Evaluation of Knowledge Level and Approaches of Physicians Working in Primary Health Care Institutions in Denizli Province on Diabetic Neuropathy

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Abstract

Background Diabetic neuropathy is a complication seen in diabetic patients and involves motor, sensory or autonomic nerve fibres due to minor vessel damage. **Aims** This study was planned to determine the knowledge and awareness levels of physicians working in family health centres about diabetic neuropathy and their approach to diabetic neuropathy. **Methodology** Our study is a cross-sectional descriptive study conducted in 111 family health centres in Denizli. The data were obtained by face to face questionnaire method. **Results** Of the 219 people participating in the study, 70.8% (n = 155) were male and 6.8% (n = 15) were family medicine specialists. 52.5% (n = 115) of the participants allocated 6-10 minutes of examination time to diabetes mellitus patients, 77.6% (n = 170) did not receive diabetic neuropathy training after graduation, and 44.3% (n = 97) had not previously diagnosed any patient with diabetic neuropathy. 74.4% of the participants (n = 163) stated that they did not use any diabetic neuropathy diagnosis and screening tests in their daily practice. 31% (n = 68) of the participants stated that their level of knowledge on diabetic neuropathy was either poor or very poor. 45.7% of the participants (n = 100) thought diabetic neuropathy screening, diagnosis, treatment and follow-up could be made in primary care. 89.5% (n = 196) of the participants stated that they needed training on diabetic neuropathy. Those who rely on their knowledge and clinical experience in diagnosing, monitoring and treating diabetic neuropathy were 44.3% of the participants (n = 97). **Conclusion** Although diabetic neuropathy is one of the most critical complications of diabetes mellitus, there is a severe insufficiency in postgraduate education in primary health care services. Simple tests and methods for physicians working in primary care should be included in the daily polyclinic routine.

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Of the 219 people participating in the study, 70.8% (n = 155) were male and 6.8% (n = 15) were family medicine specialists. 52.5% (n = 115) of the participants allocated 6-10 minutes of examination time to diabetes mellitus patients, 77.6% (n = 170) did not receive diabetic neuropathy training after graduation, and 44.3% (n = 97) had not previously diagnosed any patient with diabetic neuropathy.

74.4% of the participants (n = 163) stated that they did not use any diabetic neuropathy diagnosis and screening tests in their daily practice. 31% (n = 68) of the participants stated that their level of knowledge on diabetic neuropathy was either poor or very poor. 45.7% of the participants (n = 100) thought diabetic neuropathy screening, diagnosis, treatment and follow-up could be made in primary care. 89.5% (n = 196) of the participants stated that they needed training on diabetic neuropathy. Those who rely on their knowledge and clinical experience in diagnosing, monitoring and treating diabetic neuropathy were 44.3% of the participants (n = 97).

Conclusion

Although diabetic neuropathy is one of the most critical complications of diabetes mellitus, there is a severe insufficiency in postgraduate education in primary health care services. Simple tests and methods for physicians working in primary care should be included in the daily polyclinic routine.

What's already known about this topic?

Diabetic neuropathy is the most common chronic complication of diabetes mellitus.

Patients with type 2 DM should be screened for diabetic peripheral neuropathy every year, and patients with type 1 DM should be screened starting five years after the diagnosis with simple tests (such as 10 gr monofilament) every year.

The lack of an effective treatment for diabetic neuropathy, which is associated with severe morbidity and mortality, highlights preventive medicine.

What does this article add?

There are deficiencies in the knowledge level about diabetic neuropathy and early diagnosis examination in the primary care physicians in our study.

Methods that will eliminate physicians' shortcomings in primary care and ensure that they comply with the guidelines should be investigated.

Keywords: Diabetic Neuropathies, Diabetes Mellitus, Knowledge, Primary Health Care

Introduction

Diabetic neuropathy is the most common chronic complication of diabetes mellitus (DM), affecting different parts of the nervous system, causing different clinical findings related to the peripheral and / or autonomic nervous system, and is associated with the duration and degree of glycemic control (1,2). Neuropathy causes significant morbidity such as pain, loss of sensation, foot ulcer, gangrene and amputation (2). According to the study of the TURNEP working group in our country, diabetic peripheral neuropathy determined by clinical examination affects 40.4% of diabetic patients (3). If clinical examination and electrophysiological examination method are added, this rate has been shown to increase to 62.2% (3).

