Migration Letters

Volume: 20, No: 9 (2023), pp. 480-488

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

Knowledge And Awareness Of Diabetes Care Practices Among Type 2 Diabetes Patients' Caregivers In KSA: A Systematic Review

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Abstract

Background: *Diabetes poses a significant health burden globally, with caregivers playing a crucial role in the management of Type 2 diabetes patients. This systematic review aims to assess the knowledge and awareness levels of caregivers involved in the care of Type 2 diabetes patients in the Kingdom of Saudi Arabia (KSA).*

Methods: *A systematic literature search was conducted in PubMed, Embase, Scopus, and Cochrane Library to identify relevant studies. Inclusion criteria encompassed quantitative, qualitative, and mixed-methods studies focusing on caregiver knowledge and awareness of Type 2 diabetes care practices in KSA. Data e[1]xtraction, quality assessment, and synthesis were conducted following predefined objectives and methods.*

Results: *Out of 26 initially identified studies, 10 met the eligibility criteria. The selected studies revealed a dearth of knowledge among caregivers in KSA regarding Type 2 diabetes care practices. Caregiver characteristics, educational levels, and personal experience with diabetes emerged as factors influencing awareness. The impact of caregiver knowledge on diabetes care practices and patient outcomes was explored, providing insights into the need for targeted interventions.*

Conclusion: *The systematic review highlights inadequate knowledge and awareness levels among caregivers of Type 2 diabetes patients in KSA. Identified gaps in understanding emphasize the necessity for tailored interventions and education programs to enhance caregiver awareness, ultimately improving diabetes care practices and patient outcomes. Further research is warranted to explore specific strategies for optimizing caregiver education and support in the context of Type 2 diabetes management in KSA.*

Introduction

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The International Diabetes Federation (IDF) classifies microvascular and macrovascular problems as a result of hyperglycemia, a chronic metabolic disease that produces a number of illnesses [1]. With 10.5% of the worldwide population affected in 2021 and an anticipated increase to 783.2 million by 2045 (including 239.7 million undiagnosed cases), diabetes has now become a significant healthcare issue on a global scale [1]. Among Saudi Arabians, an estimated 13,4 percent had diabetes in 2014 (n=1,745,532), with 959 thousand instances classified as prediabetic [2]. According to the International Diabetes Federation (IDF), the anticipated cost of diabetes in 2021 was over $966 billion, and by 2030 and 2045, it is projected to climb to $1.03 trillion and $1.05 trillion, respectively, accounting for 12.2% (6.7 million) of worldwide mortality [1].

Diabetic foot syndrome is a major cause of diabetes-related illness and death [3], making it one of the disease's most dangerous consequences. Amputation is the last stage of the diabetic foot syndrome, which begins with neuropathy and progresses via peripheral artery disease, osteomyelitis, diabetic foot ulcer (DFU), and other pathological processes [3]. One of the most prevalent symptoms of diabetic foot syndrome, diabetic foot ulcers (DFUs) place a heavy strain on healthcare systems, patients, and caregivers [4-6]. Any full-thickness lesion located below the ankle in a diabetic patient, regardless of how long it has been there, is considered a diabetic foot ulcer (DFU). Multiple causes, including peripheral vascular disease, trauma, and neuropathy, may lead to DFUs [3–7].

With a worldwide prevalence of around 3-8% and an incidence rate of 25% in diabetic cases, as well as an estimated 30-second limb loss per patient every 30 seconds, the prevalence of diabetic foot may reach 5-7.5% in patients with neuropathy [8,9]. It is anticipated that 1.8% of the population in Saudi Arabia will have a DFU, with a mean frequency of 8.5% [10]. In a study done in Jeddah, Saudi Arabia, almost 52.7% of lower limb amputation (LLA) cases were caused by DFUs [11].

Primary care evaluation, patient education on self-examination, foot hygiene, and appropriate footwear, and most importantly, training caregivers to assess new skin lesions, choose appropriate footwear, maintain hygiene, and know when to seek medical intervention are all proven to decrease the incidence of diabetic foot and the need for LLA [3,12,13]. Caregiver knowledge of adequate DFU care was previously assessed in Egypt and found to vary, with 56.2% having insufficient information and 46.9% having poor knowledge [14]. Most caregivers had insufficient understanding before the training, but after it, their knowledge increased significantly, according to another research that evaluated the change in foot care practices [15].

