Educational practices in diabetic patient and perspective of health professional: a systematic review

Práticas educativas no paciente diabético e perspectiva do profissional de saúde: uma revisão sistemática

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Abstract

This systematic review has sought to identify the multidisciplinary scientific production, addressing factors for proper *diabetes mellitus* management focusing on health education, from the perspective of the patient and the professional. The goal was to synthesize the knowledge produced and point out its implications for the practice of patient care. A search was conducted in PubMed, Medline, SCOPUS, LILACS and BIREME. The intervention programs present methodologies and different structures, although the theoretical basis is education for self-management. The evaluation methodologies for effectiveness of educational programs focused on the number of subscriptions and stay in groups. Some studies also evaluated psychological, social and pathophysiological parameters. The results show qualitative improvements in self-care, humanization in care, and quality of life of patients. The evidence shows that there seems to be a positive response to the intervention programs whenever comparing the physiological, psychological, educational and social parameters, initial and final of the studies.

Keywords: *diabetes mellitus*; health education; knowledge; self care.

Resumo

Esta revisão sistemática procurou identificar a produção científica multiprofissional, que aborde fatores para o adequado manejo do *diabetes mellitus* com enfoque na educação em saúde, na perspectiva do paciente e do profissional. O objetivo foi sintetizar o conhecimento produzido e apontar suas implicações na prática do atendimento ao doente. Foi realizada uma busca nas bases de PubMed, Medline, SCOPUS, LILACS e BIREME. Os programas de intervenção apresentam metodologias e estruturas distintas, embora a base teórica seja a educação para autogestão. As metodologias de avaliação da eficácia dos programas educativos incidiram no número de adesões e permanência nos grupos. Alguns estudos também avaliaram parâmetros psicológicos, fisiopatológicos e sociais. Os resultados mostram ganhos qualitativos no autocuidado, na humanização do atendimento, e na qualidade de vida dos pacientes. As evidências apontam que parece haver uma resposta positiva aos programas de intervenção quando comparados os parâmetros fisiológicos, psicológicos, educativos e sociais, iniciais e finais dos estudos.

Palavras-chave: *diabetes mellitus*; educação em saúde; conhecimento; autocuidado.

Introduction

Diabetes mellitus (DM) is a chronic disease that manifests when the pancreas cannot produce enough insulin or the body is unable to effectively use the insulin synthesized in the pancreas. DM causes blood glucose levels to increase (hyperglycemia).[1]

Chronic hyperglycemia introduces macroangiopathic complications such as ischemic heart disease (IHD), peripheral vascular disease (PVD), and stroke. Microangiopathic complications such as diabetic retinopathy (DR), diabetic nephropathy (DN), and distal sensory neuropathy (DSN) may also occur. Higher death rates have been observed in diabetic

Submitted on: 5/4/2016.
Approved on: 6/5/2016.

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DOI: 10.5935/0101-2800.20170034

patients presenting atherosclerotic involvement of the coronary arteries of the lower limbs and of the cerebral arteries.[2]

Published numbers have shown that *diabetes mellitus* has attained the status of an epidemic. At a global level, an estimated 30 million adults had DM in 1985; the number grew to 135 million in 1995 and to 173 million in 2002. Forecasts indicate that 300 million will have DM in 2030. This increase has occurred mainly as a consequence of population growth and aging, greater urbanization, higher incidences of obesity and sedentary lifestyles, and the longer survival of patients with DM.[3,4]

As in other diseases, education plays a key role in the treatment of DM and in the management of the condition by the patients themselves. Since DM is a chronic disease, treatment success relies heavily on patient accountability and awareness over the restrictions imposed by the condition, in addition to the need for patients to manage their glucose levels. A wide array of educational interventions has been tested in patients with DM. Nonetheless, a universally effective model for patients with the disease is yet to be developed.[5]

Self-management education should reach every individual with DM. With that in mind, the *National Standards for Diabetes Self-Management Education* (DSME) were published in 2006 to improve the quality of the education and provide patients with DM in different settings with evidence-based information.[6]

Health education is recognized as an effective self-management capacity building tool, in which patients are empowered to play an active role in the management of their conditions. Defined as a means to help individuals trust their own ability to care for themselves, this approach aims to maximize the resources available and the responsibility each individual has for changing his attitude toward promoting health status improvements. The four main pillars of Empowerment are:[7] 1) empowering individuals; 2) leadership; 3) motivation and 4) development (education and information).

