



# PHYSICIANS' ATTITUDES TOWARDS THE APPROACH TO DIABETIC NEUROPATHY IN PUBLIC AND PRIVATE HEALTH CARE FACILITIES, 2023

ACTITUDES DE LOS MÉDICOS HACIA EL ABORDAJE DE LA NEUROPATÍA DIABÉTICA EN ESTABLECIMIENTOS DE SALUD PÚBLICOS Y PRIVADOS, 2023

John Longa-López <sup>1</sup>

## ABSTRACT

**Objective:** To describe the attitudes of doctors towards the approach to diabetic neuropathy. **Methods:** descriptive, observational, cross-sectional and prospective study, sample of 143 doctors, non-probabilistic convenience sampling. The variables: years of professional practice, specialty, proportion of patients in the medical consultation with a diagnosis of diabetes mellitus (type 1 or 2), proportion of patients with diabetes mellitus with a diagnosis of diabetic neuropathy, attitudes towards the approach to diabetic neuropathy. A 5-category Likert scale was used to evaluate attitudes in 3 dimensions: prioritization, diagnosis and treatment. Descriptive statistics were used. **Results:** In the prioritization dimension, 57.4% prioritize metabolic control over the evaluation of complications. Diagnostic dimension: 80.5% of doctors surveyed rely on symptoms and signs reported by the patient to make the diagnosis of said complication, 66.5% recognize that they do not use an instrument for the evaluation of neuropathy and 39.9% would not use it either. had it. In the treatment dimension, 73.5% recognize that analgesic treatment for diabetic neuropathy is frustrating and 50.4% feel "afraid" to titrate the dose of anti-neuropathic analgesic medication due to adverse effects. **Conclusions:** The attitudes of doctors compromise different areas of the approach to diabetic neuropathy such as prioritization, diagnosis and treatment with a tendency to prioritize metabolic control and other microvascular complications, to under-diagnosis, to "under-treatment". "and the need to refer patients for specialized management.

**Keywords:** Attitudes; Diabetic neuropathy. (Source: MESH-NLM)

## RESUMEN

**Objetivo:** Describir las actitudes de los médicos hacia el abordaje de la neuropatía diabética. **Métodos:** estudio descriptivo, observacional, transversal y prospectivo, muestra 143 médicos, muestreo no probabilístico por conveniencia. Las variables: años de ejercicio profesional, especialidad, proporción de pacientes en la consulta médica con diagnóstico de diabetes mellitus (tipo 1 o 2), proporción de pacientes con diabetes mellitus con diagnóstico de neuropatía diabética, actitudes hacia el abordaje de la neuropatía diabética. Se empleó escala Likert de 5 categorías para evaluar actitudes en 3 dimensiones: priorización, diagnóstico y tratamiento. Se emplearon estadísticos descriptivos. **Resultados:** En la dimensión priorización el 57.4% prioriza el control metabólico sobre la evaluación de complicaciones. Dimensión diagnóstico el 80.5% de médicos encuestados se basan en síntomas y signos referidos por el paciente para hacer el diagnóstico de dicha complicación, el 66,5% reconocen que no usan instrumento para la evaluación de la neuropatía y el 39.9% tampoco lo usarían así lo tuviera. En la dimensión tratamiento el 73,5% reconocen que el tratamiento analgésico de la neuropatía diabética es frustrante y el 50,4% siente "temor" para titular la dosis de la medicación analgésica anti-neuropática por los efectos adversos. **Conclusiones:** Las actitudes de los médicos comprometen diferentes áreas del abordaje de la neuropatía diabética como la priorización, el diagnóstico y el tratamiento con una tendencia a la priorización del control metabólico y de otras complicaciones microvasculares, al sub-diagnóstico, al "sub-tratamiento" y a la necesidad de referir a los pacientes para manejo especializado.

