Determinants of Satisfactory foot care Knowledge and Practice among Diabetic Patients attending outpatient clinics at a university hospital, Cairo, Egypt.

Inas Abd El Rahim Ali¹, Sherif Ahmad Hetta¹, Ghada O. Wassif^{2*}

- 1-Department of Family and Community Medicine, Faculty of Medicine, Misr University for Science and Technology (MUST)
- 2-Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University

ABSTRACT

Introduction: Foot complications, a significant concern among diabetic patients, can lead to severe outcomes, including amputations. Adequate foot care knowledge and practices are essential to prevent such complications, yet many patients lack them. This study explores the determinants of satisfactory foot care knowledge and practices among diabetic patients attending outpatient clinics at Ain Shams University Hospitals, Cairo, Egypt. Methods: A cross-sectional study was conducted among 207 Type 2 diabetic patients aged 40-80 years. Participants were systematically sampled and interviewed using a validated questionnaire. Data collected included socio-demographics, clinical variables, and foot care knowledge and practices, with scores classified as satisfactory or unsatisfactory. Data collection occurred between 15/01/2023 and 30/04/2023. Results: Of the participants, 44.9% were aged 40-50, and 55.1% were over 50. Most had above average or high education (73.4%) and were employed (68.6%). The mean knowledge score was 59.40 ± 24.18 , with 49.3% demonstrating satisfactory knowledge. The mean practice score was 53.10 ± 14.38 , with 38.6% showing satisfactory practice. A strong correlation (r=0.710) was observed between knowledge and practice scores. Good foot care knowledge and practices were significant predictors of higher education, employment, high income, and good treatment compliance. **Conclusion:** The study highlights considerable gaps in diabetic patients' foot care knowledge and practices. Educational programs targeting these gaps are crucial to reduce diabetic foot complications and improve patient outcomes.

Keywords: Diabetes mellitus, Foot care, Knowledge, Practice

INTRODUCTION

Diabetic foot ulcers (DFUs) significantly contribute to the morbidity and mortality of

patients with diabetes mellitus (DM). ⁽¹⁾ These ulcers arise from multiple risk factors, including a diabetes duration of 10 years or

*Corresponding author ghadawasif@med.asu.edu.eg

Commons Attribution (CC BY) license (<u>http://creativecommons.org/licenses/by/4.0/</u>)

more, poor glycemic control, advanced age, peripheral vasculopathy, and inadequate self-care knowledge^{. (2)}

Early detection through regular foot examinations and comprehensive management, including callus and nail care, wound management, and patient education, is an essential preventive measure. However, integrating such multidisciplinary care into primary health services remains challenging in many healthcare settings. ⁽³⁾

The International Diabetes Federation (IDF) ranks Egypt among the top 10 countries worldwide in terms of diabetes prevalence. In Egypt, the prevalence of diabetes is approximately 15.56% among adults aged 20 to 79, and this is projected to rise, with the country expected to move from the 8th to the 6th rank in diabetes prevalence by 2045. ⁽⁴⁻⁸⁾

Diabetes-related foot disease is one of the complications of most serious DM. representing a significant cause of morbidity, mortality, and economic burden. Foot ulcers occur in approximately 15% of diabetic patients, with a high risk of complications leading to amputation if not managed appropriately.⁽⁹⁾

Preventive strategies, including patient education and adherence to foot care practices, have been shown to reduce the incidence of foot complications significantly.⁽¹⁰⁾ However, inadequate knowledge and poor adherence to foot care practices remain prevalent, particularly in resource-limited settings. ⁽¹¹⁾

While diabetic foot care has been extensively studied in high-income countries, research in developing countries, especially in the Middle East and North Africa (MENA) region, remains limited.

Studies in similar settings highlight significant gaps in patient awareness and self-care behaviors. In Egypt, a crosssectional study by Abu-Elenin *et al.* (2018)⁽⁹⁾ involving 264 diabetic patients at Tanta University Hospitals reported that although most patients demonstrated good knowledge of foot care, their actual self-care practices were inadequate.

The study found a strong correlation between poor knowledge and suboptimal self-care, with 88% of patients with poor knowledge also exhibiting inadequate foot care practices. Similarly, research from other MENA countries, such as Saudi Arabia and Sudan, indicates that while awareness of diabetic foot complications exists, adherence to preventive foot care behaviors remains suboptimal to limited structured due cultural education programs and factors.(12,13)

Given the rising diabetes burden in Egypt and the critical role of foot care in preventing complications, it is essential to assess knowledge and self-care practices among diabetic patients.

This study aims to determine the level of knowledge and practice regarding foot care among diabetic patients attending outpatient clinics at Ain Shams University hospitals and to identify key determinants influencing satisfactory foot care knowledge and practice.

METHODOLOGY:

1. Study Design

This outpatient clinic-based crosssectional analytical study included diabetic recruited from the diabetic patients outpatient clinic at Ain Shams University Hospitals between 15/01/2023 and 30/04/2023.

Ain Shams University Hospitals in Cairo, Egypt, are renowned for providing comprehensive healthcare services.

2. Study participants

The study included patients with Type 2 Diabetes Mellitus (T2DM), aged 40-80 years, who attended diabetic outpatient clinics at Ain Shams University hospitals.

The selected age range was based on evidence indicating a significant increase in diabetes-related complications, including diabetic foot ulcers, after the age of 40. Patients younger than 40 were excluded as they generally represent a lower-risk population with different disease trajectories.

Those older than 80 were excluded to minimize potential confounding factors such as frailty, cognitive impairment, and multimorbidity, which could influence foot care practices.

Additional eligibility criteria included a minimum diabetes duration of six months and willingness to participate in the study. Patients with Type 1 diabetes, pregnancy, or lactation were excluded.

