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THE FRIGHTENING ABYSS IN THE AWARENESS ABOUT DIABETIC FOOT DISEASE IN AN URBAN POPULATION OF KERALA.

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ABSTRACT
Awareness and practice of correct foot care methods are vital in preventing foot ulcers in patients with diabetes. This cross-sectional study examined the knowledge, attitude and practices of diabetic foot care in 100 patients using a validated questionnaire. The total correct response percentages in knowledge were 37.83%, attitude, 71.67%, and practices 40.2%. The lack of knowledge detected in the essential facts about Diabetic Foot Ulcer (DFU), as well as the gaps in practices as well as attitude, are of serious concern and need to be addressed with appropriate educational interventions.

INTRODUCTION
Diabetes mellitus (DM) is a metabolic disorder with multiple long-term complications that affect almost every organ system. Diabetic Foot Ulcer (DFU) is a serious complication that can lead to lower limb amputations and mortality, with a higher incidence in type 2 diabetes (T2D)[1]. The global prevalence of Diabetic Foot Ulcers (DFU) is 6.3% [2]. At the time of diagnosis, more than 10% of patients with type 2 diabetes (T2D) have been found to have risk factors for foot diseases, such as diabetic peripheral neuropathy (DPN)[3]. A lack of knowledge and inadequate attention to foot care are common among diabetic patients worldwide. The incidence of DFU is higher among patients who do not practice proper diabetic foot care[4].
Despite being at the forefront in all health indices and other determinants of health like literacy rate, Kerala ranks among the states with the highest prevalence of diabetes, while having one of the highest numbers of undiagnosed cases of Diabetes in India[5].
The International Working Group for Diabetic Foot (IWGDF) Guidelines 2023 reaffirms that, the strategies to prevent diabetic foot, patient and staff education, standardized assessment and classification, multi-disciplinary treatment, and close monitoring are essential to reduce the global burden of DFU[6]. To adopt these strategies, the baseline knowledge of diabetic patients regarding DFU needs to be measured to launch appropriate programs. This study is an attempt in that direction.

METHODOLOGY
Study Design: This was a cross-sectional descriptive study conducted among the diabetic patients attending General Surgery OPD of Believers Church Medical College and Hospital, a tertiary care Hospital serving patients of south and central Kerala. Diabetic patients who had attended the Surgery

OPD were included in the study, while the patients with Type 1 diabetes, or weak enough to comprehend and answer a questionnaire were excluded from the study. Using non-randomized convenience sampling, 100 patients were studied. Written informed consent was obtained from all participants. A structured questionnaire was used for data collection. The pre-validated questionnaire assessed demographic characteristics of the respondents, and 14 questions in 3 domains (knowledge, attitude and practices). 6 questions were knowledge-based, 3 addressed attitude, and 5 evaluated practices. Spearman's correlation was used to detect correlation between the scores. Descriptive statistics was employed for analysis using MS Excel version 2402.

RESULTS

The median duration of diabetes in the study population was 10 years. The age of patients ranged from 45 years to 95 years, with a mean age of 67 years. 56 percent of patients were males and 44 percent were females.

Each correct response in the 14-item questionnaire was scored one point, and the total scores achieved by each participant ranged from a maximum of 11 points to a minimum of 2 points, out of a total possible score of 14 points. The questionnaire and percentage of correct responses for each question are given in Table 1 and Figure 1. The median score total score was 6, with a median of 2 in each of the domains. The total correct response percentages in knowledge were 37.83%, attitude, 71.67%, and practices 40.2%. In the knowledge domain, the highest score was for K.1 (59%), while the lowest scored question was K.5 (14%). In the attitude domain, 2 out of 3 questions, A.1 and A.3 were answered well, with A.3 having the highest correct response rate of 93% in the questionnaire. A.2 was answered correctly only by 40% of participants. In the domain on practices, the highest score was for P.4 (70%), while the lowest scored question was P.2 (25%).

The scores of each of the domains were ranked as 3 (good), 2 (fair), and 1 (poor), based on recommendations of IWGDF and with the guidance of subject experts. The distribution of the ranks is given in table 2. A fair correlation was detected between the duration of diabetes and ranks of knowledge ($r_s = 0.396$), attitude ($r_s = 0.346$), and total score of the three domains ($r_s = 0.530$).

Poor correlation was found between the three domains with Spearman's rank correlation coefficient, r_s, being 0.2 between knowledge and attitude, 0.219 between knowledge and practice, and 0.151 between practice and attitude.

