

Bridging the Gap: Foot Care Practices and Diabetic Foot Risk Among Patients with Diabetes Attending an NCD Clinic in Chennai - A Cross-Sectional Study

Jeevapriya M.R¹, Umashri Sundararaju², Sriramkumar R², Vigneshkumar A², Arun Murugan³

¹Assistant Professor, Department of Community Medicine, Government Medical College, Omandurar Estate, Chennai-02

²Department of Community Medicine, Government Medical College, Omandurar Estate, Chennai-02

³Head, Department of Community Medicine, Government Medical College, Omandurar Estate, Chennai-02

Correspondence: Umashri Sundararaju. Email: umashriutgml@gmail.com

Abstract:

Background: Diabetic foot complications are a major cause of morbidity among patients with diabetes and are preventable through appropriate foot care practices. Early risk identification and foot care assessment helpsto prevent diabetic foot complications. **Methods:** A cross-sectional study was conducted among patients with diabetes who were attending the Non-Communicable Disease (NCD) clinic of a tertiary care hospital in Chennai over a period of two months. Data were collected using an interviewer-guided questionnaire. Foot risk assessment and Foot practices was assessed using the 60-Second Foot Screening Tool and a validated structured questionnaire. Statistical analysis included the fisher test for association and the ANOVA for comparison of means. **Results:** Among the 175 participants with diabetes, 52.5% were classified as Category-0, 16.5% as Category-1, 14.2% as Category-2, and 16.5% as Category-3 foot risk. Overall, 38.6% demonstrated good foot care practices, 42.0% had moderate practices and 19.4% had poor practices. A significant association was observed between the duration of diabetes and foot risk category($p < 0.001$). Duration of diabetes was also significantly associated with foot care practices($p = 0.001$). **Conclusion:** According to the outcomes, the frequency of diabetic foot complications amongst the patients with diabetes is extremely high and linked to many controllable factors, such as inadequate foot hygiene, inappropriate glycemic control in the body, inappropriate footwear and barefoot walking.

Keywords: Diabetic Foot Problems, Foot Care Practices, 60 Second Foot Screening Tool, Barriers to Good Foot Care Practice

Introduction:

Diabetes is one of the biggest health problems in the world, affecting more than 500 million adults. The International Diabetes Federation (IDF) says that 8.8% of adults have diabetes. According to the most recent numbers, 463 million people around the world have diabetes, and 374 million are prediabetic. By 2045, this number is expected to rise to 700 million people with diabetes and 548 million people with Impaired Glucose Tolerance, a 51% rise from 2019^[1].

India has the most diabetes cases in the world, with 77 million in 2019. By 2023, this number is expected to rise to 100 million, which is one-fifth of the global burden. This increased prevalence is due to rapid urbanisation and socioeconomic and dietary pattern modifications^[2]. Though diabetes has stabilised in some developed states, it continues to increase in many regions, highlighting the need for state-specific policies and interventions to control the growing burden of diabetes^[3]. Statistics show a higher prevalence in urban

Quick Response Code	Access this article online	How to cite this article : Jeevapriya MR, Sundararaju U, Sriramkumar R, Vigneshkumar A, Murugan A. Bridging the Gap: Foot Care Practices and Diabetic Foot Risk Among Patients with Diabetes Attending an NCD Clinic in Chennai - A Cross-Sectional Study. Healthline. 2026;17(3). 225-233
	Website : www.healthlinejournal.org	
	DOI : 10.51957/Healthline_850_2026	

Received : 03-06-2026

Accepted : 01-08-2026

Published : 15-10-2026

populations (20–30%) than in rural populations, due to sedentary lifestyles and consumption of processed foods^[4].

Diabetic foot ulcer (DFU) is a complication of diabetes, with a lifetime risk of 15–25% among diabetic patients^[5]. Foot ulcers can lead to lower extremity amputations in up to 85% of cases. This causes substantial morbidity due to repeated infections, prolonged hospital stays, and high mortality rates, exceeding 50% within 5 years after major amputation^[6]. These ulcers also reduce quality of life through pain, limited mobility, social isolation and psychological distress^[7]. They remain the leading cause of non-traumatic lower-limb amputations^[8].

