



Harshi Pathiraja and Nirmani Wijebandara

# Experiences of patients with diabetic foot ulcers

A descriptive literature review

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Authors	Harshi Pathiraja Nirmani Wijebandara
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Purpose and aim - This descriptive literature review was conducted to describe patients' experiences with diabetes foot ulcers and how diabetic foot ulcer affects patients' quality of life. The aim of this literature review was to produce new knowledge that could be utilized to improve the holistic care approach in clinical nursing practices.

Methods –Data were collected from databases CINAHL and Medline according to the inclusion and exclusion criteria. Fourteen articles were selected through PRISMA. Inductive content analysis was conducted to analyse the data.

Results – The review formed three generic categories as physical experiences, social experiences, and psychological experiences under the first study question of experiences of patients with a diabetic foot ulcer. Under physical experiences, disturbed body image due to swelling and redness also disturbed body functions due to pain and sleep disturbances were identified as the main experiences. Under the social experiences, social isolation due to the embarrassment of the wound was the main experience. Under the psychological experiences, the main experiences were fear and stress on amputation, worry about an uncertain future, and stigma due to isolation. In the second study question, the effect of diabetic foot ulcer on patient's quality of life three generic categories was identified as negative physical effect negative psychological effect and negative social effect. Accordingly, in the physical effect, altered body image and altered physical mobility and energy negatively affect the quality of life. Under the social effect, mainly the inability to socialisation due to body image and limitations of recreational activities negatively affect quality of life. Under the psychological effect, unhappiness due to changes in normal life and anxiety and worry negatively affect on quality of life.

Conclusion – The findings revealed that patients were burdened physically, psychologically, and socially due to diabetic foot ulcer. Also, diabetic foot ulcer negatively affects patient's quality of life physically, psychologically, and socially. The results lead to the conclude that physical experiences presence with diabetic foot ulcer including pain, altered body image, sleep disturbances, and reduced energy and immobility, negatively affect the psychosocial well-being of patients with diabetic foot ulcers hence, it is important to pay more attention to physical care along with psychosocial support.

Key Words	Diabetes. Diabetic foot ulcer, Patient's experiences, Quality of life
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# 1 Introduction

Diabetes mellitus is a chronic metabolic condition which possibly causes vision problems, limb amputations, kidney damages, nerve defects and can cause myocardial infarction (WHO 2022). Nonetheless, there is no cure for diabetes mellitus. Across the world, approximately 415 million adults are suffering from diabetes mellitus. It is assumed the population with diabetes will increase by more than half a billion by 2040. (Centres for Disease Control and Prevention 2021.) In Europe, 58 million people are suffering from diabetes and assumed it will increase to 66.7 million by 2045 (International Diabetes Federation IDF 2019). In Finland, relatively 8.2% of the population is enduring from diabetes mellitus (Finnish diabetes association 2022).

Patients with diabetes mellitus undergo a 25% the risk of having diabetic foot ulcers during their lifespan (Singh, Armstrong & Lipsky 2005: 217). Developing a diabetic foot ulcer is a major health problem for patients suffering from diabetes mellitus, due to a high risk of lower limb amputation. Approximately, 50% of non-traumatic amputations are related to diabetes. (Holt & Kumar 2015: 81.) According to International Diabetic Federation (IDF), every second a patient loses a lower limb due to diabetes somewhere in the world. Patients face mobility and mortality problems due to the poor prognosis of diabetic foot ulcers which affect their standard of living (Edmonds et al 2018 cited in Kerr 2017: 229). Moreover, because of the ulcer or the amputation of the foot or the limb, patients face a psychosocial burden throughout their life (Nielsen, Bergenholtz & Madsen 2021:1). Studies illustrate that diabetic foot ulcers significantly affect the quality of life, of a patient with a diabetic foot ulcer than a diabetes patient without a diabetic foot ulcer, due to the pain and less activity level (Macioch et al 2017: 1; Miller 2006: 1336). Diabetic foot ulcer patients experience limitations in their ability to participate as a character in family and society. As well as limited activity level affects the patient psychologically. (Vileikyte, Pouwer & Gonzalez 2019: 1.)

Accordingly, the purpose of this review is to describe the experiences of patients with diabetic foot ulcers and how diabetic foot ulcers affect patients' quality of life, through a descriptive literature review. This study aims to produce new knowledge that could be utilized to improve the holistic care approach in clinical nursing practices.

## 2 Background

Diabetes Mellitus is a metabolic disorder in which blood glucose levels are consistently high because, the pancreas cannot properly control blood glucose levels due to lack of insulin or resistance to insulin or both (Hinkle & Cheever 2018: 1457). Type 1 diabetes mellitus and type 2 diabetes mellitus are the common variants of diabetes. In type 1 diabetes mellitus, due to an autoimmune process that damages the insulin producing beta cells, insulin synthesis in the pancreas decreases. This usually begins in childhood or adolescence. Insulin is required for the survival of people with diabetes mellitus type 1. (Winell 2013: 7.)

The autoimmune mechanism in diabetes mellitus type 1 damages the pancreas' beta cells. This causes complete insulin deficiency. The disease is considered to begin because of environmental influences on genetically predisposed individuals. (Hinkle & Cheever 2018: 1457.) In type 2 diabetes mellitus insulin secretion is insufficient because patients have developed insulin resistance. High fasting blood glucose levels and postprandial blood glucose levels cause hepatic insulin resistance and peripheral insulin resistance. This is often in people over the age of 30. Because of the growing epidemic of obesity in children, adolescents, and young adults, the prevalence of diabetic mellitus is increasing enormously among the younger generation. (Brutsaert 2020.)

### 2.1 Prevalence and incidents of diabetes

Diabetes has developed into a crucial worldwide health problem (Tuglo et al 2022: 602). Diabetes affected an estimated 463 million people in 2019, with an incidence rate of 9.3% among elders. Diabetes incidence has risen by 62% from 2009 to 2019 and it is expected to increase to 10.2% and 10.9% by 2030 and 2045 respectively. Around 80% of the world's diabetic community lives in underdeveloped countries. (Adeyemi, Olatunji, Adetunji & Rehal 2021: 1.)

Diabetes is the fastest-growing disease worldwide as well as in Finland. It affects about 500,000 Finnish people, and treatment costs account for about 15% of Finland's healthcare spending. In Finland, the number of people with Type 2 diabetes mellitus

increased dramatically in the early 2000s. Type 2 diabetes mellitus affects nearly 75% of the diabetic population and Finland has the highest occurrence of diabetes mellitus type 1 in the world. In Finland, type 1 diabetics account for 10% –15 % of all diabetes. Between 1992 and 2002 the number of people with Type 1 diabetes mellitus in Finland grew by 38%. The incidence increased from 35 to 65 instances between 1990 and 2005 but since 2005 remains the same level. (The Finnish Association of Internal Medicine and the Medical Council of the Diabetes Association 2020.)

## 2.2 Symptoms and complications of diabetes mellitus

Hyperglycaemia insulin resistance and beta cell dysfunction are common in patients with diabetes mellitus type 2. Causes for type 2 diabetes are unknown but influenced by hereditary factors as well as food, exercise, and lifestyle. (Winell 2013: 7.) Increased thirst, frequent urination, increased appetite, and unintentional loss of weight are the main symptoms of hyperglycaemia. Rapid, difficulty in breathing, changes in vision, exhaustion, nausea, vomiting, dehydration, ketoacidosis, non-healing wounds, and infections are other common symptoms of diabetes mellitus. (Hinkle & Cheever 2018: 1458.)

Besides, long-term hyperglycaemia patients develop several diabetes mellitus complications including microvascular complications, macrovascular complications, or both. Microvascular complications are nephropathy, neuropathy, and retinopathy. (Brutsaert 2020.) Diabetes retinopathy affects eyesight, and it is known as a primary cause of optical disability and blindness among patients with diabetes mellitus (Dialo et al 2018: 753). Whereas diabetes nephropathy is a frequent complication that effect on kidneys. Nearly 40% of type 2 diabetes patients suffer from kidney damage. (Quan, Yap, Jahan & Pillai 2021: 2.) Diabetes neuropathy attacks the peripheral and autonomic nerves. The frequent type of neuropathy is called distal symmetric neuropathy where higher and lower extremities are affected. (Feldman et al 2019: 1.) Microvascular disease hinders skin healing causing tiny skin breaks to turn into deeper wounds that are quickly infected, especially in the lower extremities (Brutsaert 2020). Diabetic neuropathy and peripheral arterial disease are the primary cause of diabetic foot ulcers which include alterations in foot anatomy, sensation, movement, and circulation (Ledoux et al 2013: 621). Macrovascular complications include coronary artery disease which damages the

heart, cerebrovascular disease which damages the brain and peripheral arterial disease which narrow the vessels of lower extremities (Brutsaert 2020).

### 2.3 Diabetic foot ulcer

Diabetic foot ulcer is considered as one of the serious complications of diabetes mellitus. Besides, patients lived with fear of amputation and helplessness due to limitations in daily living. (Roupa et al 2021: 1032.) Approximately 5% of diabetes patients developed a diabetic foot ulcer while, 19% to 34% of diabetes patients have a risk of developing a diabetic foot ulcer during their lifespan (Eleftheriadou 2019).

Diabetic foot ulcer is described as, a full-thickness ulcer below the ankle of a diabetic patient which cannot predict the duration of healing and involves skin necrosis and gangrene (International Diabetes Federation 2007). Age, male identity, peripheral neuropathy, vasculopathy, smoking, trauma, and a history of diabetes for more than 10 years are all risk factors for diabetic foot ulcers (Tai, Hsieh, Lee & Los 2021: 1).

