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CONSTRUCTION AND VALIDATION OF AN EDUCATIONAL BOOKLET FOR THE PREVENTION OF FOOT INJURIES IN PEOPLE WITH DIABETES

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ABSTRACT

Objectives: To construct and validate by agreement an educational booklet on the prevention of foot injuries in people with diabetes mellitus. **Method:** Methodological study was carried out from January 2020 to November 2022 and developed in two phases: construction of the booklet, and validation by agreement of the material by expert judges. A content validity coefficient of at least 0.80 was considered to ensure material validation. **Results:** In the first phase, among the 29 items evaluated in the booklet, two supported less than the determined, and then modifications were made to the material. In the second phase, all items showed agreement greater than 0.80. **Conclusion:** The booklet was validated from the point of view of offering assistance to professionals in the process of health education with patients with diabetes.

DESCRIPTORS: Validation study. Health education. Diabetes complications. Diabetic foot. Nursing.

CONSTRUÇÃO E VALIDAÇÃO DE CARTILHA EDUCATIVA PARA PREVENÇÃO DE LESÕES NOS PÉS DE PESSOAS COM DIABETES

RESUMO

Objetivos: Construir e validar uma cartilha educativa sobre a prevenção de lesões nos pés de pessoas com diabetes *mellitus*. **Método:** Estudo metodológico realizado no período de janeiro de 2020 a novembro de 2022 e desenvolvido em duas fases: construção da cartilha de acordo com literatura e consenso sobre a temática e validação do material por juízes especialistas na temática. Os especialistas foram selecionados por meio do Currículo Lattes e receberam um instrumento para avaliação da cartilha por e-mail no Google Forms. **Resultados:** Na primeira fase, dos 29 itens avaliados da cartilha, dois apresentaram coeficiente menor que o determinado, sendo então realizadas modificações no material. Na segunda fase, todos os itens apresentaram concordância superior a 0,80. **Conclusão:** A cartilha foi validada por meio de concordância entre juízes especialistas. O índice de validade de conteúdo foi considerado adequado. A cartilha contribui para que profissionais possam orientar pacientes com diabetes sobre a prevenção de lesões nos pés.

DESCRITORES: Estudo de validação. Educação em Saúde. Complicações do diabetes. Pé diabético. Enfermagem.

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CONSTRUCCIÓN Y VALIDACIÓN DE UMA CARPETA EDUCATIVA PARA LA PREVENCIÓN DE LESIONES EN LOS PIES EN PERSONAS COM DIABETES

RESUMEN

Objetivo: Construir y validar por convenio una cartilla educativa sobre la prevención de lesiones en los pies en personas con diabetes mellitus. **Método:** Estudio metodológico, realizado de enero de 2020 a noviembre de 2022, desarrollado en dos fases: construcción del cuadernillo y validación por acuerdo del material por jueces expertos. Se consideró un coeficiente de validez de contenido de al menos 0,80 para garantizar la validación del material. **Resultados:** En la primera fase, de los 29 ítems evaluados en la cartilla, dos soportaron menos de lo determinado, y luego se realizaron modificaciones al material. En la segunda fase, todos los ítems presentaron concordancia superior a 0,80. **Conclusión:** La cartilla fue validada desde el punto de vista de ofrecer asistencia a los profesionales de la salud en el proceso de educación con pacientes con diabetes.

DESCRIPTORES: Estudio de validación. Educación en Salud. Complicaciones de la Diabetes. Pie Diabético. Enfermería.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder resulting from deficiency or ineffectiveness in insulin secretion and action. It is considered a public health problem and affects around 13 million Brazilians and 422 million people worldwide[1].

Diabetes can cause several complications, particularly the risks related to the feet of patients affected by this disease, popularly known as diabetic foot. Loss of sensitivity may occur until the formation of ulcerative and/or necro suppurative processes, one of the consequences being amputation of the limb[1,2].

