Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/16795
DOI URL: http://dx.doi.org/10.21474/IJAR01/16795

RESEARCH ARTICLE

KNOWLEDGE, ATTITUDE, AND PRACTICE OF FAMILY PHYSICIANS TOWARD DIABETIC NEUROPATHY IN RIYADH, SAUDI ARABIA, 2023

Faisal Ibrahim Bin hawaidi[1], Abdullah Ahmad Alhatlani[2], Abdulrahman Abdullah Aldosery[2], Hazim Saad Almutairi[2] and Ibrahim Musaad Aljuraifani[2]

1. Consultant of Family Medicine, King Saudi Medical City, Riyadh, Saudi Arabia.
2. Resident of Family Medicine, King Saudi Medical City, Riyadh, Saudi Arabia.

Manuscript Info

Manuscript History
Received: 28 February 2023
Final Accepted: 31 March 2023
Published: April 2023

Key words:-
Family Medicine, Diabetes Mellitus, Prevention, Screening

Abstract

Background: Diabetes neuropathy (DN) is the first long term complication of diabetes and requires good control to be prevented. Family physicians represent a core necessity to guide and help patients control their blood sugar levels and prevent DN.

Objective: To assess the knowledge, attitude and practice of family physicians towards diabetes neuropathy in Riyadh, Saudi Arabia.

Methodology: This is an analytical cross-sectional study that utilized an online pre-structured questionnaire. All family residents, specialists, fellows and consultants working in Riyadh city during the year 2023 were eligible for inclusion in our study. The structured questionnaire was adopted form the literature and tested for reliability and face validity.

Results: A total of (319) responses from family physicians. The median and IQR of age were 28 (27-29), and males represented 58.9%. Senior residents represented the majority with 55.5%, while consultants accounted for only 3.1%. The median and IQR for knowledge were (7, 6-8). Attitude scores had a median and IQR of (15, 12-15), and practice scores had a median and IQR of (14, 12-15). Age showed significant positive correlation with knowledge scores (r=0.224, P-value<0.001), while advanced age was correlated with lower attitude (r= -0.162, P-value=0.004), and lower practice scores (r=0.137, P-value=0.014).

Conclusion: Knowledge levels regarding DN among family physicians were satisfactory, and the majority of participatingphysicians would screen, counsel, and educate their patients regarding diabetic neuropathy.Patients education should be considered to improve glycemic control and adherence to preventive measures of diabetic neuropathy.

Introduction:-

Is diabetes mellitus (DM) worth being aware of? In fact, 23.7% of the Saudi population are afflicted with this malady [1]. It affects virtually every organ system in the body, leading to dysfunction and ultimately failure of the affected system. It is one of the most significant risk factors to develop a cerebrovascular accident and is the commonest cause of blindness among working-age population [2, 3]. It is one of the strongest risk factors for

Corresponding Author:- Abdullah Ahmad Alhatlani
Address:- Resident of Family Medicine, King Saudi Medical City, Riyadh, Saudi Arabia.

myocardial infarction and represents the commonest cause of end stage renal disease (ESRD) in Saudi Arabia [1]. It affects extremities as well, causing peripheral neuropathy, for which DM is the commonest underlying mechanism. Diabetes is associated with micro- and macrovascular complications. Microvascular ones, including diabetic neuropathy, are directly linked to the level and duration of hyperglycemia [4]. This represents a potentially preventable type of complications through a tight control of blood glucose, which is unique for microvascular ones. Though known to be preventable, 50% of diabetics end up developing peripheral neuropathy [5].

Besides being preventable as previously mentioned, the importance of preventing peripheral neuropathy stems from several reasons; first, it affects autonomic nerves, precipitating balance issues and thus increasing the risk of falls. Furthermore, neuropathy most commonly presents as distal loss of sensation; this leads to repeated exposure to noxious stimuli, manifesting as ulcerations that are non-healing due to vascular compromise seen in diabetes. These ulcerations develop in 15% of patients and over time, progress goes unnoticed, producing a non-viable tissue that is subject to amputation [6]. Sadly, the commonest cause of nontraumatic amputation worldwide is diabetes [6]. Additionally, early detection, through screening and patient education, and early management, which are dependent upon an aware treating physician, all are associated with a better prognosis and a more controllable disease [7].

