ANKARA MEDICAL JOURNAL

Research Article

Ankara Med J, 2022;(3):359-369 // 10.5505/amj.2022.43402

EVALUATION OF KNOWLEDGE LEVEL AND APPROACHES OF PHYSICIANS WORKING IN PRIMARY HEALTH CARE INSTITUTIONS IN DENIZLI PROVINCE ON DIABETIC NEUROPATHY

Mahmut Tanırlar[1], Mehmet Arslan[2], Tamer Edirne[2]
Nilüfer Emre[2], Aysun Özşahin[2]
[1]Gülağaç District State Hospital, Aksaray, Turkey
[2]Department of Family Medicine, Pamukkale University Faculty of Medicine, Denizli, Turkey

Correspondence:
Mehmet Arslan (e-mail: mehmt.arslann@gmail.com)

Submitted: 14.04.2022 // Accepted: 29.08.2022

Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

ANKARA MEDICAL JOURNAL

Abstract

Objectives: Diabetic neuropathy is a complication seen in diabetic patients and involves motor, sensory or autonomic nerve fibers due to minor vessel damage. This study was planned to determine the knowledge and awareness levels of physicians working in family health centers about diabetic neuropathy and their approach to diabetic neuropathy.

Materials and Methods: Our study is a cross-sectional descriptive study conducted in 111 family health centers. Two hundred seventy-nine physicians were included in the study, and 219 physicians (78.49%) agreed to participate in the study. The researchers created the questionnaire form by conducting a literature review. The data were obtained by survey method under supervision.

Results: Of the 219 people participating in the study, 70.78% (n = 155) were male and 6.85% (n = 15) were family medicine specialists. 94.06% of the participants (n=206) gave the optimal glycemic control response as the most effective method to prevent diabetic neuropathy and delay its progression. 74.42% 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 of diabetic neuropathy was either poor or very poor. 89.49% (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 44.29% of the participants (n = 97).

Conclusion: As a result, although the rate of those who correctly knew the primary and secondary prevention of diabetic neuropathy was found to be high among the physicians participating in our study, it was determined that the diabetic neuropathy knowledge level of the participating physicians was insufficient. Simple tests and methods for physicians working in primary care should be included in the daily polyclinic routine.

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 methods 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 (TEMD) 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, and 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 the patient's 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 centers, 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 centers about diabetic neuropathy and their approach to diabetic neuropathy.

Materials and Methods

Our study is a cross-sectional descriptive study, and it was conducted by including 111 family health centers in Denizli. After obtaining the required permissions, 279 physicians working in family health centers were

included in the study, and 219 physicians (78.49%) agreed to participate in the study (Figure 1). The data of our study were collected between the 10.10.2015-10.12.2015 date range. 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, and their professional experience and attitudes by conducting a literature review. The total Cronbach alpha value for the questionnaire on the diabetic neuropathy knowledge level was calculated as 0.916.

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 four or more of the eight options. Subgroup analyses were examined by dividing the participants into two groups who gave correct answers to less than six questions and gave correct answers to 6 or more questions. Three questions were used to evaluate their professional experiences in diabetic neuropathy, and four questions were used to evaluate their attitudes.