**Palabras clave:** Actitudes; Neuropatía diabética. (Fuente: DeCS- BIREME)

<sup>1</sup> Endocrinologist

Cite as: Longa-López J. Physicians' attitudes towards the approach to diabetic neuropathy in public and private health care facilities, 2023. Rev Fac Med Hum. 2023;23(4):54-61. doi:10.25176/RFMH.v23i4.6109

Journal home page: <http://revistas.urp.edu.pe/index.php/RFMH>

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## INTRODUCTION

In recent years, we have witnessed processes of political, social, and economic globalization, as well as epidemiological, nutritional, and demographic transition and very recently changes that have occurred as a result of the COVID-19 pandemic, processes that have increased the prevalence of chronic degenerative diseases such as diabetes mellitus, whose exponential growth has been dizzying with a great impact on global public health. According to the most recent data from the International Diabetes Federation (IDF), there are 537 million people in the world living with the disease, and according to national statistics, the PERUDIAB study reported a prevalence of diabetes mellitus type 2 of 7% in our country<sup>(1)</sup>.

The epidemiological impact of diabetes mellitus affects mortality and the quality of life of those affected, with the macro and microvascular complications linked to it as catalysts of this impact. However, despite all the scientific advances we have made in the management of diabetes mellitus, there are disparities and gaps in the management of these complications and such is the case of diabetic neuropathy, the most frequent complication of diabetes mellitus and yet by far the least evaluated. Studies such as Pirart et. al. report an incidence of neuropathy that can reach 50% after 25 years of disease<sup>(2)</sup>.

Diabetic neuropathy has a notable impact on the quality of life of affected patients, generating a disability that is related to the often devastating painful symptoms and the neurological deficit underlying manifestations such as ataxia, weakness, falls, fractures, ulcerations, amputations and infections that can lead to death. But as mentioned above, there is an underdiagnosis of the disease, as evidenced by research such as that of Ziegler et. al.<sup>(3)</sup> in which undiagnosed neuropathy can reach 65.5% in both type 1 and 2 diabetes, a figure that reflects that diabetic neuropathy is the "forgotten complication" of this disease.

But what would be the explanation for this oblivion? We believe that the model of health determinants advocated by Lalonde many years ago could help us to

explain it, and within this model the provision of health services constitutes one of the fundamental axes of these determinants for the understanding of this problem. Precisely, the study by Nan Zhao et. al.<sup>(4)</sup> evaluates the factors that intervene in the preventive behavior oriented to the screening of the foot at risk in patients with diabetes and after multivariate analysis finds that the frequency of training, knowledge about screening, limited time in the consultation, limited availability of the necessary tools for screening as well as the attitudes of health professionals towards screening constitute the main barriers to be taken into account for the approach of this preventive activity.

That is why we consider it necessary to know the attitudes of physicians towards the approach to diabetic neuropathy in order to design training strategies that involve not only the imparting of technical knowledge, of course necessary, but also in a synchronic and holistic way the cognitive, affective and conative aspects that have a motivational role of impulsion and orientation to action and that also influence the perception and thinking that will give a lasting character and evaluative judgment to all that has been learned.

## METHODS

### Design and Study Area

A descriptive, observational, cross-sectional, and prospective study was conducted.

The present investigation is framed within the National Priorities for health research in our country, related to metabolic and cardiovascular diseases, and its objective was to evaluate the attitudes of physicians participating in a training program in diabetic neuropathy towards one of the most prevalent complications of diabetes mellitus.

### Population and Sample

The study population consisted of all physicians of both sexes participating in a training program in diabetic neuropathy, both Peruvian and foreign, from public and private health establishments, which amounted to 143, a program that was given between April and August of



the present year.

**Variables and Instrument**

The variables evaluated in the present study were:

**Age:** is defined as the number of years completed at the instrument's application date.

Years of professional practice: this is defined as the time elapsed in years from obtaining the professional title of surgeon until the instrument's application date.

**Sex:** sexual characteristics of individuals that identify them as male or female.

**Specialty:** post-graduate medical specialty degree attained up to the instrument's application date.

Proportion of patients in the medical consultation who have a diagnosis of diabetes mellitus (type 1 or 2): Average percentage of patients in daily medical consultation who have the medical diagnosis of diabetes mellitus.

Proportion of patients with diabetes mellitus who have a diagnosis of diabetic neuropathy: Average percentage of patients with type 1 or 2 diabetes mellitus who have a medical diagnosis of diabetic neuropathy in the daily consultation.

