



Diabetic Foot and Nursing Care Plans and Interventions

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Abstract:

Background: The global prevalence of diabetes mellitus (DM) has significantly increased, resulting in numerous complications, including diabetic foot ulcers (DFU). DFU affects approximately 6.3% of individuals with DM and is one of the leading causes of hospitalization, non-traumatic amputations, and elevated mortality rates. The condition arises from a combination of neuropathy, peripheral arterial disease (PAD), and poor wound healing. Early diagnosis and appropriate management are essential for preventing the progression of DFU.

Aim: This article aims to explore the pathophysiology, classification systems, risk factors, and management strategies for diabetic foot ulcers, with a focus on the importance of nursing care plans and interventions.

Methods: The article reviews current literature on DFU, including classification systems such as the Meggitt-Wagner and SINBAD systems, to provide a comprehensive understanding of DFU's severity and management. It also discusses the role of nursing interventions, including wound care, infection control, and patient education, as essential components of treatment.

Results: The review highlights the importance of early intervention and personalized care plans in managing DFU. Nursing interventions such as proper foot care, infection prevention, regular monitoring,

and education significantly improve healing outcomes. Additionally, classification systems like SINBAD and Wifl provide valuable tools for assessing the severity of DFU and predicting the need for amputation.

Conclusion: Diabetic foot ulcers are a major cause of morbidity and mortality in individuals with diabetes. Effective nursing care, including the use of appropriate classification systems and individualized treatment plans, is crucial for managing DFU and preventing complications. A comprehensive, multidisciplinary approach, along with patient education and ongoing monitoring, can improve outcomes and reduce the risk of amputations.

Key words: Diabetic Foot Ulcer, Nursing Care Plan, Classification Systems, Neuropathy, Infection Prevention, Wound Healing, Diabetes Mellitus.

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Introduction:

Globally, the prevalence of diabetic mellitus (DM) is rising at a startling rate, posing serious public health issues [1]. Many organs, including the heart, kidneys, eyes, and nerves, are harmed by diabetes mellitus (DM), which can lead to serious consequences like myocardial infarction, cerebrovascular accidents, vision loss, renal failure, and lower limb amputations. Diabetic foot ulcers (DFU) are the most common of these complications, affecting roughly 6.3% of people with DM worldwide [2]. One of the main reasons diabetic people are admitted to hospitals is the significant morbidity and mortality linked to DFU. People frequently report sensory anomalies, such as discomfort and tingling in the feet, in the early stages of diabetes mellitus. Negative symptoms, such as toe numbness and muscle weakness, become more prevalent as the illness progresses. Patients may gradually develop a combination of sensory dullness and hypersensitivity, which leads to a decline in proprioception and motor performance. Significant disability, elevated fall risk, and postural instability are all exacerbated by these deficiencies [3,4]. Furthermore, DFU is directly linked to higher mortality rates and is a major cause of non-traumatic amputations [5]. Healthcare systems are heavily burdened by the high prevalence and complexity of DFU, which raises direct medical expenses and lowers productivity. Accurate diagnosis, risk assessment, and customized treatment plans based on the patient's clinical presentation are all essential components of an integrated approach to DFU care. The pathophysiology of DFU is examined, along with its classification schemes, diagnostic methods, and contemporary management techniques, in this review. It also emphasizes the necessity of increased awareness and the creation of workable solutions to deal with this urgent clinical problem.

Definition and Classification of DFU

Definition:

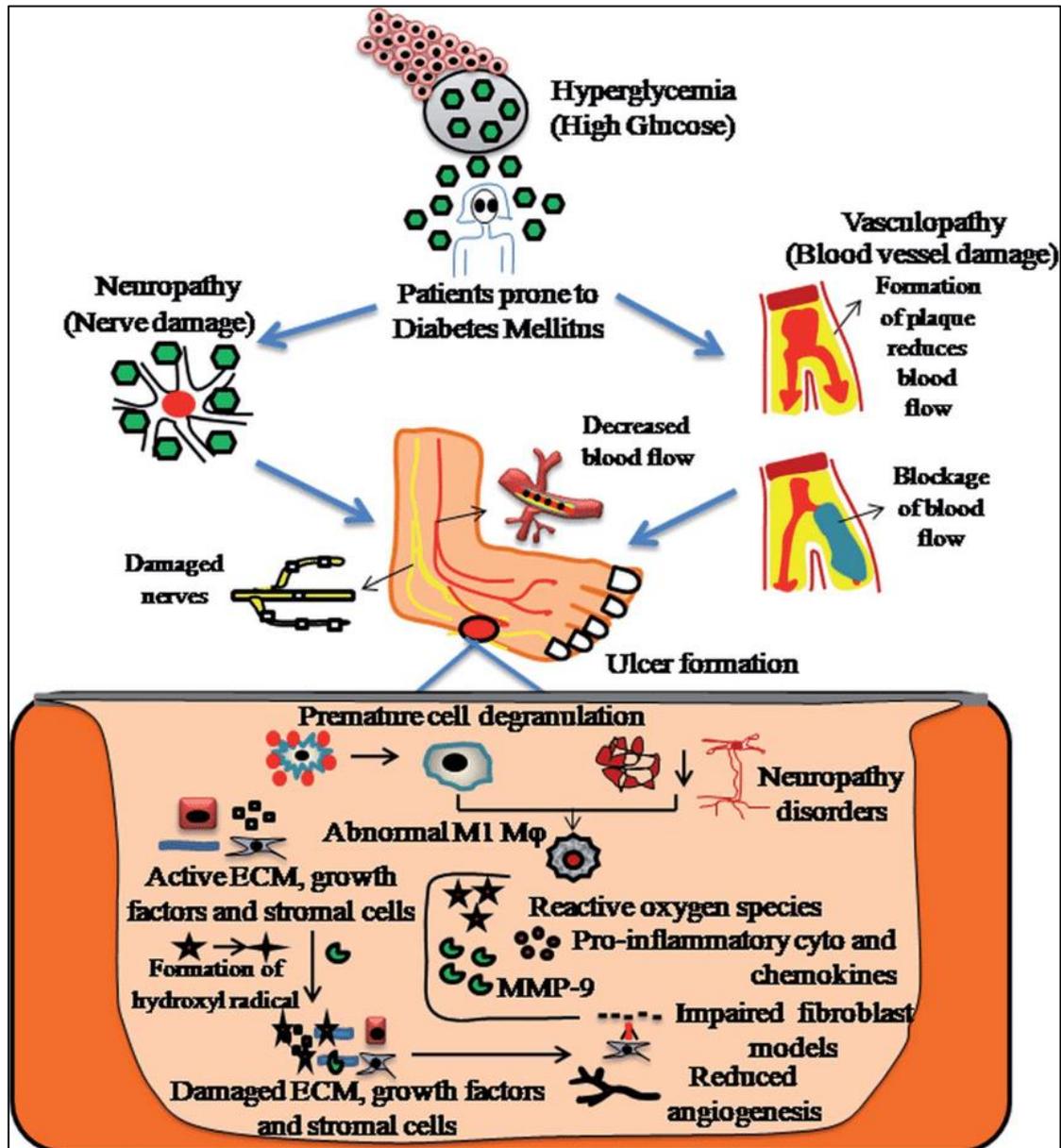
The International Working Group on the Diabetic Foot (IWGDF) states that DFU includes a variety of symptoms brought on by either past or present diabetes mellitus. As a reflection of the condition's complexity and imprecision, they include skin fissures, ulcerations, infections, and tissue loss in the feet [6,7]. DFU is a complex clinical entity that frequently manifests peripheral arterial disease (PAD), neuropathy, ulceration, and/or infection. Together, these elements weaken the dermal and epidermal layers, resulting in full-thickness lesions and heightened vulnerability to serious infections [8]. More than 60% of non-traumatic amputations in affluent nations are DFU, which raises hospitalization rates, lowers quality of life (QoL), and increases death. Affected people's difficulties are made worse by the financial and medical costs of DFU therapies, especially those that require amputation [9,10].

Classification:

Numerous diabetes-related variables, such as neuropathy and PAD, which cause neurological and vascular deficits, have an impact on the complex pathophysiology of DFU [11]. The interaction of these variables, which change based on the severity of the sickness and the length of recovery, further complicates the healing process. In order to guarantee precise diagnosis and efficient treatment catered to the requirements of each patient, the DFU categorization and score systems must take these complications into account [12]. To characterize DFU severity and direct treatment approaches, a number of classification and

rating systems have been created. In order to address important issues such end-stage renal failure, PAD, and loss of protective feeling, these systems usually consider aspects relating to the patient, the limb, and the ulcer [13]. For clinical decision-making, the majority of systems assess ulcer features such as size, depth, ischemia, and infection while taking risk factors like neuropathy and PAD into account [14,15].

Figure 1: Pathophysiology of Diabetic Foot.



