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S1 METHODS

S1.1 SEARCH STRINGS

Table S1: Search string Pubmed

#	Search terms
1	(coronavirus OR “corona virus” OR coronavirinae OR coronaviridae OR betacoronavirus OR covid19 OR “covid 19” OR nCoV OR “CoV 2” OR CoV2 OR sarscov2 OR 2019nCoV OR “novel CoV” OR “wuhan virus”) OR ((wuhan OR hubei OR huanan) AND (“severe acute respiratory” OR pneumonia) AND (outbreak)) OR “Coronavirus”[Mesh] OR “Coronavirus Infections”[Mesh] OR “COVID-19” [Supplementary Concept] OR “severe acute respiratory syndrome coronavirus 2” [Supplementary Concept] OR “Betacoronavirus”[Mesh]
2	“social isolation”[tw] OR “physical isolation”[tw] OR self-isolation[tw] OR ”patient isolation”[tw] OR "social isolation"[mh] OR quarantine[tw] OR self-quarantine[tw] OR quarantine[mh] OR “social distancing”[tw] OR “physical distancing”[tw] OR lockdown[tw] OR “lock down”[tw] OR shutdown[tw] OR “shut down”[tw] OR “home confinement”[tw] OR “house arrest”[tw] OR loneliness[tw] OR loneliness[mh]
3	sedentary[tw] OR "sedentary behavior"[mh] OR “physical inactivity”[tw] OR "physical education and training"[mh] OR “physical training”[tw] OR “physical activity”[tw] OR “physical lifestyle”[tw] OR “physical education”[tw] OR exercis*[tw] OR exercise[mh] OR sport*[tw] OR sports[mh] OR fitness[tw] OR “physical fitness”[mh] OR exert*[tw] OR endur*[tw] OR aerobic*[tw] OR aliment*[tw] OR diet*[tw] OR diet[mh] OR eat[tw] OR eating[tw] OR eating[mh] OR fare[tw] OR feed*[tw] OR food*[tw] OR food[mh] OR nourishment*[tw] OR nutrit*[tw] OR "nutritional status"[mh] OR adipos*[tw] OR adiposity[mh] OR bodyweight[tw] OR “body weight”[tw] OR "body weight"[mh] OR obes*[tw] OR obesity[mh] OR overweight[tw] OR overweight[mh] OR weight*[tw] OR tobacco[tw] OR tobacco[mh] OR smok*[tw] OR smoking[mh] OR cigarette[tw] OR cigarettes[tw] OR “tobacco products”[mh] OR nicotine[tw] OR nicotine[tw] OR wine*[tw] OR liquor*[tw] OR spirits[tw] OR beer*[tw] OR alcohol*[tw] OR drink*[tw] OR "Alcohol-Related Disorders"[mh] OR “alcohol drinking”[mh] or “drinking behavior”[mh] OR “alcoholic beverages”[mh] OR

	"cardiovascular diseases"[mh] OR cardiovascular[tw] OR cardia*[tw] OR heart*[tw] OR coronary*[tw] OR angina*[tw] OR ventric*[tw] OR myocard*[tw] OR pericard*[tw] OR ischem*[tw] OR ischaem*[tw] OR emboli*[tw] OR arrhythmi*[tw] OR thrombos*[tw] OR thromboc*[tw] OR thrombop*[tw] OR atrial fibrillat*[tw] OR tachycardia*[tw] OR endocardi*[tw] OR "sick sinus"[tw] OR "cerebrovascular disorders"[mh] OR stroke[tw] OR strokes[tw] OR cerebrovasc*[tw] OR "cerebral vascular"[tw] OR apoplexy[tw] OR "brain accident"[tw] OR ((brain*[tw] OR cerebral[tw] OR lacunar[tw]) AND infarct*[tw]) OR "hypertension"[mh] OR hypertensi*[tw] OR "peripheral arterial disease"[tw] OR ((high[tw] OR increased[tw] OR elevated[tw]) AND "blood pressure"[tw]) OR "hyperlipidemias"[mh] OR hyperlipid*[tw] OR hyperlipidemia*[tw] OR hyperlipidaemia*[tw] OR hypercholesterol*[tw] OR hypercholesterolemia*[tw] OR hyperlipoproteinemia*[tw] OR hypertriglyceridemia*[tw] OR "arteriosclerosis"[mh] OR "cholesterol"[mh] OR cholesterol[tw] OR "coronary risk factor"[tw] OR "blood pressure"[mh] OR "blood pressure"[tw]
4	#1 AND #2 AND #3

