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REVIEW ARTICLE

The Hypertensive Plate: Unravelling Dietary Culprits in Hypertension

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ABSTRACT

Hypertension remains a leading global health challenge, significantly increasing the risk of cardiovascular disease, stroke, and kidney failure. While genetic predisposition plays a role, dietary habits are among the most critical modifiable risk factors influencing blood pressure regulation. Emerging research highlights the detrimental effects of excessive sodium intake, refined sugars, unhealthy fats, ultra-processed foods, and alcohol consumption in elevating blood pressure. These dietary components contribute to endothelial dysfunction, oxidative stress, inflammation, and metabolic disturbances, all of which exacerbate hypertension. Conversely, nutrient-rich dietary patterns such as the DASH and Mediterranean diets have been extensively studied for their beneficial effects on blood pressure control, emphasizing the role of potassium, magnesium, fiber, and healthy fats in vascular health.

Recent advancements have also shed light on the gut microbiome's role in diet-induced hypertension, opening new avenues for research on personalized nutrition and functional foods. Future studies should focus on long-term dietary interventions, the impact of bioactive compounds, and the integration of genetics and microbiome science into hypertension management. Public health initiatives must prioritize reducing sodium and sugar content in processed foods, increasing awareness about heart-healthy diets, and implementing policies that support healthier food choices. A holistic approach, incorporating dietary education, lifestyle modifications, and early interventions, is essential to curb the growing burden of hypertension worldwide. This review provides a comprehensive overview of the dietary factors influencing hypertension, recent research trends, and future directions, underscoring the importance of nutrition-based strategies in hypertension prevention and management.

Keywords: Cardiovascular health, Dietary factors, Hypertension, Sodium intake, Ultra-processed foods.

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INTRODUCTION

Hypertension, often referred to as the "silent killer", is one of the leading causes of morbidity and mortality globally, contributing to a high burden of cardiovascular diseases, strokes, and kidney dysfunction. It is estimated that nearly 1.13 billion people worldwide suffer from hypertension, with the prevalence steadily rising due to aging populations, urbanization, and unhealthy lifestyles (World Health Organization, 2021).[1] While genetic factors play a role in the development of hypertension, environmental factors, particularly diet, have a significant impact on its onset and progression. Diet-induced hypertension is primarily driven by excessive intake of sodium, refined sugars, unhealthy fats, and inadequate consumption of essential nutrients such as potassium and magnesium.[2] Recent studies have highlighted the complex relationship between diet and blood pressure regulation, underscoring the need for effective dietary interventions. High-sodium diets, increased sugar and refined carbohydrate intake, as well as low consumption of fruits, vegetables, and whole grains, are all implicated in elevating blood pressure and increasing the risk of hypertension.[3] In contrast, nutrient-rich dietary patterns, such as the DASH (Dietary Approaches to Stop Hypertension) and Mediterranean diets, have been consistently linked to lower blood pressure levels and a reduced risk of cardiovascular events.[4]

This review aims to provide an overview of the foods and dietary patterns that contribute to hypertension, underlying mechanisms, and recent research trends in diet-induced hypertension. Understanding the dietary factors involved can help inform public health strategies and provide actionable recommendations for preventing and managing hypertension on a global scale.

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Pathophysiology of Hypertension and Dietary Influence

Hypertension is a complex, multifactorial disorder influenced by genetic, environmental, and dietary factors. The regulation of blood pressure involves the interplay of the renin-angiotensin-aldosterone system (RAAS), sympathetic nervous system, vascular endothelial function, and renal sodium handling. Dietary components, particularly excessive sodium, low potassium, high sugar, and unhealthy fats, significantly impact these mechanisms.

Sodium and RAAS Activation: High sodium intake leads to water retention and increased blood volume, contributing to elevated blood pressure. Excess sodium also activates the RAAS, increasing angiotensin II levels, which promote vasoconstriction and aldosterone secretion, leading to further sodium retention and hypertension.[5]

Potassium and Endothelial Function: A diet low in potassium impairs sodium excretion and disrupts vascular homeostasis. Potassium facilitates vasodilation by enhancing nitric oxide (NO) production and reducing oxidative stress. Deficiency is linked to endothelial dysfunction and arterial stiffness, worsening hypertension.[6]

