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Review Article

PERCEPÇÃO SENSORIAL TÁTIL ALTERADA EM PACIENTES COM DIABETES *MELLITUS*: UMA REVISÃO INTEGRATIVA

MODIFIED TACTICAL SENSORY PERCEPTION IN PATIENTS WITH DIABETES *MELLITUS*: AN INTEGRATIVE REVIEW

PERCEPCIÓN SENSORIAL TÁCTIL MODIFICADA EN PACIENTES CON DIABETES *MELLITUS*: UNA REVISIÓN INTEGRATIVA

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RESUMO

Objetivos: Descrever os fatores etiológicos e os sinais e sintomas do fenômeno percepção sensorial tátil alterada em pessoas com Diabetes *Mellitus*. **Métodos:** Trata-se de uma revisão integrativa da literatura realizada no período de agosto a setembro de 2016. A busca foi feita nas bases de dados da PUBMED, CINAHL, SCOPUS, LILACS, IBECS, MEDCARIB e BDENF, utilizando os seguintes descritores: neuropatias diabéticas, tato, percepção tátil, transtornos da percepção, distúrbios somatossensoriais e enfermagem. Foram identificadas 1371 publicações e uma amostra de 23 estudos foi obtida. Estes foram classificados de acordo com o nível de evidência. **Resultados:** As publicações datam desde 1992 a 2015, com maior produção nos Estados Unidos. Os estudos foram do tipo transversal, prevalecendo nível de evidência IV. A dor foi o sintoma mais prevalente, seguida de perda sensorial, dormência e formigamento. Com relação aos fatores etiológicos destacou-se o tempo de convivência com o problema, hemoglobina glicosilada alterada, idade avançada e hipertensão arterial. **Conclusão:** Constatou-se que o fenômeno tem sido compreendido como uma alteração neurológica. A identificação precoce dos agentes etiológicos e as manifestações clínicas são importantes para o seguimento dos pacientes, bem como a monitorização da sua evolução e controle glicêmico.
Descritores: Diabetes *Mellitus*; Neuropatias diabéticas; Percepção do tato; Enfermagem.

ABSTRACT

Objectives: To describe the etiologic factors, and signs and symptoms of altered tactical sensory perception phenomenon in people with Diabetes *Mellitus*. **Methods:** This is an integrative review of the literature performed from August to September 2016. The search was conducted in PUBMED, CINAHL, SCOPUS, LILACS, IBECS, MEDCARIB and BDENF databases, using the following descriptors: diabetic neuropathies, touch, tactile perception, perception disorders, somatosensory disorders and nursing. There were 1371 publications, obtaining a sample of 23 studies, classified according to the level of evidence. **Results:** The publications date from 1992 to 2015, with greater production in the United States. The studies were of the cross-sectional type, prevailing level of evidence IV. Pain was the most prevalent symptom, followed by sensory loss, numbness and tingling. Regarding the etiological factors, living time with the problem, altered glycosylated hemoglobin, advanced age and arterial hypertension stood out. **Conclusion:** The phenomenon has been understood as a neurological alteration. Early identification of etiologic agents and clinical manifestations are important for patients' follow-up as well as their evolution monitoring and glycemic control.
Descriptors: Diabetes *Mellitus*; Diabetic neuropathies; Touch Perception; Nursing.

RESUMEN

Objetivos: Describir los factores etiológicos y los sígnales y síntomas del fenómeno de percepción sensorial táctica alterada en personas con Diabetes *Mellitus*. **Métodos:** La busca fue realizada en las bases de datos de PUBMED, CINAHL, SCOPUS, LILACS, IBECS, MEDCARIB y BDENF utilizando los siguientes descriptores: neuropatías diabéticas, tacto, percepción táctil, trastornos de la percepción, trastornos somatosensoriales y enfermería. Se identificaron 1371 publicaciones y se obtuvo una muestra de 23 estudios. Estos fueron clasificados según el nivel de evidencia. **Resultados:** Las publicaciones datan de 1992 hasta 2015, con mayor producción en los Estados Unidos. Los estudios fueron de tipo transversal, con un nivel de evidencia IV. El dolor fue el síntoma más prevalente, seguido por pérdida sensorial, entumecimiento y hormigueo. Cuanto a los agentes etiológicos, se destacó el tiempo de vida con el problema, hemoglobina glicosilada modificada, edad avanzada e hipertensión arterial. **Conclusión:** Se comprobó que el fenómeno se ha entendido como una alteración neurológica. La identificación temprana de los agentes etiológicos y las manifestaciones clínicas son importantes para el seguimiento de los pacientes, así como para controlar su evolución y el control glucémico.
Descriptores: Diabetes *Mellitus*; Neuropatías diabéticas; Percepción del tacto; Enfermería.

