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The Self-care Practices of Foot among Patients with Type 2 Diabetes Mellitus in the Asian Populations: A Systematic Review

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Abstract

Diabetes mellitus is a highly prevalent chronic disease all over the world. It has become the main reason for non-traumatic amputation. Major amputation occurs every 20 seconds, as a result of diabetic foot problems caused by poor foot care. The main purpose of this study is to determine the self-care practices of foot among patients with type 2 diabetes mellitus in Asian populations. The systematic review design was applied to find out the self-care practices of the foot. Thus, Pub Med, CINAHL, Science Direct, and Wiley Online Library were searched, and 1390 articles published in English between 2016 and 2021 were identified. The PRISMA filtering technique with inclusion and exclusion criteria focused on selecting the best articles. Finally, seven articles were selected and analyzed critically to detect findings. Three themes emerged from the findings: poor foot care practices among Asians, mal-practices of foot self-care, and mal-practices of using footwear. A significant percentage of diabetic patients in the Asian region follow poor foot care practices and they follow many mal practices of diabetic foot care such as not trimming toenails straight across, cleaning their nails with sharp objects, and not applying any moisturizer on the foot skin to avoid dryness. Further, malpractices of using footwear leading to foot injuries were identified, such as not checking the inside of shoes before wearing, not measuring the foot size when selecting footwear, and wearing barefoot indoors and outdoors frequently. In conclusion, the malpractices of diabetic foot self-care and the malpractices of using footwear are influential factors for the development of various foot complications as well as increasing foot amputations. Thus, healthcare practitioners should maintain ongoing educational initiatives to ensure proper foot-care practices.

Keywords; Self-care Practices; Type2 diabetes mellitus; Diabetic foot care

Introduction

Diabetes mellitus is a very common chronic disease in the world. Thus, it has spread rapidly across Asia (Ramachandran et al., 2010). This disease currently affects more than 230 million Asians, with that number projected to grow to 335 million by 2040 (Yang et al., 2019). Hyperglycemia is a metabolic condition caused by deficiencies in insulin function, insulin secretion, or both (Al-Glows and Al-Zahrani, 2019).

There are many varieties of diabetes mellitus, including type 1 diabetes, type 2 diabetes, gestational diabetes, and diabetes caused by other factors (Muhammad et al., 2019). However, type 2 diabetes mellitus is widespread at present (Scott, 2013).

Meanwhile, diabetes is a multifaceted disease and there are many long-term complications derived from diabetes mellitus (Al-Hariri et al., 2016). Among these complications, diabetic foot problems are largely preventable (Hillson, 2015). One of the most common complications of diabetic foot problems is

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foot ulceration caused by foot injuries (Boulton et al., 2005). According to statistics, diabetic foot ulcers are responsible for approximately 70% of non-traumatic amputations (Carmona et al., 2005).

Diabetes mellitus is a major cause of non-traumatic amputation in developing countries, and 40–60% of all lower extremity non-traumatic amputations are performed in diabetic patients globally (Rajamani et al., 2009). A major amputation occurs every 20 seconds globally as a result of diabetic foot complications (Ministry of Health: Sri Lanka, 2017). According to Boulton et al. (2005), patients with diabetes mellitus account for at least half of all amputations, with diabetic foot ulcers being the most common source. Every seven seconds, a person dies from diabetes-related complications that could be avoided, such as foot complications and 50% of diabetic patients die within a year of major amputation, and foot problems (Anne and Antonio, 2015).

Hence, diabetic foot care is very important to reduce diabetic foot ulceration as well as non-traumatic amputations (Subrata and Phuphaibul, 2019). Diabetic foot care is an effective way for diabetic patients to avoid their foot issues (Seid and Tsige, 2015).

Many previous studies mentioned that improving the practice of diabetic foot care can help to manage diabetic foot problems (Ekore et al., 2010). Moreover, many Asian studies reported that the majority of patients did not follow the self-practice of diabetic foot care properly (Hasnain and Sheikh, 2009) and many patients with diabetes mellitus in Asian countries followed various malpractices related to diabetic foot care (Karadag et al., 2019). Particularly in South Asia, the prevalence of type 2 diabetes has doubled, rising from 4.1% in 1980 to 8.6% in 2014, and predicted to reach 11.3% by 2045 (International Diabetes Federation, 2021). Therefore, there is an urgent need to explore and expand the self-care practices of foot among Asians. The findings of the study will redound the benefits of conducting foot care awareness programs at the regional and national levels.