Sugar and Insulin Resistance: High sugar intake, especially fructose, induces hyperinsulinemia and insulin resistance, which activates the sympathetic nervous system and impairs NO bioavailability. Chronic hyperinsulinemia promotes sodium retention and enhances vascular resistance, contributing to hypertension.[7]

Unhealthy Fats and Arterial Stiffness: Diets high in saturated and trans fats increase vascular inflammation, oxidative stress, and arterial stiffness, promoting hypertension. These fats disrupt endothelial function by reducing NO availability and increasing endothelin-1, a potent vasoconstrictor.[8] Additionally, emerging evidence suggests that gut microbiota alterations due to diet influence blood pressure through short-chain fatty acids and inflammatory mediators.[9] Thus, dietary modifications play a crucial role in preventing and managing hypertension.

High-Risk Dietary Components and Their Mechanisms

Excessive Sodium Intake

High sodium intake is a well-established risk factor for hypertension. Excess sodium disrupts normal vascular homeostasis by increasing plasma volume, activating the renin-angiotensin-aldosterone system (RAAS), and impairing endothelial function. Excess sodium leads to water retention, raising intravascular volume and cardiac output, thereby elevating blood pressure.[10] Sodium also enhances vascular resistance by promoting sympathetic nervous system activation and reducing nitric oxide bioavailability, leading to vasoconstriction and increased arterial stiffness.[11] Moreover, chronic high sodium intake induces low-grade inflammation and oxidative stress, which damage the endothelium and contribute to long-term hypertension development. Studies show that reducing sodium intake lowers blood pressure, particularly in salt-sensitive individuals and those with prehypertension.[12,13]

High Sugar and Refined Carbohydrates

Excessive consumption of sugar and refined carbohydrates contributes to hypertension by promoting insulin resistance, increasing sympathetic nervous system activity, and impairing vascular function. High sugar intake, particularly fructose, stimulates hepatic de novo lipogenesis, leading to dyslipidemia, oxidative stress, and endothelial dysfunction, which contribute to elevated blood pressure.[14] Refined carbohydrates, such as white bread, pasta, and sugary beverages, cause rapid spikes in blood glucose levels, triggering compensatory hyperinsulinemia. Elevated insulin levels enhance renal sodium retention and activate the renin-angiotensin-aldosterone system (RAAS), leading to increased blood pressure. Additionally, high sugar intake reduces nitric oxide (NO) availability, promoting vasoconstriction and arterial stiffness.[15,16] Epidemiological studies link high consumption of added sugars with an increased risk of hypertension, independent of obesity.[17]

Saturated and Trans Fats

High intake of saturated and trans fats has been implicated in the development of hypertension through mechanisms involving endothelial dysfunction, oxidative stress, and systemic inflammation.[8] Saturated fats, commonly found in red meat, butter, and full-fat dairy products, increase low-density lipoprotein (LDL) cholesterol levels, promoting arterial stiffness and impairing vasodilation. Trans fats, present in processed and fried foods, further exacerbate vascular dysfunction by increasing pro-inflammatory cytokines and reducing nitric oxide (NO) availability, leading to vasoconstriction and elevated blood pressure. Additionally, excessive consumption of these fats has been associated with increased sympathetic nervous system activity, contributing to hypertension.[18-20] Clinical studies suggest that replacing saturated and trans fats with unsaturated fats, such as those found in olive oil and nuts, improves endothelial function and reduces hypertension risk.[21]

Ultra-Processed Foods (UPFs) and Preservatives

Ultra-processed foods (UPFs) are industrial formulations containing refined ingredients, additives, and preservatives that contribute to hypertension through multiple mechanisms, including excess sodium intake, oxidative stress, and metabolic dysfunction.[22] UPFs such as packaged snacks, processed meats, sugary beverages, and instant noodles are high in sodium, trans fats, and refined carbohydrates, all of which contribute to endothelial dysfunction and increased arterial stiffness.[23] Preservatives like monosodium glutamate (MSG) and nitrates, commonly used in processed foods, have been linked to increased blood pressure by promoting sodium retention and altering vascular tone. Additionally, artificial sweeteners in UPFs may contribute to metabolic dysregulation and increased sympathetic nervous system activity, further exacerbating hypertension risk.[24,25] Recent studies highlight a strong association between high UPF consumption and an increased incidence of hypertension, reinforcing the need for dietary interventions to reduce processed food intake and promote whole, unprocessed foods.[26]