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INTRODUCTION

Diabetes Mellitus (DM) is a growing public health problem due to its increased prevalence, morbidity and mortality in the general population. Its evolution, coupled with chronic hyperglycemia and often uncontrolled glycemic, makes individuals vulnerable to significant changes that cause dysfunction and failure of various organs, especially kidneys, eyes, nerves and blood vessels[1].

Among the complications of DM, the most prevalent is the diabetic neuropathy, affecting up to 50% of individuals with Diabetes Mellitus type 2 (DM2)[2]. However, when diagnostic methods of greater sensitivity are used in the evaluation of the sensory perception, the involvement can reach 100%[3].

The diabetic neuropathies cover a broad and heterogeneous set of clinical and subclinical syndromes characterized by a progressive loss of nerve fibers that affect the divisions of the peripheral, somatic and autonomic nervous system. Currently, there is evidence that the neuropathy and its late sequels are signs not only of the risk of amputation, but also of greater mortality[4].

The change in sensory tactile perception, complication that precedes neuropathy, is a microvascular and neurological disorder that progressively affects the nerve fibers and, therefore, the peripheral nervous system. The dysfunctional nerves leads to the loss of protective sensitivity, with impaired ability to perceive incipient, or even apparent, feet ulcerations[2]. In more severe cases, we can observe functional limitation, loss of proprioception and instability when walking[3].

This neurological complication usually manifests early in individuals with DM2, often accompanying the diagnosis, which is different in people with Diabetes Mellitus type 1 (DM1), where the problem can occur five or more years after the diagnosis[3].

Currently, there is evidence that a possible human response to the problem is the loss of tactile sensory function, an indicator of risk of ulcers and amputation, and that causes great impact on activities of daily living and quality of life of people[5]. Thus, it is important to assess the tactile sensorial perception during the follow-up of individuals with DM. This evaluation must be carried out in the nursing consultation and involves the clinical judgment of human responses using the clinical reasoning. An acurate nursing diagnosis (ND) reflects the real state of the individual, allowing the nurse to choose adequate interventions to achieve positive outcomes[6].

The diagnosis "*Disturbed Sensory Perception*" was removed from the NANDA International taxonomy (NANDA-I), with the justification that the areas focused in the diagnosis should be separated into individual concepts, etiological factors and signs and symptoms specific to each of the areas of interest and identified with clarity[7-8].

The present study aims to analyze the phenomenon of altered tactile sensorial perception (ATSP) in patients with DM through integrative review of literature. This study intends to collaborate for the problem to be appreciated by NANDA-I, aiming its return as a diagnosis for the taxonomy, once nurses should have an accurate diagnostic basis for the planning of nursing care to patients with DM.

In this perspective, the present study aimed to identify etiological factors, and signs and symptoms of the ATSP phenomenon in people with DM, from the evidence available in the literature.

METHODS

This is an integrative literature review (ILR) study. The ILR should be a methodological strategy to be held prior to the validation process of a nursing diagnosis, aiming to seek theoretical support for the realization of the next phase[9].

In this study, the methodology path comprised six distinct stages: identification of the integrative review questions or theme; sampling or search in the literature; study categorization; assessment of studies included in the integrative review; interpretation of results and summary of the knowledge evidenced in the analyzed articles[10]. The objective was to answer the following question: What are the signs and symptoms and the etiological factors to the altered tactile sensorial perception in people with Diabetes Mellitus?