**Country of origin:** Country of origin of the participating physician.

Attitudes towards the approach to diabetic neuropathy: psychological predisposition of the participating physicians in the cognitive, affective and behavioral dimensions towards the approach to diabetic neuropathy in the medical office.

Two types of instruments were used for this research:

**Data collection form:** in which the responses to the socio-demographic variables included in this study

were recorded.

**1.Attitude Scale:** The Inventory of Attitudes towards Diabetic Neuropathy (IANEDIAB - 17) was used, which was constructed using a Likert-type Scale with 5 categories: strongly agree, partially agree, neither agree nor disagree, partially disagree and strongly disagree; which was validated in a pilot test obtaining a Cronbach's alpha of 0.874 and consisted of 17 items that evaluate 3 dimensions of physicians' attitudes towards the approach to diabetic neuropathy: prioritization, diagnosis and treatment. (see annexes 1 and 2)

**Procedure**

For the application of the aforementioned instruments, the web application Google Forms was used, which was sent to the e-mail addresses of all the participants who gave their consent to fill out the survey, which was anonymous in order to achieve the greatest possible veracity of the answers given. All surveys were received prior to the start of the training program.

**Statistical Analysis**

The data obtained from the surveys were processed using the SPSS statistical package version 28.0. Descriptive statistics were used for the analysis of the variables, using measures of central tendency for quantitative variables and frequency distribution for categorical variables.

**Ethical Aspects**

The ethics committee of the Postgraduate School of the Universidad Ricardo Palma approved the study.

**Table 1.** Socio-Demographic Characteristics of Survey Respondents (N=454).

Variable	Media	DS
Age (years)	41,37	10,101
Years of professional practice	13,45	9,519





Variable	Frequency	Percentage
Sex (n= 143)		
Female	86	60,1
Male	57	39.9
Specialty (n=143)		
Endocrinology	10	7,0
Family Medicine	14	9,8
General Medicine	99	69,2
Internal Medicine	3	2.1
Neurology	1	0,7
Other	16	11.2
Proportion of patients in your practice who have a diagnosis of DM1 or DM2.		
< 10 %	17	11,9
10 - 25 %	63	44,1
25 - 50 %	42	29,4
50 - 75 %	13	9,1
>75 %	8	5,6
Proportion of your DM patients with a diagnosis of diabetic neuropathy (%)		
<5 %	34	23,8
5 - 10 %	29	20,3
10 - 20 %	27	18,9
20 - 30 %	17	11,9
30 - 40 %	13	9,1
40 - 50 %	8	5,6
50 - 60 %	8	5,6
60 - 70 %	5	3,5
70 - 80 %	1	0,7
>80 %	1	0,7
Country of Origin		
Peru	103	72,0
Colombia	30	21,0
Venezuela	4	2,8
Another	6	4,2



Table 2. Responses to the scale of attitudes toward the approach to diabetic neuropathy.

