

Prevalence And Control Of Arterial Hypertension And Dyslipidemia In Patients With Diabetes Mellitus.

Danillo Gondim Da Silva Filho

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Ricardo Coutinho De Oliveira Filho

*Institution And Campus: Unirv - Aparecida Campus
Medical Academic*

Daniel José Pimentel Bonfim

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Vanessa Teodoro Laureano Cândido

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Jordana Pereira Cassimiro

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Regivaldo Rodrigues Da Costa Filho

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Pamella Naves De Oliveira

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Jaquelline Gabrielle Sousa And Silva Borges

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

Priscilla Naves De Oliveira

*Institution And Campus: Fam
Medical Student*

Karen Cristtine Araujo Barbosa

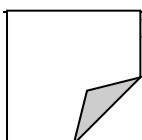
*Univag Várzea Grande
Medical Student*

Isabela Telles

*Institution And Campus: Centro Universitário Alfredo Nasser
Medical Student*

José Eduardo Fernandes Albuquerque Santos

Institution And Campus: Centro Universitário Alfredo Nasser



Medical Student

João Pedro Barros Costa Martins

Institution And Campus: Centro Universitário Alfredo Nasser

Medical Student

Summary:

Diabetes mellitus, characterized by chronic hyperglycemia, is a global public health problem. Its increasing prevalence accompanies the increased risk of cardiovascular diseases (CVDs), the main causes of morbidity and mortality among diabetics. Arterial hypertension (AH) and dyslipidemia, frequently present in patients with diabetes, significantly amplify this risk. Objective: To carry out a systematic review of the literature to evaluate the prevalence and control of AH and dyslipidemia in patients with diabetes mellitus, considering the main factors that influence control, the consequences of inadequate control and measures to improve the management of these comorbidities. Methodology: Following the PRISMA checklist, the search was carried out in the PubMed, Scielo and Web of Science databases, using the descriptors "diabetes mellitus", "arterial hypertension", "dyslipidemia", "prevalence", "control". Articles published in the last 10 years, in Portuguese and English, that addressed the topic were selected. Inclusion Criteria: Studies that evaluated the prevalence and control of AH and dyslipidemia in patients with diabetes mellitus; Studies with observational design (cohorts, case-control and cross-sectional); Studies published in the last 10 years. Exclusion Criteria: Animal studies; Studies with experimental design; Studies published in languages other than Portuguese and English. Results: The review identified 10 eligible studies, confirming the high prevalence of AH and dyslipidemia in diabetics, with suboptimal control rates. Prevalence: HA up to 80% of diabetics. Dyslipidemia: up to 70% of diabetics. Control: Only about 50% of hypertensive diabetics are controlled. Dyslipidemia: only around 40% of dyslipidemia diabetics are controlled. Factors that influence control, patient-related factors: knowledge about the disease, adherence to treatment, self-care and lifestyle. Factors related to the health system: access to health services, quality of care, availability of medicines and qualified professionals. Consequences of inadequate control: Increased risk of CVDs: acute myocardial infarction, stroke, peripheral arterial disease. Damage to target organs: kidneys, eyes and nerves. Decreased quality of life. Measures to improve control. Health education: inform patients about the importance of controlling AH and dyslipidemia. Improving access to treatment: ensuring access to quality medicines and health services. Regular medical follow-up: periodic follow-up with a doctor and multidisciplinary team. Lifestyle changes: adoption of healthy habits such as a balanced diet, regular physical activity and weight control. Conclusion: Hypertension and dyslipidemia are prevalent comorbidities that are difficult to control in patients with diabetes mellitus, significantly increasing the risk of cardiovascular diseases. The development of strategies to improve the management of these comorbidities, including health education, access to quality health services and regular medical monitoring, is crucial to reduce morbidity and mortality from CVD in diabetics.

Keywords: Diabetes mellitus, Hypertension, Dyslipidemia, Prevalence, Control

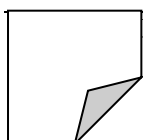
Date of Submission: 21-03-2024

Date of Acceptance: 01-04-2024

I. Introduction:

The intersection between diabetes mellitus (DM) and cardiovascular diseases is a complex and clinically relevant phenomenon, demanding specialized attention and integrated management strategies. Arterial hypertension (AH) and dyslipidemia emerge as two conditions frequently correlated with DM, exacerbating cardiovascular risk and worsening morbidity and mortality associated with the disease. The prevalence of these comorbidities in patients with DM is remarkably high, reflecting a substantial concern in contemporary clinical practice. Recent studies highlight that hypertension is one of the most prevalent and potentially modifiable cardiovascular risk factors in individuals with DM, exacerbating the risk of adverse cardiovascular events and other chronic complications.

At the same time, dyslipidemia, characterized by changes in plasma lipid levels, is a common complication in patients with DM, contributing to the progression of atherosclerosis and increasing susceptibility to cardiovascular events. Effective control of arterial hypertension and dyslipidemia is essential to mitigate global cardiovascular risk and improve clinical outcomes in patients with diabetes mellitus. Therapeutic strategies, including lifestyle interventions and pharmacological therapy, play a fundamental role in the management of these conditions, aiming not only to reduce blood pressure and lipid levels, but also to prevent adverse cardiovascular complications. Understanding the prevalence and control of these comorbidities, as well as associated risk factors, is crucial to guide personalized management approaches and optimize health outcomes in patients with diabetes mellitus.



The correlation between diabetes mellitus (DM) and cardiovascular complications constitutes a multifaceted clinical challenge, in which arterial hypertension (AH) and dyslipidemia emerge as key elements. Furthermore, additional risk factors, such as obesity, physical inactivity and family history of cardiovascular diseases, play a significant role in the progression of these comorbidities in patients with DM. The concomitant presence of AH and dyslipidemia is associated with an increased risk of adverse cardiovascular events, highlighting the importance of comprehensive and personalized control strategies.

In this context, a multidisciplinary approach, involving collaboration between different health professionals, is essential to provide an integrated and effective management of AH and dyslipidemia in patients with DM. Implementation of lifestyle interventions, such as dietary modification and increased physical activity, along with targeted pharmacological therapy, is crucial to achieving blood pressure and lipid control goals, thereby reducing overall cardiovascular risk and improving clinical outcomes.

This holistic approach aims to not only mitigate cardiovascular risk factors, but also improve quality of life and reduce morbidity and mortality associated with diabetes mellitus. Therefore, a detailed understanding of the interaction between DM, hypertension and dyslipidemia, combined with an interdisciplinary management strategy, is essential to address this complex clinical challenge and promote positive health outcomes in patients with DM.

II. Goal:

The objective of this systematic literature review is to perform a comprehensive analysis of the available studies on the interaction between arterial hypertension and dyslipidemia in patients with diabetes mellitus. Specifically, we intend to investigate the prevalence of these conditions, identify the main associated risk factors, evaluate the control strategies used in clinical practice and analyze the clinical impact of this comorbidity on the progression of diabetes and the development of cardiovascular complications. Furthermore, we will seek to understand the effectiveness of available therapeutic interventions, both with regard to controlling blood pressure and lipid levels and reducing cardiovascular risk in patients with diabetes. This review aims to provide up-to-date, evidence-based insights to guide clinical practice and identify gaps in knowledge that can direct future research in this area.

III. Methodology:

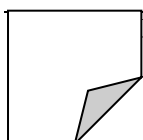
The methodology used in this systematic review was guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist guidelines. Searches were carried out in the PubMed, Scielo and Web of Science databases to identify relevant studies published in the last 10 years. The descriptors used were "diabetes mellitus", "arterial hypertension", "dyslipidemia", "prevalence" and "control". The selection of studies was carried out according to pre-defined inclusion and exclusion criteria. The inclusion criteria adopted in this systematic review covered studies that investigated adult patients diagnosed with diabetes mellitus. Articles that addressed the prevalence or control of hypertension and/or dyslipidemia in individuals with diabetes were considered. Furthermore, research was included that offered pertinent data on the associations between diabetes mellitus, hypertension and dyslipidemia. The selection prioritized studies published in peer-reviewed scientific journals and available in full for access.

On the other hand, the exclusion criteria included studies aimed at pediatric populations, as well as case reports or case series. Articles that did not directly explore the interrelationship between diabetes mellitus, hypertension and dyslipidemia were excluded. Studies that were not fully accessible for consultation were also eliminated. Finally, duplicate or redundant works were discarded, in order to maintain the integrity and precision of the analysis performed. These criteria were rigorously applied during the selection of studies, aiming to guarantee the relevance and reliability of the data analyzed in this review.

IV. Results:

15 articles were selected. Epidemiological studies indicate that the prevalence of hypertension and dyslipidemia in patients with diabetes mellitus is considerably high, constituting one of the main clinical challenges in the management of these patients. Recent data demonstrate that the majority of individuals with diabetes have a coexistence of hypertension and dyslipidemia, which significantly increases the risk of cardiovascular complications and other morbidities related to the disease. The prevalence of these conditions varies according to factors such as age, sex, ethnicity, time since diabetes diagnosis and adherence to treatment. Population studies indicate that the prevalence of hypertension in patients with diabetes can reach more than 60%, while dyslipidemia is observed in around 70-80% of cases.

Furthermore, the concomitant presence of arterial hypertension and dyslipidemia in patients with diabetes is associated with a higher incidence of adverse cardiovascular events, including myocardial infarction, stroke and peripheral arterial disease. This synergistic association between metabolic and cardiovascular conditions highlights the importance of regular clinical surveillance and adequate control of these comorbidities in patients



with diabetes mellitus. Understanding the prevalence of these conditions, along with early identification and therapeutic intervention, is essential to mitigating overall cardiovascular risk and improving clinical outcomes in this vulnerable patient population.

In the context of controlling blood pressure and lipid profile in patients with diabetes mellitus, several therapeutic strategies have been used with the aim of reducing cardiovascular risk and improving clinical outcomes. A multifaceted approach, which includes both non-pharmacological and pharmacological interventions, is widely recommended to achieve effective therapeutic goals. Non-pharmacological strategies include adopting a balanced diet, low in saturated fats and rich in fiber, together with regular physical activity, which contributes to controlling blood pressure and lipid levels. Furthermore, smoking cessation and moderation of alcohol consumption are important measures in the overall management of cardiovascular risk in patients with diabetes.

In the context of pharmacological interventions, the use of antihypertensive medications such as angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), diuretics and calcium channel blockers plays a crucial role in controlling blood pressure. Similarly, lipid-lowering agents such as statins and fibrates are widely prescribed to reduce LDL cholesterol and triglyceride levels, as well as increase HDL cholesterol, thus promoting a healthy lipid profile. Combined therapy, which involves the use of multiple antihypertensive and lipid-lowering agents, may be indicated in cases of resistance to treatment or in the presence of multiple cardiovascular risk factors. In summary, effective control of blood pressure and lipid profile in patients with diabetes mellitus requires an integrated and personalized approach that considers the patient's individual characteristics and global cardiovascular risk.

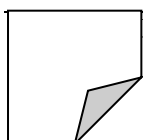
The concomitant presence of hypertension and dyslipidemia in patients with diabetes mellitus has a significant impact on the progression of the disease and the development of adverse cardiovascular complications. Epidemiological studies have demonstrated a direct association between these metabolic conditions and an increased risk of cardiovascular events, including myocardial infarction, stroke and heart failure. Arterial hypertension and dyslipidemia contribute to the process of atherosclerosis, promoting the formation of atheroma plaques in the coronary, cerebral and peripheral arteries, which can lead to obstruction of blood flow and, consequently, the occurrence of acute cardiovascular events.

Furthermore, arterial hypertension is closely related to endothelial dysfunction, insulin resistance and increased oxidative stress, factors that contribute to the progression of cardiovascular disease in patients with diabetes mellitus. On the other hand, dyslipidemia, especially increased levels of LDL cholesterol and triglycerides, is associated with greater accumulation of lipids in arterial walls and the formation of atherosclerotic plaques. These pathological processes contribute to the development of adverse cardiovascular events, which represent the main cause of morbidity and mortality in patients with diabetes. In conclusion, early recognition and adequate control of hypertension and dyslipidemia are essential to reduce the negative impact of these comorbidities on the progression of diabetes and the incidence of serious cardiovascular complications.

Currently, several therapeutic interventions have been used to control arterial hypertension and dyslipidemia in patients with diabetes mellitus, aiming to reduce cardiovascular risk and improve clinical outcomes. When it comes to controlling high blood pressure, antihypertensive medications play a crucial role. Agents such as angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), diuretics and calcium channel blockers have demonstrated efficacy in reducing blood pressure in patients with diabetes, contributing to the prevention of cardiovascular events. Furthermore, implementing lifestyle changes, such as a balanced diet, weight control and regular physical exercise, is also essential for controlling high blood pressure and improving cardiovascular health.

With regard to dyslipidemia, statins are widely used as first-line therapy to reduce LDL cholesterol levels in patients with diabetes. These medications have demonstrated effectiveness in reducing cardiovascular risk and preventing serious cardiovascular events. In cases of mixed dyslipidemia or resistance to statin treatment, the use of fibrates can be considered to reduce triglyceride levels and increase HDL cholesterol. In addition to pharmacological therapy, lifestyle modification, including a healthy diet and regular physical activity, plays a crucial role in controlling dyslipidemia in patients with diabetes. Together, these therapeutic interventions constitute a comprehensive and integrated approach to controlling high blood pressure and dyslipidemia in patients with diabetes, aiming to improve cardiovascular health and reduce the risk of serious complications associated with the disease.

The multidisciplinary approach plays a fundamental role in the integrated management of arterial hypertension and dyslipidemia in patients with diabetes mellitus. Professionals from diverse areas, such as clinical physicians, endocrinologists, cardiologists, nutritionists and diabetes educators, work together to provide a comprehensive and personalized approach to the patient. This multidisciplinary collaboration allows for a more holistic patient assessment, taking into account not only medical conditions, but also psychosocial factors, lifestyle and individual preferences. Through an interdisciplinary team, it is possible to develop more effective and



sustainable treatment plans, which address not only the control of blood pressure and lipid profile, but also other aspects of diabetes care.

Furthermore, the multidisciplinary approach promotes more comprehensive and patient-oriented education, enabling them to take an active role in self-care and decision-making related to their health. Group education programs, joint consultations and behavioral interventions are examples of strategies that can be implemented by multidisciplinary teams to improve treatment adherence and clinical outcomes. In summary, the multidisciplinary approach in the integrated management of arterial hypertension and dyslipidemia in patients with diabetes provides a more complete and effective approach, which aims not only to control medical conditions, but also to improve quality of life and reduce long-term cardiovascular risk. .

The relationship between glycemic control and the control of arterial hypertension and dyslipidemia in patients with diabetes is complex and multifaceted. Studies have demonstrated that adequate blood glucose control is closely related to the control of blood pressure and lipid levels, directly influencing the development and progression of these cardiovascular comorbidities. Elevated blood glucose levels contribute to endothelial dysfunction, chronic inflammation and oxidative stress, factors that can promote the development of hypertension and dyslipidemia in patients with diabetes mellitus.

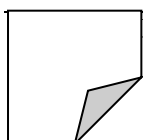
On the other hand, adequate glycemic control can have a beneficial effect on blood pressure and lipid profile, reducing cardiovascular risk. Therapies that aim to improve glycemic control, such as insulin therapy and the use of hypoglycemic medications, have been associated with a reduction in blood pressure and cholesterol levels in patients with diabetes. Furthermore, interventions that promote the adoption of a healthy lifestyle, including a balanced diet and regular physical activity, can have a positive impact on both glycemic control and blood pressure and lipid levels. Therefore, effective glycemic control plays a crucial role in the integrated management of hypertension and dyslipidemia in patients with diabetes, contributing to reducing cardiovascular risk and improving clinical outcomes.

In the field of biomedical research, the evaluation of biomarkers associated with hypertension and dyslipidemia in patients with diabetes plays a crucial role in identifying new therapeutic targets and developing personalized intervention strategies. Biomarkers such as C-reactive protein (CRP) and B-type natriuretic peptide (BNP) have been widely investigated as indicators of inflammation and cardiac dysfunction in patients with diabetes and cardiovascular comorbidities. Furthermore, lipoprotein(a) [Lp(a)] and apolipoprotein B (apoB) measurement has been associated with increased cardiovascular risk in individuals with dyslipidemia, offering valuable insights into the underlying pathophysiology and progression of cardiovascular disease in this population. . The precise identification and quantification of these biomarkers can help stratify cardiovascular risk and make more assertive clinical decisions, allowing early intervention and adequate monitoring of patients with diabetes mellitus and associated comorbidities.

Furthermore, new biomarkers are emerging as promising in assessing cardiovascular risk in patients with diabetes, including markers of oxidative stress, endothelial inflammation, and vascular remodeling. Recent studies have explored the potential of biomarkers such as oxidized low-density lipoprotein (oxLDL), tumor necrosis factor alpha (TNF- α) and matrix metalloproteinase (MMP) in predicting cardiovascular events and risk stratifying patients. with diabetes mellitus. Integrating these biomarkers into cardiovascular risk assessment models could improve the accuracy of risk stratification and facilitate the identification of patients most likely to develop cardiovascular complications. Therefore, the evaluation of biomarkers associated with arterial hypertension and dyslipidemia in patients with diabetes represents a promising area of research that can provide important insights for the clinical management and prevention of cardiovascular events in this vulnerable population.

Obesity and a sedentary lifestyle are well-established risk factors for the development and progression of hypertension and dyslipidemia in patients with diabetes mellitus. Obesity, especially abdominal obesity, is associated with increased insulin resistance, endothelial dysfunction and activation of the renin-angiotensin-aldosterone system, contributing to the development of arterial hypertension in individuals with diabetes. Furthermore, obesity is often associated with lipid profile disorders, including high triglyceride levels and reduced HDL cholesterol, further increasing cardiovascular risk in this population.

Likewise, a sedentary lifestyle has been identified as an independent risk factor for the development of hypertension and dyslipidemia in patients with diabetes mellitus. Lack of regular physical activity is associated with a series of metabolic changes, including insulin resistance, endothelial dysfunction and increased systemic inflammation, which may predispose to the development of cardiovascular disorders. Epidemiological studies have demonstrated a dose-dependent relationship between the amount of physical activity performed and the risk of hypertension and dyslipidemia in patients with diabetes, highlighting the importance of promoting an active and healthy lifestyle to prevent and control these comorbidities. In short, the impact of comorbidities such as obesity and physical inactivity on the progression of hypertension and dyslipidemia in patients with diabetes highlights the need for early prevention and intervention strategies, aiming to reduce cardiovascular risk and improve clinical outcomes in this population.



Despite significant advances in the understanding and management of hypertension and dyslipidemia in patients with diabetes mellitus, there are still challenges and gaps in the therapeutic approach to these conditions. One of the main challenges faced by healthcare professionals is patient adherence to treatment, especially in relation to drug therapy. The complexity of therapeutic regimens, together with the potential side effects of medications, can make adherence difficult and compromise the effectiveness of treatment. Furthermore, the lack of awareness and education of patients about the importance of controlling blood pressure and lipid profile may contribute to the underutilization of available therapeutic interventions.

Another challenge faced in the therapeutic approach to hypertension and dyslipidemia in patients with diabetes is the heterogeneity of the response to treatment. Not all patients respond in the same way to therapeutic interventions, which can result in variability in clinical outcomes and the need for frequent adjustments to the treatment plan. Furthermore, the presence of additional comorbidities, such as chronic kidney disease or heart failure, can further complicate the management of these conditions, requiring a personalized and multidisciplinary approach. Faced with these challenges, it is essential that healthcare professionals adopt a holistic, patient-centered approach, seeking to identify and mitigate obstacles to treatment and promote effective management of high blood pressure and dyslipidemia in patients with diabetes mellitus.

V. Conclusion:

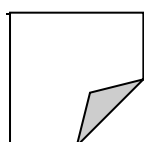
At the conclusion of this study on the prevalence and control of hypertension and dyslipidemia in patients with diabetes mellitus, it was observed that these comorbidities represent a significant challenge in clinical practice, due to their negative impact on the progression of diabetes and the development of cardiovascular complications. The data analyzed demonstrated a high prevalence of hypertension and dyslipidemia in this population, indicating the urgent need for effective control strategies. It has been shown that adequate control of blood pressure and lipid profile in patients with diabetes is associated with a significant reduction in cardiovascular risk and improvement in clinical outcomes.

Therapeutic strategies, both pharmacological and non-pharmacological, play a fundamental role in the management of these comorbidities, contributing to the prevention of serious cardiovascular events. However, challenges have been identified in implementing these interventions, including patient adherence to treatment and heterogeneity of therapeutic response. The early identification of biomarkers related to arterial hypertension and dyslipidemia, together with a personalized and multidisciplinary approach, may be crucial to improve the control of these conditions and reduce cardiovascular risk in patients with diabetes mellitus.

In summary, this study highlighted the importance of integrated cardiovascular health care in patients with diabetes, emphasizing the need for comprehensive preventive and therapeutic approaches. Understanding the risk factors, control strategies and clinical impact of hypertension and dyslipidemia in this population can guide clinical practice and contribute to improving long-term health outcomes.

Bibliographic References:

- [1] Diener Hc, Hankey GJ. Primary And Secondary Prevention Of Ischemic Stroke And Cerebral Hemorrhage: Jacc Focus Seminar. *J Am Coll Cardiol.* 2020 Apr 21;75(15):1804-1818. Doi: 10.1016/J.Jacc.2019.12.072.
- [2] Leroith D, Biessels GJ, Braithwaite Ss, Casanueva Ff, Draznin B, Halter Jb, Hirsch Ib, McDonnell Me, Molitch Me, Murad Mh, Sinclair Aj. Treatment Of Diabetes In Older Adults: An Endocrine Society* Clinical Practice Guideline. *J Clin Endocrinol Metab.* 2019 May 1;104(5):1520-1574. Doi: 10.1210/Jc.2019-00198.
- [3] Rawshani A, Rawshani A, Franzén S, Sattar N, Eliasson B, Svensson Am, Zethelius B, Miftaraj M, Mcguire Dk, Rosengren A, Gudbjörnsdóttir S. Risk Factors, Mortality, And Cardiovascular Outcomes In Patients With Type 2 Diabetes. *N Engl J Med* 2018 Aug 16;379(7):633-644. Doi: 10.1056/Nejmoa1800256.
- [4] Russo Mp, Grande-Ratti Mf, Burgos Ma, Molaro Aa, Bonella Mb. Prevalence Of Diabetes, Epidemiological Characteristics And Vascular Complications. *Arch Cardiol Mex.* 2023;93(1):30-36. English. Doi: 10.24875/Acm.21000410.
- [5] Banach M, Surma S, Reiner Z, Katsiki N, Penson Pe, Fras Z, Sahebkar A, Paneni F, Rizzo M, Kastelein J. Personalized Management Of Dyslipidemias In Patients With Diabetes-It Is Time For A New Approach (2022). *Cardiovasc Diabetol.* 2022 Nov 28;21(1):263. Doi: 10.1186/S12933-022-01684-5.
- [6] Ryan Dh, Yockey Sr. Weight Loss And Improvement In Comorbidity: Differences At 5%, 10%, 15%, And Over. *Curr Obes Rep.* 2017 Jun;6(2):187-194. Doi: 10.1007/S13679-017-0262-Y.
- [7] Handelsman Y, Butler J, Bakris Gl, Defronzo Ra, Fonarow Gc, Green Jb, Grunberger G, Januzzi JI Jr, Klein S, Kushner Pr, Mcguire Dk, Michos Ed, Morales J, Pratley Re, Weir Mr, Wright E, Fonseca Go. Early Intervention And Intensive Management Of Patients With Diabetes, Cardiorenal, And Metabolic Diseases. *J Diabetes Complications.* 2023 Feb;37(2):108389. Doi: 10.1016/J.Jdiacom.2022.108389.
- [8] Writing Committee Of The Report On Cardiovascular Health And Diseases In China. Report On Cardiovascular Health And Diseases In China 2021: An Updated Summary. *Biomed Environ Sci.* 2022 Jul 20;35(7):573-603. Doi: 10.3967/Bes2022.079.
- [9] Reyes-García R, Moreno-Pérez Ó, Tejera-Pérez C, Fernández-García D, Bellido-Castañeda V, De La Torre Casares MI, Rozas-Moreno P, Fernández-García Jc, Marco Martínez A, Escalada-San Martín J , Gargallo-Fernández M, Botana-López M, López-Fernández J, González-Clemente Jm, Jódar-Gimeno E, Mezquita-Raya P; Representing The Diabetes-Seen Working Group. Document On A Comprehensive Approach To Type 2 Diabetes Mellitus. *Endocrinol Diabetes Nutr (Engl Ed).* 2019 Aug-Sep;66(7):443-458. English, Spanish. Doi: 10.1016/J.Endinu.2018.10.010.
- [10] Lu Y, Li Sx, Liu Y, Rodriguez F, Watson Ke, Dreyer Rp, Khera R, Murugiah K, D'onofrio G, Spatz Es, Nasir K, Masoudi Fa, Krumholz Hm. Sex-Specific Risk Factors Associated With First Acute Myocardial Infarction In Young Adults. *Jama Netw Open.* 2022 May 2;5(5):E229953. Doi: 10.1001/Jamanetworkopen.2022.9953.



- [11] Hendrick Am, Gibson Mv, Kulshreshtha A. Diabetic Retinopathy. Prim Care. 2015 Sep;42(3):451-64. Doi: 10.1016/J.Pop.2015.05.005.
- [12] Lunder M, Janić M, Šabovič M. Prevention Of Vascular Complications In Diabetes Mellitus Patients: Focus On The Arterial Wall. Curr Vasc Pharmacol. 2019;17(1):6-15. Doi: 10.2174/1570161116666180206113755.
- [13] Hyassat D, Al-Saeksaek S, Naji D, Mahasneh A, Khader Y, Abujbara M, El-Khateeb M, Ajlouni K. Dyslipidemia Among Patients With Type 2 Diabetes In Jordan: Prevalence, Pattern, And Associated Factors. Front Public Health. 2022 Nov 8;10:1002466. Doi: 10.3389/Fpubh.2022.1002466.
- [14] Bachir Cherif A, Bennouar S, Bouamra A, Taleb A, Hamida F, Temmar M, Bouafia Mt. Prevalence Of Diabetes And Dyslipidemia In Hypertensive Patients In The Area Of Blida (Algeria). Ann Cardiol Angeiol (Paris). 2018 Jun;67(3):198-203. Doi: 10.1016/J.Ancard.2018.04.015.
- [15] Castro Ll, Lanna Ccd, Rocha Mp, Ribeiro Alp, Telles Rw. Recognition And Control Of Hypertension, Diabetes, And Dyslipidemia In Patients With Rheumatoid Arthritis. Rheumatol Int. 2018 Aug;38(8):1437-1442. Doi: 10.1007/S00296-018-4084-3.