Next, two independent researchers performed a search in the databases: Medical Literature Analysis and Retrieval System Online (MEDLINE) consulted by the U.S. National Library of Medicine, National Institute of Health (PubMed) Cumulative Index to Nursing & Allied Health Literature (CINAHL) and Scopus, using the *Portal de Periódicos da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES) (Portal of Journals of the Coordination

for Higher Level Personnel Improvement). In addition, the Nursing Database (BDENF), Latin American and Caribbean Literature in Health Sciences (LILACS), Spanish Bibliographic Index of Health Sciences (IBECS) and Caribbean Literature in Health Sciences (MEDCARIB) were also examined, by means of the Virtual Health Library (VHL).

For the search in databases, the following descriptors were combined: “touch”, “touch perception”, “somatosensory disorders”, “perceptual disorders”, “diabetic neuropathy”, in Portuguese, English and Spanish. The Boolean operators AND and OR were also used. The classified descriptors were those controlled and available through the Medical Subject Headings (MeSH) and Health Sciences Descriptors (DeCS).

The inclusion criteria to select the articles were: approximation with the theme; primary articles published in Portuguese, English and Spanish; diabetes publications indexed in databases selected, without time limit. The studies involving animals were excluded, as well as those that had no abstract and full text available.

The searches were conducted between August and September 2016, returning 1375 articles, of which 551 in PUBMED, 444 in CINAHL, 351 in he SCOPUS, eight in LILACS, one at IBECS base, two in MEDCARIB and 14 in BDENF.

In PubMed database, the descriptors were associated, resulting in 551. Of these, 177 were selected to read the abstracts, obtaining a sample of 76 articles. However, due to the non availability of some studies, 44 remained to be evaluated in their entirety.

During the search in CINAHL, after associating the descriptors and selecting the filters ‘Full Text’ and ‘available abstract’, the initial sample included 444 articles. After reading the titles and abstracts, the selection resulted in 35 articles, all read in their entirety.

In Scopus database, the search returned 351 articles after associating the descriptors and selecting the filter ‘articles and reviews’. The titles and abstracts were read, resulting in 45 articles. However, some did not have full text available, and only 26 articles were read in their entirety.

The search of existing publications in BDENF, LILACS, IBECS and MEDCARIB, used the same strategy to search through the VHL database. After selecting the filter ‘BDENF database’, 14 articles were identified. After reading titles and abstracts, five publications were selected, but, after reading them, no article corresponded to the established inclusion criteria for the study.

In LILACS, eight articles were found, of which the titles and abstracts were read, resulting in two studies selected.

The search in MEDCARIB returned a sample of two publications. Nevertheless, after analyzing them, only one was classified as adequate. In the research in IBECS, only one article was found, which was not included in the sample because its theme had no relation with the one established for this study.

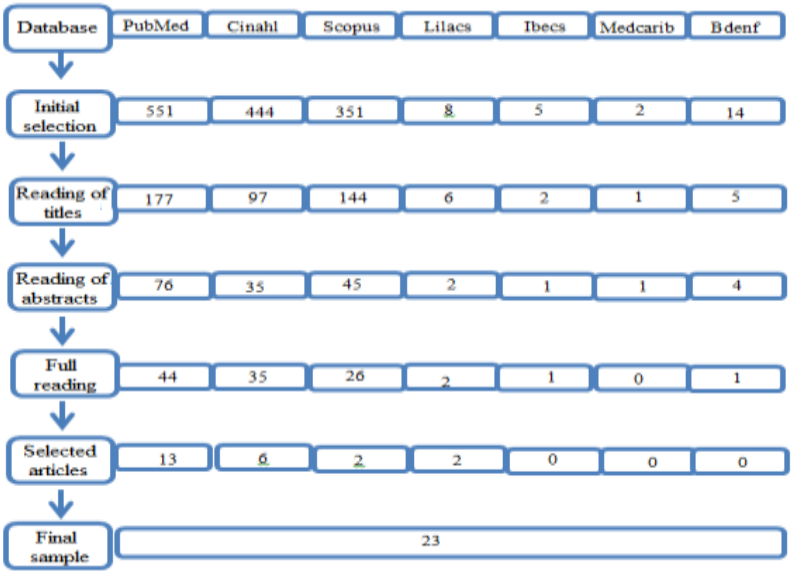
Therefore, after reading titles and abstracts, 164 were pre-selected. Of these, 53 were excluded due to repetition, resulting in 109 articles fully read and that met the eligibility criteria. In the end, 23 publications were selected, constituting the final sample due to their relation with the established question. Two researchers read and analyzed all the studies independently. Figure 1 shows the sampling process of articles that comprised the ILR.