Table S2: Search string EMBASE

#	Search terms
1	(coronavir* OR corona virus* OR betacoronavir* OR covid19 OR covid 19 OR nCoV OR CoV 2 OR CoV2 OR sarscov2 OR 2019nCoV OR 2019 novel coronavirus* OR 2019 novel CoV OR wuhan virus*).mp. OR ((wuhan OR hubei OR huanan) AND (severe acute respiratory OR pneumonia*) AND outbreak*).mp.
2	social isolation.tw. or physical isolation.tw. or self-isolation.tw. or patient isolation.tw. or exp social isolation/ or exp patient isolation/ or exp isolation/ or exp isolation facility/ or quarantine.tw. or self-quarantine.tw. or exp quarantine/ or social distancing.tw. or physical distancing.tw. or lockdown.tw. or lock down.tw. or shutdown.tw. or shut down.tw. or home confinement.tw. or house arrest.tw. or loneliness.tw. or exp loneliness/
3	sedentary.tw. or exp sedentary lifestyle/ or physical inactivity.tw. or exp physical inactivity/ or physical training.tw. or exp training/ or physical activity.tw. or exp physical activity/ or physical lifestyle.tw. or physical education.tw. or exercis*.tw. or exp exercise/ or sport*.tw. or exp sport/ or fitness.tw. or exp fitness/ or exert*.tw. or endur*.tw. or exp endurance/ or aerobic*.tw.
4	aliment*.tw. or diet*.tw. or exp diet/ or eat*.tw. or exp eating/ or fare.tw. or feed*.tw. or food*.tw. or exp food/ or nourishment*.tw. or nutrit*.tw. or exp nutrition/
5	adipos*.tw. or bodyweight.tw. or body weight.tw or exp body weight/ or obes*.tw. or exp obesity/ or overweight.tw. or weight*.tw.
6	tobacco.tw. or exp tobacco/ or smok*.tw. or exp smoking/ or cigarette.tw. or exp cigarette/ or nicotine.tw. or exp nicotine/
7	wine*.tw. or liquor*.tw. or spirits.tw. or beer*.tw. or alcohol*.tw. or drink*.tw. or exp drinking behaviour/ or exp alcohol consumption/ or exp alcoholism/ or exp alcoholic beverage/
8	exp cardiovascular disease/ or cardio*.tw. or cardia*.tw. or heart*.tw. or coronary*.tw. or angina*.tw. or ventric*.tw. or myocard*.tw. or pericard*.tw. or isch?em*.tw. or emboli*.tw. or arrhythmi*.tw. or thrombo*.tw. or atrial fibrillat*.tw. or tachycardi*.tw. or endocardi*.tw. or (sick adj sinus).tw. or exp cerebrovascular disease/ or (stroke or strokes).tw. or cerebrovasc*.tw. or cerebral vascular.tw. or apoplexy.tw. or (brain adj2 accident*).tw. or ((brain* or cerebral or lacunar) adj2 infarct*).tw. or exp hypertension/ or hypertensi*.tw. or peripheral arter* disease*.tw. or ((high or increased or elevated) adj2 blood pressure).tw. or exp hyperlipidemia/ or hyperlipid*.tw. or hyperlip?emia*.tw. or hypercholesterol*.tw. or hypercholester?emia*.tw. or hyperlipoprotein?emia*.tw. or hypertriglycerid?emia*.tw. or exp Arteriosclerosis/ or exp Cholesterol/ or cholesterol.tw. or "coronary risk factor*".tw. or Blood Pressure/ or blood pressure.tw.
9	or/3-8
10	1 and 2 and 9

