

Diabetic foot and assessment of the risk for ulceration

Pé diabético e avaliação do risco de ulceração

Pie diabetic y evaluación del riesgo de ulceración

Carlos Alberto Marques da Silva*

Débora de Sousa Pereira**

Diogo Silvino da Costa Almeida***

Marisa Isabel Lucas Venâncio****

Abstract

Diabetic foot ulcers have been receiving increased attention due to the severity of the situations and the large number of diabetic patients, whose prevalence exceeds 10% of the Portuguese population. The lack of feet vigilance among diabetic patients is an actual problem which limits the identification of risk factors, prevention and early intervention. To overcome this problem, nurses need to be familiar with and perform procedures for regular vigilance and assessment of the risk for ulceration in diabetic patients. Therefore, this paper aims to update knowledge on diabetic foot and characterise the process of assessing the risk for foot ulceration in diabetic patients. Recent scientific papers, reports, monographs and guidelines published on this topic were analysed. Despite the different opinions and differences, we concluded that the theoretical frameworks found are a sufficiently sound basis for nursing intervention, and that the existing legal framework is relatively simple, objective and achievable. The assessment of the risk for diabetic foot ulceration is within the reach of family nurses, particularly regarding the competences of level 1 teams.

Keywords: nursing; risk; diabetic foot; ulcer.

Resumo

As úlceras do pé diabético suscitam crescente atenção devido à gravidade das situações e elevado número de diabéticos, cuja prevalência supera 10% da população portuguesa. A falta de vigilância dos pés dos diabéticos é um problema existente, que limita a identificação dos fatores de risco, a prevenção e a intervenção atempada. Para superar esse problema é necessário que os enfermeiros conheçam e executem procedimentos de vigilância e avaliação do risco de ulceração, de modo sistemático, a todos os seus utentes diabéticos.

Neste contexto surgiu a necessidade de elaborar este artigo a fim de atualizar conhecimentos sobre a problemática do pé diabético e caracterizar o processo de avaliação do risco de ulceração dos pés dos diabéticos. Foi efetuada uma análise de artigos científicos recentes, relatórios, monografias e normas publicadas sobre o tema.

Conclui-se que, não obstante as diversas opiniões e diferenças, os suportes teóricos encontrados constituem-se como bases suficientemente adequadas à intervenção da enfermagem, sendo o quadro normativo existente relativamente simples, objetivo e exequível. A avaliação do risco de ulceração do pé do diabético está ao alcance dos enfermeiros de família, especialmente no que respeita às competências das equipas de nível 1.

Palavras-chave: enfermagem; risco; pé diabético; úlcera.

Resumen

Las úlceras del pie diabético llevan a una creciente atención debido a la gravedad de las situaciones y de alto número de diabéticos, cuya prevalencia es más del 10% de la población portuguesa, y la falta de vigilancia de los pies de los diabéticos un problema existente, que limita la identificación de factores de riesgo, la prevención y la intervención anticipada. Para superar ese problema, es necesario que las enfermeras conozcan y apliquen los procedimientos para el seguimiento y la evaluación del riesgo de ulceración, de manera sistemática, a todos sus usuarios diabéticos. En este contexto surgió la necesidad de la elaboración de este artículo, a fin de actualizar los conocimientos sobre el problema del pie diabético y caracterizar el proceso de evaluación del riesgo de ulceración de los pies de pacientes diabéticos se llevó a cabo un análisis de los recientes artículos científicos, informes, monografías y normas publicado sobre el tema. Se concluye que no obstante las varias opiniones y diferencias, los soportes teóricos encontrados se constituyen como bases suficientemente adecuadas a la intervención de enfermería, siendo el marco normativo existente relativamente simple, objetivo y alcanzable. La evaluación de riesgo de ulceración del pie diabético se encuentra al alcance de las enfermeras de familia, sobre todo en relación con las facultades de los equipos de nivel 1.

Palabras clave: enfermería; riesgo; pie diabético, úlcera.