Globally, the prevalence of diabetic foot ulcers varies from 1.6% to 8.0% and this is estimated to increase by 19% by 2045 (Tuglo et al 2021: 601). Diabetic patients have a 25% risk of developing a foot ulcer in their lifespan. Diabetic foot ulcer has a greater hospitalization incidence rate and high death rate than other diabetic complications. Prologed deterioration leads to ulceration, necrosis, or amputation in critical cases. (Tai & Hsieh & Lee & Los 2021: 2.) In Finland, people with diabetes had a seven-fold higher risk of major amputation than people without diabetes (Winell 2013: 8). Diabetic foot ulcer can be prevented with the proper patient education about the disease and with regular foot examination (Adeyemi, Olatunji, Adetunji & Rehal 2021: 1).

### 2.4 Experiences and quality of life of patients with diabetic foot ulcer

Individuals' emotional, cognitive, social, sexual functions, and overall well-being as well as physical elements, all account into the quality of life (Stasini, Margari, Faso, Kelesi & Dafogianni 2020: 1073). The study has concluded that diabetic foot ulcer patients have

a decreased quality of life than diabetes patients without a diabetic foot ulcer. Similarly, the diabetic foot is linked to significantly reduced health-related quality of life in both physical and mental health. (Sekhar, Thomas, Unnikrishan, Vijayanarayana & Rodrigues 2015: 165.)

In the United Kingdom, a study was conducted on the topic of the impact of diabetic foot ulcer pain on patient's quality of life and pointed out that diabetic foot ulcer pain can be more severe and has a similar negative impact on quality of life than pain from other types of wounds. Diabetic foot ulcer impacts physically and psychologically on the patient's life, mostly concerning activities, social functions and sleep. Patients experience depression, loneliness, and loss of autonomy. Moreover, diabetic foot ulcers cause pain, when changing wound dressing and due to the pressure from the footwear. (Bradbury & Prince 2011: 32.) Diabetic foot ulcer-related pain has been recognized as a major clinical issue that negatively affects a client's quality of life (Obilor & Adejumo 2015: 129). Also, a study showed that the degree of ulceration significantly impacts the quality of life of patients with diabetic foot ulcers (Kudlová & Kočvarová 2020: 34).

In addition, a quantitative study investigated the health-related quality of life of patients with diabetic foot ulcers and results showed that leisure time (47.6%) physical activity (52%), and satisfaction (40%) moderately affect the quality of life (Stasini et al 2020: 1073). Diabetic foot ulcers reduce energy and mobility, which has a negative effect on work and everyday routines (Khunkaew, Tungpunkom, Sim & Fernandez 2018: 315). An explorative study highlighted that patients with diabetic foot ulcers experienced skin problems. The common foot alteration reported were cracked heels on the feet, dry skin, diminished sensitivity, and irritated skin. (Hjelm & Beebwa 2013:126.) A quantitative study highlighted that impaired body image was one of the strongest predictors of poor quality of life (Kizilkurt et al 2020: 109).

A study conducted in Singapore pointed out, proper foot care among diabetic patients was influenced by triggering factors such as the existence of diabetic neuropathy, educational status, economical background, social support, and previous experiences (Sayampanathan, Cuttilan & Pearce 2017: 1). A study from Iran showed that demographic data and clinical characteristics influenced on quality of life. In diabetes individuals without foot ulcers, men scored higher than women across all categories of quality of life. Patients with foot ulcers had the poorer health-related quality of life scores

when they lived alone, had less education, and had at least one complication. (Yekta & Pourali & Ghasemi-rad 2011: 393.) Besides, the study found that patients with diabetic foot ulcers used behavioural adaptation to minimize the negative out-comes (Beattie, Campbell & Vedhara K. 2012: 435).

Furthermore, a study conducted in Denmark shows some patients did not like to mention about amputation. They consider amputation as a death or punishment that occurs due to neglecting self-care. (Nielsen, Bergenholtz & Madsen 2022: 4.) Additionally, another study from Northern Thailand stated that patients worry and distress due to the thoughts of amputation (Khunkaew et al 2018: 310).

Diabetic foot ulcer decreases the quality of life and, results in a negative effect on the standard of life among people with diabetic foot ulcer. It limits the standards of living due to pain, oedema, fatigue, and large dressing. (Khunkaew et al 2018: 305.) Diabetic foot ulcer patients' quality of life was reduced due to diminishing capability to conduct activities as well as psychological elements namely enjoyment, comfort, self-esteem, anxiety, depression, and social adjustability (Stasini et al 2020: 1073).

Similarly, a systematic review highlighted that diabetes mellitus patients with a foot ulcer encounter anxiety and depression and they are also financially burdened, feel helpless, blame themselves, and believe that their lives are unpredictable (Alfaqih, Kusnanto & Padoil 2020: 120). A qualitative study conducted in the United States of America found that patients with diabetic foot ulcers experience social isolation and financial burden (Crocker, Palmer, Marrero & Tan 2021: 4). A study conducted in Sweden highlighted those patients had insufficient knowledge about the causes and treatment of diabetic ulcers, the patient's beliefs about diabetic ulcers were based on personal characteristics and supernatural power as well as patients had sought help from health professionals from clinics and hospitals (Hjelm & Beebwa 2013: 129).

In addition to that, a cross-sectional study was conducted in India with 200 diabetic foot ulcer patients with a control group of 200 diabetic patients without foot ulcers revealed that patients with diabetic foot ulcers experienced anxiety and depression due to lack of mobility and thoughts of the wound will be healed or not (Sekhar et al 2015: 170).

Moreover, patients with non-healing diabetic foot ulcers have a low quality of life resulting probability of amputation and a higher 5-year mortality rate. As 32% of patients with diabetic foot ulcer experience depression and this increases the risk of mortality. (Ismail, Winkley, Stahl, Chalder & Edmonds 2007: 1475.) Besides, a quantitative study explored the experiences of patients with diabetic lower limb amputation and the research study pointed out that there was a wide range of experiences, including physical, psychological, and financial difficulties. Amputees had to adjust to new responsibilities when their limbs were amputated. They also had some financial difficulties because of their incapacity to work. Some of the amputees found solace in their surroundings. (Amoah et al 2018: 1.) Furthermore, physical, social, and psychological components are interconnected because, pain and symptoms, delay mobility and physical activities which may alter psychosocial aspects of well-being (Brod et al 2014: 340).

In contrast, the study from Denmark documented, patients were believing in themselves and endured the treatments anticipating they will be recovered (Nielsen Bergenholtz & Madsen 2022: 4). Several research studies have emphasized the need for a holistic assessment to determine a patient's health-related quality of life. Researchers showed the need for health workers to be aware of the problems that patients with diabetic foot ulcers encounter. Knowledge about the consequences of long-term diabetic foot ulcers on a patient's quality of life is critical for treatment planning, compliance management, and patient communication. (Sekhar et al 2015: 165.)

Therefore, according to the literature diabetic foot ulcers have a negative effect on quality of life of the patients. Accordingly, to determine the overall improvement of patients with diabetic foot ulcers, healthcare providers must understand how diabetic foot ulcer patients' experiences affect their health care related quality of life. Subsequently, this study was conducted to describe the experiences of diabetic foot ulcer patients and how it affects the quality of life of patients with diabetic foot ulcers.

### **3 Purpose aims and research questions**

The purpose of this descriptive literature review is to describe experiences of patients with diabetes foot ulcers and how diabetic foot ulcer affects patient's quality of life.

Therefore, the aim of this literature review is to produce new knowledge that could be utilized to improve holistic care approach in clinical nursing practices.

The research questions are formed as follows.'

1. What are the experiences of patients with diabetic foot ulcers
2. How do diabetic foot ulcers affect patient's quality of life

## **4 Methodology and methods**

The methodological approach of this study is qualitative, and the method is descriptive literature review. Qualitative research focuses on identifying experiences, ideas, concepts, and uses words as the data (Moorley & Cathala 2019: 1). It describes lively strategy to recognize the fundamental of individual life (Hollow & Galvin 2016: 3). Quantitative research focuses on hypothesis and connection between variables. Facts and numbers are used as data to solve problems rather than feelings or opinions. (Glasper & Rees 2016.)

Accordingly, this study is conducted according to qualitative methodology hence, it describes the experiences of patients with diabetic foot ulcers to understand the individual life living with diabetic foot ulcers and how it affects a patient's quality of life.

A literature review is a critical evaluation and comprehensive synopsis based on applicable existing research (Glasper & Rees 2016). The goal of a literature review is to gather the current awareness regarding a selected topic and construct a new goal. A literature review should include a structured way of selecting literature and presenting it in a readable manner. (Cronin, Ryan & Coughlan 2008: 38) According to Glasper and Rees 2016 literature review is classified into five types, narrative review, systematic review, qualitative evidence synthesis, integrative review, and scoping review. Descriptive literature review entitled as a traditional method of reviewing the literature. It provides a comprehensive outline of existing research. There are five main purposes of descriptive literature review. They are, evaluate theory, summarise the state of knowledge about a subject in terms of what is known and what is unknown, identify problems in a field of knowledge, and present historical account of theory and research development within a field data search and selection. (Glasper & Rees 2016.)

In consequence to that, this study is going to conduct as a descriptive literature review to summarise the knowledge regarding the experiences of patients with diabetic foot ulcers in terms of identifying what is known and what is unknown.

#### 4.1 Data collection method

The researchers use electronic databases CINAHL and MEDLINE for literature search and select suitable literature published in English during the five years from 2016- 2021. PICO framework uses for planning search strategy as table 1 below.

The PICO in qualitative study describes as,

P- Population. What are the characteristics of the population? or patient or what is the problem, condition, or disease interested in?

I- Interest. Interest relates to a defined event, activity, experience, or process.

Co- Context is the setting or destined characteristics. (Murdoch University library 2022)

The results from the database along with the search terms presents in table 2 in appendix 1.