The Meggitt-Wagner Classification System:

Initially proposed by Meggitt in 1976 and later popularized by Wagner in 1979, this six-grade classification system primarily focuses on ulcer depth and tissue necrosis [16-18]. Its simplicity and intuitive design make it widely used; however, its limitations stem from the exclusion of critical clinical parameters such as peripheral neuropathy and PAD. Additionally, the system does not differentiate between ischemic and infectious lesions, reducing its diagnostic precision [19,20]. Despite these shortcomings, the Meggitt-Wagner system remains a foundational tool in DFU assessment and management.

A well-known technique for assessing the severity of diabetic foot ulcers (DFU) is the Wagner classification system, which emphasizes the ulcer's depth and the degree of tissue involvement. There are

five grades in this system: A pre-ulcerative region with no open lesions is denoted by grade 0, whereas a superficial ulcer involving partial or complete skin thickness is denoted by grade 1. Grade 2 denotes that the ulcer has spread to deeper tissues such as the bone, tendon, or capsule; Grade 4 indicates localized gangrene, Grade 5 indicates worldwide gangrene of the foot, and Grade 3 indicates a Stage 2 ulcer with complications including abscess, osteomyelitis, or joint infection [16–18]. The University of Texas (UT) categorization system uses a 4 × 4 matrix to assess ulcer depth as well as infection and ischemia status. This technique predicts amputation risks more accurately than the Wagner system because it divides ulcers into four groups according to ulcer depth and the presence of infection or ischemia. In addition to making further differences based on infection and ischemia, the UT system makes a distinction between wounds that include bone or joint, wounds that penetrate deeper structures, and superficial wounds that do not affect deeper tissues. Compared to the Wagner system, which just uses tissue depth to categorize ulcers, the UT method is more useful for predicting the risk of amputation [15,21].

The five components of the 1999-introduced S(AD)SAD system—ulcer size (both area and depth), infection (sepsis), ischemia (arteriopathy), and neuropathy (denervation)—are intended for clinical audits. The severity of each factor determines its score, which ranges from 0 to 3. In order to make this system more appropriate for prospective research, it was later improved in 2004 to incorporate criteria that were absent from the UT system. The S(AD)SAD approach is useful for routine clinical use since it allows ulcer features to be documented without the requirement for sophisticated diagnostic equipment. However, because of its intricacy, which can make it hard for doctors to recall, it has been proposed that the S(AD)SAD system is better suitable for audits, while the UT system is more suited for clinical description and communication [23, 24]. To overcome the complexity of the original S(AD)SAD system, the SINBAD system was developed as a more straightforward and improved variant. The five components—size, depth, infection, ischemia, and neuropathy—remain the same, but each is given a value of 0 or 1, for a total score ranging from 0 to 6. The SINBAD system streamlines the grading procedure while maintaining sufficient information to assess the severity of ulcers. It is a useful tool for tracking ulcer progression, healing, and identifying when amputation is necessary because of its great intra-observer repeatability and modest inter-observer reproducibility. Because of its usefulness in clinical settings, the International Working Group on the Diabetic Foot (IWGDF) now generally recommends the SINBAD method [12,27,28].

The Site, Ischemia, Neuropathy, Bacterial Infection, Area, Depth (SINBAD) system evaluates diabetic foot ulcers (DFU) by scoring six clinical characteristics: site, ischemia, neuropathy, bacterial infection, area, and depth. Each of these elements is scored based on severity, with scores ranging from 0 to 1 for each category, resulting in a total possible score of 6. The site is classified as forefoot (score 0) or midfoot and hindfoot (score 1). Ischemia is scored based on the presence of pedal blood flow, with intact flow and at least one palpable pulse earning a score of 0, and reduced flow earning a score of 1. Neuropathy is assessed by the presence or loss of protective sensation, with intact sensation scoring 0 and loss of sensation scoring 1. Bacterial infection is classified as none (score 0) or present (score 1). Area is graded based on ulcer size, with ulcers smaller than 1 cm² scoring 0 and those larger than 1 cm² scoring 1. Depth refers to whether the ulcer is confined to skin and subcutaneous tissue (score 0) or has reached deeper structures such as muscle or tendon (score 1). The system is designed to provide a comprehensive assessment of ulcer severity, guiding treatment decisions and monitoring progress [13].