* Master in Health Sociopsychology. Specialization Nursing Degree in Public Health. Title of Nursing Specialist. Adjunct Professor, Nursing School of Coimbra [carlossilva@esenfc.pt]. Address: Avenida Bissaya Barreto (Polo A) - Apartado 7001, 3046-851 Coimbra

** Bachelor Degree in Nursing. RN, 3040-266 Ançã, Portugal [debora-90@hotmail.com].

*** Bachelor Degree in Nursing. RN, 4150-173 Oliveira de Azemeis, Portugal [almeida_37@hotmail.com].

**** Bachelor Degree in Nursing. RN, 3150-252 Ega - Condeixa-a-Nova, Portugal [marisa_venancio_@hotmail.com].

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Introduction

Diabetes mellitus (DM) has been increasing steadily in Portugal due to several factors. Data referring to 2010 (Observatório Nacional da Diabetes, 2012) point to a prevalence of 12.4% in the Portuguese population aged between 20 and 79 years. However, the prevalence rate of diagnosed diabetes ranges between 6.3% and 7.3% in the Portuguese population.

One of the most severe and common complications in diabetics is diabetic foot, accounting for approximately 70% of amputations performed due to non-traumatic causes (Ministério da Saúde. Direção Geral da Saúde, 2011a). Although severe and relatively common among diabetics, this complication can be prevented if health professionals intervene in an appropriate manner and diabetics adhere to preventive measures. However, with a few exceptions, in terms of the implementation of the prevention and adherence programme to prophylactic measures, there are still many constraints or difficulties that need to be identified and overcome in order to successfully reduce the risk factors associated with diabetic foot and its complications. The lack or delay of diagnosis, the non-surveillance of risk situations and the non-implementation of prophylactic measures are, still, often associated with the onset of severe injuries. In parallel, we are confronted with different views, procedures and criteria regarding interventions for preventing diabetic foot and the assessment of the risk of foot ulcer. We are, therefore, faced with a significant problem in terms of public health which needs to be overcome. For this purpose, a search was performed between May and November 2012 on the databases of EBSCO, Scielo, b-on, bvs (LILACS), the search engine "Google Scholar" and the website of the Directorate-General for Health, using the keywords "nursing", "diabetic foot", "prevention", "assessment", "treatment", "risk for ulceration" and "nursing intervention" in Portuguese and English. This search was complemented with an analysis of the literature on the subject. Priority was given to papers on diabetic foot risk assessment published after 2007. This study aimed to update knowledge on diabetic foot prevention, referral and treatment; and characterise the process for the assessment of the risk for foot ulceration among diabetic patients.

Literature Review

According to the International Consensus on the Diabetic Foot and Practical Guidelines on the Management and Prevention of Diabetic Foot (2007) and Grossi (1998) cited by Coelho, Silva, and Padilha (2009, p. 66), the term diabetic foot "is used to characterise injuries that occur on the feet of patients with diabetes mellitus as a result of multiple factors, such as motor-sensitive and chronic peripheral autonomic neuropathies, peripheral vascular disease, biomechanical alterations that lead to abnormal plantar pressure, and infection, which can aggravate the condition". Reiber (as cited in Mendonça, Moral, & Moura, 2011, p.286) characterised the diabetic foot "as an infection, ulceration and/or destruction of deep tissues associated with neurological abnormalities and various degrees of peripheral vascular disease in the lower limb".

There is evidence that more than 10% of the people with DM are more likely to develop foot ulcers throughout the life cycle (Andrade et al., 2010) and that this susceptibility leads to injuries resulting from peripheral neuropathy in 80 to 90% of the cases, as well as peripheral vascular disease and deformities.

Diabetic Foot: complications and implications in the patient's life

According to the American Diabetes Association and Al-Maskari, cited by Mendonça et al. (2011), there are several factors contributing to injury in the diabetic foot. These may be the result of two or more associated risk factors, triggered by both extrinsic and intrinsic trauma associated with peripheral neuropathy, peripheral vascular disease and biomechanical change.

Peripheral neuropathy is the most common problem associated with diabetic foot, on which Ochoa-Vigo and Pace (2005) and Mendonça et al. (2011) have similar views. Peripheral neuropathy may compromise sensory, motor and autonomic nerve fibres. Changes in the sensory system lead to gradual loss of sensitivity to pain, perception of plantar pressure, temperature and proprioception. In the motor system, it causes atrophy and asthenia of small dorsal muscles, leading to osteoarticular deformities and changes in patient ambulation. With respect to the autonomic component, besides arteriovenous changes, there is a reduction of foot sweating, leaving

them dry and susceptible to developing cracks or fissures.