Three aspects must be addressed in people with diabetes. The first is that anyone with an injury, even if not caused by diabetes, needs monitoring, glycemic control and care to prevent infection. Second, any pathophysiology that can cause bone, neuropathic and vascular changes must be identified early. The third is foot injuries in people with diabetes, which can range from superficial injuries, such as cracks and calluses, to abscesses and gangrene, which must be treated thoroughly[1].

It is essential to work on preventive measures with patients with DM to avoid the emergence of such complications. An educational approach with patients and their families aims to provide sufficient guidance so that the individual can live with the disease, avoiding its complications as much as possible[1].

Educational interventions such as the delivery of printed material have been used in the health sector to improve patient satisfaction with treatment, knowledge about it and adherence to it. It is recommended to use written materials prepared by health professionals to support verbal guidance[3].

With the concern of using reliable and appropriate instruments for a given population, knowing and understanding the procedures for validating material content are essential for researchers and health professionals[4].

OBJECTIVE

The objectives of this study were to build and validate an educational booklet on preventing foot injuries in people with diabetes.

METHOD

This is a methodological study developed in two phases: construction of the educational booklet for diabetic patients and validation of educational material by judges. The booklet was created according to the recommendations for the

design and effectiveness of educational materials, according to the characteristics: content, language, organization, layout, illustration, learning and motivation[4].

The study was carried out by students from an extension project at the Nursing faculty at the wound clinic, which assisted patients diagnosed with DM at a university hospital in the inlands of Minas Gerais, Brazil. The booklet construction period was from January to May 2020, and the validation of the educational material from February to November 2022.

The booklet was created through bibliographical research of the main publications referring to guidelines for preventing the consequences of diabetes. The theoretical references that supported the booklet were recommendations from the Ministry of Health and scientific articles on diabetes-related complications and injury prevention in patients.

The creation of the educational booklet aimed to contribute information about the disease and its complications as well as guidelines to help prevent injuries. The images were created with the help of software that provides graphic resources for creating illustrations.

To evaluate the booklet, content validity was applied, which is based on judgment that seeks to measure the adequacy of the evaluation items about the content, in addition to agreement between the judges[4].

Initially, the judges were selected and invited to participate, receiving the educational booklet in total, with the questionnaire on the professional profile and the protocol for judging the educational material.

Ninety-one judges were invited to participate in this validation. The recruitment of judges occurred by convenience, using the snowball technique. This type of sampling is a non-probability sampling that uses reference chains[4]. For judges, nurses and doctors who had been providing care for at least two years were chosen. Angiologists and endocrinologists were selected as specialties for medical professionals, and stomatherapy, for nursing professionals. Retired professionals were excluded. The selection took place through a search on the Lattes Platform using the CV, and the invitation was sent via email provided on the platform.

The judges evaluated the booklet using the validated Health Educational Content Validation Instrument (ICES) questionnaire to assess educational technologies. This questionnaire evaluates three categories of technology: objective, structure/presentation and relevance, totaling 18 items, which can be judged as: disagree, partially agree and completely agree[5].

A total of 29 items were evaluated and validated by the judges. The judges were asked about the objective and relevance of the instrument in general and the structure and presentation of each topic in the booklet. There was also space for suggestions and criticisms of the instrument. Each item was evaluated as: disagree, partially agree and agree entirely. At the end of the evaluation period by the judges, the recommendations were accepted and incorporated into the educational material. Subsequently, the booklet was sent to the same judges for a new round of evaluation.

The data obtained were analyzed using Stata software version 16.0. The content was evaluated by calculating the content validity coefficient (CVC), which met Pasquali's criteria[6], i.e., the CVC of the questions is calculated based on the averages provided by the judges for each of the questions, which are then divided by the maximum point of the scale Likert used. The experts' bias error (Pei) was subtracted to achieve the adjusted CVC. The cutoff point adopted to determine adequate content validity was ≥ 0.80[6]. Items that presented an agreement level lower than 0.80 were changed.

Finally, Cronbach's alpha was also calculated to check the internal consistency of the booklet version. Cronbach's alpha coefficient equal to or greater than 0.70 was considered acceptable for instrument consistency[7].

