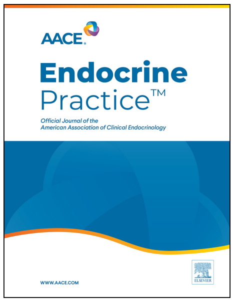

Factors Influencing the Care and Management of Diabetic Foot Ulcers: A scoping review

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Factors Influencing the Care and Management of Diabetic Foot Ulcers: A scoping review

Brief Running Title: Management of Diabetic Foot Ulcers

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Abstract

Objective: The objective of this scoping review is to explore the experiences of patients' and healthcare practitioners on the factors that influence the care and management of diabetes-related foot ulcers (DFUs).

Methods: Levac and colleagues' six-stage framework, and the Preferred Reporting Items for Systematic Review and Meta-analysis extension for scoping reviews, guided the review. The SPIDER tool was used to define key elements of the review question. Searches for relevant articles were conducted in electronic databases (PUBMED, CINAHL, AMED, Embase, Cochrane Database of Systematic Reviews, PsycINFO), Google Scholar and hand searches of reference lists.

Results: Eight articles met the inclusion criteria and were included in the review. Three themes were identified: Communication and Education about DFUs; Challenges of managing DFUs; and Barriers to treatment and management. The themes are presented as a narrative synthesis.

Conclusion: Inadequate knowledge of diabetic foot care by patients and inconsistent communication by healthcare professionals were primary factors affecting the effective management of diabetes-related foot ulcers . Consistent, patient-focused education that is supported by knowledgeable health care professionals should form the foundation of effective diabetic foot ulcer care.

Keywords: diabetes-related foot ulcers; Diabetic Foot ulcers; Diabetes; Patients with diabetes; Healthcare professionals; Scoping review

INTRODUCTION

Diabetes is a major public health issue worldwide[1] with an estimated 529 million people affected globally in 2021[2,3]. The increasing global prevalence of diabetes has also seen an increase in related complications such as diabetes-related foot ulcers (DFU)[4]. A DFU is a common and debilitating complication of diabetes, defined as an ulceration resulting from neuropathy and/or peripheral arterial disease of the lower limb in a person with diabetes[5]. These ulcers result from a complex combination of risk factors including peripheral neuropathy, peripheral vascular disease, arterial insufficiency, foot deformity and trauma[6]. Approximately 20% of people with diabetes will develop a DFU, with DFUs preceding 85% of amputations in these patients[7]. The costs associated with DFU care are substantial; in 2014–2015, the annual cost of care for DFUs in England was an estimated £1 billion[8]. Higher proportions of patients receiving guideline-based care are less costly and improve patient outcomes (avoid amputations). Strategies to increase the proportion of patients receiving guideline-based care are warranted[9]. The United Kingdom's National Health Service (NHS) could save over £250 million if the prevalence of DFUs were reduced by one-third[10].

All DFUs, particularly infected ulcers, are difficult to treat; despite administration of multiple rounds of antibiotics (risking development of antimicrobial resistance), the prospects of clinical resolution of infection can still be poor[11]. This is related to the poor blood circulation to the foot region, resulting in poor bioavailability of systemically administered antibiotics, and even when treated successfully, the risk of reinfection remains high[12]. One United Kingdom study found that a year after culture of the index ulcer, 45.5% of DFUs had healed, 15.1% of the participants had died, there was ulcer recurrence in 9.6% of participants, while 17.4% had amputation of some part of the foot and 6.0% had revascularization surgery [13]. The treatment of DFUs therefore represents a significant clinical challenge. However, DFUs may be managed with adequate patient knowledge[14]. Self-care behaviours are important for managing DFU[15]; these behaviours combined with patients' attitudes towards foot care also affect DFU outcomes such as wound healing and recurrence[16]. Many DFU patients also do not have sufficient education and knowledge about how to care for their feet[5]. Consequently, the management and care of DFUs is complicated and there is a need to better understand the factors that influence care outcomes.

This scoping review aims to better understand the factors that influence the care and management of DFUs. **METHODOLOGY**

Scoping reviews enable a 'mapping process', summarising the breadth and depth of evidence in a particular field[17]; this type of review can serve several purposes including, as here, identifying gaps in literature. We therefore aimed to explore patient's and healthcare professionals' experiences of DFUs, report factors that influence the care and treatment of DFUs and identify any gaps in that evidence, guided by the six-step framework of Levac and colleagues[17] [Table 1].

The work was also guided by the Preferred Reporting Items for Systematic Review and Meta-analysis extension for scoping reviews (PRISMA-ScR)[18]. This approach allowed the authors to merge and present data from studies with different designs and from a range of sources to represent the overall meaning of the combined body of work from these studies.

Framework stage one: Identifying the research (review) question

When developing the review question, the target population(s) (patients with DFUs; health professionals involved in the management of DFUs), the outcome of interest (DFU management and healing) and the concept (experiences of DFU care) were considered[17]. We also applied the SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) tool[19] to define key elements of the review question, which was subsequently confirmed as: *What evidence exists on the experiences of DFU patients and of health care professionals' when managing DFUs*?

Framework stage two: Identifying relevant studies

Search strategy

Since our interest was in experiences, we needed to be able to retrieve qualitative evidence. Hence, the SPIDER tool was used instead of the more familiar PICO (Population, Intervention, Comparison, Outcome) tool[20] to help develop the search strategy as it supports identification of quantitative, mixed methods and qualitative studies. The Search terms included Diabet* AND foot AND ulcer AND (peripheral OR neuropathy) AND experience* AND patient centred (centered) OR education OR training OR behaviour.

The following broad inclusion and exclusion search criteria were used:

Inclusion criteria

- Original, peer reviewed research on the experiences of patients on having, and health care professionals on managing, DFUs
- Full text studies, available in English
- Of either qualitative, quantitative, or mixed methods design

Exclusion criteria

- All other forms of publication (abstracts only, conference proceedings, editorials, literature reviews, opinion pieces) on DFUs not related to diabetes were excluded from the review.
- Studies involving patients with DFU and other co-morbidities.