Diabetes mellitus is a prevalent chronic condition, and effective management involves collaborative efforts between healthcare providers and caregivers, especially in the case of Type 2 diabetes. This systematic review aims to investigate the knowledge and awareness levels of caregivers involved in the care of Type 2 diabetes patients in the Kingdom of Saudi Arabia (KSA). Understanding the extent of caregivers' knowledge is crucial for optimizing diabetes care practices and improving patient outcomes.

Methods

Objectives

The primary objectives of this systematic review are to assess the knowledge and awareness levels of caregivers involved in the care of Type 2 diabetes patients in KSA. Specific goals

include identifying gaps in knowledge, exploring factors influencing awareness, and evaluating the impact of caregiver knowledge on diabetes care practices and patient outcomes.

Eligibility Criteria:

Types of Studies: The review included quantitative, qualitative, and mixed-methods primary research studies published in peer-reviewed journals. Studies must focus on the knowledge and awareness of caregivers of Type 2 diabetes patients in KSA. Reviews, editorials, and conference abstracts were excluded.

Participants: The participants of interest are caregivers actively involved in the care of Type 2 diabetes patients in KSA. Studies involving caregivers of other chronic conditions or non-medical disciplines were excluded.

Intervention/Exposure: The intervention/exposure of interest is the knowledge and awareness of caregivers regarding Type 2 diabetes care practices in KSA.

Outcomes: Primary outcomes include the levels of knowledge and awareness among caregivers. Secondary outcomes involve identifying factors influencing caregiver knowledge, assessing the impact on diabetes care practices, and exploring associations with patient outcomes.

Search Strategy:

A systematic literature search was conducted in relevant electronic databases (e.g., PubMed, Embase, Scopus) using predefined search terms and medical subject headings (MeSH). The search strategy was designed to capture studies related to caregiver knowledge of Type 2 diabetes care practices in KSA.

Data Extraction:

Two independent reviewers screened and extract data from selected studies using a standardized data extraction form. Extracted data included study characteristics, participant demographics, caregiver knowledge and awareness, influencing factors, and outcomes related to diabetes care practices.

Quality Assessment:

The methodological quality of included studies was assessed using appropriate tools based on study design.

Data Synthesis:

Findings are synthesized using a narrative approach, and if applicable, a meta-analysis would be conducted for quantitative studies using appropriate statistical methods.

Results

The initial search identified a total of 29 studies from PubMed, Embase, Cochrane Library, and CINAHL. There were no duplicates and the 26studies were screened based on their titles and

abstracts. Of these, 20 full-text articles were reviewed, and 10 studies were eligible for inclusion in this systematic review (Figure 1).