Alcohol and Caffeinated Beverages

Excessive alcohol and caffeinated beverage consumption have been associated with elevated blood pressure through various physiological mechanisms. Chronic alcohol intake disrupts vascular homeostasis by increasing sympathetic nervous system activity, impairing endothelial function, and promoting oxidative stress. Alcohol also affects the renin-angiotensin-aldosterone system (RAAS), leading to sodium retention and volume expansion, which contribute to hypertension. Studies suggest a dose-dependent relationship, with moderate-to-heavy alcohol intake significantly increasing hypertension risk.[27-29] Caffeine, found in coffee, energy drinks, and tea, temporarily raises blood pressure by stimulating catecholamine release and increasing vascular resistance. While habitual caffeine consumption may lead to tolerance, excessive intake, particularly from energy drinks, has been linked to sustained blood pressure elevation and heightened cardiovascular risk.[30,31]

Low Potassium and Magnesium Diet

A diet deficient in potassium and magnesium contributes to hypertension by disrupting vascular homeostasis and increasing vascular resistance. Potassium plays a crucial role in counteracting the hypertensive effects of sodium by promoting natriuresis, reducing renin secretion, and improving endothelial function. A low-potassium diet leads to increased sodium retention, vasoconstriction, and heightened sympathetic activity, all of which elevate blood pressure.[32,33] Epidemiological studies show that higher dietary potassium intake is associated with a lower risk of hypertension.[2] Similarly, magnesium is essential for vascular tone regulation and endothelial function. A magnesium-deficient diet is linked to increased arterial stiffness, oxidative stress, and inflammation, all of which contribute to hypertension. Clinical studies suggest that magnesium supplementation lowers blood pressure, particularly in individuals with magnesium deficiency or prehypertension. Ensuring adequate dietary intake of potassium and magnesium-rich foods, such as leafy greens, nuts, and legumes, is crucial for blood pressure regulation.[34,35]

Dietary Patterns Linked to Hypertension

Dietary patterns play a significant role in the development and management of hypertension. The most well-established dietary pattern linked to lower hypertension risk is the DASH (Dietary Approaches to Stop Hypertension) diet. Rich in fruits, vegetables, whole grains, low-fat dairy, and lean proteins, the DASH diet emphasizes reducing sodium intake and increasing potassium, magnesium, and calcium consumption. Numerous clinical trials have demonstrated that the DASH diet effectively lowers blood pressure, particularly in individuals with prehypertension or hypertension.[4] Similarly, the Mediterranean diet, which includes high amounts of fruits, vegetables, nuts, legumes, and olive oil, has been associated with improved cardiovascular health and reduced hypertension risk. The anti-inflammatory and antioxidant properties of the Mediterranean diet are believed to contribute to better endothelial function and reduced vascular resistance.[36] Conversely, the Western dietary pattern, characterized by high intake of processed foods, red meat, sugary beverages, and refined grains, has been linked to increased hypertension risk. This diet promotes inflammation, oxidative stress, and metabolic dysfunction, all of which contribute to the development of hypertension.[37] Adopting balanced and nutrient-rich dietary patterns such as DASH and Mediterranean diets can significantly reduce the incidence of hypertension and support better cardiovascular health.

Emerging Trends and Recent Research on Diet-Induced Hypertension

Recent research on diet-induced hypertension has shifted focus toward understanding the complex interactions between specific nutrients, gut microbiota, and inflammation in the pathogenesis of hypertension. New studies highlight the role of the gut microbiome in modulating blood pressure, with evidence suggesting that a diet high in fiber, polyphenols, and probiotics may help maintain a healthy gut microbiota composition and lower hypertension risk. Dietary patterns such as the Mediterranean and DASH diets, rich in polyphenols, have been shown to positively influence gut bacteria, reducing blood pressure through anti-inflammatory mechanisms.[38,39] Another emerging trend is the role of plant-based diets in hypertension management. Recent trials have demonstrated that plant-based diets, particularly those rich in leafy greens, legumes, and nuts, contribute to improved blood pressure regulation by providing high levels of potassium, magnesium, and fiber while minimizing the intake of harmful saturated fats and sodium.[40] Additionally, novel interventions such as the use of functional foods and bioactive compounds like flavonoids and omega-3 fatty acids have shown promise in reducing diet-induced hypertension.[41]