Electronic and manual database searches were carried out, with the search strategy undertaken in three steps. An initial search was undertaken using relevant electronic databases (PUBMED, CINAHL, AMED, Embase, Cochrane Database of Systematic Reviews, PsycINFO). A second search for unpublished studies included Google Scholar. Finally, a manual search was carried out on reference lists of already retrieved studies to identify further studies of potential interest. The search process was iterative, requiring repeated literature searches to refine the search strategy.

Framework stage three: Study selection

Duplicates were removed and all studies were screened by OO and JB against the inclusion and exclusion criteria. The remaining articles were reviewed independently by each member of the team, before meeting to select the final articles for inclusion by consensus [Figure 1: PRISMA diagram]. The initial search of databases produced 730 papers, and an additional 520 records were identified through Google Scholar and hand searches. After deduplication of search results, 250 abstracts were reviewed after which 62 full text papers were retained [Figure 1]. After full text reading and screening against the inclusion and exclusion criteria, 54 studies were rejected with reasons; eight studies were retained for the review.

Framework stage four: Charting the data

As recommended[17] the team identified and agreed on the variables of interest to be extracted from each study [Table 2]. Study design and participant demographic data were extracted by the

Research Fellow (AH), before the full team extracted data independently from each study, according to the identified variables, before meeting to discuss and resolve any differences.

Framework stage five: Collating, summarising and reporting the results

The data extraction process provided a wide view of the pertinent issues relevant to this review, enabling the team to address the research question and identify gaps in the evidence [Table 3]. The data were summarised into themes to enable synthesised reporting of patients' and healthcare professionals' experiences with DFU care.

To arrange the data below, a narrative approach was undertaken. A narrative synthesis offers flexibility, provides scope to tailor the discussion in line with the research question, and enables inclusion of the most relevant data from research that employs a range of different methodologies[20].

RESULTS

Study characteristics

Of the eight included studies, two were from the United States[21,22], and one each from Singapore[23], Iran[1], Jordan[24], Tobago[5], Taiwan[15], and Indonesia[25] [Table 3]. Seven of the eight studies used qualitative methodologies[1,5,21-25]. Two of the qualitative studies[23,25] described their methodological approach as phenomenological; two[1,22] used focus groups and the remaining five used face-to-face or telephone interviews to collect data. One study[15] was quantitative using a cross sectional survey methodology. All eight studies recruited patients with DFUs. Four of the eight studies[1,5,15,25] described their sampling method as purposive, one[23] used snowball (chain-referral) sampling, and the remaining three studies[21,22,24] did not specify their sampling methods.

All seven qualitative studies[1,5,21-25] described their data analysis approach as thematic while the one quantitative study[15] used an SPSS® package[26] with a focus on descriptive statistics and multiple linear regression analysis to determine factors associated with self-management of DFUs.

Study participants

There was a total of 334 (range 6-199) participants across the eight studies. Six of the studies[1,5,15,21,25] focused solely on patients with DFUs as subjects, one[23] recruited health care professionals (HCPs) only, and one[22] recruited patients with DFUs, carers, and HCPs. Demographic data about patient-only studies indicate those recruited were more likely to be male (60% vs 40% female) with an average age of 58 years (range 20-91 years). The studies varied in terms of other types of descriptive data collected about patient participants. Two studies[1,25] used different scales to collect data on time since diabetes diagnosis, and four[1,5,15,24] collected information on marital status; most participants were married (range 33-81%). One study[1] collected data on complications of diabetes. The two studies that recruited HCPs collected information about the HCP professional role[22,23], and whether participating HCPs worked in a private or public hospital[23].

Themes

The extraction process identified three themes in the data: (1) *Communication and Education about DFUs*; (2) *Challenges of managing DFUs*; and (3) *Barriers to treatment and management*. Themes are presented below in a narrative synthesis.

Theme 1: Communication and Education about DFU

The issue of communication was raised in several studies. Communication between health workers and patients was described as "ineffective", with most participants feeling there was little communication or education regarding the management of DFU: "*The doctor jots down the medications in a flash and throws me the prescription. They don't answer my questions, let alone educate me*" [Participant 2][1]. Patients who already felt overwhelmed with the management of DFU commented that this was frequently made more difficult by a lack of consistent communication: "*You see a different doctor every time. So every time* [the doctors] *come in, they say, "Well, let me read your record,". Every time they read something about you, they make their own decisions. So, when they come back to you, it's always something different than what [you were] told before. That's confusing to a patient*" [Meeting 6][22]. Inconsistencies in communication also caused patients to feel confused about DFU management and experienced delays in their care which subsequently had a negative impact on the therapeutic relationship in the future[22]. There were acknowledged deficits in patient knowledge and education in relation to DFU care and management[1,5,15, 22]. Most participants had little information about DFUs and appropriate management[1,5], often with inadequate knowledge of the relationship between diabetes and the signs of and risk factors related to the development of ulcers[5]. Some were unaware of the risk of DFUs and the potential consequences connected to these, until they developed a first DFU[22]. In contrast, some participants were found to have an adequate or good knowledge in relation to diet, medication and practices related to foot care[5]. The only quantitative study included in this review offers quantification of the extent to which there were deficits in knowledge about DFU amongst patients[15]. Of 199 participants, almost two thirds had received no education about DFU care, glycaemic control, or treatment of DFU; several risk factors that were associated with poorer DFU management were related to patient education and knowledge about DFU, including their engagement with health workers prior to hospitalization[15]. Health care professionals working in diabetes care perceived that patients' capacity to be receptive to, understand, and retain information had an important influence on those patients' beliefs about DFUs[23]. Communication between HCPs and patients was affected by the degree of involvement they had with patients, and the quality of follow-up [23].

