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Prevalence of Diabetic Peripheral Neuropathy among Diabetics Treated at Sedi-Hussein Specialized Clinic

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Abstract

Diabetic peripheral neuropathy is a common complication often overlooked in individuals with diabetes. This study aimed to assess the prevalence of diabetic peripheral neuropathy and its associated comorbidities among diabetic patients attending the Sedi Hussein Specialized Clinic in Benghazi in 2021. The analytical cross-sectional study included diabetic patients referred for consultation during the study period. A multivariate analysis was conducted to identify factors associated with diabetic peripheral neuropathy. Out of 200 diabetic patients, 75 were diagnosed with diabetic peripheral neuropathy, resulting in a prevalence rate of 37.5%. The average age of the patients was 56.8 years, with women making up 57% of the total sample. Furthermore, 80 patients (55.5%) had poorly controlled diabetes. The study identified several factors related to the onset of diabetic peripheral neuropathy, including gender ($p = 0.022$), occupation ($p = 0.004$), education level ($p = 0.011$), hypertension ($p = 0.003$), smoking ($p = 0.036$), poor diabetes control ($p = 0.001$), diabetic retinopathy ($p = 0.0003$), and dyslipidemia ($p = 0.009$). Additionally, a significant relationship was found between erectile dysfunction and diabetic peripheral neuropathy in men ($p = 0.0002$). In conclusion, the prevalence of diabetic peripheral neuropathy among diabetic patients is notably high at 37.5%. This condition is associated with several risk factors, including education level, hypertension, dyslipidemia, smoking, poor diabetes control, erectile dysfunction, and diabetic retinopathy. Identifying these risk factors is crucial for improving patient care and recognizing individuals at risk.

1. INTRODUCTION

According to the World Health Organization (WHO), diabetes is defined as "a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively utilize the insulin it produces. The result is elevated glucose levels in the blood" (World Health Organization, 2022). The prevalence of diabetes varies across different countries and ethnic groups. It is spreading rapidly around the globe, especially in developing nations. In Africa, statistics from 2019 indicate that 3.9% of adults aged 20 to 79 had diabetes. The most significant increases are expected to occur in developing countries.

Between 2000 and 2016, early deaths resulting from diabetes rose by 5% in these regions, according to the WHO. Libya is particularly affected by this growing health crisis. The prevalence of diabetes in Libya increased from 1.1% in 2000 to 2.6% in 2008 and reached 5.1% in 2016, according to the STEPS survey (World Health Organization, Benin, 2016).

In Africa, managing diabetes remains challenging, and individuals with diabetes are at a higher risk for complications such as diabetic neuropathy (which affects 8% to 60% of patients) (Valensi et al., 2010), silent myocardial ischemia (which accounts for 55% to 70% of diabetes-related deaths), erectile dysfunction, and other disorders that interfere with patients' daily activities (Haffner et al., 1998).

This study aims to evaluate peripheral neuropathy and associated parameters in diabetic patients at the Sedi-Hussein Specialized Clinic in Benghazi, Libya, to determine the prevalence of diabetic peripheral neuropathy (DPN) within our community. is in Benghazi, Libya, to determine the prevalence of diabetic peripheral neuropathy (DPN) within our community.

2. METHOD

This was a cross-sectional, analytical study conducted on 200 patients were included in our study. Diabetic patients under management for their diabetes at Sedi Hussein specialized Clinic, in Benghazi City during the period from 1 October - 31 December 2021, after getting approval from the scientific research ethics committee of the clinic. We took a thorough sample. The study included diabetic patients who gave free informed consent and were seen in consultation during the study period. Patients with complications of acute diabetes and patients having neuropathy as complications of other etiologies were excluded. The variables assessed were age, sex, professional activity and educational level, hypertension, duration, control and complications of diabetes. We selected the most adapted screening tool, which is the DN4 questionnaire. Collected data were exported from the Kobo-Collect application into excel for the version of Excel 2019 and analyzed by R software, version 3.6.1

3. RESULT

Socio-demographic characteristics

The patients' median age was 65 years, with the extremes being 30 –70years.114 patients, or 57%, were female. It was 0.75 for the M/F sex ratio. Patients who were employed were 39% while retired patients made up 23%. In addition, 26% of patients had a higher degree, compared to 16% of patients with secondary education.