The development of diabetic foot complications occurs due to neuropathy, peripheral arterial disease and biomechanical abnormalities that predispose the foot to injury, infection, delayed healing and lower-limb amputation^[9]. Loss of protective sensation due to neuropathy leads to repeated unnoticed trauma, while autonomic dysfunction causes skin dryness and fissuring that facilitate ulcer formation. Vascular insufficiency increases ischemia and delays wound healing^[10].

India bears a disproportionately high burden of diabetic foot disease owing to its large population of individuals with diabetes and socioeconomic challenges. Approximately 15–25% of individuals with diabetes develop a DFU during their lifetime, of whom nearly 50% develop infections requiring hospitalization and about 20% undergo lower-limb amputation^[11]. This high burden is mainly driven by delayed diagnosis, poor glycemic control, and socioeconomic factors. Factors like low literacy, financial constraints, barefoot practices and inappropriate footwear increase the risk of foot trauma and ulceration. Despite improved healthcare strategies, several barriers prevent good foot care practices, particularly in lower-income settings. Lack of awareness regarding regular foot examination and preventive foot care leads many patients to seek medical attention only after symptoms appear. Cultural practices such as walking barefoot during temple visits or religious rituals may increase the risk of foot injuries

among individuals with diabetic neuropathy. Occupational exposures such as construction work, prolonged standing, and wet work may also cause repeated minor trauma and infections affecting the feet^[12].

Financial constraints limit access to appropriate footwear and regular medical care, leading to delayed treatment. Difficulty accessing specialised foot care services, long travel distances, and the need for multiple hospital visits may discourage timely care. Social dependency on family members and misunderstanding of medical instructions regarding foot care practices may also contribute to poor adherence to preventive measures. Understanding these barriers is essential for developing interventions to improve foot care practices and reduce diabetic foot complications^[13]. Despite recommendations for annual foot examination, newly diagnosed patients often receive limited counselling regarding foot care, and preventive practices are frequently initiated only after complications occur^[12].

Despite awareness of diabetic foot conditions among diabetes patients, a gap still exists between knowledge and foot care practices. Hospital-based studies in India show that although 69% of diabetic patients have adequate awareness, only 41.6% practice appropriate foot care, such as daily self-foot examinations and proper nail hygiene. This difference results from poor self-management behaviours, educational challenges, and limited counselling during clinical visits^[13].

Objectives:

1. To describe the clinical profile of adult patients with diabetes attending the NCD clinic and to determine the association between various factors and diabetic foot risk.
2. To classify participants according to diabetic foot risk using the 60-Second Diabetic Foot Screening Tool.
3. To assess foot self-care practices using a validated foot care questionnaire.

Methodology

Study setting

A cross-sectional study was designed to assess foot care practices and evaluate the risk of diabetic foot problems among adult patients with diagnosed diabetes attending the Non-Communicable Disease (NCD) Clinic of a tertiary care teaching hospital in Chennai, Tamil Nadu, India.

Sample size

For the sample size in this research, the formula used was $N = Z^2 pq / d^2$, based on George H et al., the estimated prevalence rate of good footcare practice was 67%^[14]. With the confidence interval at 95% ($Z=1.96$) and allowable error set at 7%, the calculated sample size was 175 subjects. Sampling was done consecutively, whereby all diabetic patients attending the OPD were included until the desired sample size was met.

Study population

Inclusion criteria: Participants aged 18 years and above who were diagnosed with diabetes, were receiving treatment and were willing to provide written informed consent.

Exclusion criteria: Diabetic foot problems are uncommon in children and are predominantly associated with Type 1 diabetes, where foot care is generally managed by caregivers^[15,16]. Participants with gestational diabetes, steroid-induced diabetes, recently diagnosed diabetes at the time of the interview, severe mental retardation, critical illness, or inability to walk due to causes other than diabetes were also excluded from the study.

Questionnaire and data collection

Data collection started after obtaining approval from the Institutional Ethics Committee. After explaining the study protocol, written informed consent was obtained from all participants. Data were collected using a pre-tested semi-structured questionnaire adapted from previously validated tools used in community-based studies assessing diabetic foot care practices^[17]. Face-to-face interviews and clinical examinations were conducted to obtain information.

The questionnaire consisted of five sections and 38 questions covering demographic details, clinical characteristics of diabetes, foot screening using a standardised clinical tool, foot care practices, and barriers to foot care practices.