Challenges of managing DFUs

Three studies discussed the challenges in DFU treatment and management[1,21,25]. Diabetes-related foot ulcers place a substantial burden on patients and their families[21], including "*management of elaborate oral medication protocols, administration of intravenous antibiotics, changing of wound dressing, application of topical ointments, and cleaning and elevation of the wound*" [p.2][21]. The level of care required was burdensome to patients and their immediate family/caregivers, who often took on most of the work in relation to DFU management/care. This in turn impacted roles within families, shifting caring responsibilities and labour divisions in the household[21,25]. Treatment exacted an emotional toll [1,21,25] and presented an ongoing challenge related to loss of mobility, and the often-slow pace of rehabilitation[21,25]. Treatment, particularly amputation, generated an emotional distress which deteriorated over time:

"*I've not been off my couch … or out of my bed very much in the past 18 months. It affected my life, and it has affected my … mental well-being. It's affected me tremendously*"[p.3][21].

Two studies addressed the unusual efforts that some patients with DFUs make towards managing and treating their foot ulcers[24,25]. In the Jordanian study, a small number of participants (95 out of 1,100; 8.6%) turned to complementary or traditional therapies, drawing on a range of herbs, food products and household items [24]. Similarly, participants in the Indonesian study attributed their poor health to spirits or 'magic', while also turning to alternative treatments[25]. These practices were reported as problematic by the studies' authors, since adherence to alternative therapies often caused patients to delay seeking medical treatment[24,25], and then only when patients felt traditional treatments were no longer working or useful[25]. In both studies, delays in presenting for 'official' treatment meant the DFUs were further advanced.

Barriers to treatment and management

Numerous barriers prevented access to treatment. Participants often had difficulty in coordinating and attending multiple appointments and that this was often made increasingly difficult with frequent staff turnover in home care staff [15]. The quality of support that patients receive from healthcare workers more generally could either be a barrier or facilitate access to care[1,15]. Specific to the United States healthcare systems, there were reported limitations placed on seeking DFU care by insurance companies and a lack of access to healthcare staff (both through a lack of appointments and being unable to contact them)[22]; these findings in particular speak to the issues related to inaccessible and/or fragmented treatment, which in turn further alienated patients who were "*increasingly discouraged by the conflicting diagnoses, lack of an overall treatment plan, and the perception of premature recommendations for amputation*"[p.1391][22].

Additional barriers, including financial implications, and deficits in healthcare systems in relation to DFU care, were reported. Several risk factors that coalesce as barriers were associated with poorer DFU management including unemployment, poor financial status, and non-compliance with antihyperglycemic medication prior to hospitalization[15]. These factors are also influenced by patient education and knowledge about DFUs, which in turn is related to patient engagement with health workers prior to hospitalization [15]. Financial status was noted to compound issues where healthcare was not universal and/or free at the point of access[15]; the cost of care and other associated financial burdens that DFUs cause were also reported[1,21].

Four studies also reported the important role that family/caregivers had in assisting with treatment[1,21-23]. While none explicitly reported about living alone and/or social isolation as being a barrier (the latter instead identified as a consequence), it seems reasonable to conclude that lack of family/caregiver availability to assist with treatment could be a barrier in treatment and recovery from DFU.

DISCUSSION

This scoping review sought to understand the factors that influence the care and management of DFUs. While there were differences between studies, several identified a lack of knowledge about DFUs as a key issue in relation to early identification and intervention. After seeking treatment, issues often persisted regarding compliance and understanding of management, compounded by unclear or inconsistent communication from health workers in relation to DFU care and management. Whilst support from family/caregivers was essential, the review revealed that knowledge about DFU and a lack of support from health workers/family/caregivers were also identified as potential barriers.

Education and knowledge

The findings of this review in relation to the significance of diabetic foot education and knowledge appear to confirm the recommendations of the National Institute for Health and Care Excellence[27] - that provision of information and clear explanations should form part of the individualised treatment plan for people with a diabetic foot problem. It is recommended that the information should be provided in oral and written formats, and include:

- a clear explanation of the person's foot problem
- pictures of diabetic foot problems
- advice regarding care of the unaffected foot
- identification of foot and leg emergencies and who to contact for assistance, and
- footwear advice and wound care [27].

Robust, accurate, high quality patient education originates from well-informed HCPs. Nurses may be the first point of contact for many patients with DFUs, yet evidence indicates that nurses may also have poor knowledge of diabetic foot care [28,29]. In one Malaysian study exploring the knowledge and attitude of nurses towards diabetic foot care, the nurses were found to have poor knowledge of DFUs and appropriate care[28]. Similarly, although general knowledge of diabetes control has been shown to be good, nurses' knowledge of the specific details of foot disease complications was poor[29]. This lack of knowledge amongst general nurses may lead to under-recognition of the seriousness of the problem, and consequently, late presentation at specialist services[29]. Therefore, nursing knowledge may be insufficient for those at risk of diabetic foot complications and may not translate to changes in patients' behaviours that could potentially prevent DFU development[29]; more frequent formal training for nurses about diabetic foot care, is recommended as a vehicle for improving patient knowledge about DFUs[28]. Good quality education leads to better adherence to treatment and increased success of interventions. In one study, patients with diabetes and plantar foot ulcer had adequate training in the use of insole technology and they adhered to wearing the device, leading to successful treatment[30]. Patients with DFUs also require appropriate training, post healing footwear and regular foot care to reduce the rates of re-ulceration[31].

Continuing professional education involving patients in real life situation, team working and the use of educational movies have been shown to have significant effect in the development of essential competencies which are useful to HCPs such as nurses and physicians caring for patients with DFU[1]. These healthcare professionals are thus then able to promote knowledge about the prevention and management of the DFUs to their patients[1]. There can be significant improvement in the patients' level of knowledge, awareness, and ability to perform their own foot care following the implementation of a diabetic foot care educational programme[32].