While it is one of the late findings of Type 1 DM, it can be seen in Type 2 DM patients in the early period, even in the prediabetes period (4). Since the clinical findings of diabetic neuropathy are similar to other neuropathies, the diagnosis of diabetic neuropathy can be made only after excluding other possible etiologies (1). Society of Endocrinology and Metabolism of Turkey (TEMED) and the American Diabetes Association

(ADA) recommend that patients with type 2 DM should be screened for diabetic peripheral neuropathy every year, and patients with type 1 DM should be screened starting five years after the diagnosis with simple tests (such as 10 gr monofilament) every year (5,6).

Early diagnosis of neuropathy in diabetic patients and immediate initiation of appropriate treatment are essential in preventing non-diabetic neuropathy, treating symptomatic diabetic neuropathy, preventing cardiovascular mortality due to diabetic foot and autonomic neuropathy (5). Tight glycemic control can prevent or delay the progression of diabetic neuropathy. Reducing pain and symptoms of autonomic neuropathy can improve patients' quality of life (5).

The lack of an effective treatment for diabetic neuropathy, which is associated with severe morbidity and mortality, highlights preventive medicine. Physicians working in primary health care centres, which constitute the first medical contact point with the health system, should have comprehensive knowledge of diabetic neuropathy and detect diabetic neuropathy in the early period.

This study was planned to determine the knowledge and awareness levels of physicians working in family health centres about diabetic neuropathy and their approach to diabetic neuropathy.

Method

Our study is a cross-sectional descriptive study, and it was conducted by including 111 family health centres in Denizli. This study was initiated with the approval of Pamukkale University Non-Interventional Clinical Research Ethics Committee permission no 16 dated 17.09.2015, and the approval of Denizli Provincial Directorate of Public Health.

279 physicians working in Family Health Centers in Denizli province were included in the study, and 219 physicians (78.4%) agreed to participate in the study. Among the 219 physicians, since 19 physicians were on leave when we went to the family health centre for the study, 20 of physicians were on mobile service, 10 physicians did not want to participate in the study, 1 physician was assigned outside the province, 6 physicians could not be reached for various reasons, and 4 physicians filled the questionnaire questions incompletely, a total of 60 physicians could not be recruited to the study. The data were obtained by survey method under supervision.

The researchers created the questionnaire form to question the sociodemographic characteristics of the participants, their knowledge about diabetic neuropathy, their professional experience and attitudes by conducting a literature review.

11 of the 12 questions questioning the knowledge level of physicians participating in the study about diabetic neuropathy screening, risk factors, clinic, diagnostic method and treatment contained one correct answer. In the other 1 question, more than one option can be marked, and that question was accepted as correct for those who knew 4 or more of 8 options. Subgroup analyses were examined by dividing the participants into two groups who gave correct answers to less than 6 questions and gave correct answers to 6 or more questions. Three questions were used to evaluate their professional experiences in diabetic neuropathy, and 4 questions were used to evaluate their attitudes.

Statistical Analysis

The conformity of the variables to normal distribution was examined by visual (histogram) and analytical methods (Kolmogorov-Smirnov tests). The numerical data collected in the study are expressed as mean, median, standard deviation, value range; categorical data are expressed with descriptive methods such as ratio and percentage.

Sociodemographic characteristics were analyzed using Chi-square or Fisher's tests between those with knowledge level score below 6 and those with knowledge level score above 6. Statistical significance was accepted as $p < 0.05$ in the analysis of subgroups. SPSS 22.0 statistical package program was used for analysis.

Results

Of the 219 people participating in the study, 70.8% (n = 155) were male, 6.8% (n = 15) were family medicine specialists, and 88.1% (n = 193) were married. Considering the duration of a practising physician of the participants, 47.9% (n = 105) worked in their professions for 21-30 years. The duration of work in primary care ranges from 4 months to 38 years, and physicians work for an average of 16.2 ± 8.1 years. The average number of patients enrolled in each physician was 3571.95 ± 607.5 , and the average number of patients they looked at in one day was 60.4 ± 17.2 . 52.5% (n = 115) of the participants allocated 6-10 minutes of examination time to DM patients, 77.6% (n = 170) did not receive diabetic neuropathy training after graduation, and 44.3% (n = 97) have never previously diagnosed patients with diabetic neuropathy (Table 1).