Table 1. PICO

P	Population	Patients with diabetic foot ulcers
I	Interest	experiences and affect the quality of life
Co	Context	Nursing

The database search was conducted according to the Boolean connectors “AND”, “OR” and “NOT”. Search terms use as the table 2 in appendix 1. According to the search terms, reviewers obtained 201 hits from CINAHL and 39 hits from MEDLINE for patient’s experiences of DFU. From those, 28 from CINAHL and 14 from MEDLINE were selected based on the title. Then from those, 12 articles from CINAHL and 11 from MEDLINE were selected based on the abstract. Finally, 5 articles from CINHAL and 4 articles from

MEDLINE were selected based on full text. Accordingly, the same process was applied for search terms regarding the quality of life related to DFU.

Table 3. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Patients with diabetic foot ulcers	Foot ulcers related to other diseases
Focus on patient's experiences	Experiences of people other than patients
Written in the English language	Written in languages other than English
Studies between 2016-2021	Studies before 2016
Peer-reviewed articles, primary studies	Articles published in non-academic sources, books, and postgraduate studies. Literature review

Reviewers obtained 215 hits from CINAHL and 144 hits from MEDLINE. From those hits, 23 from CINAHL and 63 from MEDLINE were selected based on title, and then from those, 14 from CINAHL and 43 from MEDLINE were selected based on abstract. Finally, 7 articles from CINAHL and 6 articles from MEDLINE were selected based on the full text.

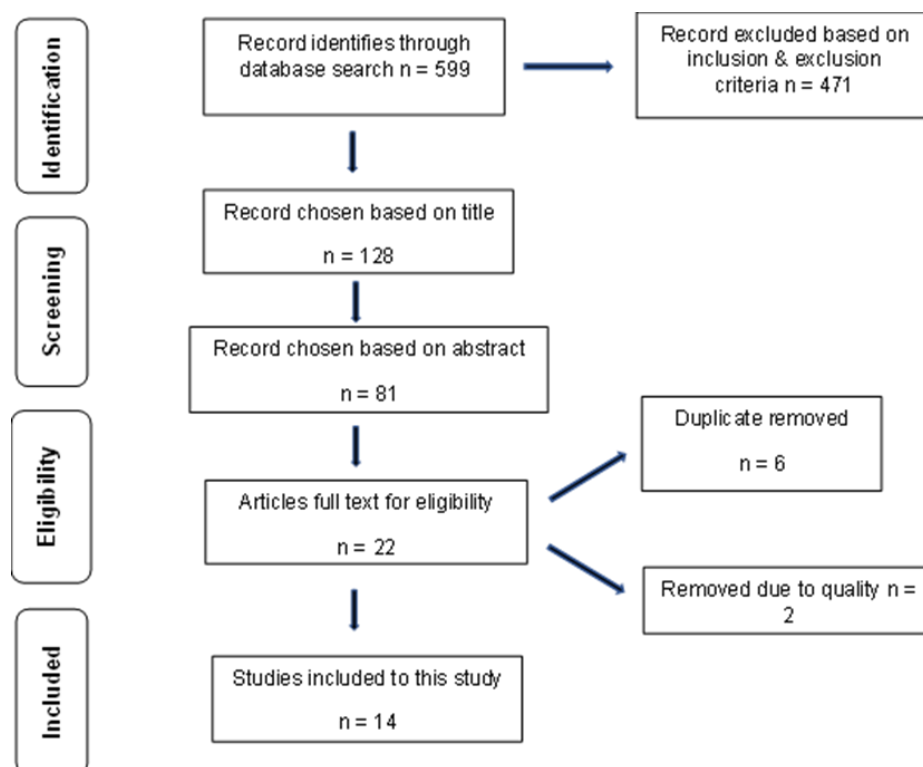


Figure 1. PRISMA

Reviewers obtained a total of 22 articles to conduct the study. The articles were selected according to the inclusion and exclusion criterias mentioned in table 3 above. The total number of articles obtained was 22, and after removing duplicate articles 16 articles were selected

PRISMA flow chart uses to display the diagrammatic study selection process. It is a vital part of the screening process. PRISMA diagram provides a transparent report of all screened articles eligible for final input of the literature review. (Glasper & Rees 2017).

Accordingly, identified data through database search  $n = 599$ , excluded based on inclusion and exclusion criteria  $n = 471$ , record chosen based on title  $n = 128$ , record based on abstract  $n = 81$ , articles full text for eligibility  $n = 22$ , from those 22 excluded due to duplicate  $n = 6$  and removed due to poor quality  $n = 2$ . Finally, 14 articles were selected to conduct this review. PRISMA flow diagram in figure 1 above.

## 4.2 Data selection

After data base search, evaluated the quality of the articles, to obtain good quality studies to conduct the data analysis. To evaluate the level of quality of journals, the journals were checked through publication channel search, Publication Forum 2022. According to the Publication Forum 2022, there are three level of classification as level 1-basic, level 2- leading, level 3- top. The journals which are not meet the criteria of level 1 are marked as 0. If there is not rating the journal is under evaluation. The journals of the selected articles were classified as follows accordingly.

Under the level 1; International Journal of Lower Extremity Wounds, International Wound Journal, Advances in Nursing Science, Journal of wound care, International Journal of Caring Sciences, Biomed central, Annals of palliative medicine, Journal of Transcultural Nursing, Journal of Wound Ostomy and Continence Nursing. Under level 2; Journal of Clinical Nursing, ELSEVIER, Marked 0 ; British journal of Nursing, No marking; Pacific Rim International Journal of Nursing Research, The Diabetic foot Journal.

Critical appraisal is the method of evaluating the quality of a research article for scientific standard and implementation, theory, guidance, or further research (LoBiondo-Wood & Haber 2021: 22). Critical Appraisal Skill Program (CASP) tool uses to assess the quality of the article itself. The CASP considers three main criteria, the validity of results, what are the outcomes, and the relevance of the outcomes.

By utilising Publication Forum and CASP tool, the obtained articles were evaluated to select good quality articles. Based on that, studies from no-marking journals were removed. Although one journal rated as 0, the article was selected due to its quality according to the CASP tool. The main findings of chosen studies were presented in table 4 in appendix 3. After removing, according to the quality appraisal 14 articles were chosen for analysis. Both qualitative and quantitative studies were selected based on 14 articles reviewed, three each from Indonesia and Greece, two studies each from South Korea, and the remaining studies were from Singapore, Thailand, China, Turkey, Slovak Republic, and Canada. In total, five studies used a qualitative approach, and nine studies used a quantitative approach. The commonly used qualitative designs were grounded theory and phenomenological. The sample size for the qualitative studies ranged from 9 to 40. All quantitative studies used cross-sectional designs with a sample size of participants ranging from 97 to 525. The studies included patients with type 2 diabetic mellitus, patients with diabetic foot ulcers and patients who had undergone major or minor amputation.

### 4.3 Data analysis

Content analysis is an analytical coding and categorising, uses for probing a considerable quantity of contextual information to decide the pattern of words utilizing their recurrence, co-relation, and structure (Vaismoradi, Turunen & Bondas 2013: 398).

The purpose of content analysis is to construct a model to define the phenomenon in a theoretical frame. Content analysis can apply to both qualitative and quantitative data in an inductive and deductive way. Inductive content analysis can utilize in situations where not sufficient literature in connection with the circumstances or when it is altered. When the general aim was to test a previous theory in a contrasting background or compare categories across time, a deductive method is used. The main phases of inductive content analysis are preparation, organizing, and reporting. There are three processes that consist of opening cords creating and categorizing cords. When forming categories, content-specific words are used to name each group. Subcategories containing comparable events and incidents are combined into categories, and the categories are combined into main categories. (Elo & Kyngas 2008: 107.) Accordingly, in this study inductive content analysis was applied. A table was created to utilize for the content analysis.

Columns were titled as, meaning unit, coding or reduction, subcategory, generic category, and main category. All the selected articles were numbered from one to fourteen. Then, meaning units were selected from each article. A meaning unit was a statement from the patient or a statement from the researcher. Content analysis was applied to both research questions separately. Then, reduced the meaning units into simpler sentences and subcategorized them into meaningful words. Developed a generic category according to the subcategory and emerged as the main category. As shown in

Table 4. Content analysis

Meaning unit	Reduction/ coding	subcategory	Generic category	Main category
What are the experiences of patients with diabetic foot ulcer.				
Most of the patients mentioned that they were afraid of losing their feet (Article 4)	Most were afraid of losing foot	<ul style="list-style-type: none"> <li>• Worry</li> <li>• Fear of amputation</li> <li>• Anxiety</li> <li>• Stress</li> </ul>	Psychological effect of having an ulcer	Experiences of patients with diabetic foot ulcer
'Now I am no longer actively participating in gatherings, especially in parties' 'I feel ashamed to attend weddings and gatherings because of the wound' (Article 5)	Social isolation due to embarrassment of the wound	<ul style="list-style-type: none"> <li>• Isolation</li> <li>• Ashamed</li> <li>• Loneliness</li> </ul>	Social experiences	Experiences of patients with diabetic foot ulcer
How diabetic foot ulcer affects patients' quality of life				
QoL among women with DFU was significantly worse than that of men with DFU for all domains, women with body image problems may experience worse QoL than men. (Article 11)	DFU negatively effect on gender and body image related quality of life.	<ul style="list-style-type: none"> <li>• Negative effect</li> <li>• Altered body image</li> <li>• Gender</li> <li>• Quality of life</li> </ul>	Negatively affects physical domain of quality of life	affects diabetic foot ulcer on quality of life
study found the presence of a DFU was a predictor of worse HRQOL in the domains relating to diabetes control, social burden, anxiety and worry, energy and mobility and other health problems and diabetes complications (Article 8)	DFU negatively affects health-related quality of life	<ul style="list-style-type: none"> <li>• negative effect</li> <li>• quality of life</li> <li>• physical</li> <li>• social</li> <li>• psychological</li> </ul>	physically, socially, and psychologically negative effect	Effect of DFU on quality of life

Table 4 above, content analysis was applied to fourteen selected articles, and results were summarised.

