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Review Article

Foot massage among diabetes patients: A concept analysis using Walker and Avant's method

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Abstract

Background
Foot massage is increasingly used as a complementary therapy in diabetes care, particularly for patients suffering from diabetic peripheral neuropathy. Despite its widespread use, the concept remains theoretically underdeveloped, inconsistently defined, and variably applied in nursing practice.

Objective
This study aimed to clarify the concept of foot massage among diabetes patients through a structured concept analysis using Walker and Avant's eight-step method.

Methods
A concept analysis was conducted following the Walker and Avant framework. Literature was reviewed from databases including PubMed, Scopus, CINAHL, and Google Scholar using keywords related to foot massage, diabetes, and non-pharmacological interventions. The defining attributes, antecedents, consequences, model cases, and empirical referents of the concept were identified and analyzed.

Results
Five defining attributes emerged: (1) manual stimulation of the feet, (2) therapeutic intention, (3) relief of physical and psychological symptoms, (4) enhancement of circulation, and (5) facilitation of self-care awareness. Antecedents included the presence of diabetic neuropathy and patient willingness to engage in complementary care. Consequences ranged from pain reduction and improved circulation to increased self-care adherence. Empirical referents included pain scores, circulation metrics, and patient-reported outcomes.

Conclusion
Foot massage among diabetes patients is a multidimensional therapeutic concept that holds significant value in holistic nursing care. This analysis provides a theoretical foundation for its application in practice, research, and nursing education, emphasizing its potential to enhance comfort, self-management, and quality of life in diabetic care.

Background

Diabetes mellitus is a chronic metabolic disorder with increasing global prevalence and debilitating complications, particularly in the lower extremities. One of the most common and severe complications is diabetic peripheral neuropathy, which leads to pain, loss of sensation, decreased circulation, and a significantly heightened risk of foot ulcers and lower limb amputation (American Diabetes Association [ADA], 2021). Conventional treatment of diabetic foot complications often includes pharmacological interventions and glycemic control; however, complementary approaches such as foot massage have gained growing attention as a supportive therapy to enhance circulation, reduce pain, improve mobility, and promote well-being (Dossey & Keegan, 2016; Ben-Arye et al., 2015).

Foot massage is a non-invasive, low-cost, and culturally acceptable intervention that may provide physical, psychological, and psychosocial benefits for patients with diabetes. It is used not only for relaxation but also to stimulate microcirculation and improve peripheral nerve function, thus potentially delaying or mitigating diabetic complications (Zamanzadeh et al., 2015). In some studies, patients receiving regular foot massage reported reduced neuropathic discomfort, enhanced foot care adherence, and increased awareness of self-management practices (Lindquist et al., 2014). Despite its growing utilization in clinical and community settings, the concept of foot massage in the context of diabetes remains poorly defined and inconsistently applied across disciplines and care models.

Concept analysis provides a systematic method to clarify ambiguous or poorly understood

concepts in healthcare by identifying their defining attributes, antecedents, and consequences (Walker & Avant, 2019). Given the widespread use of foot massage and its potential relevance in diabetes care, it is important to conceptually analyze foot massage among diabetes patients to enhance clinical understanding, guide future research, and inform holistic nursing practice.

Thus, this article aims to explore and clarify the concept of foot massage in the context of diabetes through a structured concept analysis using Walker and Avant's framework. By doing so, we seek to develop a clearer operational definition of foot massage and identify its implications for nursing care and interdisciplinary health promotion strategies among diabetic populations.

Methods

Study Design

This study employed the method proposed by Walker and Avant (2019) to analyze the concept of foot massage among diabetes patients. This method is a systematic approach commonly used in nursing to clarify ambiguous concepts and facilitate their understanding and application in clinical practice, research, and education. The aim of this concept analysis was to explore the meaning, attributes, antecedents, and consequences of foot massage within the context of diabetes management. The analysis followed the eight steps outlined by Walker and Avant: (1) selecting a concept; (2) determining the aims or purposes of analysis; (3) identifying all uses of the concept; (4) determining the defining attributes; (5) constructing a model case; (6) constructing borderline, related, and contrary cases; (7) identifying antecedents and consequences; and (8) defining empirical referents.