Fig.1 Distribution of Correct Responses Across the Three Domains

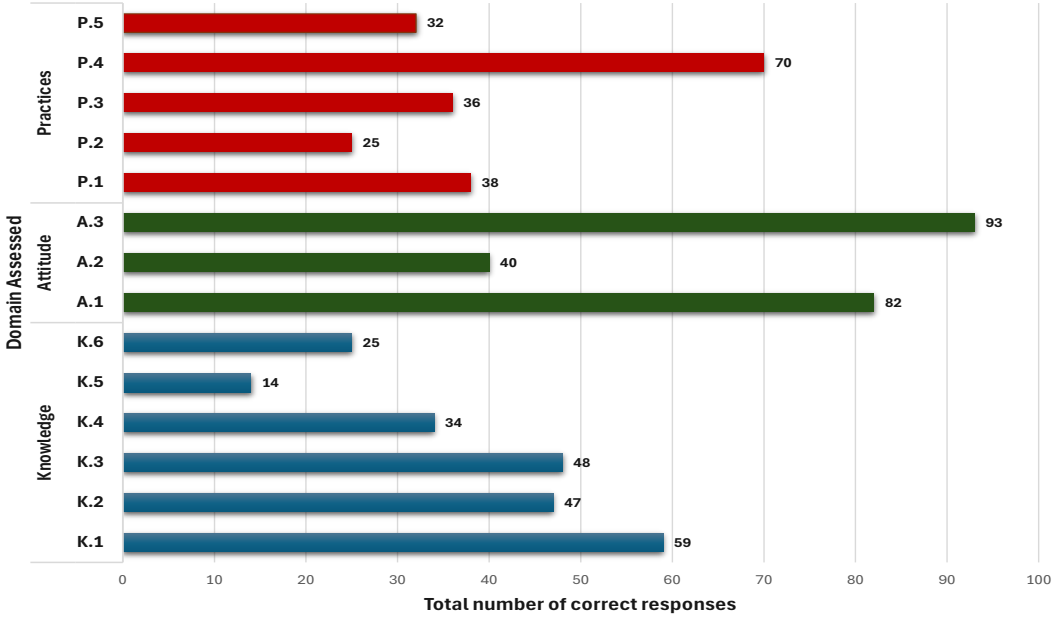

Table 1. Distribution of correct responses to DFU KAP Questionnaire.

Q. No	Question	Correct Answer	Percentage of Correct Responses
K1	Do you think your blood sugar levels has anything to do with development of ulcers in foot?	Yes- uncontrolled sugars leads to early development of ulcers.	59%
K2	How should a diabetic take extra care of their feet?	Answer- By being moderate, checking the foot once a day.	47%
K3	From my Diabetic foot care Knowledge, which is the best practice for me?	Wash the foot with water frequently, dry the foot including interdigital area and then apply moisturizing cream over all areas.	48%
K4	When you decide to purchase a diabetic footwear, what is the cheapest and most effective material of footwear that you should look for in the market?	Microcellular rubber footwear	34%
K5	Which type of footwear is best for preventing foot ulcers related to Diabetes?	Shoes covering whole foot.	14%
K6	Suppose you sustain an injury to sole of foot, then as a diabetic patient, what is the most appropriate management?	To consult a surgeon as early as possible and be under his direct follow-up every day, so that early changes in the wound can be immediately recognized and treated appropriately.	25%
A1	There are many advertisements about footwear for diabetic patients in the media. As a diabetic when do you think you should start using such a footwear?	As soon as my doctor advises it.	82%
A2	A 2. What do you think about Diabetic patients like you wearing Socks with footwear?	Wearing socks with a footwear like shoes is good as it protects pressure points.	40%
A3	A 3. What do you think about diabetic patients walking barefoot?	Not recommended as the sole of the foot may be insensitive to pain and small injuries may go unnoticed leading to infection and large ulcers.	93%
P1	P 1. How many times did you actually check your feet in the last week?	Every day as a habit after taking bath, sitting in a chair, as a dedicated activity.	38%
P2	P 2. What is your actual practice of cleaning of feet?	I always take time to wash my feet, clean dry them, and keep them well cared for.	25%
P3	P 3. In practice how frequently do you check the inside and the sole of the footwear?	Every day before wearing and when there is foreign body sensation.	36%
P4	P 4. How often do you walk barefoot?	Never.	70%
P5	P 5. What is your habit regarding maintenance of toenails?	I dip my feet in water for some time and then cut carefully with a clipper just to the appropriate length.	32%

Table 2 Distribution of Ranks across the Domains.

