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Title: Knowledge, attitude, and practice of foot care in patients with diabetes at Jeddah

Running title: KAP of foot care in patients with diabetes

Type: Original article

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Abstract

Background: Diabetic foot syndrome is one of the prevalent preventable complications of Diabetes Mellitus (DM). Foot complications in diabetes patient could affect their quality of life quality, increase morbidity and accelerate mortality. The American Diabetes Association (ADA) recommends a comprehensive foot examination once per year for diabetic patients. Proper care of the foot in diabetic patients could prevent and delay severe foot complications. The primary objective of the study was to analyze the knowledge, attitude, and practice of foot care in patients with DM in a central rural area of Saudi Arabia.

Methodology: This study was conducted in Jeddah, Saudi Arabia including 400 patients who had type 1 or type 2 diabetes. The subjects were evaluated for their knowledge about foot care and footwear practices. A structured and validated questionnaire was used for data collection.

Results: The present study found that 97.75% of the patients had awareness of the disease, and 94.25% were aware of the complications of the DM. In 25% of the patients, foot care examination and education regarding foot complications were not suggested by their treating physicians. Further, 47% of the patients did was not having any awareness regarding the annual examination of feet by the physician and self-examination available for diabetic patients.

Conclusion: Awareness of diabetes mellitus and its complications such as diabetic foot care is very essential for diabetic patients. Specific educational strategies should be established for both the consultant physician and the general population to create awareness for effective foot care.

Keywords: Attitude, diabetes, foot care, knowledge, practice

Introduction
Diabetic foot syndrome is one of the common complications of diabetes mellitus [DM]. Diabetic foot syndrome includes diabetic foot pathologies such as infection, diabetic foot ulcer, and neuropathic osteoarthropathy. Morbidity and premature mortality due to long-term foot complications are observed in DM patients. Lower extremity disease is twice as common as in people with diabetes when compared with healthy individuals [1]. The prevalence of foot related problems is common in low socioeconomic groups due to poor glucose level control and lack of proper foot-care. The range of annual incidence of foot ulcer in diabetic patients is from 1.0%–4.1% to 4%–10% of prevalence rate, and the lifetime incidence is as high as 25% [2]. The cost involved in the management of diabetic foot problems is enormous. So it is highly recommended to implement preventive measures to alleviate the cost burden of the patients and society. The American Diabetes Association recommends a comprehensive foot examination once per year for diabetic patients [3]. Proper foot care can prevent most diabetic foot complications. Much effort is required to build up good foot care habits to prevent and control diabetes foot syndrome. Furthermore, the use of inappropriate footwear is critical to prevent foot injury. Further, wearing socks is highly advised to avoid hyperkeratosis and fissures of the heel, the first interdigital space callosity or the great toe injury which could lead to severe foot complications.

Subjects and methods

A cross-sectional study was conducted in Jeddah, Saudi Arabia including 400 patients with type 1 or type 2 diabetes. The study duration was one year from the period of 2015 to 2018. Patients with type 1 or type 2 diabetes were evaluated for their knowledge about foot care and footwear practices. A structured and validated questionnaire was administered for data collection (Table 1).

Table 1: The structured questionnaire
**Knowledge regarding diabetes mellitus**

- Knows about the diabetes
- Knows about its complications
- Knows about normal blood sugar
- Knows about normal blood pressure
- Knows what to eat in diabetes
- Knows what is the role of exercise
- Knows that he/she should take foot care
- Knows that he/she should check his/her eye annually

**Attitude toward foot care**

- Has your physician told you how to take care of feet?
- Does your doctor examine your feet on your every visit to the doctor?
- Did your doctor tell you the complications of diabetes in the feet?
- Did your doctor tell you which type of footwear to wear?
- Did your doctor tell you to examine your feet daily?

**The practice of foot care in diabetes**

- Do you examine your feet every day?

All patients older than 18 years of age and diagnosed to be diabetic were included in the study. Patients who refused consent to be part of the study and patients who are already diagnosed with diabetic foot, amputated foot, or foot ulcers were excluded. All eligible patients selected for the study were asked for written informed consent in local language after getting approval from the Institutional Ethics Committee. The study was done under the supervision of King Abdulaziz University. All the data were entered into Microsoft (MS) Excel software and analyzed after verifying. All statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) software.

**Results**

Among the 400 patients studied, 377(94.25%) had type 2 DM, and 23(5.75%) had type 1 DM. Both male and female patients were equal in number. Mean age of patients was 52.4±7.5. Demographic characteristics of the study population are described in Table 2.
Table 2: Demographic characteristics of the study population

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N(%)/(Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>52.4±7.5</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>200(50%)</td>
</tr>
<tr>
<td>Female</td>
<td>200(50%)</td>
</tr>
<tr>
<td>Type of diabetes</td>
<td></td>
</tr>
<tr>
<td>T1DM</td>
<td>23(5.75%)</td>
</tr>
<tr>
<td>T2DM</td>
<td>377(94.25%)</td>
</tr>
<tr>
<td>Diabetes duration</td>
<td>10.2±7.3</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>139.7±19.11</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>80.8±14.9</td>
</tr>
<tr>
<td>PPBS (mg/dl)</td>
<td>246.7±49.8</td>
</tr>
<tr>
<td>FBS (mg/dl)</td>
<td>179±59.6</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>22.2±3.6</td>
</tr>
</tbody>
</table>

BMI: Body mass index; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; PPBS: Phosphate-buffered saline; FBS: Fasting blood sugar; SD: Standard deviation.

