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Associated Factors of Distal and Symmetric Polyneuropathy (DSPN) in Diabetic Subjects Consulting at Yopougon Attie General Hospital from November 2024 to April 2025

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Abstract

Introduction: Distal symmetric polyneuropathy (DSPN) is one of the most common chronic complications of diabetes mellitus and is associated with neuropathic pain, sensory impairment, and reduced quality of life. Identifying its predictive factors is essential for early screening and improved management of diabetic patients. **Methods**: This was a descriptive and analytical cross-sectional study conducted from November 2024 to April 2025 at the Yopougon Attié General Hospital. A total of 267 patients with type 1 and type 2 diabetes were included. The diagnosis of DSPN was based on the DN4 and MNSI scores. Statistical analysis included bivariate analysis followed by multivariate logistic regression to identify independent predictive factors. **Results**: The mean age was 55.78 ± 13.15 years, with a male-to-female ratio of 0.38. The prevalence of distal symmetric polyneuropathy was 46.82%. In multivariate analysis, age over 50 years, lack of regular physical activity, diabetic retinopathy, diabetes duration greater than 10 years, and poor glycemic control were identified as independent predictive factors of distal symmetric polyneuropathy. **Conclusion**: Distal symmetric polyneuropathy is frequent among diabetic patients followed at the Yopougon Attié General Hospital. Identifying its predictive factors highlights the importance of early screening, optimal glycemic control, and comprehensive management to reduce diabetes-related complications.

Keywords

Diabetes, Distal Symmetric Polyneuropathy, Predictive Factors, Abidjan

1. Introduction

The diabetic patient is exposed to multiple complications. Among these chronic complications, distal and symmetrical polyneuropathy (DSPN) is one of the most frequent and disabling, affecting up to 50% of diabetic patients during their lifetime. DSPN is defined as a peripheral, bilateral, and symmetrical neurogenic lesion caused by chronic hyperglycemia. Clinically, it most often presents with neuropathic pain, paresthesias, and peripheral hypoesthesia [1].

The prevalence of DSPN varies considerably depending on the populations and diagnostic methods, ranging between 8% and 60% [2]. In sub-Saharan Africa, a systematic review reported an average prevalence of 46%, reaching nearly 49% in West Africa [3]. This condition exposes the patient to foot lesions that can progress to amputation, with a major impact on quality of life and significant socioeconomic consequences [4].

Diabetic polyneuropathy thus plays a central role in the pathophysiology of the diabetic foot. In diabetic patients, the annual incidence of foot ulceration is around 2%, but this figure reaches 7% in cases of polyneuropathy [5]. It is the leading cause of non-traumatic amputation because it predisposes to foot wounds by causing a loss of sensation [6]. Despite its clinical importance, the diagnosis of DSPN remains often late. Several factors have been identified as influencing the occurrence of this complication, notably insufficient glycemic control [7].

In the Ivorian context, local data on the predictive factors of DSPN remain limited, making a better preventive approach difficult. The aim of this study was to investigate the predictive factors of distal symmetric polyneuropathy in adult diabetic subjects followed in consultation at Yopougon Attié General Hospital in order to improve early detection and management.

2. Patients and Methods

2.1. Study Population

This was a cross-sectional observational, single-center, descriptive and analytical study. It was conducted over a six-month period from November 1, 2024, to April 30, 2025, at the outpatient consultation of the endocrinology and diabetology department of Yopougon Atiié General Hospital in Abidjan. We included in this study diabetic patients over 18 years of age, regardless of the type of diabetes. Patients who refused to participate as well as non-autonomous patients were excluded from the study.

2.2. Data Collection

An information form on epidemiological, clinical, and paraclinical data was filled

out for all patients:

Participants were recruited using non-probability consecutive sampling, which included all eligible diabetic patients who presented during the study period. This was therefore not a convenience sample.

A preliminary calculation of the minimum sample size was performed using Cochran's formula, resulting in a minimum required sample size of 138 participants. However, in accordance with the adopted recruitment strategy, the consecutive inclusion of all eligible patients was continued throughout the predefined study period, resulting in a total of 267 participants, thus exceeding the minimum required sample size.

All patients underwent a general clinical examination, a foot examination, and a neurological examination (examination of sensitivity and motor function, search for osteotendinous reflexes and gait disorders…).

