e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
**International Journal of Health Sciences (IJHS)**
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

# The Effect Of Duration Of Diabetes Mellitus On The Incidence Of Lower Extremity Disorders

**Sofyan[1*] , Rezqiqah Aulia Rahmat[2]**
[*1] Nursing Professional Study Program, STIKes Pertamedika, Indonesia
[2] Faculty of Medicine, Bosowa University Makassar, Indonesia

## ABSTRACT

Diabetes mellitus ( DM) is chronic metabolic disease that May lead to various microvascular and macrovascular complications . One of the common complications involves the lower extremities , including diabetic peripheral neuropathy , peripheral artery disease , diabetic foot ulcers , infection , impaired wound healing , and amputation . The duration of diabetes is considered to be associated with an increased risk of these complications due to prolonged exposure to hyperglycemia and progressive nerve and vascular damage .This article aimed to analyze the influence of diabetes mellitus duration on the occurrence of lower extremity disorders based on available scientific evidence .This article used literature review approach by examining scientific publications and clinical guidelines addressing the relationship between diabetes duration and peripheral neuropathy , peripheral artery disease , diabetic foot ulcers , and lower extremity complications .A longer duration of diabetes is generally associated with an increased risk of lower extremity disorders . Prolonged exposure to hyperglycemia May contribute to peripheral nerve damage , microvascular dysfunction , atherosclerosis , and impaired tissue perfusion . Neuropathy causes loss of protective sensation , allowing foot injuries to remain unnoticed , while peripheral artery disease impairs wound healing . The combination of neuropathy , impaired perfusion , foot deformity , and infection May increase the risk of ulceration and amputation . However , diabetes duration is not the only determinant , as glycemic control , age , hypertension , dyslipidemia , smoking , obesity , chronic kidney disease , and a history of ulceration or amputation also contribute . The longer a person has diabetes, the greater the potential risk of lower extremity complications , particularly when risk factors are poorly controlled and foot examinations are inadequate . Early detection and continuous preventive management are essential .

**Keywords :** Diabetes Mellitus, Lower Extremity, Peripheral Neuropathy, Diabetic Foot Ulcer, Amputation

*Correspondent Author : Sofyan, Email: Sofyanrusliladina@gmail.com

e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

## 1. INTRODUCTION

Diabetes mellitus is a chronic disease that is a global health problem. This disease is characterized by chronically elevated blood glucose levels due to impaired insulin secretion, insulin action, or both. Long-term, uncontrolled hyperglycemia can cause damage to various organs, particularly nerves and blood vessels. These complications can impact quality of life, increase the need for healthcare, and increase the risk of disability and death [1-3].

One of the important complications in people with diabetes is lower extremity disorders. These disorders can include diabetic peripheral neuropathy , peripheral arterial disease, foot deformities , dry and easily damaged skin, diabetic foot ulcers , infections, gangrene , and even amputation. Foot problems in people with diabetes are complex because they usually involve more than one pathological mechanism simultaneously [4-7].

Diabetic peripheral neuropathy is a major contributing factor to foot ulcers. Sensory nerve damage results in reduced or absent protective sensation, leaving patients unaware of trauma, repetitive pressure, minor injuries, or injuries caused by inappropriate footwear. Concurrently, motor nerve impairment can lead to changes in foot shape and plantar pressure distribution , while autonomic nerve impairment can lead to changes in skin function, increasing susceptibility to injury [4,8].

Peripheral artery disease also plays a significant role in the development of lower extremity complications. Impaired blood flow results in reduced tissue oxygen and nutrient delivery, thus impeding wound healing. The presence of peripheral artery disease in patients with diabetic foot ulcers is also associated with an increased risk of adverse events in the legs and cardiovascular system [6,9].

The duration of diabetes mellitus (DM) is one factor suspected of being associated with the occurrence of lower extremity complications. The longer a person has diabetes, the longer the exposure to hyperglycemia and other metabolic risk factors. This condition can increase the likelihood of progressive nerve and blood vessel damage. However, the relationship between diabetes duration and lower extremity complications is not independent of age, glucose levels, blood pressure, lipid profile, smoking status, kidney function, physical activity, foot care, and access to health services [2,4,10].

Based on this description, a discussion of the effect of diabetes duration on the incidence of lower extremity disorders is important. Understanding this relationship can help healthcare providers identify patient groups requiring more intensive monitoring and strengthen strategies for preventing diabetic foot complications .

e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

## 2. RESEARCH METHODS

This article uses the literature review method ( literature review) **.** A literature search was conducted on scientific publications and clinical guidelines that discuss diabetes mellitus, disease duration, diabetic peripheral neuropathy , peripheral arterial disease, diabetic foot ulcers , foot infections, and lower extremity amputations.