	ITEM	Totally in agreement n (%)	Partially of Agreement n (%)	Neither agree nor disagree n (%)	Partially at odds n (%)	Totally at odds n (%)
1	"I must admit that in the approach to a patient with diabetes mellitus, I prioritize achieving good glycemic (glucose), lipid and/or blood pressure control, postponing the evaluation of complications unless they are acute."	43 (30,1)	39 (27,3)	5 (3,5)	18 (12,6)	38 (26,6)
2	"Of all the complications of diabetes, whether micro-vascular or macro-vascular, diabetic neuropathy is the one I evaluate the least in my clinical practice."	7 (4,9)	43 (30,1)	14 (9,8)	31 (21,7)	48 (33,6)
3	"The diagnosis I make of diabetic neuropathy is basically based on the symptoms and signs that patients refer to me."	60 (42)	55 (38,5)	4 (2,8)	10 (7,0)	14 (9,8)
4	"I don't usually examine the feet of a patient with diabetes mellitus unless he or she asks me to do so or refers a foot lesion to me."	15 (10,5)	47 (32,9)	14 (9,8)	20 (14)	47 (32,9)
5	"In general, I have to say, I don't have a systematic (orderly) way of evaluating (when I do) the feet of a patient with diabetes mellitus."	13 (9,1)	48 (33,6)	14 (9,8)	20 (14)	48 (33,6)
6	"In general, I do not record foot exam findings and/or neither do I use a pain rating scale when evaluating a patient with neuropathy."	18 (12,6)	56 (39,2)	13 (9,1)	25 (17,5)	31 (21,7)
7	"In my opinion, the standardized formats for neuropathy evaluation are generally impractical because they are not adapted to the time and/or resources available to us in the medical office."	36 (25,2)	51 (35,7)	23 (16,1)	15 (10,5)	18 (12,6)
8	"I think the most difficult part of making the correct diagnosis of diabetic neuropathy is the differential diagnosis with other causes of neuropathy."	45 (31,5)	57 (39,9)	17 (11,9)	16 (11,2)	8 (5,6)
9	In fact, "I do not usually use any screening instruments for diabetic neuropathy screening (monofilament, 128Hz tuning fork, reflex hammer, etc.) and rely primarily on the symptoms and/or signs reported by the patient."	44 (30,8)	51 (35,7)	6 (4,2)	16 (11,2)	26 (18,2)
10	"I must confess that EVEN IF I HAD the necessary instruments to screen for diabetic neuropathy I would not use them for various factors (time, practicality, knowledge, etc.)"	10 (7,0)	47 (32,9)	11 (7,7)	27 (18,9)	28 (33,6)
11	"I am aware that I must have a complete physical examination for the diagnosis of diabetic neuropathy but the time available at the doctor's office is insufficient."	72 (50,3)	50 (35)	2 (1,4)	8 (5,6)	11 (7,7)
12	"I must admit that I don't have the expertise I would like to have to do a proper risk screening of the feet in a patient with diabetes."	34 (23,8)	57 (39,9)	13 (9,1)	17 (11,9)	22 (15,4)
13	"I consider that of all the micro-vascular complications (nephropathy, retinopathy and neuropathy) diabetic neuropathy is the least serious."	9 (6,3)	32 (22,4)	26 (18,2)	27 (18,9)	49 (34,3)
14	"In my opinion the presence of diabetic neuropathy, being a micro-vascular complication does not carry a greater cardiovascular risk for the patient."	13 (9,1)	18 (12,6)	10 (7,0)	39 (27,3)	66 (44,1)
15	"When I have a patient with a known diagnosis of diabetic neuropathy, I prefer to refer for specialized management."	49 (34,3)	47 (32,9)	11 (7,7)	20 (14)	16 (11,2)
16	"I believe that analgesic treatment of diabetic neuropathy is generally frustrating as it fails to sufficiently relieve patients."	42 (29,4)	63 (44,1)	7 (4,9)	15 (10,5)	16 (11,2)
17	"I must confess that I am afraid to use and/or titrate the dosage of anti-neuropathic analgesic medication (gabapentin, pregabalin, tramadol, amitriptyline, etc.) because of the side effects that this could entail."	18 (12,6)	54 (37,8)	9 (6,3)	31 (21,7)	31 (21,7)

Source: Own elaboration





## DISCUSSION

As can be seen in Table No. 1 about the socio-demographic characteristics of the participants, the average age of the physicians was 41.37 ( $\pm 10.101$ ) years, with 13.45 ( $\pm 9.519$ ) years as the average length of professional practice. The highest proportion of the respondents were general practitioners with 69.2%, 72% from Peru and the proportion of patients with a diagnosis of diabetes mellitus who are evaluated in the consultation of the respondents is between 10 - 25% (1 in 10 to 1 in 4 patients) in 44% of the physicians and 25 - 50% (1 in 4 to 1 in 2 patients) in 29.4%. This data is very relevant, as it gives us an idea of the degree of "need" to know the competencies and attitudes of physicians in the approach to diabetic neuropathy, given the relative frequency with which they evaluate patients with a diagnosis of diabetes mellitus in their daily practice.

When the physicians surveyed were asked about the proportion of patients with diabetes mellitus who have a diagnosis of diabetic neuropathy in their practice, 23.8% reported a figure of less than 5% of their patients and 20.3% between 5 - 10%, which means that 44.1% of the physicians report a diagnosis of diabetic neuropathy in less than 10% of their patients. This figure contrasts with that found in international studies such as that of Young MJ[5] et al., a multicenter study from the United Kingdom, in which the prevalence of diabetic peripheral neuropathy was 20.8% (19.1-22.5%) in patients with diabetes lasting less than 5 years and in 36.8% (34.9-38.7%) of those with diabetes lasting more than 10 years.

