Research Article

Advances in Applied Biological Research
Year 2024, Volume-1, Issue-2 (July-December)

Risk for Diabetic Foot Ulcer Associated with Type 2 Diabetes Mellitus Patients

Wefaqq Mahdi Hadi[1]

[1]PhD. Department of Adults Nursing, College of Nursing, University of Babylon, Babylon province Iraq.

ARTICLE INFO

Key words: Diabetic Foot, Type 2 Diabetes Mellitus, Patients.

doi:10.48165/aabr.2024.1.2.05

ABSTRACT

Background: One of the most frequent side effects of individuals with poorly managed type 2 diabetes is ulcers in their feet caused by diabetes. It is typically brought about by inadequate care for the feet, blood vessel disease with intrinsic nerve damage, or low blood sugar levels. It additionally serves as one of the leading causes of limb loss and bone disease within the leg. **Objective**: to assess Risk for Diabetic Foot Ulcer Associated with Type 2 Diabetes Mellitus Patients. **Materials and Procedures**: A descriptive study conducted at Al-Hilla Teaching Hospital to assess Risk for Diabetic Foot among Patients With Type 2 Diabetes Mellitus. Data collection take place from December 15, 2023, to February 30, 2024. The questionnaire's validity was ensured through expert review **Results:** The high percentage %62 (50-60) years of age between (20-30) years, regarding the sex the result recorded 26(52.0) were female ,11(22.0) was post graduate regarding educational status, the result recorded 43(86.0) were married, related to occupation the result recorded 37 (74.0) were unemployed, and 13(26.0) were unemployed, related to residency the result recorded 31(62.0) were urban resident. **Conclusions:** highlights the significance of the study's findings regarding diabetes foot risk among female, with old age play significant function in the progression of type two diabetic foot ulcers patient.

Introduction

Among the more severe effects of type 2 diabetes (DM) are ulcers in the feet due to diabetes (DFU). Adults who have diabetes have a fifteen percent lifetime risk of getting a leg ulcer, and if one does, the risk of death is significant. Globally, the rate of survival after five years for those suffering from DFU ranges from twenty-five percent to forty-five percent(1). Considering more than a million amputations of the lower legs performed each year, or one amputation every twenty seconds on average, DFU has emerged to be among the world's most common reasons for amputation of the lower extremity. Eighty-five percent of individuals who have had amputations for diabetic foot ulcers (DFU) will go on to experience persistent infections and various types of gangrene, which lower the effectiveness of life and cause monetary difficulties (2).In contrast to those with no DFU, foot ulcers are thought to be responsible for 1/3 of the treatment expenditures associated with type 2 diabetes, and the overall price for therapy is anticipated to be two times greater in the time frame of the initial occurrence and 5.4 times greater in every year of the subsequent episode (3).

*Corresponding author. **Harshita Bordia**
E-mail address: nur.wafaq.mahdi@uobabylon.edu.iq

Alongside the most severe DFU ulceration, which costs over eight times as much for therapy as those with the smallest grade, the expense of medical care likewise rises with the seriousness of the diabetic foot ulcers, Increased mortality is ultimately caused by the extreme severity of DFU, in addition to high management expenditures (4) Hyperglycemia is a chronic disease marked by high blood sugar levels and impaired tissue healing that necessitates ongoing healthcare oversight to avoid acute consequences and lower the chance of permanent effects (5) Achieving suboptimal glycemic regulation can damage the circulatory system's both tiny and large artery networks, impair the performance of numerous organs, and disrupt the process of metabolism. The rate of incidence of the second form of diabetes mellitus (T2DM) is rising worldwide (6) Hyperglycemia is an incurable condition that can cause impairment, a poor standard of living, and a high death rate if it isn't recognized, treated, and regulated (7). Over 2 million fatalities each year are attributed to the disease, which is ranked as the seventh most prevalent cause of infirmity globally (8). In the European Medical Region, age-standardized fatality rates may reach as high as 140 per 100,000 individuals (9). Vascular problems from diabetic include nerve damage, renal disease, and blindness; macro vascular issues include cardiovascular , coronary artery disease (CAD), and cardiovascular disease (CVA) (10) The primary risk factor for glaucoma, lower leg loss of limbs, and kidney failure in people with ESRD is the development of type 2 diabetes mellitus (T2DM), and over half of T2DM patients pass away from heart disease (11). Managing oneself is seen as a fundamental aspect of treating diabetes by both the International Diabetes Federation (also known as IDF) and the Diabetes Association of America (ADA) (12). The key to effective diabetes treatment is changing one's habits, which includes monitoring one's own blood sugar levels, adhering to prescribed medications, examination for tiny vessel problems (retinal degeneration, kidney disease, and neuropathy, among others) and macro vascular problems (heart disease and peripheral vascular disease) on an ongoing basis, and receiving proper dietary educational opportunities (13).