Data on age, sex, duration of diabetes, mode of therapy, fasting capillary blood glucose, smoking habit, and alcohol intake were obtained. Duration of diabetes was categorised as <1 year, 1– <5 years, 5– <10 years, and >10 years. Smoking habit was classified as active smokers, passive smokers, and never smokers according to the definitions of the Centres for Disease Control and Prevention^[18]. Alcohol intake was classified as current drinker, ex-drinker, and abstainer according to World Health Organisation definitions^[19].

Clinical examination of the feet was performed using the 60-Second Diabetic Foot Screen Tool, a validated screening instrument for categorising foot problems^[24]. The tool assesses parameters such as skin status, nail status, presence of callus or ulceration, foot deformities, loss of protective sensation, vascular status, and type of footwear.

Peripheral neuropathy was assessed using a 10g monofilament test to detect loss of protective sensation^[15]. Sensory testing was performed at standard plantar sites, and absence of sensation at one or more sites was considered indicative of loss of protective sensation.

Vascular status was assessed by palpation of pedal pulses. Additional features such as dependent rubor, cool feet, hallux mobility, deformities including Charcot changes or hammertoes, and type of footwear were noted. The presence of comorbidities such as retinopathy, nephropathy, cardiovascular disease, peripheral arterial disease, and smoking was also recorded as these are risk factors for diabetic foot complications^[17].

Foot care practices were assessed using a pre-validated 15-item semi-structured questionnaire adapted from previously published studies^[17]. The questionnaire evaluated practices such as daily foot inspection, drying between toes, footwear habits, nail care practices, inspection of footwear before use, avoidance of barefoot walking, use of moisturisers, avoidance of sharp

instruments for callus removal, and protection from extreme temperatures, with a maximum score of 15.

Participants were also asked to identify barriers to appropriate foot care practices using a checklist including lack of awareness regarding foot care, religious or cultural practices such as barefoot walking, occupational exposures, financial constraints affecting footwear purchase, difficulty accessing specialised foot care facilities, time constraints due to multiple hospital visits, dependence on family members for healthcare access, and misunderstanding of foot care instructions [21,22].

Following data collection and clinical examination, all participants were provided brief health education on appropriate diabetic foot care practices, including daily inspection, proper hygiene, and use of appropriate footwear, in line with standard diabetes care recommendations.

Statistical analysis

The data from the questionnaire were entered into Microsoft Excel 2020. All data were analysed and assigned binary scoring. Duration of diabetes, smoking, and alcohol consumption were categorised using a predefined scoring system.

Foot condition was assessed using the 60-Second Diabetic Foot Screening Tool. Parameters such as loss of protective sensation (LOPS), peripheral arterial disease (PAD), and foot deformity were scored, and the average of assigned scores was calculated for each parameter. These were converted into binary variables, where a score of more than 50% was considered “present” (1) and less than 50% as “absent” (0). Other clinical parameters included history of ulcer, active ulcer, prior lower extremity amputation, and nephropathy, which were also categorised as binary variables (1 = present, 0 = absent). Based on these variables, foot risk was classified into five categories:

- A. Category-0: No LOPS and no PAD
- B. Category-1: Presence of LOPS or PAD
- C. Category-2: LOPS with PAD, or LOPS with deformity, or PAD with deformity

D. Category-3: LOPS or PAD along with one or more of the following: history of ulcer, lower extremity amputation, or nephropathy

E. Category-4: Presence of active ulcer

Foot skin and nail conditions were assessed by summing the assigned scores. Foot care practices were evaluated using a structured questionnaire adapted from a previous study. Mean percentage score was calculated for foot self-care practices using the formula: $\text{Sum of scores obtained} / \text{Maximum possible score} \times 100$. These scores were categorised into good and poor using a cut-off of 50% [21]. A score of 1 was given to each good practice and 0 to each poor practice, and the total score was converted into a percentage using the formula: $(\text{Obtained score} / 15) \times 100$. Scores greater than 50% were categorised as good practice (1) and less than 50% as poor practice (0) for further analysis.

Fisher’s exact test was used to assess associations between categorical variables including duration of diabetes and foot risk category, duration of diabetes and foot care practices, smoking and foot risk category, and alcohol consumption and foot risk category. A p-value < 0.02 was considered statistically significant. Analysis of Variance (ANOVA) was used to compare mean foot care practice scores across different duration groups. Barriers to foot care practices were analysed descriptively and presented using charts and graph.