S2 RESULTS

S2.1 EXCLUDED STUDIES

S2.1.1 STUDIES ABOUT PATIENT COHORTS (NOT REPORTED WITHIN THIS PAPER)

Study	Reference
Ahmed, 2020	Ahmed HO. The impact of social distancing and self-isolation in the last corona COVID-19 outbreak on the body weight in Sulaimani governorate- Kurdistan/Iraq, a prospective case series study. Ann Med Surg (Lond). 2020 Nov;59:110-117. doi: 10.1016/j.amsu.2020.09.024.
Albert et al., 2021	Albert U, Losurdo P, Leschiutta A, Macchi S, Samardzic N, Casaganda B, de Manzini N, Palmisano S. Effect of SARS-CoV-2 (COVID-19) Pandemic and Lockdown on Body Weight, Maladaptive Eating Habits, Anxiety, and Depression in a Bariatric Surgery Waiting List Cohort. Obes Surg. 2021 May;31(5):1905-1911. doi: 10.1007/s11695-021-05257-5.
Berard et al., 2021	Berard M, Rattaz C, Peries M, Loubersac J, Munir K, Baghdadli A. Impact of containment and mitigation measures on children and youth with ASD during the COVID-19 pandemic: Report from the ELENA cohort. J Psychiatr Res. 2021 May;137:73-80. doi: 10.1016/j.jpsychires.2021.02.041.
Biancalana et al., 2021	Biancalana E, Parolini F, Mengozzi A, Solini A. Short-term impact of COVID-19 lockdown on metabolic control of patients with well-controlled type 2 diabetes: a single-centre observational study. Acta Diabetol. 2021 Apr;58(4):431-436. doi: 10.1007/s00592-020-01637-y.
Caruso et al., 2020	Caruso I, Di Molfetta S, Guarini F, Giordano F, Cignarelli A, Natalicchio A, Perrini S, Leonardini A, Giorgino F, Laviola L. Reduction of hypoglycaemia, lifestyle modifications and psychological distress during lockdown following SARS-CoV-2 outbreak in type 1 diabetes. Diabetes Metab Res Rev. 2020 Sep 11:e3404. doi: 10.1002/dmrr.3404.
Chagué et al., 2020	Chagué F, Boulin M, Eicher JC, Bichat F, Saint Jalmes M, Cransac-Miet A, Soudry-Faure A, Danchin N, Cottin Y, Zeller M. Impact of lockdown on patients with congestive heart failure during the coronavirus disease 2019 pandemic. ESC Heart Fail. 2020 Sep 30;7(6):4420–3. doi: 10.1002/ehf2.13016.
Christoforidis et al., 2020	Christoforidis A, Kavoura E, Nemtsa A, Pappa K, Dimitriadou M. Coronavirus lockdown effect on type 1 diabetes management on children wearing insulin pump equipped with continuous glucose monitoring system. Diabetes Res Clin Pract. 2020 Aug;166:108307. doi: 10.1016/j.diabres.2020.108307.
Cirillo et al., 2021	Cirillo M, Rizzello F, Badolato L, De Angelis D, Evangelisti P, Coccia ME, Fatini C. The effects of COVID-19 lockdown on lifestyle and emotional state in women undergoing assisted reproductive technology: Results of an Italian survey. J Gynecol Obstet Hum Reprod. 2021 Feb 2;50(8):102079. doi: 10.1016/j.jogoh.2021.102079.
Cognigi et al., 2021	Cognigni M, D'Agostin M, Schiulaz I, Giangreco M, Carletti C, Faleschini E, Barbi E, Tornese G. HbA1c and BMI after lockdown for COVID-19 in children and adolescents with type 1 diabetes mellitus. Acta Paediatr. 2021 Mar 11. doi: 10.1111/apa.15838.