Methodology

The cross-sectional descriptive study design technique is a methodological approach that entails surveying individuals within a specified study population.. The units that receive diabetic patients at Al-Hilla Teaching Hospital were chosen as a rich field for collecting the study sample. Methods of Data Collection Data is gathered through use a developed questionnaire . The data were collected for the period of December 15th 2023 to February 30th 2024.

Results

Table 1: Distribution of the study sample regarding demographical characteristics

Variables		F	%
Age /years	**30-40**	7	14.0
	41-50	8	16.0
	51-60	13	26.0
	61-70	13	26.0
	71-80	9	18.0
	Total	50	100.0
Sex	**Male**	24	48.0
	Female	26	52.0
	Total	50	100.0
Educational Qualification	**Illiterate**	10	20.0
	primary school	10	20.0
	secondary school	10	20.0
	Diploma	9	18.0
	graduate or past graduate	11	22.0
	Total	50	100.0
Marital status	**Single**	6	12.0
	Married	43	86.0
	Widow	1	2.0
	Total	50	100.0

Occupation		**Government**	28	75.7
		Private	9	24.3
		Total	37	100.0
	Unemployed	**house maker**	8	61.5
		Student	5	38.5

Table 2: Distribution of the Study Sample Regarding History of Foot Ulcer

Questions		**F**	**%**	**Valid %**	Ass.
1. Do you have experienced a wound or soreness on your legs or feet which hasn't healed in in excess of a few days?	No	18	36.0	1.64	Sever
	Yes	32	64.0		
	Total	50	100.0		
2. Have you ever had a foot ulcer?	No	31	62.0	1.38	Mild
	Yes	19	38.0		
	Total	50	100.0		
3. Have you ever had a finger, foot or leg amputated?	No	30	60.0	1.4	Mild
	Yes	20	40.0		
	Total	50	100.0		
General mean				1.47	Mild

Figure (1): Distribution of sample regarding date of amputation the result show 58% of study sample without amputation.

Table 3: Distribution of study sample regarding Current Foot or Leg Problems

Questions			**F**	**%**	**Mean**	**Ass.**
1.Are you currently suffer from a blistering, tender, or irritation on your toes?	No		17	34.0	1.66	1.18
	Yes		33	66.0		
	Total		50	100.0		
2. Are your shoes have any trace of drainage or bleeding on them?	No		41	82.0	1.18	Mild
	Yes		9	18.0		
	Total		50	100.0		
3. Do you have any calluses on your feet?	No	no	17	34.0	1.66	Sever
	yes		33	66.0		
	Total		50	100.0		

4. Are you feel like your toes are achy, burning painful, or discomfort?	No	2	4.0	1.96	Sever
	Yes	48	96.0		
	Total	50	100.0		
5. Did you experienced any suffering, tension, feeling heavy, or cramping in your limbs or your toes?	No	2	4.0	1.96	Sever
	Yes	48	96.0		
	Total	50	100.0		
General mean				1.68	Sever

Table 4: Distribution of study sample regarding Foot Care

Questions		**F**	**%**	**Mean**	**Ass.**
1. Can you reach and see the bottoms of your feet?	No	11	22.0	1.78	Good
	Yes	39	78.0		
	Total	50	100.0		
2. Do you examine your feet?	No	16	32.0	1.76	Good
	Yes	34	68.0		
	Total	50	100.0		
3. Do you wash your feet every day?	No	6	12.0	1.88	Good
	Yes	44	88.0		
	Total	50	100.0		
4. Do you dry well between the toes?	no	29	58.0	1.42	Poor
	Yes	21	42.0		
	Total	50	100.0		
5. Do you use a moisturizing cream on your feet?	No	13	26.0	1.74	Good
	Yes	37	74.0		
	Total	50	100.0		
6. Do you cut your own toenails?	No	21	42.0	1.38	Poor
	yes	29	58.0		
	Total	50	100.0		
General mean				1.66	Good