For the diagnosis of distal symmetric polyneuropathy (DSPN), the Michigan score or Michigan Neuropathy Screening Instrument (MNSI) [4] was used. The monofilament, reflex hammer, and tuning fork were used for the physical examination. The MNSI is widely used for the detection of DSPN in diabetes. It includes two distinct assessments:

- MNSI with self-assessment by the patient: this is a 15-item self-administered questionnaire. A score ≥ 7 is considered pathological [8].
- Physical MNSI: this is a clinical assessment based on the examination of the lower limbs, looking for deformities, dry skin, calluses, infections, fissures, and ulcers. Ankle reflexes are also elicited. Vibration sensation is also tested in the big toe.

A score ≥ 2.5 is considered pathological [8].

In this study, we also relied on the DN4 score.

A score ≥ 4 confirmed the diagnosis of painful polyneuropathy.

Patients were considered to have distal symmetric polyneuropathy (DSPN) when:

- The clinical MNSI score was ≥2.5 and/or the MNSI questionnaire score was ≥7 and/or
- The DN4 score was ≥4 was incorporated into the overall diagnosis of DSPN

This dual approach increased the reliability of DPN screening in our study population.

The risk of risk lesions according to the International Working Group on the Diabetic Foot was used.

The analytical study is divided in this work into two parts: a univariate study of factors associated with DSPN and a multivariate study of independent predictive factors of DSPN.

Two groups of patients were determined: those who developed DSPN (G1: n = 125) or not (G2: n = 142).

2.3. Statistical Analyses

The data collected were entered directly into an input form developed in Excel

and analyzed using the Epi-info 7.2.2.6 software. Qualitative variables were expressed as absolute (n) or relative (%) frequencies. Quantitative variables were expressed as mean (m) ± standard deviation at 95%.

Variables with a p-value < 0.20, those with a p-value < 0.05 in the univariate analysis, and those of clinical interest according to the literature were entered into a multivariate logistic regression model to identify factors independently associated with DSPN.

The final model was obtained using backward stepwise regression, taking into account both the statistical significance and the clinical relevance of the variables.

For logistic regression, the reference categories corresponded to the modalities considered to be at lower risk or used for clinical comparison (e.g., absence of hypertension, shortest duration of diabetes, youngest age group, absence of neuropathy).

A preliminary check for multicollinearity between HbA1c and fasting/capillary blood glucose was performed. The indices were acceptable (covariance = 0.845; VIF = 1.183), allowing for the simultaneous inclusion of both variables in the logistic regression model.

The Odds Ratios (OR) calculated from univariate and multivariate logistic regression were presented with their 95% confidence intervals as well as their significance tests. For the comparison of percentages, the chi-squared test was used along with Fisher's exact test. To check the significance of the OR, the parametric Wald test is used to test the role of explanatory variables. A difference was considered significant when the p-value was less than 5%.

2.4. Ethical Considerations

This study was conducted in accordance with ethical principles.

Administrative approval was obtained from the administration of the Yopougon Attié General Hospital. Informed consent was obtained from each participant. Participation was voluntary, without financial compensation, and patients could withdraw at any time without any impact on their care. The anonymity and confidentiality of the data were guaranteed; the information collected was used exclusively for scientific purposes.

3. Results

1) Prevalence of DSPN (Table 1)

Table 1. Overall prevalence of dspn in our study population.

Evaluation Tool	Type of DSPN	Number (n)	Percentage (%)
	Global DSPN	**125**	**46.82**
DN4 and/or MNSI	PNDS Absent	142	53.28
	Total	267	100

Our study population consisted of 267 patients. Distal and symmetrical polyneuropathy was considered present when at least one of the two scores (DN4 or MNSI) was positive, which explains an overall prevalence of 46.82% in our population. Nearly half of the population (46.82%) had DSPN, which confirms that polyneuropathy is a common complication in the diabetic patients of the study.

The study population was predominantly female (72.66%), with a sex ratio (M/F) of 0.38. The prevalence of DSPN was comparable between women (48.97%) and men (41.10%), without a statistically significant difference ($p = 0.251$). The mean age of the patients was 55.78 ± 12.40 years. It was 54.92 ± 13.15 years in patients without DSPN and 56.73 ± 11.46 years in those with DSPN. No statistically significant difference was observed between the two groups ($p = 0.488$).

The analysis by age group showed that 69.66% of our population is over 50 years old, with a statistically significant association between age and the presence of DSPN ($p = 0.043$). DSPN was more frequent among patients aged 50 to 59 years (60.29%), while it was less observed in subjects under 40 years old (32.14%).