Fajardo (2006) mentions studies which demonstrate that loss of sensitivity leads to diabetic foot ulcers. In case of decreased vibration perception, patients are seven times more likely to develop an ulcer.

According to Boike, cited by Ochoa-Vigo and Pace (2005), from the moment peripheral neuropathy is installed, it is irreversible. Thus, it is essential for patients to be aware of its progression, maintaining an adequate control of blood glucose levels.

Peripheral Vascular Disease is one of the major causes for delayed foot ulcer healing in people with diabetes, due to atherosclerosis of peripheral arteries. This leads to poor blood circulation in the lower limbs, as it limits the supply of oxygen, nutrients and antibiotics to tissues, increasing healing time. Most cases evolve to gangrene (Levin, cited by Ochoa-Vigo & Pace, 2005). This author admits that this disease is four times more likely to affect diabetic patients than the general population. Its incidence increases depending on the patient's age and the time of diagnosis.

Biomechanical change, according to Mendonça et al. (2011), comprises any limitation of the movements and joints of the feet and ankles, and may lead to a dysfunctional gait. When associating neuropathy and bone deformities, a change in gait was also found. Due to loss of protective sensitivity, constant trauma resulting from successive walking may not be perceived, leading to callus and increased risk of foot injury.

Trauma can result in painful ischaemic or neuroischaemic ulcers which may sometimes be painless if associated with a decrease in sensitivity. Ischemic or necrotic fingers as a result of septic thrombosis, trauma, oedema or infection due to arteriolar dysfunction are one of the first signs of this type of ulcers (Ochoa-Vigo & Pace, 2005).

Of the several severe complications of diabetic foot, ulceration, infection, gangrene and, consequently, amputation of toes or lower limbs should be highlighted. The delay of appropriate treatment increases and aggravates diabetic foot complications, leading to amputations (Tavares, Dias, Araújo, & Pereira, 2009). Additionally, Amaral and Tavares (2009) observed that foot ulcers and consequent amputations are the main complication due to its mutilating factor and necessary interventions by the health care services.

These complications have an impact on the quality of

life of the patient and family (Andrade et al., 2010). They may lead to physical disability, social isolation, depression, unemployment, loss of productivity, and they may also affect the patient's self-image, self-esteem and role within the family and society (Coelho, Silva, & Padilha, 2009).

Feelings such as fear, grief and helplessness, which are common among patients with wounds, are greatly valued in our society, and depending on others can promote frustration, emotional disorganisation, doubts and unexpected reactions (Salomé, Blanes, & Ferreira, 2011).

The same authors mention studies which showed that patients with diabetes and feet wounds are more depressed and have less quality of life than those with no complications arising from diabetes.

Organisation and levels of care

In Portugal, all diabetic patients should be followed by multi-disciplinary teams of diabetic foot care. In accordance with Regulation no. 5/2011 of 21st January of the Directorate-General for Health - DGS (Ministério da Saúde. Direção Geral da Saúde, 2011a), there should be three levels of care: levels I, II and III. At the first level, the main objectives are patient and family education, risk assessment, implementation of preventive measures and provision of care and treatment of more superficial injuries. Whenever it is deemed appropriate, injuries are monitored and referred to another level of care. At this level, each ACES (Agrupamento de Centros de Saúde – Health Care Centre Clusters) should create its diabetic foot team composed of a nurse, a physician and if possible a podiatrist.

Cases with more complex injuries, such as ulcers and/or ischemic ulcers, with signs of infection and/or necrosis are assessed at level II. These cases may require surgical intervention, especially debridement with hospitalisation. It should be underlined that, at this level, multi-professional teams are more complex and should include an endocrinologist, an orthopaedist and a clinical nurse specialist in Podiatry. They may also include a general surgeon. Each hospital should have at least one of these teams. Level III requires vascular assessment and, if necessary, vascular surgery. At this level, teams should be composed of the same professionals as level II teams and also have a vascular surgeon, a physiatrist and an orthotist.

Ulcer classification

Ulceration risk assessment and the referral of patients with ulcers depend on the type of ulcer. Thus, a classification model to distinguish objectively between the various categories is necessary.