## 5 Outcomes

According to the analysis, researchers obtained three generic categories as Physical experiences, Social experiences, and Psychological experiences under the main category experiences of patient with diabetic foot ulcer as shown in figure 2. Additionally, under the main category effect of diabetic foot ulcer on patient's quality of life three generic categories were identified, Negative physical effect, Negative social effect, and Negative psychological effect as shown in figure 3.

### 5.1 Physical experiences of patients with diabetic foot ulcers

Based on the inductive content analysis of the data, four subcategories were formed under the generic category of physical experiences of patients with diabetic foot ulcers. Those four subcategories were: Disturb body image due to swelling and redness, Disturb body functions due to pain and sleep disturbance, Physiological barriers for self-care, and Behavioural adaptation due to future outcomes.

Patients with diabetic foot ulcers experience pathological skin changes in the foot. Patients have experienced skin redness and foot swelling. Altering physical appearance impacts a patient's body image since a diabetic foot ulcer reduces the patient's beauty and affects their personal life.

I didn't care at first, but the next day my foot started to swell and get red, so I went to the doctor. The doctor said I should take parenteral antibiotics, so I thought that there was something bad going on. (Meric, Ergun, Meric, Demirci & Azal 2019: 32.)

Additionally, patients experience painful sensations and sleep disturbances in coping with diabetic foot ulcers. Their daily lives have altered because of these physical discomforts. Also, the feeling of pain reduced mobility and impaired body functions.

I find it difficult to move and feel pain whenever I walk. I find it difficult to carry out daily activities and sleep at night due to the continuous feeling of a hot, burning sensation. (Suza, Eltrikanawati, Tarigan, Setiawan & Gunawan 2020: 24.)

Besides, diabetic foot ulcers heal poorly due to aging, diseases, and other factors. Some patients have encountered a variety of problems that make it difficult for them to do foot self-care.

Multifaceted conditions affected participants' ability to keep up with good foot care practices to prevent or postpone foot ulcerations such as inspecting the bottom of their feet and self-management of their active diabetic foot ulcer. (Costa, Tregunno & Camargo-Plazas 2020: 328).

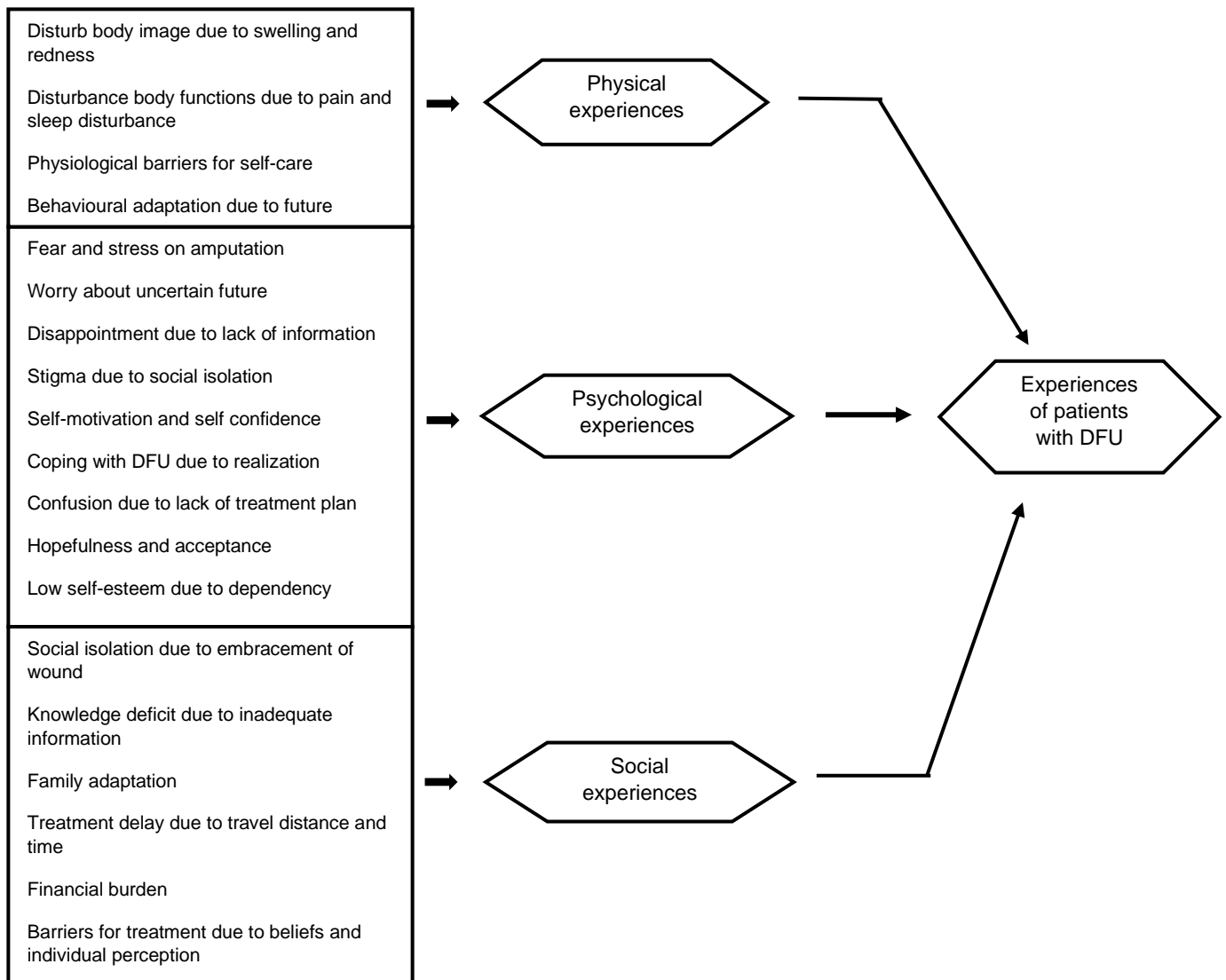


Figure 2. Experiences of patients with diabetic foot ulcer

In addition, most patients used behavioural modification to overcome physical discomforts and to prevent negative outcomes in the future. Patients, therefore, encourage compliance with treatment plans and change their own lifestyles.

The fear of having further lower extremity amputation motivates him to take care of his wound and to follow doctor's orders (Costa, Tregunno & Camargo-Plazas 2020: 327). Posttreatment changes include external physical and functional changes such as the foot's shape and walking abilities, as well as changes to daily lives regarding maintaining jobs or hobbies. (Lee & Chang 2019: 534).

## 5.2 Social experiences of patients with diabetic foot ulcers

Seven subcategories were identified under the main generic category of social experiences of patients with diabetic foot ulcers based on the inductive content analysis of the data. Those seven subcategories were: Social isolation due to embarrassment of the wound, Knowledge deficit due to inadequate information, Family adaptation, Treatment delay due to travel distance and time, Financial burden, Barriers to treatment due to beliefs and Individual perception, and Seeking health care facilities.

Patients have mentioned their feeling of shame and stigma about other people's perceptions; therefore, they tend to withdraw from social gatherings. Further, they have talked about their embarrassment at having a diabetic foot ulcer and their lack of confidence in socializing.

Now I am no longer actively participating in gatherings, especially in parties' 'I feel ashamed to attend weddings and gatherings because of the wound. (Suza, Eltrikanawati, Tarigan, Setiawan & Gunawan 2020: 24).

Further, when people seek information about diabetic foot ulcers, some are not adequately guided. Thus, patients experience a lack of knowledge due to inadequate information from health care professionals. Even though they participated in diabetes clinics they lacked a clear awareness about the occurrence and treatments for diabetic foot ulcers.

Actually, yeah. That's one thing that it came out in the diabetes class.... Not so much, ulcers, mostly about amputation, but nothing too much about ulcers. . . . Yeh! Through my diabetic education, they don't mention ulcers. They mention about amputation and stuff like that, but ulcers were a new thing for me. (Costa, Tregunno & Camargo-Plazas 2020: 329.)

Moreover, due to traveling time and long distances to the facilitated treatment locations, some participants have encountered treatment delays. They are required to visit treatment facilities once a week for wound care treatments as there are fewer facilitated treatment centres nearest to their cities. They tend to get treatment from facilitated treatment centres that are far away from them. Therefore, the distance to wound care facilities prevented patients from receiving continuous treatment for their diabetic foot ulcer.

Participants who live in a small town need to travel every week or so to have access to foot care or wound care services. Toby who needs to travel 50 miles (80.5 km) to access the wound care services confirmed: "Like, they want me to come once a week and there's sometimes when I can't just get

here financially. We come 50 miles each way. So that's 100 miles we have to travel, round trip. (Costa, Tregunno & Camargo-Plazas 2020: 330.)

Additionally, participants experienced financial issues when seeking treatments. They stated that the high cost of boots prevented them from continuing their treatments. Despite having treatment alternatives such as wearing boots to prevent diabetic foot ulcers, they were quite expensive, so they must spend a lot of money on them.

I can't afford off-loading boots. And disability wouldn't cover that. But they're expensive. Last pair I wanted to get was \$710. Not that I wanted to get, but they thought I should have, because they're made to fit your feet. (Costa, Tregunno & Camargo-Plazas 2020: 331.)

Also, different individual perceptions and social misbeliefs had experienced by the participants when accepting diabetic foot ulcers. Some patients have expressed their social myths regarding the onset of diabetic foot ulcers. They believed that diabetic foot ulcers were developed due to the supernatural power of someone. Additionally, some of the patients stopped their treatments for an extended period because they believed their disease condition to be normal, which ultimately had negative effects. Therefore, social beliefs and individual perceptions were a few of the barriers to taking proper treatments.

People in my village said that my wound was caused by supernatural transfer from someone through black magic. Usually, some people who are jealous of me. (Suza, Eltrikanawati, Tarigan, Setiawan & Gunawan 2020: 24.)