Regarding socio-economic status, (classified as low, medium, or high according to the reference grid from the joint ENSEA–AFD study on the Ivorian middle class [9]. Low: <70,000 CFA francs, Medium: 70,000 to 300,000 CFA francs, High: >300,000 CFA francs per month), the majority of patients belonged to the middle category (67.79%). The prevalence of DSPN was similar across different socio-economic groups, with no statistically significant association ($p = 0.804$).

The average duration of diabetes was 4.39 ± 5.61 years in patients without DSPN and 6.18 ± 6.62 years in those with DSPN. Although the duration of diabetes was higher in patients with NPDS, this difference was not statistically significant ($p = 0.13$).

However, the analysis of diabetes duration divided into classes showed a statistically significant association with the presence of DSPN ($p = 0.040$). DSPN was more frequently observed in patients with a diabetes duration between 10 and 19 years (65.22%) as well as in those with a duration of 20 years or more (53.85%).

64.04% (16.85% less than 1 year and 47.19% between 1 and 4 years) of our population had diabetes evolving for less than 5 years. Regarding the type of diabetes, the majority of patients had type 2 diabetes (97.37%). No statistically significant association was found between the type of diabetes and the presence of DSPN ($p = 0.327$). The symptoms experienced by patients according to the DN4 questionnaire are distributed in **Table 2** and in **Table 3** the distribution of variable in univariate analysis.

Table 2. Distribution of experienced symptoms (DN4 questionnaire).

Symptoms	Present n (%)	Absent n (%)
burns	124 (46.4%)	143 (53.6%)
Sensation of cold	71 (26.6%)	196 (73.4%)

Continued

electric shock	94 (35.2%)	173 (64.8%)
Tingling	119 (44.6%)	148 (55.4%)
prickling	111 (41.6%)	156 (58.4%)
Numbness	124 (46.4%)	143 (53.6%)
Itching	64 (24%)	203 (76%)
Hypoesthesia to touch	52 (19.5%)	215 (80.5%)
Hypoesthesia to pinprick	152 (56.9%)	115 (43.1%)
Rubbing	15 (5.6%)	251 (94.4%)

Table 3. Distribution of variables in univariate analysis.

Variables	Terms	PNDS absent	PNDS presents	Total (%)	p-value
Physical activity	No n (%)	76 (46.34%)	88 (53.66%)	164 (61.42%)	0.005
	Yes n (%)	66 (64.08%)	37 (35.92%)	103 (38.58%)	
Dyslipidemia	No n (%)	85 (48.30%)	91 (51.70%)	176 (65.91%)	0.026
	Yes n (%)	57 (64.64%)	34 (37.36%)	91 (34.09%)	
Diabetic retinopathy	No n (%)	116 (58.59%)	82 (41.41%)	198 (74.16%)	0.003
	Yes n (%)	26 (37.58%)	43 (62.32%)	69 (25.84%)	
Therapeutic adherence	Good adherence	115 (61.83%)	71 (38.17%)	186 (69.66%)	0.001
	Moderate adherence	17 (35.42%)	31 (64.58%)	48 (17.98%)	
	Poor adherence	10 (30.30%)	23 (69.70%)	33 (12.36%)	
HBA (%)	Well-controlled diabetes < 7%	54 (63.53%)	31 (36.47%)	85 (31.84%)	0.021
	Poorly controlled diabetes > 7%	88	94 (51.65%)	182 (68.16%)	
Duration of diabetes evolution	1 - 9 years	120 (57.69%)	88 (42.30%)	208 (%)	0.040

Continued

	10 - 19 years	16 (34.78%)	30 (65.22%)	46 (17.22%)
	≥20	6 (46.15%)	7 (53.85%)	13 (4.86%)

61.42% of our population did not engage in regular physical activity. Activity (defined as at least 150 minutes of moderate-intensity activity per week), in accordance with the recommendations of the World Health Organization (WHO, 2020) [10].

DSPN was more frequently observed in patients who did not engage in regular physical activity (53.66%) compared to those who had regular physical activity (35.92%). This difference was statistically significant (p = 0.005).

Regarding dyslipidemia, (Lipid profiles were interpreted in accordance with the recommendations of the National Cholesterol Education Program-Adult Treatment Panel III (NCEP ATP III) [11] [12]), DSPN was observed in 37.36% of patients with dyslipidemia compared to 51.70% in those without dyslipidemia. A statistically significant association was found between dyslipidemia and DSPN (p = 0.026). Diabetic retinopathy was identified based on a documented ophthalmological examination (fundus examination or retinography).