Cransac-Miet et al., 2021	Cransac-Miet A, Zeller M, Chagué F, Faure AS, Bichat F, Danchin N, Boulin M, Cottin Y. Impact of COVID-19 lockdown on lifestyle adherence in stay-at-home patients with chronic coronary syndromes: Towards a time bomb. Int J Cardiol. 2021 Jan 15;323:285-287. doi: 10.1016/j.ijcard.2020.08.094.
Da Silva et al., 2021	Silva, Jean & Verlengia, Rozangela & Oliveira, José & Ribeiro, Anna & Barbosa, Carolina & Sbeguen Stotzer, Uliana & Crisp, Alex. (2020). Associations between sociodemographic factors and physical activity and sedentary behaviors in adults with chronic diseases during COVID-19 pandemic. Sports Medicine and Health Science. 2. 10.1016/j.smhs.2020.11.002.
De Luis et al., 2020	de Luis Román DA, Izaola O, Primo Martín D, Gómez Hoyos E, Torres Torres B, López Gómez JJ. Effect of lockdown for COVID-19 on self-reported body weight gain in a sample of obese patients. Nutr Hosp. 2020 Dec 16;37(6):1232-1237. English. doi: 10.20960/nh.03307.
De Luis et al., 2021	de Luis D, Izaola O, Primo D, Gómez E, Torres B, Gómez JJL, Pacheco D. Factors Related to Weight Gain in Subjects with Sleeve Gastrectomy During Lockdown by the COVID-19 Pandemic. Obes Surg. 2021 May;31(5):2197-2202. doi: 10.1007/s11695-021-05253-9.
Di Stefano et al., 2021	Di Stefano V, Battaglia G, Giustino V, Gagliardo A, D'Aleo M, Giannini O, Palma A, Brighina F. Significant reduction of physical activity in patients with neuromuscular disease during COVID-19 pandemic: the long-term consequences of quarantine. J Neurol. 2021 Jan;268(1):20-26. doi: 10.1007/s00415-020-10064-6.
Endstrasser et al., 2020	Endstrasser F, Braito M, Linser M, Spicher A, Wagner M, Brunner A. The negative impact of the COVID-19 lockdown on pain and physical function in patients with end-stage hip or knee osteoarthritis. Knee Surg Sports Traumatol Arthrosc. 2020 Aug;28(8):2435-2443. doi: 10.1007/s00167-020-06104-3.
Falcetta et al., 2021	Falcetta P, Aragona M, Ciccarone A, Bertolotto A, Campi F, Coppelli A, Dardano A, Giannarelli R, Bianchi C, Del Prato S. Impact of COVID-19 lockdown on glucose control of elderly people with type 2 diabetes in Italy. Diabetes Res Clin Pract. 2021 Mar 17;174:108750. doi: 10.1016/j.diabres.2021.108750.
Félix et al., 2021	Félix S, de Lourdes M, Ribeiro I, Cunha B, Ramalho S, Vaz AR, Machado PPP, Conceição E. A preliminary study on the psychosocial impact of COVID-19 lockdown in post-bariatric surgery women: the importance of eating behavior, health care access, and social support. Curr Psychol. 2021 Feb 28:1-7. doi: 10.1007/s12144-021-01529-6.
Ghesquière et al., 2021	Ghesquière L, Garabedian C, Drumez E, Lemaître M, Cazaubiel M, Bengler C, Vambergue A. Effects of COVID-19 pandemic lockdown on gestational diabetes mellitus: A retrospective study. Diabetes Metab. 2021 Mar;47(2):101201. doi: 10.1016/j.diabet.2020.09.008.

Study	Reference
Han et al., 2021	Han, Maggie & Preciado, Priscila & Thwin, Ohnmar & Tao, Xia & Tapia-Silva, Leticia & Fuentes, Lemuel & Hakim, Mohamad & Patel, Amrish & Tisdale, Lela & Zhang, Hanjie & Kotanko, Peter. (2021). Effect of Statewide Lockdown in Response to COVID-19 Pandemic on Physical Activity Levels of Hemodialysis Patients. Blood Purification. 1-8. 10.1159/000514935.
Jimenez et al. 2021	Jimenez A, de Hollanda A, Palou E, Ortega E, Andreu A, Molero J, Mestre C, Ibarzabal A, Obach A, Flores L, Cañizares S, Balibrea JM, Vidal J, Escarrabill J, Moize V. Psychoso-cial, Lifestyle, and Body Weight Impact of COVID-19-Related Lockdown in a Sample of Participants with Current or Past History of Obesity in Spain. Obes Surg. 2021 May;31(5):2115-2124. doi: 10.1007/s11695-021-05225-z.
Kang et al., 2021	Kang HM, Jeong DC, Suh BK, Ahn MB. The Impact of the Coronavirus Disease-2019 Pandemic on Childhood Obesity and Vitamin D Status. J Korean Med Sci. 2021 Jan 18;36(3):e21. doi: 10.3346/jkms.2021.36.e21.
Karatas et al., 2021	Karatas S, Yesim T, Beysel S. Impact of lockdown COVID-19 on metabolic control in type 2 diabetes mellitus and healthy people. Prim Care Diabetes. 2021 Jan 9:S1751-9918(21)00003-6. doi: 10.1016/j.pcd.2021.01.003.
Marchitelli et al., 2020	Marchitelli S, Mazza C, Lenzi A, Ricci E, Gnessi L, Roma P. Weight Gain in a Sample of Patients Affected by Overweight/Obesity with and without a Psychiatric Diagnosis during the Covid-19 Lockdown. Nutrients. 2020 Nov 16;12(11):3525. doi: 10.3390/nu12113525.
Mulugeta et al., 2021	Mulugeta, Wudeneh & Hoque, Laboni. (2021). Impact of the COVID-19 lockdown on weight status and associated factors for obesity among Children in Massachusetts. Obesity Medicine. 22. 100325. 10.1016/j.obmed.2021.100325.
Palladino et al., 2020	Palladino F, Merolla E, Solimeno M, de Leva MF, Lenta S, Di Mita O, Bonadies A, Striano P, Tipo V, Varone A. Is Covid-19 lockdown related to an increase of accesses for seizures in the emergency department? An observational analysis of a paediatric cohort in the Southern Italy. Neurol Sci. 2020 Dec;41(12):3475-3483. doi: 10.1007/s10072-020-04824-5.
Pellegrini et al., 2002	Pellegrini M, Ponzo V, Rosato R, Scumaci E, Goitre I, Benso A, Belcastro S, Crespi C, De Michieli F, Ghigo E, Broglio F, Bo S. Changes in Weight and Nutritional Habits in Adults with Obesity during the "Lockdown" Period Caused by the COVID-19 Virus Emergency. Nutrients. 2020 Jul 7;12(7):2016. doi: 10.3390/nu12072016.
Psoma et al., 2020	Psoma O, Papachristoforou E, Kountouri A, Balampanis K, Stergiou A, Lambadiari V, Liatis S, Tsimihodimos V. Effect of COVID-19-associated lockdown on the metabolic control of patients with type 2 diabetes. J Diabetes Complications. 2020 Dec;34(12):107756. doi: 10.1016/j.jdiacomp.2020.107756.