It is noticeable that despite focussing on experiences of DFU management, none of the patient participants in the included studies commented on types of dressings/ treatments prescribed for use by HCPS, and whether these were tolerable, manageable, or difficult to use. It is pertinent to suggest that the factors focussed on by study participants presented such challenges to them, that consideration of dressing suitability and usability in managing their DFU was a low priority.

Key messages from this review

The review identified several shortcomings in best practice in managing DFUs which, if addressed, would contribute towards meeting patients' DFU-related needs. Key messages relate to patient knowledge, better communication and wraparound support, targeted support and holistic care.

Patient knowledge

Further to the knowledge-related discussion above, HCPS should - soon after initial diagnosis - engage patients with diabetes in conversations about DFUs, potential risks, identification and the necessary prompt management should ulcers develop. As evidenced in this review, increasing patient knowledge appears to be an important and fundamental first step in the prevention of DFU.

Better communication and wraparound support

There is need for better communication, and wraparound (co-ordinated) support for people with DFU. Wraparound support – originating in children's psychiatric/ psychological services – refers to care packages in which official services such as health care systems work with community provisions and clients to prioritise common goals identified by the individual and their family[33], setting this approach apart from integrated care systems[34] which, whilst co-ordinating multiple care providers, do not overtly involve the client in goal identification and prioritisation. Lack of, or inconsistent communication, identified as a frustrating barrier when trying to access DFU care, could be addressed through wraparound support and comprehensive education and care in all settings, including home care.

Targeted support and holistic care

Targeted support and services should be offered to groups who may be at higher risk of DFU (and its complications). The above studies suggest that those who are unemployed, have lower levels of education (which can affect health literacy), or who come from lower socioeconomic backgrounds may be at particular risk [1,15,21-23]. These, and all other relevant aspects of the patient's world should be considered when designing holistic education and care packages. Any education should also take into account cultural beliefs and values, and address issues such as the use of traditional or alternative therapies. Mental health and social support needs, including the availability of social support, should be considered and discussed with each patient; DFUs not only place a significant and protracted burden on patients, but also on those who care for them.

Finally, these findings speak to the broader need for universal health coverage to mitigate against the financial burden patients may face in relation to care costs, and to facilitate access to appropriate care in a timely fashion.

Limitations of the Review

There were only eight studies included in the review, with only one from the United States, and none from the United Kingdom. Furthermore, many of the studies included in the review were conducted in countries with diverse health systems, socio-economic, cultural and spiritual contexts, therefore, the findings may not be relevant to all contemporary clinical settings and should be interpretated with caution. Whilst there is a body of qualitative work addressing DFUs, several that were identified during literature searching for this review were later found to not meet the inclusion criteria or were subject to the exclusion criteria (for example, one qualitative meta-synthesis /literature review[35]). However, the international reach of the included studies demonstrates the global experiences of people with diabetes, and some HCPS, in relation to some core aspects in the management of DFUs.

Conclusion

This scoping review has shown that inadequate knowledge of diabetic foot care by patients with DFUs and inconsistent or unclear communication by healthcare professionals were major factors negatively affecting the effective management of DFUs. Clear, consistent, patient-focussed education, supported by knowledgeable HCPs, should form the bedrock of effective DFU care. Many issues such as wider cultural beliefs and the effect of the different types of wound dressings which may impact the management of DFUs were not addressed.

Future research in this area should include optimisation of better education and communication for HCPS (especially nurses) and patients and promoting effective support processes and self-care behaviour for patients with DFUs.

References

1. Aalaa M, Amini MR, Delavari S, Mohajeri Tehrani MR, Adibi H, Shahbazi S, et al. Diabetic foot workshop: A strategy for improving the knowledge of diabetic foot care providers. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2022 Jul;16(7):102543.
2. Global, regional, and national burden of diabetes from 1990 to 2021, with projections of prevalence to 2050: a systematic analysis for the Global Burden of Disease Study 2021. Lancet [Internet]. 2023 Jul 15;402(10397):203–34.
3. Zhang Y, Lazzarini PA, McPhail SM, van Netten JJ, Armstrong DG, Pacella RE. Global Disability Burdens of Diabetes-Related Lower-Extremity Complications in 1990 and 2016. Diabetes Care. 2020 ;43(5):964–74.

4. Chun D il, Kim S, Kim J, Yang HJ, Kim JH, Cho J ho, et al. Epidemiology and Burden of Diabetic Foot Ulcer and Peripheral Arterial Disease in Korea. Journal of Clinical Medicine. 2019 May 25;8(5):748.

5. Adeyemi TM, Olatunji TL, Adetunji AE, Rehal S. Knowledge, Practice and Attitude towards Foot Ulcers and Foot Care among Adults Living with Diabetes in Tobago: A Qualitative Study. International Journal of Environmental Research and Public Health. 2021 Jul 29;18(15):8021.

6. Noor S, Zubair M, Ahmad J. Diabetic foot ulcer—A review on pathophysiology, classification and microbial etiology. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2015 Jul;9(3):192–9.

7. Bergin S, Wraight P. Silver based wound dressings and topical agents for treating diabetic foot ulcers. Cochrane Database of Systematic Reviews. 2006 Jan 25

8. Insight Health Economics. Foot care in diabetes: the human and financial cost. Available at: http://www.londonscn.nhs.uk/ wp-content/uploads/2017/04/dia-foot-care-mtg-kerr-27042017.pdf. 2017.

9. Zhang Y, Carter HE, Lazzarini PA, Cramb S, Pacella R, van Netten JJ, et al. Cost-effectiveness of guideline-based care provision for patients with diabetes-related foot ulcers: A modelled analysis using discrete event simulation. Diabetic Medicine. 2023;40(1):1–11.

