Review Article

Educational strategies for diabetic people at risk for foot neuropathy: synthesis of good evidence

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ABSTRACT

The aim of the present study was to identify the best evidence concerning health education strategies used in teaching-learning for people with diabetes mellitus who are at risk for foot neuropathy. An integrative review was conducted in the databases PubMed, LILACS, CINAHL and SCOPUS in January 2015; a total of 14 papers was analyzed in detail. The results are shown in a summary table and categories are discussed, covering various health education strategies for prevention and management with patients at risk of foot neuropathy (group; individual in face-to-face visits or via telephone; and using interactive technologies), and a synthesis of the best evidence for the effectiveness of these interventions in reducing diabetic foot complications. It was concluded that all the educational strategies are effective in promoting diabetic foot self-care. However, the group strategies showed greater effectiveness, enabling significant improvements in the knowledge, attitude, and practices of care for feet and general health of diabetic patients.

Descriptors: Nursing Care; Health Education; Diabetic Foot; Educational Technology.

INTRODUCTION

Foot neuropathy is a severe microvascular complication that affects people with diabetes mellitus (DM). It leads to loss of sensation, twinges and prickling, deformities and repetitive superficial trauma, and cracked skin or foot injuries, often unnoticed by patients[1]. The

disease can result in diabetic foot in the absence of early diagnosis[2].

Diabetic foot is defined by infection, ulceration and/or destruction of deep tissues associated with neurological abnormalities and several levels of peripheral vascular disease in the lower limb[3].

If the causes of diabetic foot are known, high-risk patients can be identified early, preventing amputation. According to one study, up to 50% of amputations could be avoided through health education activities combined with the promotion of self-care and multidisciplinary care[4].

Health education in these patients consists of a process that facilitates the knowledge and skills needed for effective management of symptoms and improvement of quality of life, including physical activity, nutritional education, therapy, and other activities performed by patients for effective metabolic control and increased survival at more affordable costs[5].

In the area of nursing, there are distinct technologies to promote the emancipation of people involved in the care process. The classification of the technologies this study emphasizes educational technology, consisting of a systematic set of scientific knowledge that enables planning, execution, control, and follow-up and involves the whole formal and informal educational process[6].

In health education, it is important to choose a pedagogical concept that enables patients to develop critical possibility and construct new knowledge. From this perspective, nurses must exercise leadership and communication, and value the diversity and initiative of all the people involved, striving to enhance the human strength of everyone, especially patients[7].

Moreover, over the last decade the adoption of more appropriate educational strategies has been evolving, especially because professionals feel the need for change in relation to didactic presentations.

Despite the evolution of health education strategies, there is increasing evidence of lack of knowledge in relation to care of the feet among diabetic patients. However, a few actions have been carried out to improve this situation[8]. The prevention and management of diabetic foot continue to be a constant challenge worldwide; this is due to the growing number of diabetic patients, lack of time of patients, lack of podiatrists and nurses specialized in diabetes, and lack of educators. Therefore, if strategies to disseminate knowledge regarding foot care are not developed in time, a series of avoidable conditions of diabetic foot, such as ulcers and amputations, may be generated[9].

A recent cross-sectional study conducted in India discussed the predominant scenario of the dissemination of education for foot care among diabetic patients, emphasizing the fact that the dissemination of knowledge of this type of care needs to be improved at every level of care. However, the authors affirmed that the impact of health education on changes in foot care practices and on the development of ulcers (which require follow-up) could not be investigated, suggesting that further studies should approach this aspect[8].

Given the above, an integrative review was conducted in order to identify the best evidence on health education strategies used in teaching-learning for people with DM who are at risk for foot neuropathy.

METHOD

The study was based on the steps for integrative review proposed by Ganong[10], consisting of six stages: identification of the hypothesis or guiding question; selection of the sample based on criteria for inclusion and exclusion of studies; definition of the information to be extracted from the selected studies and/or categorization of the studies; assessment of the included studies; interpretation of the results; and synthesis of the evidenced knowledge.

To this end, two guiding questions were defined: Which health education strategies published in the literature for people with DM produce the best results for prevention and management with patients at risk for foot neuropathy? What is the effectiveness of the educational interventions in the reduction of complications resulting from diabetic foot?

A search was conducted in the scientific literature during January 2015 in the following databases: National Library of Medicine (PubMed/Medline), Latin American and Caribbean Health Sciences Literature (LILACS), Cumulative Index of Nursing and Allied Health Literature (CINAHL) and SCOPUS.

