

The Relationship Wound Grade and Neuropathy Status With Anxiety in Diabetic Foot Wound Patients

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Abstract

Background. Microvascular complications in diabetes mellitus patients often occur in the eyes (diabetic retinopathy) and diabetic neuropathy which will cause numbness in the extremities, while macrovascular complications can occur in coronary artery blood vessels in the heart, disorders of large blood vessels in the feet which will increase the risk of necrosis in the extremities Objective. The purpose of this study was to determine whether the relationship between Wound Grade and Neuropathy Status to the level of anxiety in patients with diabetic foot wounds **Method.** This type of research is descriptive analytical with a cross-sectional approach. Cross-sectional research with a sample size of 30, the sampling technique used by researchers was purposive sampling, the instruments in this study were observation sheets and Anxiety Inventory (S-AI) Form y **Results.** The results of the study obtained that there was no relationship between wound grade and anxiety levels in patients with diabetic foot wounds $p\text{-value } 0.691 > 0.05$ and there was no relationship between neuropathy status and anxiety levels in patients with diabetic foot wounds $p\text{-value } 0.248 > 0.05$ **Conclusion.** There was no correlation between wound grade and neuropathy status and anxiety levels in patients with diabetic foot ulcers

Keywords

Wound Grade, Anxiety, Neuropathy.



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1. INTRODUCTION

Diabetes mellitus is one of the chronic diseases that can lead to long-term vascular complications, including microangiopathy and macroangiopathy (ElSayed et al., 2024). Microvascular complications in diabetes mellitus patients often occur in the eyes (diabetic retinopathy) and in diabetic neuropathy, which can cause numbness in the extremities. In contrast, macrovascular complications can occur in the coronary arteries of the heart and the large blood vessels of the legs, increasing the risk of necrosis in the extremities (Zhang et al., 2024).

Vascular disorders caused by diabetes mellitus can lead to further complications such as diabetic foot ulcers, which occur due to reduced sensory function in patients, making them more susceptible to ongoing trauma (Hariftyani et al., 2021). In 2024, the prevalence of diabetic foot ulcers worldwide is estimated to reach 6.3%, with a 15-20% risk of diabetic patients developing foot ulcers within five years. Every 30 seconds, a diabetic foot amputation occurs, and 60-80% of non-traumatic amputations are caused by diabetes (International Diabetes Federation, 2025).

The prevalence of foot ulcers in Indonesia has continued to increase, from 8.4 million in 2001 to 14 million in 2006, and then to 21 million in 2021 (Hidayat et al., 2024). There are several factors that can influence the healing process of diabetic foot ulcers, both biologically, such as lifestyle and blood sugar stability, and psychologically, such as stress and depression, so that ulcers that do not heal can affect the patient's quality of life (Yan et al., 2021). The results of Hanafi et al.'s (2024) study indicate a correlation between the duration of diabetes mellitus and anxiety levels in diabetic foot ulcer patients. This study aims to determine whether there is a correlation between wound grade, neuropathy status, and anxiety levels in diabetic foot ulcer patients.

2. METHODS

This type of research is descriptive and analytical with a cross-sectional approach. Cross-sectional research is a type of research that emphasizes the measurement/observation of independent and dependent variables only once at a single point in time (Notoatmodjo, 2010). The sample used in this study consisted of 30 participants, selected using purposive sampling with the inclusion criterion of patients with recurrent diabetic foot ulcers undergoing treatment at the Kitamura Pancasila Clinic in Pontianak and the exclusion criterion of patients who had already undergone amputation. The instrument

used in this study was the Anxiety Inventory (S-AI) Form y. The minimum or lowest score is 20, and the maximum or highest score is 80. A total score between 20–35 indicates no anxiety, a total score between 36–50 indicates mild anxiety, a total score between 51–65 indicates moderate anxiety, and a total score between 66–80 indicates severe anxiety. This instrument has been tested for validity with a score $> r$ calculated with a Cronbach alpha reliability value of 0.910. The statistical test used in this study was a non-parametric fisher exact test because the data was not normally distributed, so it did not meet the requirements for parametric test.

3. FINDINGS AND DISCUSSION

Table 1 Characteristics of Age, Gender, Wound Grade, Neuropathy Status, Anxiety Level

| Characteristics | <i>f</i> | % |
|-------------------------|----------|------|
| Age | | |
| Late adulthood | 1 | 3.3 |
| Early elderly | 8 | 26.7 |
| Late elderly | 16 | 53.3 |
| Seniors | 5 | 16.7 |
| Gender | | |
| Male | 16 | 53.3 |
| Female | 14 | 46.7 |
| Grade | | |
| Grade 1 | 3 | 10 |
| Grade 2 | 23 | 76.7 |
| Grade 3 | 4 | 13.3 |
| Status Neuropati | | |
| Neuropathy | 12 | 40 |
| No neuropathy | 18 | 60 |
| Anxiety Level | | |
| No Anxiety | 2 | 6.7 |
| Mild Anxiety | 9 | 30 |
| Moderate Anxiety | 19 | 63.3 |
| Total | 30 | 100 |

The results of the study revealed that the majority of respondents were elderly individuals aged 16 (53.3%), with males being the dominant gender at 16 (53.3%). The majority of respondents had grade 2 wounds at 23 (76.7%), 18 (60%) respondents did not experience neuropathy, and the most dominant level of anxiety among respondents was moderately anxious at 19 (63.3%).