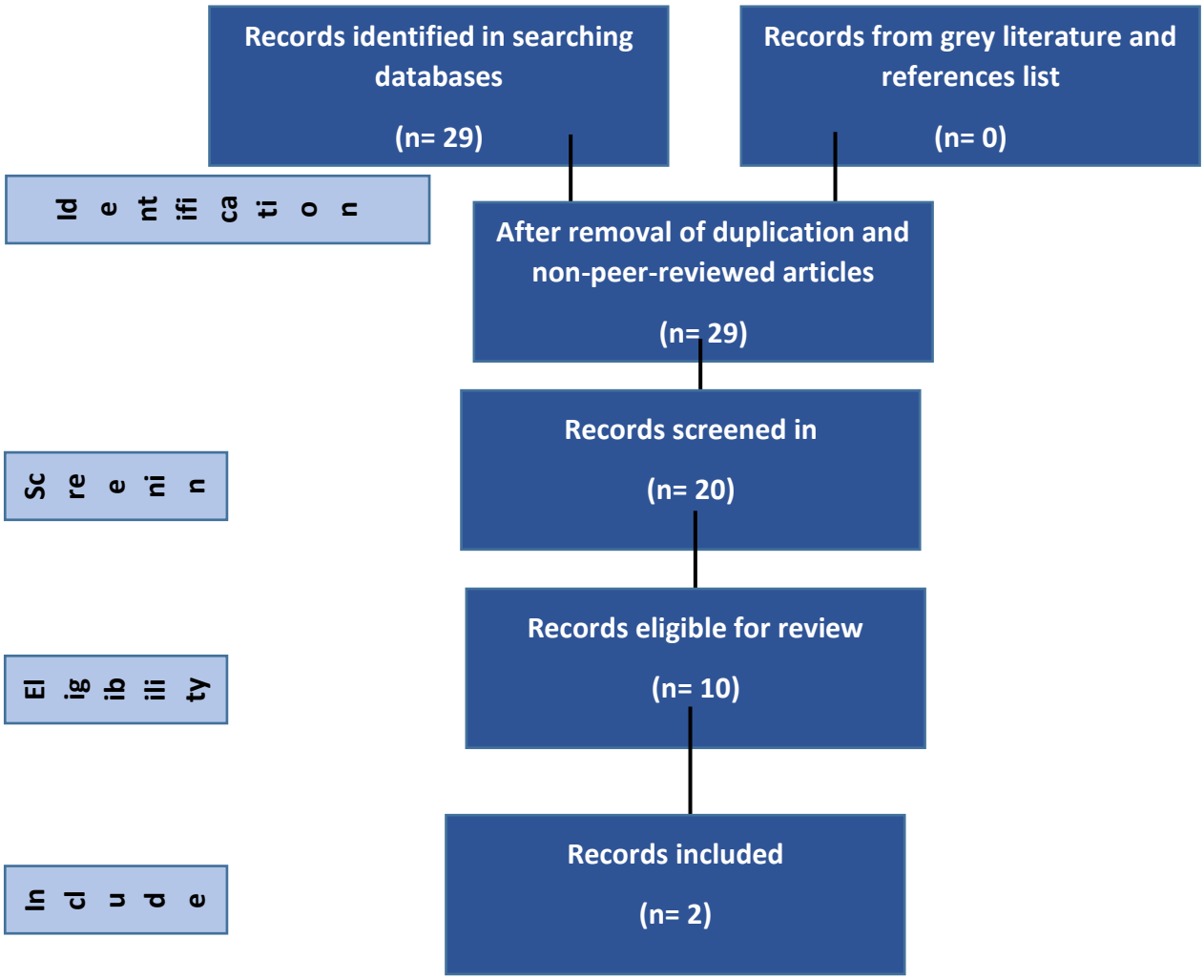

Figure 1: Flow chart of selection process

The intricate and multi-faceted disease process known as diabetic foot syndrome encompasses neuropathy, peripheral vascular disease, osteomyelitis, diabetic foot ulcer (DFU), and amputation. The syndrome's prevalent and burdensome manifestation, diabetic foot ulcers (DFUs), cause diabetes-related death and disability. Patients and caregivers must work together for DFU treatment to be successful. Caregivers of Saudi Arabian patients with diabetic foot disease should be subject to focused interventions to increase their knowledge and practice, according to this research that evaluates their knowledge, experience, and practices. Caregivers' competence and efficiency in caring for diabetic foot patients in Saudi Arabia were the major foci of this research. This goal was achieved by the use of a cross-sectional research that included Saudi Arabian caregivers of patients with diabetic foot who were 18 years of age or older. The participants were selected at random to provide a representative sample. A bachelor's degree was held by 52.4% of the participants, 61.6% of the participants were female, and 58.6% of the participants were married. The results showed that 34.6% of caregivers were taking care of diabetic foot patients; 8.5% of those patients had poor foot health, and 9.1% had to have their feet amputated. Either the patient or the caregiver moisturised and washed the patient's

feet, and in 75.2% of instances, the caregiver said they examined the patient's feet. The majority of caretakers (77.8%) clipped patients' nails, whereas almost half (49.8%) forbade patients from being barefoot. Women, those with master's degrees, those with first-hand experience with diabetes, those who have cared for patients with diabetic foot, and those with previous expertise treating diabetic foot all had a favorable correlation with diabetic foot care knowledge. Northerners and caregivers who were divorced or jobless had lower levels of expertise, on the other hand. The current research shows that Saudi Arabian caregivers for people with diabetes have a good understanding of the disease and its complications, and they also follow best practices while caring for their patients' feet. However, it is critical to identify certain categories of caregivers who can benefit from further training and instruction to enhance their skills in diabetic foot care. Diabetic foot syndrome is a major cause of death and disability in Saudi Arabia, and this study's findings may help in the development of targeted treatments to alleviate this problem [15].

Among the most dangerous complications of diabetes is diabetic ketoacidosis (DKA). This major problem arises when there is an insufficient amount of insulin, which prevents the body from using glucose for energy. As a result, there is an increase in glucose levels, which causes DKA. Take aim. In 2022, researchers in Hail City, Saudi Arabia set out to raise community-level knowledge of DKA among diabetes patients and caregivers. Before taking any further steps, it is crucial to gauge people's level of DKA awareness and expertise. The participants and caregivers in this cross-sectional research were residents of Hail City, Saudi Arabia, and all had diabetes. The target population was given an Arabic-language self-administered survey over the internet. In addition to collecting standard demographic information (such as respondents' ages, genders, and marital statuses), the survey also asks about the clinical features of diabetic patients and measures their level of knowledge and adherence to DKA. We got 348 questionnaires, with 51.1% being male and 48.9% being female. Diagnosis of DKA has been made in 29.9% of patients. The mean awareness score was 5.22 (standard deviation 3.39) out of a potential 14 points. Seventy percent of the people surveyed had low levels of awareness, 23.6 percent had moderate levels, and 8.6 percent had excellent levels. Being younger, female, single, a student, having type 1 diabetes, being diagnosed with diabetic ketoacidosis, and having adequate understanding about the disease were all factors linked to heightened awareness. Both diabetes patients and their caretakers exhibited an inadequate level of knowledge on DKA. In comparison to other subjects, younger female patients who are single and have a diagnosis of DKA are more likely to be knowledgeable about the disease. There is an urgent need to educate the diabetic community and those who care for them about DKA [16].