Table 1 illustrates the Meggitt-Wagner's ulcer classification system. This is relatively simple as it has six degrees of severity, and is a good option for ulcer classification and intervention or referral of patients.

TABLE 1 – Meggitt-Wagner's Ulcer Classification System

Degree	Wound Characteristics
0	Preulceration lesions, healed ulcers, presence of bony deformity.
1	Superficial ulcer without subcutaneous tissue involvement.
2	Penetration through the subcutaneous tissue; may expose bone, tendon, ligament, or joint capsule.
3	Osteitis, abscess or osteomyelitis.
4	Gangrene of digit.
5	Gangrene of foot.

Source: Wagner, F. W. I., Meggitt, B., as quoted in Baranoski and Ayello (2006).

Ulcers can also be classified according to their aetiology. Thus, we have two types of ulcers: neuropathic and ischaemic ulcers.

According to Couto and Camarneiro (2004), the diabetic foot with neuropathic ulcers presents a lack or decrease of pain, thermal or vibratory sensitivity. As regards symptomatology, patients have paresthesia or hyperesthesia with unbearable pain, mostly at night. During observation, the neuropathic foot can present calluses, claw toes, perforating and painless ulcers. At palpation, it presents warm and dry skin. In more advanced stages, there is disorganisation of bones and joints, which is called the Charcot Foot.

The patient with ischaemic foot complains of claudication or pain at rest. This is characterised by cold, atrophic, dry and hairless skin. Nails are thick and, sometimes, have mycoses. Arterial pulses may be absent or manifest themselves through murmurs (Basílio et al., cited by Couto & Camarneiro, 2004). Ulcers develop easily during small traumas, and, in a more advanced stage, they can present gangrene.

Assessment of the risk for diabetic foot ulceration and patient referral

Even though several authors mention different procedures to prevent and assess the risk for diabetic foot ulceration, they are unanimous in considering identification of the foot at risk for ulceration as paramount. Feet should be thoroughly observed, and this process should be part of the physical examination (Fajardo, 2006).

The evaluation of neuropathy-related sensitivity loss should always be confirmed by the application of a Semmes-Weinstein 10g monofilament together with at least one more test on sensitivity: vibration perception (using a 128-Hz tuning fork), tactile perception (use of cotton wisp) or search of patellar and Achilles reflexes (Ministério da Saúde. Direção Geral da Saúde, 2011b). Before each test, patients should be informed of its purpose. The procedure should be illustrated and tested, and patients should be informed that they ought not to look at their feet and only answer yes when they feel the pressure, or no when they do not feel the pressure.

The monofilament is applied perpendicular to the plantar surface with enough pressure to cause it to slightly bend for no more than two seconds. The sites should be randomly chosen and true touches should alternate with simulated touches so that the patient cannot predict where it will be applied. This test should not be used in case of deformity or other defect, nor applied on affected areas. If for some reason the patient does not respond to touch in a given area, the assessment should continue, and this same area should be reassessed later on (Fajardo, 2006).

As regards application sites, there are some differences of opinion. Ochoa-Vigo and Pace (2005) argue that this instrument should be applied in ten different sites of the plantar surface. Fajardo (2006) states that it is enough to apply the filament to the first, third and fifth toes and metatarsals. On the other hand, Guideline no. 3/2011 of DGS (Ministério da Saúde. Direção Geral da Saúde, 2011b) mentions that the correct test must

be performed at three sites through three applications, and the Practical Guidelines (International Working Group on the Diabetic Foot [IWGDF], 2011) specifically refer three sites corresponding to the first toe and the first and fifth head of plantar metatarsals. There is protective sensation if two of the three answers are correct for each site.

The tuning fork should be applied perpendicularly to the dorsal side of the distal phalanx of the first toe of both feet (Mendonça et al., 2011). It should be applied with constant pressure and the test should be repeated twice, alternating with a “mock” application. It is considered positive if the patient correctly answers two out of three applications, and negative when the patient provides only one or no correct answers. If the patient is unable to sense the vibrations of the tuning fork on the big toe, the test is repeated more proximally (malleolus or tibial tuberosity). Alternatively we can search the tactile sensitivity using cotton applied on the dorsal side of the foot, or opt for research of patellar and achilles reflexes.