To mitigate these complications, a good physician-patient relationship with awareness of both sides of this interaction must be present. In addition, good understanding and knowledge of the course of the disease is pivotal. These factors reflect on patient as following the management plan provided by the physician, which aims to control blood sugar levels, and then follow screening tools to detect early silent stages of microvascular complications including neuropathy [7].

Family physicians indeed are the first line, not only in detecting diabetic neuropathy, but also in educating patients, managing it and preventing its complications through being proactive. Patient's knowledge about their disease is pivotal, but what is as important is the primary care physician's knowledge. Physicians represent the most trustworthy source of information and will ensure proper education of their patients. Being aware as a family doctor will facilitate delivering information and providing proper care, which yields better outcomes. Studies have clearly shown that physician attitude and beliefs towards treatment are as important as their medical knowledge in achieving good adherence to therapy and as a consequence, better outcomes. In fact, there is a direct proportional relationship between patients' adherence to therapeutic regimen and the attitude of their treating physicians [8]. With all the previously mentioned facts, it is clear that assessing knowledge, attitude and practice of family physicians towards diabetic neuropathy in Saudi Arabia is indispensable in order to achieve the best care possible to diabetics. This study aimed to assess the knowledge, attitude and practice of family physicians towards diabetes neuropathy in Riyadh, Saudi Arabia, 2023.

Methods:-

Study Design

This is an analytical cross-sectional study, which usedan electronic form of a structured questionnaire for data collection.

The study was carried out in the primary health care centers in Riyadh city. Riyadh city is the capital of Saudi Arabia. The total population in Riyadh exceeds eight million people (stats.gov.sa) [9]. There are (447) primary health care centers in Riyadh [10].

Study population

Family physicians were the target population in our study. All family residents, specialists, fellows and consultants working in Riyadh city during the year 2023 were eligible for inclusion in our study. Interns, general physicians, rotators from other cities having less than 6 months rotations in Riyadh city were excluded from the current study.

According to the statistical yearbook of the ministry of health (MOH) of Saudi Arabia, there are (1,308) family physicians of both genders in Riyadh city at the year 2018. Using an online tool (http://www.raosoft.com/samplesize.html), the sample size was calculated at a 5% margin of error, 95% confidence interval (CI), 50% response rate and (1,308) as a reference population. The calculated sample size was (298). An increase of 10% in the sample was done to increase the study power.

Data collection

The data collection tool was adopted from literature. Different studies resembling our objective were included to design the data collection tool [11-13]. After sorting and removing repeated questions, the adopted tool was reviewed by two experts in the community medicine to ensure face validity for the new version. Content validity was improved by the inclusion of diagnostic, therapeutic and preventive items in the final version to cover the whole concept of diabetic neuropathy.

The questionnaire included four sections; the first section inquired about sociodemographic data and number of diabetic patients seen per week, the other three sections included items of knowledge, attitude, and practice.

Data were collected using an online form. The link was sent to all the family physicians who were eligible to participate. The returned forms were sorted and coded using Excel software.

Data Analysis

The data analysis was done using the statistical package for the social sciences (IBM Corp. Released 2021. IBM SPSS Statistics for Macintosh, Version 29.0. Armonk, NY: IBM Corp). Categorical variables were summarized using proportions and frequency tables, while continuous variables were summarized using median and interquartile range (IQR) after testing for normality using Kolmogorov–Smirnov and the Shapiro–Wilk tests. Cronbach's alpha test was used for the components of the questionnaire and revealed 0.32 for knowledge questions, 0.79 for attitude items, and 0.79 for practice items. Attitude and practice components were minimized to improve the reliability questions. Non-parametric (Mann-Whitney and Kruskal-Wallis) tests were used to compare between the groups in regard to the total scores of knowledge, attitude, and practice. The level of significance was set at 0.05.

Ethical consideration

An ethical approval was obtained from the ethical committee of King Saud Medical City Research Center (H1RI-05-Jan23-01). The questionnaire included an invitation letter explaining the research purpose to gain consent from the participants. All the data were handled with confidentiality and used for research purposes only.