Ruissen et al., 2021	Ruissen MM, Regeer H, Landstra CP, Schroijen M, Jazet I, Nijhoff MF, Pijl H, Ballieux BEPB, Dekkers O, Huisman SD, de Koning EJP. Increased stress, weight gain and less exer-cise in relation to glycemic control in people with type 1 and type 2 diabetes during the COVID-19 pandemic. BMJ Open Diabetes Res Care. 2021 Jan;9(1):e002035. doi: 10.1136/bmjdrc-2020-002035.
Ruiz-Roso et al., 2020	Ruiz-Roso MB, Knott-Torcal C, Matilla-Escalante DC, Garcimartín A, Sampedro-Nuñez MA, Dávalos A, Marazuela M. COVID-19 Lockdown and Changes of the Dietary Pattern and Physical Activity Habits in a Cohort of Patients with Type 2 Diabetes Mellitus. Nutrients. 2020 Aug 4;12(8):2327. doi: 10.3390/nu12082327.
Sanchez-Larsen et al., 2020	Sanchez-Larsen A, Gonzalez-Villar E, Díaz-Maroto I, Layos-Romero A, Martínez-Martín Á, Alcahut-Rodriguez C, Grande-Martin A, Sopelana-Garay D. Influence of the COVID-19 outbreak in people with epilepsy: Analysis of a Spanish population (EPICOVID registry). Epilepsy Behav. 2020 Nov;112:107396. doi: 10.1016/j.yebeh.2020.107396.
Schirinzi et al., 2020	Schirinzi T, Di Lazzaro G, Salimei C, Cerroni R, Liguori C, Scalise S, Alwardat M, Mercuri NB, Pierantozzi M, Stefani A, Pisani A. Physical activity changes and correlate effects in patients with Parkinson's disease during COVID-19 lockdown. Mov Disord Clin Pract. 2020 Jul 17;7(7):797–802. doi: 10.1002/mdc3.13026.
Shah et al., 2020	Shah N, Karguppikar M, Bhor S, Ladkat D, Khadilkar V, Khadilkar A. Impact of lockdown for COVID-19 pandemic in Indian children and youth with type 1 diabetes from different socio-economic classes. J Pediatr Endocrinol Metab. 2020 Nov 13;34(2):217-223. doi: 10.1515/jpem-2020-0460.
Sharma et al., 2020	Sharma P, Ebbert JO, Rosedahl JK, Philpot LM. Changes in substance use among young adults during a respiratory disease pandemic. SAGE Open Med. 2020 Oct 14;8:2050312120965321. doi: 10.1177/2050312120965321.
Suzuki et al., 2020	Suzuki Y, Maeda N, Hirado D, Shirakawa T, Urabe Y. Physical Activity Changes and Its Risk Factors among Community-Dwelling Japanese Older Adults during the COVID-19 Epidemic: Associations with Subjective Well-Being and Health-Related Quality of Life. Int J Environ Res Public Health. 2020 Sep 10;17(18):6591. doi: 10.3390/ijerph17186591.
Tornese et al., 2020	Tornese G, Ceconi V, Monasta L, Carletti C, Faleschini E, Barbi E. Glycemic Control in Type 1 Diabetes Mellitus During COVID-19 Quarantine and the Role of In-Home Physical Activity. Diabetes Technol Ther. 2020 Jun;22(6):462-467. doi: 10.1089/dia.2020.0169.
Veeraiah et al., 2021	Veeraiah S, Sudhakar R, Tripathy JP, Sankar D, Usharani A, Ramakrishnan S, Selvam J, Nagarajan G, Prabhakar DS, Swaminathan R. Tobacco use and quitting behaviour during COVID-19 lockdown. Int J Tuberc Lung Dis. 2021 Mar 1;25(3):247-249. doi: 10.5588/ijtld.20.0728.