In national studies, such as the one conducted by Ray Ticse et. al. at the Cayetano Heredia Hospital (Lima - Peru) in patients with type 2 diabetes mellitus<sup>(6)</sup>, the frequency of peripheral neuropathy found was even higher, reaching figures of 96.8% according to nerve conduction velocity studies and 45% using the Michigan Neuropathy Screening Instrument (MNSI), which gives us an idea of the significant underdiagnosis of this complication in the daily consultation of those surveyed. When we analyze the answers given concerning item 1 of the attitude scale, we can see that the greatest proportion of the respondents totally agree (30.1%) and partially agree (27.3%) with the

statement in which they recognize that they prioritize metabolic control (glycemic, lipid and blood pressure), postponing the evaluation of complications; This is related to what was stated in item 2, in which nearly a third of the respondents totally or partially agree (35%) that of all the microvascular complications, diabetic neuropathy is the least evaluated. These findings are consistent with that reported by Malik RA et al.<sup>(7)</sup>, in their study Perceptions of Painful Diabetic Peripheral Neuropathy in South-East Asia: Results from Patient and Physician, a study in which physicians are "extremely motivated" for glycated hemoglobin control, maintenance of renal function, lipid management, and much less to address painful diabetic neuropathy.

If we now evaluate attitudes regarding the diagnosis of diabetic neuropathy, we see that of the physicians surveyed, 42% strongly agree and 38.5% partially agree in accepting that the diagnosis of diabetic neuropathy is made based on the symptoms and signs reported by the patient. However, it is important to point out that 50% of patients with diabetic neuropathy are asymptomatic, which may explain the large underdiagnosis reported by the respondents. Physical examination is a fundamental step in the diagnostic approach to any pathology, including diabetic neuropathy, which is why it is surprising that 43.4% of the respondents totally and partially agree in recognizing that they do not usually examine the feet of patients with diabetes unless the patient asks them to do so or there is an ulcerative lesion involved.

So we see that the answers to these last 2 items have a negative synergistic effect since if 80.5% of the physicians only base their diagnosis on the symptoms and 43.4% do not usually examine the feet of their patients, the probability of diagnosing neuropathy is diluted. Precisely, the physical examination of foot evaluation requires a standardized methodological systematization to be able to examine both the thick and thin nerve fiber as well as a record of clinical findings, to be able to follow the evolution of a chronic disease that is associated with chronic complications; therefore it is surprising that in item 5, 6 and 7, which



have to do with these processes, a large proportion of respondents: 42.7% for item 5, 51.8% for item 6 and 60.9% for item 7 fully and partially agree in accepting that they do not systematize their assessment, do not record their findings or use pain scales and are not familiar with the use of standardized diabetic neuropathy screening formats respectively. This leads us to the reflection that the complexity and extension of the screening instruments is a crucial factor in their usefulness, since the time available for the evaluation in the consultation room is scarce, as ratified in item 11 by 85% of the respondents, who totally and partially agree in affirming that, although they are aware that they should perform a complete examination, they cannot do it due to lack of time in their medical office.

As we know, diabetic neuropathy is a diagnosis of exclusion, and although in most cases, diabetes will be the etiological cause of its appearance, there is a 10%, according to the Rochester Diabetic Neuropathy Study of patients with diabetes whose neuropathy is related to other causes<sup>(8)</sup>. To this we should add that according to current published guidelines<sup>(9)</sup>, for the approach to diabetic neuropathy it is important to consider relevant abnormal laboratory findings that should be included in the differential diagnosis, such as vitamin B deficiency 12, hypothyroidism, among others. In relation to this point, most of the respondents: 71.4%, totally and partially agree in recognizing that the most difficult aspect of the correct diagnosis of diabetic neuropathy is precisely the differential diagnosis.