The Wound, Ischemia, and foot Infection (WIFI) system, introduced in 2014 by the Society for Vascular Surgery Lower Extremity Guidelines Committee, focuses on three critical factors that influence the likelihood of lower limb amputation: wound size and depth, ischemia, and foot infection. Each factor is graded on a scale of 0 to 3. The wound score is based on the ulcer's size, depth, and healing potential, with larger, deeper ulcers associated with higher scores. Ischemia is assessed using the Ankle-Brachial Index (ABI), with a lower ABI indicating more severe ischemia, while foot infection is graded based on the infection's scope and severity, including the presence of purulent discharge and systemic signs of infection. Clinical studies suggest that the WIFI system is particularly effective in predicting major amputations, making it a useful tool in patients with DFU and vascular disease. It is recommended for evaluating perfusion and vascular function, guiding revascularization or drainage interventions. However, the system

requires specialist measurements for assessing foot perfusion indices and thus may not be suitable for primary or community care settings [29,30,31].

The WIfI system includes detailed grading based on clinical features, ABI, ankle systolic pressure (ASP), and toe pressure or transcutaneous oxygen pressure (TcPO₂). Grade 0 is assigned to patients without ulcers or gangrene, with normal perfusion and no signs of infection. Grade 1 includes small, shallow ulcers with no exposed bone and local infection confined to skin and subcutaneous tissue. Grade 2 is for deeper ulcers that expose bone or joint, with localized infection extending beyond the skin to deeper tissues. Grade 3 represents extensive, deep ulcers, including those involving gangrene, with signs of systemic infection or systemic inflammatory response syndrome (SIRS). These detailed categories allow clinicians to assess the severity of DFU and predict the likelihood of complications such as infection and the need for amputation, providing a comprehensive approach to patient management [29].

Risk Factors for Diabetic Foot Ulcers (DFU):

Diabetic Foot Ulcers (DFU) are caused by a variety of interrelated risk factors, with the most prominent being diabetic neuropathy (DPN), peripheral artery disease (PAD), and foot deformities. These risk factors can be categorized into different degrees of severity, each contributing to the progression of the condition [32-36]. The primary risk factors are explored in detail below.

Neuropathy:

Symmetric polyneuropathy that affects peripheral nerves' sensory, motor, and autonomic components to differing degrees is a hallmark of diabetic neuropathy [37]. Neuropathy is responsible for 16% to 66% of instances of diabetic foot syndrome, according to epidemiological research [38]. After the initial healing phase, people with neuropathy are at high risk of repeated episodes, which might result in amputation [39]. The disorder causes a lack of protective feeling, which usually starts symmetrically and spreads like socks. The first to be impacted are typically small, unmyelinated nerve fibers, including C-type fibers, which make it harder to detect mechanical stress or trauma. As a result, even mild injuries may go undiagnosed, develop over time, and become more challenging to heal [33]. Due to the denervation of particular muscle groups, motor neuropathy causes the foot muscles to atrophy, impairing normal foot function. The foot's anatomical structure is altered as minor foot muscles, such as the lumbrical, interosseous, and extensor digitorum brevis, gradually paralyze. This results in the metatarsophalangeal joints (MTPJs) being overextended or contracted. Joint mobility is unaffected in the early stages, but as symptoms increase, interphalangeal joints show signs of flexion and malposition, which can result in foot deformity [40,41]. Clinically, sensory dysfunction frequently coexists with motor neuropathy. When motor and sensory neuropathy coexist, the foot experiences an unequal distribution of pressure, which leads to an unsteady gait, pain insensitivity, and overloaded joints that eventually develop hyperkeratosis and encourage the development of ulcers [32, 43-45]. It is thought that autonomic dysfunction is a major factor in ulcer formation. Because of the increased deeper blood flow caused by autonomic neuropathy, which inhibits sweating, the skin becomes overheated. As a result, the skin becomes dry and cracked, weakening the dermal barrier and increasing the vulnerability to microbial invasion [32,46]. Increased keratin glycation also makes ulcers worse by thickening the epidermis, which further compresses the soft tissue underneath [47].

Peripheral Artery Disease (PAD)

The blockage of peripheral arteries in the upper and/or lower limbs causes tissue ischemia and a compromised blood supply, which is known as peripheral arterial disease (PAD) [48,49]. In diabetic patients, PAD significantly increases the risk of developing leg ulcers and eventually needing to have their legs amputated [50]. Due in large part to the involvement of distal arteries, such as the dorsalis pedis artery, which are frequently impacted in diabetic patients, people with diabetes and PAD have a higher rate of lower limb amputation than people without PAD [51-53]. Intermittent claudication, a condition characterized by discomfort, cramping, or numbness during physical activity and even at rest, will develop in around one-third of individuals with diabetes and PAD, which is defined by blockage of lower limb

arteries [52,54]. In addition to causing functional impairment and disability, persistent intermittent claudication can worsen into critical limb ischemia, which can lead to ischemic ulceration and amputation, when accompanied with a compromised vasodilatory response to plantar pressures [55–57].