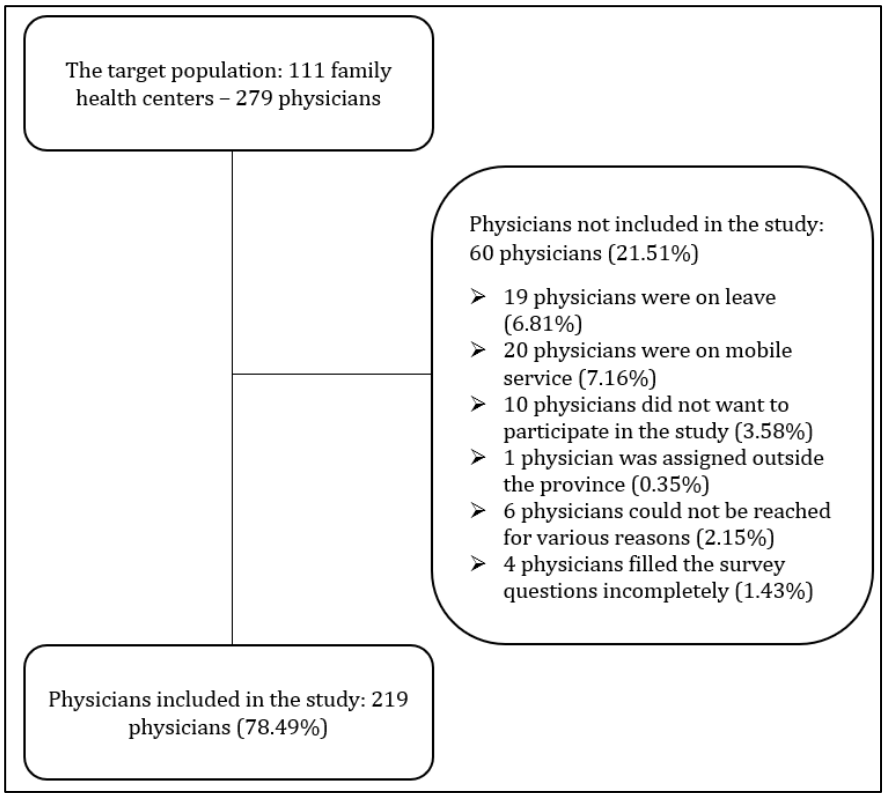

Figure 1. Participants and Non-participants

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, and 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 scores below six and those with knowledge level scores 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, 70.77% (n = 155) were male, 6.84% (n = 15) were family medicine specialists, and 88.12% (n = 193) were married (Table 1). The average number of patients enrolled in each physician was 3571.95 ± 607.51, and the average number of patients they looked at in one day was 60.42 ± 17.21.

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.

34.24% of the participants (n = 75) had neuropathy screening from Type 2 DM patients once a year, 21.91% (n = 48) every 6 months, and 9.58% (n = 21) every 3 months, and 32.87% (n = 72) of them never scanned the patients. It was determined that the participants looked at the Achilles reflex at most 20.54% (n = 45), vibration test with 6.39% (n = 14) and pin-prick test with 3.65% (n = 8) in their daily practice. However, it was determined that 74.42% (n = 163) of them did not use any diabetic neuropathy diagnosis and screening tests. Considering the referral attitudes of physicians regarding diabetic neuropathy, 67.12% of the physicians stated their referral criteria as (n = 147) "I refer the patient with DM and typical neuropathy findings", 63.01% of the physicians stated as (n = 138) "if the diagnosis of diabetic neuropathy is suspicious, I refer it", 38.35% of the physicians stated as (n=84) "if clinical findings are atypical, I refer", 20.09% of the physicians stated as (n=44) "I refer every patient I diagnosed with DM".

Table 1. Characteristics of the participants

Sociodemographic data	(n)	(%)	Sociodemographic data	(n)	(%)
Gender			**Marital Status**		
Male	155	70.77	Married	193	88.13
Female	64	29.23	Single	26	11.87
Age			**Average number of patients examined (daily)**		
≤35	17	7.76	≤40	32	14.61
36-45	92	42.01	41-55	61	27.85
46-55	95	43.38	56-70	74	33.79
56-65	15	6.85	≥71	52	23.75
Year in medicine			**Physician's total patient population**		
≤ 10 years	19	8.67	≤ 2000	11	5.02
11-20	85	38.82	2001-3000	22	10.05
21-30	105	47.94	3001-4000	153	69.86
≥ 31 years	10	4.57	≥ 4001	33	15.07
Job title			**Location of the Family Health Center**		
Family doctor	204	93.15	Center	143	65.29
Family medicine specialist	15	6.85	District	76	34.71
Time allocated to diabetes mellitus patients			**Latest diagnosis of diabetic neuropathy**		
1-5 min.	52	23.74	No diagnosis	97	44.29
6-10 min.	115	52.51	0-7 days	54	24.66
11-15 min.	41	18.72	7-30 days	43	19.63
≥ 16 min.	11	5.03	One month and above	25	11.42
Working time in primary care			**Frequency of diabetic neuropathy**		
≤ 10 years	65	29.68	Daily	89	40.64
11-20	91	41.55	Weekly	91	41.55
21-30	55	25.12	Monthly	39	17.81
≥ 31 years	8	3.65	**Education status after graduation**		
			Yes	48	21.92
			No	171	78.08

63.01% (n = 138) of the participants defined their knowledge level about diabetic neuropathy as medium, 31.05% (n = 68) as bad or very bad, 5.93% (n = 13) as good. 45.66% of the participants (n = 100) thought diabetic neuropathy screening, diagnosis, treatment, and follow-up could be made in primary care. 89.49% (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 44.29% 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 3).