10. Kerr M, Barron E, Chadwick P, Evans T, Kong WM, Rayman G, et al. The cost of diabetic foot ulcers and amputations to the National Health Service in England. Diabetic Medicine. 2019 Aug 5;36(8):995–1002.

11. Macdonald KE, Boeckh S, Stacey HJ, Jones JD. The microbiology of diabetic foot infections: a meta-analysis. BMC Infectious Diseases. 2021 Dec 9;21(1):770.

12. McGloin H, Devane D, McIntosh CD, Winkley K, Gethin G. Psychological interventions for treating foot ulcers, and preventing their recurrence, in people with diabetes. Cochrane Database of Systematic Reviews. 2021 Feb 8;2021(2).

13. Ndosi M, Wright-Hughes A, Brown S, Backhouse M, Lipsky BA, Bhogal M, et al. Prognosis of the infected diabetic foot ulcer: a 12-month prospective observational study. Diabetic Medicine. 2018 Jan 20;35(1):78–88.

14. Dinker R Pai SS. Diabetic Foot Ulcer – Diagnosis and Management. Clinical Research on Foot & Ankle. 2013;01(03).

15. Chin Y, Huang T, Hsu BR, Weng L, Wang C. Factors associated with foot ulcer self-management behaviours among hospitalised patients with diabetes. Journal of Clinical Nursing. 2019 Jun 6;28(11–12):2253–64.

16. Vedhara K, Dawe K, Wetherell MA, Miles JNV, Cullum N, Dayan C, et al. Illness beliefs predict self-care behaviours in patients with diabetic foot ulcers: A prospective study. Diabetes Research and Clinical Practice. 2014 Oct;106(1):67–72.

17. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. Implementation Science. 2010 Dec 20;5(1):69.

18. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Annals of Internal Medicine. 2018 Oct 2;169(7):467–73.

19. Cooke A, Smith D, Booth A. Beyond PICO: the SPIDER tool for qualitative evidence synthesis. Qualitative Health Research. 2012 Oct 24;22(10):1435–43.

20. Dixon-Woods M, Agarwal S, Jones D, Young B, Sutton A. Synthesising qualitative and quantitative evidence: A review of possible methods. Journal of Health Services Research & Policy. 2005 Jan 22;10(1):45–53.

21. Crocker RM, Palmer KNB, Marrero DG, Tan TW. Patient perspectives on the physical, psycho-social, and financial impacts of diabetic foot ulceration and amputation. Journal of Diabetes and its Complications. 2021 Aug;35(8):107960.

22. Zamani N, Chung J, Evans-Hudnall G, Martin LA, Gilani R, Poythress EL, et al. Engaging patients and caregivers to establish priorities for the management of diabetic foot ulcers. Journal of Vascular Surgery. 2021 Apr;73(4):1388-1395.e4.

23. Sayampanathan AA, Cuttilan AN, Pearce CJ. Barriers and enablers to proper diabetic foot care amongst community dwellers in an Asian population: a qualitative study. Annals of Translational Medicine. 2017 Jul;5(12):254–254.

24. Abu-Qamar M, Wilson A. Qualitative content analysis of complementary topical therapies used to manage diabetic foot in Jordan. African Journal of Traditional, Complementary and Alternative Medicines. 2012 Sep 20;9(3).

25. Suza DE, Eltrikanawati T, Tarigan R, Setiawan, Gunawan J. The lived experience of patients from an ethnic group in Indonesia undergoing diabetic foot ulcer treatment. British Journal of Nursing. 2020 Mar 12;29(5):S20–6.

26. SPSS Inc. SPSS for Windows. Version 16.0. Chicago: SPSS Inc.; 2007.

27. National Institute for Health care and excellence. Available at: https://www.nice.org.uk/guidance/ng19/chapter/recommendations (accessed 20/12/23). 2019. Diabetic Foot Problems: prevention and management.

28. Ng B, Azhar A, Azman M, Sukri M, Arvinder-Singh H, Wahid AA. Knowledge and attitude of nurses towards diabetic foot care in a secondary health care centre in Malaysia. The Medical Journal of Malaysia. 2020;75(4):391–5.

29. Wilson P, Buccholtz L, Bowden J, Duffy E, Gillen C. A patient-led audit of diabetic foot disease knowledge and practices among patients with diabetes and at high risk attending an urban tertiary referral centre. Diabetic Foot Journal. 2022;25(3):28–33.

30. Abbott CA, Chatwin KE, Foden P, Hasan AN, Sange C, Rajbhandari SM, et al. Innovative intelligent insole system reduces diabetic foot ulcer recurrence at plantar sites: a prospective, randomised, proof-of-concept study. The Lancet Digital Health. 2019 Oct;1(6):e308–18.

31. Cavanagh PR, Lipsky BA, Bradbury AW, Botek G. Treatment for diabetic foot ulcers. The Lancet. 2005 Nov;366(9498):1725–35.

