefits from participating in the study. Although significant clinical and some dietary outcomes were not achieved in the main study,¹² it was indicated through the qualitative arm of the study that participants believed that they had benefited in diverse ways. Thus, the findings highlight the limitations of using quantitative measures only to assess the effect of an intervention.

High levels of participant satisfaction were also reported with the programme in other diabetes mellitus education studies in which a dietary component was included.¹⁷ The reasons for participants' high satisfaction with our programme could be because it was based on the target group's expressed need for nutrition education. Some of these needs were met. For example, the programme was delivered in a group format, and education materials were provided, as suggested during the needs assessment. Aside from certain aspects of the programme being customised, other factors could have contributed to the high levels of satisfaction with it. These include the facilitators' attributes, considered to be positive; the cultural appropriateness of the majority of the nutrition education sessions, i.e. the choice of language, the majority of the facilitators being from the study setting and the use of local foods in the demonstrations; the delivery of nutrition education using methods which catered for the low literacy levels, such as demonstrations and the use of visual aids; as well as the perceived benefits of the study.

Satisfaction with the programme was closely tied to the reasons indicated by patients for participating in the study. The desire to know more about their condition could have stemmed from the belief that they had insufficient information about it, as reported in the needs assessment⁸ and in other studies.¹⁸ The perception that they did not have adequate information might also have related to their lack of exposure to structured comprehensive education on their condition. Lack of exposure to structured education implies that some of the information received by the participants was new. This could be the reason for the suggestion that all of the topics covered during the training (curriculum) component should be repeated at the follow-up sessions. The low literacy of the participants could also affect their ability to process and understand information.¹⁹ Therefore, as previously reported, repeating key messages is an important element of interventions for people of low socio-economic status with diabetes mellitus.²⁰

The support given through providing funds for the participants' transport also minimised the barrier to attendance, often reported in people with low income.²¹ The positive experience of the overall programme, including the facilitators' positive personal characteristics, contributed to high participation in the programme. Positive facilitator characteristics, such as respect, trust and expertise, have previously been reported as being important to people with type 2 diabetes mellitus with respect to participation in education programmes.^{17,22} Group meetings in the current study provided social support and a supportive environment in which to learn and share problems. This finding has been reported in other studies.^{17,22} Thus, the findings reinforce the value of group education for people with diabetes mellitus.

A striking finding in this study was the value placed on the teaching aids, tools and education materials provided as handouts. These were seen as aids to understanding the messages, and as cues for positive behaviour. The education materials provided for use at home were also perceived as being instrumental to gaining family support, and for the family's engagement with positive dietary behaviour. The ability to visualise what was taught (from the visual tools, materials and food displays) could have contributed to the significant finding on reduced starchy food intake (servings) in the intervention group.¹²

Strengths and limitations of the study

Process evaluation, nested in a randomised controlled trial, was employed in this study. Therefore, insight was gained into participants' experience of the intervention. This information helped to rule out the possibility that the non-significant findings for some of the outcomes could have related to lack of satisfaction by participants with the programme. Bias in data collection and analysis was minimised because the principal investigator was not involved in the focus group discussions. Likewise, the moderator was not involved in the analysis. The use of the same moderator across all the focus group discussions allowed consistency in the data collection. Lastly, the use of already established groups for the focus group discussions implies homogeneity in terms of the information received during the intervention. This allowed greater group dynamics and spontaneity in the discussions.

There were some limitations to this study. There were more women than men. Therefore, it is not possible to generalise the results. The moderator of the focus group discussions was the major facilitator of the nutrition education sessions. As a result, the relationship created with the participants could have resulted in the high level of observed positive responses. Lastly, although the analysis was discussed with the research team, the coding of data by one person could have introduced subjective bias.

Conclusion

Exploring the perceptions of participants about a programme is essential for interventions which are planned on the basis of participants' assessed needs, as the information provides insight into whether or not the intervention met their concerns and needs. The perceptions help to explain why participants benefited or not from the programme. This study demonstrated that customising

nutrition education to the needs of patients enhanced their participation in and satisfaction with the programme. Perceived and real benefits, relating to improved health, family support, support from other patients and education materials that enhance learning and reinforce positive behaviour at home, appear to be the most important for programme participation and satisfaction. The positive characteristics of educators foster a caring trusting relationship with patients, and thus are also integral to programme satisfaction.

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