

Review of the Pilot Implementation of Family Centered Nutrition and Exercise Diabetes Intervention in Senwabarwana of Limpopo Province

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Abstract

Background: Diabetes prevalence and its incidences are increasing; therefore evidence-based interventions are needed to improve health and general well-being of patients. Such interventions should be rigorously evaluated for efficacy and effectiveness. Pilot studies are critical and plays essential role in the development and evaluation of an intervention by contributing to better understanding of the mechanisms and conditions of intervention's applicability and transferability. Family-centred nutrition and exercise diabetes intervention was piloted. Therefore, this paper seeks to review the pilot implementation of the family-centred nutrition and exercise diabetes intervention.

Method: A quantitative evaluation and cross-sectional study design was used in this study. A total of 100 subjects (50 DM patients and 50 nondiabetic family members) were purposively sampled. Close-ended evaluation questionnaire were used to collect data from participants and data analysed using SPSS.

Results: Majority of patients (84%) and all family members (100%) indicated that the organization of the educational intervention was commendable. All patients (100%) and family members (100%) indicated that the presentations stimulated their interest and were very helpful to their learning; seen flyers and posters. Majority of patients (88%) indicated that the intervention was neither easy nor difficult, compared to less than half of family members (86%). All patients (100%) and 94% of family members indicated that they have learned much from intervention.

Conclusion: Both patients and families commended the intervention, found the presentations informative and that the whole intervention was beneficial to them since they learned much from it. Therefore, this study recommends conducting of main and impact studies, respectively.

Keywords: Intervention; Pilot study; Patients; Family Members; Diabetes

Introduction

With consideration of increasing diabetes prevalence and its incidences, there is a need for evidence-based interventions

[1], for improving the health and general well-being of patients. Such interventions should be rigorously evaluated so that they become efficacious and effective [1]. Intervention in this context implies any program, service, policy, or product

that is intended to ultimately influence or change people's social, environmental, and organizational conditions as well as their choices, attitudes, beliefs, and behaviors [1]. Interventions need to focus on changeable behaviors and objectives, and be relevant to the target populations; and have the potential to meet the intervention's goals [2,3]. Due to constraints of resources, it was found that not all interventions are tested for both efficacy and effectiveness [1]. Pearson N, et al. [4], point out that the failure to translate effective interventions for improving population and patient outcomes into policy and routine health service practice is a challenge resulting in wasteful expenditure. As such there is a need to prioritize and improve the implementation of the interventions [4,5].

The aim of the implementation intervention are to identify and address care gaps, support practice change, and enhance quality and equity of health care [6]. It minimizes the financial waste expenditure by providing evidence on effective strategies for translating study findings into enhanced healthcare practice and thus improved health outcomes [6,7]. The global cost of conducting health research is estimated at US\$85 billion a year; therefore this costs can be minimized through identification of necessary factors for translation of an effective intervention or innovation from the research setting to routine clinical practice [6,8]. Implementability is regarded as the likelihood of the adoption of an intervention into routine practice, as well as health consumer behaviours across settings and over time [6]. Pilot studies are critical and plays essential role in the development and evaluation of an intervention by contributing to better understanding of the mechanisms of intervention and conditions of its applicability and transferability [9]. They facilitate evidence-based decisions about design and conduct of main studies, which are aimed at the generation of new evidence to inform public health policy [9]. Pilot studies describe strategy which may obstruct implementation by providing recommendations [10]. It is important not to include participants of the pilot study in the main study [11], this will help in avoidance of asking same persons to collect similar data. Pilot studies do not test hypotheses about the impact of intervention, however, it assess feasibility/acceptability of the intervention [10].

Feasibility studies are used to determine appropriateness for further testing; assessment of whether or not the ideas and findings can be shaped to be relevant and sustainable [1]. It focuses on the intervention process and addresses questions about whether and how an intervention can be evaluated and implemented. Feasibility studies are implemented prior to conducting an outcome-focused pilot study or full-scale evaluation to test the effectiveness of an intervention [12]. Feasibility studies were found to be iterative, formative, and adaptive [1]. The rationale for feasibility studies is to assess

recruitment capability, data collection procedures and outcome measures, acceptability, resources and ability to manage and implement the intervention [13]. Moreover, they confirm the feasibility of intervention studies and whether they can be conducted reliably. It confirms in advance whether main study or intervention can be carried out [14].

