



The Effect of a Therapeutic Education Program on the Feeling of Self-Efficacy, Self-Care Behaviors and Glycemic Control in Type 2 Diabetic Patients: Literature Review

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Abstract

Diabetes is one of the most common non-communicable diseases in the world. It represents a real public health problem due to its increasing frequency, morbidity, mortality and economic cost. Indeed, diabetes requires significant and complex behavioral changes in the lives of patients. To manage this disease, diabetic patients must perform technical acts themselves, make therapeutic decisions and must have the knowledge required to participate in the decision-making process necessary for self-care. **Objective:** The aim of this literature review is to understand the effect of a therapeutic education program on the feeling of self-efficacy, self-care behaviors and glycemic value in type 2 diabetic patients. **Method:** The search for scientific articles for this literature review was done via the CINAHL, MedLine (EBSCO), Science Direct (Elsevier), SAGE journal online and Cochrane Library (Endocrine & Metabolic-Diabetes) databases. The terms used to search for scientific articles are: diabetes mellitus type 2 non insulin dependent adherence-self-management or self-care behavior or education program-self-efficacy intervention-intervention study or clinical trials as well as meta analysis and systematic nursing review. **Results:** During the search for articles for this literature review, 603 potential articles were identified. Of these articles, 220 were selected for a more detailed evaluation by the student-researcher. Finally, considering the criteria mentioned above, six literature reviews, one meta-analysis and three experimental studies were selected for this review. **Conclusion:** In this systematic review, relevant data regarding the effects of an education program were provided and mutual strategies in education to improve self-efficacy, self-care behaviors and achieve optimal blood sugar levels.

Subject Areas

Nursing

Keywords

Type 2 Diabetes, Self-Efficacy, Self-Care Behavior, Therapeutic Education, HbA1c

1. Introduction

Diabetes is one of the most common non-communicable diseases in the world [1]. It represents a real public health problem due to its increasing frequency, morbidity, mortality and economic cost [2]. In developing countries, the number of people with diabetes will increase by 109.1% in Africa and 96.2% in the Mediterranean region over the next 20 years. This increase is explained by the aging of the population, the inappropriate diet, obesity and a sedentary lifestyle [3]. The World Health Organization (WHO) predicts a worldwide increase in the prevalence of diabetic patients, mainly T2D, from 135 million in 1995 to 300 million in 2025 [4].

Indeed, diabetes requires significant and complex behavioral changes in the lives of patients [5]. To manage this disease, diabetic patients must perform technical acts themselves, make therapeutic decisions [6] and must have the knowledge required to participate in the decision-making process necessary for self-care [7].

In addition, in the writings, several studies indicate that it is difficult for the diabetic person to live with this chronic disease which produces great changes in their life [8]. This difficulty for patients to control their chronic disease can reduce their quality of life and their psychological well-being [7].

Hence the importance of the role of health professional is with these people. He must be attentive and meet their needs. The acquisition and maintenance by the patient of self-care skills is one of the specific purposes of therapeutic patient education [9].

Therapeutic education places the patient at the center of care practice and is an important element of his care. It provides him with the knowledge and skills necessary to manage his disease and its treatment, but also to provide him with psychological support to help him be observant with regard to his treatment and to integrate his disease into his daily life [10].

The aim of this literature review is to understand the effect of a therapeutic education program on the feeling of self-efficacy, self-care behaviors and glycaemic value in type 2 diabetic patients.

2. Method

The search for scientific articles for this review of writings was done via the

CINAHL, MedLine (EBSCO), Science Direct (Elsevier), SAGE journal online and Cochrane Library (Endocrine & Metabolic-Diabetes). The terms used for scientific research are: diabetes mellitus type 2 non insulin dependant adherence-self-management or self-care behavior or education program, self-efficacy nursing intervention-intervention study or clinical trials as well as meta analysis and systematic review. The articles had to be written in English or French and published in the last 15 years. No attempt was made to identify unpublished studies. The results obtained following this first research on the selected databases are: for CINAHL, 50 articles; MedLine, 108 articles; Science Direct, 50 articles; Cochrane, 193 articles; and finally SAGE, 202 articles.

As a result of these research findings and to obtain relevant articles that meet the needs of this research, a written selection process have been established (**Figure 1**).