Results

We enrolled 175 patients with diabetes visiting the NCD clinic in a tertiary care hospital in the study. The mean age of the participants was 58.61 ± 9.8 years. The study population comprised 95 (54.3%) males and 80 (45.7%) females. With regard to antidiabetic therapy, 131 (74.9%) patients were receiving oral hypoglycemic agents (OHA) alone, 18 (10.3%) were on insulin therapy alone, and 31 (17.7%) were receiving a combination of OHA and insulin. **Table 1** shows the distribution of participants according to duration of diabetes and foot risk category. A total of 175 participants, 21% had <1 year of diabetes duration, 32% had 1- <5 years of diabetes duration, 29% had 5- <10 years of diabetes duration, and 17% had >10 years of diabetes duration.

Among the study participants, 52.5% were categorised as Category-0, 16.5% as Category-1, 14.2% as Category-2 and 16.5% as Category-3 foot risk, as per the 60 Second Foot Screening Tool Category.

The relationship between the duration of Diabetes with 60 Second Foot Screening Tool Category was assessed through a cross-tabulation. Owing to sparse cell counts and zero frequencies in the contingency tables, the assumptions of the Chi-square test were not met. Therefore, Fisher's exact test was used to assess the association between duration of diabetes and diabetic foot risk category. To facilitate statistically valid analysis, adjacent categories were combined into clinically meaningful groups (IWGDF Categories 0-1 vs. 2-3)

To assess the relationship between Diabetes Duration and Foot Practice Score, Fisher's exact test was done, and it revealed a statistically significant association between the duration of diabetes and foot practice score ($p < 0.001$). But 80% of cells had expected counts below 5, meaning a key assumption of the chi-square test was not met; Therefore, Fisher's exact test

was used to assess the association between duration of diabetes and foot care practice. To facilitate statistically valid analysis, adjacent categories were combined into clinically meaningful groups (low & Moderate vs High). Table 2 illustrates the association between the duration of diabetes and foot practice score.

As depicted in Table 3, A one-way ANOVA was used to compare mean foot practice scores among the different groups of diabetes duration

As shown in Table 3, a one-way analysis of variance (ANOVA) was conducted to compare mean foot practice scores across the different duration-of-diabetes groups. This test provided a statistically significant result of $F = 352.077$ and $p < 0.001$, suggesting that the duration of diabetes significantly influences foot care practices.

Correlation analysis revealed a very strong positive relationship between duration of diabetes and foot practice score, with Spearman's $\rho = 0.946$ ($p < 0.001$). This indicates that foot care practice scores significantly improve as the duration of diabetes increases

Table 1: Distribution of Participants by Duration of Diabetes and 60 Second Foot Screening Tool Category (Merged Categories) (n = 175)

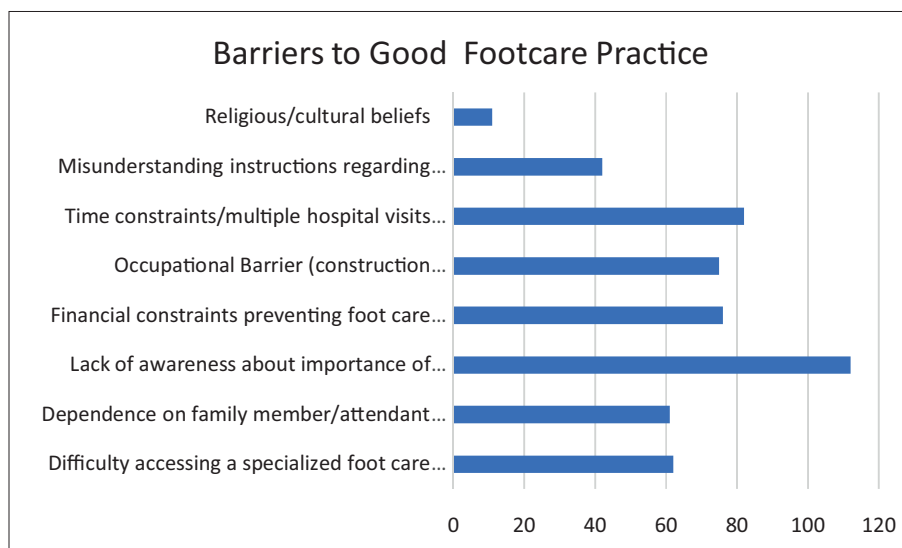
Duration of	60 SECOND FOOT SCREENING TOOL Category 0-1	60 SECOND FOOT SCREENING TOO Category 2-3	Total
<5 year	93	0	93
≥5 years	28	54	82
Total	121	54	175

