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Knowledge, Attitude and Practices (KAP) Study on Diabetic Foot Care among Diabetic Patients with Diabetic Foot Lesions in District Bahawalpur, Pakistan

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Diabetes mellitus is a chronic multifactorial metabolic illness that is characterized by numerous chronic complications. Diabetes affects almost every system of the body. Among these diabetic foot is one of the major complications of diabetes mellitus. Its main objective was to investigate the knowledge, attitude and foot care practices in diabetic patients suffering from diabetic foot lesions. An institutional-based cross-sectional study was designed to be conducted at Civil Hospital, Bahawalpur, Pakistan. Total 150 diabetic patients with diabetic foot lesions were selected by systematic random sampling method. An informed written consent was obtained from each of the

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study participant according to the declaration of Helsinki. Data was collected by a structured and pretested questionnaire via face-to-face interview and by direct observation of the patient. Ratio of Type II diabetes among study population was 91.3% whereas 23.3% patients were having family history of diabetes. Result of the study showed that 44.35% patients of study sample were having some knowledge about diabetes related complications whereas 45.44% patients were having a positive attitude towards control and prevention of diabetes related complications. Good foot care and footwear practices were being carried out by just 33.62% of patients included in the study. It was concluded from the present study that by providing education regarding control and management of diabetes and its complications, patients training about foot care practices, early detection and management of peripheral neuropathy and strict control of blood glucose could be very helpful in decreasing the diabetic complication including diabetic foot lesions.

Keywords: Diabetes mellitus; diabetic foot; knowledge; education.

1. INTRODUCTION

Diabetes mellitus is a chronic and complex metabolic disorder requiring continuous and proper medical care for maintenance of normal blood glucose level and reduction of complications [1,2]. Significant research evidences suggest that a wide range of interventions are required for the improvement of diabetic outcomes [3]. Diabetes casuses alteration of microvasculature, leading to extracellular matrix protein synthesis, and capillary basement membrane thickening that are the main reason for the development of diabetic microangiopathy [4]. All these factors alongwith oxidative stress, glycation end products, neovascularization of vasa vasorum and low grade inflammation can progress to development of macrovascular complications [5]. Long term uncontrolled hyperglycemia is linked with chronic damage of the various systems of body primarily affecting heart, eyes, kidney and nerves [6]. The ratio of diabetes and its associated complications is increasing throughout the globe [7]. Although a long list of complications affects a diabetic patient but one disastrous complication is diabetic foot or foot ulcer/lesion [8]. Diabetic foot lesions gradually develop by the loss of sensations in feet [9]. Main reason of diabetic foot lesions incluse peripheral arterial disease, infections and peripheral neuropathy [10]. Diabetic foot is very common and also one of most expensive complication of diabetes [11]. Diabetic foot lesion has notable impact on socio-economic status and well being and of diabetic patient. It not only hampers the quality of life but also has conspicuous result on the financial status of a diabetic patient [12]. Diabetic Foot lesion is a devastating condition because it also increases the rate disability and even death of diabetic patients [13]. Foot ulcers can lead to recurrent hospital admission, superadded bacterial infections of lesions and even limb amputation in severe cases [14].

In developing countries like Pakistan, diabetic foot lesions are very distressing for the diabetics [15]. It is not only associated with significant risk of disability, morbidity and mortality but has a great psychological impact on diabetic patients [16]. Study evidences suggest that 15% of diabetic patients can suffer from diabetic foot lesions at some stage of their disease [17]. Severity of complication can vary from simple boil to life threatening secondary bacterial infection or even limb amputation [18]. Risk factors for diabetic foot lesions include peripheral neuropathy, peripheral vascular disease, shoes pressure, poor blood glucose control, cigarette smoking etc and these factors can also play an important role in patho-physiology of the disease [12]. Although diabetic foot is a devastating and protracted condition associated with diabetes even then it can be prevented in high risk patients [13,19]. Prophylactic practices are very economical but not much prevalent that's one of the reason that incidence of diabetic foot lesion is very common and a challenge as well for health care professionals [20]. Diabetic foot lesions need reliable, systematic and exclusive health care facilities for the prevention, early detection and management in diabetics [21]. Study analysis recommend that age and weight along with educational status, self care practices, type of diabetes has remarkable effect on diabetic foot lesions [22]. Yet, determining factors vary widely among diabetic patients with different socioeconomic status and has different influential factors for development of complications [23].