In order to obtain data on ischaemia or the vascular situation, it is important to investigate the presence of claudication or rest pain at night. However,

professionals must take into account whether pain appears during gait and if it relieves when gait ends. These signs become more severe when they arise in short walks and/or in more distal areas of the foot. There are other signs which can also suggest ischaemia, such as skin colour (cyanosis/pallor), onychogryphosis, cold skin, and hair reduction (Ochoa-Vigo & Pace, 2005). This author also argues that searching for pulses is an important fact to be taken into account, particularly posterior tibial and pedial pulses. In case of weak or missing pulse, whenever possible, the professional should request the help of another colleague for a new assessment. In case of lack of pulse, the patient should be forwarded to a specialist in order to be made a more thorough assessment.

Another suitable procedure for circulatory assessment is the Ankle Brachial Pressure Index (ABPI). A score inferior to 0.9 is a sign of vascular change. Revilla, Sá and Carlos (2007) have similar views to the above mentioned authors; however, they specified the scores to classify obstruction, considering four categories of what they called the Ankle Brachial Systolic Index (ABSI).

TABLE 2 – Reference values for the ABSI

Value	Degree of Obstruction
0.91 - 1.30	No obstruction
0.70 - 0.90	Mild Obstruction
0.40 - 0.69	Moderate Obstruction
<0.40	Severe Obstruction

Source: Revilla, Sá and Carlos (2007)

During the assessment, the foot should be classified in terms of the risk of developing ulcers, based on specific criteria and the presence of certain risk factors. The assessment procedures and factors to be considered may vary depending on the team and the situation, but in Portugal there are official rules established by the DGS which are listed in Regulation no. 5/2011 of 21st January of the DGS (Ministério da Saúde. Direção Geral da Saúde, 2011a), and complemented by Guideline no. 3/2011, of 21st January (Ministério da Saúde. Direção Geral da Saúde, 2011b).

The current regulatory framework classifies the risk of developing foot ulcers into three categories: low risk, medium risk and high risk. However, when classifying the risk level, one problem emerges. Where should patients with low risk factors be included? In fact, Rules Circular no. 8/DGCG, of 24th April 2001 (Ministério da Saúde. Direção Geral da Saúde, 2011) specifically includes these situations in category II and the same orientation is found in some of the publications consulted. However, both the regulation in force and its predecessor only consider the presence of Neuropathy as medium risk.

In practical terms, integrating low risk situations in medium risk could create a distortion of the assessment indicators and in the follow-up model. On the other hand, low risk factors, even though not formally restricted to a limited universe with regulated inclusion criteria, can be eliminated or corrected, whereas Neuropathy is considered irreversible. Thus, in the flowchart of Figure 1, such situations are included in category I, which corresponds to low

risk. Teams should identify the factors and assign the patient to the appropriate risk category. The necessary interventions and patients' referral must take into account the appropriate level of care and the organization of each service.

Schematically, given the regulatory context and the official guidelines, assessment and referral procedures regarding the risk for ulceration are represented in the flowchart of Figure 1.