Search Strategy

A literature review was conducted using several electronic databases, including PubMed, Scopus, Google Scholar, and CINAHL. The search included studies, reviews, guidelines, and theoretical discussions published in English without date limitations. Keywords used in the search were "foot massage," "diabetes," "diabetic neuropathy," "complementary therapy," "nursing care," "self-management," and "non-pharmacological intervention." Articles and texts related to nursing, holistic care, traditional healing, and rehabilitative practices were also included to ensure comprehensive coverage. Studies were selected based on relevance to the concept and alignment with the context of diabetes care.

Inclusion and Exclusion Criteria

The criteria for inclusion were the use of foot massage in the care of patients with diabetes, especially those experiencing diabetic neuropathy, and its application in nursing or therapeutic settings. Sources unrelated to diabetes or involving generalized massage without specific focus on the foot were excluded. The selected literature was analyzed to extract definitions, characteristics, and contexts in which the concept is applied.

Results

Selecting a Concept

The concept selected for this analysis is foot massage among diabetes patients, with a specific focus on individuals suffering from diabetic peripheral neuropathy—a prevalent and debilitating complication of diabetes mellitus. Foot massage is increasingly used in both clinical and community-based settings as a non-pharmacological and holistic intervention. It is employed not only for symptom relief but also to improve circulation, reduce psychological distress, and enhance patients' engagement with self-care practices.

Despite its widespread use, the concept of foot massage lacks consistent definition, standardized implementation, and theoretical underpinning within nursing literature. Its ambiguous usage across clinical, wellness, and alternative medicine contexts underscores the need for rigorous conceptual clarification. By selecting this concept, the analysis aims to resolve the ambiguity surrounding foot massage and define its specific meaning and application within the context of diabetes care, thereby contributing to more effective, evidence-based nursing practices.

Determining the Aims or Purposes of Analysis

The primary aim of this concept analysis is to elucidate the theoretical and practical meaning of foot massage as applied to patients with diabetes mellitus. Through the structured lens of Walker and Avant's method, this analysis

intends to identify the defining attributes, antecedents, consequences, and empirical referents of the concept. The ultimate goal is to produce a clear, operational definition of foot massage that can guide clinical practice, inform nursing education, and support future research on integrative care strategies for chronic illnesses. Additionally, this conceptual clarification seeks to establish foot massage as a legitimate and valuable component of holistic diabetes care, thereby strengthening its role in improving patient outcomes such as pain relief, circulation, psychological well-being, and adherence to self-care behaviors. The analysis also aims to facilitate interdisciplinary dialogue and standardization regarding its application in various healthcare settings.

Identifying All Uses of the Concept

The term "foot massage" is used in diverse ways across various disciplines. In general usage, it refers to the act of applying manual pressure, stroking, or kneading to the feet for the purposes of relaxation or pleasure. In clinical contexts, especially within rehabilitative and nursing care, foot massage is employed with therapeutic intent to address specific symptoms such as neuropathic pain, poor circulation, or muscular stiffness. In complementary and alternative medicine, foot massage often overlaps with reflexology, a practice that involves stimulating specific pressure points believed to correspond to internal organs.

Additionally, in traditional healing systems and cultural practices, foot massage may hold symbolic, ritualistic, or spiritual significance. In the context of diabetes care, particularly among patients with peripheral neuropathy, foot massage is framed as a supportive intervention aimed at promoting circulation, relieving pain, and encouraging self-monitoring behaviors. These diverse interpretations necessitate a focused analysis to identify which uses are most relevant to nursing practice and how they can be distinguished from non-therapeutic or recreational applications.

Determining the Defining Attributes

Based on an extensive literature review, five key defining attributes of foot massage among diabetes patients were identified. First, foot massage involves manual stimulation of the feet, typically using the hands, thumbs, or massage tools to apply rhythmic pressure, kneading, or stroking. This physical interaction targets muscles, soft tissues, and nerves within the foot. Second, the practice is characterized by a therapeutic intention—that is, it is not performed merely for relaxation but with the purpose of achieving specific health outcomes such as pain reduction or improved circulation.