Using a systematic random sampling technique, every 3rd patient attending the clinic was interviewed on three alternating days per week. The sample size was calculated using OpenEpi version 3.0 open-source calculator and based on a study by Desalu *et al.*, 2011. ⁽¹⁴⁾

A sample size of 173 patients is sufficient to achieve the study objectives, based on a hypothesized percentage frequency of the outcome factor of 10.2% (i.e., the percentage of Diabetic patients who had satisfactory practice of DM foot care), a confidence level of 97.0%, and a margin of error of \pm 5. By the end of the study period, the sample size increased to include 207 diabetic patients.

3. Study tools:

A validated, pretested, and structured interview questionnaire was designed based on established guidelines and previous studies to assess knowledge and practices related to diabetic foot care (DFC).

The questionnaire comprised four sections: 1-Socio-demographic characteristics: Age, gender, marital status, educational level, occupation, and monthly income. 2- Clinical variables: Smoking diabetes duration. medication status. adherence, history of diabetic foot ulcers, weight, height, and BMI [Wt./Ht. (m2)]. 3-Knowledge of diabetic foot care: Assessed using 22 dichotomous (Yes/No) questions covering key foot care practices, such as daily foot inspection, proper hygiene, footwear selection, and early detection of complications. 4- Self-care practices of diabetic foot care: Assessed using 22 items on a four-point Likert scale (Never = 0, Rarely = 1, Often = 2, Always = 3), evaluating behaviors related to foot hygiene, protective measures, and adherence to medical advice.

The questions reflecting participants' knowledge and practices of Diabetic Foot care (DFC) were formulated based on CDC guidelines for people living with diabetes (15), the American College of Foot and Ankle Surgeons (16), international consensus recommendation guidelines for DFC (17-18), and earlier research studies (19-21). Patients were interviewed in Arabic, which is the official language of communication in Egypt.

The scores from both questionnaires are summed to calculate the total score for knowledge and practice. A higher total score indicates better understanding and practice of diabetic foot care. Knowledge and practice scores are classified as: Satisfactory: If the percentage score is 60% or more & Unsatisfactory: If the percentage score is less than 60%. ⁽²²⁻²³⁾

Before the main data collection, a pilot study was conducted on 20 diabetic patients not included in the final study population. The pilot aimed to assess the questionnaire's clarity, reliability, and feasibility and ensure that all items were comprehensible to the target population.

Necessary modifications were made based on participant feedback and expert review before finalizing the questionnaire for the main study.

4. Ethics approval and consent to participate.

The ASU Faculty of Medicine Institutional Review Board (IRB) granted the study's ethical approval under the reference number FMASU R 199/2022, dated 17/11/2022. Additionally, administrative approval was secured from the director of Ain Shams University Hospitals.

All procedures adhered to the ethical standards outlined in the Declaration of Helsinki and its subsequent amendments or comparable ethical guidelines. Before the interviews, participants were briefed on the general objectives of the study and informed that their participation was entirely voluntary.

Written informed consent was obtained from each participant before their involvement in the study. Participants were assured they could withdraw from the study without legal repercussions. The confidentiality of the collected data was strictly maintained.

5. Statistical Analysis

The Statistical Package for Social Sciences (SPSS) version 23.0 was used to analyze the data. The univariate relationships between the demographic characteristics (independent variables) and Patients' Knowledge and practice levels about DFC (dependent variables) were evaluated using the Chi-square test.

Multiple linear regression analysis was used to identify the predictors for Patients' Knowledge and practice levels about DFC. Statistics were considered statistically significant at $P \le 0.05$.

Results

The study population comprised a wellbalanced sample in terms of gender distribution (51.7% male, 48.3% female) and socioeconomic background, with the majority being married (65.7%) and employed (68.6%).

Most participants were between 40 and 50 (44.9%), aligning with the peak prevalence of Type 2 Diabetes Mellitus (T2DM) in middle age.

Educational attainment varied, with 41.5% having higher education and 31.9% above-average education, while 35.7% of participants had a monthly income between 1000 and 1999 pounds.

Health-related factors revealed that 36.2% were smokers, a known contributor to diabetes complications. The majority had been living with diabetes for 5 to 9 years (46.9%), with 75.4% adhering regularly to their medication regimen, reflecting a relatively positive approach to disease management.

However, 16.4% had a history of diabetic foot ulcers, underscoring the need for effective foot care education. Additionally, a significant proportion of participants were overweight (46.8%) or obese (34.1%), reinforcing the role of obesity in diabetes progression and related complications (Table 1).

Knowledge and practice levels regarding diabetic foot care showed considerable variability. The mean knowledge score was 59.40 ± 24.18 , ranging from 0 to 100, with 49.3% of participants demonstrating satisfactory knowledge ($\geq 60\%$) and 50.7% having unsatisfactory knowledge (< 60%), indicating a notable gap in awareness.

In contrast, the mean practice score was lower (53.10 ± 14.38) , ranging from 13.64 to 86.36, with a larger proportion (61.4%) falling into the unsatisfactory category.

These findings suggest that adherence to proper foot care routines remains a challenge sufficient among those with even knowledge. The observed gap between knowledge and practice highlights the need for stronger educational programs and behavioral interventions to improve adherence and ultimately reduce the risk of diabetic foot complications (Table 2).

A positive linear relationship was observed between knowledge and practice scores, as illustrated in the scatter plot. The coefficient of determination ($R^2 = 0.504$) suggests a moderate correlation, with approximately 50.4% of the variance in practice scores explained by knowledge scores. However, considerable variability remains, as some individuals with high knowledge scores exhibit poor practice scores, suggesting potential barriers to translating knowledge into action.

These findings underscore the importance of behavioral interventions and structured education programs that enhance learning and promote adherence to proper foot care practices among individuals with diabetes (Figure 1).