During the search, each database was accessed on the same day and researched at the same time, in order to exhaust the search for publications, avoiding bias that would impair the reliability of this stage. Moreover, this stage was conducted independently by two researchers, who met later to come to consensus on the papers that would be included in the sample.

The terminology in the Descriptors in Health Sciences (DeCs/BIREME) and Medical Subject Headings (MeSH/PubMed) was used. The descriptors were used with the Boolean marker “and” in the subject fields: Pé Diabético/Diabetic Foot/Pie Diabético, Educação em Saúde/Health Education/Educación em Salud.

Studies on health education for people with diabetes who are at risk for foot neuropathy, with no limitations on period of publication, available and free online in full, written in English, Spanish, or Portuguese, were included. Editorial-type publications, letters to the editor, reflexive studies, reports of experiments, and integrative reviews were excluded, as these were not considered to examine health education strategies in the context of practical application by professionals in health services. The final sample consisted of 14 papers, analyzed in full, published between 2004 and January 2015.

The instrument Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA)[11] was used to introduce the summary of the selection of studies (Figure 1).

A detailed and analytical reading was conducted to define the information to be extracted from the studies, supported by a form eliciting the following information: identification of the studies (authors, journals, year of publication, country of origin, and level of scientific evidence); methodological characteristics; and variables of interest for the integrative review (main findings, implemented strategies, and evidence of their effectiveness).

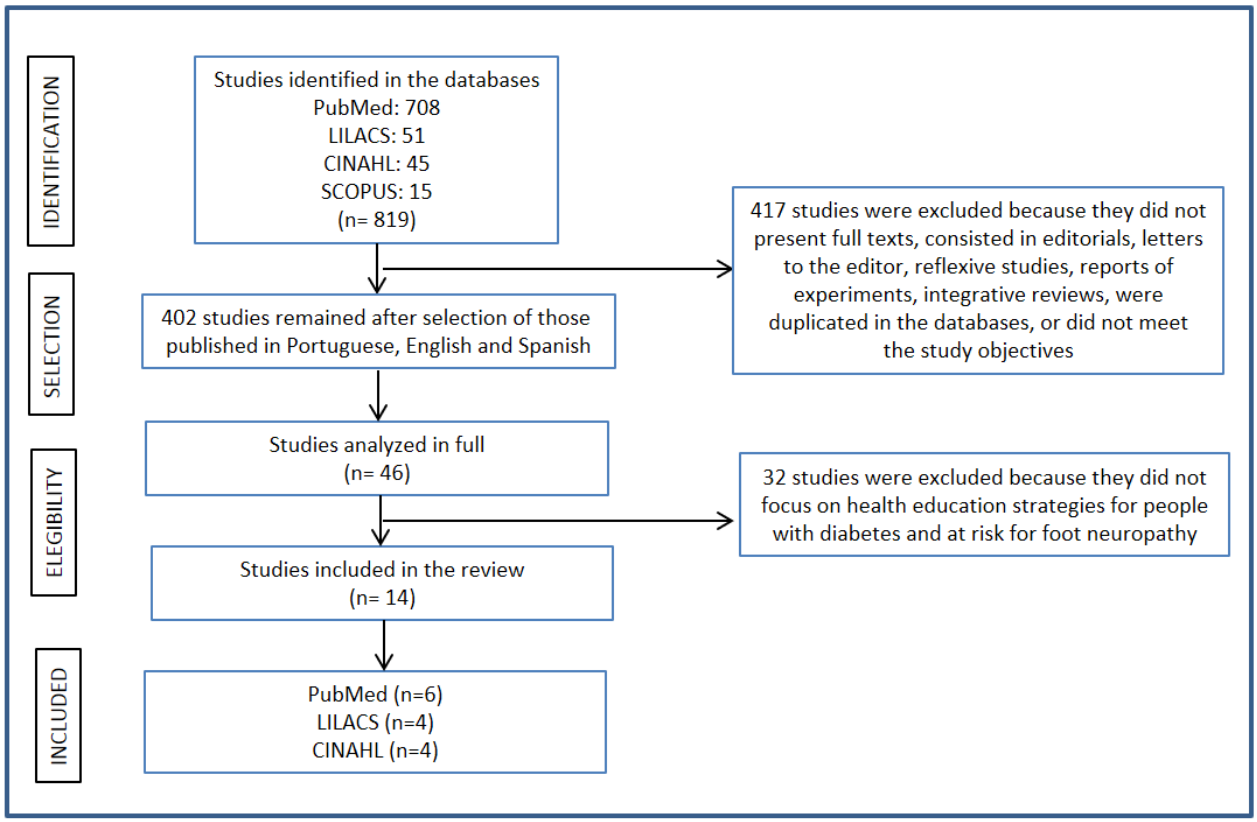

Figure 1: Flowchart of the selection of publications.