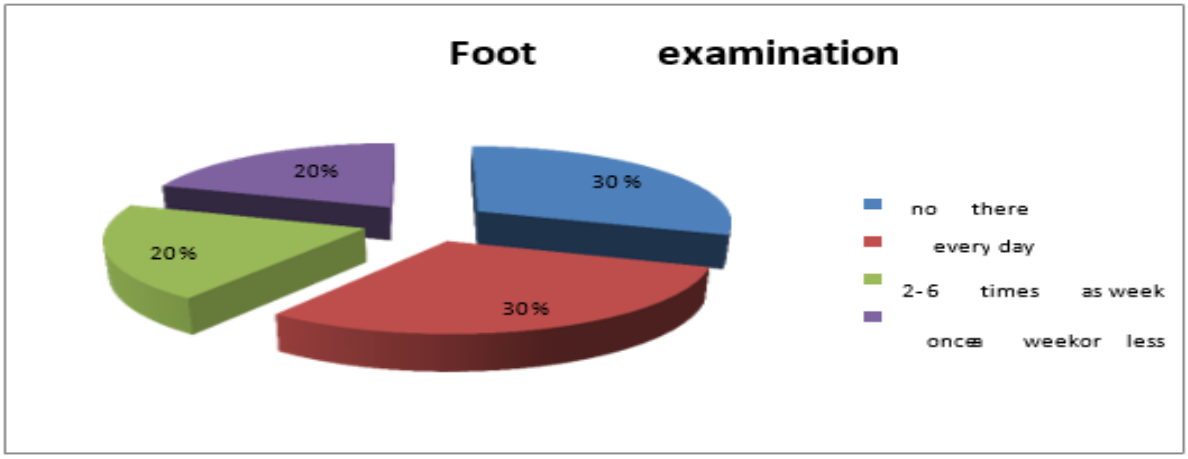

Figure 2: Distribution of study sample regarding foot examination the result recorded 30% without examination .