Results:-

The analysis included a total of (319) responses from family physicians. The median and IQR of age were 28 (27-29). Males represented 58.9%, and the majority (98.1%) were Saudis. Senior residents represented the majority with 55.5%, while consultants accounted for only 3.1%. More than half (53%) were interested in joining a diabetology fellowship. See the demography and clinical-related variables in (Table 1).

The participants were asked a total of 10 knowledge questions. Regarding risk factors, the majority have identified common risk factors except for tall height, which was correctly answered by only 5.3%. The majority (67.4%) were also able to identify the medication prescribed to prevent diabetic neuropathy. Regarding the nature of abnormality in DN patients, 95% chose sensory, 65.5% chose autonomic, and 47.3% chose motor. Knowledge total scores were calculated out of a total score of 10. While the knowledge scores ranged form two to 10, the median and IQR for knowledge were (7, 6-8). Attitude scores had a median and IQR of (15, 12-15), and practice scores had a median and IQR of (14, 12-15). See the responses of knowledge questions in (Table 2).

Further questions included three statements measuring the attitude and five statements measuring the practice of family physicians towards diabetic neuropathy. The majority (69%) strongly agreed to educate the patients about DN as a complication of diabetes mellitus. Similar proportion (64.9%) strongly agreed to reviewing the management plan for patients diagnosed with DN. Regarding practice, while always screening for DN was indicated by more than half of the patients (55.8%), the majority (72.4%) of the physicians indicated always screening for other complications upon the diagnosis of DN. See the attitude and practice responses in (Table 3).

Demography was tested with the total scores of knowledge, attitude, and practice. Age was significant positive correlation with knowledge scores ($r=0.224$, P-value<0.001). While advanced age was correlated with lower attitude ($r=-0.162$, P-value=0.004), and lower practice scores ($r=0.137$, P-value=0.014).

Males showed significantly higher score in knowledge schools (P-value=0.010), while females had significantly higher practice score (P-value<0.001). Knowledge scores was highest among consultants, followed by junior residents (P-value<0.001). While attitude and practice scores were variable across the different positions of family

physicians. Furthermore, knowledge, attitude, and practice scores showed significant variable differences across the groups of number of diabetic patients seen per week and years of experience. See the related results in (Table 4).

		N	%
Gender	Male	188	58.90%
	Female	131	41.10%
Nationality	Saudi	313	98.10%
	Non-Saudi	6	1.90%
Region	North Riyadh	122	38.20%
	South Riyadh	70	21.90%
	East Riyadh	78	24.50%
	West Riyadh	49	15.40%
Current position	Junior resident	62	19.40%
	Senior resident	177	55.50%
	Specialist	46	14.40%
	Fellow	24	7.50%
	Consultant	10	3.10%
Experience years	1-2 years	56	17.60%
	3-4 years	189	59.20%
	5-6 years	48	15.00%
	> 6 years	26	8.20%
How many diabetic patients (approximately) do you see each week?	Less than 10	37	11.60%
	10-20 patients	182	57.10%
	21-30 patients	46	14.40%
	More than 30 patients	54	16.90%
Do you have an interest to enter diabetology fellowship?	No	150	47.00%
	Yes	169	53.00%

Table 1:- Demographic characteristics and experience of the participated family physicians.

	True (%)	False (%)
Risk factors		
Poor glycemic control	317 (99.4%)	2 (0.6%)
Advanced age	302 (94.7%)	17 (5.3%)
Hypertension	256 (80.3%)	63 (19.7%)
Smoking	261 (81.8%)	58 (18.2%)
Tall height	17 (5.3%)	302 (94.7%)
Type of neurological damage		
Sensory	303 (95%)	16 (5%)
Motor	151 (47.3%)	168 (52.7%)
Autonomic	209 (65.5%)	110 (34.5%)
Prevention and diagnosis		
What is the drug used to prevent diabetic neuropathy?	215 (67.4%)	104 (32.6%)
How to diagnose diabetic neuropathy?	118 (37%)	201 (63%)

Table 2:- Responses of family physicians to items of the knowledge section.