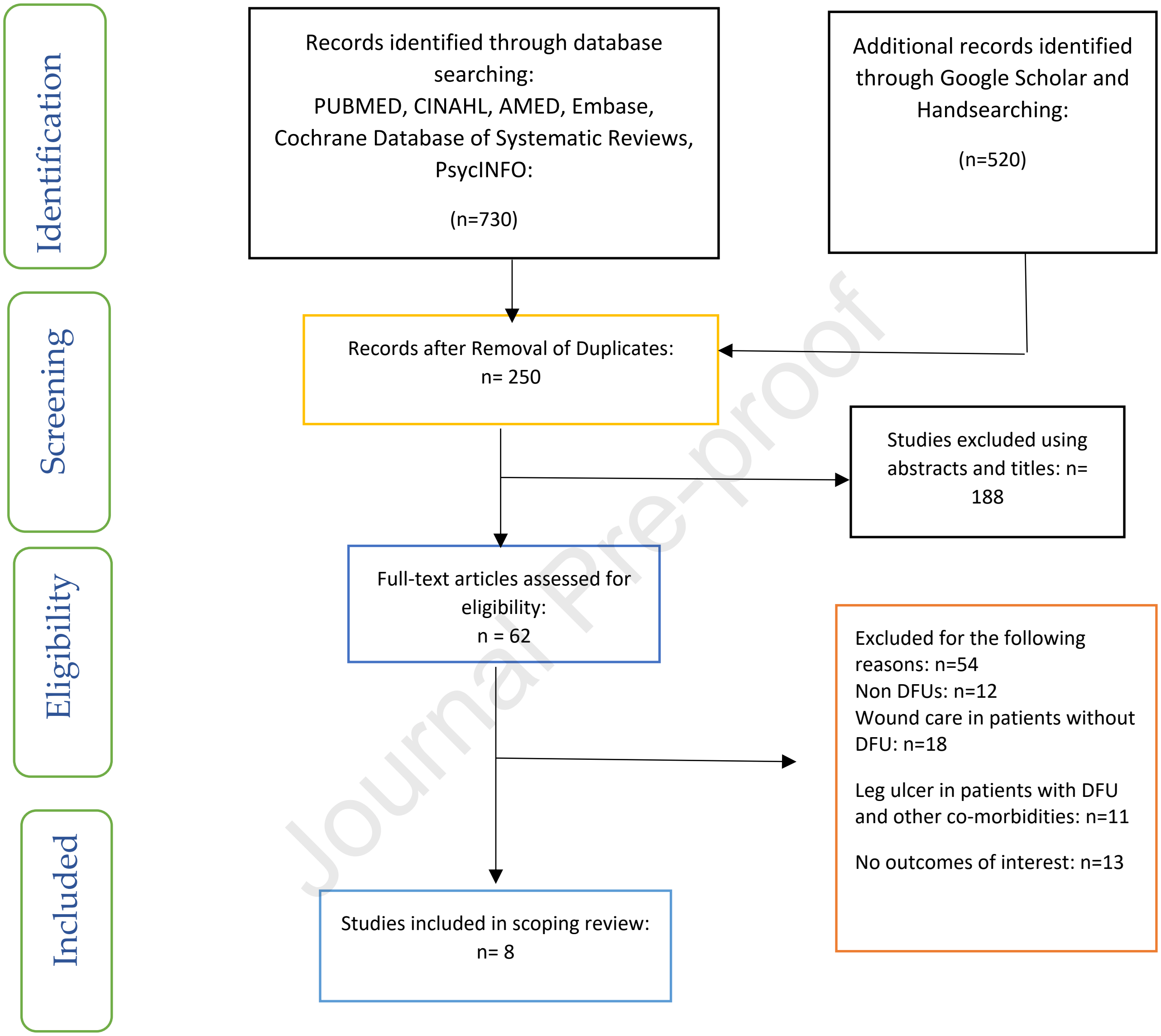
32. Mohamed NA, Kersha RH. Evaluate the Effect of Education Interventions in the Prevention of Diabetic Foot Ulcers through Knowledge of the Disease and Self-Care Practices in Saudi Arabia. Open Access Macedonian Journal of Medical Sciences. 2018 Nov 15;6(11):2206–13.

33. National Wraparound Initiative. Wraparound Basics. Available at https://nwi.pdx.edu/wraparound-basics/. Accessed 28th March 2024. 2024.

34. NHS England. What are integrated care systems? Available at: https://www.england.nhs.uk/integratedcare/what-is-integrated-care/. Accessed 28.03.2024. No Date.

35. Coffey L, Mahon C, Gallagher P. Perceptions and experiences of diabetic foot ulceration and foot care in people with diabetes: A qualitative meta-synthesis. International Wound Journal. 2019 Feb 4;16(1):183–210.

Figure 1. PRISMA flow chart of study selection



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Framework Stage	Purpose
Stage 1	Identifying the research question
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Table 2: Variables of Interest from each included study with rationale

Variable	Rationale, simplifications or assumptions
Author, year and country	To demonstrate that the selected articles are current and relevant. To demonstrate the geographical spread of the literature.
Research question/purpose of the study	To demonstrate the relationship between the research question and the aim of the scoping review.
Methodology	To evidence the type of research included in the scoping paper, including the selection of participants, data collection and analysis.
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Other background information	To understand if there are other factors that influence the management of DFUs.
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Communication of self-care practices	To understand how the communication of DFU self-care influences patient practices.
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Table 3: Characteristics of Included Studies

AUTHOR Author(s) Year Location	STUDY POPULATION (1) Participants (N=) (2) Participant details (3) Gender (4) Age (5) Diabetes duration (6) History of complications	STUDY AIMS	STUDY DESIGN (1) Methodology (2) Sampling method (3) Data collection (4) Analysis	Results	Identified Gaps
Aalaa et al. 2021 Iran	(1) N=16 (2) Patients with DFU receiving care	To explore the views of patients with	(1) Qualitative (unspecified) (2) Purposeful	- Patients had poor understanding of DFU	Need for:

	in primary and specialty care centres (3) 10 males; 6 females (4) Range 40-75years. Mean = 56.4 years (5) Diabetes duration range 5-25 years, Mean = 16.6 years (6) 13 patients had experienced at least one complication	diabetes and DFU about the requirements of providing DFU preventative and therapeutic care in order to optimise the process of care and management	(3) Focus groups, recorded and transcribed. (4) Thematic analysis	except where they had an acquaintance with DFU. • Miscommunication between healthcare team and patients/families was an obstacle to effective education especially about risk factors for DFU and prevention. • financial burden of treatment and compliance with care • Non-physical injury and mental health impacts	• more holistic approach to DFU care • consideration of patients' socio-economic conditions • better education, with patients included in delivery of that. • a wide range of support that is empathetic and patient centred.