The articles meeting the inclusion criteria were randomized studies with a control group, because this type of study usually has high validity. All of the studies included in the literature review assessed the effect of an education program on a non-insulin-dependent type 2 diabetic population aged 18 years and over, and each study had to describe the following characteristics: the number and age of participants, type of study, pre- and post-test results, type of education program intervention, duration of intervention and measurement instruments used.

The first objective of these education programs was to enhance the feeling of self-efficacy. The second objective of these education programs is to improve self-care behaviors. The behavior changes studied had to show results from one

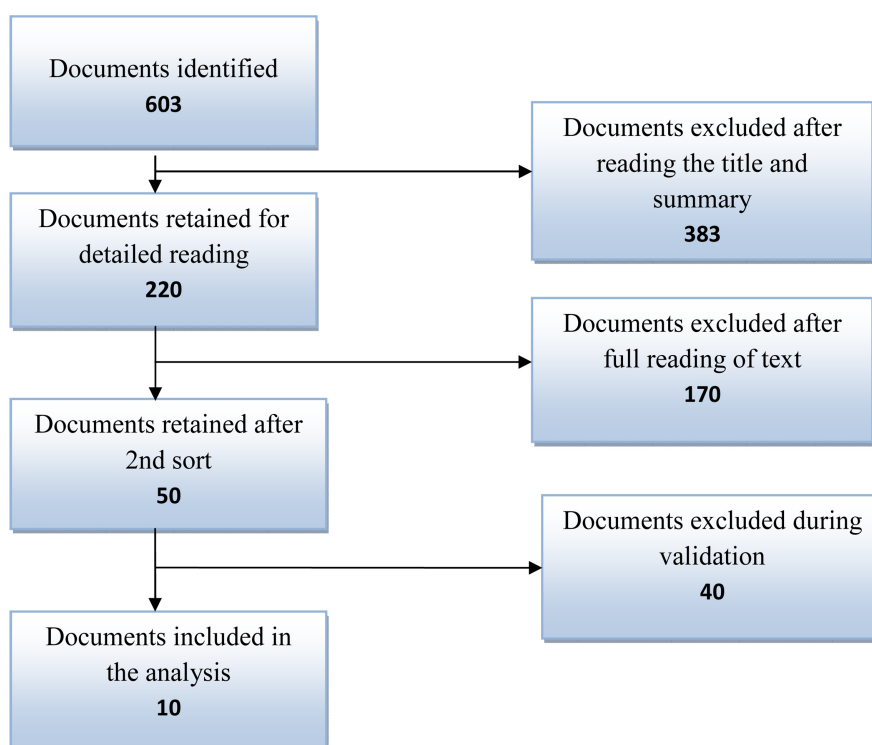


Figure 1. Diagram of selection of writings.

of these variables: diet, exercise, self-monitoring of blood sugar, medication and foot care. The third objective is to lower the HbA1c level.

During the search for articles for this literature review, 603 potential articles were identified. Of these articles, 220 were selected for a more detailed evaluation by the student-researcher. Finally, considering the criteria mentioned above, six literature reviews, one meta-analysis and three experimental studies were retained for this review (**Table 1**).

3. Results

A total of 10 articles were included in this review. These articles describe the importance of therapeutic education on the feeling of self-efficacy, self-care behaviors and HbA1c levels in diabetic patients.

In an effort to examine the effect of feeling AE on improving self-management behaviors in type 2 diabetic patients, Shi *et al.* conducted an experimental study in 2010, with a sample of 160 people with type 2 diabetes (GE: 80 and GC: 80). The intervention consisted of four weekly sessions at the rate of one hour per session. The learning targeted glycemic control, physical exercise and diet. The methods used were interactive: discussion, computer-assisted presentation and exposure to a video. The results showed that there were statistically significant differences between the two groups; the sense of AE and self-management behaviors in the GE improved ($F = 26.888$ and $F = 198.619$, $df = 1.155$, $p < 0.05$ respectively) [11].

Along the same lines, Mohebi *et al.* in 2014, explored the role of self-efficacy (SE) as a factor influencing diabetes self-management by analyzing 26 studies: literature reviews ($n = 2$), correlational ($n = 21$) and experimental ($n = 3$), published between 1990 and 2011. Mohebi *et al.* proved that the feeling of AE affects behaviors and is a major contributor to successful disease management. Its effect is powerful on motivation: the more the diabetic patient perceives himself capable of taking an action, the more he becomes motivated and makes efforts to adopt behaviors in order to manage his disease well [12].