Several factors were significantly associated with knowledge levels regarding foot care. Higher education, employment, and higher income were linked to better knowledge, suggesting that socioeconomic factors play a crucial role in awareness.

Married individuals demonstrated higher knowledge levels than widowed and divorced participants, possibly due to better social support.

Additionally, patients with regular compliance to treatment exhibited significantly greater knowledge, indicating that adherence to medical guidance may contribute to awareness.

In contrast, age, gender, smoking, diabetes duration, and history of diabetic foot ulcers did not show statistically significant associations, implying that knowledge gaps may persist irrespective of these factors.

These findings underscore the need for targeted educational interventions tailored to lower-income, less-educated, unemployed, and noncompliant patients to improve their understanding of proper foot care practices (Table 3).

Similarly, significant associations were found between foot care practice levels and factors such as education, employment, income, and treatment compliance. Patients with higher education and income demonstrated better foot care practices.

At the same time, those who were illiterate or had lower incomes exhibited the poorest practices, emphasizing the need for targeted education and financial support.

Employed individuals were likelier to adhere to proper foot care routines than unemployed or retired participants, likely due to greater health awareness and economic stability. Regular treatment compliance was also strongly linked to satisfactory foot care, reinforcing the importance of consistent medical guidance.

In contrast, age, gender, marital status, smoking, diabetes duration, previous diabetic foot ulcers, and BMI did not show significant associations, suggesting that demographic and disease-related factors alone do not necessarily influence foot care behaviors. These findings underscore the need for comprehensive interventions, including educational programs for vulnerable groups, financial support for low-income patients, and strategies to enhance treatment adherence, to improve diabetic foot care outcomes (Table 4).

Multiple linear regression analysis identified educational level, employment status, income, and treatment compliance as significant independent predictors of foot care knowledge.

Lower education levels were associated with poorer knowledge, emphasizing the critical role of health literacy in foot care awareness. Similarly, unemployed individuals demonstrated lower knowledge scores, suggesting that employment may facilitate better access to health information and resources.

Higher income levels correlated with improved knowledge, likely due to greater healthcare educational access and opportunities. Notably, irregular treatment compliance was a strong negative predictor, indicating that noncompliant patients tend to have poorer foot care knowledge. In contrast, age, gender, marital status, diabetes duration. previous smoking, diabetic foot ulcers, and BMI did not show significant associations, suggesting that demographic and disease-related factors

alone do not directly impact foot care knowledge.

These findings highlight the importance of targeted educational interventions to enhance care awareness and practices, particularly for lower-income, unemployed, and noncompliant patients (Table 5).

Similarly, income and treatment compliance were identified as significant independent predictors of foot care practices. Higher income was positively associated with better foot care behaviors, likely due to greater access to healthcare resources and self-care materials.

However, Irregular treatment compliance was a significant negative predictor, indicating that noncompliant patients were less likely to adhere to proper foot care practices.

Other variables, including age, gender, marital status, educational level, employment status, smoking, diabetes duration, previous diabetic foot ulcers, and BMI, did not show significant associations, suggesting that demographic and diseaserelated factors alone do not directly influence foot care behaviors.

These findings highlight the importance of financial stability and adherence to treatment plans in promoting optimal foot care practices among diabetic patients (Table 6).

Discussion

Egypt ranks 8th globally in diabetes prevalence, with an estimated 8.2 million patients. By 2045, this number is expected to double, pushing Egypt to 6th place in global diabetes prevalence. ⁽⁸⁾

These rising numbers highlight the urgent need for effective diabetes management strategies, particularly in preventing complications such as diabetic foot ulcers, which significantly impact patients' quality of life and healthcare systems.

The present study showed that 49.3% of participants had a satisfactory level of diabetic foot knowledge, a finding similar to that of a survey conducted by Jia *et al.*, 2022 ⁽²⁴⁾ on 1,080 diabetic rural adults in North China, where 56.1% had moderate diabetic foot knowledge.

In contrast, a study conducted in the Madinah Region, Saudi Arabia, by Metwally *et al.*, 2023 ⁽²⁵⁾ found that 79.9% of participants demonstrated good foot care knowledge, highlighting significant regional variations.

These discrepancies may be attributed to differences in demographic characteristics, healthcare infrastructure, access to

education, and the implementation of diabetic foot care training programs.

The presence of structured education programs in certain settings may significantly improve patient awareness, which underscores the importance of integrating standardized foot care education into diabetes management programs.

Despite nearly half of the participants demonstrating adequate knowledge, only 38.6% had satisfactory foot care practices, reflecting a gap between knowledge and behavior.

This aligns with findings from *Manickum et al.*, 2021 ⁽²⁶⁾, who systematically reviewed 58 studies and concluded that while many diabetic patients possess sound knowledge, fewer translate this knowledge into effective self-care behaviors.

A similar trend has been reported in studies from Nigeria ⁽¹⁴⁾, Iran ⁽²⁰⁾, India ⁽²⁷⁾, and Kuwait ⁽²⁸⁾, all demonstrating a positive but incomplete translation of knowledge into practice.

According to the Knowledge-Attitude-Practice (KAP) theory, knowledge is the foundation for developing positive attitudes, which influence behavioral change. However, knowledge alone is often insufficient, as multiple external and psychological factors influence behavioral change.

This finding emphasizes the need for behavioral interventions that extend beyond patient education, incorporating motivational strategies, practical demonstrations, and regular follow-up to reinforce adherence to foot care practices.

A key finding of the study is that income, employment status, education level, and compliance with diabetes treatment were significant independent predictors of foot care knowledge and practices.

The association between higher income and better foot care knowledge and practices aligns with findings from Alharbi & Sulaiman (2022)⁽²⁹⁾, who reported a significant correlation between family income and diabetic foot care knowledge and practices among patients in Saudi Arabia.

