Title

Lifestyle risk factors and all-cause and cause-specific mortality in the Mexico City prospective study: Assessing the influence of reverse causation

Abstract

Background: We examined the association between individual lifestyle risk factors with all-cause and cause-specific mortality. Methods: Prospective cohort study including 155,002 participants from the Mexico City Prospective Study. Cox regression models were used to estimate the association between individual lifestyle risk factors and all-cause and cause-specific mortality. Participants with prevalent diseases at baseline and participants who died during the first 2, 5, 10, and 15 years of follow-up were excluded to account for reverse causation. Results: 27,469 people died during 18.3 years of follow-up years. Overweight and moderate alcohol consumption were inversely associated with all-cause mortality, while low physical activity and smoking were positively associated when all participants were included, regardless of prevalent disease or duration of follow-up. The direction of the association of overweight with all-cause mortality changed from inverse to positive after excluding the first 10 years of follow-up. Compared with normal weight, the hazard ratio (95 % confidence interval) was 1.17 (1.13,1.22) for obesity after excluding those who died in the first 5 years of follow-up and 1.71 (1.59,1.84) after excluding the first 15 years of follow-up. The magnitude of the association of alcohol intake, low physical activity, and smoking with mortality attenuated, whereas for fruits and vegetables increased, after excluding longer periods of follow-up. Limitations: The data were collected exclusively in Mexico City; lifestyle risk factors were self-reported and thus prone to misclassification bias. Conclusions: Reverse causation may influence both the magnitude and the direction of the associations between lifestyle risk factors and mortality.

Authors

Ferrari G.; de Maio Nascimento M.; Petermann-Rocha F.; Rezende L.F.M.; O'Donovan G.; Gouveia É.R.; Cristi-Montero C.; Marques A.

Author full names

Ferrari, Gerson (57208326105); de Maio Nascimento, Marcelo (57193956749); Petermann-Rocha, Fanny (57220028899); Rezende, Leandro F.M. (56447174800); O'Donovan, Gary (9844699900); Gouveia, Élvio R. (36637395800); Cristi-Montero, Carlos (55082023800); Marques, Adilson (55082567000)

Author(s) ID

57208326105; 57193956749; 57220028899; 56447174800; 9844699900; 36637395800; 55082023800; 55082567000

Year

2024

Source title

Journal of Affective Disorders

Volume

352.0

Page start

517

Page end

524

Page count

7.0

DOI

10.1016/j.jad.2024.02.072

Link

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85187514463&doi=10.1016%2fj.jad.2024.02.072&partnerID=40&md5=ab22e485e2d2a99e024e9e826f0d873e

Affiliations

Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Providencia, Chile; Universidad de Santiago de Chile (USACH), Escuela de Ciencias de la Actividad Física, el Deporte y la Salud, Santiago, Chile; Department of Physical Education, Federal University of Vale do São Francisco, Petrolina, Brazil; Centro de Investigación Biomédica, Facultad de Medicina, Universidad Diego Portales,

Santiago, Chile; Departamento de Medicina Preventiva, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, Brazil; Instituto Masira, Universidad de Santander, Bucaramanga, Colombia; Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibáñez, Santiago, Chile; Facultad de Medicina, Universidad de los Andes, Bogotá, Colombia; Department of Physical Education and Sport, University of Madeira, Funchal, Portugal; Laboratory of Robotics and Engineering Systems (LARSYS), Interactive Technologies Institute, Funchal, Portugal; IRyS Group, Physical Education School, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile; CIPER, Faculdade de Motricidade Humana, Universidade de Lisboa, Lisbon, Portugal; Faculdade de Medicina, ISAMB, Universidade de Lisboa, Lisbon, Portugal

Authors with affiliations

Ferrari G., Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Providencia, Chile, Universidad de Santiago de Chile (USACH), Escuela de Ciencias de la Actividad Física, el Deporte y la Salud, Santiago, Chile; de Maio Nascimento M., Department of Physical Education, Federal University of Vale do São Francisco, Petrolina, Brazil; Petermann-Rocha F., Centro de Investigación Biomédica, Facultad de Medicina, Universidad Diego Portales, Santiago, Chile; Rezende L.F.M., Departamento de Medicina Preventiva, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, Brazil; O'Donovan G., Instituto Masira, Universidad de Santander, Bucaramanga, Colombia, Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibáñez, Santiago, Chile, Facultad de Medicina, Universidad de los Andes, Bogotá, Colombia; Gouveia É.R., Department of Physical Education and Sport, University of Madeira, Funchal, Portugal, Laboratory of Robotics and Engineering Systems (LARSYS), Interactive Technologies Institute, Funchal, Portugal; Cristi-Montero C., IRyS Group, Physical Education School,

Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile; Marques A., CIPER, Faculdade de Motricidade Humana, Universidade de Lisboa, Lisbon, Portugal, Faculdade de Medicina, ISAMB, Universidade de Lisboa, Lisbon, Portugal

