

REVIEW ARTICLE

ANXIETY IN DIABETIC FOOT ULCER PATIENTS

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Abstract

Introduction : Diabetic foot ulcers (DFUs) is the most common complication of diabetes mellitus (DM) with life time risk up to 25% of cases. DFUs are associated with increased mortality, high risk of amputation, recurrence of ulceration, poor quality of life and elevated levels of anxiety. The **aim** of this study was to review factors associated with anxiety among patients with DFUs. **Material and Method**: A literature review was conducted on English language, through Pubmed, Scopus, Science Direct and Google Scholar databases, using the key-words: "mental health", "anxiety", "diabetic foot ulcer", and "diabetes mellitus". **Results** : According to literature, several factors are held to be responsible for anxiety among DFU patients such as demographic, clinical or social. Anxiety seems to be higher in women, in younger patients as well as in those having an ulcer for >2 years and of low educational level. Furthermore, clinical characteristics are associated with anxiety such as duration of DM, co morbid diseases and HbA1c level of >7%. Moreover, difficulties when performing physical and personal activities due to mobility related issues might also be a source of anxiety. Additionally, an ulceration that fails to improve, provokes negative emotions, including anxiety while psychological factors may affect healing. Equally important predictors to anxiety is low social support, dependence on environment, limited self-care behavior as well as patients' views and perceptions. **Conclusions** : DFUs individuals should be supported to live in the severe physical, psychological and social constraints of the disease, thus alleviating anxiety.

Keywords: Anxiety, diabetic foot ulcer, diabetes mellitus

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Introduction

Diabetes mellitus (DM) is a common metabolic disorder affecting about 2–5% of the population in Europe and about 20% of the population in other parts of the world. DM incidence is expanding worldwide due to increased life expectancy, dietary habits and physical inactivity. According to estimates by 2030, DM will grow up to 366 million.¹

Diabetic foot ulcers (DFUs) are the most common complication of DM, with life time risk up to 25% of cases.² This long-term complication of DM, imposes several health and socioeconomic problems in patients' lives. DFUs require long-term hospitalization, carry the risk of amputation and generally are associated with morbidity and mortality.^{3,4}

The severity of the DFU is a significant risk factor of amputation for DM patients. In patients with DM, 84% of non-traumatic limb amputations are preceded by foot ulcers.⁵ In 2010, approximately 73.000 non traumatic lower-limb amputations were performed on people with DM in the U.S, accounting for more than 60% of all non traumatic lower-limb amputations.⁶ In developed countries, one in every six people with DM will have a DFU during their lifetime while this risk is even higher in developing countries.^{3,4}

DFUs are affected by several factors including age, educational status, weight of patient, type of DM, foot self-care practice, place of residence, and presence of complicated peripheral neuropathy.¹ For example, DM patients living in rural areas are 2.57 times more likely to develop DFU than patients from urban areas which is mainly attributed to their habits (barefoot, working outdoors) and poor awareness about foot self-care practice.¹ Moreover, patients' education regarding foot care and use of appropriate footwear along with annual foot screening play an important role in prevention of DFU.^{5,6,7}

Patients with DM are approximately twice more likely to suffer from anxiety and depression than the

general population.^{8,9} These psychological disorders could lead to DFU recurrence and worse clinical outcomes.⁸

It is noteworthy that anxiety frequently co-exists with depression while some symptoms may overlap, such as sleep problems, concentrating, and fatigue. Irritability may also manifest in forms of anxiety or depression (in place of low mood).⁹

Anxiety may also derive from several causes such as long treatment duration, impairment of mobility and productivity, economic burden of lengthy treatment and hospitalization. Many other factors trigger patients' anxiety such as uncertainty about survival, threat to identity, unavoidable pain, loss of social life or of loved ones and fear of death.^{8,9}

The **aim** of this study was to review factors associated with anxiety among patients with Diabetic foot ulcers (DFUs).

Material and Method: A literature review was conducted on English language, through Pubmed, Scopus, Science Direct and Google Scholar databases, using the key-words: "mental health", "anxiety", "foot ulcer", and "diabetes mellitus".

Factors associated with anxiety among patients with Diabetic foot ulcers (DFUs)

According to literature, DFU patients experience elevated levels of anxiety while various factors are held to be responsible for anxiety.

Udovichenko et al.,¹⁰ who studied 285 DFU patients, showed depression in 110 patients (39%) and anxiety in 103 (36%). Grigsby et al.,¹¹ showed generalized anxiety disorder in 14% of patients with DM. Furthermore, Maia et al.,¹² showed that the most common anxiety disorders among DFU patients were generalized anxiety disorder (21%), dysthymia (15%), social phobia (7%), depression (5.5%) and suicide panic disorder (2%). A recent study among 195 Greek DFU outpatients illustrated high levels of anxiety and depression in

13.8% and 20.0% of the participants, respectively. Furthermore, those with moderate or high levels of anxiety had 9.37 and 16.08 points, respectively, worse general health in quality of life than those with low levels.