The research was submitted to the Research Ethics Committee of the University Hospital of the Federal University of Juiz de Fora, MG -Brazil, and approved under Opinion No. 5,210,511.

RESULTS

The first version of the booklet was created with three main topics: the concept of diabetes mellitus, the concept of possible changes in the feet of patients with diabetes (vascular, neuropathic component) and guidelines for general care concerning people with diabetes, highlighting the foot care for injury prevention.

The initial version had 12 pages, containing a front and back cover. On page 3, the concept of the diabetic foot, diabetic neuropathy, and guidelines for general care to prevent foot injuries are discussed.

In the first round, the form was sent to 91 professionals. Of these, 11 responded to it and participated in the survey. Of the 11 judges, 90.91% were female, with an average age of 48 years, all nurses (100%). The average training time was 23 years. Regarding specialization, 45.45% had a *lato sensu* postgraduate course in stomatherapy, 45.45% another *lato sensu* postgraduate course in addition to stomatherapy, and 9.09% had a postgraduate degree in stomatherapy, master's or doctorate.

Of the 29 sub-items evaluated in the educational material, 27 were classified with a CVC greater than 0.80; one item was classified between 0.70 and 0.80, and one item with a CVC less than 0.50. Those classified with a value lower than 0.80 were reviewed, and the judges' suggestions to make changes were considered. Table 1 shows the CVC value for each item evaluated regarding the objective and relevance of the educational material.

Table 1. Content validity coefficient of questions regarding the objective and significance of the educational material. Juiz de Fora, MG, Brazil, 2022.

Query	Content validity coefficient[†]
Booklet theme	0.878
Adaptation to the teaching and learning process	0.848
Clarification of doubts	0.909
Reflection of the topic	0.969
Encouraging behavior change	0.939
Stimulation of learning	0.909
Contribution to knowledge of the area	0.969
Awaken interest in the topic	0.969
Appropriate language	0.848
Interactive language	0.909
Necessary informations	0.939
Current theme	1.0
Adequate number of pages	0.969
Suitable title	0.787

[†]Discounting the judges' polarization error (Pei).

Table 2 shows the CVC value for each item evaluated regarding the structure and presentation of each topic of the educational material (topic 1: the concept of the diabetic foot; topic 2: diabetic neuropathy; topic 3: guidelines for general care for preventing foot injuries).

In the first phase, the Cronbach's alpha value of the booklet evaluated by the judges was generally 0.76, demonstrating adequate internal consistency for the items analyzed; however, some items had a CVC below expectations (0.80). Therefore, according to the judges' suggestions, changes were made, such as: grammatical revision, adapting the language to better understand the target audience, changing the title, and adding and removing descriptive content. Table 3 presents the qualitative synthesis of the judges' recommendations accepted by the authors until the final version of the booklet.

Table 2. Content validity coefficient of questions regarding the structure and presentation for each topic of the educational material. Juiz de Fora, MG, Brazil, 2022.

Query	Content validity coefficient†
Topic 1) Clear and objective message	0.878
Topic 1) Scientifically correct information	0.878
Topic 1) Logical sequence of content	0.939
Topic 1) Correct spelling and agreement	0.909
Topic 1) Expressive and sufficient illustrations	0.939
Topic 2) Clear and objective message	0.878
Topic 2) Scientifically correct information	0.939
Topic 2) Logical sequence of content	0.484
Topic 2) Correct spelling and agreement	0.878
Topic 2) Expressive and sufficient illustrations	0.939
Topic 3) Clear and objective message	0.939
Topic 3) Scientifically correct information	0.848
Topic 3) Logical sequence of content	0.909
Topic 3) Correct spelling and agreement	0.909
Topic 3) Expressive and sufficient illustrations	0.909

†Discounting the judges' polarization error (Pei).

Table 3. Summary of the qualitative analysis of the suggestions made by the judges. Juiz de Fora, MG, Brazil, 2022.