Author Keywords

Bias; Lifestyle risk factor; Mortality; Prospective study; Reverse causation

Index Keywords

Cause of Death; Humans; Life Style; Mexico; Overweight; Prospective Studies; Risk Factors; adult; aged; alcohol consumption; all cause mortality; Article; cohort analysis; female; follow up; human; human experiment; lifestyle; male; Mexico City; mortality; obesity; physical activity; prospective study; risk factor; sampling; smoking; vegetable; cause of death; Mexico; obesity; prospective study; risk factor

Funding Details

Medical Research Council, MRC; Mexican Health Ministry; Consejo Nacional de Ciencia y Tecnología, CONACYT; Wellcome Trust, WT; Vicerrectoría de Investigación y Doctorados, Universidad Autónoma de Chile; Universidad Autónoma de Chile.This, (2022-020)

Funding Texts

Funding text 1: This research has been conducted using Mexico City Prospective Study (MCPS) Data under Application Number 2022-020. MCPS (https://www.ctsu.ox.ac.uk/research/mcps) has received funding from the Mexican

Health Ministry , the National Council of Science and Technology for Mexico , Wellcome , and core grants from the UK Medical Research Council to the MRC Population Health Research Unit at the University of Oxford. We would like to thank the participants from the Mexico City Prospective Study.; Funding text 2: The present research received financial support from Vicerrectoría de Investigación y Doctorados, Universidad Autónoma de Chile . ; Funding text 3: The present research received financial support from Vicerrectoría de Investigación y Doctorados, Universidad Autónoma de Chile.This research has been conducted using Mexico City Prospective Study (MCPS) Data under Application Number 2022-020. MCPS (https://www.ctsu.ox.ac.uk/research/mcps) has received funding from the Mexican Health Ministry, the National Council of Science and Technology for Mexico, Wellcome, and core grants from the UK Medical Research Council to the MRC Population Health Research Unit at the University of Oxford. We would like to thank the participants from the Mexico City Prospective Study. We thank everyone who took part in the Mexico City Prospective Study.

References

Alegre-Diaz J., Herrington W., Lopez-Cervantes M., Et al., Diabetes and cause-specific mortality in Mexico City, N. Engl. J. Med., 375, pp. 1961-1971, (2016); Aune D., Sen A., Prasad M., Et al., BMI and all cause mortality: systematic review and non-linear dose-response meta-analysis of 230 cohort studies with 3.74 million deaths among 30.3 million participants, BMJ, 353, (2016); Aune D., Giovannucci E., Boffetta P., Et al., Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality-a systematic review and dose-response meta-analysis of prospective studies, Int. J. Epidemiol., 46, pp. 1029-1056, (2017); Banack H.R., Kaufman J.S., Estimating the time-varying joint effects of obesity and smoking on all-cause mortality using marginal structural models, Am. J. Epidemiol.,

183, pp. 122-129, (2016); Banack H.R., Bea J.W., Kaufman J.S., Et al., The effects of reverse causality and selective attrition on the relationship between body mass index and mortality in post-menopausal women, Am. J. Epidemiol., 188, pp. 1838-1848, (2019); Behrens G., Matthews C.E., Moore S.C., Et al., Body size and physical activity in relation to incidence of chronic obstructive pulmonary disease, CMAJ, 186, pp. E457-E469, (2014); Bhaskaran K., Douglas I., Forbes H., Et al., Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5.24 million UK adults, Lancet, 384, pp. 755-765, (2014); Bosello O., Vanzo A., Obesity paradox and aging, Eat. Weight Disord., 26, pp. 27-35, (2021); Fitzpatrick A.L., Kuller L.H., Lopez O.L., Et al., Midlife and late-life obesity and the risk of dementia: cardiovascular health study, Arch. Neurol., 66, pp. 336-342, (2009); Flegal K.M., Graubard B.I., Williamson D.F., Et al., Reverse causation and illness-related weight loss in observational studies of body weight and mortality, Am. J. Epidemiol., 173, pp. 1-9, (2011); Frayling T.M., Timpson N.J., Weedon M.N., Et al., A common variant in the FTO gene is associated with body mass index and predisposes to childhood and adult obesity, Science, 316, pp. 889-894, (2007); Giordano G.N., Lindstrom M., Trust and health: testing the reverse causality hypothesis, J. Epidemiol. Community Health, 70, pp. 10-16, (2016); Global, B.M.I.M.C, Di Angelantonio E., Bhupathiraju S.N., Et al., Body-mass index and all-cause mortality: individual-participant-data meta-analysis of 239 prospective studies in four continents, Lancet, 388, pp. 776-786, (2016); Hainer V., Aldhoon-Hainerova I., Obesity paradox does exist, Diabetes Care, 36, pp. S276-S281, (2013); van der Ham M., Bolijn R., de Vries A., Et al., Gender inequality and the double burden of disease in low-income and middle-income countries: an ecological study, BMJ Open, 11, (2021); Katikireddi S.V., Whitley E., Lewsey J., Et al., Socioeconomic status as an effect modifier of alcohol consumption and harm: analysis of linked cohort data, Lancet Public Health, 2, pp. e267-e276, (2017); Kivimaki M., Shipley M.J., Bell J.A., Et al., Underweight as a risk factor for respiratory