Third, foot massage produces multidimensional therapeutic effects, encompassing both physical relief (e.g., reduced neuropathic discomfort) and psychological benefits (e.g., decreased anxiety, improved mood). Fourth, the intervention contributes to enhanced peripheral circulation, which is critical in preventing foot ulcers and complications associated with impaired blood flow in diabetic patients. Fifth, foot massage fosters self-care awareness by encouraging patients to pay more attention to foot hygiene, regular inspection, and early detection of injuries or ulcers. These attributes together define foot massage as a holistic, patient-centered practice that integrates physical, psychological, and behavioral dimensions of care.

Constructing a Model Case

A model case illustrates the concept in its entirety by incorporating all defining attributes. Consider Mrs. A, a 60-year-old woman with type 2 diabetes who has been diagnosed with peripheral neuropathy. She experiences burning sensations and numbness in her feet, which interfere with her sleep and mobility. Under the guidance of a community health nurse, her daughter learns to perform a 15-minute foot massage daily using warm oil and gentle circular motions.

Over the course of several weeks, Mrs. A reports a significant reduction in discomfort, improved sleep quality, and greater ease in walking. She also becomes more vigilant in checking her feet for cuts, blisters, or signs of infection. This case exemplifies intentional manual stimulation, therapeutic purpose, symptom relief, enhanced circulation, and increased self-care engagement—demonstrating the full operational scope of foot massage in diabetes care. The intervention here is integrated, purposeful, and aligned with nursing goals of comfort, prevention, and empowerment.

Constructing Borderline, Related, and Contrary Cases

To refine the conceptual boundaries, borderline, related, and contrary cases were developed. A borderline case is exemplified by Mr. B, a diabetic patient who receives a short foot massage during a spa pedicure. While the session involves manual stimulation and relaxation, it lacks a therapeutic goal, patient education, and follow-up—thus only partially fulfilling the attributes of the concept. A related case involves Ms. C, who undergoes reflexology sessions for energy balancing. Although her feet are stimulated and she experiences relaxation, the intent is not symptom-focused or diabetes-specific, and there is no emphasis on foot care awareness. This related case shares some features with foot massage but diverges in purpose and mechanism. A contrary case is illustrated by Mr. D, a diabetic patient with foot pain who avoids any touch due to fear of injury. He refuses all forms of foot massage, does not inspect his feet, and is disengaged from self-care—lacking all defining attributes. These comparative examples help delineate the scope of foot massage and highlight the importance of therapeutic intent, clinical relevance, and patient participation.

Identifying Antecedents and Consequences

Antecedents are events or conditions that must occur prior to the implementation of foot massage. In this context, key antecedents include a diagnosis of diabetes mellitus, often accompanied by peripheral neuropathy, which creates a need for symptom management. Other antecedents include the patient's openness to complementary therapies, the availability of a trained caregiver or provider, and recognition of foot care as an essential component of diabetes management. These conditions establish the relevance and feasibility of foot massage as an intervention. The consequences of foot massage, as identified through the literature, are notably positive. They include reduction in neuropathic pain, improved blood circulation, decreased anxiety and improved sleep, enhanced relaxation, greater adherence to routine foot care, and strengthened self-efficacy in disease management. These outcomes support the incorporation of foot massage into holistic nursing strategies for chronic care and suggest its potential role in preventing long-term complications such as ulcers and amputations.

Defining Empirical Referents

Empirical referents are measurable indicators that allow the concept to be observed and assessed in practice. For foot massage among diabetes patients, empirical referents include pain intensity scores (e.g., measured using the Visual Analog Scale), circulation assessments (e.g., Doppler ultrasound, thermography), and psychological well-being (e.g., via the State-Trait Anxiety Inventory). Additional referents include patient-reported improvements in relaxation, mobility, and sleep quality, as well as increased frequency of foot inspections and self-monitoring behaviors. These indicators allow practitioners to evaluate the effectiveness of foot massage interventions and support their integration into evidence-based care plans. Moreover, the availability of empirical referents makes the concept researchable and applicable in diverse clinical, educational, and community health settings.