				• support from treatment team and family and friends. • empathy for their 'voices to be heard'. • ability to offer their experiences to others through peer led education.	
Abu-Qamar and Wilson 2012 Jordan	(1) 68 participants (2) Patients with DFUs who use complimentary remedies for	Describe the use of topical complimentary medicines for	(1) Qualitative (unspecified) (2) Purposive	• A wide range of preparations (household items, Jordanian herbs, and water solutions, were used.	Need for: • Educational campaigns to raise awareness of the possible hazards of

	treatment outside of professional context. (3) 38 males and 30 females (4) Range 20-91 years. Mean age = 59 years (5) No data. (6) No data.	DFU by Jordanians	(3) Questionnaire with free text responses (4) Content analysis of written responses arranged as 'condensed meanings'.	• Interventions were also sought from traditional healers; patients often unaware of ingredients in preparations acquired via this route. Use of complementary therapies may increase risk of lower limb amputation.	complementary medicine therapies. Agreement with attending HCP regarding use of complementary therapies.
Adeyemi et al. 2021 Tobago	(1) 20 participants (2) Diabetic patients with DFUs for at least 4 months	Aimed to assess the knowledge, attitudes and	(1) Qualitative exploratory (2) Purposive	• Poor knowledge of DFU, signs of DFU and its relationship to diabetes	Need for: • better patient management

(3) 8 males and 12 females (4) Ages 28-71. Mean age = 56 years. (5) No data. (6) No data.	practice of adults with diabetes on foot ulcers and foot care.	(3) Telephone interviews using a semi-structured guide, recorded, and transcribed. (4) Thematic content analysis. Purposive sampling to recruit adults with DFU.	• Perception of inadequate education from HCPs about DFUs and footcare Good awareness of footcare, especially about cleaning and inspection	education programmes • training for nurses and caregivers on delivering health education talks to people with diabetes. • regular health education sessions from HCPs for people with diabetes and DFUs. • diabetic care and prevention education to be given to

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Chin et al. 2019 Taiwan	**(1)** 199 participants **(2)** Hospitalised patients with DFU. **(3)** 125 males and 74 females. **(4)** Average age 62 yrs. (5) No data. (6) No data.	To determine pre-hospitalised diabetes related DFU self-management behaviours and explore the factors	1) Quantitative – Cross sectional survey questionnaire DFUs. 2) Convenience 3) Bespoke demographic questionnaire; DFSBS; DFUSMBS; data	• Most participants did not monitor their blood sugars or seek treatment for non-painful wounds. • Eight significant variables were associated with DFU self-management behaviours: 1) Number of DFU hospitalisations	Need for: • Robust and extensively available patient education on diabetes, foot care, and DFUs. • strategies that target high-risk groups to eliminate barrier beliefs.

	associated with them.	collected via structured interview SPSS software analysis – descriptive statistics and multiple linear regression analysis to determine factors associated with self-management	2) Receiving education about DFU care 3) HCP guidance re blood sugars and DFU 4) HCP guidance re urgent help seeking by patients with DFU. 5) Lack of knowledge re timely DFU management (barrier belief). 6) Inconvenience of medical treatment seeking (barrier belief). 7) WS-DFUD-KQ score. DFSBS score.	• Environments that encourage treatment seeking. Aggressive promotion of self-care practices.

Crocker et al. 2021 USA	(1) 15 participants (2) Patients of White or Hispanic background with history of at least one DFU. (3) 10 males and 5 females (4) Mean age = 54 years. (5) No data. (6) No data.	To capture detailed personal accounts and insights from patients with a clinical history of DFUs and amputations to better understand patient behaviours	(1) Qualitative (unspecified) (2) Purposive (3) Telephone interviews, recorded and transcribed (4) Thematic analysis	• Managing care is a heavy burden. • Significant declines in ambulatory function • Economic impacts because of the cost of care alongside job loss. Emotional impacts – depression and frustration which worsened as their condition worsened.	Need for: • emphasis on mental health assessments as condition progresses. • early screening for mental health impacts. • diversify support that extends beyond the health care system and acknowledges the burden of care. financial hardship to be recognised and

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Sayampanathan et al. 2017 Singapore	(1) 17 participants (2) Healthcare professionals including doctors and allied health professionals. with at least 5 years' experience in diabetic foot care in either public or private sectors. (3) No data (4) N/A	To identify the causes of proper and improper diabetic footcare.	(1) Qualitative, unspecified (2) Purposive, snowball sampling (3) Semi-structured face-to-face interviews, recorded and transcribed Thematic analysis	1. Patients perceived to have a mix of proper and improper beliefs and information about foot care. 2. Modifiable predisposing factors were education, socioeconomic status, social support. 3. Non-modifiable factors were age, and presence and severity of co-	Need for: care packages to take into account all factors that impact on patients' foot care, i.e.: a more holistic approach.

(5) N/A (6) N/A	morbidities restricting ability to self-care. 4. Precipitating patient factors included receptiveness to information, and presence of psychological barriers. 5. Precipitating provider factors included degree of multi-disciplinary approach to care, presence of administrative inconveniences. 6. Precipitating disease factors included presence

				of diabetic sensory neuropathy, and complexity of disease process.	
Suza et al. 2020 Indonesia	(1) 10 participants (2) Patients with DFU. (3) 6 males and 4 females (4) Majority aged 50 or above. (5) 90% had diabetes for more than 10 years.	To explore the experience of people of the Batak Karo ethnic group in Indonesia in diabetes-related foot ulcers treatment	(1) Qualitative: hermeneutic phenomenology (2) Purposive sampling (3) In-depth interviews and field notes, recorded and transcribed	• Participants held strong beliefs concerning health disorders linked to cultural beliefs about spirits and magic. • Participants endured physical, psychological and spiritual changes – pain, difficulty in walking, feelings of hopelessness,	Need for: • nurses to pay attention to the sociocultural aspects that affect patient behaviour regarding DFUs. nurses to increase their cultural awareness and competency to offer

(6) No data (7) Indonesia	Van Manen's hermeneutic thematic analysis	stress, feelings of shame, isolation, not leaving home, inability to attend church, feeling dirty even when using ablution water. • Most participants used traditional local treatments such as spices, often supplied by the shaman. • Self-management guided by cultural beliefs – traditional ceremonies	appropriate treatment and support.