Table 2: Association between Duration of Diabetes and Foot Practice Score (n = 175)

Duration	Low(1-5) & Moderate (6-10)	High(1115)	Total
<5year	93	0	93
≥5 years	36	46	82
Total	129	46	175

Table 3: ANOVA of Foot Practice Score by Duration of Diabetes

Source	Sum of Squares	df	Mean Square	F	p-value
Between Groups of Duration of Diabetes	1161.825	3	387.275	352.077	<0.001
Within Groups of Duration of Diabetes	188.095	171	1.100		
Total	1349.920	174			



The barriers to good foot care practices reported by the study participants are presented in **Figure 1**. The most reported barrier in this study was a lack of awareness about the importance of foot care in 112 participants, indicating a significant gap in patient education. This was followed by time constraints in 82 participants, financial limitations 76 participants, occupational barriers such as prolonged standing or construction-related work 75 participants, difficulty in accessing specialised foot care facilities due to long travel distance 62 participants, dependence on family members for healthcare access 61 participants and religious or cultural practices, including barefoot walking 11 participants which may hinder regular foot care practices. Additionally, misunderstanding of foot care instructions was reported by 42 participants, needing for clearer communication by healthcare providers. Overall, both knowledge and socio-economic factors influence foot care practices among patients with diabetes.

Discussion

The study assessed diabetic foot risk and foot self-care practices among adults with diabetes who attended a tertiary-care NCD clinic. The mean age was 58.6 years, with a slight male predominance, and most participants were on oral hypoglycaemic agents. Although over half were classified as low risk (Category 0), a considerable proportion fell into higher-risk categories (2 and 3), indicating a substantial burden of established or

impending foot complications. Most participants had diabetes for more than five years, and poor glycaemic control was commonly observed, indicating a high-risk clinical profile. A statistically significant association was observed between the duration of diabetes and diabetic foot risk. Foot self-care practice scores also improved significantly with increasing duration of diabetes, while lack of awareness was identified as the most common barrier to appropriate foot care.

The findings of this study revealed that foot care practices were predominantly moderate. About 19.4% of participants had poor practices, while only 38.6% demonstrated good adherence. Previous studies conducted in India and other low-resource settings have reported

similar findings, with suboptimal awareness and adherence to foot care practices. The moderate adherence observed in this study may be due to lower awareness and insufficient structured educational programs^[23,24].

The presence of foot deformities in this study was notable, with nail deformities (40.9%) and skin changes (35.8%) being the most common findings, followed by loss of protective sensation (27.8%). These findings are consistent with previous studies that identified neuropathy and foot lesions as early indicators of diabetic foot problems^[25].

An important finding of this study is the statistically significant association between foot care practices and

loss of protective sensation. Participants with poor foot-care practices had a higher prevalence of neuropathy than those with good practices. This highlights the protective role of proper foot care behaviours in preventing complications. Similar relationships have been reported in earlier studies, emphasising the importance of patient education and behavioural modification strategies^[21].

Duration of diabetes was significantly associated with foot problems, with patients having diabetes for five years or more showing a higher prevalence of complications. Prolonged exposure to hyperglycaemia can lead to vascular and neural damage. This finding supports previous studies that report the duration of diabetes as an important determinant of complications and quality of life among diabetic patients^[26,27]. Persistent hyperglycaemia may lead to impaired circulation, reduced immune response, and delayed wound healing^[28].

The present study further demonstrated a statistically significant association between duration of diabetes and foot self-care practices. Participants with diabetes duration of ≥ 5 years had significantly better foot practice scores than those with shorter disease duration. In addition, ANOVA and Spearman's correlation analyses showed that foot care practice scores increased significantly with increasing duration of diabetes, suggesting that prolonged exposure to diabetes care and repeated counselling may improve self-care behaviours. However, despite better practices, patients with longer disease duration continued to have a higher risk of diabetic foot complications, emphasising the need for regular foot screening and reinforcement of preventive practices.