Several drugs are available to treat individuals with DM. However, according to the *American Diabetes Association* (ADA), only 50% of the patients making regular use of medication are able to attain desirable blood glucose levels. Compliance to treatment is an issue among patients with DM. Treatment requires patients to change their eating habits, engage in regular physical activity, and be followed by a specialized multidisciplinary team, which often affects their family lives. In addition to proper glucose level management, patients with DM must be offered an intervention that encompasses other risk factors and chronic complications such as obesity, hypertension, dyslipidemia, and smoking.[5]

By means of educational efforts devised to motivate patients to comply with their drug regiments, have regular meals, and stick to their prescribed individual physical exercise programs, this approach aims to attain the following success parameters: improved metabolic management, reduced cardiovascular risk, and management of chronic complications related to diabetes. It also includes the development of adequate settings and training programs for primary health care (PHC) workers from a variety of educational tools designed to improve patient quality-of-life and self-management skills.[8]

This study looked into health education practices offered to individuals with DM type 2 in Brazil and described the reality of various levels of health care in the country. These findings may be used as input in the development of patient-specific care plans and interventions on the health care system to improve functional health literacy (FHL) levels via enhanced communication techniques and attractive, simplified written materials, along with training programs for educators and health care workers to further support the required changes and health promotion/prevention actions designed to improve patient quality-of-life.

With the aspects cited above in mind, this study aimed to identify papers on educational practices applied to individuals with DM type 2 published between 2010 and February 2016 and report the perspectives of health care workers.

Method

This qualitative systematic review focused on health education for diabetic patients. It included the following steps: definition of the guiding question; paper selection based on inclusion criteria; extraction of the papers included in the review; assessment of the included studies; interpretation of results; and presentation of an integrative review.

The review used the following guiding question: *What is the relevance of health education for diabetic patients and health care workers?*

Data collection was carried out in February 2016 from the following platforms: *National Center for Biotechnology Information U.S. National Library of Medicine* (PubMed), Medline, *Scientific Electronic Library Online* (SciELO), *Virtual Health Library* (Bireme) and *Scopus/Elsevier*. The use of health sciences descriptors "health education and *diabetes mellitus*" resulted in a total of 517 papers.

The following inclusion criteria were observed: full complete text *online*; paper published from 2010 to 2016; abstract described educational practices developed for individuals with diabetes; educational practices developed for health care workers; data collected in Brazil; papers written in Portuguese or English. The following were excluded: incomplete texts and papers not available *online*; bibliographic reviews; papers on formal technical education; studies performed to validate instruments/scales; papers assessing only the knowledge of patients and health care workers; and theses.

The quality of the studies was assessed through the protocol set out in the *Critical Appraisal Skills Programme* (CASP) of the *Public Health Resource Unit* (PHRU).[9] This protocol is made up of ten items (maximum of 10 points) used to assess study quality in terms of: 1) objective; 2) method suitability; 3) presentation of theoretical and methodological procedures; 4) sample selection; 5) data collection procedure; 6) relationship between authors and studied population; 7) ethics; 8) data analysis procedure; 9) presentation of results; 10) relevance of the study. The studies were categorized based on their scores: 6 to 10 points (good method and reduced bias); or at least 5 points (satisfactory method, increased risk of bias). This study included only papers assigned scores ranging from 6 to 10 points.

A second instrument was used in this systematic review, the "Classificação Hierárquica das Evidências para Avaliação dos Estudos" (hierarchies of evidence for the assessment of studies),[10] to contemplate the following items: 1) systematic review or meta-analysis; 2) randomized clinical trials; 3) non-randomized clinical trials; 4) cohort and case-control studies; 5) systematic review of descriptive and qualitative studies; 6) single descriptive or qualitative study; 7) expert opinion and/or expert committee report. Fifteen papers remained at the end of the selection procedure.

Two reviewers read the papers, and whenever there was doubt over a selected paper the opinion of a third reviewer was used to untie the decision. After the CASP protocol was used to assess the studies for quality, 15 papers remained in the final sample.

Results

Table 1 summarizes the results of this study and describes the number of papers found, pre-selected, excluded, and included in this review. As mentioned above, health sciences descriptors health education and *diabetes mellitus* and the CASP protocol were used in this study. Most of the publications found initially came from Virtual Health Library Bireme (193), followed by PubMed (158), Scopus/Elselvier (104), Scielo (38), and Medline (24); most of the papers eventually used in the study came from Bireme.

Nine papers (60%) were written in Portuguese and six (40%) in English. Many had versions in English, Spanish, and Portuguese. This number shows that only a handful of studies carried out in Brazil ended up being published in international journals.