The levels of evidence were defined through the classification proposed by Stetler et al.[11]. Summary of information on ATSP, its signs and symptoms (signs and symptoms) and etiological factors (etiological factors) were established.

RESULTS

Frame 1 shows the 23 articles selected to compound this ILR.

Figure 1 - Flowchart of selection of studies and final sample.



Source: Data obtained from the study, 2016.

Figure 2 - Articles included in the integrative literature review, Campina Grande, Paraíba, 2016.

N.	Title	Author	Year	Database	Country	Type of study	Level of evidence
1	Selecting a prospective test for early detection of diabetic polyneuropathy	Ruhdorfer *et al.*	2015	PUBMED	Austria	Cross-sectional	III
2	Treatment-induced neuropathy of diabetes: an acute, iatrogenic complication of diabetes	Gibbons, Freeman	2015	CINAHL	United States	Cohort	III
3	Significance of quantitative sensory testing in the diagnosis of diabetic peripheral neuropathy	Jia *et al.*	2014	PUBMED	China	Cross-sectional	III
4	Prevalence and correlates of diabetic peripheral neuropathy in a Saudi Arabic population: a cross-sectional study	Wang *et al.*	2014	PUBMED	Saudi Arabia	Cross-sectional	III
5	Peripheral neuropathy in adolescents and young adults with type 1 and type 2 diabetes from the search for diabetes in youth follow-up cohort: a pilot study	Jaiswal *et al.*	2013	CINAHL	United States	Cohort	III
6	Early electrophysiological abnormalities and clinical neuropathy: a prospective study in patients with type 1 diabetes	Hyllienmark *et al.*	2013	CINAHL	United States	Cohort	III
7	Progressive axonal dysfunction precedes the development of neuropathy in type 2 diabetes	Sung *et al.*	2012	CINAHL	Taiwan	Cohort	III
8	Diabetic foot complications in Malta: prevalence of risk factors	Formosa; Gatt; Chockalingam	2012	PUBMED	Malta	Cross-sectional	III
9	Cross-sectional survey of diabetic neuropathy in Kanagawa and clinical significance of a touch test using tissue paper	Jin *et al.*	2012	PUBMED	Japan	Cross-sectional	I
10	Childhood diabetic neuropathy: functional impairment and non-invasive screening assessment	Blankenburg *et al.*	2012	PUBMED	Germany	Cross-sectional	III
11	Disturbed vibrotactile sense in finger pulps in patients with Type 1 diabetes--correlations with glycemic level, clinical examination and electrophysiology	Dahlin *et al.*	2011	PUBMED	Sweden	Cohort	III
12	Evaluation of the feet of diabetic patients assisted at health unit	Najjar *et al.*	2010	LILACS	Brazil	Cross-sectional Descriptive	III

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N.	Title	Author	Year	Database	Country	Type of study	Level of evidence
13	Preclinical symptoms of the diabetic foot	Bekler; Ertav	2009	PUBMED	Turkey	Cross-sectional	III
14	Peripheral neuropathy is an early complication of type 2 diabetes in adolescence	Karabouta *et al.*	2008	PUBMED	England	Cases series	II
15	Clinical characteristics of patients with diabetic polyneuropathy: the role of clinical and electromyographic evaluation and the effect of the various types on the quality of life	Ovayolu *et al.*	2008	CINAHL	Turkey	Cross-sectional	III
16	Prevalence and characteristics of diabetic polyneuropathy in Passo Fundo, South of Brazil	Tres *et al.*	2007	LILACS	Brazil	Cross-sectional	III
17	Factors that impact symptomatic diabetic peripheral neuropathy in placebo-administered patients from two 1-year clinical trials	Tesfaye *et al.*	2007	CINAHL	—	Randomized and double-blind	I
18	Implementing a clinical assessment protocol for sensory and skeletal function in diabetic neuropathy patients at a university hospital in Brazil	Sacco *et al.*	2005	PUBMED	Brazil	Case series	III
19	Longitudinal assessment of the development of diabetic polyneuropathy and associated risk factors	Franse *et al.*	2002	PUBMED	Germany	Cohort, longitudinal	III
20	'Numbness of the feet' is a poor indicator for polyneuropathy in Type 2 diabetic patients	Franse *et al.*	2000	PUBMED	Netherlands	Cross-sectional	II
21	Clinical examination for the detection of protective sensation in the feet of diabetic patients	Smieja *et al.*	1999	SCOPUS	United States	Cross-sectional	III
22	Neuropathy in non-insulin-dependent diabetes mellitus. The significance of symptoms	Hong; Chia; Fong	1998	PUBMED	Singapore	Case-control	III
23	Clinical examination versus neurophysiological examination in the diagnosis of diabetic polyneuropathy	Valk *et al.*	1992	SCOPUS	Netherlands	Cross-sectional	III