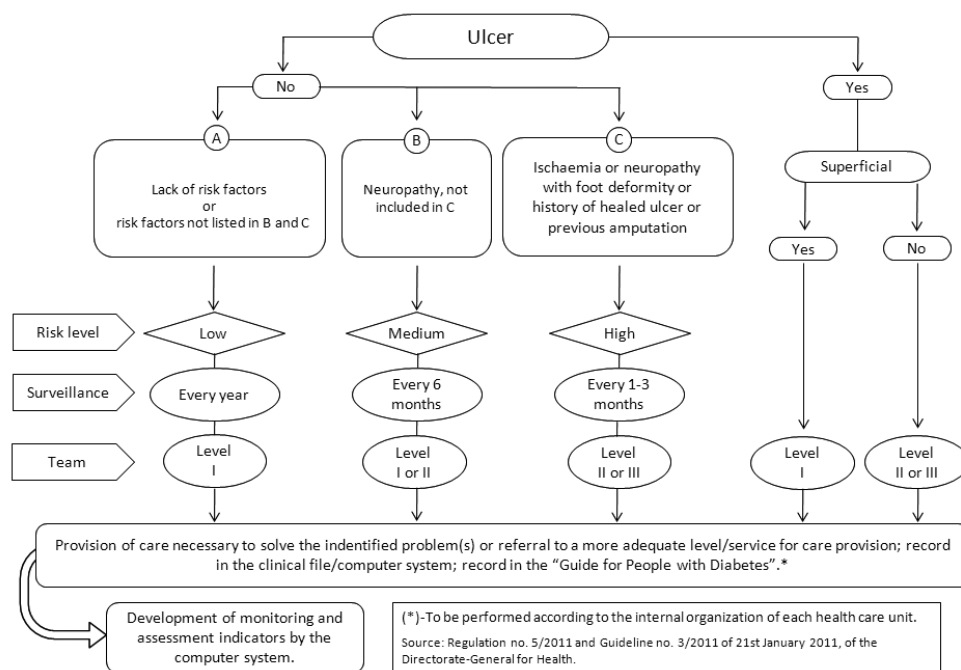


FIGURE 1 – Flowchart on assesment of the risk for diabetic foot ulceration and patient referral.

Prevention of risk for ulceration

Several authors mentioned different risk factors associated with diabetic foot complications and ulcers: previous history of ulcers, non-traumatic feet amputations, deficit in therapeutic education, inadequate metabolic control, obesity, age, gender, time of diabetes diagnosis, difficulty of accessing health services, calluses, use of inappropriate footwear or socks, smoking, burns, phlyctenae, fissures/cracks, dry or desquamated skin, onychogryphosis, lack of hygiene care, inadequate nail cutting, hypertension, dyslipidaemia, low visual acuity, bromidrosis, mycosis and/or onychomycosis, bone deformities and non-ulcerative injuries.

Diabetic patients should attend consultation for foot surveillance at least once a year. Fajardo (2006)

mentions that 50% of the patients undergoing an amputation made few feet exams. This author also mentions that several targets ought to be achieved for preventing diabetic foot, such as feet examination once a year, the identification of patients with high risk for ulceration, the use of proper footwear, the assessment and treatment of non-ulcerative pathologies, the continuous training of health professionals and, subsequently, of patients and their families.

Concerning the type of footwear, it should be assessed taking into account four aspects: model, width, length and type of material. With regard to the model, it should be closed, be one size larger than the normal shoe size, and be made of a soft material such as leather. Studies show that 54% of the ulcers in patients with neuropathy result from the use of

inappropriate footwear (Tavares et al., 2009), which illustrates the importance of a risk factor which can be corrected.

Health education raises patients' awareness, motivates them, changes behaviours and lifestyles and, consequently, reduces the risk of wounds, infections and ulcers (Ochoa-Vigo & Pace, 2005). Amaral and Tavares (2009) corroborate this idea and emphasise that the more knowledge patients have of the disease and its complications, the more easily they will change behaviours and improve their quality of life. They also advocate the use of resources to assess patients' knowledge, which they consider to be an important feature in educational actions. In this way, professionals become aware of patients' learning needs, allowing them to redirect strategies so as to meet the real needs of this group of patients.

According to Fajardo (2006) and Ochoa-Vigo and Pace (2005), both patients and families must have some knowledge of foot care, namely: the habit of observing their feet on a daily basis; the signs which they should control, such as colouration, calluses, blisters, cuts/cracks or wounds, as well as temperature changes; daily hygiene care, such as using mild soap and warm water; dry the feet without rubbing the skin, especially between the toes; skin hydration with cream, avoiding the space between the toes and open wounds or cracks; not applying talcum powder on the feet; nail care, cutting or filing them straight across and not too short, after the bath; checking the footwear before putting them on; not crossing the legs as it causes poor blood circulation; the importance of physical activity, particularly in dependent patients; the importance of raising the lower limbs when at rest; the consequences of smoking since it reduces blood circulation; use of appropriate socks, without tight elastic tops and seams, changing them on a daily basis; and resistant and adapted footwear.

If patients observe warning signs, such as open wounds, phlyctenae, changes in colouration (cyanosis) and temperature (cold skin), numbness, pain in the legs while walking, athlete's foot, among others, they should contact health professionals.

IWGDF guidelines (2011) refer the need for feet to be inspected by another person should the diabetic person be unable to do so. Patients should also avoid using hot-water bottles or heaters to warm their feet, avoid walking barefoot and avoid wearing shoes without socks. Calluses should be removed by health

professionals, thus chemical agents or plasters should be avoided.