In terms of study design, the sample contained 11 descriptive or qualitative studies (evidence level VI), and four clinical randomized trials (evidence level II).

Table 1 Distribution of papers identified and selected from databases

Databases	Identified	Pre-selected	Excluded	Reviewed
PubMed	158	17	12	4
Medline	24	8	7	1
Scielo	38	16	13	3
Bireme	193	13	10	3
Scopus	104	18	14	4
TOTAL	517	45	30	15

Studies with a qualitative and descriptive design provide answers to questions related to the perceptions individuals and health care workers have over educational programs and further elucidate health promotion interventions. By their turn, randomized clinical trials are more specific and verify whether individual behavior changed with the implementation of educational programs.

Permanent Health Education as a set of ongoing educational programs devised to transform work processes into valuable learning experiences aims to foster the construction of new knowledge and turn the health care network into a teaching-and-learning space.[11]

The high cost of glucose monitors, of the drugs used to treat insulin resistance, and of the insulin administered to patients with DM are some of the additional challenges faced by multidisciplinary teams. Although Brazilian legislation sets that these medications must be distributed free of charge, prescription by a physician is required before patients can have access to these drugs.[12] Therefore, access to medical care is also a determining factor in the high number of individuals diagnosed with DM not followed regularly by a physician.

The papers included in this study predominantly followed the lines of Paulo Freire's[13] theory of education for liberation. In it, the learner constructs his own knowledge from the circumstances of daily life. Reference was also made to the writings of Dorothea Orem[14] on self-care, in which active participation from health care workers is reinforced for purposes of promoting health, while targeting and fostering patient emancipation.

Table 2 lists the educational practices developed for individuals with diabetes in Brazil from 2010 to 2016 described in the papers included in this study.

Most of the studies were carried out in public health care clinics (60%), followed by university research and outreach centers (20%), hospitals (20%), and other services (20%). During the interventions, multidisciplinary teams made up of physicians, dentists, psychologists, social workers, nutritionists, and nurses saw the patients

The target audience described in the studies included adult individuals diagnosed with diabetes in 11 papers (69.2%) and health care workers in four (30.8%).

The population with DM enrolled in the included studies comprised mostly females (66.72%); most were 60 and older (57.65 ± 15); nearly three quarters had incomplete elementary education (72.22%); almost a fifth (18.18%) completed elementary education; 9.09% completed secondary or postsecondary education; mean household income was 1.5 ± 2 Brazilian minimum wages.[15,17-23,27-29]

Most of the educational programs described in the included studies were delivered in four sessions, in which group tasks, group work, lectures, and other motivational methods were used to promote awareness over the need for self-care in the emancipation of patients.

The table also shows that 12 of the included studies applied educational programs for DM with individual and group patient interventions. The latter produced better outcomes and more interaction among learners in teaching, audiovisual, informative, and practical sessions. The themes discussed by the groups revolved around patient self-care and independence.

Most of the selected studies had the importance of regular physical activity,[1,15-20,22,23,26,28] balanced diet,[15-23,25,26,28,29] and foot care and complications[15-20,22,23,25] as their main themes, all of which extremely relevant for individuals with diabetes.

Some studies covered other topics, such as the pathophysiology of the disease,[16,19-21,26,28,29] its causes, signs, and symptoms,[16,23,26] prevention against acute and chronic complications of the condition,[19,20,21,23,28,29] and glucose monitoring and management.[21-23,25,27,28]

A few studies addressed the management of diabetes as a complication of other diseases[21] and, although these factors are related to lifestyle changes, only one study looked into this topic.[22]

One study stressed the relevance of reorienting patient education practices to enhance health care worker skills, working goals, and the assessment of educational interventions, in the definition of health promotion and disease management strategies.[24]

Another aspect to be considered was the dialog established in the construction of each stage of the discussions on the topic, shaped by the reality experienced by the patients and the use of teaching strategies based on the findings arising from individual and group sessions, which allowed the identification of technical/scientific knowledge outside the traditional

Table 2 Characteristics of papers in regards to the site of the study, target audience, theoretical references, and educational tool/instrument