Source: Data obtained from the study, 2016.

The articles were published from 1992 to 2015, with the highest number in 2012 (4-17.3%). Most of the studies were produced in the United States (4-17.3%). The researches were cross-sectional (13-56.5%), cohort (6-26.1%), case series (2-8.6%), control case (1-4.35%) and randomized clinical trial (1-4.35%), with the majority with level of evidence IV (11-56.5%). The PUBMED database contained 56.5% of the articles, 26.1% in CINAHL, 8.7% in SCOPUS and 8.7% in LILACS (Table 1).

Table 1 - Characterization of articles included in the integrative literature review, Campina Grande, Paraíba, 2016.

Characteristics	N.	%
Language		
English	22	95.6
Portuguese	1	4.3
Year of publication		
1990-1995	1	4.3
1996-2000	3	13.1
2001-2005	2	8.7
2006-2010	6	26.1
2011-2015	11	47.8
Publication site		
North America	4	17.4
South America	3	13.1
Asia	6	26.1
Europe	9	39.1
Unidentified	1	4.3
Study design		
Cross-sectional	13	56.6
Cohort	6	26.1
Case series	2	8.7
Case-control	1	4.3
Randomized	1	4.3

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Characteristics	N.	%
Level of Evidence		
I	1	4.3
III	6	26
IV	11	47.8
V	1	4.3

Source: Data obtained from the study, 2016.

The scientific evidence found for the ATSP phenomenon derive from longitudinal (cohort) studies, case-control and cross-sectional. Only two articles had randomized clinical trial design.

Twenty etiological factors for the ATSP problem were identified (Table 2). The duration of DM was the main factor related to the ATSP (47.8%), followed by glycosylated hemoglobin (39.1%) and advanced age (30.4%).

Table 2 - Etiological factors of the ATSP in people with DM, Campina Grande, Paraíba, 2016.

Etiological Factors	Articles	N. (23)	% (100)
Duration of DM	3, 5, 9, 12, 13, 14, 15, 16, 19, 20, 21	11	47.8
Glycosylated hemoglobin	2, 6, 8, 9, 11, 14, 16, 19, 20	9	39.1
Advanced age	4, 9, 12, 16, 19, 20, 21	7	30.4
Arterial Hypertension	4, 5, 8, 16, 17	5	21.7
Hyperglycemia (duration and level)	4, 7, 12, 18	4	17.3
Smoking	4, 5, 16,17	4	17.3
Sex	11, 16, 20, 21	4	17.3
Uncontrolled Diabetes *Mellitus*	1, 6, 18	3	13
Obesity	4, 5,11	3	13
Dyslipidemia	8, 17	2	8.6
Height	4,19	2	8.6
BMI	4, 19	2	8.6
High levels of homocysteine, serum creatinine, urea nitrogen and leukogram	4, 16	2	8.6
Microalbuminuria	4, 16	2	8.6
Use of insulin	4	1	4.3
Dysfunction of small diameter fibers	3	1	4.3
Retinopathy	8	1	4.3
Nephropathy	8	1	4.3
Kidney Failure	16	1	4.3
Peripheral arterial disease	16	1	4.3

Source: Data obtained from the study, 2016.

Regarding signs and symptoms, 22 articles addressed signs and symptoms of ATSP (Table 3). The pain was the most discussed manifestation (56.5%) of people with ATSP, followed by sensory loss (43.4%), numbness (39.1%) and biting sensation (30.4%).