Foot Deformities:

According to the American Diabetes Association's Foot Care Interest Group, foot abnormalities, neuropathy, and trauma are the triad of causes most frequently linked to ulceration [34,58]. Pes cavus, pes equinus, metatarsophalangeal joint (MTPJ), and interphalangeal joint deformities are common foot abnormalities seen in diabetes patients [59]. The most common MTPJ abnormalities in diabetics are hallux valgus, which is characterized by the outward tilting of the first MTPJ, and hammer-and-claw toes, which is characterized by hyperextension of the interphalangeal joints [58,60]. Although the precise cause of foot abnormalities in diabetes patients is still unknown, the most often accepted pathogenic process entails motor neuropathy-induced muscle atrophy, decreased joint mobility, and uneven force distribution on the foot [58,59,61]. Fatty infiltration and the atrophy of both intrinsic and extrinsic foot muscles are signs of musculoskeletal deterioration in diabetics [62–64].

Hyperextension of MTPJs and flexion of interphalangeal joints result from the disruption of joint stability and foot function caused by the weakening of minor muscles, such as the extensor digitorum brevis and interosseous muscles [33,65,66]. Furthermore, the decreased range of motion of these joints puts more strain on the bony prominences, especially the metatarsal head. Persistently applying too much pressure to these regions can cause ischemia damage and structural distortion of the metatarsal head, which can lead to ulceration and skin disintegration [68–71]. Additionally, after pressure-induced ischemia, ischemia-reperfusion cycles may worsen tissue damage by inducing an inflammatory response, which could lead to the development of ulcers [72,73]. Hyperkeratosis, or the thickening of calluses as a result of continuous pressure, is another component that contributes to the development of ulcers. The metatarsal heads, heel, and middle of the big toe are common sites for callus development, which frequently occurs before ulceration [59,74]. This thickening continuously presses against the underlying tissue, which causes ulcers when combined with other stresses. Additionally, impaired ankle dorsiflexion and restricted joint mobility are caused by changes in tendon structure, such as the Achilles tendon's enlarged size and aberrant structure, which hastens the development of ulcers [62,79].

Prevention and Management of Diabetic Foot Ulcer (DFU)

The management strategies for diabetic foot ulcers (DFUs) have evolved over time, building upon the foundational principles proposed by Treves, which include sharp debridement, offloading, and patient education. This section outlines various commonly utilized management techniques, emphasizing the growing importance of multidisciplinary care in DFU treatment.

Preventive Education

The main defense against the start of DFU is educational programs that emphasize foot care and self-examination. It has been demonstrated that a simple yet very successful method of preventing DFUs is the combination of intensive nursing and thorough foot care programs with patient education. According to studies, regular assessment of arterial perfusion can greatly improve foot health, especially in diabetic individuals with peripheral neuropathy or foot abnormalities. Promoting preventative measures also requires public health initiatives that enhance patient self-management. This includes testing for foot feeling, self-assessment for skin lesions, using proper footwear, and teaching patients about foot cleanliness. Patients can avoid autonomic neuropathy-related cracks and pressure-induced skin redness by following practical advice, such as washing their feet in lukewarm water and checking their skin frequently. Apart from these self-management enhancements, regular examinations for complications associated to

diabetes, like eye problems, are essential and economic measures to forestall additional complications [81][82][84].

Debridement

In order to encourage healing, debridement—a crucial part of DFU management—involves removing nonviable tissue from the wound bed. Both non-surgical and surgical techniques can be used to achieve this. Although it may cause harm to good tissue, surgical debridement—also known as "creating a new acute wound"—involves removing necrotic tissue all the way down to the bleeding tissue, which is essential for the healing process. On the other hand, non-surgical debridement techniques like mechanical debridement with hydrotherapy, enzymatic debridement, and autolytic debridement using hydrogels have also shown promise. Medicinal maggots are a promising non-surgical technique for selective tissue removal that may speed wound healing and lower the risk of secondary infections [85][33][86][87].