Authors	Site of the study	Target audience	Theoretical references	educational tool/instrument
Pereira *et al.*, 2012[15]	Outpatient ward	62 adults	Paulo Freire	Lectures, group work
Torres *et al.*, 2010[16]	Public health care clinic	85 health care workers	Paulo Freire	Lectures, discussion groups
Torres *et al.*, 2011[17]	Public health care clinic	63 adults	Paulo Freire	Lectures, group work
Brito e Santos, 2011[18]	Public health care clinic	14 adults	Dorotea Orem	Lectures, group work
Torres *et al.*, 2009[19]	Hospital	104 adults	Paulo Freire	Interactive, playful group sessions based on educational games and theoretical/practical knowledge
Torres *et al.*, 2011[20]	University research and outreach center	27 adults	Paulo Freire	Interactive, playful group sessions, booklets, games
Rodrigues *et al.*, 2009[21]	University research and outreach center	83 adults > 60	Paulo Freire	Group work: role playing, group sessions, exchange of experiences.
Landim *et al.*, 2011[22]	University research and outreach center	43 adults > 60	Dorotea Orem	Educational groups developed in four sessions with multidisciplinary team.
Scain *et al.*, 2009[23]	Medical clinic, Hospital	104 adults	Dorotea Orem	Educational groups developed in four sessions encouraging active participation during sessions, asking questions, and reporting experiences
Torres *et al.*, 2010[24]	Public health care clinic	23 health care workers	Paulo Freire	Focus groups
Rodrigues *et al.*, 2010[25]	Outpatient ward	Family health team 5 health care workers	Paulo Freire	Educational workshops
Matsumoto *et al.*, 2012[26]	Public health care clinic	166 adults	Paulo Freire	Group work: lectures, discussion groups
Faria et al., 2013[27]	Public health care clinic	51 health care workers	Paulo Freire	Supply of educational and rate control material
Pereira *et al.*, 2014[28]	Hospital	232 adults	Paulo Freire	Educational groups developed in 12 sessions every 15 days for six months monitored by a nurse or health care worker
Imazu *et al.*, 2015[29]	Health services covered in the "Chronic Patient Monitoring Program"	150 adults	Paulo Freire	Biannual visits with a nurse, monitoring over the phone, and educational group work

means by which information is conveyed. Health care workers were interested and sensitized by the need to work in an integrated fashion in health promotion and diabetes education programs. The studies stressed the importance of planning in organized educational programs for diabetes; of considering the needs, values and beliefs of patients; and of health care workers using appropriate language when talking to patients about different issues.[16,24-26]

The quality-of-life of individuals with diabetes is intrinsically linked to all factors mentioned above, but two studies covered this topic particularly well.[27,28]

They analyzed the intersections between physical activity, nutrition, diabetic foot care, complications, and self-monitoring.

Discussion

The literature included in this study showed that health educational intervention improved the self-perception of patients over *diabetes mellitus*, and helped build the skills of health care workers in terms of information and care as experienced by diabetic individuals. Since individuals with DM are offered multidisciplinary care, continued health education should involve workers from all areas, including physicians, nurses, nutritionists, dentists, psychologists, and social workers. In addition to keeping everyone up-to-date, continued education has produced good outcomes when the scenarios BEFORE and AFTER the administration of health education programs are compared.

The quality-of-life of individuals with *diabetes mellitus* is closely linked to glucose monitoring, and the quality of glucose monitoring is closely linked to the quantity and quality of the information delivered to patients by the multidisciplinary care team. An educational approach assumes the existence of a partnership between learners and educators. The benefits of such partnership include better disease management and decreases of as much as one percent in glucose levels for every 23.5 hours of interaction between patients and specialized health care workers.[3]

Educational activities can occur in individual or group sessions, held in a room, over the phone, or through the Internet; they may be led by health care workers or peer patients in daily, weekly or monthly meetings, with or without the involvement of patient families.

In every case, educational interventions introduced beneficial effects on attained outcomes with the goal of helping patients with DM decrease and manage their glucose levels. These efforts, however, are often marred by obstacles related to the causes of DM type 2, such as unwillingness or impossibility to perform physical activity, dyslipidemia arising from metabolic syndrome, and lack of nutritional education.

Cultural factors also introduce additional resistance to the lifestyle changes needed to control and monitor glucose levels, and to prevent and care for high morbidity conditions arising from DM.

Level of education is considered a determining factor in the success of educational programs for individuals with DM, since patients need to acquire knowledge before they are able to effectively engage in self-care. Low level of education has been described as a factor that interferes with compliance to drug therapy. The drug regimens prescribed to patients with DM are complex and have to be well comprehended.[30]

The groups enrolled in the included studies were quite homogeneous in terms of education. Most had incomplete elementary education and were comparable for their ability to learn. Other authors also reported a predominance of such level of education among individuals with DM.[30,31]

In the analyzed population, old age was not related to learning disorders. However, another study that looked into the obstacles in providing diabetes education found that elderly individuals, in addition to other difficulties, had trouble learning.[32]

Another important item to consider, specifically as it concerns older and less educated individuals with DM, is health literacy, a variable not assessed in the mentioned studies and scarcely explored in Brazil. In one of the few existing Brazilian papers on this matter, Sampaio *et al.*,[33] used specific tests to assess the level of FHL in the area of glucose level management of diabetic individuals seen in the Brazilian public health care system (SUS).