When we analyze items 9 and 10, we see that 66.5% of the physicians do not use any instrument (tuning fork, monofilament, etc.) to make the diagnosis of neuropathy, which is basically, as referred to, based on symptoms, and we could think then, that it is only a matter of availability of such an instrument, which is partially true since in item 10, 39.9% of the respondents, totally and partially agree in recognizing that even if they had the instruments they would NOT USE THEM for different reasons. This last aspect is very relevant from the point of view of public health, since, as we can see, it

is not only a question of the necessary logistical availability, but also of educational, administrative and attitudinal aspects, as we have been pointing out. And this is reflected in items 12 and 15 in which a large proportion of physicians: 63.7% totally and partially agree in recognizing that they do not have the expertise they would like to have for the diagnosis of diabetic neuropathy, which is related to the fact that 67.2% of them prefer to refer a patient with such a diagnosis for specialized management.

Finally, and no less important, is to discuss the aspects related to the attitudes in relation to the pharmacological approach to diabetic neuropathy and this is reflected in item 16, according to which 73.5% of the physicians totally and partially agree in considering that the analgesic treatment of diabetic neuropathy is frustrating and according to item 17: 50.4% of them, acknowledge being afraid to titrate the dose of anti-neuropathic medication because of the side effects that this could entail in the patient, which probably further increases the frustration of not being able to relieve patients suffering from neuropathic pain sufficiently. In fact, according to available information, none of the first-line drugs are universally effective or tolerated, even in combination, requiring at least a 30% decrease in pain to determine their effectiveness and 50% to impact the quality of life of affected patients<sup>(10)</sup>.

## CONCLUSIONS

There is no doubt that diabetes mellitus has acquired epidemic features and that there is a gap in the approach to its complications, with diabetic neuropathy being one of the most neglected in terms of prevention, early recognition, and treatment. It is necessary to have a holistic vision in the approach to diabetic neuropathy, which includes not only cognitive aspects that apparently do not reach enough to put the spotlight on it but also account for the attitudinal aspects that are related to the predisposition that health professionals have towards certain pathologies and that becomes the engine that drives or not the need to deal with them. This predisposition involves different dimensions of the approach to diabetic neuropathy such as its prioritization, risk stratification,



diagnosis and treatment, an approach in which we have seen a tendency to prioritize metabolic control and other microvascular complications, to underestimate the impact on the patient's cardiovascular risk, to under-diagnose, to "under-treat" and to generally refer affected patients for specialized management. Powerful educational interventions are required that consider not only the knowledge but also the perceptions and attitudes of those to be educated.

## LIMITATIONS

The present study included all the physicians

participating in a training program in diabetic neuropathy before the program was given, but they were not randomly selected, thus making it difficult to generalize the results. Likewise, not all medical specialties involved in the care of this complication were included, which would allow stratification of attitudes according to the expertise of the participants.

## THANK YOU

To the participants of the training program for their active participation.

**Authorship contribution:** The author participated in the writing, conceptualization, design of the article, data collection, data processing and analysis, and approval of the final version.