In the absence of a recent examination or documentation, the patient was considered to have no known retinopathy

For diabetic retinopathy, DSPN was present in 62.32% of affected patients compared to 41.41% in those without retinopathy. This association was statistically significant (p = 0.003).

Treatment adherence was assessed using the 8-item Morisky Adherence Scale (MMAS-8) [13]. The Morisky Adherence Scale is a validated and widely used tool for assessing patient treatment adherence, primarily for chronic conditions. It is interpreted as follows: Good adherence: score = 8; Moderate adherence: 6 - 7; Poor adherence: <6.

DSPN was significantly more frequent in patients with moderate (64.58%) and poor (69.70%) adherence compared to those with good adherence (38.17%).

The difference was statistically significant between insufficient adherence (poor and moderate) and the presence of DSPN (p = 0.001).

Regarding the interpretation of HbA1c, (HbA1c was classified according to the recommendations of the American Diabetes Association (ADA 2025): diabetes was considered well-controlled for an HbA1c < 7%, and poorly controlled for an HbA1c ≥ 7% (ADA 2025) [14]), DSPN was present in 51.65% of patients with poorly controlled diabetes compared to 36.47% of those with well-controlled diabetes (p = 0.021).

68.16% of our population had poorly controlled diabetes. On the other hand, the analysis of the duration of diabetes divided into classes showed a statistically significant association with the presence of DSPN (p = 0.040). DSPN was more

frequently observed in patients who had diabetes for 10 to 19 years (65.22%) as well as in those who had it for 20 years or more (53.85%). 64.04% (16.85% for less than 1 year and 47.19% between 1 and 4 years) of our population had diabetes for less than 5 years. Table 4 showed the multivariate logistic regression.

Table 4. Table of multivariate logistic regression.

Variables	Adjusted OR	95% CI	p-value
Age 40 - 49 years	2.28	[0.76 - 6.84]	0.140
Age 50 - 59 years	**6.45**	**[2.13 - 19.51]**	**<0.001**
Age ≥ 60 years	**2.29**	**[1.297 - 18.737]**	**0.019**
Lack of regular physical activity	**1.98**	**[1.11 - 3.53]**	**0.020**
Female sex	1.45	[0.78 - 2.70]	0.247
History of Dyslipidemia	0.84	[0.69 - 2.21]	0.365
Diabetic retinopathy	**3.079**	**[1.401 - 6.766]**	**0.005**
Duration of diabetes 1 - 4 years	1.40	[0.63 - 3.08]	0.409
Duration of diabetes 5 - 9 years	0.74	[0.27 - 2.01]	0.548
Duration of diabetes 10 - 19 years	**2.95**	**[1.10 - 7.93]**	**0.031**
Duration of diabetes ≥ 20 years	**1.64**	**[0.41 - 6.60]**	**0.038**
Morisky score–poor adherence	**2.54**	**[1.04 - 6.21]**	**0.041**
Morisky Score–moderate adherence	**2.37**	**[1.14 - 4.93]**	**0.021**
HbA1C > 7	**2.04**	**[1.7 - 2.98]**	**0.002**
Acceptable blood sugar control (capillary)	1.45	[0.71 - 2.96]	0.306
Poor glycemic control (capillary)	**2.84**	**[1.37 - 5.87]**	**0.005**

4. Discussion

4.1. Discussion of the Prevalence of Distal and Symmetrical Polyneuropathy

In our study, the prevalence of distal symmetric polyneuropathy (DSPN) was 46.82%, diagnosed using the DN4 and MNSI scores. This high prevalence confirms that DSPN is a common complication among diabetic patients followed in outpatient care in our hospital setting. Our prevalence of 46.82% is comparable to that reported by the major meta-analysis by Shiferaw *et al.* [3], which estimated the overall prevalence of diabetic peripheral neuropathy in Africa at 46%. In this same analysis, the prevalence in West Africa was 49.4%, a value higher than that observed in our study.

Several African studies, however, report prevalences higher than ours. In Côte d'Ivoire, Yao A *et al.* [15] found a prevalence of 56.5% in an elderly population. Similarly, Elleuch *et al.* [9], in Tunisia reported a prevalence of 57.8%, while Traoré S in Mali found a prevalence of 69.8% [10]. Our prevalence is also lower

than that found in Benin by Gnonlonfoun [11], which was SS57%. These prevalences higher than ours could be explained by differences in the diagnostic tools used.