Table 2. Relationship between wound grade and anxiety level in patients with diabetic foot ulcers

| Variable | Anxiety Level | | | | | | <i>p</i> |
|----------|---------------|---|--------------|---|------------------|----|----------|
| | No Anxiety | | Mild Anxiety | | Moderate Anxiety | | |
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % | |
| Grade 1 | 0 | 0 | 0 | 0 | 3 | 10 | 0.691 |

| | | | | | | |
|---------|---|---|---|------|----|----|
| Grade 2 | 2 | 7 | 8 | 26.5 | 13 | 43 |
| Grade 3 | 0 | 0 | 1 | 3.5 | 3 | 10 |
| Total | 2 | 7 | 9 | 30 | 19 | 63 |

The results of the study showed that the p-value was $0.691 > 0.05$, which means that there was no relationship between wound grade and anxiety levels in patients with diabetic foot ulcers.

Table 3. Relationship between Neuropathy Status and Anxiety Levels in Patients with Diabetic Foot Ulcers

| Variable | Anxiety Level | | | | | | <i>p</i> |
|---------------|---------------|-----|--------------|------|------------------|----|----------|
| | No Anxiety | | Mild Anxiety | | Moderate Anxiety | | |
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % | |
| Neuropathy | 1 | 3.5 | 5 | 16.5 | 6 | 20 | 0.248 |
| No neuropathy | 1 | 3.5 | 4 | 13.5 | 13 | 43 | |
| Total | 2 | 7 | 9 | 30 | 19 | 63 | |

The results of the study showed that the p-value was $0.248 > 0.05$, which means that there was no relationship between neuropathy status and anxiety levels in patients with diabetic foot ulcers.

DISCUSSION

The relationship between neuropathy status and anxiety levels in diabetic foot ulcer patients, with a p-value of $0.248 > 0.05$, indicates that there is no significant association between neuropathy status and anxiety levels in diabetic foot ulcer patients. This aligns with the findings of Al-Ayed et al. (2021), who also found no association between wound grade and anxiety levels in diabetic foot ulcer patients. Several factors may influence anxiety levels in diabetic foot ulcer patients, including educational level, gender, and duration of treatment.

Other psychosocial factors that can influence anxiety levels in diabetic foot ulcer patients, such as limitations in performing daily activities (ADL), also constitute risk factors for increased anxiety and even depression in these patients (Vileikyte et al., 2005). Anxiety may also arise due to patients' perceptions of uncertainty regarding symptoms that persist throughout the treatment process (Almaqhawani et al., 2023). Uncontrolled anxiety can lead to worsening complications experienced by diabetes mellitus patients, such as hyperglycemia and hypoglycemia (Berkol et al., 2018).

The Relationship Between Neuropathy Status and Anxiety Levels in Patients with Diabetic Foot Ulcers. The study results showed a p-value of $0.691 > 0.05$, indicating that there is no significant relationship between neuropathy status and anxiety levels in diabetic foot ulcer patients. The findings of Gayatri et al. (2020) also demonstrated no association between wound severity and anxiety levels. The causes of anxiety in diabetic foot ulcer patients include physical discomfort,

such as pain and difficulty performing daily activities. Risk factors for anxiety in diabetic foot ulcer patients may increase due to low educational levels, which can affect patients' knowledge of the care process, adherence to treatment, and marital status (Al-Ayed et al., 2021).

The results of the study by Polikandrioti et al. (2020) indicate that anxiety in patients with diabetic foot ulcers can also occur due to insufficient social support for patients, both from family members and community members in the surrounding area. Therefore, the focus in managing diabetic foot ulcer patients should not only be on the severity of the wound but also on psychosocial factors that can influence the patient's mental well-being, including anxiety in diabetic foot ulcer patients. This is because anxiety can affect glycemic control in diabetic patients (Nugroho & Anggraeni, 2024). Patients with diabetic foot ulcers who experience anxiety exhibit higher fluctuations in blood sugar levels (Yang et al., 2022). Blood sugar instability in diabetic foot ulcer patients experiencing anxiety may occur because anxiety can trigger hormones such as adrenaline and cortisol, which can increase glucose production in the liver (Breanna & Alicia, 2019).

4. CONCLUSION

The results of the study showed that the level of anxiety experienced by respondents was most dominant at the moderately anxious level, with the majority of respondents not having neuropathy. There was no relationship between wound grade and neuropathy status on the level of anxiety in patients with diabetic foot wounds.

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