I had diabetes long ago...but I have never taken any diabetes medicine, you know...I just take it (diabetes) as normal...because I need to upgrade my (work-related) skills...focus on my work trainings and career...I wanted (blood glucose level) 7 to 8 (mmol/dl) but that time (before amputation) mine was 15 (mmol/dl).(Zhu et al.2021: 854.)

For some individuals, family adaptation significantly contributed when dealing with diabetic foot ulcers. Patients received adequate support from their families. They expressed that family members were paying attention to them and, they had clear awareness regarding the disease. Additionally, their family supported, and encouraged them. So, they could accept their diabetic foot ulcers with hope.

My family adapts. They're on me all the time, because sometimes, I'm not always in the boot, and if they come in and they see it, they lose their crap. Mom, get your boot on." Sometimes I forget, sometimes it's too hot . . . . For me it is good to know that she cares about me and brings more hope for those days that I feel down. (Costa, Tregunno & Camargo-Plazas 2020: 330.)

Furthermore, most of the patients try to seek more information regarding healthcare facilities for foot care. Most of them get information from wound care clinics and health

care agencies. They were satisfied with the guidance and resources provided to them for future, better healthcare. So, they accept the disease with hope.

Most participants also valued the support they received from health care providers at the wound care clinic and at the health care agencies. They highlighted that the having a place to go and someone to guide them provides huge support and helps them in keeping up with their own foot care. (Costa, Tregunno & Camargo-Plazas 2020: 329.)

I was advised to visit the hospital after I found no changes in my wound. (Suza, Eltrikanawati, Tarigan, Setiawan & Gunawan 2020: 25).

### 5.3 Psychological experiences of patients with diabetic foot ulcers

Based upon the inductive content analysis nine sub-categories were identified under the generic category of psychological experiences. As, Fear and stress on amputation, Worry about an uncertain future, Disappointment due to lack of information, Stigma due to social isolation, Self-motivation, and self-confidence, Coping with diabetic foot ulcer due to realization, Confusion due to lack of treatment plan, Hopefulness and acceptance, and Low self-esteem due to dependency.

Most patients stated a psychological burden due to losing their feet. They encounter fear and anxiety and live in a dilemma about what will be happened next in their lives. They have uncertainty about their future which increases their anxiety. Nevertheless, some patients desired to accept the reality by removing the affected area of the foot.

Most of the patients mentioned that they were afraid of losing their feet (Ergün & Demirci 2019: 32).

I thought it would be gangrene. In fact, I didn't have the heart to say it, but I was afraid. Finally, I thought that if they did cut off my foot, it would be a relief to me. (Ergün & Demirci 2019: 33.)

In opposition, some patients motivated themselves to accept the reality and not surrender before the diabetic foot ulcer. Inspired themselves and follow the treatment with anticipation. They were ready to accept their current situation.

I'm trying to cheer myself up. If I get stressed and say Oh my foot!', it would be bad for me. So, I haven't, and I've told myself there will definitely be a treatment. I'll follow the treatment. I feel good. I hope I'll be well. (Ergün & Demirci 2019: 32)

Besides, some patients understand their damage and are motivated to follow the treatment to avoid an amputation again. Endure the burden of amputation awake their rationalization and fear of losing a foot

The fear of having further lower extremity amputation motivates him to take care of his wound and to follow “doctor’s orders. (Costa & Tregunno & Camargo-Plazas 2020: 327.)

However, some individuals worried about losing their feet and they would live with a cane rest of their life. They were trouble thinking about how they would continue their life with one leg. They expected to preserve their leg as it feels incomplete and ashamed of living with one leg.

I was worried. I asked myself what I would do if my foot was cut off or how I would walk with a cane. I wish I didn’t have to have it done. I’ll feel incomplete if I become someone with only one leg. (Ergün & Demirci 2019: 33.)

Additionally, patients are concerned about the burden their families endure due to the disease. Even though, family members support them, patients hold low self-esteem because of dependency. They expect to be recovered as it led to independence.

My family is on my side and always takes care of me. My children haven’t had their own lives because of me. If my foot gets better, I’ll go everywhere, I wouldn’t disturb my wife or my daughter. Now, look I can’t walk, I’m dependent on my family. (Ergün & Demirci 2020: 32.)

However, patients develop anxiety due to sudden changes in their life. They maintain an ordinary life until a diabetic foot ulcer occurs. As a result of a delay in wound healing patients experienced fear and disappointment. In addition, their fear and anxiety progress with long-term hospitalization which ultimately lead to stress and depression.

I don’t know how my feet became like this. I was behaving normally, but suddenly I felt like I had foot odour. So, I looked at my feet, and they were severely wounded like this. I am anxious because I feel like there seems to be no change in me wound during treatment. I was hospitalized, and I wonder when I will be able to leave the hospital. I feel frustrated. (Lee & Chang 2019: 533.)

#### 5.4 The negative physical effect of diabetic foot ulcers on quality of life

Under the main generic category of negative physical effect of diabetic foot ulcers on quality of life, the following subcategories were created through the inductive content analysis of the data process. The subcategories were: Altered physical mobility and energy, Altered body image, Demographic data, clinical characteristics, and the severity of diabetic foot ulcer.

The negative effect of diabetic foot ulcers on quality-of-life results in large part from decreased mobility. The inability to conduct regular functions and engage in relaxing activities are directly influenced by the lack of mobility. The study that interviewed 145 patients with diabetic foot ulcers showed that diabetic foot ulcers exert a negative effect on physical functioning.

The quality of life of diabetic foot patients is influenced by chronic diastolic aetiologies at their lower extremities. to a moderate degree in the availability of free time for patients. to a negative effect on physical condition with an impact on daily life difficulties patient's life. (Stasini, Margari, Fasoi, Kelesi & Dafogianni 2020: 1078.)

Also, diabetic foot ulcers negatively affect gender and body image-related quality of life. This study examined body image as a mediator in the connection between gender and quality of life among 201 patients with diabetic foot ulcers. They revealed that the connection between gender and quality of life was totally mediated by body image. The findings were in every domain, the quality of life for women with diabetic foot ulcer was markedly lower than it was for men with the condition. Women with body image concerns may also have a lower quality of life than men. (Putri et al 2012: 661.)

Further, the demographic data and the clinical characteristics of the patients with diabetic foot ulcers negatively affect the quality of life. The cross-sectional study of 525 patients with diabetic foot ulcers showed that there were significant negative relationships between demographic information including age, the period of diabetes mellitus, the length of therapy for diabetic foot ulcers, and a lower level of quality of life. Thus, the quality of life of patients with diabetic foot ulcers is influenced by sociodemographic factors and clinical traits. (Nemcovà et al 2016: 1245.)

In addition, the gravity of diabetic ulcers negatively affects the quality of life. According to the study's findings, the quality of life of diabetic ulcer patients and the grade of their ulcers are significantly correlated ( $p < 0.001$ ). The presence of an ulcer with a higher Wagner classification is associated with lower ratings across all dimensions of quality of life. (Nurhikmah, Gayatri & Nuraini 2019: 3.) In addition, according to Wagner classifications, a statistically significant correlation was shown between the severity of diabetic foot ulcers and quality of life. Patients with higher diabetic foot ulcer grades received noticeably lower physical scores ( $p = 0001$ ). (Nemcovà et al 2016: 1245.)

## 5.5 The negative social effect of diabetic foot ulcers on quality of life

Under the main generic category of negative social effect of diabetic foot ulcers on quality of life, the following subcategories were created through the inductive analysis of the data process. The subcategories were: Inability to socialize due to body image, Limitation of recreational activities, Social burden, and Economical burden.

Qualitative studies have proved clinical assessment that diabetic foot ulcer patients have a significant negative social effect. The qualitative cross-sectional study of 201 patients with diabetic foot ulcers showed that women who have diabetic foot ulcers unable to participate in religious rites, which affect their quality of life. Due to issues with body image, women with diabetic foot ulcers have issues participating in religious activities. Their religious affiliation may be impacted, which would ultimately result in a decrease in happiness and quality of life. Women's daily lives are disturbed by body image issues, particularly those who engage in religious or cultural traditions that require a fine body image. These problems possibly impact how happy they are. Hence, this study illustrated the inability to socialize with patients with diabetic foot ulcers due to body image. (Putri et al 2021: 661.)

In addition, the presence of diabetic foot ulcer negatively affects the quality of life as it caused to limitation of recreational activities The use of leisure time was found to have a modest negative impact on the quality of life for diabetic foot ulcer patients. Concerning the types of recreational activities, 47.6% changed simply. (Stasini, Margari, Fasoi, Kelesi & Dafogianni 2020: 1073.)

Moreover, chronic wounds can have unpleasant odours and bulky dressings. This affects a person's social life negatively. In the domains of social burden, the presence of diabetic foot ulcers was found to be a highly significant predictor of poor quality of life. (Khunkaew, Fernandez & Sim 2019: 6.)

In addition, a cross-sectional study of 97 patients with diabetic foot ulcers showed the economic and social burden of the presence of diabetic foot ulcers. According to the study's findings, social and economic status significantly affect patients with diabetic foot ulcers' quality of life ( $p = 0.007$ ). Patients with diabetes mellitus who have a lower socioeconomic position, elderly people, and feminine gender tend to have a lower quality

of life in general. Due to the high costs of controlling diabetic ulcers, people with lower incomes experience more difficulties than those with higher incomes. (Nurhikmah, Gayatri & Nuraini 2019: 3.)

## 5.6 Negative psychological effect of diabetic foot ulcer on quality of life

In reference to the generic category, three subcategories were identified according to inductive content analysis on the negative psychological effect of diabetic foot ulcers on quality of life. They were Unhappiness due to changes in normal life, Anxiety and worry, and Low psychological tolerance.

According to a quantitative study done with 502 participants, the existence of a diabetic foot ulcer negatively affects the patient's quality of life more than the patient without a diabetic foot ulcer. The study shows the anxiety and worry of a patient with a diabetic foot ulcer are notably greater than a patient without a diabetic foot ulcer. The bad odour, unable to mobilize voluntarily, and severe pain ultimately increase the worry and anxiety which finally lead to depression. (Khunkaew et al 2019: 6.)

