



# The Role of Lifestyle in the Co-occurrence of Depression and Hypertension: A review

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## Abstract

Depression is a common mental illness and Hypertension is a chronic disease. Due to negligence depression in hypertension may accelerate the progression of cardiovascular disease. Compared to the general population, people with depression had a higher incidence of hypertension. Aim to investigate the research on the relationship between lifestyle factors and the co-occurrence of depression and hypertension. The database collected from such as sciencedirect, researchgate, pubmed, Scopus, and Google Scholar were searched. Control of blood pressure may be difficult in patients with hypertension who are depressed. Screening patients with hypertension for depression is an easy and affordable method that could lead to better results. A key factor in the management of both conditions is lifestyle choices.

**Keywords:** Depression, Hypertension, Psychological therapies, Lifestyle management

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## Introduction

Depression and hypertension are recognized chronic illnesses that have a significant global impact.<sup>1-3</sup> The burdens include physiological restriction, psychological stress, and an increased risk of suicide.<sup>4</sup> Lifestyle factors have been linked to stress, worry, and mental strain, which can raise blood pressure and lead to other chronic diseases.<sup>5</sup>

Hypertension is termed when the blood pressure of the arteries elevates, as the systolic blood pressure starts to rise to 130-139 mmHg and the diastolic blood pressure rises 80-89 mmHg.<sup>6</sup> Several studies suggest that individuals experiencing depression are at high risk for developing hypertension, as well as being predisposed to stroke and ischemic heart disease.<sup>7,8</sup>

Although depression is a prevalent mental condition that may be treated, doctors frequently fail to identify it when treating people with chronic illnesses.<sup>9</sup> The National Institute of Mental Health (NIMH) states that depression is a serious medical illness. Instead of experiencing transitory sadness, one may experience weeks-long feelings of being “down,” “low,” and/or “hopeless.” This usually has a detrimental effect on the patient's mental health, which could influence how well they adhere to the treatment plan for a chronic illness.<sup>10</sup>

Hypertension and depression are pathophysiologically related, as both conditions have elevated sympathetic tone, and increased release of cortisol and adrenocorticotropic hormone.<sup>7,11</sup> The antihypertensive properties of dopamine and related neurotransmitters have led to the usage of dopamine receptor agonists such as bromocriptine and fenoldopam in the treatment of hypertension.<sup>12</sup> Depression and/or elevated blood pressure may result from dopamine deficiency at specific brain locations.<sup>13</sup> Moreover, people with hypertension may be more susceptible to depression due to the ischemic and cerebrovascular alterations in the brain that are induced by high blood pressure.<sup>14</sup> Additionally, the risk of incident cardiovascular disease and the rate at which the disease progresses are increased by both hypertension and depression.<sup>15,16</sup>

Despite its widespread incidence and severity, depression frequently goes undetected by primary care doctors, and patients rarely receive proper treatment. This can hurt patients' quality of life as well as it interfere with the management and prognosis of other chronic illnesses.<sup>7,17</sup> Therapy and prevention of hypertension may benefit from improving patients' psychological well-being.<sup>18</sup>

Furthermore, several variables, including the existence of risky behaviours (such as smoking or alcohol consumption), physical activity,

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body mass index (BMI), and other comorbid conditions (such as dyslipidemia, diabetes, insulin resistance, and inflammation), may complicate the relationship between blood pressure and depression.<sup>19</sup>

Since the significant prevalence of both depression and hypertension, it is critical to comprehend their interaction better.

## Depression in Hypertensive

Depression in patients with hypertension is linked to worse health outcomes, such as worse life quality more medical sources a lower rate of treatment adherence and even a higher risk of death.<sup>20-25</sup> A person's inability to accomplish social and professional roles may be a sign of depression.<sup>26</sup> For hypertension patients who are depressed, it is faster for their symptoms to worsen. While depression and hypertension together may have additional negative effects on patients' quality of life and physical function, there is currently insufficient evidence to support the idea that screening for depression in hypertensive patients can improve their physical health and reduce their clinical symptoms.<sup>25,27,28</sup> It has also been reported that people with hypertension have a higher prevalence of depression, patients receiving hypertension treatment had a three-fold increased incidence of serious depression.<sup>29</sup> One potential risk factor for poorly managed blood pressure in hypertensive patients seems to be the presence of depression.<sup>30</sup> Depression and hypertension have a similar mechanism, therefore it makes sense to think about depression in patients who have high blood pressure (and hypertension in patients who have depression).<sup>31</sup>

