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# EFFECTIVENESS OF FOOT REFLEXOLOGY IN REDUCING ANXIETY AFTER CABG SURGERY

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**ABSTRACT**
Coronary Artery Disease (CAD) remains a leading cause of mortality worldwide and often requires Coronary Artery Bypass Graft (CABG) surgery. Patients undergoing CABG are at high risk of experiencing postoperative anxiety, which can negatively affect haemodynamic stability, delay recovery, and impair overall clinical outcomes. Therefore, effective non-pharmacological nursing interventions are needed to manage anxiety during the postoperative period. This study aimed to describe the effectiveness of foot reflexology as a complementary nursing intervention in reducing anxiety in a post-CABG patient using an Evidence-Based Nursing (EBN) approach. Method: This study employed a single-case study design with an Evidence-Based Nursing approach. The subject was a 67-year-old male with a history of hypertension and type 2 diabetes mellitus who underwent three-graft off-pump CABG. Foot reflexology was administered for three consecutive days from postoperative day two to day four, for 30 minutes per foot in each session. Data were collected through comprehensive nursing assessment and analysed descriptively by comparing pre- and post-intervention anxiety levels using the Templer Death Anxiety Scale (DAS), along with changes in vital signs and observed behavioural responses. The patient initially presented with moderate to high anxiety, with a DAS score of 52. Following the intervention, anxiety scores gradually decreased to 45 on the second postoperative day and further to 36 on the fourth postoperative day. Improvements were also observed in vital signs, sleep quality, and overall relaxation, with no adverse effects reported. The application of foot reflexology was proven effective as a complementary nursing intervention in reducing anxiety in post-CABG patients.

Keywords: anxiety scale, CABG; coronary artery disease; foot reflexology

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## INTRODUCTION

Coronary Artery Disease (CAD) is a condition characterized by narrowing or blockage of the coronary arteries due to the buildup of atherosclerosis plaques, causing a decrease in blood flow and oxygen supply to the heart muscle. A common medical procedure for severe CAD patients is Coronary Artery Bypass Graft (CABG), which is surgery to create new channels in the coronary arteries to facilitate blood flow to the heart muscle. This procedure aims to improve blood flow to the myocardium by creating a new pathway using autologous blood vessels. Many patients experience postoperative anxiety due to pain, physical discomfort, and concerns about complications or death (Muthukrishnan et al., 2023). Post-CABG anxiety levels are reported to be quite high, with 30–60% of patients experiencing moderate to severe psychological distress during the initial recovery phase (Tarigan et al., 2025).

Untreated anxiety can slow wound healing, increase blood pressure and heart rate, and worsen long-term cardiovascular outcomes. Based on research (Kolbadinejad et al., 2023), CABG patients experience moderate to severe anxiety. The study also confirms that untreated anxiety can worsen physiological conditions, such as increased blood pressure and heart rate, potentially inhibiting the healing process. To overcome this anxiety, various non-pharmacological therapies have begun to be developed, one of which is foot reflexology massage. This therapy is carried out by applying

pressure to the reflection points on the soles of the feet which are believed to have neural connections with various organs of the body. The pressure stimulates the parasympathetic nervous system and increases the release of endorphins that create a sense of calm and comfort. Kolbadinejad et al.'s (2023) study entitled "Effect of Foot Reflexology Massage on Death Anxiety and Well-being of Patients Undergoing Coronary Artery Bypass Graft: A Randomized Controlled Trial" is the latest strong scientific evidence on the effectiveness of this therapy.

This therapy is carried out by applying pressure to the points of reflection on the soles of the feet that are related to certain organs of the body. Physiologically, stimulation of reflection points can decrease the activity of the sympathetic nervous system and increase the parasympathetic response, thereby causing a relaxation effect and lowering anxiety (Bahramian et al., 2025). Hashemzadeh et al., (2029) found that giving foot reflexology therapy for 30 minutes was able to significantly lower anxiety scores compared to the control group ($p<0.001$). Similar results were obtained by Alimohammadi et al., (2022) WHO reported an increase in comfort and a decrease in anxiety. subjective anxiety, but also decreased serum cortisol levels and increased heart rate variability, which signaled an improvement in the body's autonomic balance.

## METHOD

This study used a single-case study design with an Evidence-Based Nursing (EBN) approach. The subject was a patient with Coronary Artery Disease (CAD) after Coronary Artery Bypass Graft (CABG) treated in the cardiovascular inpatient ward of H. Adam Malik General Hospital Medan in November 2025. Data were collected through a comprehensive nursing assessment, including interviews, observation, physical examination, and review of medical records. Based on assessment findings, anxiety was established as the nursing diagnosis.