Along the same lines, Hunt (2013) published a literature review of 40 studies that assessed the ability of educational nursing interventions to improve self-management of type 2 diabetes. The results showed that nurses used a wide range of methods while teaching patients, such as individual or group sessions, or through the web or phone calls. The majority of nurse education plans were individualized and tailored to patient needs with a view to recommending tailored changes. The majority of these interventions had a positive impact on various indicators: increased patient knowledge of diabetes disease; improving their commitment to self-management behaviors [13].

In this perspective, Timm *et al.* (2013) analyzed 16 experimental studies published between 2007 and 2011. The educational programs of these studies targeted self-management behaviors, blood glucose monitoring, stress management, self-efficacy and knowledge of people with type 1 diabetes, 2 on diabetes.

Table 1. Tables of studies, literature reviews and meta-analyses on interventions carried out with type 2 diabetic patients.

Authors/Year	Goal	Intervention/Studies	Results
Mohebi <i>et al.</i> 2014	Investigate the role of self-efficacy as a determining agent in the self-management of diabetic patients.	26 studies: literature reviews (n = 2), correlational (n = 21) and experimental (n = 3), published between 1990 and 2011.	The feeling of AE affects behaviors and is a major contributor to successful disease management. Its effect is powerful on motivation: the more the diabetic patient perceives himself capable of taking an action, the more he becomes motivated and makes efforts to adopt behaviors in order to manage his disease well.
Hunt 2013	Evaluate nursing interventions aimed at improving T2D self-management	40 experimental and quasi-experimental studies: 2002-2013 *Role of nursing interventions in diabetes self-management *Effects of nursing interventions on T2DM patients	Role of nursing interventions in diabetes self-management: monitoring the care provided—providing care supervising non-medical staff Effects of nursing interventions on T2D patients: knowledge of diabetes—self-management behavior—physiological effects—psychological effects self-management of diabetes.
Timm 2013	Analyze the strategies used in interventions aimed at improving therapeutic adherence and controlling T2D	16 experimental studies—2007 and 2011 Programs targeting self-management behaviors, blood sugar monitoring, stress management, self-efficacy, diabetes knowledge teaching approaches: individual or in groups, with strategies for encouragement and in the presence of family members.	HbA1c improved in 7 studies with teaching strategies based on patient needs, group learning and interactive discussions
Worswick <i>et al.</i> / 2013	Evaluate the impact of interventions that improve the quality of diabetes care	50 literature reviews: 1999-2011 1) Emotional and behavioral education and support 2) Telemedicine 3) Role of intervention providers 4) Basic interventions	Education and Emotional and Behavioral Support: HbA1c decreased Foot examination improved □1) Telemedicine: more frequent blood glucose monitoring □2) Role of intervention providers: prevention of diabetes and cardiac complications and risk factors □3) Core Interventions: Self-Management Behaviors
Walker 2013	Identifying and examining the effects of behavioral interventions on glycemic control in African American T2DM	10 experimental and quasi-experimental studies 2000-2012	5 of 10 studies showed a statistically significant change in HbA1c in GE. The characteristics of the interventions used in these studies were: problem-solving method, education was provided by a nurse, individual education.

Continued

Klein 2013	To show the effectiveness of interventions based on diabetes self-management education programs on the maintenance of good glycemic control.	<p>52 education programs used in experimental studies 1992-2009 3 parameters:</p> <p>1-Stakeholders: Family physicians-endocrinologists, nurses specializing in diabetology-researcher, dietician, other health professionals: social worker, physiotherapist, psychologist</p> <p>Among the 52 programs 23 are done by nurses</p> <p>2-Content: Procedures: guidelines concerning diet, physical exercise, blood sugar monitoring and transcription of data into a logbook Affective and emotional: Motivation, encouragement, self-confidence, capacities. Social: Strategies for managing diabetes during social activities, vacations, restaurants Cognitive: understanding diabetes in order to act on the consequences to lower blood glucose levels 3-Teaching methods: Individual, group, by telephone, in the presence of a person with social resources: family, friend, spouse, technological: SMS, internet, computer.</p>	<p>Significant reduction in HbA1c level. Long-term interventions seem to be less effective than short-term ones. Patients at the beginning make an effort to apply the recommendations but find it difficult to persevere over time to be observant. Interventions provided by nurses in partnership with other health professionals were the most significant, unlike those where the nurse was not part of the intervener. : the difference was not significant Interventions that combined various methods had a more significant effect</p>
Norris, Lau, Smith, Schmid, Engelgau, 2002	To assess the effectiveness of diabetes self-management education on HbA1c levels	<p>Meta analysis of 31 Experimental studies between: 1980-1999 Individual or group didactic education, per week between 1 month and 27 months</p>	<p>Self-management education improves HbA1c levels in the immediate term, and the longer the follow-up time, the greater the effect. The benefit declines 1 - 3 months after the intervention ends, however, behavior change is suggested to occur over time. Further research is needed to develop effective interventions to maintain good glycemic control over the long term.</p>