Conversely, our prevalence is higher than those found by Camara A, which is 28.8% [12], and that of Nientao I, which is 28.5% [13]. It is also higher than that reported by Djibril Y, which is 43.20% [14], highlighting a heterogeneity of results within the West African region itself.

Overall, the prevalence observed in our study reflects the reality of this microangiopathic complication among African diabetic patients, exposing them to a high risk of diabetic foot ulcers.

Compared to international data, the prevalence of DSPN in our study was higher. Indeed, Juan S *et al.*, in a meta-analysis, reported a prevalence of 30%. A similar prevalence (30%) was found by Wang L *et al.*, [16]. Moreover, the EURODIAB IDDM study, conducted in 16 European countries and including 3250 patients, reported a prevalence of 26% [17].

4.2. Discussion of the Sociodemographic Characteristics of the Patients Followed

In our study, the average age of diabetic patients was 55.78 ± 12.40 years, with 69.66% of patients over 50 years old. Our result is close to that reported by Traoré S [10], which was 55 years, and that of Sangaré S, which was 55 years ± 13.9 [18]. It is also close to that found by Djibril Y, which was 52.63 ± 11.32 years [14]. However, it is lower than the average age reported by Elleuch *et al.*, in Tunisia, which was 62.07 years [9], and by Barbosa *et al.*, in Portugal, which was 69 ± 9.1 years [19], indicating a delay in PNDS screening in these countries.

4.3. Discussion of the Predictive Factors of Distal and Symmetrical Polyneuropathy

1) Age > 50 years as a predictive factor for distal and symmetric polyneuropathy

In our study, among the sociodemographic factors evaluated (sex, economic status, average age), only age divided into groups was found to be associated with distal and symmetric polyneuropathy (DSPN) in bivariate analysis ($p = 0.043$). Age groups over 50 years had the highest frequency of DSPN, suggesting a growing relationship between age and the occurrence of neuropathy. Our results corroborate those of Oulad Sayad *et al.* [20], Djorolo *et al.* [21], as well as Jember [22].

After adjusting for other factors in the multivariate logistic regression, age over 50 years appeared as an independent predictive factor for DSPN. Patients aged 50 to 59 years had the highest risk (adjusted OR = 6.45; 95% CI [2.13 - 19.51]) compared to the reference group (≤40 years), while the risk remained significant in patients ≥ 60 years (adjusted OR = 2.29; 95% CI [1.30 - 18.74]), suggesting a risk peak in the sixties. These results confirm the well-established trend of increased prevalence of diabetic neuropathy after age 50.

Comparison with international literature, however, shows threshold variations. Our threshold of 50 years corresponds to that found by Jember G *et al.* in Ethiopia [22], while other studies in China conducted by Cheng Y *et al.* [23], and in Uganda by Kisozi T *et al.* [24], identified higher thresholds of 66 and 60 years, respectively. These differences can be explained by the specific characteristics of the populations studied, such as life expectancy, access to healthcare, methods of NCD diagnosis, or the presence of distinct genetic and environmental factors.

From a pathophysiological standpoint, the association between advanced age and DPN results from several synergistic mechanisms: progressive decline in nerve regeneration capacity, accumulation of oxidative stress, and increased susceptibility to microvascular damage, which, combined with the deleterious effects of chronic hyperglycemia, make the peripheral nervous system more vulnerable with age.

2) Diabetic retinopathy, a predictive factor of distal and symmetrical polyneuropathy.

In our study, diabetic retinopathy was significantly associated with distal and symmetrical polyneuropathy (DSPN) in bivariate analysis ($p = 0.003$). This association is well documented in the literature, both at the African and international levels, and reflects the tendency of diabetic microvascular complications to coexist in the same patient due to common pathophysiological mechanisms. Studies conducted in Morocco by Kacem *et al.* [25] and Berkia *et al.* [26] showed a significant association between diabetic retinopathy and peripheral neuropathy. The same result was observed in the European EURODIAB study by Tesfaye *et al.* [17].

After adjusting for other variables in the multivariate logistic regression, the presence of diabetic retinopathy remains an independent predictive factor for PNDS (adjusted OR = 3.08; 95% CI [1.40 - 6.76]; $p = 0.005$). Our results corroborate those of Elleuch M *et al.* in Tunisia, who also found diabetic retinopathy to be a predictive factor for DSPN [9].

3) Diabetes duration > 10 years predictive of distal and symmetrical polyneuropathy

In our study, the association between the duration of diabetes and distal and symmetrical polyneuropathy (DSPN) was highlighted in a bivariate analysis, with patients having diabetes for more than 10 years being the most affected ($p = 0.040$). Our results corroborate numerous studies, notably those by Malgrange D [27], and Aouiche *et al.* [28], which reported a positive correlation between the duration of diabetes and the occurrence of distal neuropathy.