Attitude					
	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1. I would educate my patients about diabetic neuropathy as a complication of their condition	0 (0%)	1 (0.3%)	40 (12.5%)	58 (18.2%)	220 (69%)
2. I would review the management of diabetes in patient diagnosed with diabetic neuropathy	0 (0%)	1 (0.3%)	35 (11%)	76 (23.8%)	207 (64.9%)
3. I would screen all diabetics for diabetic neuropathy	1 (0.3%)	1 (0.3%)	50 (15.7%)	73 (22.9%)	194 (60.8%)

Practice				
	Never	**Rarely**	**Sometimes**	**Always**
1. I educate my patients about diabetic neuropathyas a complication of their condition.	0 (0%)	1 (0.3%)	114 (35.7%)	204 (63.9%)
2. I review the management of diabetes in patient diagnosed with diabetic neuropathy	1 (0.3%)	3 (0.9%)	82 (25.7%)	233 (73%)
3. I screen all diabetics for diabetic neuropathy	0 (0%)	22 (6.9%)	119 (37.3%)	178 (55.8%)
4. I counsel the patients about the risk factors of diabetic neuropathy	0 (0%)	3 (0.9%)	92 (28.8%)	224 (70.2%)
5. I screen for other complications if my patient has diabetic neuropathy	0 (0%)	7 (2.2%)	81 (25.4%)	231 (72.4%)

Table 3:- Participants responses to the items of attitude and practice sections.

	Knowledge (mean rank)	**Attitude (mean rank)**	**Practice (mean rank)**
Gender			
Male	170.8	153.8	144
Female	144.5	168.9	182.9
P-value*	0.010	0.122	<0.001
Interest in diabetology fellowship			
Yes	143.9	187.8	196.9
No	178.1	128.6	118.5
P-value*	<0.001	<0.001	<0.001
Current position			
Junior resident	201.5	115.9	126.9
Senior resident	142.6	171.2	177.5
Specialist	156.9	183.3	172.4
Fellow	164.8	169.3	101.8
Consultant	214.3	105.2	139.1
P-value**	<0.001	<0.001	<0.001
Diabetic patients per week			
Less than 10 patients	155.1	147.1	119
11-20 patients	149.3	152.9	164
21-30 patients	170	158.6	172.5
More than 30 patients	190.9	193.9	163.9
P-value**	0.022	0.014	0.026
Years of experience		0.014	0.026
1-2 years	191.7	123.1	130.9
3-4 years	141.8	173.5	173.6
5-6 years	182.2	158.3	121.6
More than 6 years	182.9	144.5	194.5
P-value**	<0.001	0.001	<0.001

Table 4:- Association between knowledge, attitude, and practice with other demography and clinical experience
*P-value calculated using Mann-Whitney test
**P-value calculated using Kruskal-Wallis test

Discussion:-

The prevalence of diabetes is rapidly increasing worldwide, becoming a major health issue and imposing a significant burden on healthcare systems (14). As a consequence, diabetic neuropathy, a common and debilitating complication of diabetes, is expected to rise in prevalence (15). The literature has widely discussed the relationship between diabetes and diabetic neuropathy, emphasizing the role of glycemic control in preventing and managing this complication, which can adversely affect patients' quality of life (16). In this context, family medicine physicians play a crucial role in delivering primary care to diabetic patients, as they are ideally positioned to provide

comprehensive, patient-centered care, addressing the medical, psychological, and social aspects of the disease (17). By adopting a holistic approach, family physicians can effectively manage, treat, and prevent complications such as diabetic neuropathy, promoting better health outcomes and improving patients' quality of life (18).

The present study sheds light on the family physician's knowledge, attitudes, and practice toward diabetic neuropathy. The majority of our participants demonstrated a good level of knowledge with a median score of (7/15), which was not limited to the clinical aspect of the condition but also encompassed a preventive perspective. These findings are consistent with previously published studies that have reported good knowledge levels among participants regarding diabetes and its complications (19,20). Furthermore, the study revealed that most participants agreed with the importance of screening, educating, and counseling diabetic patients for diabetic neuropathy. Such interventions have been shown to increase patients' knowledge, improve their acceptance of the disease and adherence to treatment, and ultimately enhance their quality of life (21,22). Thus, family physicians can play a vital role in promoting patient education, providing tailored counseling, and raising awareness about diabetic neuropathy, which can lead to better health outcomes and improved quality of life for their patients.