Acceptability is regarded as an essential element to be considered during the design, evaluation and implementation of healthcare interventions [15] to guarantee the best clinical outcomes achievable using available resources [16]. It has been pointed out that acceptability is extremely important but not sufficient condition for effectiveness of an intervention [15]. Treatment acceptability is dependent on patients' attitude towards treatment and their judgement of perceived acceptability prior to participating in an intervention [17]. The following factors were found to influence patients' perceived acceptability i.e. intervention's appropriateness in addressing the clinical problem, suitability to individual lifestyle, convenience and effectiveness in managing the clinical problem [17]. With this conceptualization of treatment acceptability, it can influence patients' decisions in terms of wishing to complete treatments and willingness to participate in an intervention. However, it is argued that perceptions of acceptability may change with actual experience of the intervention [18]. Therefore, this paper seeks to review the pilot implementation of the family-centred nutrition and exercise diabetes intervention.

Methods

Research Approach and Design

A quantitative method and cross-sectional study descriptive design were used in this study.

Study Participants and Setting

Target population in this study were patients living with diabetes and their non-diabetic family members who participated in the implementation of family-centred nutrition and exercise diabetes intervention study. This study was conducted in selected clinics in Senwabarwana area of Blouberg Municipality of Capricorn District in Limpopo Province South Africa. Most persons living in Senwabarwana are speaking Sepedi. A total of 100 participants (50 patients living with diabetes and 50 non-diabetic family members) were included in this study, using purposive sampling.

Family Centred Nutrition and Exercise Diabetes Intervention

This intervention was developed to support and care for patients living with diabetes through partnership of healthcare facilities and non-diabetic families members of patients. Both patients and their family members received

the intervention at the clinics. The intervention was aimed at closing knowledge gaps identified during baseline study, including behavioural change. The intervention was offered by dietitian and physiotherapists through structured education and demonstrations. All participants received nutrition and exercise diabetes care educational talk for 60 minutes through focus groups consist of 10 persons (5 patients and 5 family members). Flyers and posters were used to facilitate education, as well as demonstrations. The participants were thereafter given questionnaires to evaluate acceptability and implementability of the intervention.

Data Collection and Instruments

Data was collected using close-ended questionnaire which was developed from Andersson A, et al. [19]. The questionnaire had two sections, which are Section A (socio-demographic profile) and Section B (evaluation of the intervention). Section B had questions related to how the intervention was organized, demonstrations, presentations,

written materials (flyers and posters), and also the general evaluation.

Data Analysis

Data were coded and entered into the Statistical Package for Social Sciences version 27.0 for analysis. Descriptive statistics used where frequency distributions, means and standard deviations were calculated. Chi-squared test was used to calculate associations @ 95% CI where p-value of <0.05 was considered statistically significant.

Results

Table 1 show that most of the patients (66%), and 24% of family members were of the age ≥ 61 years. Most patients (84%) and 78% of family members were females. Over half of patients (52%) and 28% of family had primary education, whilst majority of patients (6%) and 44% of family members were married.

Demographic data		Patients (n=50)	Family members (n=50)
Age groups	≤ 60 yrs	17 (34%)	38(76%)
	>61 yrs	33 (66%)	12(24%)
Gender	Male	08 (16%)	11(22%)
	Female	42 (84%)	39(78%)
Education	No education	17 (34%)	06(12%)
	Primary education	26 (52%)	14 (28%)
	Secondary or higher	07 (14%)	30(60%)
Marital status	Single	12(24%)	28(56%)
	Married	38(76%)	22(44%)

Table 1: Socio-demographic profile.

Table 2 shows that overwhelming majority of patients (84%) indicated that the organization of the educational intervention was commendable, compared to 100% family members.

Only 8% of patients indicated that the demonstrations done during implementation of the educational intervention need improvement, compared to 10% of family members.

Statement related to the evaluation of the organization and demonstrations part of the educational intervention		Participants	Yes	Not sure	No
Organization of educational intervention	Commendable	Patients (n=50)	42 (84%)	7 (14%)	1 (2%)
		Family (n=50)	50 (100%)	0	0
	Needs improvement	Patients (n=50)	7 (14%)	9 (18%)	34 (68%)
		Family (n=50)	3 (6%)	11 (22%)	36 (72%)
	Goals of the intervention well met	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0

Demonstrations	Commendable	Patients (n=50)	42 (84%)	8 (16%)	0
		Family (n=50)	45 (90%)	5 (10%)	0
	Needs improvement	Patients (n=50)	4 (8%)	11 (22%)	35 (70%)
		Family (n=50)	5 (10%)	17 (34%)	28 (56%)
	Stimulate interests	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Respond well to questions	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Very helpful to my learning	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0

Table 2: Evaluation of the organizational and demonstration part of the educational intervention, % in rows.