Six levels of evidence were considered[12]:

- Level I – studies related to the meta-analysis of multiple controlled studies;
- Level II – individual experimental studies;
- Level III - quasi-experimental studies, such as non-randomized clinical studies pre-test and post-test single groups, and time series or case-control studies;
- Level IV – non-experimental studies, such as descriptive, correlational, comparative research with a qualitative approach and case studies;
- Level V – program assessment data and data obtained in a systematic manner;
- Level VI – opinions of experts, experiment reports, consensus, regulations, and legislation.

The present study did not involve human subjects. The intellectual property of the authors of the papers that made up the sample was respected, namely by strict citation of their work.

RESULTS

Table 1 presents the publications in relation to identification, design, level of evidence, and variables of interest (implemented analytical category, health education techniques or strategies, and effectiveness of the interventions).

Table 1: Characterization of the papers according to identification, design, level of evidence, and variables of interest.

Authors	Year/Journal/ Country	Design*	Level of evidence**	Analytical category/subcategory	Implemented health education techniques or strategies	Evidence of effectiveness of interventions
Pereira DA, Costa NMSC, Sousa ALL, Jardim PCBV, Zanini CRO[13]	2012/ Rev. Latino-Am. Enfermagem./ Brazil	Randomized clinical trial	II	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Guidance and practical assessment of care	Improved knowledge of diabetes and foot care in the intervention group (p<0.05).
Adib-Hajbaghery M, Alinaqipoor T[14]	2012/ J Caring Sci./Iran	Randomized clinical trial	II	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Lectures and practical classes.	A significant relationship between adherence by the intervention group and the level of reduction of the surface of the ulcer (r = 0.36, p = 0.04) was observed.
Kruse RL, Lemaster JW, Madsen RW[15]	2010/ Phys Ther./ United States of America	Randomized clinical trial	II	Health education strategies for prevention and management of patients at risk for foot neuropathy/Individual guidance in visits and via telephone	Individual health education	A small increase in how long the intervention group could remain standing on one leg with their eyes closed. No other force or measurement balance differences between the groups.
Abbas ZG, Archibald, LK[16]	2007/ Int Wound J./ Sudan	Randomized clinical trial	II	Health education strategies for prevention and management of patients at risk for foot neuropathy/Individual guidance in visits and via telephone	Educational interventions with individual guidance.	Reduction in the occurrence of adverse events associated with diabetic foot after educational intervention.
MakkiAwouda FO, Elmukashfi TA, Hagal-Tom AS[17]	2014/Glob J Health Sci./ Sudan	Quasi-experimental clinical trial	III	Health education strategies for prevention and management of patients at risk for foot neuropathy/Individual guidance in the visits and via telephone	Individual health education	Improved knowledge of the disease, its complications, and foot care after educational activity (p <0.05).
Chen MY, et al.[18]	2011/ J Adv Nurs./ China	Quasi-experimental	III	Health education strategies for prevention and management of patients at risk for foot neuropathy/Individual guidance in visits and via telephone	Individual and via telephone advice	Significant improvement (p<0.05) of the physiological variables and skills of self-care of the feet after the educational program. Also, improvement in the nervous and peripheral vascular functions of 37 participants at high risk for diabetic foot.