In contrast to that, a study done to understand the role of psychological resilience in the quality of life of patients with diabetic foot ulcers shows that low psychological resilience is a potential risk factor for quality of life. According to the study, of 30% of individuals with superficial ulcers, 17% have low psychological resilience whereas 13% have high psychological resilience and, from 51% of individuals with an extension ulcer, 40% have low psychological resilience whereas 11% have high psychological resilience. Accordingly, the study shows that the extension of the foot ulcer significantly affects the psychological resilience of the patient. (Kuang et al 2021: 5614.)

Besides, a study done among Visegrad countries shows that patients with higher grades of diabetic foot ulcers considerably affect the psychological domain of quality of life. Additionally, the study stated duration of the diabetic foot ulcer and older age notably affect all domains of quality of life in patients with diabetic foot ulcers. (Nemcová et al 2016: 1250.) In addition to that, a quantitative study done in Greece with 195 patients stated that patients with diabetic foot ulcers are more prone to develop depression

compared to diabetic patients without foot ulcers. According to the study, patients age more than 60 years are more subjected to depressive symptoms when they have diabetic foot ulcers. The study stated eight dimensions of quality of life, bodily activities, physical character, emotional character, energy/fatigue, psychological well-being, social functioning, pain, and overall- wellness. Accordingly, the study identified all the dimensions of quality of life were statistically and considerably related to anxiety and depression. (Polikandrioti et al 2020: 172.)

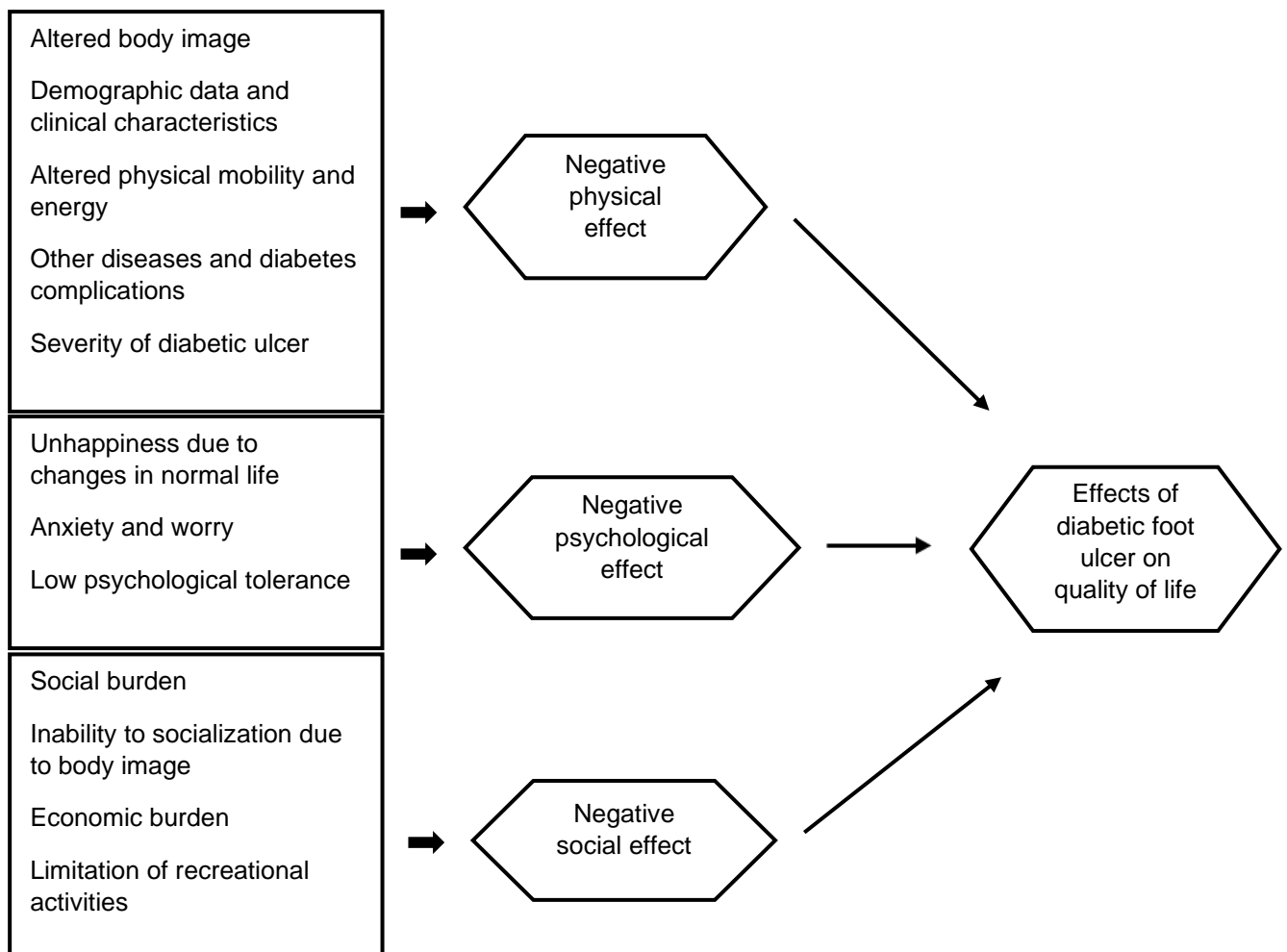


Figure 3. Effects of diabetic foot ulcer on quality of life.

## 6 Discussion

### 6.1 Discussion of the results

This review describes the experiences of patients with diabetic foot ulcers and how it affects patients' quality of life in a descriptive literature review, using 14 research studies conducted from 2016 to 2021. The findings revealed that patients were burdened

physically, psychologically, and socially due to diabetic foot ulcers. In addition, diabetic foot ulcer negatively affects patients' quality of life physically, psychologically, and socially. According to the results, the experiences of patients with diabetic foot ulcers and the negative effects on quality of life are interconnected.

Through the findings of this review, patients with diabetic foot ulcers experienced various experiences connected to the physical domain of their life. The review revealed that diabetic foot ulcer patients have pathological skin alterations on their feet that caused an alteration in physical appearance. The research article which is published by the open nursing journal highlighted similar findings to this review. According to the study, patients with diabetic foot ulcers experienced different pathological skin problems. The majority had initially noticed a sore or wound that was painful, while some had noticed foot swelling or irritation other prevalent foot complications reported were cracked heels, dry skin, altered sensitivity, and inflamed skin. Hence, the reactions due to the split of entirety cause a disfigured body image. (Hjelm & Beebwa 2013: 126.) Furthermore, this review showed that diabetic foot ulcers negatively affect gender and body image-related quality of life. Negative feelings of disfigured body image negatively impact well-being. Similarly, a study from Turkey revealed that when people's impressions of their bodies are compromised after amputation, they struggle to accept their new body image and have more difficulty in performing the bodily activities required for everyday activities. They highlighted that quality of life negatively interacted with the physical appearance of the patients with diabetic foot ulcers. (Kizilkurt et al 2020: 117.)

Additionally, this review revealed that patients experienced disappointment, loss of autonomy, and loneliness due to diabetic foot ulcers. Patients expected recovery to gain independence in their lives. Moreover, the findings showed that the patients coping with diabetic foot ulcers experienced pain and had sleep disturbances. Comparable results were found in studies that many participants experienced significant pain, limited, and reduced movements, inability to walk, and sleep disturbances which led them to feel disabled. (Bradbury & Prince 2011: 32 ; Hjelm & Beebwa 2013: 126).

Moreover, this review showed the negative influence of diabetic foot ulcers on quality-of-life effects in most of the altered mobility and energy. Further, the researchers revealed that physical functioning is negatively affected by a diabetic foot ulcer. Diabetic foot ulcer-related pain has been recognized as a major clinical issue that negatively affects a

client's quality of life. (Obilor & Adejumo 2015: 129). The results were the same in the research that found many participants have difficulties with their energy and mobility, which makes it challenging for them to walk comfortably and leads them to tire easily. Hence, diabetic foot ulcers reduce energy and mobility, which has a negative effect on work and everyday routines. (Khunkaew et al 2018: 315.)

In addition, this review suggested physiological barriers that patients with diabetic foot ulcers encountered to performing foot self-care. The researchers identified participants' ability to maintain good foot care habits were influenced by a variety of factors, including ageing, disease, and other factors. In the same way, a study conducted in Singapore highlighted the hindrance to regular foot care. Proper foot care among diabetic patients was influenced by triggering factors such as the existence of diabetic neuropathy, educational status, economical background, social support, and previous experiences. (Sayampanathan, Cuttilan & Pearce 2017: 1.)

Furthermore, this review pointed out that the demographic data and the clinical characteristics of the patients with diabetic foot ulcers negatively affect the quality of life. In the same way, a study was conducted to identify demographic and clinical factors influencing health-related quality of life. In that study, they found that in diabetes patients without foot ulcers, the male gender scored greater than the female gender across all quality-of-life domains. In patients with foot ulcers, living alone, having less education, and having minimum complications were related to diminished health-related quality scores. (Yekta, Pourali & Ghasemi-rad 2011: 393.)

In addition, this review pointed out that most patients used a behavioural modification to overcome physical discomforts and to prevent negative outcomes in the future. Similarly, a study conducted in the United Kingdom also mentioned, patients with diabetic foot ulcers experience positive behavioural changes to minimize the risk of occurring more diabetic foot ulcers. (Beattie, Campbell, & Vedhara 2012: 435.) Besides, another finding of this review was the severity of diabetic ulcers negatively affects the quality of life. Similarly, the results of the study showed that the degree of ulceration significantly impacts the quality of life of the patient with diabetic foot ulcers. (Kudlová & Kočvarová 2020: 34.)