The purpose of this study was to describe the effectiveness of foot reflexology as a complementary nursing intervention in reducing anxiety in a post-CABG patient. The EBN process involved identifying the clinical problem, searching and appraising relevant scientific evidence, and integrating the best evidence with the patient's clinical condition. Foot reflexology was selected as the nursing intervention based on evidence from recent empirical studies. Nursing interventions were implemented according to the Indonesian Nursing Intervention Standards (SIKI), while nursing outcomes were determined using the Indonesian Nursing Outcomes Standards (SLKI). Anxiety levels were evaluated using the Templer Death Anxiety Scale (DAS).

## RESULT

The results of this study describe the clinical response of a post-CABG patient to the administration of foot reflexology as a complementary nursing intervention to reduce anxiety. The reported patient is Mr. P, a 67-year-old man, who is undergoing treatment in the cardiovascular inpatient room of H. Adam Malik Hospital Medan.

Table 1.
Pre and Post Foot Reflexology Data Tables

| Data | Pre | Post | Interpretasi |
|---|---|---|---|
| Day 2 | 52 | 45 | Moderate anxiety |
| Day 3 | 45 | Not done | Not measured |
| Day 4 | 45 | 36 | Mild anxiety |

On the first day of the study revealed an excessive fear of death and the possibility of disease recurrence. The results of observations showed that the patient appeared agitated, with a blood pressure of 144/99 mmHg and a pulse rate of 110 times per minute. The initial watershed score was recorded at 52, which falls into the category of moderate-high anxiety. Patients showed calmer and more cooperative behavioral changes during treatment after the first session on the second day. The re-evaluation of the anxiety level after the watershed score was 45, which was still in the category of moderate anxiety, but showed improvement compared to the initial condition.

On the third postoperative day patients report that anxiety begins to decrease, although sleep quality is not yet fully optimal. Blood pressure decreased to 144/87 mmHg and pulse rate 89 times per minute. At this

time, no watershed score measurement was performed, but clinical evaluations showed that patients appeared more relaxed and able to adjust to postoperative conditions. Remeasurement of anxiety levels was performed again on the fourth postoperative day. Patients appear calmer, facial expressions are more relaxed, and report improvements in sleep quality. Vital signs indicate a relatively stable condition with blood pressure of 112/69 mmHg and pulse rate of 99 times per minute. The watershed score on day 4 was recorded at 36, which indicates anxiety is in the mild category.

The results showed a consistent decrease in anxiety levels that lasted gradually after the patient received the foot reflexology intervention for three consecutive days. Patients had a decrease of 7 points after the first intervention and a further decrease of 9 points after the follow-up intervention, so that the total decrease was 16 points from the initial outcome. Total decline: 52 → 36 (30.7%). This decrease suggests that foot reflexology interventions have an immediate and progressive impact.

Table 2.
Post-CABG Drug Therapy

| Drug Name | Dosage | Frequency | Route | Indikasi |
|---|---|---|---|---|
| Sodium Chlorida | 500 ml | 24 hours | IV | A type of electrolyte infusion fluid that has the function of controlling water content in the body, preventing and overcoming sodium loss in the blood caused by a lack of body fluids |
| Aspilet Chewable | 80 mg | 24 jam | Oral | Blood thinners for myocardial infarction patients |
| Clopidogrel | 75 mg | 24 jam | Oral | To prevent stroke and heart attack |
| Atorvastatin | 20 mg | 24 jam | Oral | Prevent cardiovascular disease in high-risk people and reduce abnormal lipid levels, lowering bad cholesterol and triglycerides |
| Lisinopril | 10 mg | 24 jam | Oral | First-line treatment for high blood pressure, enzyme inhibitor drugs Angiotensin modifiers and as the gold standard drug in the treatment of high blood pressure, are also used to treat heart failure and after heart attacks |
| Isosorbies Dinitrate | 5 mg | 24 jam | Oral | Prevent and relieve angina (chest pain) consequences of coronary heart disease |
| Nitrokaf Retard | 2,5 mg | 12 jam | Oral | Contains the active substance Nitroglycerin for prevention and long-term therapy for angina sufferers |
| Bisoprolol | 2,5 mg | 24 jam | Oral | Medications used primarily for heart disease, specifically include pressure high blood pressure, angina pectoris and heart failure |
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## DISCUSSION

Based on table 1 there is a second postoperative day, the patient is still at a moderate level of anxiety, which is a common response in the early phases of postoperative recovery. Anxiety levels showed a tendency to decrease after repeated intervention administration until they reached the mild category on day 4. These results prove that foot reflexology is effective in reducing anxiety in post-CABG CAD patients in a short period of time. Total decrease in anxiety: 16 points (30.7%). The results showed a decrease in anxiety levels in post-CABG CAD patients after foot reflexology intervention for three consecutive sessions. The anxiety score based on the Templer Death Anxiety Scale (DAS) on the first day was 52 (moderate anxiety category), then decreased to 45 on day two, and further decreased to 36 on the fourth day (near the low category). This proves that foot reflexology is effective in reducing anxiety responses in postoperative patients.