	Judges' suggestions
Cover/title	*Adequacy of the title; modification of the term diabetic patient*
General structure	Modification of images; spelling review; exchange of terms (for example: patient for person); addition of page for notes at the end of the material
Content	Addition of content on the concept of diabetes; review of information on the topic of diabetic neuropathy and prevention guidelines; addition of concepts, such as, for example, podiatry professionals

The items were reviewed and the educational material was improved. Due to the changes in the content, a second round of evaluation by the judges was considered essential.

After all the changes made, the new version of the booklet had 14 pages, with restructuring of topics: concept of diabetes; complications of diabetes with a focus on diabetic neuropathy and diabetic foot syndrome in patients with diabetes; and guidelines for general care to prevent foot injuries, with the inclusion of space for notes on the final page. The new version was returned to the 91 judges selected in the first stage.

In the second round, eight judges responded. Of these, five (62.5%) are female, with an average age of 49.50 years, all nurses (100%). The average training time was 24.87 years. Regarding specialization, seven (87.5%) only had a lato sensu postgraduate degree in stomatherapy, and one (12.50%) had stomatherapy and another specialization course.

The evaluation form was the same as the first round. Of the 29 items evaluated, all (100%) presented a CVC greater than or equal to 0.80. Table 4 shows the CVC value for each item assessed regarding the objective and relevance of the educational material.

Table 4. Content validity coefficient of questions regarding the objective and relevance of the educational material. Juiz de Fora, MG, Brazil, 2022.

Query	Content validity coefficient†
Booklet theme	0.958
Adaptation to the teaching and learning process	1.0
Clarification of doubts	1.0
Reflection on the topic	1.0
Encouraging behavior change	1.0
Stimulation of learning	1.0
Contribution to knowledge of the area	1.0
Awaken interest in the topic	1.0
Appropriate language	0.958
Interactive language	1.0
Necessary informations	1.0
Current theme	1.0
Adequate number of pages	1.0
Suitable title	0.958

†Discounting the judges' polarization error (Pei).

Table 5 shows the CVC value for each item evaluated regarding the structure and presentation of each new topic in the educational material (topic 1: concept of the diabetic; topic 2: complications of diabetes; topic 3: guidelines for general care for preventing foot injuries).

Table 5. Content validity coefficient of questions regarding the structure and presentation for each topic of the educational material. Juiz de Fora, MG, Brazil, 2022.

Query	Content validity coefficient†
Topic 1) Clear and objective message	0.958
Topic 1) Scientifically correct information	1.0
Topic 1) Logical sequence of content	1.0
Topic 1) Correct spelling and agreement	1.0
Topic 1) Expressive and sufficient illustrations	0.958
Topic 2) Clear and objective message	1.0
Topic 2) Scientifically correct information	1.0
Topic 2) Logical sequence of content	0.958
Topic 2) Correct spelling and agreement	1.0
Topic 2) Expressive and sufficient illustrations	0.958
Topic 3) Clear and objective message	1.0
Topic 3) Scientifically correct information	0.958
Topic 3) Logical sequence of content	1.0
Topic 3) Correct spelling and agreement	1.0
Topic 3) Expressive and sufficient illustrations	1.0

†Discounting the judges' polarization error (Pei).

In the second round, Cronbach's alpha value was 0.93, demonstrating adequate internal consistency for the items analyzed.

DISCUSSION

The creation of the booklet resulted from the need to provide constant guidance to patients with DM treated at the wound clinic. As part of the care, the health education process is integrated into patient care. Therefore, including educational material reinforcing all verbal guidelines was of great importance.

The booklet was validated by agreement, with all evaluation items with a CVC greater than 0.80 after the second round of evaluation by the judges and a Cronbach's alpha value of 0.93, presenting validity in line with other construction studies and validation of booklets[5,8].

The validation of educational content is of great importance for verifying the relevance of the material in achieving the objectives for which it is intended. The judges' evaluation process is a primary tool for promoting material with the most objective content, paying attention to structure, cohesion, coherence and organization[5,8].