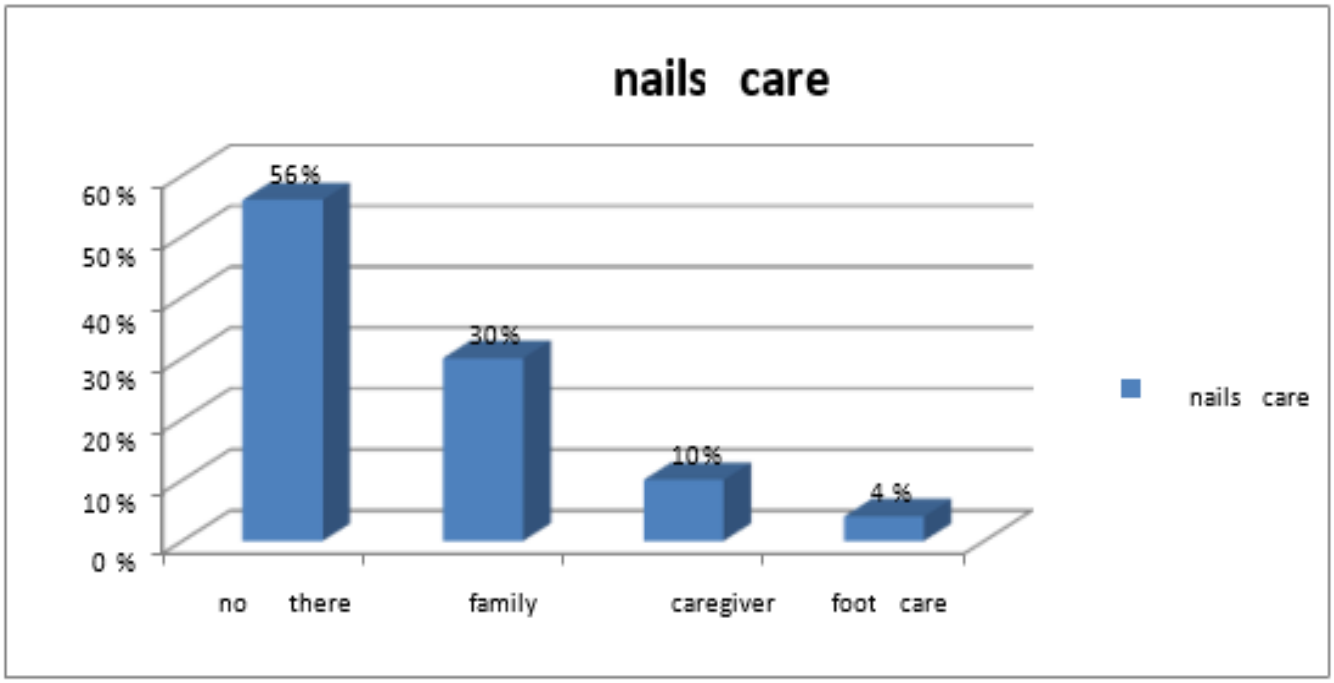

Figure 3: Distribution of study sample regarding nails care the result recorded 56% without care for nails.

Table 5: Distribution of study sample regarding Foot Care Education

Questions		F	%	Mean	Ass.
1.Do you have any experience taking foot care classes?	No	47	94.0	1.06	Poor
	yes	3	6.0		
	Total	50	100.0		
2. Are you previously perused anything pamphlets on feet take note?	No	33	66.0	1.34	Poor
	yes	17	34.0		
	Total	50	100.0		
3. Have you ever studied any pamphlets about appropriate footwear??	No	25	50.0	1	Poor
	yes	25	50.0		Good
	Total	50	100.0		
4. Are you be interested in receiving an information sheet regarding foot care?	No	17	34.0	1.66	Poor
	yes	33	66.0		
	Total	50	100.0		
General mean				1.26	

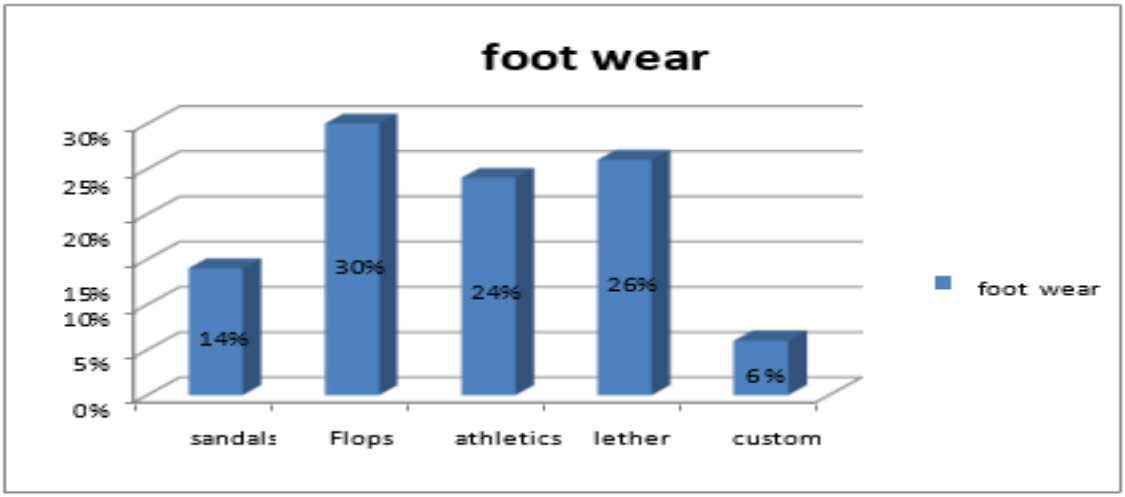

Figure 4: Distribution of study sample regarding foot wear the result recorded high percentage 30% using flops.