Glycemic Control

It is commonly known that glycemic management and the development of complications from diabetes, including DFU, are connected. It has been demonstrated that strict glycemic control in diabetic patients promotes wound healing by delaying the development of retinopathy, peripheral neuropathy, and nephropathy—all of which are significant risk factors for DFUs. Glycemic control and DFU outcomes have been shown to positively correlate in a number of studies [39][89][90]. Hemoglobin A1c (HbA1c) levels are important markers of wound healing; a 0.028 cm² decrease in wound healing is linked to every 1% increase in HbA1c. Tight glycemic control is beneficial in lowering the occurrence of microvascular complications, such as diabetic peripheral neuropathy (DPN), according to the Diabetes Control and Complications Trial and the United Kingdom Prospective Diabetes Study [91]. The best way to define intensive glycemic control is still up for dispute, despite these favorable correlations. While the American Diabetes Association provides more specific goals for certain patient populations, including children, pregnant women, and older adults, the International Diabetes Federation advises a HbA1c level below 6.5%.[92, 93, 94, 95, 96]. According to some research, DFU patients' risk of amputation can be decreased by 35% by keeping their HbA1c between 6% and 7.5% [97][98]. Intensive glycemic management does, however, come with difficulties and possible side effects, such as a higher risk of hypoglycemia, which is more prevalent in individuals who have more stringent glycemic objectives [39][99][100]. Thus, close observation is required. Although there is disagreement regarding the advantages of strict glycemic control, it is still an essential strategy for preventing complications in diabetic patients and is associated with better long-term results, such as lower readmission rates and the avoidance of "glycemic memory" effects that continue even after treatment approaches are changed [101][102][103][104].

Exercise

The impact of exercise on diabetic foot ulcer (DFU) management is likely mediated through its influence on various risk factors. Regular physical activity plays a significant role in preventing or mitigating peripheral artery disease (PAD) in patients with type 2 diabetes mellitus (DM)[55]. Exercise has been shown to improve claudication distance in PAD patients[50] and can also slow the progression of diabetic peripheral neuropathy (DPN). Different forms of exercise are effective in reducing HbA1c levels, with combined exercise proving more beneficial than aerobic or resistance exercise alone[55]. Future research should further clarify the exact relationship between exercise and DFU therapy to enhance the integration of exercise into treatment plans.

Offloading

Offloading, defined as reducing high foot pressure, is a critical component in DFU healing and prevention. Evidence-based guidelines emphasize the importance of offloading the affected area by redistributing pressure to other regions of the foot[105][106]. Offloading devices are classified into four categories: casting, bracing, footwear, and walking aids[108]. This section highlights four representative offloading devices.

Total Contact Cast (TCC)

The total contact cast (TCC) is widely regarded as the gold standard offloading device[86] and is often recommended as the first-choice treatment[106][109]. It prevents further trauma and deformity to the foot, promotes tissue repair, and redistributes pressure through below-knee immobilization[110]. In comparison with other devices like removable cast walkers (RCWs) and therapeutic footwear, TCCs are reported to offer superior healing rates[108][112][113]. However, TCC utilization remains low in practice. A U.S. survey found that only 1.7% of 858 centers considered TCC as the primary offloading method for DFU treatment, with 45.5% of centers never using TCCs at all[114]. Factors contributing to this low usage include the difficulty of disassembling TCCs, which complicates wound care and mobility, and the need for skilled technicians to apply the cast[107]. Additionally, prolonged casting can lead to muscle stiffness and joint atrophy, reducing patient acceptance[111].

Removable Cast Walkers (RCWs)

RCWs, knee-high removable offloading devices, offer several advantages, including ease of removal, convenient wound assessment, and better mobility for daily activities[115]. Unlike TCCs, RCWs require less time, energy, and experience for proper application[116], making them more suitable for frequent examinations and nursing care. While RCWs provide similar plantar pressure reduction and wound healing outcomes as TCCs, they may be less effective in healing due to lower patient compliance. Patients are more likely to remove RCWs at home, which can hinder healing. Compliance is crucial to the healing process, as demonstrated by lower healing rates when patients do not consistently use the device[117][118][119].

Therapeutic Footwear

Proper footwear is an essential component of DFU management and prevention. Therapeutic footwear has been shown to be an effective strategy for ulcer healing and prevention[86][120]. These shoes often feature deeper, loose toe boxes, rocker outsoles, and soft padding, providing better accommodation for foot deformities[121][111]. Prescription shoes, such as forefoot offloading shoes (FOS), are specifically designed to offload the forefoot and are proven to reduce pressure in the forefoot by 15% to 20%[123]. However, the negative-heel rocker outsole design of FOS may compromise gait symmetry and stability, reducing patient comfort and clinical acceptance[124][125]. Insoles designed to reduce shear stress on the plantar surface have also been found to be effective in DFU prevention[126]. Dynamic foot orthosis (DFO) insoles, which feature a free-floating segment, reduce shear stress on both the foot and insole. The use of DFO insoles has been associated with a reduction in midfoot temperature, which is a key factor in ulcer formation.