The literature used included research articles, systematic reviews, meta-analyses, and clinical guidelines from relevant professional organizations and health institutions. The literature was selected based on its relevance to the topic, relevance to the relationship between duration of diabetes and lower extremity complications, and the quality of the scientific sources.

The analysis was conducted using a descriptive-narrative approach to identify the relationship between DM duration and the incidence of lower extremity disorders. The discussion focused on pathophysiological mechanisms , contributing risk factors, the most common forms of lower extremity disorders, and implications for prevention and clinical monitoring.

## 3. RESEARCH RESULTS AND DISCUSSION

### a. Research result

Based on a review of relevant literature, a trend toward a relationship between the duration of diabetes mellitus (DM) and the incidence of lower extremity disorders was found. DM patients with longer disease duration tend to have a higher risk of lower extremity complications than those with shorter disease duration. These disorders include diabetic peripheral neuropathy , peripheral arterial disease, diabetic foot ulcers , infections, impaired wound healing, and even amputations.

Long-term diabetes mellitus (DM) is associated with prolonged exposure to chronic hyperglycemia. This condition can cause progressive damage to the peripheral nervous system and blood vessels. Peripheral neuropathy can lead to decreased or loss of protective sensation in the feet, making sufferers unaware of trauma, repetitive pressure, or minor injuries. Meanwhile, vascular disorders can lead to decreased tissue perfusion and impede wound healing.

The study also showed that peripheral neuropathy is a significant factor associated with the occurrence of diabetic foot ulcers . People with diabetes with neuropathy can experience impaired sensation, often delaying the detection of foot wounds. This condition can be exacerbated by foot deformities and repeated mechanical stress.

Peripheral artery disease has also been identified as a contributing factor to lower extremity disorders. Impaired blood flow deprives tissues of oxygen and nutrients, thus impairing wound healing. When this condition is accompanied by neuropathy and infection, the risk of slow-healing ulcers and amputation can increase.

e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

Although diabetes duration has been shown to be associated with lower extremity complications, studies have shown that disease duration is not the sole determining factor. The risk of complications is also influenced by glycemic control, age, hypertension, dyslipidemia , obesity, smoking, chronic kidney disease, physical activity, foot care, history of ulcers, and history of amputation.

The study showed that the longer a person has diabetes, the greater the likelihood of lower extremity complications. However, the impact of duration can vary from person to person due to other risk factors and differences in disease management.

**b. Discussion**

The study results indicate that the duration of diabetes mellitus is associated with an increased risk of lower extremity disorders. This condition can be explained by pathological processes resulting from long-term exposure to hyperglycemia. Chronic hyperglycemia can cause oxidative stress, the formation of advanced glycation end products , impaired endothelial function, and changes in cell metabolism, ultimately contributing to nerve and blood vessel damage.

The longer the duration of diabetes mellitus (DM), the longer the body is exposed to abnormal metabolic conditions. If blood glucose levels are not properly controlled, tissue damage can progress. One complication that can arise is diabetic peripheral neuropathy . Neuropathy causes impaired sensory , motor, and autonomic nerve function in the lower extremities.

Sensory impairment is a key mechanism in the development of diabetic foot ulcers . Reduced protective sensation prevents sufferers from feeling pain from pressure, friction, cuts, or minor trauma. As a result, sufferers can continue with daily activities without realizing that tissue damage has occurred in the foot. Wounds that are not promptly treated can develop into ulcers and then become infected.

In patients with long-term diabetes, the risk of neurological disorders may increase, especially if accompanied by poor glycemic control. This suggests that disease duration and glycemic control have a mutually reinforcing relationship in the development of complications. Therefore, the duration of diabetes cannot be separated from the quality of blood glucose control.

Peripheral artery disease is also a significant factor in the development of lower extremity disorders. Diabetes mellitus is a risk factor for peripheral vascular disease. Impaired blood flow to the lower extremities reduces the supply of oxygen and nutrients to the tissues. As a result, foot wounds are more difficult to heal.

The combination of neuropathy and peripheral artery disease is a highly risky condition. Neuropathy can cause wounds to go unnoticed, while impaired perfusion can make them difficult to heal. If the wound becomes infected, it can progress to more extensive tissue damage. In severe cases, amputation may be necessary to prevent the spread of infection and save the patient's life.

e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

The relationship between diabetes duration and lower extremity disorders can also be seen in the increased likelihood of multiple complications with the duration of the disease. Patients with long-standing diabetes are more likely to experience a combination of risk factors, such as neuropathy , peripheral artery disease, kidney disease, and visual impairment. This combination can increase the difficulty of performing self-care for the feet and increase the likelihood of complications.