A recent Brazilian study used a scale to assess health literacy without covering number literacy skills of a group of elderly diabetic individuals. This study targeted a different age group when compared to the papers included in this review. The authors of this study indicated that the level of functional health literacy of the interviewed individuals with DM type 2 was not significantly associated with glucose level management assessed through fasting glucose and glycated hemoglobin tests.

However, stratified analysis by number literacy and reading skills identified an association between higher fasting glucose test results and poor number literacy.[34] These findings were not replicated in

similar studies carried out in other countries, in which a trend toward a significant correlation was found between low levels of literacy and poor glucose level management.[35]

The educational program implemented in these studies raised knowledge levels as verified by technical instruments, particularly questionnaires systematically applied before and after the delivery of educational programs on diabetes. The studies focused primarily on the use of educational tools such as leaflets, role-playing, personal accounts, and visits to patient homes to acquire knowledge on the disease.[15,17-23,27-29] The patients were followed for six to 12 months in generally successful programs, but educational interventions in which patient collaboration was required were more effective.

The educational programs developed for health care workers confirmed the fact that continued education fosters more effective group work and search for care solutions through critical thinking. One of the studies cited that educational programs for health care workers based on interaction and dialog fostered socialization among members of the multidisciplinary team and further exchange of knowledge and experience.

The studies listed enabling factors in the execution of teaching-learning processes such as solution-driven critical thinking when dealing with issues discussed in the program, appreciation of two-way communication, exchange of experiences in the production of knowledge, and the role of health care workers as educators and active participants in the generation of knowledge.

From the standpoint of health care workers, the benefits of patient intervention included improved relationships with patients, humanization of care, opportunities for reflection, knowledge building from exchanges with patients, and capacity building. The latter is an essential item in continued education and ongoing professional skill building. Exchanging and studying information and practice foster multidisciplinary professional learning, in which action-reflex-action are concomitantly built.

Our analysis revealed that health care workers reported limited success in patient continued education efforts, some due to insufficient knowledge from health care workers or inadequate patient management.

A few studies reported trouble with reduced patient participation, short program duration, and program discontinuation. However, it should be noted that most of the educational intervention strategies reviewed in the included papers were effective and fostered cognitive, emotional, and motivational development, and thus promoted patient self-care.

Actions of this nature led to active involvement of patients in the management of their quality-of-life, promoted significant decreases in glycated hemoglobin levels and other pathophysiological and anthropometric indicators, and improved performance in physical activity tests.

Conclusion

This review encompassed strategies, parameters for the comparison between approaches described in the literature, and pointed out the need to better organize and improve health education processes used in combination with DM programs.

The analysis of clinical variables and diabetes self-care evinced the relevance of demographic, cultural, social, and cultural factors in the attainment of behavioral change and improved coexistence with the disease. Education plays a pivotal role in self-care and helps mitigate chronic complications.

Proper attention must be given to educational measures and FHL in order to improve the comprehension of health care advice and education programs delivered to patients with DM in particular. More specifically, the role of low levels of FHL on individual and collective health must be considered in the planning and management of health services. It is of the utmost importance that health care teams be made aware of the relationship between care and health literacy in future studies performed in this area.

The educational practices developed for Brazilian patients with DM described in the selected papers showed that health education encouraged active participation of individuals in all stages of the process (planning, development, and implementation of educational programs) and fostered learning and the introduction of lifestyle changes; they also mitigated the issues related to the knowledge and attitudes of diabetic patients toward the daily management of the disease.

The participation of a multidisciplinary team was also covered as a strategy to achieve metabolic control and increased compliance to treatment, with specific relevance given to the role of nurses as key participants in the promotion of health education.

The implementation of structured care programs for chronic diseases has been attempted in recent years. This review evinced the need to build the skills and train health care workers involved in the treatment of diabetic patients and prepare them to work as facilitators in professional training programs devised to standardize and organize good quality comprehensive patient care to foster patient independence and provide health education.

Conflicts of interest

The authors have no conflicts of interest related to the publication of this paper.

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