## Autonomic Dysfunction

Autonomic dysfunction is associated with depression and common types of cardiovascular disease (CVD),<sup>32</sup> which may increase the risk of adverse cardiovascular events. Depression is consequently linked to hypertension, reduced heart rate variability, and resting tachycardia. These factors may be the cause of the left ventricular hypertrophy, endothelial dysfunction, and myocardial supply/demand mismatch that are also associated with depression.<sup>33-35</sup>

Heart rate variability and autonomic balance are altered in depressive patients, favouring an elevated sympathetic tone. The increased cardiac morbidity and mortality rates in patients with significant depression may be attributed to either low or high cardiovagal activity or sympathetic activity.<sup>36</sup> Patients with significant depression experience malfunction in their parasympathetic nervous system as a result of their mental state. Lower heart rate variability indices are a reflection of changes in autonomic nervous system function that encourage vagal withdrawal.

## Neuroendocrine Imbalance

Depression is frequently accompanied by hyperactivity of the hypothalamic-pituitary-adrenal axis, and the resulting hypercortisolemia may be a molecular link to chronic cardiometabolic disorders, including cardiovascular disease.<sup>37</sup> Elevated levels of cortisol have been linked to prothrombotic effects, early atherosclerosis, hypertension, and an increased risk of developing diabetes mellitus.

## Inflammation

Patients who are depressed have increased levels of adhesion

molecules, acute phase proteins, inflammatory cytokines, and tumour necrosis factor-alpha. These factors may be linked to cardiovascular events and hypertension.<sup>38</sup>

## Screening of Depression

The PHQ-2 was used for the initial depression screen; PHQ-9 or other measures of depressed symptoms should be used to assess the entire degree of depressive symptoms.<sup>39</sup> Psychosocial risk factors that raise cardiovascular risk, such as socioeconomic status, stressful life circumstances, social isolation, hostility/irritability, and other psychiatric disorders, should also be evaluated for those who screen positive for depression.<sup>40</sup>

Similar recommendations for routine screening are made by the European Society of Cardiology for patients suffering from heart failure.<sup>35,41,42</sup>

## Lifestyle Management and Treatment

### 1. Stress Management

Stress is a normal response to the pressures of our constantly shifting environment. Stress levels are directly impacted by how people interpret both internal and external changes, even though people are continually faced with demands and changes.<sup>43-45</sup>

#### Stress Management Strategies<sup>46,47</sup>

- *Attitude:* It is normal for people to desire to get excited. The mind is a formidable tool; make the most of it.
- *Laugh:* Engage in enjoyable activities, take up a hobby, hang out with friends, and discover how to have a good balance in life.
- *Avoid alcohol and smoking:* This is just a band-aid solution. Once the chemicals leave individual body, the individual will likely feel even worse than the individual did before, irritated all over again.
- *Healthy eating:* Eating a nutritious diet can help individual to obtain the necessary nutrients. Eat at least one hot meal prepared at home each day.
- *Sleep:* Individual require at least 7 hours of sleep per night for optimal brain and body performance. Steer clear of naps that extend beyond an hour.

### 2. Dietary Management

The Dietary Approaches to Stop Hypertension (DASH) diet was created to prevent and treat hypertension through dietary management. The DASH diet calls for eating more fruits, vegetables, whole grains, low-fat dairy, chicken, fish, and nuts while consuming less red meat and sugar-sweetened foods and beverages. Compared to the average western diet, the DASH diet usually has lower levels of cholesterol and saturated fat and higher levels of potassium, calcium, magnesium, dietary fibre, and protein.<sup>48</sup> Additional blood pressure reduction occurs when the DASH diet is combined with salt restriction at the nationally recommended level (2300 mg/day) or at an even lower level (1150 mg/day).