Furthermore, This review pointed out patients experienced social isolation due to the embarrassment of the diabetic wound. Patients with diabetic foot ulcers usually avoid social gatherings because of the feeling of embarrassment and stigma regarding the judgments of others about their appearance. Another important finding of this study was the financial burden. Patients experienced financial issues when continuing treatments. Similar findings were highlighted by a qualitative study conducted in the United States of America. The study revealed patients experienced social isolation due to limb loss-related body image and experienced financial stress when seeking treatments. (Crocker, Palmer, Marrero & Tan 2021: 4.)

This review showed negative social effects on the quality of life of the patients with diabetic foot ulcers and pointed out that diabetic foot ulcers have a negative impact on the quality of life as it limits recreational activities. Moreover, this review showed that the patients who had diabetic foot ulcers revealed the financial and social burden of having diabetic ulcers. A qualitative study highlighted similar findings. That study pointed out both that patients and caregivers experienced negative effects on social domains of quality of life due to restricted mobility, and a reduction in social activities, finances, and social life. (Brod 1998: 365.)

Another finding of this review was a knowledge deficit due to inadequate information. This study suggested that patients experienced a lacked clear understanding of the causes and treatment for diabetic foot ulcers. Besides, this review revealed barriers to treatment due to beliefs and individual perceptions, and patients believed, diabetic foot ulcers were developed due to the supernatural power of someone. Another finding of this review was health care facilities seeking behaviour. This review highlighted those patients who received facilities from wound care clinics and health care agencies. A study conducted in Sweden highlighted similar findings. The study pointed out patients had insufficient knowledge, the patient's beliefs about diabetic ulcers were based on personal characteristics and supernatural power, also patients had sought help from health professionals in clinics and hospitals. (Hjelm & Beebwa 2013: 129.)

According to the findings, the most common psychological experiences, the reviewers identified were stress, worry, hopelessness, low self-esteem, fear, anxiety, and depression along with the negative psychological effects on a patient's quality of life. Accordingly, a study conducted in Ghana documented diabetic foot ulcer patients felt

helpless and useless to their family members. The study concluded; amputation of the lower limb due to a diabetic foot ulcer affects psychologically leading to loss of autonomy. (Amoah et al 2018: 3) One of the psychological experiences patients had in this review was low self-esteem due to dependency. Patients worried about the dependency they felt on family members and their helplessness. Patients become psychologically burdened due to their limitations and loss of independence. Along with that, this review revealed diabetic foot ulcer psychologically affects patients' quality of life. This review revealed severe pain of foot ulcer, odour, and unable to mobilize according to the will, were affected patients psychologically leading to anxiety and depression. Similarly, a study conducted in the United Kingdom showed comparable results. The study signified patients were frustrated and depressed due to diabetic foot ulcer pain along with dependency. (Bradbury & Price 2011: 42.)

Another significant finding of this review was the patient's uncertainty about the future. Patients worry about the life they should spend without a foot. Similarly, a study conducted in Denmark stated that patients did not like to answer questions regarding amputation. The study explained, patients compared amputation to death or being punished for neglecting self-care. (Nielsen Bergenholtz & Madsen 2022: 4.) Moreover, fear and worry about amputation were documented in another study conducted in Northern Thailand. The study mentioned that patients feel distressed with the thoughts of amputation. (Khunkaew et al 2018: 310.)

In addition, this review showed patients with diabetic foot ulcers are more prone to anxiety and depression compared with diabetic patients without a foot ulcer. This review stated psychological resilience was decreased in patients with extension ulcers. Similarly, a cross-sectional study conducted in India revealed the considerable influence of anxiety and depression on diabetic foot ulcer patients in comparison to diabetic patients without foot ulcers. (Sekhar et al 2015: 170)

In opposition, there were patients who realized and accepted the current situation. They anticipated they will recover, thus providing a contribution to the treatments. Accordingly, a similar study showed patients believed they can cope up with the condition. Patients console themselves by comparing their condition to other patients around them. (Nielsen Bergenholtz & Madsen 2022: 4 ; Amoah et al 2018: 3.)

Accordingly, this review signified that physical pain, altered body image, sleep disturbances, reduce energy, and immobility all affect changes in the psychosocial well-being of patients with diabetic foot ulcers and negatively affect patients' quality of life.

## 6.2 Limitations

The study has some limitations. Firstly, the study focused only on patients with diabetic foot ulcers and did not provide experiences of patients with other kinds of ulcers. Secondly, only the English language studies were selected, studies with other languages might be provided further insight regarding the topic. Finally, only fourteen articles were selected to conduct the study, which reduces the generalisability of the study.

## 6.3 Ethics

Ethical consideration is a vital part of healthcare research. All healthcare-related research must go through the ethical committee which is relevant to their local bodies and must gain the approval to conduct the research. (Mitchell 2015: 46.) There are three principles in ethical consideration. Respect for person, Beneficence, and Justice. Participants should be respected, and they have the right to participate or back off from the research on their own. (Glasper & Rees 2017.) They should be informed prior to the research and informed consent must be taken, the researcher must be responsible for the anonymity, privacy, and risk factors of the participants and he should overcome the issues that affect the ethical guidelines before, throughout, and after data collection. (Moorley & Cathala 2019: 11.)

In Finland, the Finnish national board of research integrity(TENK) works as the authoritative body to investigate misconduct in Finland research. There are two main types of research violations, the more serious crime is "misconduct" and the less severe one is "disregard for responsible conduct of research".(Spoof 2018.)

In this review, to establish trustworthiness and reliability, The Responsible Conduct of Research Guidelines was adopted in conducting a literature review. Ethical approval, informed consent, and participants are not involved, and scientifically accessible sources were used as evidence in this literature review. Ethically acceptable data collection

methods and research methods were used in conducting this review. This review did not cause any physical, emotional, social, financial, or legal harm or risk to anyone. Two reviewers identified titles and abstracts of appropriate articles independently if the articles fulfil all the inclusion criteria.

#### 6.4 validity

The validity of qualitative research is associated with the relevance of data, process, and tools. The research questions should be relevant to expected results, the selected methodology should be relevant to solve research questions, the design should be relevant to the methodology, and the sampling and analysis of data should be applicable. The outcomes and determinations should be relevant to the sample and the environment. The validation of qualitative research relies on the nature of existence and the philosophical theory of knowledge. ( Leung 2015: 325.) If the collected data are incorrect, incomplete or the interpretations of the researcher and telling the truth or lies by the participants will impact the validity of the research (Holloway & Galvin 2017).

For high credibility, various methods or data sources are used to explore the phenomenon (Holly, Salomnd & Saimber 2017). So, the validity of this literature review was increased by using two databases and consulting informatics for searching articles. To find academic information it is safest to use databases so, the databases utilized in this review were found to be reliable and recommended by Metropolia University of Applied Sciences library and, the Publication Forum is used to check the quality of the study journal.

To ensure the quality of findings, a second reviewer uses to confirm and analyses data as well as to ask questions, meanings, and data interpretation (Holly, Salomnd & Saimbert 2017). So, during this research process seek support from two professional supervisors to improve the validity of the research findings. It is vital to show a link between the results and the data to enhance the validity of the study (Elo & Kyngas 2008: 109). So, in this review appendices and tables were used to illustrate how the data and results were connected. Authentic citations could also be utilized to enhance the trustworthiness and to indicate reader where or what kinds of authentic data categories are used (Elo & Kyngas 2008: 109).so, trustworthiness is enhanced by using original sources.

## 6.5 Conclusion and recommendation

The purpose of this descriptive literature review was to describe the experiences of patients with diabetic foot ulcers and how diabetic foot ulcer affects patients' quality of life. According to the patients' experiences, diabetic foot ulcers reduce patients' body image and affect their physical functioning. Because of the changes in a person's appearance and personal life patients with diabetic foot ulcers suffer socially and psychologically. According to the results, the experiences of patients with diabetic foot ulcers and the negative effects on quality of life are interconnected.

This review highlighted that the presence of physical experiences with diabetic foot ulcers including physical pain, altered body image, sleep disturbances, and reduce energy and immobility, negatively affect the psychosocial well-being of patients with diabetic foot ulcers. Hence, it is important to pay more attention to physical care along with the psychosocial aspect. The results can be utilized in the nursing care of patients with diabetic foot ulcers. Thus, it is necessary to combine psychosocial support with routine diabetic foot ulcer treatments. Consequently, prompt actions should be needed to improve the holistic care approach in clinical nursing practices rather than considering only medical treatments. Further studies are required to understand the effectiveness of psychosocial support on a patient's standard of living.

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## 7 Appendix 1

Table 2. Data base search results

Data base	Search terms	Number of hits	Selected based on title	Selected based on abstract	Selected based on whole text
CINAHL Complete (Ebsco)	patient experiences <b>OR</b> perceptions <b>OR</b> opinions or attitudes <b>OR</b> views. <b>AND</b> diabetic foot ulcer <b>OR</b> diabetic foot sore <b>OR</b> diabetic foot <b>OR</b> diabetic foot wound <b>NOT</b> child* or paediatric <b>OR</b> teenage*	201	28	12	5
MEDLINE (Ovid)	Experiences <b>OR</b> perceptions <b>OR</b> views <b>AND</b> Diabetic foot ulcer <b>OR</b> diabetic foot wound <b>OR</b> diabetic foot sore <b>NOT</b> Child* <b>OR</b> teenage*	39	14	11	4
CINAHL Complete (Ebsco)	quality of life <b>AND</b> diabetic foot ulcer <b>OR</b> diabetic foot sore <b>OR</b> diabetic foot <b>OR</b> "diabetic foot wound" <b>NOT</b> child* teenage*	215	23	14	7
MEDLINE (Ovid)	Quality of life <b>OR</b> well-being <b>OR</b> health related quality of life <b>AND</b> diabetic foot ulcer <b>OR</b> diabetic wound <b>OR</b>	144	63	43	6

	diabetic sore <b>NOT</b> child* <b>OR</b> teenage*				
Limitation	Articles in English Year 2017- 2022				
Total		599	128	81	22

## 8 Appendix 2

Table 4 Article summary.