Diabetes prevalence in Pakistan was 8.7% during 1994–98 and this ratio increased to approximately 26.3% of local population above

19 years age during 2016-2017 estimated by the Pakistan Health Research Council [24,25]. Provincial pattern of prevalence revealed 30.2% diabetic patients were present in Punjab Province [25]. If current scenerio continues, Pakistan is at risk to achieve the highest prevalence of diabetes globally. The prevalence of foot ulcers is reported to range from 4.0% to10.0% in patients with diabetes, which suggests that lifetime risk of developing foot ulcers in these patients may be as high as 25.0% [26]. Diabetic foot problems are one of the most common reasons for hospitalisation of diabetic patients and impose a significant economic burden on patients, their families and society as a whole [27]. Therefore, identification of such striking factors is very important for prevention of calamitous effect of diabetic foot lesions [28]. Current study was designed to evaluate diabetic foot lesions and corresponding risk factors in adult diabetic patients visiting the diabetic clinic at the Civil Hospital, Bahawalpur, Pakistan. The findings of current study can be helpful in reducing the incidence of diabetic foot lesions and its associated complications in this region.

2. METHODOLOGY

2.1 Data Collection and Data Analysis

An institutional-based cross-sectional study was conducted at Civil Hospital, Bahawalpur from the 1st of February to the 30th of March, 2019. Civil Hospital, Bahawalpur is a teaching and general hospital. It also serves as referral center for many patients from peripheral areas. Study population comprised of all diabetic patients who were attending the diabetic follow-up at the Civil Hospital, Bahawalpur during above mentioned time period. Diabetic patients having any lesion due to any trauma, accident and seriously ill patients or unable to communicate were excluded from the study. Diabetic foot lesion was dependent variable in this study. Whereas age, sex, religion, ethnicity, educational status, marital status, address, socioeconomic status**,** physical activity, cigarette smoking, type and duration of diabetic illness, body mass index, regular follow-up visit, history of ulceration, neuropathy and peripheral vascular disease were independent variables.

Systematic random sampling method was adopted for selection of diabetic patients suffering from diabetic foot lesions. 150 patients having diabetic foot lesions were selected for the study. Data was collected on a single visit in the form of case report by the investigator. Patient biodata i.e. name, gender, age, height and weight was collected. Additionally fasting blood sugar, blood pressure, age of diagnosis of diabetes and duration of diabetes was recorded. Data was collected by a structured and pretested questionnaire via face-to-face interview and by direct observation of the patient. The questionnaire was prepared in English, translated to local language (Urdu) then back to English to keep its consistency. Data collectors were also given one day training. A patient having a current foot lesion/gangrene, or a healed ulcer of history of deformity in form of foot or leg amputation was included. Data of any previous foot lesion was recorded. Both feet were physically examined by the investigator and any pigmentation, discoloration, cracked or dry skin, blister, callus formation or muscle wasting was recorded. Descriptive statistical analysis was used for all the collected data. All variables were presented as proportions and percentages. All statistical analyses were carried out using SPSS 18.0.

3. RESULTS

3.1 Baseline Characteristics

Total 150 diabetic patients were included in the study. Sex distribution was 56% male and 44% female patients. Age of the patients was from 21-50 years. 8.66% patients were suffering from Type I diabetes whereas 91.3% patients were suffering from type II diabetes. No case of gestational diabetes was reported. 23.3% patients had a family history of diabetes (Table 1).

Table 1. Baseline characteristics

	Percentage
Age distribution	
21-30	18%
31-40	34%
41-50	47.3%
Sex distribution	
Male	56%
Female	44%
Diabetes mellitus type	
Type I	8.66%
Type II	91.3%
GDM	-
Family history of diabetes	23.3%
Diabetes education	46%