Authors	Year/Journal/ Country	Design*	Level of evidence**	Analytical category/subcategory	Implemented health education techniques or strategies	Evidence of effectiveness of interventions
Saurabh S, Sarkar S, Selvaraj K, Kar SS, Kumar SG, Roy G[19]	2014/ Indian J Endocrinol Metab./ India	Cross-sectional	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Integrative educational technologies	Use of posters with pictures of wounds and leaflets.	Improvement in the foot care practices of 47 patients out of the 60 who returned for a second visit, 12 presented no improvement and one patient presented a reduced score (P <0.001 in the Wilcoxon test).
Harrison-Blount M, Cullen M, Nester CJ[20]	2014/J Foot Ankle Res./ India	Action research	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Focus group.	Development of a health education program and construction of an instrument for assessment of diabetic foot by professionals.
Martin VT, Rodrigues C DS, Cesarino CB[21]	2011/Rev. Enferm. UERJ/ Brazil	Descriptive, cross-sectional	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Problematization method.	After educational activity there was significance for foot care behaviors: trimming of the nails (p=0.0002), adequate footwear (p=0.0005), not walking barefoot (p=0.009), use of cotton sockets with no rubber bands (p=0.013) and hydration of the feet (p=0.0002).
Andrade NHS, et al.[22]	2010/Rev. Enferm. UERJ/ Brazil	Cross-sectional	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Group health education activities.	Improvement in self-care skills related to daily foot hygiene, use of appropriate footwear, and the habit of removing cuticles.
Cisneros LL[23]	2010/Rev Bras Fisioter./ Brazil	Exploratory/ Clinical Qualitative	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Focus group.	Improvement in the rates of incidence of wounds in the intervention group (38.1% vs. 57.1% in the control group). Of the patients presenting ulcers, 83% were in the control group and 16.7% in the intervention group. Within a one-year period, the intervention group showed a 75% chance of presenting no wounds against 61% of the control group, decreasing to 60% and 52%, respectively, in two years.

Authors	Year/Journal/ Country	Design*	Level of evidence**	Analytical category/subcategory	Implemented health education techniques or strategies	Evidence of effectiveness of interventions
Gallardo Pérez UJ, Ruano LZ, Carreño NC, Vélez LM[24]	2008/Rev Cubana Med Gen Integr./ Cuba	Qualitative	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Focus group.	Most patients showed lack of knowledge of the definition of diabetic foot and its risk factors. Their foot self-care was insufficient, leading to risk behaviors.
Ahmed ME, Abdelrhan SH [25]	2006/J Family Community Med./ Sudan	Longitudinal intervention	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Exchange of information and experiences in group	Questionnaire and practical activities	Significant improvement in the knowledge, attitudes, and practices of diabetic patients in relation to adherence to treatment and nutritional instructions, regular foot care practices, and knowledge of diabetic complications and hypoglycemic monitoring signs.
Beem SE, Machala M, Holman C, Wraalstad R, Bybee A[26]	2004/Am J Public Health/ United States of America	Descriptive	IV	Health education strategies for prevention and management of patients at risk for foot neuropathy/Integrative educational technologies	CD-ROM and posters for patients and professionals.	After the training of nurses and students, people with diabetes received regular foot exams for free, and improvements in self-care were observed.

* The designs listed in this table are described as in the analyzed paper.

** the level of significance of the studies was established according to the classification of Polit and Beck[12].

Most of the articles were found in the PubMed database (6, 30%), with higher concentration from 2011 to 2016, and predominance in 2010 and 2014. Studies of more participative educational strategies intensified beginning in 2010.

No studies in the SCOPUS database were included, because they were descriptive studies without implementation of educational strategies for diabetic patients at risk for foot neuropathy. Such studies only mentioned or reinforced the need to use these strategies in patient care, without emphasizing their effectiveness.

Brazil presented the highest number of publications (28.5%). Seven papers (50%) were produced in South, Central, and North America, four in Asia, and three in Africa, emphasizing the distribution of the research worldwide, as DM is a disease of worldwide concern.

Of the papers included in the review, six (42.8%) were published in medical journals, five (35.7%) in general nursing journals, and two (14.2%) in the area of physical therapy; in one study it was not possible to identify the professional category of the authors. However, it is important to mention that health education involves the health, educational, and social spheres, requiring interdisciplinarity.

Regarding design, the following were emphasized: action research, descriptive, longitudinal, focus group, quasi-experimental, and randomized; one study was longitudinal with intervention. Randomized clinical trials were highlighted, with four (14.2%) publications. Clinical trials conducted in this context obtained favorable results for assessing the effectiveness of the proposed educational interventions.

In relation to the types of strategies or techniques implemented to approach patients with DM who are at risk for foot neuropathy, two were used more often: group guidance and individual guidance, associated or not, and linked or not to educational programs. Group guidance strategies were predominant.

Considering education to be critical for the self-management of care in DM, five (35.7%) studies pointed out improvements in patients' knowledge of care of the disease, its complications, and the feet after the educational interventions.