Author(s), year, country	Topic (purpose/aim)	Methodology	Participants	Main outcome
<b>01)</b> Nemcová.et al <b>Slovak Republic</b> <b>2016</b>	Quality of life in patients with diabetic foot ulcer in Visegrad countries.  To identify the quality of life of patients with diabetic foot ulcers in the Visegrad countries	Quantitative Cross-sectional  Questionnaire	Patients with diabetic foot ulcer  n = 525	The significant negative correlations between demographic data such as age, duration of diabetes mellitus.  Duration of diabetic ulceration treatment and a lower level of quality of life were found.  Significant differences of quality of life among Visegrad countries were found.
<b>02)</b> Lee & Chang <b>South Korea 2019</b>	Diabetic Foot Ulcer Patients' Uncertainty Regarding Their Prognosis  A Q-Methodological Study  The purpose of the study was to identify the subjective patient perspectives toward the uncertainty regarding diabetic foot ulcer prognosis.	Qualitative (Q-methodology)  Semi structured interviews.	Patients with diabetes foot ulcer  n = 40	prognostic uncertainty classified as;  •lack of knowledge about disease.  •Worry about difference in physical, social, financial outcomes  •Confusion about self confidence
<b>03)</b> Kim & Han <b>South Korea 2019</b>	Factors related to self-care behaviors among patients with diabetic foot ulcers.	Quantitative cross-sectional	Outpatients and Inpatients	<ul style="list-style-type: none"> <li>DFU patients in this study felt a moderate level of diabetes-related stress</li> </ul>

	<p>examine the level of self-care behaviors among patients</p> <p>with diabetic foot ulcers and identify factors related to their self-care behaviors</p>	<p>survey questionnaire</p>	<p>n = 131</p>	<ul style="list-style-type: none"> <li>• used an emotion-focused coping style rather than a problem-focused coping one</li> <li>• perceived high family support.</li> <li>• DFU patients in this study mainly used an emotion-focused coping style and their self-care behaviors were related to a problem-focused coping style.</li> <li>• This study also found that the perceived family support of DFU patients positively affected both diabetes management and diabetic foot care, whereas perceived stress negatively</li> <li>• impacted diabetes management</li> </ul>
<p><b>04) Meriç et al</b></p> <p><b>Turkey 2019</b></p>	<p>It is not diabetic foot: it is my foot</p> <p>To examine the experiences of patients with diabetic foot ulcers (DFUs)</p>	<p>Qualitative</p> <p>Semi structured questionnaire</p>	<p>Patients</p> <p>n = 15</p>	<p>Most of the patients were afraid of losing their feet and had difficulties in coping with the situation. Patients expected health professionals to understand the difficulties they were experiencing.</p>
<p><b>05) Khunkaew et al</b></p> <p><b>Thailand 2019</b></p>	<p>Demographic and clinical predictors of health-related quality of life among people with type 2 diabetes mellitus living in northern Thailand: A cross-sectional study.</p> <p>The aim of the study was to</p>	<p>Quantitative</p> <p>Cross- sectional</p> <p>Questionnaire</p>	<p>Participants with type 2 diabetes</p> <p>n = 502</p>	<p>People with T2DM showed that their self-perceived HRQOL was poor.</p> <p>Patients do not consider diabetes to be a serious disease. Therefore, they do not perceive the relationship between HRQOL and disease</p>

	determine the demographic and clinical predictors of health-related quality of life among people with type 2 diabetes mellitus (T2DM) in Northern Thailand.			severity. Give negative impact on physical and psychological functioning.
<b>06) Nurhikmah Gayatri &amp; Nuraini</b> <b>Indonesia 2019</b>	Body image related to quality-of-life diabetic ulcer patients.  Identify the relationship between body image with the quality of life of diabetic ulcer patients.	Quantitative Cross-sectional  Questionnaire	Patients with diabetic foot ulcer  n = 97	significant relationship between body image with the quality-of-life diabetic ulcer patients.  Beside of the body image, the factors affecting the quality-of-life diabetic ulcer patients were social, economic status, grade of diabetic ulcer, and odor.
<b>07) Tregunno &amp; Camargo-Plazas</b> <b>Canada 2020</b>	I Cannot Afford Off-loading Boots Perceptions of Socioeconomic Factors Influencing Engagement in Self-management of Diabetic Foot Ulcer.  study aimed at uncovering the factors influencing individuals' ability to engage in selfmanagement of diabetic foot ulcer (DFU) and presenting a theoretical model depicting these factors and the outcomes	Qualitative grounded theory  Semi structured interviews Field notes Researchers' journals.	Participants with active diabetes foot ulcer  n = 30	Identified factors Primary outcome •4 internal and 2 external factors influencing participants engagement in self-management of DFU. Internal factors 1.aging and/or living with multiple chronic conditions 2 internal motivations (fears of amputation and desire to go back to usual routine. 3 self-efficacies, 4 self-management knowledge about diabetes and foot care

				<p>External factors</p> <p>1 self-management support and access to services and resources.</p> <p>Secondary outcome</p> <p>healing and prevention of amputation</p>
<p><b>8) Suza et al</b></p> <p><b>Indonesia 2020</b></p>	<p>The lived experience of patients from an ethnic group in Indonesia undergoing diabetic foot ulcer treatment.</p> <p>explore the experience of people of the Batak Karo ethnic group in Indonesia in diabetic foot ulcer treatment.</p>	<p>Qualitative phenomenological</p> <p>In depth interviews</p>	<p>Participants</p> <p>n = 10</p>	<p>The experience of the Batak Karo ethnic group in the treatment of diabetic foot ulcers was culturally related to supernatural and magical powers.</p>

<p><b>9) Stasini et al</b></p> <p><b>Greece 2020</b></p>	<p>Quality of Life among Patients with Diabetic Foot Ulcer</p> <p>aim was to investigate the health-related quality of life (HRQoL) of patients with diabetic foot ulcers.</p>	<p>Quantitative</p> <p>Questionnaire interviews</p>	<p>Patients</p> <p>n = 145</p>	<p>quality of life patients moderately affected</p> <p>leisure time (47.6%)</p> <p>physical activity (52%)</p> <p>satisfaction (40%)</p>
<p><b>10) Polikandrioti et al</b></p> <p><b>Greece 2020</b></p>	<p>Depression in diabetic foot ulcer: Associated factors and the impact of perceived social support and anxiety on depression.</p> <p>The purpose of the study was to explore the impact of anxiety and perceived social support on depression of DFU patients well as patients' characteristics associated with depression.</p>	<p>Quantitative</p> <p>Cross-sectional</p> <p>Interview</p> <p>Questionnaire</p>	<p>Patients with diabetic foot ulcer</p> <p>n = 180</p>	<p>sample perceived high levels of social support and experienced moderate anxiety and depression.</p> <p>DFU patients are more likely to have depression and anxiety compared with diabetic patients without foot complications.</p> <p>higher the social support a patient perceived, the lesser the depression had.</p>

<p><b>11) Polikandrioti et al</b></p> <p><b>Greece 2020</b></p>	<p>Quality of Life in Diabetic Foot Ulcer: Associated Factors and the Impact of Anxiety/Depression and Adherence to Self-Care</p> <p>study was to assess the impact of patients' characteristics, anxiety/depression, and adherence to guidelines on the QoL of patients with diabetic ulcer.</p>	<p>Quantitative Cross-sectional</p> <p>Interview Questionnaire</p>	<p>Patients with diabetic foot ulcer</p> <p>n = 195</p>	<p>Moderate to high quality levels in emotional well-being, pain, social functioning, and fatigue.</p> <p>Low level of quality in physical functioning, role physical and role emotional.</p> <p>Moderate level in general health high level of anxiety and depression.</p>
<p><b>12) Made et al</b></p> <p><b>Indonesia 2021</b></p>	<p>Body Image as a Mediator Between Gender and Quality of Life Among Patients With Diabetic Foot Ulcers in Indonesia</p> <p>study examined body image as a mediator in the relationship between</p> <p>gender and quality of life (QoL) among patients with diabetic foot ulcer (DFU) in Indonesia.</p>	<p>Quantitative Cross-sectional</p> <p>Questionnaire</p>	<p>Patients with diabetic foot ulcer</p> <p>n = 201</p>	<p>Women with DFU had a more negative body image and worse QoL than men. Given the fact that body image was also, a mediating factor between gender and QoL</p>

<p><b>13) Zhu et al</b></p> <p><b>Singapore</b></p> <p><b>2021</b></p>	<p>“When nothing happens, nobody is afraid!” beliefs and perceptions around self-care and health-seeking behaviours: Voices of patients living with diabetic lower extremity amputation in primary care.</p> <p>aim of this study was to explore beliefs and perceptions around self-care and the health-seeking behaviours of patients</p> <p>living with DLEA in primary care in Singapore to identify the implications for practice.</p>	<p>Qualitative</p> <p>Phenomenological</p> <p>Semi structured interviews</p>	<p>Patients undergone minor or major amputation due to diabetes in the last 12 months</p> <p>n = 9</p>	<p>displayed profound lack of knowledge of self-care of diabetes and foot and passive health-related behaviours.</p>
<p><b>14) Kuang et al</b></p> <p><b>China 2021</b></p>	<p>Impacts of psychological resilience on self-efficacy and quality of life in patients with diabetic foot ulcers: a prospective cross-sectional study.</p> <p>to determine the role of psychological resilience in DFU patients’ quality of life.</p>	<p>Quantitative</p> <p>Cross-sectional</p> <p>Questionnaire</p>	<p>Patients with diabetic foot ulcer</p> <p>n = 98</p>	<p>low psychological resilience and older age was identified as risk factors of self-efficacy.</p> <p>Low psychological resilience, older age, lower perceived social support, and higher level of HbA1c were identified as risk factors of QoL.</p>