Similar findings were reported by Rondhianto *et al.* (2023, ³⁰⁾ in Indonesia, where low-income patients demonstrated poor foot care behaviors. Income level is crucial in accessing healthcare services, purchasing appropriate footwear, and affording regular follow-ups. ⁽³¹⁾

These findings suggest that foot care education programs should be tailored to account for economic disparities,

incorporating subsidized care, free foot screenings, and community-based interventions for patients with lower incomes. ⁽³²⁾

In addition to income, employment status was significantly associated with knowledge and practice levels, with employed individuals demonstrating better awareness and adherence to foot care recommendations.

This is consistent with findings from Wazqar *et al.* (2021, ³³⁾, where employed individuals exhibited significantly higher knowledge scores. Employment may enhance exposure to health information, financial stability, and better access to healthcare services, reinforcing the need for workplace-based diabetes education initiatives.

Education level also emerged as a key determinant, with 61.6% of highly educated participants demonstrating satisfactory foot care knowledge and 48.8% demonstrating good practice levels.

This is supported by studies from Pakistan ⁽²⁰⁾, Saudi Arabia ^(34,35), and Ethiopia ⁽³⁶⁾, all demonstrating a strong correlation between higher education and better foot care awareness.

These findings underscore the importance of tailoring foot care education strategies to

individuals' literacy levels. While highly educated patients may benefit from structured educational sessions, lowerliteracy groups may require simplified messaging, visual aids, and interactive demonstrations to enhance understanding and retention of key foot care principles.

Another crucial predictor identified in the present study was compliance with diabetes treatment, significantly associated with knowledge and practice levels.

Similar findings were reported by Kassahun *et al.* (2016) ⁽³⁶⁾ in Ethiopia, where patients adhering to their diabetes treatment regimens exhibited better foot care awareness and behaviors.

Studies from Asia and Africa ⁽³⁷⁻³⁹⁾ have consistently demonstrated that poor adherence to diabetes treatment is linked to low levels of self-care, including inadequate foot care practices.

This finding underscores the need for an integrated approach that educates patients on foot care and reinforces overall diabetes selfmanagement. Strengthening patientprovider communication, implementing reminder systems, and involving family members in diabetes care may help improve treatment adherence and foot care behaviors.

4.1. Study limitations:

The cross-sectional design of this study provides a snapshot of patients' knowledge and practices at a single point in time, limiting the ability to assess changes over time or establish causal relationships between the identified determinants and foot care behaviors.

Additionally, as the study relied on selfreported data collected through questionnaires, there is a potential for recall bias, where participants may not accurately remember or report their foot care behaviors.

Social desirability bias may have also influenced responses, with some participants possibly overestimating their knowledge and adherence to proper foot care practices to present themselves in a more favorable light.

5. Conclusion & Recommendation:

This study reveals significant gaps in diabetic foot care knowledge and practices, with only 49.3% demonstrating satisfactory knowledge and 38.6% adhering to proper foot care practices, despite a relatively educated population. A positive correlation between knowledge and practice underscores the need for targeted interventions.

Key determinants included education, employment, income, and treatment compliance, while marital status and body mass index (BMI) influenced knowledge levels. Structured educational programs, community-based initiatives, and tailored interventions should be implemented to improve adherence.

Future longitudinal studies are recommended to assess changes over time and evaluate the effectiveness of these interventions in enhancing diabetic foot care outcomes.

Abbreviations

r: Pearson Correlation Coefficient; DFUs: Diabetic Foot Ulcers; IDF: International Diabetes Federation; MENA: Middle East and North Africa; T2DM: Type 2 Diabetes Mellitus; BMI: Body Mass Index; Wt: Weight; Ht: Height; CDC: Centers for Disease Control and Prevention; SPSS: Statistical Package for the Social Sciences; p: p-value; t: t- statistic; B: Regression Coefficient.

Declarations Acknowledgments

The authors would like to thank all the participants who provided the data for this paper.

Funding

This research received no specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Consent for publication

Not applicable.

Availability of data and materials

Data are available from the corresponding author upon request.

Competing interests

The authors declare no conflict of interest.

References

- Sa BC, Maskan Bermudez N, Shimon SV, et al. Diabetic foot ulcers: A review of debridement techniques. Surg Technol Int. 2024; 44: 31–5. doi: <u>http://dx.doi.org/10.52198/23.STI.43.</u> <u>WH1718</u>
- McDermott K, Fang M, Boulton AJM, et al. Etiology, epidemiology, and disparities in the burden of diabetic foot ulcers. Diabetes Care. 2023; 46(1): 209– 21. doi:

http://dx.doi.org/10.2337/dci22-0043.

- Bus SA, Sacco ICN, Monteiro-Soares M, *et al.* Guidelines on the prevention of foot ulcers in persons with diabetes (IWGDF 2023 update). Diabetes Metab Res Rev. 2024; 40(3): e3651. doi: http://dx.doi.org/10.1002/dmrr.3651
- Abouzid MR, Ali K, Elkhawas I, et al. An overview of diabetes mellitus in Egypt and the significance of integrating preventive cardiology in

diabetes management. Cureus. 2022; 14(7): e27066. doi: http://dx.doi.org/10.7759/cureus.27066