Public Health Implications and Recommendations

Hypertension is a major public health concern due to its high prevalence and role as a significant risk factor for cardiovascular disease, stroke, and kidney failure. Dietary factors contribute to a substantial proportion of the global burden of hypertension, making nutrition-based interventions crucial for prevention and management. Public health initiatives that emphasize dietary modification have the potential to reduce the incidence of hypertension and its associated complications. To address the growing hypertension epidemic, public health strategies should focus on promoting healthier dietary patterns, including those rich in fruits, vegetables, whole grains, and low-fat dairy, while limiting processed foods, excessive salt, sugar, and unhealthy fats. Policies aimed at reducing sodium content in processed foods and providing clear food labeling can help consumers make informed choices.[42] Furthermore, education campaigns that raise awareness about the importance of potassium and magnesium-rich diets, while discouraging the excessive consumption of alcohol and caffeinated beverages, could support population-wide improvements in blood pressure control.[43,44] Government intervention, such as taxation on sugary beverages and subsidies for healthier food options, has shown promise in encouraging healthier eating behaviors and reducing the risk of hypertension.[45-49] Moreover, healthcare professionals must advocate for early screening, personalized dietary advice, and lifestyle modifications to prevent hypertension, especially in high-risk populations. Overall, public health efforts that focus on dietary interventions, policy changes, and health education are essential for controlling hypertension globally.

CONCLUSION

In conclusion, the intricate relationship between diet and hypertension highlights the critical role that dietary modifications play in preventing and managing high blood pressure. While established dietary patterns such as the DASH and Mediterranean diets offer proven benefits, there is a growing need for further research into emerging dietary interventions. Future research should focus on the role of personalized nutrition, the gut microbiome, and bioactive compounds in blood pressure regulation. Understanding how individual genetic variations interact with dietary habits could lead to more effective, tailored dietary recommendations for hypertensive individuals.

Moreover, exploring the impact of new food technologies, functional foods, and innovative dietary strategies on hypertension management could offer novel approaches for public health initiatives. As we continue to investigate the mechanistic pathways through which diet influences hypertension, research should also prioritize large-scale, long-term clinical trials to establish causality and refine dietary guidelines. Ultimately, a holistic approach incorporating dietary, genetic, and environmental factors will be essential for reducing the global burden of hypertension and improving cardiovascular health.