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Several patients' characteristics such as demographic, clinical or social may be a source of anxiety.

In terms of gender, the incidence of anxiety seems to be higher in women than in men (55.3% versus 32.9%).¹¹ Regarding age, younger DFU patients experience more intense anxiety as they still belong to working force and support their family.⁹ DFU individuals over the age of 70 and those living with ulcers for more than 2 years have significantly lower hopes for effective treatment.^{14,15}

An equal important demographic factor that may trigger anxiety is educational level which reflects the way patients comprehend the ulcer and its' therapy. More in detail, education contributes to better understanding of the provided information and helps people to use rationalization in order to deal with stressful situations. The level of education is an important factor associated with self-care.^{16,17}

Contrariwise, patients who poorly understand the provided information have the tendency to be more suspicious of medical recommendations or therapies especially when they not resonate with their personal view of medical care.¹⁸ Feinglass et al.,¹⁹ showed that 62% of DM patients had limited understanding of the association between foot ulcer and amputation.

Furthermore, clinical characteristics are associated with anxiety. Ahmad et al.,⁹ showed that anxiety is positively associated with duration of DM (< 10 years), with \geq three comorbid diseases and HbA1c (:glycosylated hemoglobin) level of >7%. In particular, the risk of anxiety among DM patients having the disease <10 years was 2.69 times higher compared to those with DM lasting \geq 10 years. Also, the risk of anxiety was 4.82 times higher among DM patients with three or more chronic conditions and 2.51 times higher among those with

HbA1c level >7% compared with HbA1c level of patients <7%. Glucose control serves to prevent, or at least to decrease the frequency or severity of complications in DM patients, thus increasing their functional status. Interestingly, the level of well being among DFU patients is associated with the amount of daily activities (eg, recreation, work, and sports) performed by these individuals.⁹

Mobility related issues might also be a source of anxiety. Eurodiale study supports that DFUs affect patients' functional ability. More in detail, an ulceration involves physical limitations in walking and climbing stairs or inability to stand or walk without help. Moreover, patients experience leg pain and discomfort from the weight of bedding on the ulcer, which may result in sleep disturbance and fatigue. Reduced mobility results in difficulties when performing physical, personal or over daily activities, thus leading to dependency on supportive devices or other people for help.²⁰

An equally important factor that might be a source of anxiety is history of ulceration.²¹ DFUs individuals may experience feelings of frustration, anger, and guilt over the possible development of a new ulcer and the threat of amputation. Indeed, amputation should be the last therapeutic option while the cost of amputation is higher than the cost of ulcer dressing.²²

However, the healing of DFU may indirectly minimize anxiety by improving quality of life, as measured by SF-36. Nabuurs-Franssen et al.,²³ who explored 294 patients with ulcer duration \geq 4 weeks showed that patients with a healed foot ulcer had better quality of life than those having a persisting ulcer.

Psychological factors can contribute to the delay of healing as anxiety has direct effects on endocrine and immune function. Additionally more, an ulceration that fails to improve, provokes negative emotions, including low self-esteem, anxiety, and feelings of powerlessness.^{24,25}

Strikingly, diagnosis of powerlessness is more common when patients believe that the course of the

disease will not change, irrespectively of their efforts. Assessment of powerlessness may provide information to improve care delivery since DFU outpatients are frequently anxious, without hope that the lesion will ever heal, thus expressing feelings of loss of control over this situation.

Among psychosocial factors, low social support is another possible contributor of anxiety. A relevant study among 180 DFUs patients demonstrated that an one point increase in support indicated a decrease of 1.52 points in patient's depression.²⁶ Social support usually refers to the mechanisms through which interpersonal relationships and relations with other family members, friends or the society protect patients from the adverse effects of a disease, thus promoting their mental health.²⁶ More in detail, perceived social support is associated with adherence to medications, diet, and regular foot checks. Indeed, support helps in self-care practices, in learning proper daily hygiene of the lower extremities, in the timely identification of suspicious signs and symptoms, and in the development of self-control skills.²⁷ All these parameters may reduce anxiety.