- Hegazi R, El-Gamal M, Abdel-Hady N, et al. Epidemiology of and risk factors for type 2 diabetes in Egypt. Ann Glob Health. 2015; 81(6): 814–20. doi: http://dx.doi.org/10.1016/j.aogh.2015.1 2.011
- International Diabetes Federation. Diabetes in Egypt. 2023 [cited 2025 Mar 11]. Available from: <u>https://idf.org/our-network/regions-</u> <u>and-members/middle-east-and-north-</u> <u>africa/members/egypt/</u>
- World Health Organization. Diabetes.
 2025 [cited 2025 Mar 11]. Available from: <u>https://www.who.int/health-topics/diabetes</u>
- Saeedi P, Petersohn I, Salpea P, et al. 8. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. Diabetes Clin Res Pract. 2019: 157(107843):107843. doi: http://dx.doi.org/10.1016/j.diabres.201 9.107843
- Mira M. Abu-elenin, Ahmed A. Elshoura, Ghada M. Alghazaly. Knowledge, Practice and Barriers of Foot Self-Care among Diabetic Patients

at Tanta University Hospitals, Egypt. The Egyptian Journal of Community Medicine, 2018; 36(4): 94-102. doi: 10.21608/ejcm.2018.23001

- Taksande B, Thote M, Jajoo UN. Knowledge, attitude, and practice of foot care in patients with diabetes at central rural India. J Family Med Prim Care. 2017; 6(2): 284. doi: <u>http://dx.doi.org/10.4103/2249-</u> <u>4863.219994</u>
- Kassab, Heba Sadek, Ismaeal, Marwa Tarek, Elfattah, Talaat Abd and Elaaty, Abd. Diabetic foot care knowledge and practice in type 2 diabetes and relation to microvascular complications in Alexandria (Egypt), Endocrine Regulations, vol.56, no.2, 2022, pp.95-103. doi: <u>https://doi.org/10.2478/enr-2022-0011</u>.
- 12. Al-Hariri MT, Al-Enazi AS, Alshammari DM, *et al.* Descriptive study on the knowledge, attitudes and practices regarding the diabetic foot. J Taibah Univ Med Sci. 2017; 12(6): 492–6. doi: http://dx.doi.org/10.1016/j.jtumed.2017 .02.001
- Ahmed SA, Badi S, Tahir H, *et al.* Knowledge and practice of diabetic foot care in Sudan: A cross sectional survey. Diabetes Metab Syndr. 2019; 13(4): 2431–5. Available from:

http://dx.doi.org/10.1016/j.dsx.2019.06 .016

- 14. Desalu OO, Salawu FK, Jimoh AK, *et al.* Diabetic foot care: self reported knowledge and practice among patients attending three tertiary hospital in Nigeria. Ghana Med J. 2011 Jun; 45(2): 60-5. doi: 10.4314/gmj.v45i2.68930. PMID: 21857723; PMCID: PMC3158533.
- 15. Centers for Disease Prevention and Control (CDC). Diabetes and Your Feet; available at: https://www.cdc.gov/diabetes/diabetescomplications/diabetes-and-yourfeet.html; 2022. Accessed on August 29, 2023.
- 16. Hingorani A, LaMuraglia GM, Henke P, et al. The management of diabetic foot: A clinical practice guideline by the Society for Vascular Surgery in collaboration with the American Podiatric Medical Association and the Society for Vascular Medicine. J Vasc Surg. 2016; 63(2 Suppl): 3S-21S. doi: http://dx.doi.org/10.1016/j.jvs.2015.10. 003
- 17. International Diabetes Federation. IDF
 Clinical Practice Recommendations on
 the Diabetic Foot 2017. Available
 from:

https://idf.org/media/uploads/2023/05/a ttachments-61.pdf

- Schaper NC, Van Netten JJ, Apelqvist J, et al. International Working Group on the Diabetic Foot (IWGDF). Prevention and management of foot problems in diabetes: A Summary Guidance for Daily Practice 2015, based on the IWGDF guidance documents. Diabetes Res Clin Pract. 2017; 124: 84–92. doi: http://dx.doi.org/10.1016/j.diabres.201 <u>6.12.007</u>
- Moh'd Al-Qaddah R, Abdallah Al Eyadeh MD, Ma'en Zaid Abu-Qamar DN, *et al.* Knowledge, and practice of foot care among diabetics at King Hussein Medical Center, Jordan. JRMS., 2016; 23: 55-63. doi: 10.12816/0029074.
- Pourkazemi A, Ghanbari A, Khojamli M, *et al.* Diabetic foot care: knowledge and practice. BMC Endocr Disord.
 2020; 20(40): 1-8. doi: <u>https://doi.org/10.1186/s12902-020-</u> 0512-y.
- Tuglo LS, Nyande FK, Agordoh PD, *et al.* Knowledge and practice of diabetic foot care and the prevalence of diabetic foot ulcers among diabetic patients of selected hospitals in the Volta Region, Ghana. Int Wound J. 2022 Mar; 19(3): 601-614. doi: 10.1111/iwj.13656.
- 22. Alam S, Khan S, Ahsan A, *et al.* A cross-sectional survey of knowledge, attitude and practice (KAP) among the

 MBBS students after a year of COVID

 19 outbreak. Tren Med Res. 2021;

 16(2):
 30–6.

 http://dx.doi.org/10.3923/tmr.2021.30.3

 6.

- Yusof, A.M.M., Rahman, N.A.A. and Haque, M. Knowledge, attitude and practice toward food poisoning among food handlers and dietetic students in a public university in Malaysia. J. Pharm. Bioallied Sci. 2018; 10: 232-239. doi: 10.4103/JPBS.JPBS_141_18.
- 24. Jia H, Wang X, Cheng J. Knowledge, Attitudes, and Practices Associated with Diabetic Foot Prevention Among Rural Adults with Diabetes in North China. Front. Public Health, 2022; 10: 876105. doi: 10.3389/fpubh.2022.876105.
- 25. Metwally AS, Aljohani ZA, Maashi MI, *et al.* Knowledge, attitude, and practice regarding the risk of diabetic feet among diabetic patients in the Madinah region, Saudi Arabia. Cureus. 2023; 15(12): e49933. doi: <u>http://dx.doi.org/10.7759/cureus.49933</u>
- 26. Manickum P, Mashamba-Thompson T, Naidoo R, *et al.* Knowledge and practice of diabetic foot care - A scoping review. Diabetes Metab Syndr. 2021 May-Jun; 15(3): 783-793. doi: 10.1016/j.dsx.2021.03.030. Epub 2021 Mar 31. PMID: 33838615.