Table 1: Socio-demographic characteristics of the patients selected.

	Number	Percentage %
Age (years)		
<40	82	41
>40	118	59
Gender		
Males	86	43
Females	114	57
Profession		
Employee	78	39
Retired	46	23
Unemployed	76	38
Level of education		
Uneducated	54	27
Primary	62	31
Secondary	32	16
Higher	52	26

Clinical features

68% (136 patients) of the patients had hypertension, 19% had strokes (19 patients), and 50.5% had dyslipidemia (101 patients). Patients who smoked were 13% (26 patients).

Table 2. Distribution of patients according to related history.

	Number	Percentage %
Hypertension		
Yes	136	68
No	64	32
Dyslipidemia		
Yes	101	50.5
No	99	49.5
Stroke		
Yes	38	19
No	162	81
Smoking		
Yes	26	13
No	174	87

Type of diabetes, treatment, duration, and diabetes management

All of the patients had type II diabetes, and 58.7% of them had had it for more than five years. The majority of patients (90.3%) were receiving oral diabetes medications. 54.8% of the patients had diabetes imbalance.

Table 3. Distribution of patients according to duration, type, treatment and diabetes control. HbA1c.

	Number	Percentage %
Duration of diabetes		
<5 Years	87	43.5
≥5 Years	113	56.5
Type of diabetes		
Type I	0	0
Type II	200	100
Type of treatment		
Oral drugs	162	81
Insulin	12	6
Oral and Insulin	26	13
Diabetes control		
HbA1c< 7%	89	44.5
HbA1c> 7%	111	55.5

Height and weight measurements

A total of 89 patients (44.5%) were overweight, and 68 patients (34%) were obese. Our patients had an average waist circumference of 93 cm. 77.8 percent of the patients had abdominal obesity.

Complications:

A funds examination was performed on all patients. Twenty-six percent of the patients had diabetic retinopathy.
In 7.1% of patients, erectile dysfunction was discovered.

Diabetic peripheral neuropathy prevalence:

75 patients, or 37.5%, of the 200 patients surveyed had diabetic peripheral neuropathy and diabetic peripheral neuropathy-related factors.

Diabetes-related peripheral neuropathy was associated with high blood pressure ($p = 0.003$), dyslipidemia ($p = 0.009$), and smoking ($p = 0.036$).

Stroke ($p = 0.816$), and obesity ($p = 0.369$) were not connected to diabetic peripheral neuropathy.

Diabetic peripheral neuropathy was connected to a diabetes imbalance ($p = 0.003$).

There was no correlation between the duration of diabetes ($p = 0.818$) or the kind of treatment ($p = 0.905$) and diabetic peripheral neuropathy.

Diabetes-related peripheral neuropathy was linked to erectile dysfunction ($p = 0.0002$) and diabetic retinopathy ($p = 0.0003$).

4. DISCUSSION

In our study, the prevalence of diabetic peripheral neuropathy (DPN) was found to be 37.5%. This finding aligns with those from several other studies: Fendi et al. (2011) reported a prevalence of 33.3% in Tunisia, Aynaou et al. (2019) found 43% in Morocco, Doukpo (2015) reported 47.6% in Benin, and Djibril (2013) noted 43.2% in Mali. However, lower prevalence rates were observed in some studies, such as Boufaida et al. (2017) in Morocco and Mizouri et al. (2018) in Tunisia, which reported rates of 17.5% and 8.6%, respectively. These discrepancies may be attributed to differences in diagnostic criteria.

Our research indicated that gender was a significant factor in the development of DPN, with a higher prevalence observed in women ($p = 0.022$). This association has also been reported by Aouiche et al. (2014) in Algeria and Fendi et al. (2011) in Tunisia. Conversely, studies conducted by Doukpo (2015) in Benin and Aynaou et al. (2019) in Morocco found no significant link between sex and DPN.