Therefore, the present study opted for organizing the papers by grouping them into two categories and three subcategories, with the aim of better discussion of the educational focus of the analyzed works: Category 1, health education strategies for prevention and management of patients at risk for foot neuropathy, with three subcategories: exchange of information and experiences in groups, individual guidance in visits and via telephone, and interactive educational technologies; and Category 2, synthesis of the best evidence of the effectiveness of educational interventions in the reduction of diabetic foot complications.

DISCUSSION

The adoption of educational practices as a strategy for treating patients with DM who are at risk for foot neuropathy aims to use an emancipatory perspective. This perspective was present in most of the studies, outweighing the curative model and expanding individuals' knowledge of the disease, healthier life

habits, and foot care. In addition to improving quality of life, this approach also increases patients' autonomy despite the disease.

The results of the analyzed papers are discussed below, emphasizing the different educational strategies available for people with DM and their effectiveness for prevention and management of patients at risk for foot neuropathy.

Category 1. Health education strategies for prevention and management of patients at risk for foot neuropathy

This category includes studies that approach distinct health education activities, with emphasis on these modalities: groups[13-14,20-25], visits (face-to-face)[15-17], distance visits (via telephone)[18] and interactive[19,26].

Exchange of information and experiences in groups

There were eight studies[13-14,20-25] in this category, covering questions relating to group educational activities. Two studies[20,24] used focus groups. This technique consists of interactions between participants and researchers, with the aim of obtaining data based on discussion of previously planned themes, in which the participants express their perceptions, beliefs, values, attitudes, and social representations about a given subject[27].

In general, the strategies adopted in group educational sessions provide a solid foundation for education on diabetes. If the sessions are interactive and based on dialogue, they will value the reports of the experiences of participants, enabling an integrative process for better therapeutic control of the disease[23].

One of the characteristics of groups is the possibility of bringing together people with similar histories who share their experiences, creating opportunities to improve knowledge and leading to changes in habits and the construction of knowledge intended for the self-care of diabetic patients[21].

As observed in one study, analysis of the set of factors that influences the decision-making process in relation to preventive actions for diabetic foot for patients at risk of neuropathy showed that this care was only performed after experiencing complications or loss (ulcers, lack of sensitivity in the feet, or amputation) or after sharing experiences with others[14].

In the problematizing educational model, health education should value discussion, dialogue, humanization, and the difficulties of those involved in the process[21].

Two other studies[14,25] were also grouped in this category, focusing on questions related to subsidized educational strategies in practical activities. Patients with diabetes need to acquire skills that can only be acquired through practical activities related to foot care[25]. Therefore, practical teaching for these patients is clearly important.

During the process of health education based on practical activities, patients share their histories,

knowledge, and practices[14]. They become not only people who receive care, but also subjects who learn and multiply knowledge[25].

It is important to mention that, in addition to allowing for understanding of information, education conducted through practical group activities encourages patients to find solutions for themselves and deal with problems in a more effective manner[28].

One study was conducted in Cuba over two years, involving 44 diabetic patients presenting wounds. The results showed that the wounds of 77.3% of the patients in the intervention group were healed after receiving guidance related to the practices and carrying out correct care of the feet and wounds, while this occurred in 54.5 % the control group [16]. This study also points out that sharing the knowledge of professionals and associating knowing with doing contributed to the effectiveness of educational actions to promote self-care.

Individual guidance in visits and via telephone

This educational strategy was identified in three studies[15-17] that promoted traditional individual activities and in one study[17] that reinforced educational guidance via telephone.

Naturally patients with DM require constant self-care and are co-responsible for the maintenance of their health and quality of life. Some patients wait until their medical visits to express their problems and get their doubts about the disease clarified.

Therefore patients with diabetes need to maintain good relationships with multidisciplinary teams. These professional-patient relationships contribute to a higher level of adherence to self-care, and must be based on trust, listening to patients' needs, establishment of bonds, and autonomy[17,23].

In this context, the active participation of patients in self-care activities is the main factor in the control of DM, since patients and their families are responsible for more than 95% of treatment[29]. The analyzed studies showed improvements in self-care behaviors in relation to knowledge of the disease, its complications, and foot-related care, as the educational strategies expanded the possibilities of teaching-learning of people with DM.

In view of its relevance to the results of preventive actions, adherence to interventions proposed in visits was considered a positive point by 72.4% of the sample in a study that made daily use of therapeutic footwear recommended by professionals[14]. This behavior is one of the most important factors in preventing foot ulcerations[30].