### 3. Weight Management

Weight loss techniques significantly improved the patients' ability to lower their blood pressure and/or reduce their body weight in obese hypertension patients.<sup>49</sup>

Calorie burning and stress relief are two benefits of physical activity. Exercise is one way to reduce tension. The suggested amount of exercise is thirty minutes three times a week. To help the mind and body relax, take a few deep breaths.<sup>50</sup> It has been demonstrated that increasing physical exercise improves cardiovascular outcomes and depressed symptoms.<sup>51</sup>

Overweight and hypertension are directly correlated, to the point that it has been estimated that reducing obesity may remove 48% of white people's hypertension.<sup>52</sup>

#### 4. **Smoking**

Smoking or tobacco use continues to be one of the leading global causes of morbidity and mortality. Smokers are exposed to at least fifty more harmful compounds in addition to nicotine, tobacco, tar, and carbon monoxide. Long-term cigarette smoking raises oxidative stress, reduces nitric oxide bioavailability, induces endothelial dysfunction, and cardiac remodeling.<sup>53,54</sup>

#### 5. **Alcohol**

Among populations from many different geographic regions, such as North America, Europe, and Asia, alcohol intake is one of the most significant modifiable risk factors for hypertension.<sup>55</sup> Even after controlling for significant confounders including age, body mass, smoking, exercise, and salt and potassium intake, there is typically still a positive correlation between blood pressure and alcohol consumption. Because research participants continuously adjust to the depressing effects of alcohol withdrawal, it has been hypothesized that the blood pressure-lowering benefit of a lower alcohol intake is less pronounced in the long-term than in short-term intervention trials.<sup>55,56</sup>

#### 6. **Medication**

Prescription medications known as antidepressants can alter the chemistry of the brain that underlies depression.<sup>57</sup>

In the 1950s, antidepressants were developed. Subsequently, scientists have created other variations of the medication.

There are a number of varieties (categories) of antidepressants, such as:

- Selective serotonin reuptake inhibitors (SSRIs). These are the antidepressants that are prescribed the most frequently.
- Serotonin/norepinephrine reuptake inhibitors (SNRIs).
- Tricyclic antidepressants (TCAs): due to their higher incidence of side effects, TCAs are an older family of antidepressants that are frequently saved for cases of anxiety and depression that do not respond to treatment.
- Atypical antidepressants.
- Serotonin modulators.
- Monoamine oxidase inhibitors (MAOIs). They are the most traditional antidepressants. Despite their great efficacy, they're often reserved for treatment-resistant depression and anxiety. This is because using an MAIO necessitates changing one's diet to prevent hypertensive reactions brought on by interactions with tyramine, an amino acid that can be found in foods at high concentrations.

- N-methyl-D-aspartate (NMDA) antagonists.
1. *Psychotherapy*: The process of psychotherapy, often known as talk therapy, entails speaking with a mental health specialist. Counsellors assist in recognizing and altering negative feelings, ideas, and actions. While there exist other forms of psychotherapy, the most widely used one is cognitive behavioural therapy.
  3. *Complementary medicine*: This refers to medical interventions that can be administered in addition to conventional modern medicine. Biofeedback, acupuncture, massage, hypnosis, and other therapies can help people who are suffering from persistent symptoms of mild depression or enhance their overall well-being.
  4. *Brain stimulation therapy*: Individuals with severe depression or depression coupled with psychosis may benefit from brain stimulation therapy. Vagus nerve stimulation (VNS), transcranial magnetic stimulation (TMS), and electroconvulsive therapy (ECT) are a few forms of brain stimulation therapy.<sup>58</sup>

## Conclusion

This study included a broad overview of the treatment and management therapies. Translational research on hypertension and depression, which are widespread in chronic illnesses, may also shed light on potential new therapeutic targets. Addressing psychological and lifestyle factors, including stress, food, and weight control, may be crucial in the treatment of depression and hypertension. To improve blood pressure control in individuals with hypertension, healthcare professionals should think about screening for anxiety and depression. In addition, the management of depression and hypertension may depend on the implementation of interventions to address psychological lifestyle variables.