In multivariate analysis, a duration of diabetes between 10 and 19 years appeared as an independent predictive factor for DSPN (adjusted OR = 2.95; 95% CI [1.10 - 7.93]; $p = 0.031$), while the other classes lost their significance after adjustment. This result confirms the consistency of diabetes duration as a predictive factor, reported both in the African and international literature. Our result is comparable to that of Gebabo T *et al.* [29], who identified a diabetes duration of more than 10 years as a predictor of DSPN. In Ethiopia, Mekuria Negussie Y. *et al.* [30]

identified a diabetes duration > 5 years as an independent factor. In China, Li L *et al.* [31], as well as a meta-analysis conducted by Liu X *et al.* [32], including 12,116 patients, also confirmed the duration of diabetes as a major predictor of peripheral neuropathy.

4) Therapeutic adherence as a predictive factor of DSPN

In our study, poor or moderate therapeutic adherence, evaluated using the Morisky score, was significantly associated with distal symmetric polyneuropathy (DSPN) in bivariate analysis (p = 0.001). Our results are consistent with those reported in the literature, where several studies emphasize the major impact of treatment adherence on the occurrence of diabetic complications. For example, Badr W *et al.* [33] showed that poor adherence was significantly associated with peripheral neuropathy, and Khunti K *et al.* [34] reported an increased risk of micro- and macrovascular complications in non-adherent patients.

After adjusting for other variables in the multivariate logistic regression, therapeutic adherence appeared as an independent predictive factor for DSPN. Compared to adherent patients, those with moderate adherence (aOR = 2.37; p = 0.021) or poor adherence (aOR = 2.54; p = 0.041) had a significantly higher risk of developing DSPN. Our results are consistent with international studies: in Ethiopia, Demoz *et al.* [35], using the Morisky score in an adjusted logistic model, showed that poor adherence significantly increased the risk of peripheral neuropathy after adjustment. In India, Samu A *et al.* [36] observed that good adherence reduced the severity of sensory neuropathy.

From a pathophysiological standpoint, this association could be explained by the central role of therapeutic adherence in glycemic control. Poor adherence to treatment promotes chronic hyperglycemia involved in the development of diabetic neuropathy.

5) Glycemic imbalance as a predictive factor of DSPN

In our study, elevated fasting blood glucose as well as glycated hemoglobin (HbA1c) above 7% were significantly associated with the occurrence of distal symmetric polyneuropathy (DSPN) in univariate analysis. This result is consistent with the data in the literature. Indeed, Alshammari *et al.* [37] identified fasting blood glucose as being associated with DSPN, while Hartmann *et al.* [38] reported a significantly higher prevalence of diabetic polyneuropathy in patients with high HbA1c levels, suggesting a close link between poor chronic glycemic control and this complication. After adjustment for potential confounding factors using multivariate logistic regression, high fasting blood glucose and an HbA1c above 7% remained independent predictive factors of DSPN.

This result highlights that glycemic imbalance, whether assessed by immediate or long-term integrated markers, has an impact on the occurrence of diabetic neuropathy. Our results corroborate the work of Pai YW *et al.* [39], and Wu *et al.* [40], who demonstrated the independent predictive role of glycemic parameters in DSPN. Intensive glycemic treatment is necessary to reduce the risk of DSPN by 64%, as reported by the DCCT study (Diabetes Control and Complications Trial) [41].

Limitations of the Study

This study has certain limitations, including its single-center, outpatient setting and its cross-sectional design, which limit the generalizability of the results and preclude any causal inferences. The exclusion of non-ambulatory patients may have introduced selection bias. Finally, the lack of confirmatory nerve conduction studies constitutes a diagnostic limitation.

5. Conclusions

The high prevalence of 46.82% of DSPN found in our study highlights the magnitude of the problem in our context. Several factors were found to be independently associated with peripheral neuropathy, namely poor glycemic control (fasting blood glucose), age over 50 years, lack of regular physical activity, poor treatment adherence, diabetes duration exceeding 10 years, and diabetic retinopathy. These results confirm the importance of optimal glycemic control and close monitoring of at-risk patients.

Our study emphasizes the need for systematic and early screening of DSPN in routine practice, in order to improve management, prevent complications such as diabetic foot ulcers, and reduce the associated morbidity and mortality.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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