This study also found a higher occurrence of foot problems among individuals wearing poorly fitted footwear. In patients with neuropathy, inappropriate footwear may lead to repeated injuries, pressure points, and ulceration. Therefore, encouraging diabetic patients to wear appropriate footwear is an important preventive measure^[29].

There was a statistically significant association between walking barefoot and loss of protective sensation. Walking barefoot increases the likelihood of unnoticed injuries due to environmental hazards. This practice is common in some populations because of cultural habits and lack of awareness, highlighting the need for targeted health education^[30].

Foot complications were also significantly associated with smoking habits. Smoking increases the risk of peripheral vascular disease and reduces peripheral blood flow, which may delay wound healing. Encouraging smoking cessation is therefore important in diabetes management^[31].

A moderate negative correlation was observed between foot care practices and fasting glucose levels, suggesting that better foot care practices may be associated with improved glycaemic control. In contrast, a positive correlation between duration of diabetes and foot-related problems indicates that complications tend to worsen over time. Hence the cumulative effects of chronic hyperglycaemia continue to increase the risk of diabetic foot complications.

From a public health perspective, these findings emphasise the need for stronger preventive strategies in diabetes management. Although healthcare services are available, greater attention is needed for patient education, behaviour modification, and routine screening. Regular foot examinations using simple screening tools, combined with patient education on foot care, can significantly reduce complications. Training healthcare professionals in preventive foot care is also essential.

Another important finding was that lack of awareness was the most commonly reported barrier to appropriate foot care, followed by time constraints, financial limitations, occupational exposure, difficulty accessing specialised foot care services, dependence on family members, and misunderstanding of foot care instructions. The study suggests that both educational and socioeconomic factors influence adherence to recommended foot care practices and should be addressed through comprehensive diabetes education programmes.

Limitations

This study has several strengths, including the use of a standardised assessment tool, an adequate sample size, and data collection in a real clinical setting. However, some limitations should be considered. The cross-sectional design prevents conclusions about causality. Recruitment from a single tertiary care centre may limit generalizability. As foot care practices were self-reported, recall and reporting bias may have occurred. The study also did not evaluate long-term outcomes such as ulcer progression or amputation, and socioeconomic or educational factors were not fully assessed.

Recommendations

Future research should consider longitudinal studies across multiple centers to better understand the progression of diabetic foot complications. Educational interventions, community awareness programmers, and improved access to protective footwear to strengthen preventive foot care practices. The barrier analysis highlighted the factors affecting proper foot care, including lack of awareness, financial constraints, limited access to specialized care, time constraints due to repeated hospital visits, dependence on family members, and misunderstanding of medical advice. Addressing these barriers is important to improve adherence to foot care practices and reduce diabetic foot complications.

Conclusion

According to the outcomes of the study, the frequency of diabetic foot complications amongst the patients diagnosed with diabetes is exceedingly high and linked to many controllable factors, such as inadequate foot hygiene, inappropriate control of the glucose level in the body, incorrect footwear, barefoot walking and smoking.

Funding:

No funding was received for this study.

Conflict of Interest:

We declare that we have no conflict of interest.

Use of Artificial Intelligence:

AI tools were used solely for sentence rephrasing and grammatical improvement of the manuscript. AI was not

used for data analysis, interpretation of results, or generation of scientific content. All content was reviewed and approved by the authors, who take full responsibility for the manuscript.

References:

- Magliano DJ, Boyko EJ, IDF Diabetes Atlas 10th edition scientific committee. IDF Diabetes Atlas. 2021 [cited 2026 July 4]; Available from: <http://europepmc.org/books/NBK581934>
- Pradeepa R, Mohan V. Epidemiology of type 2 diabetes in India. *Indian J Ophthalmol* [Internet]. 2021;69(11):2932–8. Available from: http://dx.doi.org/10.4103/ijo.IJO_1627_21
- Anjana RM, Unnikrishnan R, Deepa M, Pradeepa R, Tandon N, Das AK, et al. Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17). *Lancet Diabetes Endocrinol* [Internet]. 2023;11(7):474–89. Available from: [http://dx.doi.org/10.1016/S2213-8587\(23\)00119-5](http://dx.doi.org/10.1016/S2213-8587(23)00119-5)
- Mohan V, Sandeep S, Deepa R, Shah B, Varghese C. Epidemiology of type 2 diabetes: Indian scenario. *Indian J Med Res*. 2007;125(3):217–30.
- Yazdanpanah L, Shahbazian H, Nazari I, Arti HR, Ahmadi F, Mohammadianinejad SE, et al. Incidence and risk factors of diabetic foot ulcer: A population-based diabetic foot cohort (ADFC study)-two-year follow-up study. *Int J Endocrinol* [Internet]. 2018;2018:7631659. Available from: <http://dx.doi.org/10.1155/2018/7631659>
- 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: From ulceration to death, a systematic review. *Int Wound J* [Internet]. 2016;13(5):892–903. Available from: <http://dx.doi.org/10.1111/iwj.12404>
- Bodhare T, Bele S, B B, MR, Francis J G, V S, et al. Health costs and quality of life among diabetic foot ulcer patients in south India: A cross-sectional study. *Cureus* [Internet]. 2025;17(3):e79950. Available from: <http://dx.doi.org/10.7759/cureus.79950>
- Bandyk DF. The diabetic foot: Pathophysiology, evaluation, and treatment. *Semin Vasc Surg* [Internet]. 2018;31(2–4):43–8. Available from: <http://dx.doi.org/10.1053/j.semvascsurg.2019.02.001>
- B G S, V U, Shivaram JM, Belehalli P, M A S, H C C, et al. Diabetic foot assessment and care: Barriers and facilitators in a cross-sectional study in Bangalore, India. *Int J Environ Res Public Health* [Internet]. 2023;20(11):5929. Available from: <http://dx.doi.org/10.3390/ijerph20115929>
- Guell C, Unwin N. Barriers to diabetic foot care in a developing country with a high incidence of diabetes related amputations: an exploratory qualitative interview study. *BMC Health Serv Res* [Internet]. 2015;15(1):377. Available from: <http://dx.doi.org/10.1186/s12913-015-1043-5>
- Ghosh P, Valia R. Burden of diabetic foot ulcers in India: Evidence landscape from published literature. *Value Health* [Internet]. 2017;20(9):A485. Available from: <http://dx.doi.org/10.1016/j.jval.2017.08.489>