The questions questioning physicians participating in the study about diabetic neuropathy screening, risk factors, clinic, diagnostic method and treatment and the percentage of correct answers are given in Table 2. When the knowledge of the diabetic neuropathy diagnosis / screening tests was evaluated, EMG with 60.7% (n = 133), Achilles reflex with 38.4% (n = 84) and vibration test with 24.7% (n = 54) (128 Hz diapason) were the most well-known tests (Table 2).

34.2% of the participants (n = 75) had neuropathy screening from Type 2 DM patients once a year, 21.9% (n = 48) every 6 months, and 9.6% (n = 21) every 3 months, and 32.9% (n = 72) of them never scanned the patients. It was determined that the participants looked at the Achilles reflex at most 20.5% (n = 45), vibration test with 6.4% (n = 14) and pin-prick test with 3.7% (n = 8) in their daily practice. However, it was determined that 74.4% (n = 163) of them did not use any diabetic neuropathy diagnosis and screening tests. Considering the referral attitudes of physicians regarding diabetic neuropathy, 67.1% of the physicians stated their referral criteria as (n = 147) "I refer the patient with DM and typical neuropathy findings", 63% of the physicians stated as (n = 138) "if the diagnosis of diabetic neuropathy is suspicious, I refer it." (Table 3).

63% (n = 138) of the participants defined their knowledge level about diabetic neuropathy as medium, 31.1% (n = 68) as bad or very bad, 5.9% (n = 13) as good. 45.7% of the participants (n = 100) thought diabetic neuropathy screening, diagnosis, treatment and follow-up could be made in primary care. 89.5% (n = 196) of the participants stated that they needed training on diabetic neuropathy. Those who rely on their knowledge and clinical experience in diagnosing, monitoring and treating diabetic neuropathy were 44.3% of the participants (n = 97).

The knowledge levels of women, family medicine specialists, those working in the district, and those diagnosed with diabetic neuropathy within 0-7 days were statistically significantly higher (p; 0.014, 0.046, 0.013, 0.037, respectively) (Table 4).

Discussion

In our study, 94.1% of the optimal glycemic control response given to the most effective method to prevent diabetic neuropathy and delay its progression shows that the physicians in the study are aware of primary and secondary prevention in diabetic neuropathy. In contrast, more than 50% of physicians working in primary care answered only 5 of the 12 knowledge level questions about diabetic neuropathy in our study. It was found that 74.4% of the physicians did not perform diabetic neuropathy diagnosis/screening tests in their daily practice and the majority of them tend to refer to a higher centre. While only 44.3% of the physicians participating in our study rely on their knowledge and clinical experience in diagnosing, monitoring and treating diabetic neuropathy, 89.5% stated that they need training on diabetic neuropathy.

Many organizations such as the ADA, TEMD and the Turkish Diabetes Foundation recommend that diabetic neuropathy screening be performed annually in Type 2 DM patients and annually, five years after diagnosis in Type 1 DM patients (5-7). According to the retrospective study conducted by Harris et al. on family physicians in Canada, when looking at the records kept by 29 family physicians participating in the study, it was seen that only 36% of diabetic patients were examined for peripheral neuropathy (8). In our study, 32.9% of the physicians stated that they never screened diabetic neuropathy in Type 2 DM patients, while 67.1% stated that they scanned at different time intervals. Only 34.2% of the physicians do the annual screening

stipulated by the guidelines.

In the study conducted by Mabrouk et al. in 2013, with 60 family physicians working in family medicine centres in Egypt, it was stated that 48.3% of the participants gave correct answers to 50% or more of the questions and their knowledge level was considered sufficient (9). When Peimani et al. conducted a study on diabetes and its complications in Iran in 2010, only 29% of all physicians were sufficient in terms of their knowledge level (10). 47.8% of the physicians correctly answered the question specifically for diabetic neuropathy (10). When we evaluate the results we found in our study and the results in the literature, it can be said that the knowledge level of primary care physicians about diabetic neuropathy is low. This situation can be interpreted as a situation that makes the diagnosis, follow-up and treatment of diabetic neuropathy in primary care difficult.

In our study, the knowledge level score of family physicians who received speciality training was found to be statistically significantly higher than family physicians who did not receive specialist training. This may be because physicians who receive family medicine residency training have more knowledge in rotations and encounter more patients with diabetic neuropathy.