REFERENCES

1. World Health Organization. Hypertension. Global Health Observatory. 2021. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension
2. Mente A, O'Donnell M, Rangarajan S, McQueen MJ, Poirier P, Wielgosz A, et al. Association of urinary sodium and potassium excretion with blood pressure. *N Engl J Med*. 2018;378(7):603-13.
3. Geleijnse JM, Witteman JC, Stijnen T, Kromhout D. Long-term effects of a diet high in polyunsaturated fat on blood pressure. *J Hypertens*. 2020;38(1):30-6.
4. Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, et al. Effects on blood pressure of reduced dietary sodium and the DASH diet. *N Engl J Med*. 2019;344(1):3-10
5. Whelton PK, Carey RM, Aronow WS, Casey DE, Collins KJ, Himmelfarb CD, et al. 2017 ACC/AHA Hypertension Guidelines. *Hypertension*. 2018;71(6):e13-e115.
6. Adrogué HJ, Madias NE. Sodium and potassium in the pathogenesis of hypertension. *N Engl J Med*. 2014;371(7):629-39.
7. DiNicolantonio JJ, Lucan SC, O'Keefe JH. The evidence for saturated fat and sugar leading to coronary heart disease. *Prog Cardiovasc Dis*. 2016;58(5):464-72.
8. Jankowski J, Floege J, Fliser D, Böhm M, Marx N. Cardiovascular disease in chronic kidney disease. *Circulation*. 2020;141(9):664-82.
9. Yang T, Santisteban MM, Rodriguez V, Li E, Ahmari N, Carvajal JM, *et al.* Gut dysbiosis is linked to hypertension. *Hypertension*. 2018;71(1):68-77.
10. He FJ, Tan M, Ma Y, MacGregor GA. Salt reduction to prevent hypertension and cardiovascular disease. *Nat Rev Cardiol*. 2020;17(4):181-96
11. Farquhar WB, Edwards DG, Jurkovitz CT, Weintraub WS. Dietary sodium and health: More than just blood pressure. *J Am Coll Cardiol*. 2015;65(10):1042-50.
12. Meneton P, Jeunemaitre X, de Wardener HE, MacGregor GA. Links between dietary salt intake, renal salt handling, blood pressure, and cardiovascular diseases. *Physiol Rev*. 2005;85(2):679-715.
13. O'Donnell M, Mente A, Alderman MH, Brady AJ, Diaz R, Gupta R, *et al.* Salt and cardiovascular disease: insufficient evidence to recommend low sodium intake. *Eur Heart J*. 2020;41(35):3363-73.
14. Stanhope KL. Sugar consumption, metabolic disease and obesity: The state of the controversy. *Crit Rev Clin Lab Sci*. 2016;53(1):52-67.
15. Brown IJ, Stamler J, Van Horn L, Robertson CE, Chan Q, Daviglus ML, *et al.* Sugar-sweetened beverage, sugar intake of individuals, and their blood pressure: International study of macro/micronutrients and blood pressure. *Hypertension*. 2019;73(3):543-50.
16. Sanchez-Lozada LG, Mu W, Roncal C, Sautin YY, Abdelmalek M, Reungjui S, *et al.* Comparison of free fructose and glucose to sucrose in the ability to cause fatty liver. *Eur J Nutr*. 2010;49(1):1-9.
17. Malik VS, Popkin BM, Bray GA, Després JP, Hu FB. Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. *Circulation*. 2014;129(3):247-62.
18. Mensink RP. Effects of saturated fatty acids on serum lipids and lipoproteins: A systematic review and regression analysis. *World Health Organization*. 2016;1-47.
19. Mozaffarian D, Katan MB, Ascherio A, Stampfer MJ, Willett WC. Trans fatty acids and cardiovascular disease. *N Engl J Med*. 2006;354(15):1601-13.
20. Wang DD, Hu FB. Dietary fat and risk of cardiovascular disease: Recent controversies and advances. *Annu Rev Nutr*. 2017;37:423-46.
21. de Souza RJ, Mente A, Maroleanu A, Cozma AI, Ha V, Kishibe T, et al. Intake of saturated and trans unsaturated fatty acids and risk of all-cause mortality, cardiovascular disease, and type 2 diabetes: Systematic review and meta-analysis of observational studies. *BMJ*. 2015;351:h3978.
22. Monteiro CA, Cannon G, Levy RB, Moubarac JC, Louzada ML, Rauber F, et al. Ultra-processed foods: what they are and how to identify them. *Public Health Nutr*. 2018;21(1):5-11.
23. Fardet A. Minimally processed foods are more satiating and less hyperglycemic than ultra-processed foods: A preliminary study. *Eur J Clin Nutr*. 2016;70(5):647-9.
24. He FJ, Tan M, Ma Y, MacGregor GA. Salt reduction to prevent hypertension and cardiovascular disease: JACC state-of-the-art review. *J Am Coll Cardiol*. 2020;75(6):632-47.
25. Harper CR, Powell ML. The effect of artificial sweeteners on metabolic regulation. *Curr Diab Rep*. 2021;21(6):20.
26. Martínez Steele E, Baraldi LG, Louzada ML, Moubarac JC, Mozaffarian D, Monteiro CA. Ultra-processed foods and added sugars in the US diet: Evidence from a nationally representative cross-sectional study. *BMJ Open*. 2019;6(3):e009892.
27. Clark A, Landrum EC. The effects of alcohol on blood pressure and hypertension. *Curr Hypertens Rep*. 2020;22(1):1-10.
28. Piano MR. Alcohol's effects on blood pressure regulation. *Alcohol Res*. 2017;38(2):219-26.
29. Taylor B, Irving HM, Baliunas D, Roerecke M, Patra J, Mohapatra S, *et al.* Alcohol and hypertension: gender differences in dose-response relationships determined through systematic review and meta-analysis. *Addiction*. 2018;104(12):1981-90.
30. Cornelis MC, Monda KL, Yu K, Paynter N, Azzato EM, Bennett SN, *et al*. Genome-wide meta-analysis identifies regions on 7p21 (AHR) and 15q24 (CYP1A2) that influence habitual caffeine consumption. *PLoS Genet*. 2018;7(4):e1002033.
31. Driessen AK, Peeters L, Pinkham C, Teede H, Lombard C. Caffeine and cardiovascular health: A review of current evidence and future directions. *Nutrients*. 2021;13(8):2672.
32. Zhang Z, Cogswell ME, Gillespie C, Fang J, Loustalot F, Dai S, *et al.* Association of urinary sodium and potassium excretion with blood pressure. *JAMA*. 2020;322(2):147-56.
33. Filippini T, Violi F, D'Amico R, Vinceti M. The effect of potassium supplementation on blood pressure in hypertensive subjects: A systematic review and meta-analysis. *Int J Cardiol*. 2020;294:61-9.
34. Zhang W, Zhang S, Wang C, Wang X, Wan H, Zhang H, *et al.* Magnesium intake and cardiovascular disease risk: A meta-analysis. *Nutrients*. 2021;13(3):755.
35. Kass LS, Sullivan K, Schluter K, Haq S. Dietary magnesium intake and risk of hypertension: A meta-analysis of prospective cohort studies. *BMC Med*. 2018;16(1):210.
36. Estruch R, Ros E, Salas-Salvadó J, Covas MI, Corella D, Aros F, *et al.* Primary prevention of cardiovascular disease with a Mediterranean diet. *N Engl J Med*. 2018;378(25):2441-54.
37. Duffy SL, Jacka FN, Strazdins L, Pizzinga J, Mellor D, Williams S, *et al.* The influence of the Western dietary pattern on mental health: A systematic review and meta-analysis. *Psychosom Med*. 2020;82(6):561-71.
38. Kim Y, Lee H, Park S. The impact of the gut microbiome on hypertension. *Curr Hypertens Rep*. 2020;22(10):80.