Felted Foam

Felted foam, commonly used in accommodative dressings, has been shown to promote DFU healing. Research comparing felt foam with other pressure-reducing devices confirms its efficacy in promoting wound healing[128]. Combining felted foam with therapeutic footwear has also demonstrated healing benefits. Studies have shown that felt deflective padding provides similar healing effects for small, neuropathic ulcers[129]. The choice of material in felted foam, such as latex-wool felts, has also been shown to reduce pressure more effectively compared to other materials, offering a comprehensive advantage in promoting healing[130]. The use of unremovable devices like TCCs is recommended for optimal DFU offloading. However, when unremovable devices are unsuitable due to patient or institutional factors, removable devices like RCWs provide an alternative with comparable therapeutic effects[131]. Clinicians should carefully consider the specific offloading requirements of the foot and patient adherence when selecting therapeutic footwear and offloading devices[132].

Nursing Care Plan for Diabetic Foot Ulcers

A nursing care plan for diabetic foot ulcers (DFUs) aims to provide comprehensive, individualized care that addresses the multifaceted needs of patients with this condition. The primary goals of nursing interventions for DFUs include promoting wound healing, preventing infection, alleviating pain, reducing

pressure on the affected foot, and improving overall glycemic control. The nursing care plan is based on a thorough assessment, individualized interventions, and regular monitoring to ensure optimal outcomes.

Assessment and Diagnosis

The first step in the nursing care plan involves a comprehensive assessment of the patient's foot ulcer. This includes evaluating the size, depth, and location of the ulcer, as well as identifying the presence of infection, signs of ischemia, or neuropathy. A detailed history of the patient's diabetes management, including blood glucose levels, medications, and any previous foot issues, should be obtained. The nurse should assess the patient's mobility, footwear, and lifestyle factors, which may contribute to the development of the ulcer. Common nursing diagnoses related to DFUs include impaired skin integrity, risk for infection, chronic pain, and ineffective peripheral tissue perfusion.

Goal Setting

The short-term goals for a nursing care plan for DFUs may include preventing further injury to the foot, controlling pain, and initiating proper wound care. Long-term goals typically focus on promoting wound healing, reducing the risk of infection, and restoring the patient's ability to ambulate and engage in daily activities. Achieving better glycemic control is a crucial part of the care plan, as high blood glucose levels can impair wound healing and increase the risk of infection.

Interventions

Nursing interventions for DFUs are multifaceted and should be tailored to the individual patient's needs. One of the most important interventions is wound care, which includes cleansing the ulcer with appropriate solutions, applying dressings that promote moisture balance, and using offloading devices to reduce pressure on the ulcerated area. Offloading techniques, such as total contact casts (TCC) or removable cast walkers (RCWs), help redistribute pressure and prevent further tissue damage. Nurses should regularly assess the wound for signs of infection, such as increased redness, swelling, or purulent discharge, and promptly initiate appropriate antimicrobial therapy if needed. Pain management is another key intervention, which may include administering prescribed analgesics, as well as educating the patient on non-pharmacological pain-relief methods, such as elevating the foot or using cold compresses. Nurses should also focus on educating patients about proper foot care practices, including daily inspection of the feet, appropriate footwear selection, and techniques to prevent injury. Education on blood glucose control is essential, as optimal glycemic control can significantly improve wound healing. Nurses should collaborate with the healthcare team to ensure the patient's diabetes is well-managed and offer support and resources for lifestyle modifications such as diet and exercise.

Evaluation

The effectiveness of the nursing care plan should be regularly evaluated based on the progress of the wound healing, the patient's ability to maintain offloading techniques, pain control, and overall improvement in glycemic levels. The nurse should assess whether the patient is adhering to foot care and lifestyle modifications and adjust the care plan as necessary. Regular follow-up appointments and reassessment of the wound, as well as any changes in the patient's condition, are essential to ensure continued healing and to prevent recurrence of DFUs. In conclusion, a nursing care plan for diabetic foot ulcers is a dynamic process that requires ongoing assessment, individualized interventions, and collaboration with the healthcare team. By focusing on wound care, infection prevention, pain management, and blood glucose control, nurses play a vital role in promoting healing and preventing complications in patients with DFUs.