3.2 Knowledge of Diabetic Foot Care

Data collected from 150 patients showed that 45.37% people were aware and 42.75% were unaware of foot care practices. 24.7% patients were not having any knowledge about it. Feet were examined by 57.3% patients on regular basis whereas 14% patients didn't examine their feet. n=43(28%) participants were not aware of this point. 62% patients were having some knowledge regarding foot complications, 23% participants were not aware and 14% participants answered that they not clear. 46% patients were having knowledge about reduced blood flow in their feet while 21.3% patients didn't know it. 28.6% patients were aware that reduced blood flow to feet could develop foot ulcers while 36% patients had no knowledge of it. 44%patients observed loss of sensation in their feet whereas 14% didn't. 59.3% patients were aware of developing foot gangrene while 29.6% were not. 65.3% patients were getting proper information regarding foot care whereas 22% patients were not getting any such awareness. 23.3% patients were having knowledge that smoking can reduce blood flow towards feet whereas 52% patients were not aware of it (Table 2).

3.3 Patient's Attitude towards Control & Prevention of Diabetic Foot

Next questionnaire was to assess the attitude of participants towards control and prevention of diabetic complications. 45.44% participants attitude was good towards foot care and 24.24% participants was not satisfied and the attitude of 30.24% was with a label of don't know as they were totally unaware of diabetic foot care. Questions regarding life style changes, any effect of routine changes on the control of diabetes and its complications was asked. Neither the patients were willing to wear any special foot ware to reduce the foot ulcers nor were they doing any self examination of the feet (Table 3).

Table 2. Data of questionnaire about knowledge of diabetic foot care

Question asked from patients	Yes	No	Not clear
Do you Examine your feet?	57.3%	14%	28%
Do you know if you have foot infection, you will develop foot wounds?	62%	23%	14%
Is it true that all patients with diabetes develop reduced blood flow in their feet?	46%	21.3%	32.6%
Do you know that if you have reduced blood flow on your foot, you are more prone to get foot ulcers?	28.6%	36%	35.3%
Do you know that if you have loss of sensation on your foot, you are more prone to have foot ulcers?	44%	14%	42%
Do you know that mostly patients with diabetes develop gangrene?	59.3%	28.6%	12%
Do you know that mostly patients with diabetes develop foot ulcers?	37.3%	47.3%	15.3%
Do you know that mostly patients with diabetes develop lack of sensation in their feet?	65.3%	22%	12.6%
Are you aware that smoking can reduce blood flow in your feet?	23.3%	52%	24.6%

Table 3. Data of Questionnaire about Patient's Attitude towards control & prevention of Diabetic Foot

Question asked from patients	Yes	No	Not clear
Are you willing to change your food habits and do regular exercise to prevent further complications due to diabetes?	72%	17.3%	10.6%
Do you think you can lead a normal life if you take appropriate measures for diabetes?	54%	31.3%	14.6%
Will you wear footwear indoors as advised by your podiatrist?	36.6%	27.3%	36%
Are you willing to use special footwear prescribed by your podiatrist?	16%	26%	58%
Do you think people with diabetes should take the responsibility of self foot examination like checking sole of foot daily/wearing podiatrist prescribes footwear/consulting podiatrist regularly?	48.6%	19.3%	32%

Table 4. Data of Questionnaire about Foot care and footwear Practices by diabetic Patient

Question asked from patients	Yes	No	Not clear
Do you wash your feet daily?	72%	17.3%	10.6%
Do you check the temperature of water before washing?	57.3%	39.3%	32%
Do you go for foot checkup once in a month?	15.3%	72%	12.6%
Do you check your shoes before you put them on?	14.6%	52.6%	32.6%
Do you check your shoes when you take them off?	18.6%	42.6%	38.6%
Do you cut your nails regularly?	30.6%	59.3%	10%
Do you dry you feet and toes properly?	45.3%	29.3%	25.3%
Do you moisturize dry areas of your feet daily?	20.6%	52%	27.3%
Do you check whether your shoes/socks leave marks on your feet?	46%	32%	22%
Do you check your feet daily for any injury?	13.3%	64%	22.6%

3.4 Foot Care and Footwear Practices by Diabetic Patient

The net result of participants that were carrying good foot care practices was about 33.62%, about 46.44 participants were not practicing any technique and almost 19.5% participants were not having any knowledge about it. Daily foot washing was done by 72% patients and 17.3% were not washing their feet daily. Foot temperature was checked by 57.3% patients and 39.3% patients were not doing so. Nail care was done by 30.6% patients whereas 59.3% were not paying attention to it. Toes care was done by 45.3% patients whereas it was neglected by 29.3% patients. 46% patients were keen to observe their feet after removal of socks and shoes whereas 32% were not doing any such practice (Table 4).

