

A Systematic Review of Risk Factors in Adolescents' Predictors of High Blood Pressure in Adulthood

EPH153



M.G.S. COSTA¹, J.J. CARO², M. PADILLA¹, L. SCHROEDER¹, and K.V. BLOCH³

¹Instituto Nacional de Cardiologia, Rio de Janeiro, Brazil, ²McGill University, London School of Economics, Evidera, Lincoln, MA, USA, ³Universidade Federal do Rio de Janeiro, Rio de Janeiro,

INTRODUCTION

Uncontrolled high blood pressure can cause myocardial infarction, heart failure, stroke, dementia, kidney failure, and blindness^{1,2}. The high blood pressure in childhood is the strongest predictor of adult hypertension. Adolescents with the highest percentiles of BP have an increased risk of hypertension in adult life^{3,4}.

OBJECTIVE

To assess published evidence on adolescent risk factors for hypertension and their contribution to developing the disease in adulthood.

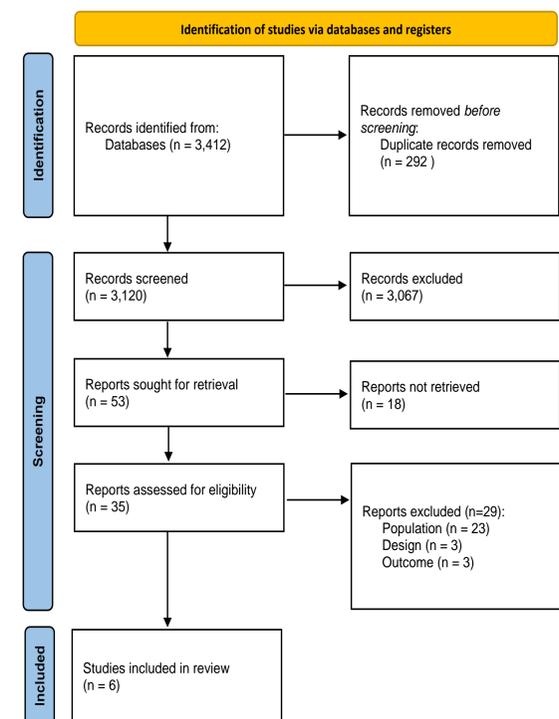
METHOD

A systematic review was carried out. A search was performed in the Embase, Lilacs, Adolec, Medline, Cochrane Library databases, and manual search (cross-reference of included studies). Eligibility criteria: adolescents (12 to 17 years); cohort studies that measured adolescent risk factors and documented their long-term association with hypertension occurring in adulthood. Exclusion criteria: specific populations known to have a higher incidence of hypertension. The quality of studies was assessed by Newcastle-Ottawa Scale. (PROSPERO database ID: CRD42020172254)

RESULTS

- ✓ All six studies included (N = 37,901) were cohorts (Figure 1). It was not possible to perform meta-analysis due to heterogeneity in data extraction and outcome measures.
- ✓ The articles had in general a low risk of bias.
- ✓ Obese adolescents are more likely to report high blood pressure in young adulthood than normal-weight adolescents, N = 14,322, adjusted odds ratio (aOR) = 1.96; 95% confidence interval (CI) = 1.50-2.57⁵.
- ✓ The increase in systolic and diastolic blood pressure results in adult hypertension (N= 1,082): systolic blood pressure OR= 1.45, 95% CI 1.09-1.91 for men and OR 1.32 (95% CI 1.02-1.71) for women, diastolic blood pressure OR=1.17, 95% CI 0.89-1.53 for men; and OR= 1.75 (95% CI 1.32-2.31) for women⁶.
- ✓ In men, excessive alcohol consumption is a strong predictor of adult hypertension; adding it to models with childhood systolic and diastolic blood pressure and BMI increases the odds ratio for systolic blood pressure, OR= 2.46, 95% CI 1.18-5.77 and for diastolic blood pressure, OR= 2.41, 95% CI 1.17-1.97⁶.
- ✓ For women, alcohol consumption: systolic blood pressure, OR= 0.70, 95% CI 1.17-2.99, and for diastolic blood pressure, OR= 1.04, 95% CI 0.22-4.97⁶.

Figure 1. Prisma 2020 flow diagram of systematic review of risk factors for HBP



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

CONCLUSIONS

Overweight and obesity doubled the chance of hypertension in adulthood; systolic and diastolic blood pressure increased the chance by 1.5 times. Salt intake and physical activity/sedentary lifestyle, independently, were not related to the development of hypertension.

REFERENCES

1. World Health Organization. Global status report on noncommunicable disease. World Health Organization 2014. Available in: https://apps.who.int/iris/bitstreams/handle/10665/148114/9789241564854_eng.pdf. Accessed: 2021 July 15. 3.
2. World Health Organization. A global brief on hypertension: silent killer, global public health crisis. World Health Day 2013. World Health Organization 2013. Available in: <https://apps.who.int/iris/handle/10665/79059>. Accessed: 2021 July 15.
3. Tirosh A, Afek A, Rudich A, Pericik R, Gordon B, Ayalon N, et al. Progression of normotensive adolescents to hypertensive adults: a study of 26,980 teenagers. *Hypertension* 2010; 56:203-209. 55 13.
4. Vik KL, Romundstad P, Nilsen TI. Tracking of cardiovascular risk factors across generations: family linkage within the population-based HUNT study, Norway. *J Epidemiol Community Health* 2013; 67:564-570.
5. Ford CA, Nonemaker JM, Wirth KE. The influence of adolescent body mass index, physical activity, and tobacco use on blood pressure and cholesterol in young adulthood. *J Adolesc Health*. 2008 Dec;43(6):576-83. doi: 10.1016/j.jadohealth.2008.06.010. Epub 2008 September 27. PMID: 19027646
6. Petkeviciene J, Klumbiene J, Simonyte S, Ceponiene I, Jureniene K, Kraucioniene V, et al. Physical, behavioral and genetic predictors of adult hypertension: the findings of the Kaunas Cardiovascular Risk Cohort study. *PLoS One*. 2014 Oct 14;9(10):e109974. doi: 10.1371/journal.pone.0109974. PMID: 25313554; PMCID: PMC4196949.

CONTACT INFORMATION

Márcia Gisele Santos da Costa, PhD
E-mail: mgisele@gmail.com