In relation to health education via telephone, mentioned in a quasi-experimental study[18] conducted with elderly persons living in rural areas of Taiwan, patients received individual guidance, which was intensified via telephone. This strategy is considered a satisfactory alternative for patients living far from these services; the findings pointed out ineffective control of glucose levels, but also found significant improvements in foot care[18].

Individual guidance during visits and via telephone based on the transmission of information may be

insufficient to promote behavioral changes. As observed, educational activities involving active methodologies produce better results[5]. Currently, behaviors that take into account the development of critical consciousness, making people responsible for their learning, have been increasingly encouraged and adopted by health professionals.

Interactive educational technologies

Strategies for health education using educational technologies were identified in two studies[19,26] that developed individual and/or group activities by means of a more interactive approach. These involved distribution of education materials in outpatient clinics, reinforcing treatment in general as well as foot care.

The importance of education in promoting health is undeniable, and it has been recognized as an essential factor in the improvement of quality of life. However, in order to be effective, the teaching-learning process in health requires that the didactic resources that are implemented enable and motivate patients in order to allow the incorporation of new meanings, practices, and autonomy, aiming at improving quality of life[19].

A study of the implementation of individual health education by means of information booklets and folders in a public institution, involving 109 individuals with diabetes, revealed changes of attitude in relation to knowledge of preventive care for diabetic foot and control of DM ($p< 0.0001$)[31]. As observed, the use of images in simplified materials, such as illustrative folders, information booklets, brochures, posters, and leaflets, followed by guidance mediated by health professionals, produces satisfactory results. This approach facilitates teaching-learning and helps patients in relation to doubts when they are not interacting with health professionals[19].

A quasi-experimental study conducted in Mexico based on participative communication compared with traditional methods favored learning about and choices of behaviors for foot care[6]. Thus, educational strategies expand the possibilities of teaching-learning, and when implemented in an appropriate manner, they support the acquisition of new knowledge and skills in the management of the disease.

Considering these different strategies, and being aware of the existence of several technologies for health care, the use of videos needs to be considered. According to what is believed, educational strategies using videos may be responsible for behavioral changes, as videos are relevant instruments to support health education[28].

From this perspective, the educational video entitled “If you have diabetes, please take off your shoes and socks,” developed for diabetic patients receiving care in rest homes, hospitals, clinics, and rural areas in the United States, emphasizes the importance of some actions required for self-care of the feet, such as: education of family members and patients; use of appropriate footwear; treatment of non-ulcerative disease; and regular inspection and examination of the feet for identification of at-risk feet[26].

Since it is an innovative strategy, use of videos favors the teaching-learning process and supports people with DM in relation to foot care for prevention of wounds and/or amputations[26]. Also, it facilitates

the work of nurses and improves the quality of the care provided by them.

Based on the foregoing, health professionals, particularly nurses involved in the care of people with DM, should always rethink the process of health education currently practiced and experienced by those who make up Brazilian health services, based on the assumption that the best strategies are those that are appropriate to the reality of patients, their previous knowledge, their attitudes and practices, and their family relationships, considering economic, cultural, social, and environmental contexts. Therefore, it is possible to think about transformation of these patients into individuals who are active in their treatment through better assimilation of knowledge and transformation of such knowledge into more effective and safer self-care practices.

Category 2. Synthesis of the best evidence of the effectiveness of educational interventions in the reduction of diabetic foot complications

This category presents a synthesis of the best evidence pointed out by studies on the effectiveness of the distinct strategies for health education adopted in the prevention and management of diabetic foot.

In the analyzed studies, individuals with DM participated in different strategies for education to promote health and prevent complications related to diabetic foot. The studies highlight guidance by means of lectures, individual visits, visits via telephone, practical classes, group meetings, and the use of educational materials for communication and learning (posters, folders, and video). However, in relation to the effectiveness of the health education strategies among the analyzed approaches, group work was found to be the most effective.

This approach was found to be a possible and appropriate strategy for the development of educational activities, contributing to promoting the autonomy of patients and enabling active participation of individuals in the construction of new knowledge.

It was possible to observe that the best level of effectiveness for production of knowledge occurred in activities such as continuing education for foot hygiene and drying the interdigital spaces for execution in the practice[22-23]. However, it was observed that this type of guidance is not always clearly provided. The improved effectiveness of foot hygiene and drying procedures may be explained by the fact that the guidance was provided in a simple manner through group practice, as well as by the fact that this is a low-cost procedure.

