

## Knowledge and Attitude of Foot Care Among Diabetics in Prevention of Amputation in Saudi Arabia

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### ABSTRACT

Diabetes mellitus is a prevalent endocrinal disorder in Saudi Arabia. Diabetic foot ulceration occurs in about one fifth of diabetics, and significantly increase the risk of gangrene and amputation. Early and proper foot care is essential to prevent such deleterious complication. **Objectives:** the aim of this review is to study the knowledge and attitude about foot care among diabetics in Saudi Arabia and its impact on prevention of amputation. **Methods:** To achieve this aim, online database was searched for articles reporting knowledge and/or attitude of Saudi patients about foot care. Results yielded from this search were quickly inspected, the titles and abstract were quickly read to select related studies. **Results:** Up to one fifth of diabetic patients had poor knowledge about their foot care, and in spite of regular checkups, they lacked awareness of signs and symptoms of diabetic foot infection. However, when educational programs were implemented, complications rate has significantly declined. **Discussion:** Previous literature studies indicated that Saudi diabetic patients had moderate to poor knowledge about their illness in general. Most of them are not adequately educated about the complications of their illness, and how to deal with them. However, when engaged in systematic educational programs, they were highly responsive and compliant and their new adopted attitude and knowledge about the illness decreased their amputation as well as other complications rate.

**Keywords:** Diabetic foot, diabetes, amputation, knowledge, attitude.

### INTRODUCTION

Diabetes mellitus is a prevalent endocrinal disorder among Saudi Arabia, affecting up to 30% of the population<sup>(1)</sup>. It has deleterious effects on organs and systems including the feet. Ulceration of feet and lower limbs occur in about 15% of diabetic patients<sup>(2)</sup>. These ulcerations make diabetic patients at 15 to 40-fold higher risk of gangrene and amputation<sup>(3)</sup>. In spite of the continuous efforts aimed at prevention, there was a notable increase in amputation rate over the last decade in the United States<sup>(3)</sup>. Amputation has a significant negative impact on survival, the five-year survival rate reported after amputation hovered around 50%<sup>(4,5)</sup>. Many risk factors have been established to increase the risk of diabetic foot to ulceration and

subsequently amputation. The most common of which are diabetic peripheral neuropathy, vascular insufficiency, mechanical factors, uncontrolled diabetes and trauma<sup>(3,6-9)</sup>.

In Saudi Arabia, a retrospective cohort study conducted on 62,681 diabetic patients indicated that prevalence of diabetic foot complications was 3.3%. Foot ulcers, gangrene and amputation occurred in only 2.05%, 0.19% and 1.06%, respectively. Risk factors reported to increase the rate of complications among the studied population were male gender, duration of diabetes ( $\geq 10$  years), uncontrolled diabetes, insulin use, peripheral vascular, coronary artery disease or cerebrovascular disease, diabetic neuropathy, diabetic retinopathy, smoking and hypertension<sup>(10)</sup>. The

prevalence of diabetic peripheral neuropathy among Saudi diabetic patients was reported to be about 20%<sup>(11)</sup>. **Hassan Ali *et al.*** in his review article,<sup>(12)</sup> indicated that about 325 amputations occur in Jeddah, 741 in Riyadh, and 3970 in Saudi Arabia annually.

**Study rationale and objectives:** Given the big magnitude of the problem and its grave complications, it was necessary to conduct a research to identify the patients' knowledge and attitude towards diabetic foot complications and how they deal with them. Inadequate patient knowledge certainly plays a key role in the grave complications of diabetic foot. Thus, this research aimed at exploring the knowledge and attitude of foot care among diabetic patients in an attempt to reduce the rate of amputation in Saudi Arabia.

**METHODS:**

For conducting this review, online data base was searched for articles reporting knowledge and/or attitude of Saudi patients about foot care. Cochrane library and PubMed were systematically searched for studies reporting diabetic foot disorders in Saudi Arabia. The yielded research articles were then deeply inspected, the titles and abstract were quickly read to select related studies. We have only investigated researches conducted in Saudi Arabia that are related to diabetic foot care, diabetic foot health education, knowledge and

**Table (1):** Saudi studies assessing the knowledge, attitude, and behavior of diabetic Saudi towards their illness.

No.	Author	Year	Patients	Type of study	Aim	Comments
1	<b>Al-Khaldi <i>et al.</i></b> <sup>(13)</sup>	2004	107	Cross-sectional	Study behaviors towards diabetic foot care	53% regularly checked feet
2	<b>Suliman <i>et al.</i></b> <sup>(14)</sup>	2016	75	Cross-sectional	Study patient's knowledge about diabetes in general	13.3% good knowledge 72% moderate 14.7% poor
3	<b>Balkees <i>et al.</i></b> <sup>(15)</sup>	2010	1634	Cross-sectional	Explore patient behaviors toward foot diseases	47.1% used conventional topical medications 21.7% used complementary and alternative medicine 31.2% used both.
4	<b>Al-Wahbi <i>et al.</i></b> <sup>(18)</sup>	2010	41	Retrospective pilot	Assess the efficacy of foot care educational program on diabetic foot ulcer outcome	Amputation rates were significantly lower among patients who were exposed to foot care educational program than their counterparts

attitude about the risk of amputation of diabetic foot, and the approaches adopted to solve this problem. Four articles were closely related to the research point and they were reviewed thoroughly.

The study was done after approval of ethical board of Imam Muhammad ibn Saud Islamic university.