12. Pavithra H, Akshaya KM, Nirgude AS, Balakrishna AG. Factors associated with awareness and practice about foot care among patients admitted with diabetes mellitus: A cross sectional research from a medical college hospital of southern India. *Nepal J Epidemiol* [Internet]. 2020;10(3):897–904. Available from: <http://dx.doi.org/10.3126/nje.v10i3.29213>
13. Song K, Chambers AR. Diabetic foot care. 2025 [cited 2026 July 4]; Available from: <http://europepmc.org/books/NBK553110>
14. George H, Rakesh P, Krishna M, Alex R, Abraham VJ, George K, et al. Foot care knowledge and practices and the prevalence of peripheral neuropathy among people with diabetes attending a secondary care rural hospital in southern India. *J Family Med Prim Care* [Internet]. 2013;2(1):27–32. Available from: <http://dx.doi.org/10.4103/2249-4863.109938>
15. Wever A, Schickenberg-Werrij BG, Willems J, Schaper NC, Schott DA. Prevalence and awareness of functional and structural foot abnormalities in children and adolescents with type 1 diabetes. *J Pediatr Endocrinol Metab* [Internet]. 2016;29(9):1019–24. Available from: <http://dx.doi.org/10.1515/jpem-2015-0455>
16. American Diabetes Association Professional Practice Committee. 14. Children and adolescents: Standards of Medical Care in diabetes-2022. *Diabetes Care* [Internet]. 2022;45(Suppl 1):S208–31. Available from: <http://dx.doi.org/10.2337/dc22-S014>
17. Paramasivam S, Ramalingam G, Gani ARP. Foot self-care practices among diabetic patients attending a teaching hospital in Tamil Nadu, India. *J Family Med Prim Care* [Internet]. 2023;12(9):2036–41. Available from: http://dx.doi.org/10.4103/jfmpe.jfmpe_409_23
18. Ryan H, Trosclair A, Gfroerer J. Adult current smoking: differences in definitions and prevalence estimates--NHIS and NSDUH, 2008. *J Environ Public Health* [Internet]. 2012;2012:918368. Available from: <http://dx.doi.org/10.1155/2012/918368>
19. Rehm J, Irving H, Ye Y, Kerr WC, Bond J, Greenfield TK. Are lifetime abstainers the best control group in alcohol epidemiology? On the stability and validity of reported lifetime abstention. *Am J Epidemiol* [Internet]. 2008;168(8):866–71. Available from: <http://dx.doi.org/10.1093/aje/kwn093>
20. Murphy CA, Laforet K, Da Rosa P, Tabamo F, Woodbury MG. Reliability and predictive validity of Inlow's 60-Second Diabetic Foot Screen Tool. *Adv Skin Wound Care* [Internet]. 2012;25(6):261–6. Available from: <http://dx.doi.org/10.1097/01.ASW.0000415343.45178.91>
21. Vibha SP, Kulkarni MM, KirthinathBallala AB, Kamath A, Maiya GA. Community based study to assess the prevalence of diabetic foot syndrome and associated risk factors among people with diabetes mellitus. *BMC EndocrDisord* [Internet]. 2018;18(1):43. Available from: <http://dx.doi.org/10.1186/s12902-018-0270-2>
22. Woo MWJ, Cui J. Factors influencing foot care behaviour among patients with diabetes: An integrative literature review. *Nurs Open* [Internet]. 2023;10(7):4216–43. Available from: <http://dx.doi.org/10.1002/nop2.1710>
23. Elsaesser O, Leiter U, Buettner PG, Eigentler TK, Meier F, Weide B, et al. Prognosis of sentinel node staged patients with primary cutaneous melanoma. *PLoS One* [Internet]. 2012;7(1):e29791. Available from: <http://dx.doi.org/10.1371/journal.pone.0029791>
24. Filardi CE, Smith CE. Molecular phylogenetics of monarch flycatchers (genus *Monarcha*) with emphasis on Solomon Island endemics. *Mol Phylogenet Evol* [Internet]. 2005;37(3):776–88. Available from: <http://dx.doi.org/10.1016/j.ympev.2005.02.007>
25. Sullman MJM, Stephens AN, Yong M. Driving anger in Malaysia. *Accid Anal Prev* [Internet]. 2014;71:1–9. Available from: <http://dx.doi.org/10.1016/j.aap.2014.04.019>
26. Nickzad S, Foroutan M, Hedayati AH, Pourmohseni MR, Asl NS. The relationship between the duration of diabetes and dimensions of general health and quality of life associated with the health of diabetic patients. *J Family Med Prim Care* [Internet]. 2024;13(8):2927–33. Available from: http://dx.doi.org/10.4103/jfmpe.jfmpe_1377_23
27. Stratton IM, Adler AI, Neil HA, Matthews DR, Manley SE, Cull CA, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ* [Internet]. 2000;321(7258):405–12. Available from: <http://dx.doi.org/10.1136/bmj.321.7258.405>
28. Bus SA, van Deursen RW, Armstrong DG, Lewis JEA, Caravaggi CF, Cavanagh PR, et al. Footwear and offloading interventions to prevent and heal foot ulcers and reduce plantar pressure in patients with diabetes: a systematic review: Footwear and Offloading Interventions for Patients With Diabetes. *Diabetes Metab Res Rev* [Internet]. 2016;32 Suppl 1(S1):99–118. Available from: <http://dx.doi.org/10.1002/dmrr.2702>
29. Thomson CA, Giuliano AR, Shaw JW, Rock CL, Ritenbaugh CK, Hakim IA, et al. Diet and biomarkers of oxidative damage in women previously treated for breast cancer. *Nutr Cancer* [Internet]. 2005;51(2):146–54. Available from: http://dx.doi.org/10.1207/s15327914nc5102_4
30. Rossouw JE, Prentice RL, Manson JE, Wu L, Barad D, Barnabei VM, et al. Postmenopausal hormone therapy and risk of cardiovascular disease by age and years since menopause. *JAMA* [Internet]. 2007;297(13):1465–77. Available from: <http://dx.doi.org/10.1001/jama.297.13.1465>
31. Tesfaye S, Boulton AJM, Dyck PJ, Freeman R, Horowitz M, Kempler P, et al. Diabetic neuropathies: update on definitions, diagnostic criteria, estimation of severity, and treatments. *Diabetes Care* [Internet]. 2010;33(10):2285–93. Available from: <http://dx.doi.org/10.2337/dc10-1303>