Conclusion:

Diabetic foot ulcers (DFU) represent a major complication of diabetes mellitus (DM), contributing to significant morbidity and mortality rates worldwide. The condition arises due to a combination of factors, primarily neuropathy, peripheral arterial disease (PAD), and foot deformities, which impair wound healing and lead to skin breakdown. Without appropriate management, DFU can lead to severe outcomes, including

non-traumatic amputations, increased hospitalization, and reduced quality of life. This review underscores the complexity of DFU and the necessity of a thorough, individualized approach to patient care. The management of DFU requires a comprehensive nursing care plan that incorporates wound care, infection control, and preventive strategies. Early detection and accurate risk assessment using classification systems such as the Wagner, SINBAD, and Wifl systems are critical for determining the severity of the ulcer and guiding treatment decisions. These systems not only assess ulcer characteristics such as size, depth, and infection but also incorporate factors such as ischemia and neuropathy, allowing for more precise management. Nursing interventions play a central role in managing DFU. Regular monitoring of the wound, proper dressing changes, and education on foot care can significantly improve healing and reduce the risk of complications. Additionally, patient education on managing blood glucose levels, smoking cessation, and proper footwear is essential for preventing recurrence and improving long-term outcomes. Moreover, a multidisciplinary approach involving healthcare providers such as endocrinologists, vascular surgeons, and podiatrists is crucial for optimizing treatment plans. The integration of these strategies, alongside a patient-centered approach that includes education and empowerment, can lead to better outcomes in individuals with DFU. In conclusion, DFU remains a significant challenge in the management of diabetes. However, with early intervention, effective nursing care, and appropriate use of classification systems, the prognosis for patients with DFU can be greatly improved, reducing the burden on healthcare systems and improving the quality of life for individuals affected by this debilitating condition.

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القدم السكرية وخطط الرعاية التمرضية والتدخلات

الملخص:

الخلفية: شهدت معدلات انتشار مرض السكري (DM) على مستوى العالم زيادة كبيرة، مما أدى إلى ظهور العديد من المضاعفات، بما في ذلك تقرحات القدم السكرية (DFU). تؤثر تقرحات القدم السكرية على حوالي 6.3% من مرضى السكري، وتُعد أحد الأسباب الرئيسية لدخول المستشفيات، والبتير غير الناتج عن الإصابات، وزيادة معدلات الوفيات. تنشأ هذه الحالة نتيجة مزيج من الاعتلال العصبي، ومرض الشريان المحيطي (PAD)، وسوء التنام الجروح. يُعد التشخيص المبكر والإدارة المناسبة ضروريين لمنع تفاقم الحالة.

الهدف: تهدف هذه المقالة إلى استكشاف الفيزيولوجيا المرضية، ونظم التصنيف، وعوامل الخطر، واستراتيجيات إدارة تقرحات القدم السكرية، مع التركيز على أهمية خطط الرعاية التمرضية والتدخلات.

الطرق: تستعرض المقالة الأدبيات الحالية حول تقرحات القدم السكرية، بما في ذلك أنظمة التصنيف مثل نظام ميغيت-واجتر ونظام SINBAD، لتقديم فهم شامل لخطورة الحالة وإدارتها. كما تناقش دور التدخلات التمرضية، بما في ذلك رعاية الجروح، ومكافحة العدوى، وتثقيف المرضى، كعناصر أساسية للعلاج.

النتائج: تسلط المراجعة الضوء على أهمية التدخل المبكر وخطط الرعاية الشخصية في إدارة تقرحات القدم السكرية. تحسن التدخلات التمرضية مثل العناية الصحيحة بالقدم، والوقاية من العدوى، والمراقبة الدورية، والتثقيف بشكل كبير من نتائج التنام الجروح. بالإضافة إلى ذلك، توفر أنظمة التصنيف مثل SINBAD و WiFi أدوات قيمة لتقييم خطورة الحالة والتنبؤ بالحاجة إلى البتر.

الخلاصة: تُعد تقرحات القدم السكرية سببًا رئيسيًا للمراضة والوفيات بين مرضى السكري. تُعتبر الرعاية التمرضية الفعالة، بما في ذلك استخدام أنظمة التصنيف المناسبة وخطط العلاج الفردية، أمرًا بالغ الأهمية لإدارة الحالة والوقاية من المضاعفات. يمكن للمقارنة الشاملة متعددة التخصصات، إلى جانب تثقيف المرضى والمراقبة المستمرة، أن تحسن النتائج وتقلل من مخاطر البتر.

الكلمات المفتاحية: تقرحات القدم السكرية، خطة الرعاية التمرضية، أنظمة التصنيف، الاعتلال العصبي، الوقاية من العدوى، التنام الجروح، مرض السكري.