Table 3 - Signs and symptoms of ATSP in peopl with DM. Campina Grande, Paraíba, 2016.

Sign and Symptoms	Articles	N. (23)	%
Pain	1, 2, 3, 6, 9, 12, 13, 14, 17, 20, 21, 22, 23	13	56.5
Sensory loss	2, 7, 10, 11, 12, 13, 14, 17, 18, 21	10	43.5
Numbness	1, 3, 9, 12, 17, 18, 20, 21, 22	9	39.1
Biting or needle sensation	1, 2, 4, 12, 18, 21, 23	7	30.4
Paresthesia	2, 6, 9, 13, 22, 23	6	26
Burning	1, 2, 13, 17, 21	5	21.7
Tingling	1, 4, 9, 12, 18	5	21.7
Hyperalgesia	2, 3,10, 17	4	17.3
Decreased sensation of vibration	2, 4,11, 17	4	17.3
Loss of motor power	17, 18, 22	3	13
Foot deformity	4, 8, 22	3	13
Distal weakness	2, 3, 12	3	13
Allodynia	2, 17	2	8.6
Callosities	8, 14	2	8.6
Muscle cramps	1, 9	2	8.6

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Sign and Symptoms	Articles	N. (23)	%
Intermittent claudication	8, 16	2	8.6
Alteration of sural nerve function	6, 23	2	8.6
Atrophy of the lower limbs	13	1	4.3
Dry skin	18	1	4.3
Dysesthesia	9	1	4.3
Contact hypersensitivity	22	1	4.3
Decrease thermal sensitive threshold	3	1	4.3

Source: Study data, 2016.

DISCUSSION

In people with DM, ATSP represents a serious public health problem and is a constant challenge for patients and health professionals. The identification of signs and symptoms and etiological factors as well as the early trial of ATSP and nursing care for the prevention of feet injury should be established.

The present study identified the scientific evidence for the ATSP phenomenon. These derived from level of evidence IV. These results show the need for studies with more robust designs on the ATSP. However, the publications highlight the ATSP as a phenomenon of interest for the nurse's care work.

The predominant etiologic factor of ATSP was the duration of DM. The development of neuropathy in diabetic patients increased the risk of ulceration of the lower limbs. As observed in the studies carried out, 67.6% of the patients had had type 2 diabetes for 10 years or more[12].

In addition, the duration of DM and the age of the individual are associated with neuropathic complications, being also a factor of higher incidence of amputation[13].

Although it is not a modifiable risk factor, the duration of diabetes is of great importance for the early identification and management of any change in tactile sensitivity and neuropathy[14]. The time of diagnosis of the disease, associated with the metabolic disarray (HbA1c>7%), brings serious consequences to the patient with DM.

The diabetic neuropathy was recently investigated in a study with 522 individuals and, of these, 110 had the longest DM, higher prevalence of abdominal obesity and arterial hypertension, in comparison with their counterparts without neuropathy[13], corroborating the data found in the present study.

As years pass by, controlling the disease can become more tiresome, at the same time in which the metabolism decreases. Such associated factors hinder the patient's ability to keep an adequate lifestyle and healthy habits for health promotion and prevention of diseases, increasing the occurrence of risk factors.

Another important factor for the prevention of ATSP is the metabolic control, since fasting glycaemia reflects the current and instantaneous glycemic level at the exact moment of realization, while tests of glycosylated hemoglobin (HbA1c) shows the average glucose history over the last four months[3].

Furthermore, high glycosylated hemoglobin is considered an indicator for the severity of DM and the consequent change in tactile sensation, once a prolonged hyperglycemia can lead to decreased blood flow to the tissues, causing microvascular damage in the peripheral nerves and, therefore, the development of neuropathy[14].

In this sense, the risk of developing ATSP is associated with the magnitude and the rate of change in glycosylated hemoglobin. In this way, its control is considered an important factor for the prevention of diabetic neuropathy and other complications[15].