In our study, age did not appear to be a factor associated with DPN, a conclusion that is consistent with Boufaida et al. (2017) in Morocco. However, Aouiche et al. (2014) in Algeria and Aynaou et al. (2019) in Morocco reported a significant association, suggesting that differences in sample size may explain these varying results.

Additionally, we found a general association between occupation and the prevalence of DPN. Employed diabetics exhibited a lower frequency of DPN compared to their unemployed counterparts. This could be attributed to the potential influence of working hours on better blood glucose control.

Our study also identified a relationship between smoking and DPN, aligning with findings from AL Mahroos et al. (2007) in Bahrain. Furthermore, we observed that educational level was significantly correlated with DPN. Patients with lower education levels (illiterate or with only a primary education) had a higher prevalence of DPN. This may stem from a lack of diabetes knowledge among less educated individuals, making them more vulnerable to chronic complications like diabetic peripheral neuropathy.

The study by Doukpo (2015) in Benin also noted relationships between occupation and DPN, as well as education level and DPN prevalence .

Moreover, 68% of patients with diabetic peripheral neuropathy in our study also had hypertension ($p = 0.003$), indicating a significant association between DPN and hypertension. This finding is supported by studies such as Boufaida et al. (2017) in Morocco and Aouiche et al. (2014) in Algeria.

Interestingly, our research did not find a link between obesity and peripheral neuropathy in diabetics. A similar conclusion was reached in Mali (Djibril, 2013). However, AL Mahroos et al. (2007) discovered a connection between being overweight and the prevalence of DPN in Bahrain.

Lastly, in examining the mechanisms of nerve deterioration related to diabetic peripheral neuropathy, we noted a connection with dyslipidemia. Boufaida et al. (2017) also found a significant correlation between dyslipidemia and DPN in Morocco. Our study reinforces this link, showing a significant association between dyslipidemia and diabetic peripheral neuropathy ($p = 0.009$).rocco. Our study reinforces this link, showing a significant association between dyslipidemia and diabetic peripheral neuropathy ($p = 0.009$).

Peripheral diabetic neuropathy was linked to diabetic imbalance. This outcome is consistent with the body of research. In fact, there is an increase in advanced glycation end products (AGEs) production when there is poor diabetic control, and AGEs play a role in the development of diabetic peripheral neuropathy. The findings of (Aouiche et al.2014) in Algeria, (Al Mahroos et al.2007) in Bahrain, are similar to this concept when diabetic peripheral neuropathy is linked to diabetic imbalance. However, neither (Mahamane et al.2015) in Niger nor (Doukpo,M.M.2015) in Benin had reported an association.

The correlation between diabetes age and the risk of diabetic peripheral neuropathy has not been proven. In a similar manner, (Oueslati et al.2018) came to the same conclusion in Tunisia. However, in Bahrain (Al Mahroos et al.2007) came to the conclusion that chronic complications of diabetes appear with the duration of diabetes.

Erectile dysfunction was linked to diabetic peripheral neuropathy ($p = 0.0002$), and this finding is consistent with (Mahamane et al.2015) findings from Niger.

Peripheral diabetic neuropathy was highly correlated with diabetic retinopathy. Similar conclusions were reached by (Boufaida et al.2017) in Morocco, (Aynaou et al. 2019) in Morocco, and (Mahamane et al. 2015) in Niger, The increase of AGEs induced by persistent hyperglycemia is the pathophysiological mechanism that both diabetic retinopathy and diabetic peripheral neuropathy share, so this discovery should not come as a surprise.

5.CONCLUSION

We concluded that the prevalence of diabetic peripheral neuropathy is high 37.5% in the diabetics included in the study, which examined for diabetic peripheral neuropathy and associated factors in diabetics treated at Sedi-Hussein specialized clinic, Benghazi 2021. Gender, occupation, education level, arterial hypertension, dyslipidemia, smoking, diabetic imbalance, erectile dysfunction, and diabetic retinopathy are the factors linked to diabetic peripheral neuropathy. For improved care and the identification of patients at risk, the determination of these risk variables is crucial.

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