Continued

Authors/Year	Aim	type of study	Sample	Intervention	Instruments	Measurement time	Results
Kim, Oh 2003 n: 36 Kim's	Evaluate the effectiveness of telephone calls	Experimental	GE: 20 GC: 16	Distribution of a 49 p. 30 min explanation and 25 min telephone 16 times/patient	1-HbA1c self-reported adherence questionnaire (99)	Before and 12 months after	Decrease HbA1c level (1.2%) Increased compliance: diet and HGT
Chan, Yee, Leung, Day 2006	Assessing the effectiveness of nursing intervention: consultation	Quasi-experimental	n: 150 GE: 75 GC: 75	Consultation 30 min each month and telephone follow-up every 2 weeks	1-HbA1c 2-PEDQ: patient evaluation of the quality of diabetes care	Before and 12 months after	Decrease in HbA1c, BP and use of healthcare service
Shi, Q., Ostwald, S.K, & Wang, S. (2010).	To examine the effect of a hospital-based clinic intervention on glycaemic control self-efficacy and glycaemic control behaviour of Chinese patients with type 2 diabetes mellitus (DM).	Experimental study	N = 160	Discussion, computer-assisted presentation, video exposure and telephone tracking	SDCA DMSES	Before and one and three months after	Statistically significant differences between the two groups; self-efficiency and self-management behaviour in the EG improved (F = 26.888 and F = 198.619, df = 1.155, p < 0.05, respectively)

The teaching methods adopted were individual or in groups and in the presence of family members. Most of the strategies used in these studies were participatory, such as: discussion and dialogue, demonstration, training exercise, motivational interviewing. HbA1c levels improved in eight of these studies with teaching strategies based on patient needs, group learning and interactive discussions [14].

Worswick *et al.* (2013) identified 125 literature reviews published in 76 journals between 1999 and 2011. The authors selected 50 reviews with high quality standards and evaluated the effects of interventions on improving the quality of diabetes care. The number of studies included in each review varied from 5 to 82 studies. Thirty-one reviews included only studies that performed randomized trials with or without control groups. Twenty reviews used one or more methods of analysis and thirty-four meta-analyses. Emotional and behavioral patient education and support was the most common type of intervention in the reviewed reviews (n = 21), followed by telemedicine (n = 10), general interventions (n = 8), 1 expanding the roles of health professionals (n = 7) and the role of or-

ganizations (n = 4). The results of this review showed that interventions based on patient education and emotional and behavioral support improved HbA1c, blood pressure, cholesterol, and prevention of diabetic foot in patients. Telemedicine interventions have been associated with improved glycemic control. Interventions in which healthcare professionals have expanded their roles have had an impact on glycemic control and vascular risk factors. In light of the analysis of these 50 reviews, it appears clear that interventions based on education, emotional and behavioral support for type 2 diabetes patients, out of 19 telemedicine, and those provided by different healthcare professionals health, appear to improve the quality of diabetes care [15].

The level of glycosylated hemoglobin, following an educational intervention, decreased significantly and this was demonstrated in the four studies analyzed in this review of the literature [16] [17] [18] [19]. Among these articles, we note the study by Walker *et al.* (2013). These authors examined the effects of behavioral interventions on glycemic control in patients with type 2 diabetes and which are reported in 10 experimental and quasi-experimental studies published between 2000 and 2012. Six of these studies mentioned that the intervention was carried out by a nurse. Five of these studies showed a drop in HbA1c levels in the experimental group after 6 to 12 months of education. These authors conclude that patients have more confidence when education is provided by a nurse. They recommend integrating the problem-solving method into teaching methods, this method helps patients to memorize the knowledge acquired in the long term. Nevertheless, the selection of the writings of this review was limited to articles having measured only the level of glycemic control (the HbA1c level), which may limit the scope of the results of this review [18].