Taher et al.,²⁸ showed that individuals who perceived better social support reported also better self-care than those with poor support. On the contrary, lack of social support, especially from friends and family, can also be seen as an obstacle to self-care. Ribu et al.,²⁹ indicated that DFU patients experience anxiety (fear for the future), along with social isolation, loneliness, and restricted life activities. However, in the course of time, patients become more experienced in coping with the situation and at the same time levels of anxiety are gradually minimizing to an acceptable level. According to Feams et al.,³⁰ individuals should be supported to live in the severe physical, psychological and social constraints of the DFU. As the patient's health deteriorates, psychosocial morbidity increases, sexual activity decreases, domestic tensions increases and quality of life decreases.

Patients' views about DFU may be a significant contributor to anxiety. Situm et al.,³¹ demonstrated that patients' perceptions in conjunction with reduced mobility, pain, unpleasant odor, sleep disorders, and inability to perform daily tasks are significantly reducing quality of life.

DFUs involve a loss of self-esteem which determines the adjustment to the disease.^{32,33} Esteem needs are the fourth level in Maslow's hierarchy and are classified as following : a) esteem for oneself (dignity, achievement, independence) and b) desire for reputation or respect from others (e.g., status, prestige). According to Maslow's pyramid, self-esteem is important because it influences people's choices and decisions and determines the possibility that they will take care of themselves.³³

It is well known that patient education is part of the professional role of nurses. Education in DFU patients enhances adherence to treatment and self-care, thus improving clinical outcomes.^{34,35} An intensive patients' education program (IEP) is minimizing anxiety and depression in DFU patients with Wagner grade 2 but not Wagner grade 1. More in detail, the IEP is composing of 5 items including: a) educating the patients, b) educating the patients' family members, c) supervising patients' harmful habits and diets, d) providing psychological care, and e) establishing a patient-physician-nurse.³⁵ However, frequently DM patients do not receive guideline recommendations for foot care or elaborate education. Basu et al.,³⁶ showed that 33% of people with DM did not recall receiving information about foot care while a prior study conducted by Wikblad et al.,³⁷ indicated that 87% of patients reported never inspecting their feet, and 66% reported not to be interested in further knowledge of diabetes foot care. Psychological and cultural factors may often underlie limited self-care behavior.³⁸ Based on the above findings, it is possible that limited education may trigger anxiety indirectly since patients are unable to comprehend and

to apply therapy, thus leading themselves to worse clinical outcomes.

Current guidelines for standardized care of DM patients recommend annual screening for high risk feet while those at high risk should receive enhanced and focused foot care education. Education should put more emphasis on older patients and those with longer duration of DM since they are more prone to inability to handle the DFU needs, thus increasing anxiety indirectly.³⁵

The demanding issue is to incorporate anxiety assessment in this foot screening in clinical settings. DFU treatment should not focus solely on healing but should incorporate emotional well-being through holistic care. Additionally, knowledge alone is not enough for patients' effort to combat with all their complex problems. DFU treatment requires interventions by approach from an interdisciplinary team at experienced centers by health professionals with specialist training in diabetic foot problems. Creating a therapeutic relation with health professionals is a determining factor in medical care.^{39,40,41}

Last but not least, it is important to note that the most widespread scale assessing anxiety is the State-Trait Anxiety Inventory (STAI). The State Anxiety Scale (S-Anxiety) evaluates the current state of anxiety, and the Trait Anxiety Scale (T-Anxiety) evaluates relatively stable aspects of "anxiety proneness." In a clinical setting, it is essential to differentiate between temporary condition of anxiety (state anxiety) and the long-standing anxiety that one experiences on a day to-day basis (trait anxiety). The STAI has 40 items, 20 items allocated to each of the S-Anxiety and T-Anxiety subscales.⁴²

Also, a widely used instrument is the Zung's Self-Rating Anxiety Scale (SAS) which consists of 20 questions that assess how respondents felt during the previous week.⁴³ In both scales, higher score values indicate higher stress levels.^{42,43}

Conclusions

Although, in the literature are cited many factors associated with anxiety, in the present review, are discussed the following:

- gender (higher incidence of anxiety in women)
- younger age
- DFU for more than 2 years
- duration of DM (< 10 years)
- comorbid diseases
- HbA1c (:glycosylated hemoglobin) level of >7%
- mobility related issues
- history of prior ulceration and development of a new ulcer
- low social support
- loss of self-esteem and powerlessness
- absence of education or guideline-recommended for foot care.

The results of this study will significantly contribute to an understanding of the most common factors associated with anxiety among this sensitive population group. Clinically, this information may promote early recognition and effective treatment of anxiety. In the clinical setting, healthcare professionals should encourage DFU individuals to set realistic goals, to take an active part in making health decisions, and promote a sense of well-being.

In order to provide effective psychological support to DFU patients, nurses must have time availability, awareness of the patient's condition, clinical training, very good communication skills, non-critical attitude towards the patient and finally must be aware of the complex problems of patients and their families.

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