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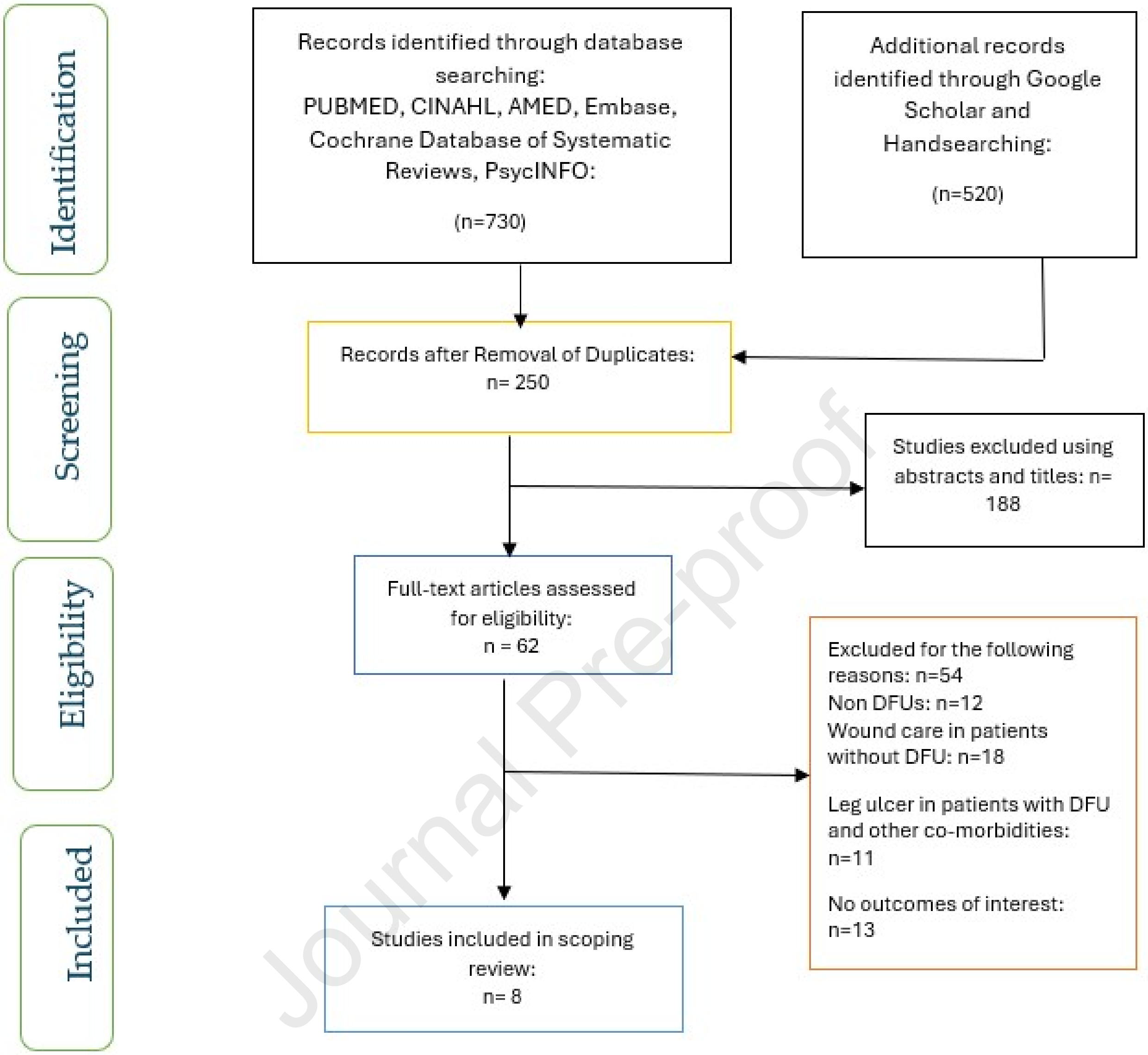
Identification
Screening
Eligibility
Included
Records identified through database searching: PUBMED, CINAHL, AMED, Embase, Cochrane Database of Systematic Reviews, PsycINFO: (n=730)
Additional records identified through Google Scholar and Handsearching: (n=520)
Records after Removal of Duplicates: n= 250
Studies excluded using abstracts and titles: n= 188
Full-text articles assessed for eligibility: n = 62
Excluded for the following reasons: n=54
Non DFUs: n=12
Wound care in patients without DFU: n=18
Leg ulcer in patients with DFU and other co-morbidities: n=11
No outcomes of interest: n=13
Studies included in scoping review: n= 8

Highlights:

Teaching Points:

- What risk factors are implicated in the development of diabetes-related foot ulcers?
- What are the costs and other implications of poor management of diabetes-related foot ulcers?
- What are the perspectives of health care professionals and patients on the factors that influence the care and management of diabetes-related foot ulcers?
- How would you promote the knowledge of diabetic foot care in patients with diabetes-related foot ulcers?
- How would you enhance and ensure consistent, clear and effective communication by healthcare professionals managing patients with diabetes-related foot ulcers?

Clinical Relevance:

This review has identified several shortcomings in best practice in managing diabetes-related foot ulcers which, if addressed, would contribute towards meeting patients' diabetic foot ulcers -related needs. Key messages relate to patient knowledge, better communication and wraparound support, targeted support and holistic care.

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The author is an Editorial Board Member/Editor-in-Chief/Associate Editor/Guest Editor for *[Journal name]* and was not involved in the editorial review or the decision to publish this article.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: