Revista de Ciencias Médicas de Pinar del Río

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

ORIGINAL ARTICLE

Factors associated with diabetic foot in patients aged 40 to 60 years with type 2 diabetes mellitus

Factores asociados al pie diabético en pacientes de 40 a 60 años con diabetes mellitus tipo 2

Mely Anahi Castro-Galarraga[1] , **Julio Rodrigo Morillo-Cano**[1]

[1]Universidad Regional Autónoma de los Andes (UNIANDES). Tulcan, Ecuador.

Received: January 16, 2025
Accepted: January 20, 2025
Published: January 23, 2025

Citar como: Castro-Galarraga MA, Morillo-Cano JR. Factores asociados al pie diabético en pacientes de 40 a 60 años con diabetes mellitus tipo 2. Rev Ciencias Médicas [Internet]. 2025 [citado: fecha de acceso]; 29(2025): e6639. Disponible en: http://revcmpinar.sld.cu/index.php/publicaciones/article/view/6639

ABSTRACT

Introduction: Considering the knowledge about diabetes mellitus, which is one of the main pathologies that have meant a public health problem worldwide.
Objective: To determine the factors associated with the presence of diabetic foot in patients aged 40 to 60 years with type 2 diabetes mellitus.
Methods: Systemic approach and included as study population the nursing staff who care for patients with type 2 diabetes mellitus.
Result: Diabetic foot is a pathology that arises as a complication of diabetes mellitus. The prevalence of this pathology is above average for the male gender. Regarding the factors with the highest incidence in relation to diabetic foot, it was found that the majority of the population determines factors associated with lifestyle; while another part of the population mentions that it was due to factors related to pharmacological treatment.
Conclusion: The main factors associated with the presence of diabetic foot are in patients between 40 and 60 years of age, being a long-term complication, which originates from diabetes mellitus 2 and consists of the presence of lesions in the deep tissues belonging to the lower extremities.

Key words: Diabetic Foot; Diabetes Mellitus, Type 2; Associated Factors.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

RESUMEN

Introducción: Teniendo en cuenta el conocimiento acerca de la diabetes mellitus que es una de las principales patologías que han significado un problema de salud pública mundialmente.
Objetivo: determinar los factores asociados a la presencia del pie diabético en pacientes de 40 a 60 años con Diabetes Mellitus tipo 2.
Métodos: enfoque sistémico y acogió como población de estudio al personal de enfermería que asisten a pacientes con diabetes mellitus tipo 2.
Resultado: El pie diabético es una patología que surge como complicación de la diabetes mellitus La prevalencia de esta patología esta sobre la media para el género masculino. En relación a los factores de mayor incidencia con relación al pie diabético, se pudo conocer que la mayoría poblacional determina factores asociados a los estilos de vida; mientras que otra parte de la población menciona que se dio por factores relacionados al tratamiento farmacológico.
Conclusión: los principales factores asociados a la presencia del pie diabético son en pacientes de entre 40 a 60 años siendo una complicación a largo plazo, que se origina a causa de la diabetes Mellitus 2 y consiste en la presencia de lesiones en los tejidos profundos pertenecientes a las extremidades inferiores.

Palabras Clave: Pie Diabético; Diabetes Mellitus Tipo 2; Factores Asociados.

INTRODUCTION

Diabetes Mellitus is considered one of the main public health problems worldwide because it has a high prevalence and generates a high impact on the quality of life of people who suffer from it. It is estimated that it has a prevalence of 8,8 % worldwide, with an age between 20 and 79 years, while in Latin America it has a prevalence of 9,9 %.[1] It is a disease that generates a series of complications that drastically decrease the life expectancy of each of the people who suffer from it, especially those who do not maintain adequate medical control of this pathology.[2] Annually, 1.5 million deaths are caused by diabetes; and 2,2 million deaths are attributed to certain forms of hyperglycemia.[3]

It is a chronic non-communicable disease that has a series of metabolic disorders due to a partial or total lack of insulin.[4] On the other hand, diabetes mellitus is established as a public health problem that occurs continuously in the population worldwide. It is characterized by being a metabolic disorder of various etiologies; in this pathology, main aspects are identified such as: chronic hyperglycemia that appears due to internal alterations of the metabolic components. Diabetes also presents vascular diseases, since its symptoms affect the cardiovascular system generating secondary health complications.[5]

Type 2 Diabetes Mellitus, for its part, is considered one of the four chronic non-communicable diseases that has the highest priority in the current situation. It is classified as an endocrine-metabolic disease characterized by high morbidity and mortality rates worldwide, characterized by the presence of hyperglycemia caused by a deficient action of insulin and the inability of insulin-sensitive tissues to respond to it.[6]

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

Being a chronic metabolic disease, it causes damage to the cardiovascular system, eyes, kidneys and nerves. More than 90 % of cases of diabetes mellitus are DM2, a condition characterized by deficient insulin secretion by the β cells of the pancreatic islets, tissue resistance to insulin (IR) and an inadequate compensatory insulin secretory response.[7] The organs involved in the development of DM2 include the pancreas (β cells and α cells), liver, skeletal muscle, kidneys, brain, small intestine and adipose tissue.[8]

The level of morbidity and mortality due to diabetes and its possible complications are many and cause significant health problems for both the family and society.[9] The main complication generated by this pathology is diabetic neuropathy, which causes direct damage to the nerves that generate pain or numbness in the feet, including effects on the heart and bladder.[10] This complication is directly identified as diabetic foot.

Diabetic foot is a long-term complication caused by diabetes and consists of the presence of lesions in the deep tissues of the lower extremities, which are associated with neurological disorders and peripheral vascular disease. This pathology is detrimental and negatively affects the quality of life and well-being of people who suffer from it, causing social, economic and health problems.[11]

Diabetic foot is a pathology characterized by the presence of ulcerations, infections or the appearance of gangrene in the foot; which is directly related to diabetic neuropathy and to the different levels or degrees of peripheral vascular disease. In this way, it constitutes a public health problem that interferes with the integral development of the person.[12]

It is estimated that diabetic foot is a growing pathology worldwide, estimating that 25 % of people with diabetes suffer from it, since sometimes they are victims of the appearance of ulcers on their feet. The general age of onset of this pathology is between 45-65 years. 35 % of people who suffer from diabetic foot have shown an evolution towards a complex lesion that interferes with their quality of life and 40 % of these patients have the probability of developing gangrene in the foot.[13]

Diabetic foot presents several risk factors that increase the probability that patients with diabetes can acquire it, these factors are: peripheral neuropathy (occurs in 16-66 %, which occurs if there is no adequate diabetic control, causes such as toxins, hypothyroidism, kidney disease, vitamin B12 deficiency, cancer and vasculitis must be ruled out); peripheral arterial disease (occurs due to complications at the macrovascular level, which helps the development of ischemia in the extremities) and foot deformity (irreducible contractures that are not corrected manually such as hallux valgus, hammer toes, claw toes).[14]

Diabetes is a common disease among the population and is very common worldwide. If not controlled properly, it can cause serious health complications such as diabetic foot, which is known as a leading cause of mortality among patients with diabetes. It is important to know that there are several factors that are associated with the development of diabetic foot and that they must be controlled correctly to prevent the progression of this pathology.

The present investigation aimed to determine the factors associated with diabetic foot in patients with type II diabetes mellitus.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

METHODS

A basic, descriptive and cross-sectional research was carried out at the Autonomous Regional University of the Andes "UNIANDES" during the period of the year 2024. The Universe was made up of 425 patients. A sampling was usedsimple random to select the sample of 159 patients, who have given their informed consent to participate in the research.

For the analysis of the information through inferential statistics, the following dependent variables were defined: Risk of developing diabetic foot
Independent Variable: Diabetic neuropathy, time of diagnosis, type of treatment, comorbidities.

The main methods of data collection used were:

Scientific observation: this type of observation made it possible to analyze and characterize the sample.

Documentary Analysis: a study of the database available through the Internet was carried out in order to collect information and statistics from reports to give scientific prominence to the research.

In relation to the methods of the theoretical level:

Historical – logical: this method made it possible to analyze previous research on the subject of study, to verify its importance within the population of patients diagnosed with Type II Diabetes Mellitus, in relation to their health status and evolution of the pathology.

Inductive – deductive: a general to specific analysis was established regarding the factors associated with diabetic foot.

Analytical – synthetic: enabled the analysis and study of information about the research topic to synthesize the results appropriately.

Systemic approach: This approach allowed maintaining a logical order within the study, allowing for a sequential and adequate structure to be maintained for understanding the results.

RESULTS

Referring to graph 1 on the level of action in the face of factors associated with diabetic foot in patients aged 40 to 60 years with type 2 diabetes mellitus, it was found that the majority of the population, with 45 %, deduces it as good; while 35 % determines it as very good and finally 20 % assumes it as excellent. In this way, it is known that the level of action is positive.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

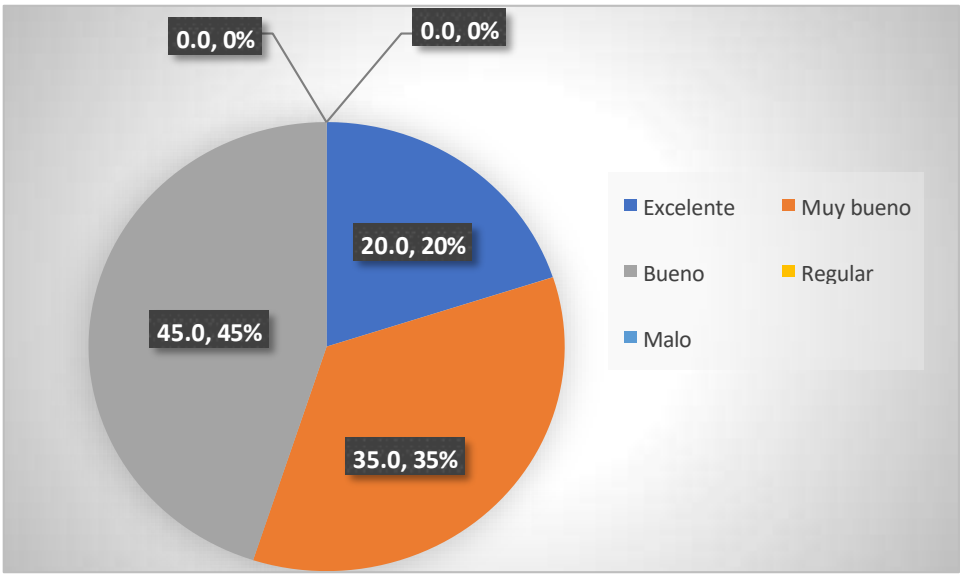

Chart. 1 Action against diabetic foot factors.

In the assessment of graph 2, a history of injury due to diabetic decompensation has been presented, 100 % stated yes. In this way it is determined that all have this history.

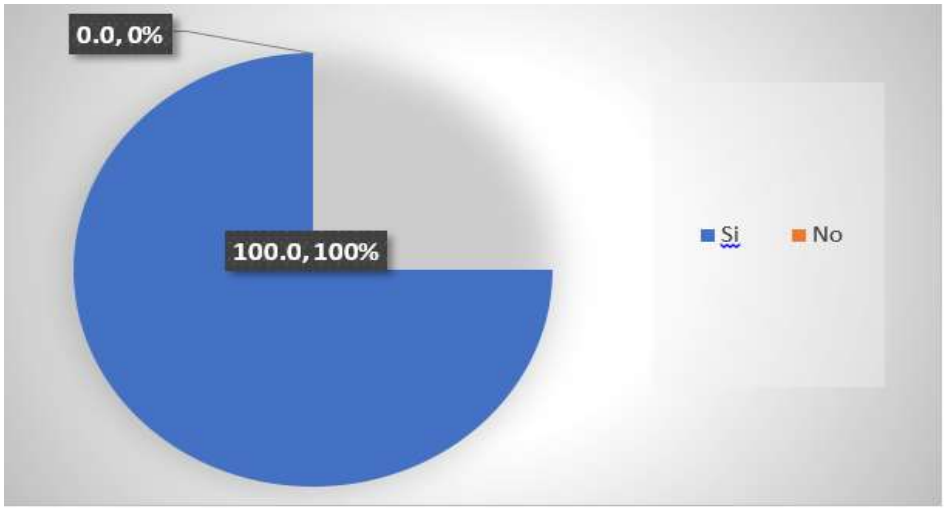

Chart. 2 Injury due to diabetic decompensation.

Regarding graph 3, it is defined that the time of evolution of diabetes since its diagnosis; it was known that the majority of the population with 75 % recognizes from their experience that it is more than 10 years. On the contrary, 25 % of the population says that it is less than 10 years. It was determined that from the diagnosis of diabetes more than 10 years must pass to show evolution of this pathology.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

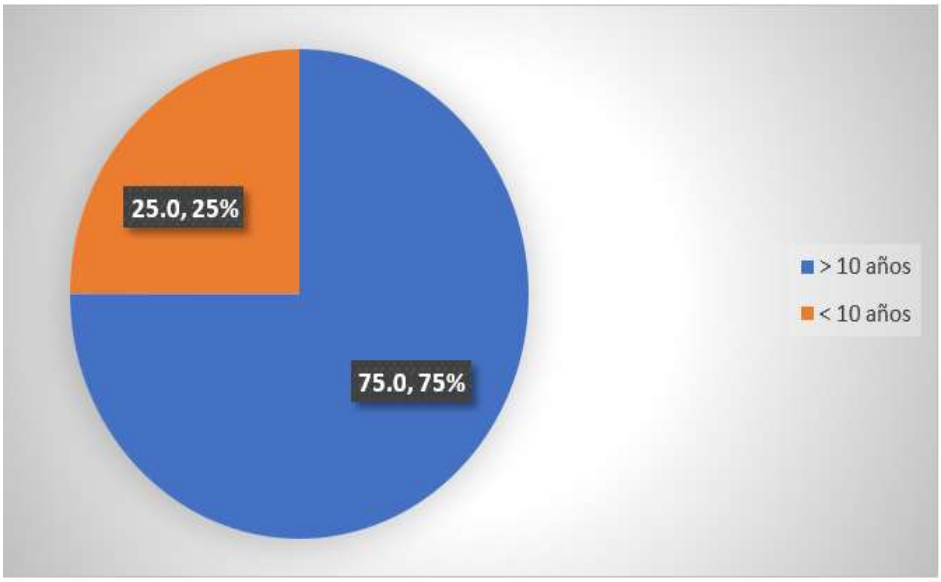

Chart. 3 Evolution of diabetes since diagnosis.

Referring to Chart 4 on patients who are taking some type of diabetes treatment, it was found that 95 % of the population are on a combination treatment, while 15 % of the population reports receiving insulin therapy. This means that combined treatments for diabetes are more frequently needed.

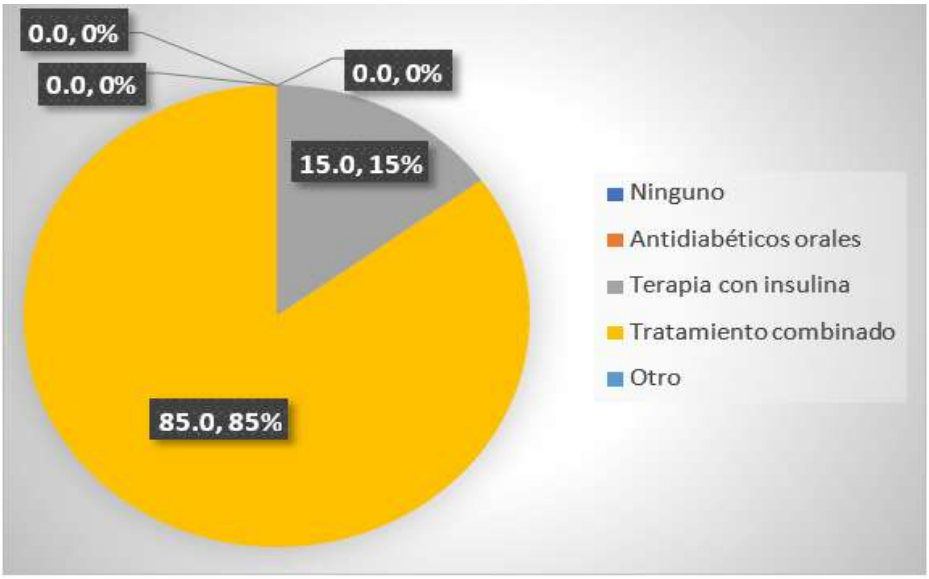

Chart. 4 Diabetes treatment.

Referring to Chart 5 of the comorbidity registry, it was found that 55 % of the population does not present any type of comorbidity, while 35 % have cardiovascular diseases and 10 % have hypertension. It can be interpreted that there is greater comorbidity for cardiovascular diseases.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

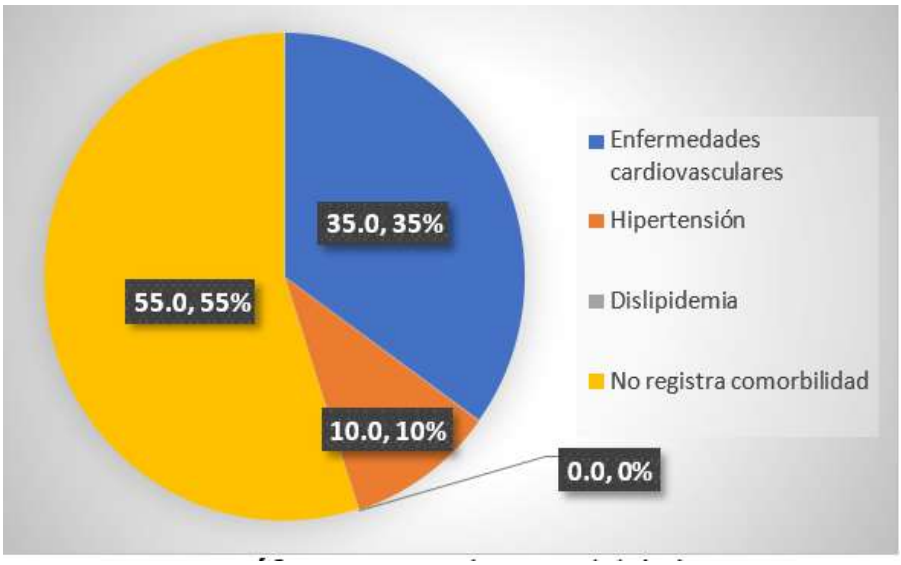

Chart. 5 Comorbidity registry.

DISCUSSION

After collecting primary information, a study revealed that the majority of the population of people between 40 and 60 years of age with type 2 diabetes mellitus, who were part of the study sample, represent around 45 % for the female gender and 55 % for the male gender, meaning that the majority of the population of those with diabetic foot is male.

Which agrees with the study developed by Núñez,[15] because through this study it was possible to determine that the prevalence of diabetic foot corresponds to a percentage of 15,83 % of a total of 35 patients; in turn it was possible to know that this pathology has a higher prevalence in the male gender.

On the contrary, according to the study carried out by Iglesias in 2021, it was found that the prevalence of diabetic foot is for the female gender in patients over 40 years of age. Likewise, it was found through the same study that these patients mostly belong to the urban area.

While this study revealed that, in terms of the origin of the patients, there is no majority population, since 50 % are from the urban sector and the other 50 % are from the rural sector. Likewise, it was found that in relation to the factors associated with diabetic foot, this study showed a higher incidence of factors associated with lifestyle, followed by factors associated with pharmacological treatment.

In relation to this, according to the study developed by Núñez,[15] it was also known that among the most prevalent factors that influence diabetic foot are: obesity, alcoholism, smoking, high blood pressure and arterial insufficiency.

On the other hand, but within the same context, it was possible to learn in the development of this study for patients, that 45 % state that the level of action against factors associated with diabetic foot in patients aged 40 to 60 years with type 2 diabetes mellitus is good; while 35% say that the action is very good.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

For its part, according to the study by Da Cunha,[16] it was known that nursing care is related to the professional's own knowledge of the diabetic foot, which is of extreme need and great concern within the health system.

Regarding the presence of lesions due to diabetic decompensation, this study determined that 100 % of the patient population has experienced this circumstance as a background to their disease. Whereas, in relation to the time of evolution of diabetes since the date of diagnosis, the majority of the population, 75 %, states that it may take more than 10 years to show improvement.

This perspective is consistent with the findings of the study developed by, which mentions that it takes seven years for people with type 1 diabetes to regulate insulin production; while for patients with type 2 diabetes, recovery takes longer. Likewise, it was determined through this developed study that it is necessary for the nursing area to receive constant training for this type of cases; likewise, in relation to the treatments that patients with diabetes must follow, determining that the majority of the population receives a combined treatment for the various ailments inherent to the disease.

CONCLUSIONS

Diabetic foot is a long-term complication caused by diabetes and consists of the presence of lesions in the deep tissues of the lower extremities, which is associated with neurological disorders and peripheral vascular disease. It is characterized by the presence of ulcerations, infections or gangrene in the foot, which is directly related to diabetic neuropathy. The study population is characterized by patients between 40 and 60 years of age who suffer from type 2 diabetes mellitus, of which there is a higher prevalence of diabetic foot disease in the male gender with 55 %. Likewise, it was known that the majority of the population belongs to urban areas. With reference to the main factors associated with the presence of diabetic foot in patients aged 40 to 60 years with type 2 Diabetes Mellitus, it was determined that the prevalence for the acquisition of this disease was due to the lifestyles of people prior to diagnosis.

BIBLIOGRAPHIC REFERENCES

1. Atamari N, Ccorahua M, Taype A, Mejía C. Mortality attributable to diabetes mellitus as recorded by the Ministry of Health of Peru, 2005-2014. Revista Panamericana de Salud Pública [Internet]. 2018 [Citado 20/12/2024]; 42(28): e50. Disponible en: https://iris.paho.org/handle/10665.2/34969

2. Cole J, Florez J. Genetics of diabetes mellitus and diabetes complications. Nature Reviews Nephorology [Internet]. 2020 [Citado 20/12/2024]; 16(7): 377-390. Disponible en: https://pubmed.ncbi.nlm.nih.gov/32398868/

3. Altamirano L, Vásquez M, Cordero G, Álvarez R, Añez R, Rojas J, et al. Prevalencia de la diabetes mellitus tipo 2 y sus factores de riesgo en individuos adultos de la ciudad de Cuenca-Ecuador. Avances en Biomedicina [Internet]. 2017 [Citado 20/12/2024]; 6(1):10-21. Disponible en: https://www.redalyc.org/journal/3313/331351068003/html/

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

4. Lazo C, Durán S. Efecto del diagnóstico de la diabetes mellitus y su complicación con los trastornos de la conducta alimentaria. Revista chilena de nutrición [Internet]. 2019 [Citado 20/12/2024]; 46(3): *352-360*. Disponible en: https://pesquisa.bvsalud.org/portal/resource/pt/biblio-1003714

5. Menéndez M, Riesgo S, Carballo X. El pie diabético: etiología y tratamiento. Revista para profesioanles de la salud [Internet]. 2019 [Citado 20/12/2024]; 3(29): 70-90. Disponible en: https://www.npunto.es/revista/29/enfermeria-y-diabetes-el-pie-diabetico-etiologia-y-tratamiento

6. Rodríguez M, Mnedoza M. Factores de riesgo de diabetes mellitus tipo 2 en población adulta. Barranquilla, Colombia. Revista Colombiana de Endocronología, Diabetes & Metabolismo [Internet]. 2019 [Citado 20/12/2024]; 6(2). Disponible en: file:///C:/Users/User/Downloads/_endocrino2017,+Journal+manager,+4-+Factores+de+riesgo+de+diabetes+mellitus+tipo+2.pdf

7. Eizirik D, Pascuali L, Cnop M. Células β pancreáticas en diabetes mellitus tipo 1 y tipo 2: diferentes caminos hacia el fracaso. Natures Reviewa Endocrinology [Internet]. 2020 [Citado 20/12/2024]; 16(7): 349-362. Disponible en: https://pubmed.ncbi.nlm.nih.gov/32398822/

8. Galicia U, Asier B, Jabari S, Larrea A, Siddiqi H, Uribe K, et al. Fisiopatología de la Diabetes Mellitus Tipo 2. MDPI [Internet]. 2020 [Citado 20/12/2024]; 21(17): 6275. Disponible en: https://www.mdpi.com/1422-0067/21/17/6275

9. Ronquillo Pillajo WV, Loor bbriones JC, Olivo Gonnzález MA. Factores determinantes y complicaciones en pacientes diabéticos. Más Vita[Internet]. 2023 [Citado 20/12/2024]; 5(2): 94-106. Disponible en: https://doi.org/10.47606/ACVEN/MV0199

10. Xavier D, Umbelino T, Alves A, Rocha L, Rabelo L, Veras K, et al. Estrategias de rehabilitación con fisioterapia en pacientes con neuropatía diabética: Una revisión sistemática. Sustinere: Revista de Salud y Educación [Internet]. 2021 [Citado 20/12/2024]; 9(1). Disponible en: https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.e-publicacoes.uerj.br/sustinere/article/download/45639/39565/221358

11. Díaz J. Aspectos clínicos y fisiopatológicos del pie diabético. Medicina Interna México [Internet]. 2021 [Citado 20/12/2024]; 37(4): 540-550. Disponible en: https://www.medigraphic.com/pdfs/medintmex/mim-2021/mim214i.pdf

12. González H, Berenguer M, Mosquera A, Quintana M, Sarabia R, Verdú J. Clasificaciones de lesiones en pie diabético II. El problema permanece. Gerokomos [Internet]. 2018 [Citado 20/12/2024]; 29(4): 197-209. Disponible en: https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1134-928X2018000400197

13. García A. El pie diabético en cifras. Apuntes de una epidemia. Revista Médica Electrónica [Internet]. 2016 [Citado 20/12/2024]; 38(4): 514-516. Disponible en: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1684-18242016000400001

14. Ministerio de Salud de Chile. Orientación Técnica. Manejo Integral del Pie Diabético[Online]. Chile; 2018 [cited 20/12/2024]. Available from: https://www.capacitacionesonline.com/blog/wp- content/uploads/2019/07/Orientaci%C3%B3n-T%C3%A9cnica-Manejo-integral- del-pie-diab%C3%A9tico.-MINSAL-Chile-2018.pdf.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 28(2025): e6639

15. Núñez Ocaña, Paulina del Rocío. Prevalencia de pie diabético en el servicio de curaciones del Hospital General Docente Riobamba [Tesis]. Unach. Riobamba; 2019 [Citado 20/12/2024]. Disponible en: http://dspace.unach.edu.ec/handle/51000/602

16.da CUNHA A. Atención de enfermería a paciente con pie diabético**.** Rev Científica Multidisciplinar Núcleo do Conocimiento[Internet]. 2021[Citado 20/12/2024]; 12: 111-126. Disponible en: https://www.nucleodoconhecimento.com.br/salud/pie-diabetico