In order to provide a deeper understanding of how family physicians perceive diabetic neuropathy, and how they apply their knowledge and skills to manage it effectively, one interesting finding was the correlation between age and knowledge. It was found that older physicians had a greater level of knowledge about diabetic neuropathy, which suggests that experience plays a significant role in enhancing knowledge. However, age was negatively associated with attitude and practice scores, indicating that older physicians may not be as active in their approach to managing and treating diabetic neuropathy. On the other hand, multiple studies observed that shorter experience durations were significantly associated with higher knowledge scores than longer experience durations (23,24). Another noteworthy finding was the difference in scores between male and female physicians. While male participants scored higher on knowledge, female participants scored higher on practice. This suggests that there may be differences in the way male and female physicians approach the management and treatment of diabetic neuropathy. In comparison to our findings, male physicians were found to have higher overall knowledge, attitude, and practice scores (24).

When interpreting our findings, it is essential to acknowledge some of the limitations. Firstly, it is important to note that the study was conducted in a single region of Saudi Arabia. Therefore, caution must be taken when generalizing our findings to other regions. Also, the reliability of the knowledge component items was lower than the standard coefficient, which may have impacted the results of knowledge levels among our participants. Nevertheless, our study provides valuable insights into the knowledge levels of family physicians in Saudi Arabia and highlights the need for further research on this topic. Moreover, our investigation is the first of its kind to focus specifically on diabetic neuropathy among family medicine physicians in Saudi Arabia, making it a significant contribution to the field.

Conclusion:-

Family practitioners in Riyadh showed high levels of knowledge, attitude, and practice. The median scores for knowledge, attitude, and practice were as follow; 7/10, 15/15, and 14/15, respectively. The majority of our participants would screen, counsel, and educate their patients regarding diabetic neuropathy. Higher age was correlated with higher levels of knowledge and lower levels of attitude and practice. Males performed better in the knowledge component while females had higher practice scores. Further national, multi-centered study will provide a further understanding of knowledge, attitude, and practice of diabetic neuropathy among family medicine physicians. While the levels of knowledge and practice were satisfactory among family physicians, patients education should be considered to improve glycemic control and adherence to preventive measures of diabetic neuropathy.

Acknowledgement:-

N/A.

Conflicts of interests

None.