Table 3 shows that overwhelming majority of patients (98%) indicated that the presentation made during implementation of the educational intervention were commendable, compared to 100% of family members. All patients (100%) indicated that excellent explanations were provided compared to most overwhelming majority of

family members (98%). All patients (100%) indicated that good summaries were provided, compared to 96% of family members. All patients (100%) and family members (100%) indicated that the presentations stimulated their interest and were very helpful to their learning.

Statement relation to the evaluation of the presentation part of the educational intervention	Participants	Yes	Not sure	No
Commendable	Patients (n=50)	49 (98%)	1 (2%)	0
	Family (n=50)	50 (100%)	0	0
Needs improvement	Patients (n=50)	0	13 (26%)	37 (74%)
	Family (n=50)	1 (2%)	27 (54%)	22 (44%)
Excellent explanations	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	49 (98%)	0	1 (2%)
Stimulate interests	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	50 (100%)	0	0
Dynamic, engaging style	Patients (n=50)	48 (96%)	1 (2%)	1 (2%)
	Family (n=50)	47 (94%)	2 (4%)	1 (2%)
Good use of visual aids	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	50 (100%)	0	0
Effective examples	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	50 (100%)	0	0
Good summaries provided	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	48 (96%)	1 (2%)	1 (2%)
Respond well to questions	Patients (n=50)	48 (96%)	2 (4%)	0
	Family (n=50)	50 (100%)	0	0
Very helpful to my learning	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	50 (100%)	0	0

Table 3: Evaluation of the presentation part of the educational intervention, % in rows.

Table 4 shows that all patients (100%) and family members (100%) saw both flyers and posters used during the intervention; and that they were informative. None of patients

said flyers and posters need improvement, compared to family members who indicated that flyers (2%) and posters (8%) need improvement.

Statement related to the evaluation of the flyers and posters used in the implementation of educational intervention		Participants	Yes	Not sure	No
Flyers	Did you see flyers?	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Are/were they informative?	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Did you take a copy with you	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Need improvement	Patients (n=50)	0	0	50 (100%)
		Family (n=50)	1 (2%)	2 (4%)	47 (94%)
Posters	Did you see posters?	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Are/were they informative?	Patients (n=50)	50 (100%)	0	0
		Family (n=50)	50 (100%)	0	0
	Need improvement	Patients (n=50)	0	0	50 (100%)
		Family (n=50)	4 (8%)	19 (38%)	27 (54%)
	Good coverage of material	Patients (n=50)	46 (92%)	2 (4%)	1 (2%)
		Family (n=50)	47(94%)	3 (6%)	0
	Right length for the amount of time given	Patients (n=50)	40 (80%)	2(4%)	8 (16%)
		Family (n=50)	43 (86%)	7 (14%)	0

Table 4: Evaluation of the flyers and posters used in the implementation of the educational intervention, % in rows.

Table 5 shows overwhelming majority of patients (88%) indicated that the intervention was neither easy nor difficult, compared to less than half of family members (86%). All patients (100%) indicated that they have learned much,

compared 94% of family members. All patients (100%) and family members (100%) indicated that the intervention has met their expectations.

Statement related to overall evaluation of the educational intervention	Participants	Easy	In between	Difficult
How challenging do you find this educational intervention?	Patients (n=50)	3 (6%)	44 (88%)	3 (6%)
	Family (n=50)	1 (2%)	43 (86%)	6 (12%)
		Much	Nothing	Little
How much do you think you have learned in this educational intervention?	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	47 (94%)	0	3 (6%)
		Adequate	In between	Inadequate
How well has this educational intervention met your expectations?	Patients (n=50)	50 (100%)	0	0
	Family (n=50)	50 (100%)	0	0

Table 5: Overall evaluation of the educational intervention, % in rows.

Discussion

This paper intended to review the pilot-implementation of the family-centred nutrition and exercise diabetes care intervention before it can be implemented in a large scale. Therefore, this study evaluated how the intervention was implemented, demonstrations and presentations, educational tools, and overall intervention. Participants found the intervention commendable and educational tools informative. Moreover, participants indicated presentations stimulated their interests and were helpful to their learning, and that the intervention has met their expectations.

Most of patients living with diabetes and all family members indicated that the organization of the educational intervention was commendable. It has been reported that the learning environment should be quiet without distraction for greater understanding and that group being educated should not exceed 10 and that the session must also not exceed 60 minutes [20]. The family-centred nutrition and exercise diabetes care intervention was provided through focus group consisting of 10 persons. Group education is reportedly the most effective teaching method and enables communication with other patients experiencing similar health problems, thereby enhancing learning [21]. A Brazilian evaluation study similarly reported effectiveness of group education and further highlighted that it may lead good glycemic control [22]. Communication among patients, their family members and healthcare providers on diabetes management plays an important role and may enhance learning [23].