The duration of diabetes mellitus (DM) cannot be used as the sole predictor of lower extremity disorders. Some patients have long-term diabetes but do not experience severe complications because they maintain good glycemic control, undergo regular foot examinations, maintain a healthy lifestyle, and receive adequate healthcare. Conversely, patients with a relatively short duration of diabetes mellitus (DM) can experience complications if they have severe or uncontrolled risk factors.

Age also plays a role in increasing the risk of lower extremity disorders. Increasing age can be accompanied by decreased sensory function , impaired mobility, vascular changes, and an increased prevalence of comorbidities. These conditions can exacerbate the risk of diabetic foot complications.

Hypertension and dyslipidemia also contribute to vascular disorders. If these factors are not controlled, atherosclerosis can progress and lead to reduced lower extremity perfusion . Smoking can also worsen blood vessel conditions and increase the risk of peripheral artery disease.

A history of previous ulcers is another important factor. Patients who have experienced a foot ulcer have a higher risk of recurrent ulcers. This suggests that secondary prevention should be an important part of the management of DM patients, especially those with a long disease duration and a history of previous complications.

The duration of diabetes mellitus can be used as an indicator to determine the level of awareness of lower extremity complications. Patients with longer-term disease should receive regular foot examinations to detect neuropathy , peripheral artery disease, foot deformities , calluses, and skin breakdown. Routine examinations and education can help identify risk factors before they develop into ulcers or more severe complications.

Prevention of lower extremity disorders requires a comprehensive approach. These efforts include controlling blood glucose, blood pressure, and lipid levels; quitting smoking; maintaining a healthy weight; engaging in appropriate physical activity; wearing appropriate footwear; conducting regular foot examinations; and seeking immediate medical attention if wounds or signs of infection are found.

The study results show that the longer the duration of diabetes, the greater the potential for lower extremity disorders, but this relationship is influenced by various other factors. A diabetes management approach focused on preventing complications

e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

and risk stratification needs to be implemented sustainably to reduce the incidence of diabetic foot ulcers and amputations.

## 4. CONCLUSION AND SUGGESTIONS

### a. Conclusion

The duration of diabetes mellitus is associated with an increased risk of lower extremity disorders. The longer diabetes persists, the greater the likelihood of complications such as diabetic peripheral neuropathy and peripheral arterial disease, which can further increase the risk of foot ulcers, infections, impaired wound healing, and even amputation.

This relationship is influenced by various other factors, including glycemic control, age, hypertension, dyslipidemia , smoking, obesity, chronic kidney disease, foot deformity , history of ulcers, and quality of foot care. Therefore, the duration of diabetes should be viewed as one risk stratification factor, not the sole determinant of lower extremity disease.

Early detection of neuropathy and peripheral arterial disease, regular foot examinations, foot care education, proper footwear use, and metabolic risk factor control are important strategies for preventing lower extremity complications in people with diabetes.

### b. Suggestion

1) For diabetes mellitus patients , it is recommended to carry out regular foot checks, maintain the cleanliness and condition of the skin on the feet, wear appropriate footwear, and immediately seek medical attention if wounds, changes in skin color, swelling, or signs of infection are found.
2) For healthcare workers , regular screening for lower extremity disorders is necessary, especially in patients with long-term DM and patients who have additional risk factors such as neuropathy , peripheral arterial disease, foot deformities , or a history of ulcers.
3) For health care facilities , it is necessary to develop an integrated diabetic foot education and prevention program that involves a multidisciplinary team to treat high-risk patients.
4) For further researchers , it is recommended to conduct analytical research with a cohort or cross-sectional design to measure the relationship between the duration of DM and the incidence of lower extremity disorders quantitatively, taking into account confounding factors such as age, gender, glycemic control, blood pressure, smoking status, kidney function, and history of complications.