Discussion

The findings of this inquiry provide to development of the risk for diabetic foot among patients with type 2 diabetes Mellitus at Al-Hilla. The findings presented in Table 1 depict demographic characteristics of the participants, shedding light on factors that might influence the risk for diabetes foot. Notably, the majority of participants were between 50-60 years of age, indicating that this age group might be more susceptible to diabetes foot complications. Our results regarding the patient's age-related risk of diabetic foot are similar to the results described by (14) he discovered that, disregarding additional risk variables, ageing is an important indicator of the appearance of neuropathy due to diabetes in Type 2 Diabetes sufferers. This includes including smaller and bigger damage to nerves.

Additionally, a higher proportion of females were observed in the study, suggesting potential gender-specific differences in diabetes foot risk factors. These results were similar to the results described by (15), there were differences in the parameters linked to the appearance of diabetic foot complications between sexes. Nearly every one of the individuals who were noticed had diabetes; in addition to them, callus formation, clawed toes, and an older age were warning signs for the condition. Furthermore, a significant portion of the participants were married and unemployed, which could have implications for their access to healthcare and ability to manage their diabetes effectively. Urban residency was predominant among the participants, highlighting the need for tailored interventions in urban settings to address diabetes foot risk. The researcher (16) mentioned in his study where he found there was a significant difference between Diabetic Foot Self-Care Behavior Scale (DFSBS) ratings, sex, and the people's place of residence (urban versus rural). There was a discernible difference in the respondents' AIS scores according to their gender, level of higher education, welfare status, domicile, and financial situation. Patients with low socioeconomic level appear to have fewer mental assets in addition to greater difficulties in relationships with other people. (17). the assessment of diabetes foot risk involved various aspects, as indicated by the findings presented in (Tables 2- 4). Firstly, (Table 2) suggests that participants generally reported a mild level of history of foot problems, indicating a pre-existing vulnerability to diabetes foot complications among the studied population. However, the severity increased when considering current foot or leg problems, as evidenced by the higher mean score in (Table 2).This underscores the importance of continuous monitoring and management of foot health among T2DM patients to prevent exacerbation of existing issues. Given the importance of this data collected from patients with diabetic foot, we refer to another study conducted by (18), where it was found in this study demonstrated conclusive correlations between DF including kidney disease, peripheral vascular disease, nerve damage, and the usage of insulin or insulin analogs. Furthermore, it has been demonstrated that socioeconomic factors including gender and age at diagnosis significantly influence the risk for DF. Consequently, we propose that easily accessible data on the medical history, multiple medical conditions, and demographics of individuals may enable tailored testing.

Moreover,(Tables 3)demonstrate relatively good levels of foot care and safety and prevention practices among the participants. These findings are encouraging as they indicate a certain level of awareness and adherence to recommended foot care practices, which can mitigate the risk of diabetes foot complications. However, (Table 4) highlights a concerning gap in foot care education, with participants reporting a poor level of knowledge in this area. This emphasizes the need for targeted educational interventions to enhance participants' understanding of effective foot care strategies and preventive measures. This was indicated in another

study conducted in China, where the researcher (19) found A greater understanding of the disease could foster improved procedures and good views on avoiding the development of the disease.

Conclusion

The findings underscore the importance of addressing demographic factors, enhancing foot care education, and promoting preventive measures to mitigate the risk of diabetes foot complications in this population.by implementing targeted interventions based on these findings, healthcare providers can effectively reduce the burden of diabetes foot complications and improve the overall quality of care for T2DM patients.

Limitation

It must be remembered to keep in mind that the current study has certain limitations. Data was gathered using just nurses' samples and measures that nurses themselves reported.

Acknowledgment

The Babylon Health Department Directorate provided support in collecting the data for this research, for which the authors are eternally grateful.

Financial support and sponsorship

Not available

Conflict of interest

There are no conflicts of interest.

References:

Jupiter DC, Thorud JC, Buckley CJ, Shibuya N. The impact of foot ulceration and amputation on mortality in diabetic patients. I: from ulceration to death, a systematic review. Int Wound J. 2016 Oct;13(5):892–903

Rice JB, Desai U, Cummings AK, Birnbaum HG, Skornicki M, Parsons NB. Burden of diabetic foot ulcers for medicare and private insurers. Diabetes Care. 2014;37(3):651–8.