Quality assessment

The study's cross-sectional design aligns with the research objective of evaluating the knowledge and foot care practices among caregivers of diabetic patients in Saudi Arabia [15]. The inclusion criteria for participants, based on age, residence, and caregiving role, are clearly defined. The use of a questionnaire, adapted from established tools and validated through a pilot study, enhances the reliability of data collection. The study's reliance on random sampling adds to its generalizability. However, the article lacks details on potential limitations and biases associated with the cross-sectional design, such as recall bias in self-reported practices. The ethical considerations, including approval from the Research and Ethics Committee and guarantees of confidentiality, demonstrate a commitment to ethical standards. The presentation of sociodemographic characteristics and descriptive statistics is thorough, offering a comprehensive overview of the caregiver participants. However, the article could benefit from

a more concise presentation of these results to maintain reader engagement. The association between various factors and caregivers' knowledge is well-analyzed using statistical methods. The inclusion of odds ratios and confidence intervals adds depth to the interpretation of results. The discussion of results is clear, emphasizing the positive aspects of caregiver knowledge and practices. However, the study could benefit from a more critical examination of potential limitations, such as the relatively short duration and the narrow socioeconomic focus of participants. Additionally, the reasons behind certain trends, such as the association between divorced status and lower knowledge, might be explored further.

The discussion provides a comprehensive analysis of the findings, drawing comparisons with previous studies. The identification of factors associated with increased or decreased knowledge adds depth to the interpretation. The recommendations for implementing health education programs for both patients and caregivers are practical and relevant. However, a more extensive exploration of potential cultural or contextual factors influencing caregiver knowledge could enhance the discussion. While the study identifies good knowledge and practices among caregivers, it would be beneficial to discuss areas for improvement or potential interventions to address any identified gaps. The article [16] effectively addresses its research objectives, providing valuable insights into the knowledge and practices of caregivers regarding diabetic foot care in Saudi Arabia. However, a more critical exploration of potential limitations and a deeper discussion of contextual factors could further strengthen the study.

The study [16] employs a cross-sectional design with a sample size of 348 participants from Hail City, Saudi Arabia, aiming to assess the awareness and practice of diabetic ketoacidosis (DKA) among diabetic patients and their caregivers. The demographic information and clinical features are well-documented, contributing to the clarity and completeness of the study. However, the reliance on an online survey may introduce selection bias, as participants with limited internet access or technological proficiency may be excluded. Additionally, the representativeness of the sample in relation to the entire diabetic population in Hail City could be a potential limitation. The statistical analysis, utilizing the SPSS software, includes appropriate methods such as Mann–Whitney and Kruskal-Wallis tests for non-normally distributed data. The use of a scoring system to categorize awareness levels is clear, allowing for a straightforward interpretation of results. However, the study lacks a detailed exploration of potential confounding variables that could impact awareness levels, and the authors do not discuss the rationale behind the choice of a 50% cutoff for defining poor awareness. The study would benefit from a more robust statistical analysis, considering potential confounders and adjusting for them in the interpretation of results [16].

The results section provides a comprehensive overview of the sociodemographic and clinical characteristics of the participants. The discussion interprets the findings well, highlighting the lack of awareness among the study population. The comparison of results with other studies adds context, although a more critical analysis of potential cultural or regional variations affecting awareness levels could strengthen the discussion. Overall, the study contributes valuable insights into the awareness of DKA among diabetic patients in Hail City, but addressing the limitations and providing a more in-depth analysis of potential influencing factors would enhance its scientific rigor [16].

Discussion

Amputation, neuropathy, osteomyelitis, and diabetic foot syndrome are all symptoms of the same complex clinical disease [3]. Everyone involved in healthcare, from patients to

caregivers, bears a heavy burden due to this condition [4-6]. The average frequency of diabetic foot syndrome in Saudi Arabia is 8.5%, and the incidence rate is about 1.8% [10].