The main focus of this booklet was guidance related to the prevention of foot injuries in patients with DM, which are classified as one of the most significant morbidity factors among these individuals. As they are characterized by the development of chronic injuries, foot injuries in these patients are a condition that requires considerable investment by the health system, a public health issue. Therefore, identifying risk factors and forms of prevention becomes fundamental, as well as the entire health education process aimed at patients with DM[9,10].

In a study carried out with 88 patients with DM, the participant's knowledge about the disease and care for the lower limbs was assessed through interviews. After analyzing the results, it was possible to realize that 70% of people only had access to public health services, using primary care for initial care. Added to this factor, the majority of interviewees were unaware of the complications generated by DM, and 90.9% did not wear suitable shoes[11]. Even though it is a local study, it illustrates the population's lack of knowledge about DM and its complications. Promoting guidelines to minimize such gaps is extremely important for preventing diabetic foot and, consequently, minimizes costs, increasing patients' quality of life.

In convergence with this theme, an integrative review was carried out at the University of Costa Rica on possible educational strategies for patients with DM. The review identified 12 educational strategies for preventing injuries to the lower limbs of people with DM. Among them, pamphlets, workshops, educational booklets, workshops, educational groups, programs, seminars and videos encouraging self-care were mentioned[12].

According to Oliveira et al.[12]:

> Educational booklets use written language as their main way of transmitting information. Written language may or may not be associated with visual images that are used as educational tools in favor of preventing foot ulcers. They can promote awareness among people about the development and adoption of skills for self-care and improving their lifestyle. It is a printed educational material that aims to communicate information that helps patients, family members, caregivers and communities to make more assertive decisions about their health.

A quasi-experimental before-and-after study developed with older people who were monitored by primary health care evaluated the effect of educational interventions carried out by nursing related to self-care in people with DM. After analyzing the results, the intervention group showed improved clinical parameters: capillary blood glucose, blood pressure, and body mass index. In addition to this improvement, it also showed improved adherence to treatment and implementation of guidelines on nutrition and foot care, thus reaffirming the importance of health education in preventing and reducing diseases arising from DM.[13].

It is also worth highlighting the importance of primary care in educational practices, guidance and distribution of booklets for the patient and their support network, as this is a place of easy access to the population, helping to disseminate quality information, considered primary care. Protective factor in preventing injuries and/or injuries to the lower limbs[14].

Nurses provide the most health education and guidance for patients in outpatient clinics and basic health units. The applicability of the educational booklet becomes viable through nursing work with the patient, explaining the terms and illustrations, guiding and encouraging adherence[14].

Regarding the study's limitations, there needed to be higher adherence by the participating judges to validate the booklet and the absence of participation of doctors who could contribute to the subject. Validation of the educational booklet by patients is planned for the near future.

CONCLUSION

The study allowed the preparation of the educational booklet "Prevention of injuries to the feet of people with diabetes mellitus", validated according to content by specialists (nurses) working in assistance and considered informative, appropriate and viable for health education activities for patients with DM.

The booklet is a foundation for health professionals' daily assistance to patients, families and the community. It enables the promotion of guidelines that assist in patients' self-care with DM.

AUTHOR' S CONTRIBUTION

Conceptualization: Menezes BRM, Souza LSR, Caetano LCO, Souza MJP, Santos KB; **Data Curation:** Menezes BRM, Souza LSR, Caetano LCO, Souza MJP, Fonseca CC, Santos KB; **Methodology:** Menezes BRM, Souza LSR, Caetano LCO, Souza MJP, Fonseca CC, Santos KB; **Project Administration:** Menezes BRM, Souza LSR, Caetano LCO, Souza MJP, Fonseca CC, Santos KB; **Resources:** Fonseca CC, Santos KB; **Writing – first draft:** Menezes BRM, Souza LSR, Caetano LCO, Souza MJP, Fonseca CC, Santos KB; **Writing – Review and editing:** Fonseca CC, Santos KB.

DATA AVAILABILITY STATEMENT

We are available to make research data available if requested.

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Not applicable.

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There is not.

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