References:-

1. Naeem Z. Burden of diabetes mellitus in Saudi Arabia. International journal of health sciences. 2015;9(3):V. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4633187/
2. Tun NN, Arunagirinathan G, Munshi SK, Pappachan JM. Diabetes mellitus and stroke: a clinical update. World journal of diabetes. 2017;8(6):235. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5483423/
3. Wang W, Lo AC. Diabetic retinopathy: pathophysiology and treatments. International journal of molecular sciences. 2018;19(6):1816. Available at: https://www.mdpi.com/1422-0067/19/6/1816
4. Chawla A, Chawla R, Jaggi S. Microvasular and macrovascular complications in diabetes mellitus: distinct or continuum?. Indian journal of endocrinology and metabolism. 2016;20(4):546. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911847/
5. Callaghan BC, Cheng HT, Stables CL, Smith AL, Feldman EL. Diabetic neuropathy: clinical manifestations and current treatments. The lancet NEUROLOGY. 2012;11(6):521-34. Available at: https://www.sciencedirect.com/science/article/abs/pii/S1474442212700650
6. Juster-Switlyk K, Smith AG. Updates in diabetic peripheral neuropathy. F1000Research. 2016;5. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4847561/
7. Snyder MJ, Gibbs LM, Lindsay TJ. Treating painful diabetic peripheral neuropathy: an update. American family physician. 2016;94(3):227-34.https://www.aafp.org/pubs/afp/issues/2016/0801/p227.html
8. Mabrouk N, Abdou M, Nour-Eldin H, El-Foly AA, Omar SA, Sliem HA. Knowledge, attitude, and practice of family physicians regarding diabetic neuropathy in family practice centers: Suez Canal University. International Journal of Medicine and Public Health. 2013;3(4). Available at: https://www.ijmedph.org/article/80
9. Population in Riyadh region by gender, age group, and nationality (Saudi/Non-Saudi). General Authority for Statistics. 2018. Available from: https://www.stats.gov.sa/en/5721
10. On-duty healthcare centers. MOH porta, health awareness, on-duty healthcare centers, Riyadh. Available from: https://www.moh.gov.sa/en/HealthAwareness/On-Duty-Healthcare-Centers/Pages/Riyadh.aspx
11. Shera AS, Jawad F, Basit A. Diabetes related knowledge, attitude, and practices of family physicians in Pakistan. J Pak Med Assoc. 2002;52(10). Available at: https://pubmed.ncbi.nlm.nih.gov/12553676/
12. Aldossari KK, Al-Ghamdi S, Alzahrani J, Al Turki MS, Almuhareb M, Alanazi ZG, Alshahrani ZM, Wong J. Physicians' Perception About Use of Vitamin B12 in the Treatment or Prevention of Diabetic Neuropathy: A Cross-sectional Survey in Saudi Arabia. Current Diabetes Reviews. 2022;18(2):71-80. Available at: https://www.ingentaconnect.com/content/ben/cdr/2022/00000018/00000002/art00007
13. Khan AT, Lateef NA, Khamseen MA, Alithan MA, Khan SA, 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. Nigerian journal of clinical practice. 2011;14(1). Available at: https://www.ajol.info/index.php/njcp/article/download/65727/53415
14. Guariguata L, Whiting DR, Hambleton I, Beagley J, Linnenkamp U, Shaw JE. Global estimates of diabetes prevalence for 2013 and projections for 2035. Diabetes research and clinical practice. 2014;103(2):137-49. Available at: https://www.sciencedirect.com/science/article/pii/S0168822713003859
15. Callaghan BC, Price RS, Chen KS, Feldman EL. The importance of rare subtypes in diagnosis and treatment of peripheral neuropathy: a review. JAMA neurology. 2015;72(12):1510-8. Available at: https://jamanetwork.com/journals/jamaneurology/article-abstract/2448750
16. Pop-Busui R, Boulton AJ, Feldman EL, Bril V, Freeman R, Malik RA, Sosenko JM, Ziegler D. Diabetic neuropathy: a position statement by the American Diabetes Association. Diabetes care. 2017;40(1):136.Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6977405/?report=reader
17. Mendes EV. A construção social da atençãoprimária à saúde. Brasília: Conselho Nacional de Secretários de Saúde. 2015;45. Available at: http://www.conass.org.br/biblioteca/a-construcao-social-da-atencao-primaria-a-saude-2a-edicao/
18. Pimentel CR, dos Santos MA, Zanetti AC, Zanetti ML. Representaçõessociais de pacientes com diabetes mellitus sobre o atendimento por profissionais de saúde. Psico. 2013;44(1):15. Available at: http://revistaseletronicas.pucrs.br/ojs/index.php/revistapsico/article/view/11039
19. Guariguata L, Whiting DR, Hambleton I, Beagley J, Linnenkamp U, Shaw JE. Global estimates of diabetes prevalence for 2013 and projections for 2035. Diabetes research and clinical practice. 2014;103(2):137-49. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7553261/#cit0002
20. Zibran MA, Mohammadnezhad M. Determinants of knowledge, attitude and practice in patients with both type 2 diabetes and chronic kidney disease in Fiji. F1000Research. 2019;8. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6480935/

21. de Souza VP, de Vasconcelos EM. Educação em saúde como estratégia para o controle do diabetes mellitus: revisão integrativa da literatura. Revista Baiana de Saúde Pública. 2017;41(1). Available at: http://rbsp.sesab.ba.gov.br/index.php/rbsp/article/view/2318
22. Iquize RC, Theodoro FC, Carvalho KA, Oliveira MD, Barros JD, Silva AR. Práticas educativas no paciente diabético e perspectiva do profissional de saúde: umarevisão sistemática. Brazilian Journal of Nephrology. 2017;39:196-204. Available at: https://www.scielo.br/j/jbn/a/3CBcqXBfYJKWsQGJqJQBBTM/?lang=pt&format=html
23. Ugwu E, Young E, Nkpozi M. Diabetes care knowledge and practice among primary care physicians in Southeast Nigeria: a cross-sectional study. BMC family practice. 2020;21:1-1. Available at: https://link.springer.com/article/10.1186/s12875-020-01202-0
24. Khan AT, Lateef NA, Khamseen MA, Alithan MA, Khan SA, 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. Nigerian journal of clinical practice. 2011;14(1). Available at: https://www.ajol.info/index.php/njcp/article/download/65727/53415.