Also, the Klein *et al.* (2013), these authors evaluated 52 programs used in experimental studies, studies that were published between 1992 and 2009. These programs provided by various health professionals were carried out with type 2 diabetic patients in order to help them adopt self-management behaviors and produce changes in HbA1c levels. Of these 52 studies, 23 programs were delivered by nurses. The overall results of this meta-analysis showed that education-based interventions aimed at improving diabetes self-management significantly reduced HbA1c levels in the experimental group (at baseline: 8.70%; at end: 7.61%). The authors recommend for future research, to further detail the 24 programs adopted and include cognitive self-management techniques that develop in patients the skills to detect possible complications and to avoid, as much as possible, the obstacles that prevent them from maintaining a normal HbA1c level [19]. In another meta-analysis carried out in 2002 on 31 studies, Norris and his colleagues show that diabetic patients involved in self-management education programs have a decrease in their HbA1c [20].

4. Discussion

Mohebi *et al.* (2014) concluded that a high sense of self-efficacy can help diabetic

patients to consolidate their self-confidence. It can be favored during learning during an education session. To be successful, the educator must integrate Bandura's four sources of influence by targeting the following approaches: dividing large behaviors into small tasks, showing the performance of a behavior by other patients, repeating the action, encouraging, reinforce and reward whenever positive change is demonstrated [12].

Timm *et al.* confirm that education is a reliable source to deal with problems of adherence. They insist on the fact that one should not expect direct adherence from patients and support the idea that the measurement of HbA1c is an essential tool to assess the level of therapeutic adherence. They also concluded that it is more than likely that the HbA1c level will drop after the intervention if the duration of the intervention does not exceed the period of 12 months. Unfortunately, in some of the studies reviewed, the duration of education and the measurement of the HbA1c level were missing, which are two necessary elements to guide any research aimed at improving the management of diabetes [14].

The systematic reviews by Worswick *et al.* (2013) and Cheng (2011) concluded that a nursing intervention that juxtaposes an education program can lead to more relevant results concerning the improvement of diabetes management and that the nurse, through her educational function, is considered as an actor, leading in the management of diabetes; hence the need to better understand the state of knowledge on the interventions carried out by nurses with diabetic clients. These authors were able to show that the interventions provided by a multidisciplinary team and based on interactive educational programs, promote the improvement of the quality of diabetes care [15] [21].

Klein *et al.* (2013) recommend for future research to further detail the programs adopted and include cognitive self-management techniques that develop in patients the skills to detect possible complications and to avoid, as much as possible, the obstacles that prevent them from maintaining a normal HbA1c level [19].

The majority of these interventions had a positive impact on various indicators: increased patient knowledge of diabetes disease; improving their commitment to self-management behaviors; correction of their clinical results, in particular HbA1c. These interventions also had an effect on the psychological symptoms which decreased, leading to an improvement in the patients' quality of life and an increase in the level of their well-being. Hunt concludes that the nurse, through her educational function, is a key player who contributes to improving the management of diabetes and reducing the onset of its complications. She emphasizes that these nursing interventions need to be continually supported and maintained and suggests that more research be conducted to show which of the nursing interventions are most relevant. In light of what Hunt has argued in his review, it is evident that the management of diabetes is complex and requires the effective involvement and increased participation of the diabetic patient.

By way of conclusion from the systematic reviews presented in the previous section, it is clear that interventions based on nurse-led education programs and characterized by active and non-traditional learning strategies have a significant effect on the control of diabetes and specifically on the reduction of the HbA1c level. The authors recommend for future research to provide more detail on the programs adopted and to include cognitive self-management techniques that develop in patients the skills to detect possible complications and to avoid, as much as possible, the obstacles that prevent them from maintaining a normal HbA1c level.

5. Limits

For practical reasons of feasibility, the review was restricted to a few databases. Incompatible evaluation tools, and/or heterogeneous between studies, the lack of description of educational procedures, are limits for this literature review. Unfortunately, in some of the studies reviewed, the duration of education was missing, which is a necessary element to guide any research aimed at improving the management of diabetes.

6. Conclusion

In this systematic review, relevant data regarding the effects of an education program were provided and mutual strategies in education to improve self-efficacy, self-care behaviors and achieve optimal blood sugar levels. In addition, much remains to be done to ensure a better match between programs and recent international recommendations and to improve the quality of research to generate evidence.

Conflicts of Interest

The authors declare no conflicts of interest.

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