Among the total, 97.75% of the patients were found to be aware of the disease, and 94.25% were aware of the complications of the DM. In 25% of the patients, foot care examination and education regarding foot complications were not suggested by their treating physicians. The physicians educated around 49.75% of patients about their preferred type of footwear to wear. Around 69.25% of patients were educated to examine their feet daily, and only 44.25% of patients examined their foot on a daily basis. It was found that Male patients had a better attitude towards foot care than female patients. Type 2 DM patients had a better knowledge and attitude compared with type1 DM (Table3).
Table 3: Knowledge and attitude mean score towards demographics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Knowledge (Mean±SD)</th>
<th>Attitude (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5.2±1.3</td>
<td>2.8±1.2</td>
</tr>
<tr>
<td>Female</td>
<td>5.1±1.2</td>
<td>2.7±1.1</td>
</tr>
<tr>
<td>P-value</td>
<td>0.08</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1DM</td>
<td>4.8±1.4</td>
<td>2.8±1.1</td>
</tr>
<tr>
<td>T2DM</td>
<td>5.9±1.1</td>
<td>4.1±1.5</td>
</tr>
<tr>
<td>P-value</td>
<td>0.01</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Mean ±SD of knowledge=5.8±1.4; Mean ±SD of attitude=2.6±1.2

Discussion

Our study showed that less education, poor socioeconomic status, and unawareness of foot care were contributing factors found for improper footwear practices observed in the studied population, which could increase the risk for diabetic foot complications. Similar results were reported by Shah et al., George et al., Ekore et al., and Taksande et al.[1,4,5,6]. Further studies from Chellan et al. and Saurabh et al. [7,8] found an inverse relation among diabetic foot ulcer and foot care knowledge which was in agreement with the results of the present study. Also Shah et al. and Ekore et al. observed that doctors very rarely suggested foot care and education prevent complications to their patients. In the present study, we found that doctors do play a great role in patient education and this resulted in better foot care and reduced the complications in DM patients [4,6]. The diabetes knowledge was 82.9%, and its difficulties were 23.2% in studies reported by Singh et al. as well as Taksande et al. while in our study knowledge about diabetes was 97.7%, and its complications were 94.25% in the study subjects [1, 9]. The diabetes attitude score was 86.3% as supported by Chellan et al. and Singh et al. However, the favorable footwear was chappals, rather than sandals with strap, floaters, or shoes, which provide better support to the feet as seen in the study by Saurabh et al. [8]. A neuropathic foot may have a deformity, skin problems [corn and callosity], and infection precipitate limb-threatening complications which are preventable or treatable by seeking timely advice and treatment from the physicians [1]. Few studies highlight the ignorance in foot care knowledge
and practices, which contributes to severe complications such as diabetic foot for injury, infection, or amputation. While our study shows the improvement of foot care and relatively decreased diabetic foot complications concerning the active role of the physician to spread awareness between diabetic patients [10,11]. Our study and study from Khamseh et al. and Quinn et al. showed that patients with type 2 diabetes have higher education and better knowledge than those with type 1 DM [11,12]. Quinn et al. also emphasizes that patients with lower education need more information and knowledge about the diagnosis. The contributing factors for this predisposition are a busy clinical practice of diabetologists, who in turn spare very little time for patients’ education and awareness regarding diabetic foot care, associated with a bad attitude of many patients to follow foot care practices for long. Poor motivation from the patient's side to maintain optimal glucose level control, their negligent attitude towards infection, injury, and other symptoms related to the foot leads to a delay in timely consultation to their physician. However, an essential component of these practices is the selection of proper footwear [12]. Poor choice of footwear used by diabetic patients [e.g., chappals], increases foot trauma and complications. In our study, around 49.75% of patients were educated by their physician about the appropriate footwear for diabetic patients. All newly detected diabetics, as well as known diabetics, should be educated about diabetes and its avoidable complications. At every visit, a detailed foot examination should be done by the treating physician to rule out vasculopathy or neuropathy to identify the foot at risk. Therefore, a joint effort on the part of the physician and the patient is needed to provide and receive education about foot care to reduce foot problems as recommended by Taksande et al. [1]. Our study shows the importance of self-care which aims at the normal function, development, health, and well-being of the patient. The role of treating physician in patient education about their disease and how to deal is essential and helps patients to decrease morbidity and improve quality of life eventually. However, the lack of knowledge needs to be analyzed. Our data show that the physician’s primary job is in providing knowledge and information to the patients regarding foot care which could play an important role in preventing foot complications as also reported by Taksande et al. [1]

**Conclusion**

Awareness of diabetes mellitus and its complications including diabetic foot care is important for diabetic patients. Specific educational strategies should be established for both the consultant physician and the general public to create awareness for effective foot care.
List of abbreviations:

DM Diabetes Mellitus
ADA American Diabetes Association
MS Microsoft
SPSS Statistical Package for the Social Sciences software.

Consent for publication:

Informed consent was obtained from all the participants.

Funding:

None

Conflict of interest:

The authors declare that there is no conflict of interest regarding the publication of this article

Ethical Approval: not provided (Provide the center for approval, date and letter number)
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