4. DISCUSSION

Current study indicates that poor educational status, low socioeconomic conditions and negligence about foot care were the contributory factors for increasing incidence of diabetic foot lesions. Uncontrolled diabetes mellitus also increases the severity of disease and makes patients more prone towards complications including diabetic foot [29]. Increased body weight of diabetic patients is also another risk factor [30]. Obesity increases the risk of atherosclerosis in diabetic patients that cause decrease blood supply to lower extremities particularly feet. Prolonged diabetic illness and poverty were two major risk factors for the development of foot lesions [31]. Detailed feet examination should be carried out at each follow up visit by the physician to prevent neuropathy at its initial stage [32-34].

Neuropathy leads to loss of sensation in feet [35]. This is why abnormal and persistent increased pressure on feet remains undiagnosed. Skin cell react to this increased pressure by increasing keratinization that facilitates callus formation [36]. Callus itself predisposes diabetic patient to foot lesions [37]. Decreased blood supply to feet also slows down the healing process in case of any lesion or injury in this area [38]. That's the reason foot callus develop very quickly in patients suffering from peripheral neuropathy [39]. In case of any wound the conditions are also favorable for the growth of bacteria as well that lead to secondary bacterial infection of the diabetic feet [40].

Foot care practices vary from person to person among diabetics [41]. The results showed that a good foot care practice is very protective in reducing the likelihood of diabetic foot lesions. This finding is also comparable with the previous studies conducted in different settings [42]. Poor foot care practices like lack of daily feet washing, proper drying of feet after washing or after removal of shoes and socks and lack of early detection and management of any abnormality contribute to the increased incidence of diabetic foot lesions [42]. Data shows that bad selection of shoes like chappals by diabetics having no support for heel and divider that is splitting the toes is one of major risk factor [34].

In order to decrease the risk of foot lesions it is recommended that patient should inspect his/her feet on daily basis for any cut, blister, redness, swelling or any nail problem [43]. Daily feet washing with luke warm water and drying properly especially between toes should be advised. A good moisturizer should be used to avoid cracking and itching [44]. Nails should not be cut too short in order to avoid ingrowing [45]. Patient should not treat any corn or callus by

him/herself [46]. Proper medical advice is needed in such cases. Blood glucose level should be controlled in normal range [47]. Patient should not walk bare footed in order to avoid any cut or scratch [48]. Smoking should be avoided as it restricts blood flow towards feet [49]. Feet should be kept dry and warm [50]. Regular examination of the feet is very much important [42].

5. CONCLUSION

Ratio of Diabetic foot lesion was very alarming in patients suffering from diabetes mellitus. It is important to develop awareness about diabetes and its associated complications in the general population. Although it was a small study size and results of this study could not be generalized to the whole population of the country. But such studies can be helpful in addressing the problems of far off population of rural areas. By the result of this study it was concluded that health care professionals can play their role in controlling diabetes and its complications including diabetic foot lesions. By educating patients about good foot care practice, dietary and life style changes, proper exercise, regulation of body weight, strict control of blood glucose level and proper follow-up especially of the patients who are from rural areas. Similarly early detection and management of any foot lesion, infection or neuropathy can be helpful in reducing the incidence of diabetic foot lesions.

6. STUDY LIMITATIONS

The small sample size was the limitation of this study. It was a cross-sectional study design that decreased the power of the study. It also decreased causal conclusion between diabetic foot lesions and its associated risk factors.

ETHICAL APPROVAL AND CONSENT

Ethical clearance was obtained from the Institutional Ethical Committee in the board of studies of the University College of Conventional Medicine, The Islamia university of Bahawalpur under the letter number 1460-A/UCCM. An official letter of cooperation was written to the Civil Hospital Bahawalpur administration. After explaining the purpose of the study, an informed written consent was obtained from each of the study participant according to the declaration of Helsinki. Participants were also informed that participation was on a voluntary basis and that they could withdraw at any time, for any reason. Personal identifiers were not included in the written questionnaires to ensure participants' confidentiality.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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