e-ISSN: 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

## REFERENCES

1. Abbott CA, Malik RA, van Ross ERE, Kulkarni J, Boulton AJM. Prevalence and characteristics of painful diabetic neuropathy in a large community-based diabetic population in the UK Diabetes Care . 2011;34(10):2220-2224. doi:10.2337/dc11-1108.
2. American Diabetes Association Professional Practice Committee for Diabetes. 1. Improving care and promoting health in populations : Standards of Care in Diabetes—2026. Diabetes Care . 2026;49( Suppl 1).
3. American Diabetes Association Professional Practice Committee for Diabetes. 12. Retinopathy , neuropathy , and foot care : Standards of Care in Diabetes—2026. Diabetes Care . 2026;49( Suppl 1):S261-S276. doi:10.2337/dc26-S012.
4. Armstrong DG, Boulton AJM, Bus SA. Diabetic foot ulcers and their recurrence . N Engl J Med . 2017;376(24):2367-2375. doi:10.1056/NEJMra1615439.
5. Boulton AJM, Armstrong DG, Albert SF, Frykberg RG, Hellman R, Kirkman MS, et al. Comprehensive foot examination and risk assessment : a report of the Task Force of the Foot Care Interest Group of the American Diabetes Association . Diabetes Care . 2008;31(8):1679-1685. doi:10.2337/dc08-0550.
6. Brownlee M. The pathobiology of diabetic complications : a unifying mechanisms . Diabetes. 2005;54(6):1615-1625. doi:10.2337/diabetes.54.6.1615.
7. Bus SA, Lavery LA, Monteiro -Soares M, Rasmussen A, Raspovic A, Sacco ICN, et al. Guidelines on the prevention of foot ulcers in persons with diabetes (IWGDF 2023 update ). Diabetes Metab Res Rev . 2023;39(3):e3652.
8. Fitridge R, Thompson M, Hinchliffe RJ, et al. The intersocietal IWGDF, ESVS, SVS guidelines on peripheral artery disease in people with diabetes and a foot ulcer . Diabetes Metab Res Rev. 2024;40(S1).
9. Hinchliffe RJ, Forsythe RO, Apelqvist J, Boyko EJ, Fitridge R, Hong JP, et al. Guidelines on diagnosis, prognosis, and management of peripheral artery disease in patients with a foot ulcer and diabetes (IWGDF 2019 update ). Diabetes Metab Res Rev. 2020;36(S1):e3276. doi:10.1002/dmrr.3276.
10. International Diabetes Federation . IDF Diabetes Atlas. 10th ed. Brussels : International Diabetes Federation ; 2021.
11. IWGDF Editorial Board . IWGDF guidelines on the prevention and management of diabetes- related foot disease . The Hague : International Working Group on the Diabetic Foot ; 2023.
12. Pop- Busui R, Boulton AJM, Feldman EL, Bril V, Freeman R, Malik RA, et al. Diabetic neuropathy : a position statement by the American Diabetes Association . Diabetes Care . 2017;40(1):136-154. doi:10.2337/dc16-2042.
13. Pannyiwi, R. (2026). The Free Nutritional Meal Program (MBG) as a Government Intervention to Improve Children's Health and Learning Achievement. Sahabat Sosial:

Publish: Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage: https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

Journal of Community Service, 4(4), 1586–1599. Retrieved from https://jurnal.agdosi.com/index.php/jpemas/article/view/1361

14. Pannyiwi, R., Azis, MNSA, & Rahmat, RA (2025). Analysis of Nurses' Obstacles in Implementing Therapeutic Communication in Healthcare Environments. Barongko : Journal of Health Sciences, 4(1), 231–243. https://doi.org/10.59585/bajik.v4i1.921
15. Pannyiwi, R., & Ali, A. (2026). The Role of School Health Education in Increasing Adolescent Awareness of the Dangers of Drugs. JIMAD: Multidisciplinary Scientific Journal , 3(4), 226–231. Retrieved from https://jurnal.agdosi.com/index.php/JIMAD/article/view/1324
16. Schaper NC, van Netten JJ, Apelqvist J, Bus SA, Hinchliffe RJ, Lipsky BA. Practical guidelines on the prevention and management of diabetes- related foot disease (IWGDF 2023 update ). Diabetes Metab Res Rev. 2024;40(S1).
17. Singh N, Armstrong DG, Lipsky BA. Preventing foot ulcers in patients with diabetes. JAMA. 2005;293(2):217-228. doi:10.1001/jama.293.2.217.
18. Tesfaye S, Boulton AJM, Dyck PJ, Freeman R, Horowitz M, Kempler P, et al. Diabetic neuropathies : update on definitions , diagnostics criteria , estimation of severity , and treatments . Diabetes Care . 2010;33(10):2285-2293. doi:10.2337/dc10-1303.
19. van Netten JJ, Raspovic A, Lavery LA, Monteiro -Soares M, Rasmussen A, Sacco ICN, et al. Prevention of foot ulcers in persons with diabetes at risk of ulceration : a systematic review and meta- analysis . Diabetes Metab Res Rev . 2024;40(3):e3652.
20. Wahyuni, T., Achmad, VS, Pannyiwi, R., & Rahmat, RA (2025). The Relationship Between Nurse's Knowledge about Ventilators and Compliance in Prevention Ventilator - Associated Pneumonia (VAP) in the ICU. International Journal of Health Sciences , 3(4), 704–710. https://doi.org/10.59585/ijhs.v3i4.892
21. World Health Organization . Diabetes [Internet]. Geneva : World Health Organization ; 2024