**Financing:** Self-financed.

**Conflict of interest:** The author declare they have no conflict of interest.

**Received:** October 20, 2023.

**Accepted:** December 04, 2023.

**Correspondence:** John Longa López.

**Address:** Calle Doña Nelly 566 – Dpto 401. Urb. Santa Rosa de Surco 2da etapa – Santiago de Surco. Lima-Perú.

**Telephone number:** (+51) 95912710

**E-mail:** [johnlonga@gmail.com](mailto:johnlonga@gmail.com)

## REFERENCES

- 1.- Seclen SN, Rosas ME, Arias AJ, Medina CA. Elevated incidence rates of diabetes in Peru: report from PERUDIAB, a national urban population-based longitudinal study. *BMJ Open Diabetes Res Care*. 2017 Jul 19;5(1):e000401. doi: 10.1136/bmjdr-2017-000401. <https://pubmed.ncbi.nlm.nih.gov/28878935/>
- 2.- Pirart J. Diabète et complications dégénératives. Présentation d'une étude prospective portant sur 4400 cas observés entre 1947 et 1973 (troisième et dernière partie) [Diabetes mellitus and its degenerative complications: a prospective study of 4,400 patients observed between 1947 and 1973 (3rd and last part) (author's transl)]. *Diabète Metab*. 1977 Dec;3(4):245-56. French. PMID: 598565. <https://pubmed.ncbi.nlm.nih.gov/598565/>
- 3.- Ziegler D, Strom A, Lobmann R, Reiners K, Rett K, Schnell O. High prevalence of diagnosed and undiagnosed polyneuropathy in subjects with and without diabetes participating in a nationwide educational initiative (PROTECT study). *J Diabetes Complications*. 2015 Nov-Dec;29(8):998-1002. doi: 10.1016/j.jdiacomp.2015.09.008. Epub 2015 Sep 14. PMID: 26482177.
- 4.- Zhao, N., Xu, J., Zhou, Q. et al. Screening behaviors for diabetic foot risk and their influencing factors among general practitioners: a cross-sectional study in Changsha, China. *BMC Prim. Care* 24, 68 (2023). <https://doi.org/10.1186/s12875-023-02027-3>
- 5.- Young MJ, Boulton AJ, MacLeod AF, Williams DR, Sonksen PH. A multicentre study of the prevalence of diabetic peripheral neuropathy in the United Kingdom hospital clinic population. *Diabetologia*. 1993 Feb;36(2):150-4. doi: 10.1007/BF00400697. PMID: 8458529.
- 6.- Tiscé R, Pimentel R, Mazzeti P, Villena J. Elevada frecuencia de neuropatía periférica en pacientes con Diabetes mellitus tipo 2 de un hospital general de Lima-Perú. *Rev Med Hered*. 2013; 24:114-121. [http://www.scielo.org.pe/scielo.php?script=sci\\_arttext&pid=S1018-130X2013000200004](http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1018-130X2013000200004)
- 7.- Malik RA, Aldinc E, Chan SP, Deerochanawong C, Hwu CM, Rosales RL, Yeung CY, Fujii K, Parsons B. Perceptions of Painful Diabetic Peripheral Neuropathy in South-East Asia: Results from Patient and Physician Surveys. *Adv Ther*. 2017 Jun;34(6):1426-1437. doi: 10.1007/s12325-017-0536-5. Epub 2017 May 13. PMID: 28502036; PMCID: PMC5487881.
- 8.- Dyck PJ, Kratz KM, Karnes JL, Litchy WJ, Klein R, Pach JM, Wilson DM, O'Brien PC, Melton LJ 3rd, Service FJ. The prevalence by staged severity of various types of diabetic neuropathy, retinopathy, and nephropathy in a population-based cohort: the Rochester Diabetic Neuropathy Study. *Neurology*. 1993 Apr;43(4):817-24. doi: 10.1212/wnl.43.4.817. Erratum in: *Neurology* 1993 Nov;43(11):2345. PMID: 8469345.
- 9.- Dan Ziegler, Solomon Tesfaye, Vincenza Spallone, Irina Gurieva, Juma Al Kaabi, Boris Mankovsky, Emil Martinka, Gabriela Radulian, Khue Thy Nguyen, Alin O Stirban, Tsvetelina Tankova, Tamas Varkonyi, Roy Freeman, Peter Kempler, Andrew JM Boulton. Screening, diagnosis and management of diabetic sensorimotor polyneuropathy in clinical practice: International expert consensus recommendations. *diabetes research and clinical practice* 186 (2022) 109063. [https://www.diabetesresearchclinicalpractice.com/article/S0168-8227\(21\)00422-8/pdf](https://www.diabetesresearchclinicalpractice.com/article/S0168-8227(21)00422-8/pdf)
- 10.- Price R, Smith D, Franklin G, Gronseth G, Pignone M, David WS, Armon C, Perkins BA, Brill V, Rae-Grant A, Halperin J, Licking N, O'Brien MD, Wessels SR, MacGregor LC, Fink K, Harkless LB, Colbert L, Callaghan BC. Oral and Topical Treatment of Painful Diabetic Polyneuropathy: Practice Guideline Update Summary: Report of the AAN Guideline Subcommittee. *Neurology*. 2022 Jan 4;98(1):31-43. doi: 10.1212/WNL.0000000000013038. PMID: 34965987.