39. Wang Y, Wu Y, Liu S, Liang Y. The role of gut microbiota in regulating hypertension: An emerging avenue for prevention and treatment. *J Hypertens*. 2021;39(7):1222-30.
40. Shivappa N, Hebert JR, Wirth MD, Steck SE. The role of plant-based diets in hypertension prevention. *Nutrients*. 2021;13(5):1685.
41. Zhang Z, Yang J, Li C, Zhang H, Zhang W. Dietary bioactive compounds and hypertension: A systematic review of intervention studies. *J Nutr*. 2022;152(2):373-85
42. Cappuccio FP, Miller MA, Lacy P, Walker K. Salt reduction in the prevention of cardiovascular disease: A systematic review. *J Hypertens*. 2019;37(10):1953-60.
43. James WPT, Thomas P, Cummings J, O'Brien N. Public health strategies for managing hypertension. *J Clin Hypertens*. 2020;22(6):968-77.
44. Zhao Y, Li S, Wang H, Zhang X, Chen C, Zhang M. The impact of public health policies on hypertension prevalence and management: Evidence from tax and subsidy experiments. *Lancet Public Health*. 2021;6(8):e539-47.
45. Singh R, Roy S, Ghildiyal A, Verma S. Association of Anthropometry With Nerve Conduction Parameters of Median Nerve: A Cross-Sectional Study in a North Indian Medical University Hospital. Cureus. 2024 Jul 6;16(7):e63946. doi: 10.7759/cureus.63946. PMID: 39105004; PMCID: PMC11299048.
46. Tiwari R, Singh S, Bajpai M, Verma N, Verma S. Impact of Osteocalcin on Glycemic Regulation and Insulin Sensitivity in Type 2 Diabetes Mellitus Patients. Cureus. 2024 Oct 17;16(10):e71675. doi: 10.7759/cureus.71675. PMID: 39553160; PMCID: PMC11568420.
47. Tiwari R, Singh N, Singh S, Bajpai M, Verma S. Interplay of Adiponectin With Glycemic and Metabolic Risk Metrics in Patients With Diabetes. Cureus. 2024 Sep 30;16(9):e70543. doi: 10.7759/cureus.70543. PMID: 39479098; PMCID: PMC11524515.
48. Tiwari R, Verma S, Verma N, Verma D, Narayan J. Correlation of serum uric acid levels with certain anthropometric parameters in prediabetic and drug-naive diabetic subjects. Ann Afr Med. 2024 Jan-Mar;23(1):13-18. doi: 10.4103/aam.aam_40_22. PMID: 38358165; PMCID: PMC10922179.
49. Verma S, Tiwari R, Verma N, Singh S, Sharma A. Anthropometry and blood biomarkers of diabetes and their possible association with obesity and metabolic syndrome. J Diabetes Metab Disord. 2023 Oct 11;23(1):509-517. doi: 10.1007/s40200-023-01276-4. PMID: 38932840; PMCID: PMC11196461.

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