Discussion

This concept analysis aimed to clarify the meaning and application of foot massage among patients with diabetes, particularly those experiencing peripheral neuropathy, within the context of holistic and complementary care. Through Walker and Avant's (2019) structured method, this study identified foot massage as a multidimensional therapeutic approach that integrates physical, psychological, and behavioral components of care. The defining attributes identified—including intentional manual stimulation, enhancement of circulation, relief from neuropathic symptoms, relaxation, and increased self-care engagement—reflect a holistic paradigm that aligns with the principles of person-centered nursing and integrative health practices (Dossey & Keegan, 2016; Zamanzadeh et al., 2015).

Foot massage has often been considered a supportive or secondary intervention in diabetes care. However, the consequences identified in this analysis—such as improved comfort, sleep, and self-care behaviors—suggest that it may hold more central value, especially in contexts where pharmacologic treatment is insufficient or limited. As previous studies have shown, non-pharmacological therapies including foot massage can

significantly reduce physical discomfort and enhance patients' quality of life (Ben-Arye et al., 2015; Lindquist et al., 2014). Moreover, foot massage may function as a gateway behavior to greater self-awareness and responsibility in daily diabetes management, as also discussed in theories of health behavior change.

Importantly, this analysis highlights that the therapeutic value of foot massage depends not solely on the mechanical act itself but on its intentional use within a caring and structured framework. The model case presented demonstrates how foot massage, when integrated into a patient's routine and supported by caregivers or health professionals, can serve as a source of physical relief and emotional support. In contrast, the borderline and related cases show that practices lacking clinical purpose or patient involvement may fail to deliver meaningful outcomes. These comparisons reinforce the need to define foot massage not only by what is done, but how and why it is done, consistent with the epistemological distinction in nursing between technical and intentional care (Walker & Avant, 2019).

The antecedents and consequences derived from this concept are also significant for nursing education and clinical decision-making. Understanding that foot massage requires patient readiness, knowledge of diabetes complications, and availability of a skilled provider underscores the importance of interprofessional collaboration and patient education. The consequences—especially reductions in neuropathic symptoms and increases in foot care adherence—align with nursing goals of promoting comfort, prevention, and self-management (American Diabetes Association, 2021; Habibzadeh et al., 2017).

Finally, the identification of empirical referents suggests that the concept of foot massage can be operationalized and measured using both clinical and patient-reported outcomes. This expands its relevance for future nursing research and evidence-based practice. Tools such as VAS for pain, Doppler for circulation, and self-care adherence checklists provide feasible means for evaluating interventions and establishing protocols for foot massage in diabetic care settings.

Conclusion and Recommendation

This concept analysis clarified the meaning, attributes, and applications of foot massage among diabetes patients, particularly those affected by peripheral neuropathy. The findings demonstrate that foot massage is not merely a physical intervention but a multidimensional practice encompassing therapeutic intention, symptom relief, psychological comfort, and support for patient self-care. Through identifying its defining attributes, antecedents, consequences, and empirical referents, this study provides a clearer framework for understanding how foot massage can contribute meaningfully to holistic diabetes management. The concept was shown to be particularly valuable in promoting circulation, reducing pain, enhancing relaxation, and improving adherence to foot care routines, which are all essential components in the prevention of diabetes-related foot complications.

For clinical nursing practice, the findings of this concept analysis underscore the importance of incorporating non-pharmacological and complementary therapies like foot massage into standard diabetes care plans. Nurses and other healthcare professionals should consider foot massage not only as a supportive intervention but also as an opportunity for therapeutic engagement, patient education, and empowerment. Incorporating structured foot massage protocols within diabetes education programs may enhance patient outcomes, particularly when combined with culturally sensitive care and caregiver training.

In terms of future research, this concept warrants further empirical investigation through qualitative and quantitative studies to validate its effectiveness across diverse populations and healthcare settings. Interventional studies can help determine optimal frequency, technique, and duration of foot massage, as well as explore patient satisfaction and long-term clinical benefits. In addition, nursing curricula may benefit from including conceptual education on

complementary therapies such as foot massage to expand the scope of practice in chronic care management. Clarifying this concept supports the advancement of holistic, person-centered nursing and strengthens the theoretical foundation for integrating alternative modalities into evidence-based diabetes care.

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Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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