Research has shown that when patients and caregivers work together, we can lower the prevalence of diabetic foot and the frequency of LLA [12]. For that reason, we set out to assess the level of expertise among Saudi Arabian caregivers who deal with diabetic foot condition.

According to the demographic data, around 39.9% of the caregivers had an average age of 35.5 ± 12.4. This aligns with a research that measured the expertise of caregivers in Egypt about how to handle diabetic foot patients having their feet amputated. According to their findings, the average age of caregivers was 37.21±13.87 years old [14]. Caretakers of diabetes patients who had amputations had an average age of 51.74±15.16 years, which is consistent with our data and a 2018 research in Northern Portugal that measured the risks of life among caretakers [6]. Younger generations are better able to take care of their families, according to this data. In line with the research carried out in Egypt by Abdel-Mordy et al., where the majority of caregivers were females as well [14], the bulk of caretakers for patients with diabetic foot were females. In contrast to a prior research in Egypt that found women to be the primary caregivers for their husbands, this one found that children were more likely to be the primary caregivers for their parents [14]. Caretakers often live in the same residence as their patients, according to these two reports.

Consistent with previous research by Abdel-Mordy et al. [14] and Wang et al. [11], we also discovered that most caregivers in our study were married. Our study's results contrast from those of Abdel-Mordy et al. [14], whose majority of participants were housewives, whereas over half of our participants were working. In addition, in contrast to Abdel-Mordy et al. [14], who discovered that the majority of their sample had just a secondary school education, our research indicated that the majority of caregivers had bachelor's degrees.

The most prevalent presenting symptoms of DKA, according to a research published by Satti et al. [17], were stomach discomfort (66.3% of cases), vomiting (71.3%), and infections (82.1% of cases). A different study from the Central area of KSA found that out of all the symptoms of DKA, the most well-known one was the smell of breathing (70 percent), while the least well-known one was skin coldness (29.5%). The author also found that 63.3% of people knew that DKA might cause severe dehydration or coma, and that 68.8% knew that. Though we found that physical activity and infections are both potential causes of DKA, our sample size was quite small (27% and 24.7%, respectively). However, we did find that a significant portion of our group had fatigue and sleepiness as their primary first symptoms of illness (64.9%).

It was found that only 43.7% of people in a sample considered DKA an urgent consequence of diabetes that needs to be treated very once [16]. Unfortunately, there was a lack of adequate knowledge on whether DKA is limited to children and the potential consequences of low blood insulin levels. Notwithstanding these limitations, a portion of the population relies on their information via consulting a physician (29.9%), the Internet (17.2%), or friends and family (14.9%) [16]. In Somalia, 37.5% of diabetes patients sought medical assistance for their condition, and even less adhered to a regular fitness routine, which might lead to more difficulties [18].

Research conducted in Riyadh, KSA [19, 20] found that 68.8% of diabetic caregivers were aware that DKA might cause coma or severe dehydration (63.3%), and 88.9% recognized that following insulin instructions can avoid DKA. While 40.8% of the participants were sure that

the first thing to do in the event of DKA was to transport the patient to the hospital for treatment right away, just 25.3% knew that forgetting to give themselves an insulin injection may cause DKA. Patients and caregivers should be taught by diabetes educators that insulin should never be stopped when indicators of diabetic ketoacidosis are present [16]. They should also be instructed to self-monitor their blood glucose levels and adjust the dosage as required. Therefore, if nothing works, they need to take the patient to the emergency department to stop the DKA from becoming worse [16].

Conclusion

Majority of Saudi Arabians who treat diabetic foot patients are young, married women with college degrees. Diabetic foot affects a large percentage of people with diabetes; however, only a tiny percentage of those people show signs of poor health or need to have their feet amputated. Regular foot checks, cleanliness, moisturization, nail trimming, and footwear selection are all part of a caregiver's standard operating procedure. Numerous caregivers are well-versed in the treatment of diabetes patients' feet and the difficulties that might arise from the disease. Being female, having a master's degree, being familiar with diabetes from a personal experience, caring for patients with diabetic foot, and having worked with patients with diabetic foot in the past are all factors that are linked to more understanding. Both diabetes patients and their caretakers exhibited an inadequate level of knowledge on DKA. In comparison to other subjects, younger female patients who are single and have a diagnosis of DKA are more likely to be knowledgeable about the disease. Closing the knowledge gaps about DKA among people with diabetes and those who care for them is very important. We must all do our part to inform diabetic patients and their loved ones about the disease's dangers and how to prevent its consequences.

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