However, most of the Asian studies in this field have been conducted on a country-by-country basis. Therefore, the present study maintains a unique status as the study is based on the Asian region at large. Accordingly, the study aimed to determine the self-care practices of foot among patients with type 2 diabetes mellitus in Asian populations.

Materials and Methods

A systematic review design has been selected for this study. The systematic review process has five steps (Khan et al., 2003) formulating the research question, search strategy, inclusive and exclusive criteria, critical appraisal of the literature, and data extraction utilized step by step.

2.1 Formulating the Research Question

Identifying Population, Intervention, and Outcome (PIO) is the way of formulating the question. The research question of the present study is; “What are the self-care practices of foot among patients with type 2 diabetes mellitus in Asian populations”. This research question is formulated according to the PIO structure. The table presents how the research question was framed using the PIO structure.

Table 01. PIO structure of research question

Population	***Intervention***	***Outcome***
Patients with type 2 diabetes mellitus in Asian populations	Self-care practices related to foot	Increased knowledge of foot care practices among this population

2.2 Search Strategy

Several sources were referred to collect relevant literature for the present study. Then different databases had to be searched to find relevant articles. Pub Med, CINAHL, Science Direct, and Wiley Online Library were used in the search process and 1390 articles were found initially. Meanwhile, six articles were identified through other sources. Then a total

number of 1396 articles were identified. PRISMA Flow Chart (Figure 01) of article selection shows how the research articles are selected step by step.

Finally, only seven articles were selected based on a thorough analysis of the quality. (Karadag, et al., 2019; Al-Gaows and Al-Zahrani, 2019; Kim and Han, 2020; Al -Hariri et al., 2016; Taksande et al., 2017; Pourkazemi et al., 2020 and Dundar and Akinci, 2017).

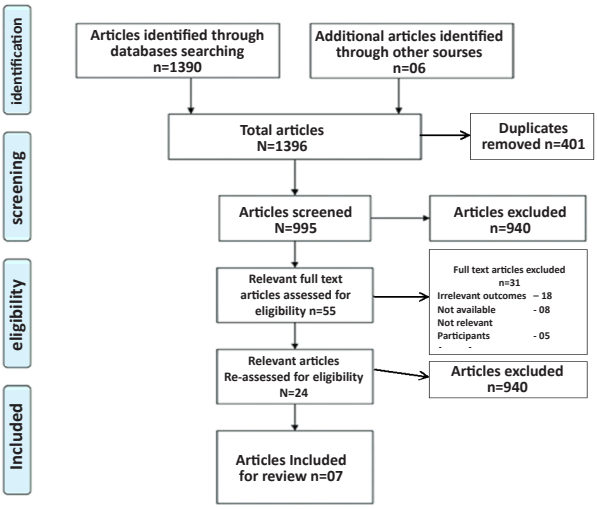

Figure 01. PRISMA Flow Chart

2.3 Inclusive and Exclusive Criteria

The publications from 2016 and above were included because the self-care practices of diabetic feet are updated rapidly. Initially, the articles based on patients with other types of diabetes mellitus were excluded. Likewise, the studies conducted in non-Asian countries were also excluded.

2.4 Critical Appraisal of the Literature

The Critical Appraisal Skills Programme, 2018 (CASP) checklist was used as a tool for the critical appraisal of the study.

2.5 Data Extraction

In the present study, the data related to the self-care practices of the foot were extracted from the selected studies.

Results and Discussion

3.1 Results

The selected seven articles were critically evaluated and discussed following the CASP checklist as follows.

Karadag, et al. (2019) conducted a cross-sectional study to assess practices of diabetic foot care. According to the results of the study, diabetic patients in Turkey followed poor foot care practices. This study mentioned that 29.5% of patients had bad foot care practices and 49.6% of patients had moderate foot care practices. In addition, 52.14% of patients were not careful about the shape of their nails, 48.45% of patients did not change their socks daily, 73.20% of patients did not use moisturizer for their feet and many of them were not careful about the material of their shoes.

Al-Gaows and Al-Zahrani (2019) conducted a cross-sectional descriptive study in Jeddah City, Saudi Arabia, to evaluate the practice of diabetic patients regarding foot care. According to the study, participants often had poor self-care practices in the areas of washing their feet in warm water, inspecting feet regularly, trimming toenails straight across, measuring foot size when buying footwear, inspecting footwear before wearing and wearing elasticated hosiery. Furthermore, 50% of participants had poor foot care practices and 28% had satisfactory foot care practices.