		RANK		
		Good (3)	**Fair (2)**	**Poor (1)**
DOMAIN	**Knowledge**	6	34	60
	Attitude	29	58	13
	Practices	15	48	37

DISCUSSION

This study was intended to assess the level of awareness of diabetic patients about diabetic foot ulcers and foot care practices.

Three risk factors form the basis of developing DFU 1. Loss of protective sensation (diabetic neuropathy) 2. hypoperfusion (peripheral arterial disease), 3. a precipitating event (trauma, infection, etc). Peripheral neuropathy also causes foot deformities and limited joint mobility produces abnormal biomechanical loading of the foot, producing abnormally high mechanical stress in some areas leading to callus formation. The callus results in subcutaneous haemorrhage and eventually skin ulceration. Since there is reduced pain feedback due to neuropathy, the patient ends up unknowingly applying continued stress to the ulcer leading to poor healing. Adding to this peril is the Peripheral Arterial Disease component, 50 percent of which is, atherosclerotic secondary to Diabetes Mellitus. Based on the presence of both the components the ulcers may be purely ischaemic (painful, follows a minor trauma), Neuro-ischaemic (combination of neuropathy or ischemia), and purely neuropathic. The initiating event of the Diabetic foot ulcer can be a trauma, like bumps to the furniture edges, ill-fitting shoes, thermal injury, etc. The questions were designed keeping in mind these facts to test the existing knowledge.

Though ideal practices to prevent the occurrence of Diabetic foot ulcers are clearly given as guidelines, which are freely available, the percolation of this knowledge into masses has been very poor across the world, evident from many similar studies reported from across the globe. For example, in this study 41 percent diabetic patients were not aware that Diabetics Mellitus can also lead to a foot ulcer disease. 79 percent of diabetic patients in this study knew that Diabetes could lead to loss of sensation of foot and the evaluation of diabetes also involved evaluation of protective sensation of the foot.

Washing of the foot thoroughly and drying of the foot including the interdigital space and inspection of the foot must be done daily as per guidelines; however, in this study, 52 percent patients did not know or consider it as an essential practice.

The patient must be able to recognize the pre-ulcerative conditions like callus, oedema, fungal infections, haemorrhage, fissures etc. In case of a doubtful lesion or injury a member of the foot care team must be contacted immediately. However, in this study, 75 percent of the patients did not think they should consult a member of the foot care team, if they sustain an injury to the sole of the foot nor they knew about the pre ulcerative conditions.

The nails of the toes should be cut in a straight across pattern. This should be advised to the patient by the foot care team and such techniques are expected to be taught to the patient using different modalities. In this study, 68% of the patients were unaware of the correct techniques of nail cutting.

The patients at risk of DFU should never walk barefoot because it increases the chances of minor trauma. The recommendation is to use a pair of socks along with shoes, both indoors and outdoors. However different footwear based on cultural variations may be used. All patients at risk should wear appropriate footwear, which should be adapted to conform to any alteration in foot structure or foot biomechanics affecting the person's foot. The ideal footwear should have its inside length 1-2 cm more than the foot and should not be either too tight or too loose. The internal width should equal the width of the foot at the metatarsal phalangeal joints (or the widest part of the foot), and the height should allow enough room for all the toes. The fitting should be examined in standing position and preferably during day to consider the swelling of the foot. In our study 93 percent patients were aware of the dangers of diabetic patients walking barefoot. Checking of the inside of the footwear and the insole is not practiced systematically by 64% of the patients. 60 percent of the patients thought it is not appropriate to wear socks with a footwear, whereas it is a strong recommendation by IWGDF guidelines not only for outdoors, but indoors also (shoes is recommended by IWGDF, but culturally appropriate changes for alternative fully covering footwears like sandals are allowed).

Therapeutic footwear is preferred in case of poor fit or if signs of poor loading of the foot are present. Microcellular Rubber (MCR) is the ideal material to be used in the therapeutic footwear. The MCR sheets manufactured with a shore hardness of 15' Shore 'A', has helped prevent high-pressure points and thus avoid plantar ulcers in anesthetic feet[7]. It is widely used in India for the manufacture of

Diabetic footwear with newer modifications appearing rapidly which makes the footwear aesthetically more pleasing and more comfortable to wear. Research by Dr Anulekha et al shows that people are reluctant to use MCR footwear as it is expensive, less comfortable than the flip flops, and wearing the back straps after bending and strapping is difficult for older people[8]. In our Study, 66 percent of patients did not know about Microcellular Rubber or its more popular acronym MCR material for diabetic footwear.