**RESULTS:**

Different studies were conducted in Saudi Arabia and focused in the presentation and management of diabetic food. Four of them were closely related. For instance, **Al-Khaldi *et al.***<sup>(13)</sup> in a cross-sectional study on 107 Saudi male diabetic patients in Aseer region during the year 2004, examined patients' behaviors toward their foot care and correlated these behaviors with signs found on physical examination of their feet. They reported that more than one third of the studied patients (37%) suffer lack of previous knowledge about the deleterious effects of uncontrolled diabetes on feet. More than half of patients, however, had regular check-ups on their feet. About 22% had diabetic foot symptoms and fungal infection was found in 31%<sup>(13)</sup>. Similarly, **Suliman *et al.*** reported in another cross-sectional study conducted on 75 diabetic patients in Riyadh, that only 13.3% of patients had good knowledge about diabetes, 72% had moderate knowledge and 14.7% had poor knowledge<sup>(14)</sup>.

As regards the attitude and behavior, Saudi diabetics were found to use complementary and alternative medicines much more common than conventional treatment. To exemplify this, **Balkees et al.**<sup>(15)</sup> reviewed 1634 diabetic patients in Jeddah, Saudi Arabia via a questionnaire to determine their knowledge and behaviors in dealing with their feet. About two-thirds of the interviewed patients had diabetic foot diseases. Up to half of those patients stated that they used only topical medications, with one fifth of them using complementary and alternative medicine. Honey seems to be the most common complementary medicine used by Saudi diabetics (56.6%). Therefore, more than half of the diabetic patients with foot diseases had tried alternative and complementary medicine with or without the conventional medications. Alternative and complementary medicine use is commonly used among Saudi population in general<sup>(16)</sup>. In spite of paucity of well-designed double controlled trials approving or denying the efficacy of these medicines in management of diabetic foot diseases, the popularity of their use necessitates further research to assess its efficacy. This study, however, revealed that many diabetics had negative behaviors towards foot care.

The effect of implementing an educational program had also been studied. **Fatma et al.**<sup>(18)</sup> evaluated the impact and efficacy of educational program introduced to 150 type 2 diabetes mellitus patients attending to King Fahd outpatient clinics, Al Khobar. They had been followed up to assess the efficacy of the adopted program on the patients' outcome. Patients were reported to have a significant decrease in body mass index, more control of their follow-up blood glucose level, more compliance to their recommended diets and more adherence to exercise and lifestyle modification. Furthermore, patients' education about diabetes had significantly improved after adoption of the planned educational program.

Similarly, **Al-Wahbi et al.**<sup>(18)</sup> in a retrospective pilot study conducted in 2010 on 40 diabetic patients in Riyadh, explored the impact of adopting an educational program for diabetic foot care on the outcome of diabetic patients with foot ulcers. They compared the outcome of 20 patients who were not involved in the educational program to 21 patients who were involved. Results from their study indicated that there was a statistically significant reduction in the amputation rate among

the group exposed to foot care educational program. Educated patients had an amputation rate of 61.9%, whereas 70% of the non-educated group underwent amputation. Additionally, toe amputation as well as below-knee amputation rates were lower among educated patients – in spite of being statistically insignificant – when compared to non-educated group.

## DISCUSSION

Upon reviewing literature studies published from Saudi Arabia, it was clear that there is an apparent lack of knowledge about diabetes mellitus among Saudi diabetic patients. Patients were neither aware of the importance of control of their blood glucose level nor its grave complications. Furthermore, they tended to adopt non-medical approaches to treat their foot disorders.

In spite of regular checkups reported by over half of Saudi diabetics, at least one third seemed to be unaware of the hazardous consequences of uncontrolled diabetes on their feet<sup>(13)</sup>. This may explain the relatively high prevalence of diabetic foot disorders and fungal infection among diabetic patients in Saudi Arabia<sup>(13)</sup>. Similarly, poor knowledge about diabetes was reported in up to 15% of patients, and less values had adequate knowledge<sup>(14)</sup>. Such poor knowledge eventually led to the common tendency to use non-approved complementary and alternative medicine regimens for management of diabetic foot symptoms, either alone or combined with conventional medications, in over half of the diabetic population<sup>(15)</sup>.

Values collected through the above-mentioned studies strengthen and justify the urgent need to adopt health education program to be carried out by Saudi health care sector in community. Education of patients about the risk factors of diabetic foot diseases, early symptoms and signs, and the proper preventative and therapeutic measures for their management is of utmost importance. Implementing proper educational technique induced promising results on reducing the complications of diabetic foot<sup>(18)</sup>. Many studies had proposed some applicable solutions. For instance, the role of nurse in early detection, prevention, and health education about diabetic foot infection had also been studied<sup>(15)</sup>, and results from this study strongly recommend engaging nurses in health education programs. Other studies recommended the use of social media

as a common and friendly method to deliver proper educational material for early identification of diabetic foot symptoms and signs and eventually early intervention to abort grave complications. Literature studies stated that social media were the most commonly used sources for information among patients<sup>(17)</sup>. Thus, directive plans towards using these tools should be considered.

An encouraging point about the probable beneficial outcome of adopting educational programs is the positive results of previously held studies that explored the impact of introducing educational programs to diabetic patients on overall outcome.

## CONCLUSION

In conclusion, Saudi diabetic patients seemed to have moderate to poor knowledge about their illness in general. Most of them are not adequately educated about the complications of their illness, and how to deal with them. However, when engaged in systematic educational programs, they were highly responsive and compliant and their new adopted attitude and knowledge about the illness decreased their amputation as well as other complications rate. This necessitates the adoption of a hands-on intensive health educational program for early detection, understanding, preventing, and treating diabetic foot complications among Saudi diabetics.

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