- 27. Magbanua E, Lim-Alba R. Knowledge and practice of diabetic foot care in patients with diabetes at Chinese general hospital and medical center. J ASEAN Fed Endocr Soc. 2017; 32(2): 123–31. doi: http://dx.doi.org/10.15605/jafes.032.02. 05.
- Alsaleh FM, AlBassam KS, Alsairafi ZK, *et al.* Knowledge and practice of foot self-care among patients with diabetes attending primary healthcare centers in Kuwait: A cross-sectional study. Saudi Pharm J. 2021; 29(6): 506–15. doi: http://dx.doi.org/10.1016/j.japa.2021.04

http://dx.doi.org/10.1016/j.jsps.2021.04 .006

29. Alharbi MO, Sulaiman AA. Foot care knowledge, attitude and practices of diabetic patients: A survey in Diabetes health care facility: A survey in Diabetes health care facility. J Family Med Prim Care. 2022; 11(7): 3816–23. doi:

> http://dx.doi.org/10.4103/jfmpc.jfmpc_ 183_21

 Rondhianto R, Widayati N, Qur'aini S. Foot Care Behavior Among People with Type 2 Diabetes Mellitus: Overview and Sociodemographic Factors Impact. Nursing and Health Sciences Journal. 2023 Jun; 3(2): 213-220. doi: https://doi.org/10.53713/nhsj.v3i2.257

- 31. D'Souza MS, Ruppert SD, Parahoo K, et al. Foot care behaviors among adults with type 2 diabetes. Prim Care Diabetes. 2016; 10(6): 442–51. doi: <u>http://dx.doi.org/10.1016/j.pcd.2016.04</u> .002
- 32. Tan TW, Armstrong DG, Concha-Moore KC, *et al.* Association between race/ethnicity and the risk of amputation of lower extremities among Medicare beneficiaries with diabetic foot ulcers and diabetic foot infections. BMJ Open Diabetes Res Care. 2020; 8(1): e001328. doi: 10.1136/bmjdrc-2020-001328.
- 33. Wazqar, A.A.; Baatya, M.M.; Lodhi, F.S.; *et al.* Assessment of knowledge and foot self-care practices among diabetes mellitus patients in a tertiary care centre in Makkah, Saudi Arabia: A cross-sectional analytical study. Pan. Afr. Med. J. 2021; 40: 123. doi: 10.11604/pamj.2021.40.123.30113.
- 34. Darraj G, Somaili M, Shaban S, *et al.* Footcare knowledge and practice among diabetic patients attending primary health care centers in Jazan region, Saudi Arabia. J Gen Fam Med. 2023 Mar 13;24(3):164-170. doi: 10.1002/jgf2.613. PMID: 37261044; PMCID: PMC10227747.
- 35. Qadi M, Al Zahrani H. Foot care knowledge and practice among diabetic

patients attending primary health care centers in Jeddah city. J King Abdulaziz Univ-Med Sci. 2011; 18(2): 55–71. doi: http://dx.doi.org/10.4197/med.18-2.5

- 36. Kassahun T, Gesesew H, Mwanri L, et al. Diabetes related knowledge, selfcare behaviours and adherence to medications among diabetic patients in Southwest Ethiopia: a cross-sectional survey. BMC Endocr Disord. 2016; 16: 28. doi: 10.1186/s12902-016-0114-x.
- 37. Islam SMS, Niessen LW, Seissler J, *et al.* Diabetes knowledge and glycemic control among patients with type 2 diabetes in Bangladesh. Springerplus. 2015; 4(1): 284. doi:

http://dx.doi.org/10.1186/s40064-015-1103-7.

- 38. Al-Maskari F, El-Sadig M, Al-Kaabi JM, *et al.* Knowledge, attitude and practices of diabetic patients in the United Arab Emirates. PLoS One. 2013; 8(1): e52857. doi: <u>http://dx.doi.org/10.1371/journal.pone.</u> 0052857.
- 39. Demaio AR, Dugee O, de Courten M, *et al.* Exploring knowledge, attitudes, and practices related to alcohol in Mongolia:
 a national population-based survey.
 BMC Public Health. 2013; 13(1): 178.
 doi: <u>http://dx.doi.org/10.1186/1471-2458-13-178</u>.

Variables		No.	%
	40-50 years	93	44.9%
Age	50-60 years	72	34.8%
	More than 60 years	42	20.3%
Candar	Male	107	51.7%
Genuer	Female	100	48.3%
	Single	20	9.7%
Marital status	Married	136	65.7%
Warna status	Widowed	33	15.9%
	Divorced	18	8.7%
	High Education	86	41.5%
	Above Average	66	31.9%
Educational level	Average	25	12.1%
	Primary/Preparatory	15	7.2%
	Illiterate	15	7.2%
Fmnlovment status	Employed	142	68.6%
Employment status	Non-Employed/Retired	65	31.4%
Incomo	Less than 1000 pounds	39	18.8%
	1000-1999 pounds	74	35.7%
Income	2000 - 3000 pounds	55	26.6%
	More than 3000 pounds	39	18.8%
Smolting	No	132	63.8%
Shioking	Yes	75	36.2%
	Less than 5 years	56	27.1%
Duration of diabetes	5-9 years	97	46.9%
Duration of madeies	10-15 years	33	15.9%
	More than15 years	21	10.1%
Compliance with diabe	tes Compliant	156	75.4%
treatment	Non-Compliant	51	24.6%
Previous diabetic foot	No	173	83.6%
	Yes	34	16.4%
Body Mass Index	Normal	39	19.0%
(RMI)	Overweight	96	46.8%
	Obese	70	34.1%