These findings are in line with the concept found by (Townsend & Morgan, 2018) which states that anxiety is an emotional response to threats or uncertainties of the body's condition, especially after a patient undergoes a major surgical procedure. (Varcarolis' Essentials of Psychiatric Mental Health Nursing - 5th Edition | Elsevier Shop, n.d.) also emphasizes that untreated anxiety can negatively impact a patient's physical condition and psychological recovery process. The decrease in anxiety levels in these cases suggests that the interventions provided contribute to helping patients manage emotional responses related to postoperative concerns.

The reduction in anxiety in patients is related to the physiological mechanism of foot reflexology. Wright (2023) explains that stimulation of the reflection point on the soles of the feet can activate the parasympathetic nervous system which plays a role in creating a relaxation effect. These relaxation response activities can trigger a decrease in muscle tension, slow down heart rate, and reduce the production of stress hormones such as cortisol, in line with Hasson & Fry (2021). The results of this study are reinforced by Pourshaikhian et al., (2025) who report that the administration of foot reflexology massage in post-CABG patients significantly lowered anxiety levels and improved physiological parameters compared to the control group. The findings suggest that foot reflexology interventions can act as an effective supportive therapy during the postoperative recovery phase of the heart. Research by Senosy et al., (2025) shows that foot reflexology not only helps to reduce post-CABG pain, but also increases patient resilience. Increasing psychological resilience is considered important because it contributes to the patient's ability to adapt to postoperative conditions and face the recovery process more positively. The clinical response observed in patients in this case report is consistent with these findings.

This study is also consistent with the study of Rigi et al., (2021) which reported that foot reflexology significantly lowered anxiety in post-CABG patients. Alimohammadi et al., (2022) showed that patients who received the intervention for three consecutive days contributed to a decrease in anxiety and increased patient comfort. Chuang et al., (2023) explain that foot reflexes can affect the autonomic nervous system so as to help balance the physiological stress response in postoperative heart patients. Post-CABG patients are known to be prone to physical pain and discomfort that can aggravate anxiety Smeltzer & Bare (2022). Foot reflexology has the potential to help divert the perception of pain through neurological stimulation as well as provide nonpharmacological effects. This opinion is in line with Gök Metin & Ozdemir (2021) who stated that reflexology can be used to reduce pain and tension in postoperative patients, so that anxiety decreases significantly.

Support for the psychological and spiritual aspects of patients has an important role in reducing anxiety. Rahman et al., (2023) stated that nursing interventions that focus on physical comfort are associated with improved patient psychological coping. Al-Qahtani et al., (2022) show that health care provider support and therapeutic communication during treatment peoses can increase patients' sense of security, which ultimately helps lower anxiety levels. The implementation of interventions in this case actively involves patients in a conducive atmosphere and is supported by supportive communication. Research by Zahra et al., (2023) reported that a combination of foot reflexology and respiratory relaxation techniques was effective in lowering anxiety and maintaining the stability of vital signs in intensive care patients. The findings reinforce the role of foot reflexology as part of a complementary nursing approach.

Ignatavicius et al., (2021) emphasize that nonpharmacological interventions, such as foot reflexology, are recommended in postoperative patients to help reduce the side effects of anxiolytic medications. The Evidence-Based Nursing framework shows that the application of foot reflexology is in line with Potter & Perry (2023) who emphasize the importance of a holistic approach so that patients' physical, psychological, social, and spiritual needs can be met in an integrated manner. This study provides evidence that foot reflexology is a safe, inexpensive, non-invasive technique, and can be performed by nurses as an independent intervention to reduce anxiety in post-CABG CAD patients. The significant decrease in the DAS score in a short period of time suggests that this therapy has the potential to be integrated into the standard of nursing care in postoperative heart surgery patients.

## CONCLUSION

Nursing care for patients after Coronary Artery Bypass Graft (CABG) with the application of foot reflexology intervention was carried out for 3 days of treatment. The results of the study showed that the patient experienced high anxiety characterized by fear, anxiety, and changes in vital signs. After three treatments of foot reflexology, the results were obtained that there was a significant

decrease in anxiety based on the Templer Death Anxiety Scale (DAS) score from 52 to 36. The patient's psychological and physiological response is improving, such as a more regular breathing pattern, more relaxed facial expressions, and the patient seems able to adapt to the recovery process. This shows that foot reflexology is effective in reducing anxiety in post-CABG patients.

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