Title

The projected economic burden of non-communicable diseases attributable to overweight in Brazil by 2030

Abstract

Objectives: The prevalence of overweight increases the risk of several non-communicable diseases (NCDs) and, consequently, the costs of health care systems. In this study, we aimed to project the economic burden of NCDs attributable to overweight in Brazil between 2021 and 2030. Methods: A cohort simulation of adults (17–117 years) using multistate lifetable modeling was used to estimate the costs of NCDs attributable to overweight in Brazil. The projections of direct health care costs (outpatient and inpatient expenses in the Unified Health System) and indirect costs (years of productive life lost) considered different trajectories of the prevalence of overweight between 2021 and 2030. Results: In 2019, the prevalence of overweight was 55.4% in the adult Brazilian population. We estimate that around 1.8 billion international dollars (Int$) would be spent on the direct health care cost of NCDs between 2021 and 2030, through the continued increase in overweight prevalence observed between 2006 and 2020. The indirect costs over the same time would be approximately 20.1 billion Int$. We estimate that halving the annual increase in body mass index slope from the beginning of 2021 until 2030 would save 20.2 million Int$ direct and indirect costs by 2030. In the scenario of keeping the prevalence of overweight observed in 2019 constant until 2030, the savings would be 40.8 million Int$. Finally, in the scenario of a 6.7% reduction in the prevalence of overweight observed in 2019 (to be achieved gradually until 2030), 74.1 million Int$ would be saved. Conclusions: These results highlight the high economic burden of overweight in the Brazilian adult population.

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References

Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults, Lancet, 390, pp. 2627-2642, (2017); Stanaway J.D., Afshin A., Gakidou E., Lim S.S., Abate D., Abate K.H., Et al., Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017, Lancet, 392, pp. 1923-1994, (2018); Estivaleti J.M., Guzman-Habinger J., Lobos J., Azeredo C.M., Claro R., Ferrari G., Et al., Time trends and projected obesity epidemic in Brazilian adults between 2006 and 2030, Sci Rep, 12, (2022); Dai H., Alsalhe T.A., Chalghaf N., Ricco M., Bragazzi N.L., Wu J., The global burden of disease attributable to high body mass index in 195 countries and

territories, 1990–2017: an analysis of the Global Burden of Disease Study, PLoS Med, 17, (2020); Ferrari G., Giannichi B., Resende B., Paiva L., Rocha R., Falbel F., Et al., The economic burden of overweight and obesity in Brazil: perspectives for the Brazilian Unified Health System, Publ Health, 207, pp. 82-87, (2022); Nilson E.A.F., Gianicchi B., Ferrari G., Rezende L.F.M., The projected burden of non-communicable diseases attributable to overweight in Brazil from 2021 to 2030, Sci Rep, 12, (2022); da Silva L.E.S., Gouvea E., Stopa S.R., Tierling V.L., Sardinha L.M.V., Macario E.M., Et al., Data resource profile: surveillance system of risk and protective factors for chronic diseases by telephone survey for adults in Brazil (Vigitel), Int J Epidemiol, 50, pp. 1058-1063, (2021); Collaboration P.S., Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies, Lancet, 373, pp. 1083-1096, (2009); Almeida M.S.C., Sousa Filho L.F., Rabello P.M., Santiago B.M., Classificação Internacional das Doenças-11 revisão: da concepção à implementação, Rev Saude Publica, 54, (2020); Nilson E.A.F., Andrade R., de Brito D.A., de Oliveira M.L., [Costs attributable to obesity, hypertension, and diabetes in the Unified Health System, Brazil, 2018. Costos atribuibles a la obesidad, la hipertension y la diabetes en el Sistema Unico de Salud de Brasil, 2018], Rev Panam Salud Publica, 44, (2020); GBD compare, (2015); Pesquisa nacional por amostra de domicílios contínua-PNAD Contínua, (2020); Nilson E.A.F., Metlzer A.B., Labonte M.E., Jaime P.C., Modelling the effect of compliance with WHO salt recommendations on cardiovascular disease mortality and costs in Brazil, PLoS One, 15, (2020); Vega-Solano J., Madriz-Morales K., Blanco-Metzler A., Fernandes-Nilson E.A., Estimation of the economic benefits for the public health system related to salt reduction in Costa Rica, PLoS One, 18, (2023); Healthy people 2030, (2021); Blakely T., Moss R., Collins J., Mizdrak A., Singh A., Carvalho N., Et al., Proportional multistate lifetable modelling of preventive interventions: concepts, code and worked examples, Int J Epidemiol, 49, pp. 1624-1636, (2020); Cobiac L.J., Scarborough P., Kaur A., Rayner M., The Eatwell guide: modelling the health