death in the Whitehall cohort study: exploring reverse causality using a 45-year follow-up, Thorax, 71, pp. 84-85, (2016); Lee J.Y., Kim H.C., Kim C., Et al., Underweight and mortality, Public Health Nutr., 19, pp. 1751-1756, (2016); Lee D.H., Rezende L.F.M., Ferrari G., Et al., Physical activity and all-cause and cause-specific mortality: assessing the impact of reverse causation and measurement error in two large prospective cohorts, Eur. J. Epidemiol., 36, pp. 275-285, (2021); Lloyd-Jones D.M., Ning H., Labarthe D., Et al., pp. 822-835, (2022); Mikkelsen L., Phillips D.E., AbouZahr C., Et al., A global assessment of civil registration and vital statistics systems: monitoring data quality and progress, Lancet, 386, pp. 1395-1406, (2015); Murray J.M., Coleman H.G., Hunter R.F., Physical activity and cancer risk: findings from the UK Biobank, a large prospective cohort study, Cancer Epidemiol., 68, (2020); NCD-RisC, 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); Oviedo-Solis C.I., Hernandez-Alcaraz C., Sanchez-Ortiz N.A., Et al., Association of sociodemographic and lifestyle factors with dietary patterns among men and women living in Mexico City: a cross-sectional study, Front. Public Health, 10, (2022); Pena S., Makela P., Laatikainen T., Et al., Joint effects of alcohol use, smoking and body mass index as an explanation for the alcohol harm paradox: causal mediation analysis of eight cohort studies, Addiction, 116, pp. 2220-2230, (2021); Peters R., Peters J., Booth A., Et al., Trajectory of blood pressure, body mass index, cholesterol and incident dementia: systematic review, Br. J. Psychiatry, 216, pp. 16-28, (2020); Rezende L.F.M., Ferrari G., Lee D.H., Et al., Lifestyle risk factors and all-cause and cause-specific mortality: assessing the influence of reverse causation in a prospective cohort of 457,021 US adults, Eur. J. Epidemiol., 37, pp. 11-23, (2022); Sallis H.M., Palmer T., Tilling K., Et al., Using allele scores to identify confounding by reverse causation: studies of alcohol consumption as an exemplar, Int. J. Epidemiol., 52, pp. 536-544, (2023); Sanderson E., Glymour

M.M., Holmes M.V., Et al., Mendelian randomization, Nat Rev Methods Primers, 2, (2022); Strain T., Wijndaele K., Sharp S.J., Et al., Impact of follow-up time and analytical approaches to account for reverse causality on the association between physical activity and health outcomes in UK Biobank, Int. J. Epidemiol., 49, pp. 162-172, (2020); Sun Y.Q., Burgess S., Staley J.R., Et al., (2019); Tapia-Conyer R., Kuri-Morales P., Alegre-Diaz J., Et al., Cohort profile: the Mexico City prospective study, Int. J. Epidemiol., 35, pp. 243-249, (2006); Tarp J., Hansen B.H., Fagerland M.W., Et al., Accelerometer-measured physical activity and sedentary time in a cohort of US adults followed for up to 13 years: the influence of removing early follow-up on associations with mortality, Int. J. Behav. Nutr. Phys. Act., 17, (2020); Tutor A.W., Lavie C.J., Kachur S., Et al., Updates on obesity and the obesity paradox in cardiovascular diseases, Prog. Cardiovasc. Dis., 78, pp. 2-10, (2023); Wang X., Ouyang Y., Liu J., Et al., Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies, BMJ, 349, (2014); Winslow U.C., Rode L., Nordestgaard B.G., High tobacco consumption lowers body weight: a Mendelian randomization study of the Copenhagen General Population Study, Int. J. Epidemiol., 44, pp. 540-550, (2015); Zhang X., Molsberry S.A., Schwarzschild M.A., Et al., Association of diet and physical activity with all-cause mortality among adults with Parkinson disease, JAMA Netw. Open, 5, (2022); Zuo Y., Li H., Chen S., Et al., Joint association of modifiable lifestyle and metabolic health status with incidence of cardiovascular disease and all-cause mortality: a prospective cohort study, Endocrine, 75, pp. 82-91, (2022)

Correspondence Address

G. Ferrari; Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Santiago, Providencia, Chile - Dirección: Av. Pedro de Valdivia 425, Providencia,

Chile; email: gerson.demoraes@uautonoma.cl

Publisher

Elsevier B.V.

ISSN

01650327

CODEN

JADID

PubMed ID

38408614.0

Language of Original Document

English

Abbreviated Source Title

J. Affective Disord.

Document Type

Article

Publication Stage

Final

Source

Scopus

EID

2-s2.0-85187514463