Guideline no. 3 of DGS (Ministério da Saúde. Direção Geral da Saúde, 2011b) reinforces that people should wear seamless and cotton socks. Since footwear often causes foot lesions, shoes should not be too tight or too loose and should have one more centimetre of length, width and height. It is important for shoes to have replaceable insoles to correct plantar hyperpressure, which can lead to calluses.

Another important issue has to do with two aspects which should be highlighted to ensure adequate care provision to patients and obtain the expected results: improvement of adherence to treatment and the aid relationship between patient and professional (Fajardo, 2006). No less important is the fact that patients should have equal access to health care because that is the only way health professionals can intervene in time to prevent complications without the risk of overlooking some problematic situation.

Treatment of diabetic foot

The treatment of this type of pathologies is truly important since the sooner it starts, the better results will be obtained. Thus, the continuity of patients' quality of life can be ensured since ulcer complications will not be so likely to have significant impacts in the future.

Treatment can be divided into two categories: the treatment of non-ulcerative injuries and the treatment of ulcerative injuries.

According to the Practical Guidelines on the Management and Prevention of the Diabetic Foot published in 2011, mentioned by the IWGDF (2011), an investment should be made in the treatment of precipitating factors such as calluses and nail and skin problems, using qualified professionals. Regarding bone malformations, the guideline is leaning towards its correction through non-surgical methods.

In case of ulcers, for the treatment to be effective, it is necessary to take into consideration the triggering factor, the type and characteristics of the injury, such as the site, the depth, and the potential signs of infection.

According to Guideline no. 3/2011 (Ministério da Saúde. Direção Geral da Saúde, 2011b), these injuries are treated by relief of plantar pressure, thus limb immobilization being required. In the case of ulcers,

infection control is imperative, using techniques of surgical and non-surgical debridement. According to the IWGDF (2011), in the latter technique ulcer depth is difficult to determine due to calluses and necrosis. Therefore, neuropathic ulcers should be debrided as early as possible, while in ischaemic ulcers the priority is to restore the blood flow. It is also important that professionals try to involve patients and their families in the necessary care and the screening of warning signals, so as to avoid ulcer aggravation or recurrences.

Conclusion

The results from this study highlight a problem with major repercussions at various levels. Prevention of the risks associated with diabetic foot and identification of the risk for ulceration implies the involvement of many health professionals, covers a large target population (in Portugal alone there are approximately one million patients) and requires specific knowledge and procedures from the whole professional community, patients and family members.

The higher the demand for qualification of the teams performing vigilance and the more cases are classified in category II or III of the risk for ulceration, the higher economic costs and necessary human resources will be. Both the analysed scientific studies, and normative documents and technical guidelines emphasise the advantages of an adequate intervention for the prevention or resolution of risk factors. The majority are low risk, which are the ones that will most likely generate differences of opinion as to their classification into a category of risk for ulceration.

The last two guidelines of the DGS (Ministério da Saúde. Direção Geral da Saúde, 2010, and Ministério da Saúde. Direção Geral da Saúde, 2011b) have not included low risk factors in category II and, despite the fact that the circular in force omits their inclusion in category I, evidence were not found that would justify the inclusion of these cases into a higher risk category. Distinct severity situations fall into the three categories provided, which doubles minimum mandatory needs for annual vigilance and imply more differentiated care with the increase of the risk level. Regarding existing risk categories, we concluded that there is a general need to create a new category to differentiate diabetic patients who do not have any

risk factor from those who present low risk factors.

Considering the various opinions and documents on the assessment of risk for diabetic foot ulceration, we observed that the basic procedures required for the assessment and referral of patients are relatively simple and are within reach of the health care teams and the respective family nurses. By assigning full responsibility in this field to level I, II or II teams, at least one yearly assessment of the feet of approximately one million Portuguese diabetics becomes difficult to achieve without family nurse involvement.

Finally, if the lack of regular feet vigilance of diabetic patients is a problem which must be overcome, the possible existence of different criteria to assess risk for ulceration is also undesirable as it compromises epidemiological surveillance, the elaboration of reliable health indicators, the assessment of the performance of health services and the fulfilment of the health programme.

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