Driver VR, Fabbi M, Lavery LA, Gibbons G. The costs of diabetic foot: the economic case for the limb salvage team. J Vasc Surg. 2010 Sep;52(3 Suppl):17S–22S.

Jalilian M, Sarbarzeh PA, Oubari S. Factors related to severity of diabetic foot ulcer: a systematic review. Diabetes Metab Syndr Obes Targets Ther. 2020;13:1835–42.

Saber, H. J., & Daoud, A. S. (2018). Knowledge and practice about the foot care and the prevalence of the neuropathy among a sample of type 2 diabetic patients in Erbil, Iraq. Journal of family medicine and primary care, 7(5), 967-974.

Goweda R, Shatla M, Alzaidi A, Alzaidi A, Aldhawani B, Alharbi H, et al Assessment of knowledge and practices of diabetic patients regarding diabetic foot care, in Makkah, Saudi Arabia Education. 2017;19:5.4

Husseini, A., Abu-Rmeileh, N. M., Mikki, N., Ramahi, T. M., Ghosh, H. A., Barghuthi, N., ... & Jervell, J. (2009). Cardiovascular diseases, diabetes mellitus, and cancer in the occupied Palestinian territory. The lancet, 373(9668), 1041-1049

Saadi, H., Carruthers, S. G., Nagelkerke, N., Al-Maskari, F., Afandi, B., Reed, R., ... & Benedict, S. (2007). Prevalence of diabetes mellitus and its complications in a population-based sample in Al Ain, United Arab Emirates. Diabetes research and clinical practice, 78(3), 369-377.

M. Zhou, B., Lu, Y., Hajifathalian, K., Bentham, J., Di Cesare, M., Danaei, G., ... & Gaciong, Z. (2016). Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4· 4 million participants. The lancet, 387(10027), 1513-1530.

Costanian, C., Bennett, K., Hwalla, N., Assaad, S., & Sibai, A. M. (2014). Prevalence, correlates and management of type 2 diabetes mellitus in Lebanon: findings from a national population-based study. Diabetes research and clinical practice, 105(3), 408-415.

Stolar, M. (2010). Glycemic control and complications in type 2 diabetes mellitus. The American journal of medicine, 123(3), S3-S11

Guariguata, L., Whiting, D. R., Hambleton, I., Beagley, J., Linnenkamp, U., & Shaw, J. E. (2014). Global estimates of diabetes prevalence for 2013 and projections for 2035. Diabetes research and clinical practice, 103(2), 137-149.

Musaiger, A. O., & Al-Hazzaa, H. M. (2012). Prevalence and risk factors associated with nutrition-related noncommunicable diseases in the Eastern Mediterranean region. International journal of general medicine, 199-217.

Mao, F., Zhu, X., Liu, S., Qiao, X., Zheng, H., Lu, B., & Li, Y. (2019). Age as an independent risk factor for diabetic peripheral neuropathy in Chinese patients with type 2 diabetes. Aging and disease, 10(3), 592.

Navarro-Peternella, F. M., Lopes, A. P. A. T., de Arruda, G. O., Teston, E. F., & Marcon, S. S. (2016). Differences between genders in relation to factors associated with risk of diabetic foot in elderly persons: A cross-sectional trial. Journal of clinical & translational endocrinology, 6, 30-36.

Şahin, S., & Cingil, D. (2020). Evaluation of the relationship among foot wound risk, foot self-care behaviors, and illness acceptance in patients with type 2 diabetes mellitus. Primary care diabetes, 14(5), 469-475.

Tol, A., Pourreza, A., Shojaeezadeh, D., Mahmoodi, M., & Mohebbi, B. (2012). The assessment of relations between socioeconomic status and number of complications among type 2 diabetic patients. Iranian Journal of Public Health, 41(5), 66.

Rossboth, S., Lechleitner, M., & Oberaigner, W. (2021). Risk factors for diabetic foot complications in type 2 diabetes—a systematic review. Endocrinology, Diabetes & Metabolism, 4(1), e00175.

Jia, H., Wang, X., & Cheng, J. (2022). Knowledge, attitudes, and practices associated with diabetic foot prevention among rural adults with diabetes in North China. Frontiers in Public Health, 10, 876105.