However, the low level of effectiveness of the educational strategy for adherence to the use of appropriate footwear shown in the studies may have been affected by its higher cost[14,20,23]. Yet, in a study conducted in a public health unit in Porto Alegre-RS using focus groups, adherence to the proposed interventions was a positive point, as the patients chose and received their preferred model and color of therapeutic footwear, and 72.4% used the footwear on a daily basis[23].

In relation to therapeutic footwear, the International Working Group on the Diabetic Foot[3] emphasizes that, when biomechanical alteration is already shown by the presence of callosities or

deformities in the feet or toe amputation, footwear should be tailor-made, in the correct length, width, and height, in soft leather with no internal seams, and with rigid buttresses.

In addition to the low economic status of the patients in some studies[13,19-20], low educational level may also represent a barrier to educational activities, as it limits understanding of the transmitted information. Health professionals must be aware of this and adapt educational measures so that they are accessible to everyone in order to contribute to behavioral changes in patients, with a focus on self-care and adherence to prevention methods[13]. In one study, illiterate participants in a group were invited to participate in educational sessions together with literate family members[14]. Preventive education contributes to reduction of future complications, especially non-traumatic amputations[18], and its effectiveness depends directly on the information received by patients and the sensitization that can lead to changes in lifestyle and development of self-care actions.

It is necessary to note that a significant number of diabetic patients count on the support of family members and other people to perform their daily care, so educational practices should include these people[25].

This reinforces the importance of professionals approaching health education actions in a simple manner, valuing and respecting patients with diabetes and their limitations, involving them as individuals in self-care actions.

In individual visits, patients also had the opportunity to express their opinions about their difficulties with controlling the disease and foot-related care, among other issues[15-17].

Individual care enabled a better understanding of patients, their doubts, lifestyles, foot care practices, and ways to establish the educational process. Guidance was provided according to the needs of the individual, strengthening educational action[16]. Individuals verbally expressed their satisfaction with their participation in the program [16]. An important aspect to be observed in practice is the autonomy of individuals: More than transferring knowledge, educators should open spaces for their audiences to build their own perspectives.

Valorization of dialogue between health professionals and individuals in both group and individual educational practices was observed; this also generates positive results in the promotion of self-care and foot care.

In one study, the approach adopted in individual sessions of health education, with the use of illustrative folders and photos of ulcers, provided strong encouragement of education on diabetes, since they were interactive and valued reports of the experiences of people with diabetic foot, enabling a reduction in ulceration rates ($p<0.005$) and amputations ($p<0.005$), aiming at better therapeutic control of the disease[19]. The use of a video in one study with the appropriate language for patients and health professionals on foot care enabled better planning of care[26]. Use of videos has been pointed out in the literature as a promising strategy in the acquisition of knowledge, playing a relevant educational role.

The use of resources that use an interactive approach through problem-solving strategies supports the

empowerment of patients, demonstrating the creativity of professionals, one of the skills most essential to quality care processes.

CONCLUSIONS

The present review identified studies that gathered the best evidence on health education strategies for people with DM who are at risk for foot neuropathy, showing that this has been a theme of growing interest for researchers in the area of health in recent years. There was a predominance of educational activities conducted in groups through exchange of information and emancipatory experiences involving patients with DM, family members, and health professionals, with emphasis on actions developed by nurses.

The evidence generally showed that all the modalities of health education are effective in the promotion of self-care for these patients for prevention and management of diabetic foot. However, group strategies and interventions showed higher effectiveness, enabling improvements in knowledge of diabetes and foot care; reductions in the size and depth of ulcers in comparisons between control and intervention groups; higher levels of adherence to self-care in program groups and reductions in the surface of ulcers; significant differences in foot care, including nail trimming, appropriate footwear, not walking barefoot, use of cotton socks without elastic, and foot hydration; improvements in self-care skills related to daily foot hygiene, the use of appropriate footwear, and the habit of removing cuticles; and highly significant improvements in the knowledge, attitudes, and practices of diabetic patients, including adherence to treatment and diet, regular foot care, knowledge of the main diabetic complications, knowledge of the signs of hypoglycemia, and monitoring of hypoglycemia at home.

Thus, this study concluded that health education is essential for people affected by chronic diseases, especially those living with DM, with a view to effectiveness of self-care, changes in habits, and improvements in quality of life.

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