In the study conducted by Mabrouk et al., the knowledge level of family physicians working in urban areas for diabetic neuropathy was found to be better than those working in rural areas, and their practical scores were found to be lower (9). The reason why physicians working in rural areas were found better than those working in cities in our study and other studies may be that physicians working in rural areas work in a more isolated environment and are not comfortable in referring the patient to a specialist. Another reason may be that physicians working in rural areas have to keep their knowledge more up-to-date to combat diabetes complications (11).

Considering the age and level of knowledge, while the knowledge level score of those younger than 35 years old was 76.5%, it decreased to 53.3% between the ages of 55-66. While the total duration of work in primary care was 66.2% among those who had 10 years or less with a knowledge level of 6 and above, this ratio decreased with the increase of working years and decreased to 50% for those who worked for 31 years or more. Accordingly, as the duration of work and the physician's age in primary care increases, there is a decrease in the knowledge level score. However, this decrease in score was not found to be statistically significant between groups for age groups and duration of the study. In the study conducted by Khan et al. among ninety nine family physicians in Saudi Arabia in 2010, physicians' knowledge, attitude, and practice scores about type 2 DM tend to decrease as the duration of their work increases (12). According to this study, the knowledge, attitude and behaviour scores of physicians with a working period of 1-5 years were found to be better than physicians who worked longer (12). The reason for this may be that physicians who receive medical faculty or speciality training are not subjected to any proficiency test after the training process, and the information learned is forgotten as time passes. Another reason may be that young physicians follow the current developments in the diagnosis of diabetes and its complications more closely than more experienced physicians (11).

It has been determined that more than half of the participants do not trust themselves in diagnosing, monitoring and treating diabetic neuropathy. The number of DM patients followed only by family physicians in Turkey is unknown. Since diabetic neuropathy is mostly asymptomatic, physicians working in primary care do not consider themselves sufficient in diagnosis, follow-up and treatment, which may prevent them from screening. Therefore, autonomic system findings of neuropathy requiring expertise may remain untreated for a long time.

It was determined that the physicians in our study had a different approach from the ADA's guideline and mostly preferred to refer DM patients with typical neuropathy findings, although it was not recommended in the guideline. As recommended by the guideline, those who referred patients with atypical clinical findings remained in the minority.

It has been found that physicians working in primary care mostly look at the Achilles reflex in their daily practice. Although the monofilament test is one of the most recommended tests in the national TEMD and

ADA guidelines, only 4.6% of the physicians in our study stated that they knew this test, and only 1.8% applied it in clinical practice (5,6).

Most of the physicians in our study stated that they agreed with the idea that training in diabetic neuropathy is needed. In the study by Mabrouk et al., 85% of the physicians stated that they needed more information and practice about diabetic neuropathy management (9). As can be seen from these results, the education given to primary care physicians on diabetic neuropathy should be increased.

Conclusion

Although diabetic neuropathy is one of the most critical complications of DM, there are deficiencies in the knowledge level about diabetic neuropathy and early diagnosis examination in the primary care physicians in our study. The reason why physicians did not perform screening might be that there is no screening guidance for diabetic neuropathy, unlike the other microvascular complications such as diabetic nephropathy and retinopathy in the "Periodic Health Examinations and Screening Tests Recommended in Family Medicine Practice" published by the Turkish Public Health Institution in 2015, when our study was conducted. Methods that will eliminate physicians' shortcomings in primary care and ensure that they comply with the guidelines should be investigated.

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Table 1. Characteristics of the participants

Sociodemographic data	Number (n)	Percentage (%)	Sociodemographic data	Number (n)	Percentage (%)
Gender			Marital Status		
Male	155	70,8	Married	193	88,1
Female	64	29,2	Single	26	11,9
Age			Average number of patients examined (daily)		
[?] 35	17	7,8	[?] 40	32	14,6
36-45	92	42,0	41-55	61	27,9
46-55	95	43,4	56-70	74	33,8
56-65	15	6,8	[?] 71	52	23,7
Year in medicine			Physician's patient population		
[?] 10 years	19	8,7	[?] 2000	11	5,0
11-20	85	38,8	2001-3000	22	10,0
21-30	105	47,9	3001-4000	153	69,9
[?] 31 years	10	4,6	[?] 4001	33	15,1
Job title			Location of the Family Health Center		
Family doctor	204	93,2	Center	143	65,3
Family medicine specialist	15	6,8	District	76	34,7
Time allocated to diabetes mellitus patients			Latest diagnosis of diabetic neuropathy		
1-5 min.	52	23,7	No diagnosis	97	44,3
6-10 min.	115	52,5	0-7 days	54	24,7
11-15 min.	41	18,7	7-30 days	43	19,6
[?] 16 min.	11	5,0	1 month and above	25	11,4
Working time in primary care			Frequency of diabetic neuropathy		