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

Questions	Correct answers	(n)	(%)
1. When is diabetic neuropathy screening done in type 2 DM patients?	Once a year	80	36.52
2. When is diabetic neuropathy screening done in type 1 DM patients?	Once a year	50	22.83
3. When does nerve damage begin in DM patients?	Prediabetes period	43	19.63
4. What is the most important risk factor for diabetic neuropathy in types 1 and 2 DM?	DM and duration of hyperglycemia	192	87.67
5. 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	89.95
6. In diabetic neuropathy, the 5th cranial nerve is the most commonly involved cranial nerve and causes facial paralysis, hyperacusis, and a decrease in tears.	False	44	20.09
7. In diabetic neuropathy, the heart becomes overly sensitive to catecholamines. dysrhythmias increased exercise intolerance and sudden death may occur.	True	126	57.53
8. Diabetic neuropathy causes an increase in gastric motility and ejaculation rate and often diarrhea.	False	70	31.96
9. Diabetic neuropathy may be the cause of erectile dysfunction and infertility in men, difficulty in sexual arousal, and dyspareunia in women.	True	197	89.95
10. In diabetic neuropathy, an uncontrolled increase in sweating can be seen in the affected area.	False	40	18.26
11. What is the most effective method to prevent diabetic neuropathy and delay its progression?	Optimal glycemic control	206	94.06
12. Knowledge of diabetic neuropathy diagnosis/screening tests	UK screening test	8	3.65
	Michigan neuropathy screening test	28	12.79
	Pin-prick test	24	10.96
	Achilles reflex	84	38.35
	Monofilament test	10	4.56
	Vibration test (128 hz diapason)	54	24.66
	Determination of vibration threshold (Biotesiometer)	16	7.30
	EMG	133	60.73

Table 3. Knowledge level about diabetic neuropathy

Sociodemographic data	Knowledge level				Statistical analysis
	<6 points		≥6 points		
	Number (n)	Percentage (%)	Number (n)	Percentage (%)	p
Gender					
Male	66	42.38	89	57.42	0.014*
Female	16	25	48	75	
Job title					
Family doctor	80	39.22	124	60.78	0.046*
Family Medicine Specialist	2	13.33	13	86.67	
Workplace					
Center	62	43.36	81	56.64	0.013*
District	20	26.32	56	73.68	
Age					
≤35	4	23.53	13	76.47	0.330
36 - 45	31	33.70	61	66.30	
46 - 55	40	42.11	55	57.89	
56 - 66	7	46.67	8	53.33	
Working time in primary care					
≤10	22	33.85	43	66.15	0.705
11 - 20	33	36.26	58	63.74	
21 - 30	23	41.82	32	58.18	
≥31	4	50	4	50	
Average number of patients examined (daily)					
≤40	10	31.25	22	68.75	0.740
41 - 55	21	34.43	40	65.57	
56 - 70	30	40.54	44	59.46	
≥71	21	40.39	31	59.61	
Average time devoted to DM patients					
1-5 min	26	50	26	50	0.076
6-10 min	37	32.17	78	67.83	
11-15 min	17	41.46	24	58.54	
≥16 min	2	18.18	9	81.82	
Frequency of diabetic neuropathy					
Daily	31	34.83	58	65.17	0.532
Weekly	38	41.76	53	58.24	
Monthly	13	33.33	26	66.67	
The last time to diagnose diabetic neuropathy					
No diagnosis	43	44.33	54	55.67	0.037*
0-7 days	12	22.22	42	77.78	
7-30 days	19	44.19	24	55.81	
One month and above	8	32	17	68	
Education status after graduation					
Yes	17	34.69	32	65.31	0.652
No	65	38.24	105	61.76	

**p<0.05, **p<0.01, ***p<0.001*

Discussion

In our study, 94.06% 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 correctly only 5 of the 12 knowledge level questions about diabetic neuropathy in our study. It was found that 74.42% 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 center. While only 44.29% of the physicians participating in our study rely on their knowledge and clinical experience in diagnosing, monitoring, and treating diabetic neuropathy, 89.49% 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, 32.87% of the physicians stated that they never screened for diabetic neuropathy in Type 2 DM patients, while 67.12% stated that they scanned at different time intervals. Only 34.24% 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 centers 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 specialty 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 to be 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 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 76.47%, it decreased to 53.33% between the ages of 55-66. While the total duration of work in primary care was 66.15% among those who had ten 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 behavior 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 specialty 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.