The lack of knowledge detected in the essential facts about DFU, as well as the gaps in practices as well as attitude, are of serious concern. IWGDF recommends creating awareness in patients to improve the foot care practices of the patient. Our study also points towards the dire need for awareness generation among patients. Equally important is the role of educating the caregivers of the elderly, since they are the ones who make decisions for the older persons who are under their care. The role of care providers including healthcare workers, is also crucial in this regard, and educating them regarding the need for awareness generation among their patients, is the first step to be taken.

Considering the global burden of Diabetic Foot Disease in terms of the pain, morbidity, high risk of amputation, mortality, economic burden, infections or a decrease in quality of life, a global drive to warranted educate diabetic patients regarding the prevention of DFU.

The scenario of India or other developing countries need special mention here as the situations are much different in these countries compared to the other parts of the world. The same footwear worn to protect the diabetic foot is also used when the patient is working in a paddy field, subjected to mud and water. Wearing socks while working outside in rainy weather could be unthinkable. Hence region-wise and culture-appropriate methods must be devised.

Conclusion:

The region of central Kerala where this study was conducted, is having a literate, and affluent population who have resources to be well-informed regarding diabetes and its complications; yet, the knowledge acquired, and the amount of that knowledge converted to practice, is frighteningly low. The level of understanding of the guiding principles by the healthcare workers needs to be evaluated further. Newer and more intense methods have to be adopted to educate the patients, caretakers, and healthcare workers. The know-how to set up a foot care clinic in every healthcare facility needs to be standardized and implemented. There should be a platform for healthcare workers and NGOs to work together with financial support from the government for the widespread adoption of a Diabetic Foot Care Programme in India. We propose to conduct further educational interventions in the patients and caregivers based on the gaps identified in this study.

REFERENCES

1. Akkus G, Sert M. Diabetic foot ulcers: A devastating complication of diabetes mellitus continues non-stop in spite of new medical treatment modalities. World J Diabetes. 2022 Dec 15;13(12):1106-1121. doi: 10.4239/wjd.v13.i12.1106. PMID: 36578865; PMCID: PMC9791571.
2. Zhang P, Lu J, Jing Y, Tang S, Zhu D, Bi Y. Global epidemiology of diabetic foot ulceration: a systematic review and meta-analysis †. Ann Med. 2017 Mar;49(2):106-116. doi: 10.1080/07853890.2016.1231932. Epub 2016 Nov 3. PMID: 27585063.
3. Alsaleh FM, AlBassam KS, Alsairafi ZK, Naser AY. Knowledge and practice of foot self-care among patients with diabetes attending primary healthcare centres in Kuwait: A cross-sectional study. Saudi Pharm J. 2021 Jun;29(6):506-515. doi: 10.1016/j.jsps.2021.04.006. Epub 2021 Apr 23. PMID: 34194257; PMCID: PMC8233518.
4. Osunde RN, Olorunfemi O. Knowledge, practice, and challenges of diabetes foot care among patients at the University of Benin Teaching Hospital, Benin City: A cross-sectional study. Ayu. 2023 Jan-Mar;44(1):1-8. doi: 10.4103/ayu.ayu_282_22. Epub 2024 Feb 21. PMID: 38505106; PMCID: PMC10946662.
5. Menon VU, Kumar KV, Gilchrist A, Sugathan TN, Sundaram KR, Nair V, Kumar H. Prevalence of known and undetected diabetes and associated risk factors in central Kerala--ADEPS. Diabetes

Res Clin Pract. 2006 Dec;74(3):289-94. doi: 10.1016/j.diabres.2006.03.025. Epub 2006 May 30. PMID: 16730847.

6. Practical Guidelines 7 Guidelines Development and methodology IWGDF Guidelines on the prevention and management of diabetes-related foot disease IWGDF Guidelines [Internet]. Available from: https://iwgdfguidelines.org/wp-content/uploads/2023/07/IWGDF-Guidelines-2023.pdf
7. Micro Cellular Rubber (MCR) - a boon for leprosy affected patients with anaesthetic feet in preventing secondary impairments Sathish K Paul[1], Edward Rajkumar[2], Tina Mendis3 From 4th Congress of the International Foot and Ankle Biomechanics (i-FAB) Community Busan, Korea. 8-11 April 2014
8. John, Anulekha Mary; Charley, Jessilin K.; Joy, Jibily. Assessment of Footwear among Patients with Diabetes Mellitus: A Cross-Sectional Descriptive Study from South India. Journal of Diabetology 12(1):p 41-45, Jan–Mar 2021. | DOI: 10.4103/jod.jod_16_20