Likewise, a study on the evaluation of risk factors for loss of plantar protective sensitivity in diabetic patients from João Pessoa-Brazil showed that the duration of DM and the patient's age were the main factors associated with the absence of tactile sensory perception detected by the monofilament testing. The individuals most affected by DM in that sample were those in adulthood, showing that the aging process and the life habits of the population, as issues involving diet and sedentary lifestyle, are important factors for greater involvement of the disease[16].

The severity of the ATSP, frequent in diabetics, also relates to the presence of smoking and hypertension. The nicotine, the substance present in cigarettes, is considered an aggravating factor for the obliteration of arteries and arterioles. According to studies, smokers are twice more likely to undergo an amputation. Therefore, it is important to educate the population about the abandonment of this practice[17]. Smoking, besides being an important

cardiovascular risk factor, also increases the risk of ulceration and complicates the process of wound healing[3]. The SAH also increases the chances of developing macro and microvascular complications and its association with dyslipidemia contributes to the development of complications in lower extremities[18].

Regarding signs and symptoms, pain was the most prevalent symptom identified in the studies. This, sometimes, causes progressive reduction of tactile and painful sensitivity and even absence of tactile sense, which makes the region of the feet vulnerable to external aggression[19]. The study found that the most commonly found symptoms were neuropathic pain, burning sensations in the feet or legs and numbness or tingling[20].

A study conducted in China with 196 patients, employing quantitative sensory tests, observed the presence of sensory changes and symptoms characteristic of DNP. Among the patients' complaints, 22% had numbness, pain and hyperalgesia[21].

The neuropathy can affect fine, coarse or mixed fibers, resulting in numbness, burning, and pain twinge or needle prick located in the legs and feet, with greater frequency in the evening. In addition to these, they can manifest hyperesthesia (pain when touching sheets and blankets), reduction or loss of tactile, thermal or painful sensitivity, weakness and loss of distal motricity[22].

The most prevalent signs and symptoms found in this ILR were characteristic of autonomic neuropathy and were also observed in another study[(20)]. The autonomic neuropathy affects the lower extremities and leads to decreased sweating, resulting in dry skin that is prone to cracks or fissures, and calluses[5,23], but also to increased blood flow (in the absence of arterial disease) caused by sympathetic vasoconstriction and that can lead to Charcot foot. These are important in the genesis of feet ulcers in diabetes[4].

The orthopedic alterations found cause repetitive trauma due to a continuous aggression in certain area of the foot, leading to the appearance of the ulcer[5]. These ulcers are preceded by calluses, cracks and fissures that, with the continuing walking, evolve to ulceration.

Thus, the role of nursing in the assistance to the patient with DM is essential, mainly through the systematic and coherent planning and implementation of nursing care, focused on the human being and his/her family. The professional must instruct the patient about the importance of glycemic control and cardiovascular risk factors such as diet, exercise, adequate weight and cessation of smoking, so that he/she, despite being affected by this pathology, can have a quality of life. The proper hygiene must also be highlighted, as well as foot care and planning of activities for health promotion and disease prevention, delaying the onset of feet complications[24-25].

Some limitations of this study are the small number of studies identified and the low level of evidence from studies addressing the theme. In this sense, new studies exploring the theme should be developed, contributing to the organization of the knowledge basis, with a view to promoting the quality of assistance, providing the necessary care to a specific population and guiding the organization of services.

CONCLUSION

The ATSP is involved with the diabetic neuropathy and, consequently, to the development of diabetic foot. This ILR identified studies addressing etiological factors of the problem, such as temporal evolution of the disease and inadequate glycemic control. Signs and symptoms found were pain, sensory loss, numbness and burning, more frequent in the lower limbs.

There was a deficit of Brazilian publications on the ATSP and low levels of evidence. Therefore, more studies with strong evidence about the problem are necessary, especially for being a phenomenon affecting the quality of life of individuals, due to functional limitations caused by it and the fact that it still lacks a specific treatment.

In this way, the ATSP requires special attention of the nursing team in the identification of the phenomenon and in the planning and implementation of individualized care that promote continuous monitoring of people with DM, the control of symptoms and the coexistence with the limitations, for a better adaptation to changes arising from the problem.

In this sense, NANDA International must consider the tactile sensory perception phenomenon and the ATSP as a possible nursing diagnosis liable to return to the taxonomy.

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