We have some limitations to this study. In our survey, a scale was not used for the knowledge level questions, and these questions were prepared by the researchers by scanning the literature. Since the scale was not used, a standard could not be provided in terms of scoring, and this situation made it difficult for us to generalize and make clear statements with our results. Similarly, there is no cut-off point in terms of knowledge level, and therefore, comparison analyzes were made by dividing them into two groups from the midpoint of the total score.

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.

As a result, although the rate of those who correctly knew the primary and secondary prevention in diabetic neuropathy was found to be high among the physicians participating in our study, it was determined that the diabetic neuropathy knowledge level of the participating physicians was insufficient, the majority of them did not perform the diagnostic/screening tests for diabetic neuropathy in their clinical practice, and they tended to refer these patients. Methods that will eliminate physicians' shortcomings in primary care and ensure that they comply with the guidelines should be investigated.

Ethical considerations: 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 Pamukkale Provincial Directorate of Public Health. It is declared that the study was carried out in accordance with the Principles of the Declaration of Helsinki.

Conflict of interest: The authors declare no conflict of interest.

References

1. National Diabetes Consensus Group. TÜRKDİAB Diabetes Diagnosis and Treatment Guideline 2019 [Internet]. https://turkdiab.org/admin/PICS/files/Diyabet_Tani_ve_Tedavi_Rehberi_2019.pdf. (Accessed: 23.03.2021).
2. Sendi RA, Mahrus AM, Saeed RM, Mohammed MA, Al-Dubai SAR. Diabetic peripheral neuropathy among Saudi diabetic patients: A multicenter cross-sectional study at primary health care setting. J Fam Med Prim care. 2020;9(1):197-201 (doi:10.4103/jfmpc.jfmpc_927_19).
3. Erbas T, Ertas M, Yucel A, Keskinaslan A, Senocak M, TURNEP Study Group. Prevalence of Peripheral Neuropathy and Painful Peripheral Neuropathy in Turkish Diabetic Patients. J Clin Neurophysiol. 2011;28(1):51–5 (doi:10.1097/WNP.0b013e3182051334).
4. Aring AM, Jones DE, Falko JM. Evaluation and prevention of diabetic neuropathy. Am Fam Physician. 2005;71(11):2123–30.
5. American Diabetes Association. 9. Microvascular complications and foot care. Sec. 9. In Standards of Medical Care in Diabetes. Diabetes Care. 2015;38(Supplement 1):S58–66 (doi:10.2337/dc15-S012)
6. TEMD Diabetes Mellitus Study and Education Group. TEMD Clinical Practice Guideline for Diagnosis, Treatment and Follow-up of Diabetes Mellitus and Its Complications 2020 [Internet]. https://file.temd.org.tr/Uploads/publications/guides/documents/20200625154506-2020tbl_kilavuz86bf012d90.pdf (Accessed: 23.03.2021).
7. Yılmaz T, Keskinkılıç B, İmamecioğlu R, et al. Diabetes Profile in Turkey. Current Situation Assessment in Diabetes Care, Monitoring and Treatment. Workshop Report 2009 [Internet]. http://www.nefroloji.org.tr/folders/file/Turkiyede_Diyabet_Profili.pdf (Accessed: 23.03.2021).
8. Harris SB, Stewart M, Brown JB, et al. Type 2 diabetes in family practice. Room for improvement. Can Fam physician. 2003 Jun;49:778–85.
9. Mabrouk N, Abdou M, Nour-Eldin H, Solyman El-Foly A, Omar S, Sliem H. Knowledge, attitude, and practice of family physicians regarding diabetic neuropathy in family practice centers: Suez Canal University. Int J Med Public Heal. 2013;3(4):230–4 (doi:10.4103/2230-8598.123424)
10. Peimani M, Tabatabaei-Malazy O, Heshmat R, Moghaddam SA, Sanjari M, Pajouhi M. Knowledge, attitude and practice of physicians in the field of diabetes and its complications; a pilot study. Iran J Diabetes Lipid Disord. 2010;9:1-7.
11. Shera AS, Jawad F, Basit A. Diabetes related knowledge, attitude and practices of family physicians in Pakistan. J Pak Med Assoc. 2002 Oct;52(10):465–70.
12. Khan AR, Al Abdul Lateef ZN, Khamseen MB, Al Aithan MA, Khan SA, Al Ibrahim I. Knowledge, attitude and practice of ministry of health primary health care physicians in the management of type 2 diabetes mellitus: a cross-sectional study in the Al Hasa District of Saudi Arabia, 2010. Niger J Clin Pract. 2011;14(1):52–9 (doi:10.4103/1119-3077.79241).