[?] 10 years	65	29,7	Daily	89	40,6
11-20	91	41,6	Weekly	91	41,6
21-30	55	25,1	Monthly	39	17,8
[?] 31 years	8	3,7	Education status after graduation		
			Yes	48	21,9
			No	171	78,1

Table 2. Percentages of correct answers given to the questions questioning the level of knowledge about diabetic neuropathy

Questions	Correct answers	Number (n)	Percentage (%)
When is diabetic neuropathy screening done in type 2 DM patients?	Once a year	80	36,5
When is diabetic neuropathy screening done in type 1 DM patients?	Once a year	50	22,8
When does nerve damage begin in DM patients?	Prediabetes period	43	19,6
What is the most important risk factor for diabetic neuropathy in types 1 and 2 DM?	DM and duration of hyperglycemia	192	87,7
Diabetic neuropathy (especially distal-symmetrical sensory polyneuropathy involving the lower extremities) is the most important cause of foot amputation, together with infection and ischemia.	True	197	90,0
In diabetic neuropathy, the 5th cranial nerve is the most commonly involved cranial nerve and causes facial paralysis, hyperacusis, and decrease in tears.	False	44	20,1

In diabetic neuropathy, the heart becomes overly sensitive to catecholamines. dysrhythmias, increased exercise intolerance and sudden death may occur.	True	126	57,5
Diabetic neuropathy causes an increase in gastric motility and ejaculation rate and often diarrhea.	False	70	32,0
Diabetic neuropathy may be the cause of erectile dysfunction and infertility in men, difficulty in sexual arousal and dyspareunia in women.	True	197	90,0
In diabetic neuropathy, an uncontrolled increase in sweating can be seen in the affected area.	False	40	18,3
What is the most effective method to prevent diabetic neuropathy and delay its progression.	Optimal glycemic control	206	94,1
Knowledge of diabetic neuropathy diagnosis / screening tests	UK screening test Michigan neuropathy screening test Pin-prick test Achilles reflex Monofilament test Vibration test (128 hz diapason) Determination of vibration threshold (Biotesiometer) EMG	8 28 24 84 10 54 16 133	3,7 12,8 11,0 38,4 4,6 24,7 7,3 60,7

Table 3. Physicians' referring status diabetic neuropathy patients to a higher center

If clinical findings are atypical, I refer	Nu
If the diagnosis of diabetic neuropathy is suspicious, I refer	84
I refer those with DM who have typical neuropathy findings.	138
	147

I refer every patient I diagnosed with DM

I never refer

More than one option was specified by the participants. Percentage of each answer independently calculated over 'n'.

44

4

* M

Table 4. Knowledge level about diabetic neuropathy

Sociodemographic data	Knowledge level <6 points Number (n)	Knowledge level <6 points Percentage (%)
Gender		
Male	66	42,6
Female	16	25,0
Job title		
Family doctor	80	39,2
Family Medicine specialist	2	13,3
Work place		
Center	62	43,4
District	20	26,3
Age		
35	4	23,5
36 - 45	31	33,7
46 - 55	40	42,1
56 - 66	7	46,7
Working time in primary care		
10	22	33,8
11 - 20	33	36,3
21 - 30	23	41,8
31	4	50,0
Average number of patients examined (daily)		
40	10	31,3
41 - 55	21	34,4
56 - 70	30	40,5
71	21	40,4
Average time devoted to DM patients		
1-5 dk	26	50,0
6-10 dk	37	32,2
11-15 dk	17	41,5
16 dk	2	18,2
Frequency of diabetic neuropathy		
Daily	31	34,8
Weekly	38	41,8
Monthly	13	33,3
Last time to diagnose diabetic neuropathy		
No diagnosis	43	44,3
0-7 days	12	22,2
7-30 days	19	44,2
1 month and above	8	32,0
Education status after graduation		
Yes	17	34,7
No	65	38,2
<i>*p<0.05, **p<0.01, ***p<0.001</i>	<i>*p<0.05, **p<0.01, ***p<0.001</i>	<i>*p<0.05, **p<0.01, ***p<0.001</i>