Table (1): Characteristics of the studied Diabetic Patients (n=207)

Variables	Mean <u>+</u> SD	Unsatis <60.0%	factory	Satisfa 60.0%	Satisfactory 60.0% or more	
	(Kange)	No.	%	No.	%	
Knowledge Level	59.40 ± 24.18 (0.00 - 100.0)	105	50.7%	102	49.3%	
Practice Level	53.10 <u>+</u> 14.38 (13.64 – 86.36)	127	61.4%	80	38.6%	

Table (2): Knowledge and Practice of	f satisfactory foot care among participating Diabetic
Patients (n=207)	



Figure (1): Correlation between Knowledge and Practice of foot care among participating Diabetic Patients

Variables		Knowledge Level						
		Unsatisfactory		Satisfactory		Chi-	P-value	
			%	No.	%	square		
	40-50 years	40	43.0%	53	57.0%			
Age	50-60 years	41	56.9%	31	43.1%	4.021	0.134	
	More than 60 years	24	57.1%	18	42.9%			
Comban	Male	54	50.5%	53	49.5%	0.000	0.939	
Gender	Female	51	51.0%	49	49.0%	0.006		
	Single	10	50.0%	10	50.0%		0.004**	
Marital status	Married	58	42.6%	78	57.4%	12 074		
	Widowed	24	72.7%	9	27.3%	13.274		
	Divorced	13	72.2%	5	27.8%			
	High Education	33	38.4%	53	61.6%			
	Above Average	34	51.5%	32	48.5%		0.000**	
Educational	Average	12	48.0%	13	52.0%	21.379		
level	Primary/Preparatory	12	80.0%	3	20.0%			
	Illiterate	14	93.3%	1	6.7%			
Employment Status	Employed	61	43.0	81	57.0%	10.014	0.001**	
	Non-Employed/Retired	44	67.7	21	32.3%	10.914		
Ŧ	Less than 1000 pounds	31	79.5%	8	20.5%		0.000**	
	1000-1999 pounds	40	54.1%	34	45.9%	21.001		
Income	2000 - 3000 pounds	22	40.0%	33	60.0%	21.981		
	More than 3000 pounds	12	30.8%	27	69.2%			
C	No	64	48.5%	68	51.5%	0 721	0.392	
Smoking	Yes	41	54.7%	34	45.3%	0.731		
	Less than 5 years	30	53.6%	26	46.4%		0.275	
D	5-9 years	45	46.4%	52	53.6%	2 1 1 2		
Duration	10-15 years	16	48.5%	17	51.5%	3.112	0.375	
	More than15 years	14	66.7%	7	33.3%			
Compliance	Compliant	67	42.9%	89	57.1%	15 217	0.000101	
with diabetes	Non-Compliant	38	74.5%	13	25.5%	15.31/	0.000**	
Previous	No	84	48.6%	89	51.4%	1 09 4	0.150	
diabetic foot	Yes	21	61.8%	13	38.2%	1.984	0.159	
Body Mass	Normal	17	43.6%	22	56.4%			
Index	Overweight	43	44.8%	53	55.2%	6.269	0.044*	
(BMI)	Obese	44	62.9%	26	37.1%			

 Table (3): Determinants of Diabetic patients' Knowledge level toward satisfactory foot

 care (n=207)

(*) Statistically significant at P \leq 0.05, (**) Highly statistically significant at p \leq 0.01.

		Practice Level						
Variables		Unsatisfactory		Satisfactory		Chi-	P-value	
		No.	%	No.	%	square		
	40-50 years	54	58.1%	39	41.9%			
Age	50-60 years	43	59.7%	29	40.3%	2.303	0.316	
	More than 60 years	30	71.4%	12	28.6%			
Condon	Male	71	66.4%	36	33.6%	2 2 2 0	0.126	
Gender	Female	56	56.0%	44	44.0%	2.338		
	Single	14	70.0%	6	30.0%		0.169	
Marital status	Married	76	55.9%	60	44.1%	5 045		
Warnar status	Widowed	24	72.7%	9	27.3%	5.045		
	Divorced	13	72.2%	5	27.8%			
	High Education	44	51.2%	42	48.8%		0.008**	
	Above Average	39	59.1%	27	40.9%			
Educational	Average	18	72.0%	7	28.0%	13.774		
	Primary/Preparatory	12	80.0%	3	20.0%			
	Illiterate	14	93.3%	1	6.7%			
Employment	Employed	78	54.9%	64	45.1%	7 868	0.005**	
Status	Non-Employed/Retired	49	75.4%	16	24.6%	7.000		
Turana	Less than 1000 pounds	34	87.2%	5	12.8%		0.001**	
	1000-1999 pounds	44	59.5%	30	40.5%	16 506		
meome	2000 - 3000 pounds	32	58.2%	23	41.8%	10.500		
	More than 3000 pounds	17	43.6%	22	56.4%			
Smolting	No	78	59.1%	54	40.9%	0.786	0.375	
Smoking	Yes	49	65.3%	26	34.7%	0.780		
	Less than 5 years	30	53.6%	26	46.4%		0.077	
Duration	5-9 years	58	59.8%	39	40.2%	6 858		
Duration	10-15 years	21	63.6%	12	36.4%	0.050	0.077	
	More than15 years	18	85.7%	3	14.3%			
Compliance	Compliant	86	55.1%	70	44.9%	10.046	0.001***	
with diabetes	Non-Compliant	41	80.4%	10	19.6%	10.346	0.001**	
Previous	No	105	60.7%	68	39.3%			
diabetic foot	Yes	22	64.7%	12	35.3%	0.193	0.660	
Body Mass	Normal	20	51.3%	19	48.7%			
Index	Overweight	58	60.4%	38	39.6%	3.903	0.142	
(BMI)	Obese	49	70.0%	21	30.0%			

Table (4): Determinants of Diabetic patients' Practice level toward satisfactory foot care (n=207)

(**) Highly statistically significant at $p \le 0.01$.