A cross-sectional study related to self-care practices among patients with diabetic foot ulcers was conducted by Kim and Han (2020) in South Korea. The main objective of this study was to examine the level of foot self-care practices. The finding of this study indicated many patients followed poor self-care practices of the foot. Another study from Malaysia has stated the same results (Muhammad-Lutfi et al., 2014). Additionally, this study mentioned that the participants had a low score in managing foot calluses.

Al-Hariri et al. (2016) conducted a cross-sectional study in Saudi Arabia to find out foot self-care

practices among diabetic patients. According to this study, many patients followed bad practices of foot care such as walking barefoot frequently, cleaning their nails with sharp objects, and wearing ill-fitting shoes. The study further states that foot injuries can be avoided by using footwear properly.

Taksande et al. (2017) conducted a cross-sectional analysis in central rural India on the practice of foot care. According to the statistics, only 23.2% of patients were concerned about diabetic foot complications. In addition, nearly 84.5% of the population refused to wear footwear as well as outdoors and indoors, 14.5% of patients walked barefoot. Moreover, this study revealed that malpractice of footwear caused foot injuries.

Dundar and Akinci (2017) performed an institution-based cross-sectional study in Turkey to identify diabetic foot care practices. The study's findings were discussed in two categories, one of which was uninformed and the other was informed. According to the results, the informed group's overall foot care practice score was significantly higher than the uninformed group's. The percentage of the "good practice" score was 46% in the informed group and 11% in the uninformed group. The "foot and nail care" category was considered "poor practice" in both groups, while the "beware of inappropriate behavior" and "awareness of footwear" sets were considered "satisfactory practice" in both. The uninformed group's overall foot care practice score was extremely low.

Pourkazemi et al. (2020) recently conducted a cross-sectional study in Iran on diabetic foot care practices, involving diabetic patients. According to the current study, many patients had poor diabetic foot care practices (88.7%). Using talcum powder between the toes, appropriate toenail trimming, keeping the foot skin moist and avoiding dryness were reported as having the least practice.

3.2 Discussion

This discussion was focused on three key themes derived from the above studies through qualitative thematic analysis.

Theme 01: Poor foot care practices

Many diabetic patients in the Asian region follow poor foot care practices (Kim & Han, 2020; Pourkazemi et al., 2020). A Sri Lankan study by Jinadasa & Jeewantha (2011) highlighted the same situation. Moreover, many Asian studies indicated the same idea (Khams, Vatankhah, and Baradaran, 2007: Hanley et al., 2020). Not only patients in Asian countries but also those in Western countries (Robles et al., 2017) and African countries (Chiwanga & Njelekela, 2015) showed the same results.

Theme 02: Foot care-related mal-practices

Foot complications are caused by mal-practices of diabetic foot care such as not trimming toenails straight across, cleaning their nails with sharp objects, and not applying any moisturizer on the foot skin to avoid dryness (Al-Hariri et al., 2016; Pourkazemi et al., 2020). These malpractices were also pointed out by Ekore (2010) conducting a study in Nigeria. Although many diabetic patients had good knowledge of foot care, relatively the level of foot self-care practice was poor (Pourkazemi et al., 2020). Erva and Rebecca (2017) in China and Abu-Qamar (2014) in Turkey, emphasized the same finding.

Theme 03: Footwear-related mal-practices

Most of the patients with type 2 diabetes mellitus indicated a lack of proper understanding and ability to use footwear and it is a major provenance for foot injuries (Taksande et al., 2017; Karadag, et al., 2019). Muhammad-Lutfi et al. (2014) in Malaysia pointed out a similar opinion. However, many mal-practices were leading to foot injuries identified related to footwear such as not checking the inside of shoes before wearing, not measuring foot size when buying footwear, using ill-fitting shoes, wearing non-elas-

ticized hosiery, wearing barefoot indoors and outdoors frequently (Al-Gaows and Al-Zahrani, 2019). These malpractices were also noted by D'Souzaa et al. (2016).

Conclusion

According to the findings of the study, the self-care practices followed in foot care patients among type 2 diabetes mellitus in Asian populations were not adequate. Misconceptions and poor understanding of the use of footwear, the risk of foot injuries has increased. Therefore, self-practices of foot care should be improved by arranging awareness programs regarding foot care strategies for the diabetic population, especially among the Asian population.

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