## References

1. Son YJ, Won MH. Depression and medication adherence among older Korean patients with hypertension: Mediating role of self-efficacy. *International journal of nursing practice*. 2017 Jun;23(3): e12525.
2. Kulkarni V., Lingappa S. Prevalence of depression in patients attending general medicine outpatient department for hypertension. *International Journal of Medical Science and Public Health*. 2019; 8(2):105–109.
3. Mandollikar RY, Naik P, Akram MS, Nirgude AS. Depression among the elderly: a cross-sectional study in an urban community. *Int J Med Sci Public Health*. 2017 Jan 1;6(2):318-23.
4. Ginty AT, Carroll D, Roseboom TJ, Phillips AC, de Rooij SR. Depression and anxiety are associated with a diagnosis of hypertension 5 years later in a cohort of late middle-aged men and women. *Journal of human hypertension*. 2013 Mar;27(3):187-90.
5. Nejati S, Zahiroddin A, Afrookhteh G, Rahmani S, Hoveida S. Effect of group mindfulness-based stress-reduction program and conscious yoga on lifestyle, coping strategies, and systolic and diastolic blood pressures in patients with hypertension. *The Journal of Tehran University Heart Center*. 2015 Jul 7;10(3):140.
6. School Harvard Medical Reading the new blood pressure guidelines. 2018. Apr, Accessed on 20-4 2020.
7. Meng L, Chen D, Yang Y, Zheng Y, Hui R. Depression increases the risk of hypertension incidence: a meta-analysis of prospective cohort studies. *Journal of hypertension*. 2012 May 1;30(5):842-51.

8. NEMEROFF CB, O'CONNOR CM. Depression as a risk factor for cardiovascular and cerebrovascular disease: emerging data and clinical perspectives. *The American heart journal*. 2000;140(4).
9. World Health Organization Depression. 2018. Mar 22, Accessed on 20-4 2020.
10. Prathibha MT, Varghese S, Jincy J. Prevalence of depression among hypertensive individuals in urban Trivandrum: a cross sectional study. *International Journal Of Community Medicine And Public Health*. 2017 May 22;4(6):2156-61.
11. Davidson K, Jonas BS, Dixon KE, Markovitz JH. Do depression symptoms predict early hypertension incidence in young adults in the CARDIA study?. *Archives of internal medicine*. 2000 May 22;160(10):1495-500.
12. Murphy MB, Murray C, Shorten GD. Fenoldopam—a selective peripheral dopamine-receptor agonist for the treatment of severe hypertension. *New England Journal of Medicine*. 2001 Nov 22;345(21):1548-57.
13. Mycek MJ, Harvey RA, Champe PC. Antidepressant Drugs. In: Mycek MJ, Harvey RA, Champe PC, editors. *Pharmacology*. Philadelphia: Lippincott Williams & Wilkins; 2000. pp. 119–26.
14. Thomas J, Jones G, Scarinci I, Brantley P. A descriptive and comparative study of the prevalence of depressive and anxiety disorders in low-income adults with type 2 diabetes and other chronic illnesses. *Diabetes care*. 2003 Aug 1;26(8):2311-7.
15. Nemeroff CB, Goldschmidt-Clermont PJ. Heartache and heartbreak—the link between depression and cardiovascular disease. *Nature Reviews Cardiology*. 2012 Sep;9(9):526-39.
16. Thayer JF, Lane RD. The role of vagal function in the risk for cardiovascular disease and mortality. *Biological psychology*. 2007 Feb 1;74(2):224-42.
17. O'Connor CM, Gurbel PA, Serebruany VL. Depression as a risk factor for cardiovascular and cerebrovascular disease: Emerging data and clinical perspectives. *Am Heart J*. 2000;140:S63–9.
18. Cai Y, Chen M, Zhai W, Wang C. Interaction between trouble sleeping and depression on hypertension in the NHANES 2005–2018. *BMC public health*. 2022 Dec;22(1):1-11.
19. Song X, Zhang Z, Zhang R, Wang M, Lin D, Li T, Shao J, Ma X. Predictive markers of depression in hypertension. *Medicine*. 2018 Aug;97(32).
20. Rueda B, Perez-Garcia AM. Coping strategies, depressive symptoms and quality of life in hypertensive patients: mediational and prospective relations. *Psychology & health*. 2013 Oct 1;28(10):1152-70.
21. Saboya PM, Zimmermann PR, Bodanese LC. Association between anxiety or depressive symptoms and arterial hypertension, and their impact on the quality of life. *The International Journal of Psychiatry in Medicine*. 2010 Sep;40(3):307-20.
22. Batal O, Khatib OF, Bair N, Aboussouan LS, Minai OA. Sleep quality, depression, and quality of life in patients with pulmonary hypertension. *Lung*. 2011 Apr;189:141-9.
23. Maguire LK, Hughes CM, McElnay JC. Exploring the impact of depressive symptoms and medication beliefs on medication adherence in hypertension—a primary care study. *Patient education and counseling*. 2008 Nov 1;73(2):371-6.
24. Moise N, Davidson KW, Chaplin W, Shea S, Kronish I. Depression and clinical inertia in patients with uncontrolled hypertension. *JAMA internal medicine*. 2014 May 1;174(5):818-9.
25. Oganov RG, Pogosova GV, Koltunov IE, Romasenko LV, Deev AD, IuM I. Depressive symptoms worsen cardiovascular prognosis and shorten length of life in patients with arterial hypertension and ischemic heart disease. *Kardiologia*. 2011 Jan 1;51(2):59-66.
26. Wells KB, Stewart A, Hays RD, Burnam MA, Rogers W, Daniels M, Berry S, Greenfield S, Ware J. The functioning and well-being of depressed patients: results from the Medical Outcomes Study. *Jama*. 1989 Aug 18;262(7):914-9.
27. Wang L, Li J. Role of educational intervention in the management of comorbid depression and hypertension. *Blood pressure*. 2003 Jan 1;12(4):198-202.
28. Coventry P. Multicondition collaborative care intervention for people with coronary heart disease and/or diabetes, depression and poor control of hypertension, blood sugar or hypercholesterolemia improves disability and quality of life compared with usual care. *BMJ Evidence-Based Medicine*. 2012 Dec 1;17(6):e13.
29. Rabkin JG, Charles E, Kass F. Hypertension and DSM-III depression in psychiatric outpatients. *The American journal of psychiatry*. 1983 Aug 1;140(8):1072-4.
30. Rubio-Guerra AF, Arceo-Navarro A, Lozano-Nuevo JJ, Vargas-Ayala G, Rodríguez-López L, Ramos-Brizuela LM. Efficacy of a fixed-dose combination of trandolapril-verapamil in patients with stage 2 hypertension inadequately controlled by monotherapy. *Clinical drug investigation*. 2005 Jul;25:445-51.
31. Barton DA, Dawood T, Lambert EA, Esler MD, Haikerwal D, Brenchley C, Socratous F, Kaye DM, Schlaich MP, Hickie I, Lambert GW. Sympathetic activity in major depressive disorder: identifying those at increased cardiac risk?. *Journal of hypertension*. 2007 Oct 1;25(10):2117-24.
32. Dhar AK, Barton DA. Depression and the link with cardiovascular disease. *Frontiers in psychiatry*. 2016 Mar 21;7:33.
33. Kaye DM, Lefkowitz J, Jennings GL, Bergin P, Broughton A, Esler MD. Adverse consequences of high sympathetic nervous activity in the failing human heart. *Journal of the American College of Cardiology*. 1995 Nov 1;26(5):1257-63.
34. Pitzalis MV, Iacoviello M, Todarello O, Fioretti A, Guida P, Massari F, Mastrospasqua F, Russo GD, Rizzon P. Depression but not anxiety influences the autonomic control of heart rate after myocardial infarction. *American heart journal*. 2001 May 1;141(5):765-71.
35. Jha MK, Qamar A, Vaduganathan M, Charney DS, Murrrough JW. Screening and management of depression in patients with cardiovascular disease: JACC state-of-the-art review. *Journal of the American College of Cardiology*. 2019 Apr 16;73(14):1827-45.
36. Singla S, Jhamb S, Singh KD, Kumar A. Depression affects autonomic system of the body? Yes, it does!. *Journal of education and health promotion*. 2020 Jan 1;9(1):217.
37. Wong ML, Kling MA, Munson PJ, Listwak S, Licinio J, Prolo P, Karp B, McCutcheon IE, Geraciotti Jr TD, DeBellis MD, Rice KC. Pronounced and sustained central hypernoradrenergic function in major depression with melancholic features: relation to hypercortisolism and corticotropin-releasing hormone. *Proceedings of the National Academy of Sciences*. 2000 Jan 4;97(1):325-30.
38. Miller GE, Stetler CA, Carney RM, Freedland KE, Banks WA. Clinical depression and inflammatory risk markers for coronary heart disease. *The American journal of cardiology*. 2002 Dec 15;90(12):1279-83.
39. Lichtman JH, Bigger Jr JT, Blumenthal JA, Frasure-Smith N, Kaufmann PG, Lesperance F, Mark DB, Sheps DS, Taylor CB, Froelicher ES. Depression and coronary heart disease: recommendations for screening, referral, and treatment: a science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes

- Research: endorsed by the American Psychiatric Association. *Circulation*. 2008 Oct 21;118(17):1768-75.
40. Hasin DS, Sarvet AL, Meyers JL, Saha TD, Ruan WJ, Stohl M, Grant BF. Epidemiology of adult DSM-5 major depressive disorder and its specifiers in the United States. *JAMA psychiatry*. 2018 Apr 1;75(4):336-46.
  41. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JG, Coats AJ, Falk V, González-Juanatey JR, Harjola VP, Jankowska EA, Jessup M. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Kardiologia Polska (Polish Heart Journal)*. 2016;74(10):1037-147.
  42. McMurray JJ, Adamopoulos S, Anker SD, Auricchio A, Böhm M, Dickstein K, Falk V, Filippatos G, Fonseca C, Gomez Sanchez MA, Jaarsma T. Guía de práctica clínica de la ESC sobrediagnóstico y tratamiento de la insuficienci cardiaca aguda y crónica 2012= ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012. *Revista Española de Cardiología*. 2012;65(10):938.
  43. Pettinger R. *Stress management*. New York: Capstone; 2002 Apr.
  44. Greenberg J. *Comprehensive stress management*. McGraw-Hill Education; 2012.
  45. Van den Bergh O. *Principles and practice of stress management*. Guilford Publications; 2021 Jun 14.
  46. Smith JC. *Stress management: A comprehensive handbook of techniques and strategies*. Springer Publishing Company; 2002.
  47. Pekala RJ, Forbes EJ. Subjective effects of several stress management strategies: With reference to attention. *Behavioral Medicine*. 1990 Mar 1;16(1):39-43.
  48. Pase MP. Dietary Approaches to Reduce Aortic Stiffness. *Handbook of Lipids in Human Function*. 2016 Jan 1:141-61.
  49. Ho AK, Bartels CM, Thorpe CT, Pandhi N, Smith MA, Johnson HM. Achieving weight loss and hypertension control among obese adults: a US multidisciplinary group practice observational study. *American journal of hypertension*. 2016 Aug 1;29(8):984-91.
  50. Edenfield TM, Blumenthal JA. Exercise and stress reduction. *The handbook of stress science: Biology, psychology, and health*. 2011:301-19.
  51. Blumenthal JA, Babyak MA, Carney RM, Huber M, Saab PG, Burg MM, Sheps D, Powell L, Taylor CB, Kaufmann PG. Exercise, depression, and mortality after myocardial infarction in the ENRICH trial. *Medicine and Science in Sports and Exercise*. 2004 May 1;36(5):746-55.
  52. El-Atat F, Aneja A, McFarlane S, Sowers J. Obesity and hypertension. *Endocrinol Metab Clin North Am*. 2003;32:823-54.
  53. Talukder MH, Johnson WM, Varadharaj S, Lian J, Kearns PN, El-Mahdy MA, Liu X, Zweier JL. Chronic cigarette smoking causes hypertension, increased oxidative stress, impaired NO bioavailability, endothelial dysfunction, and cardiac remodeling in mice. *American Journal of Physiology-Heart and Circulatory Physiology*. 2011 Jan;300(1):H388-96.
  54. Tuomilehto J, Elo J, Nissinen A. Smoking among patients with malignant hypertension. *British Medical Journal (Clinical research ed.)*. 1982 Apr 4;284(6322):1086.
  55. Dahl LK, Leitl G, Heine M. Influence of dietary potassium and sodium/potassium molar ratios on the development of salt hypertension. *The Journal of experimental medicine*. 1972 Aug 8;136(2):318.
  56. Parker K, He J, Cutler A. Potassium and blood pressure. *MJIM*. 2003;275:1620-32.
  57. <https://my.clevelandclinic.org/health/treatments/9301-antidepressants-depression-medication>
  58. <https://www.mayoclinic.org/diseases-conditions/depression/diagnosis-treatment/drc-20356013>

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