The family centred nutrition and exercise diabetes care intervention was provided through face-to-face educational talks. Face to face teaching method is the most commonly used in the healthcare, globally [24], enables participants to discuss their health concerns with healthcare provider [25], and linked with adherence of diabetes self-care activities and better health outcomes [26]. Health care providers delivering diabetes or health education may strongly influence on how patients perceive their disease and follow the recommended treatment [25]. Almost all patients (98%) and all family members (100%) in this study indicated that the presentation by the healthcare providers were commendable. Furthermore, all patients (100%) and family members (100%) indicated that the presentation stimulated their interests and helpful to their learning, respectively. A Brazilian study reported that the patient's motivation and attitude towards diabetes treatment is stimulated by healthcare providers [22].

Visuals were used to facilitate nutrition and exercise diabetes care education intervention. The use of visuals such as pictures, drawings, charts, graphs and diagrams, can be effective tools for communicating health information

and make the presentation of complex information easily understood by the participants [27]. However, Texas study reported that not all visuals used during the health education are effective [28]. All participants in this study indicated that the presenters applied good use of visuals to facilitate nutrition and exercise diabetes care education. Well-designed visuals reinforce written or spoken health messages and increases understanding and recall, as well as intentions and behaviors toward adherence [29].

It has been reported that written materials such as flyers and posters are used to supplement verbal health education to maximize the effectiveness of the health education [30]. Flyers and posters were used to supplement verbal education in this study. All participants indicated that they saw both the flyers and posters. Various studies highlighted that people living with diseases appreciate the usefulness of written materials during counselling or educational talk [31,32]. It is important to ensure that written health education materials are suitable for the target population for easy of understanding and ultimately effectiveness of the intervention. All participants in this study indicated that they were given copies of the flyers. These educational materials should also be shared using internet or social networks platforms such as WhatsApp, etc. In addition, social media pages must be established regarding diabetes management for referral of patients and their family members. The educational materials must be loaded on the social media pages to be established. The Fourth Industrial Revolution (4IR) has advanced the acquisition of knowledge and that people are using technology or internet to acquire health education [33]. In rural areas such as Senwabwarwana where internet connectivity is poorer; the issuing of hard copies of written materials and support groups remain essential. Almost all patients (98%), compared with all family members reported that both flyers commendable and that all participants reported that posters are commendable.

According to Kosti M, et al. [21], the assessment of the education outcomes seems to be a neglected aspect, yet it is important factor which informs if the program is feasible, and/or achieves objectives or not. The use of simple and understandable language without scientific terms that depends on individual's personality and comprehension ability is the cornerstone for the success of health education [21]. All patients (100%) and most family members (94%) indicated that they have learned much from the nutrition and exercise diabetes care educational intervention, which could imply that simple language, was used. Furthermore, all participants indicated that the intervention has adequately met their expectations. Therefore, this study can be implemented to larger population of patients living with diabetes and their family members.

Conclusion

Pilot implementation of family-centered nutrition and exercise diabetes intervention was reviewed by patients living with diabetes and their non-diabetic family members, who were beneficiaries. They found the intervention commendable and educational tools informative, learned much, and that the intervention met their expectations. Therefore, this study implies that the intervention was acceptable to patients and their family members. As such, the intervention can be implemented to a larger population of patients living with diabetes and their family members in Senwabarwana. Furthermore, impact evaluation should be conducted to assess if the intervention has met its intentions.

Recommendations

- Implementation of the intervention to a larger group of patients and family members.
- Impact evaluation should be conducted to assess if the intervention has met its objectives.

Limitations of the Study

This study was piloted on few participants and cannot be generalized as true representation of larger population of patients with diabetes and their family members in Senwabarwana. The study did not assess the impact of the intervention.

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Authors Contribution

Mphasha was a project leader, responsible for data collection and interpretation; he contributed 50% in writing this article. Skaal analysed data, and supervised data collection and interpretation; and contributed 30% in writing this article. Mothiba co-supervised data collection and interpretation; she contributed 20% in writing this article. The final manuscript was approved by all the authors.

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Availability of Data and Materials

This article is based totally on the data gathered from patients with diabetes and their non-diabetic family members in

Senwabarwana, Limpopo Province of South Africa. The dataset generated or analysed during the current study is not publicly available, as further publications are planned but can be requested from corresponding author.

Ethics Approval and Consent to Participate

The study was approved by the Turfloop Research and Ethics Committee of the University of Limpopo, South Africa. Limpopo Department of Health and Operational Managers at the Clinics of Blouberg Municipality granted permission to conduct the study. Written informed consent were obtained from participants before data collection.

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