implications of incorporating new sugar and fibre guidelines, PLoS One, 11, (2016); Blakely T., Foster R., Wilson N., Costilla R., Burden of disease epidemiology, equity and cost-effectiveness (BODE3) study protocol, (2011); Barendregt J.J., Van Oortmarssen G.J., Vos T., Murray C.J., A generic model for the assessment of disease epidemiology: the computational basis of DisMod II, Popul Health Metrics, 1, pp. 1-8, (2003); Nilson E.A.F., Pearson-Stuttard J., Collins B., Guzman-Castillo M., Capewell S., O'Flaherty M., Et al., Estimating the health and economic effects of the voluntary sodium reduction targets in Brazil: microsimulation analysis, BMC Med, 19, (2021); Arnold M., Pandeya N., Byrnes G., Renehan P.A.G., Stevens G.A., Ezzati P.M., Et al., Global burden of cancer attributable to high body-mass index in 2012: a population-based study, Lancet Oncol, 16, pp. 36-46, (2015); Groot Koerkamp B., Weinstein M.C., Stijnen T., Heijenbrok-Kal M.H., Hunink M.M., Uncertainty and patient heterogeneity in medical decision models, Med Decis Making, 30, pp. 194-205, (2010); Okunogbe A., Nugent R., Spencer G., Powis J., Ralston J., Wilding J., Economic impacts of overweight and obesity: current and future estimates for 161 countries, BMJ Glob Health, 7, (2022); Rodgers A., Woodward A., Swinburn B., Dietz W.H., Prevalence trends tell us what did not precipitate the US obesity epidemic, Lancet Public Health, 3, pp. e162-e163, (2018); Hall K.D., Ayuketah A., Brychta R., Cai H., Cassimatis T., Chen K.Y., Et al., Ultra-processed diets cause excess calorie intake and weight gain: an inpatient randomized controlled trial of ad libitum food intake, Cell Metabol, 30, pp. 67-77. e3, (2019); Pagliai G., Dinu M., Madarena M., Bonaccio M., Iacoviello L., Sofi F., Consumption of ultra-processed foods and health status: a systematic review and meta-analysis, Br J Nutr, 125, pp. 308-318, (2021); Juul F., Vaidean G., Lin Y., Deierlein A.L., Parekh N., Ultra-processed foods and incident cardiovascular disease in the Framingham offspring study, J Am Coll Cardiol, 77, pp. 1520-1531, (2021); Adams J., Hofman K., Moubarac J.-C., Thow A.M., Public health response to ultra-processed food and drinks, BMJ, (2020); Alatab S., Sepanlou S.G., Ikuta K., Vahedi H., Bisignano C., Safiri S., Et al., The global, regional,

and national burden of inflammatory bowel disease in 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017, Lancet Gastroenterol Hepatol, 5, pp. 17-30, (2020); Figueiredo A.V.D.A., Recine E., A regulação de produtos alimentícios ultraprocessados: o desafio de governar o mercado, 37, (2022); Regulação de ultraprocessados desafia políticas no Brasil, (2018); Ng S.W., Rivera J.A., Popkin B.M., Colchero M.A., Did high sugar-sweetened beverage purchasers respond differently to the excise tax on sugar-sweetened beverages in Mexico?, Publ Health Nutr, 22, pp. 750-756, (2019)

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