	Unstandardized Coefficients		Standardized	Т	Sig.
Model			Coefficients		
	В	Std. Error	Beta		
(Constant)	19.402	2.928		6.626	.000
Age	.596	.547	.086	1.089	.278
Gender	.990	.808	.093	1.224	.222
Marital status	310	.493	043	630	.530
Educational level	831	.388	190	-2.140	.034*
Employment Status	-2.133	.899	186	-2.374	.019*
Income	.824	.410	.155	2.008	.046*
Smoking	.189	.874	.017	.217	.829
Duration	086	.421	015	204	.838
Compliance with diabetes treatment	-2.430	.880	198	-2.763	.006**
Previous diabetic foot	681	.950	047	716	.475
Body Mass Index (BMI)	763	.471	102	-1.621	.107

Table (5): Independent Predictors of Diabetic patients' knowledge toward foot care (n=207)

(*) Statistically significant at P \leq 0.05.

(**) Highly statistically significant at p \leq 0.01.

Predictors	Unstandardized Coefficients		Standardized Coefficients	Т	Sig.
	В	Std. Error	Beta		
(Constant)	45.297	5.352		8.464	.000
Age	176	1.001	014	176	.861
Gender	.293	1.478	.016	.198	.843
Marital status	.138	.901	.011	.153	.879
Educational level	-1.115	.710	144	-1.571	.118
Employment Status	-1.357	1.642	067	826	.410
Income	1.825	.750	.193	2.433	.016*
Smoking	-1.992	1.598	101	-1.246	.214
Duration	516	.769	050	671	.503
Compliance with diabetes treatment	-4.357	1.608	200	-2.710	.007**
Previous diabetic foot	.159	1.737	.006	.092	.927
Body Mass Index (BMI)	-1.249	.860	094	-1.452	.148

Table (6): Independent Predictors of Diabetic Patients' Practice toward Foot Care (n=207)

(*) Statistically significant at P \leq 0.05.

(**) Highly statistically significant at P \leq 0.01.

الملخص العربي

محددات المعرفة والممارسة المرضية للعناية بالقدم بين مرضى السكري المترددين على العيادات الخارجية في مستشفى جامعي، القاهرة، مصر

> **إيناس عبد الرحيم علي ١، شريف أحمد هتة ١، غادة واصف ٢*** ١- قسم طب الأسرة والمجتمع، كلية الطب، جامعة مصر للعلوم والتكنولوجيا ٢- قسم الطب المجتمعي والبيئي والمهني، كلية الطب، جامعة عين شمس

الملخص:

المقدمة: يُعد داء السكرى حالة مزمنة ذات تأثير ات صحية عالمية كبيرة، خاصةً في الدول النامية. تُعتبر مضاعفات القدم من المشكلات الخطيرة بين مرضى السكري، حيث قد تؤدي إلى نتائج خطيرة، بما في ذلك البتر. تُعد المعرفة والممارسات الكافية للعناية بالقدم ضرورية للوقاية من هذه المضاعفات، ومع ذلك، يفتقر العديد من المرضى إليها. تهدف هذه الدراسة إلى استكشاف محددات المعرفة والممارسة المرضية للعناية بالقدم بين مرضى السكرى المترددين على العيادات الخارجية بمستشفيات جامعة عين شمس، القاهرة، مصر المنهجية: أجريت در إسة مقطعية شملت ٢٠٧ من مرضى السكري من النوع الثاني الذين تتراوح أعمار هم بين ٤٠ و٨٠ عامًا. تم اختيار المشاركين بشكل منهجي وإجراء مقابلات معهم باستخدام استبيان مُعتمد. شملت البيانات التي تم جمعها المتغيرات الاجتماعية والديموغرافية، والمتغيرات السريرية، بالإضافة إلى معرفة المرضى وممارساتهم فيما يتعلق بالعناية بالقدم، حيث تم تصنيف الدرجات على أنها مرضية أو غير مرضية. تم جمع البيانات في الفترة من ١/١٥-٢٠٢ الى ٢٠٢٣/٠٤/٣٠. النتائج :كان ٤٤,٩٪ من المشاركين في الفئة العمرية ٤٠-٥٠ عامًا، بينما تجاوز ٥٥,١٪ منهم سن الخمسين. كان لدى معظم المرضى مستوى تعليمي فوق المتوسط أو مرتفع (٧٣,٤٪)، وكان ٦٨,٦٪ منهم يعملون. بلغ متوسط درجة المعرفة ٥٩,٤٠ ± ٢٤,١٨، حيث أظهر ٤٩,٣٪ من المرضى معرفة مرضية. أما متوسط درجة الممارسة فكان ٥٣,١٠ ± ١٤,٣٨ مع إظهار ٣٨,٦٪ من المرضى ممارسات مرضية. وُجدت علاقة ارتباط قوية بين درجات المعرفة والممارسة .(r=0.710) وكانت أهم العوامل التي تنبأت بمستوى جيد من المعرفة والممارسات المتعلقة بالعناية بالقدم هي المستوى التعليمي العالي، والعمل، والدخل المرتفع، والالتزام الجيد بالعلاج. الاستنتاج: تُبرز الدراسة وجود فجوات كبيرة في معرفة وممارسات العناية بالقدم بين مرضى السكري. لذا، فإن تنفيذ برامج تثقيفية تستهدف هذه الفجوات يُعد أمرًا ضروريًا للحد من مضاعفات القدم السكرية وتحسين نتائج المرضى. الكلمات المفتاحية : داء السكرى، العناية بالقدم، المعرفة، الممارسة.