S2.1.2 Excluded Fulltexts – Reason: Topically relevant study, but using non-probabilistic sampling

Study	Reference
Adams et al., 2020	Adams EL, Caccavale LJ, Smith D, Bean MK. Food Insecurity, the Home Food Environment, and Parent Feeding Practices in the Era of COVID-19. Obesity (Silver Spring). 2020 Nov;28(11):2056-2063. doi: 10.1002/oby.22996.

Study	Reference
Adibelli & Sümen, 2020	Adıbelli D, Sümen A. The effect of the coronavirus (COVID-19) pandemic on health-related quality of life in children. Child Youth Serv Rev. 2020 Dec;119:105595. doi: 10.1016/j.childyouth.2020.105595.
Aegerter et al.,2021	Aegerter AM, Deforth M, Sjøgaard G, Johnston V, Volken T, Luomajoki H, Dratva J, Dressel H, Distler O, Melloh M, Elfering A; NEXpro Collaboration Group. No Evidence for a Decrease in Physical Activity Among Swiss Office Workers During COVID-19: A Longitudinal Study. Front Psychol. 2021 Feb 11;12:620307. doi: 10.3389/fpsyg.2021.620307.
Aguilar-Farias et al., 2020	Aguilar-Farias N, Toledo-Vargas M, Miranda-Marquez S, Cortinez-O'Ryan A, Cristi-Montero C, Rodriguez-Rodriguez F, Martino-Fuentealba P, Okely AD, Del Pozo Cruz B. Socio-demographic Predictors of Changes in Physical Activity, Screen Time, and Sleep among Toddlers and Preschoolers in Chile during the COVID-19 Pandemic. Int J Environ Res Public Health. 2020 Dec 29;18(1):176. doi: 10.3390/ijerph18010176.
Ahmed et al., 2020	Ahmed MZ, Ahmed O, Aibao Z, Hanbin S, Siyu L, Ahmad A. Epidemic of COVID-19 in China and associated Psychological Problems. Asian J Psychiatr. 2020 Jun;51:102092. doi: 10.1016/j.ajp.2020.102092.
Albalawi et al., 2021	Albalawi, A., Hambly, C. and Speakman, J.R. (2021), The impact of the novel coronavirus movement restrictions in the United Kingdom on food outlet usage and body mass index. Obes Sci Pract. https://doi.org/10.1002/osp4.477
Albertella et al., 2021	Albertella L, Rotaru K, Christensen E, Lowe A, Brierley ME, Richardson K, Chamberlain SR, Lee RSC, Kayayan E, Grant JE, Schluter-Hughes S, Ince C, Fontenelle LF, Segrave R, Yücel M. The Influence of Trait Compulsivity and Impulsivity on Addictive and Compulsive Behaviors During COVID-19. Front Psychiatry. 2021 Feb 23;12:634583. doi: 10.3389/fpsyt.2021.634583.
Al-Domi et al., 2021	Al-Domi H, Al-Dalaeen A, Al-Rosan S, Batarseh N, Nawaiseh H. Healthy nutritional behavior during COVID-19 lockdown: A cross-sectional study. Clin Nutr ESPEN. 2021 Apr;42:132-137. doi: 10.1016/j.clnesp.2021.02.003.
Alfawaz et al., 2021	Alfawaz H, Amer OE, Aljumah AA, Aldisi DA, Enani MA, Aljohani NJ, Alotaibi NH, Alshingetti N, Alomar SY, Khattak MNK, Sabico S, Al-Daghri NM. Effects of home quarantine during COVID-19 lockdown on physical activity and dietary habits of adults in Saudi Arabia. Sci Rep. 2021 Mar 15;11(1):5904. doi: 10.1038/s41598-021-85330-2.
Al Hourani et al., 2021	Al Hourani H, Alkhatib B, Abdullah M. Impact of COVID-19 lockdown on body weight, eating habits and physical activity of Jordanian children and adolescents. Disaster Med Public Health Prep. 2021 Feb 16:1-28. doi: 10.1017/dmp.2021.48.
Alhusseini & Alqahtani, 2020	Alhusseini N, Alqahtani A. COVID-19 pandemic's impact on eating habits in Saudi Arabia. J Public Health Res. 2020 Sep 16;9(3):1868. doi: 10.4081/jphr.2020.1868.
Ali et al., 2021	Ali A, Sohaib M, Iqbal S, Hayat K, Khan AU, Rasool MF. Evaluation of COVID-19 Disease Awareness and Its Relation to Mental Health, Dietary Habits, and Physical Activity: A Cross-Sectional Study from Pakistan. Am J Trop Med Hyg. 2021 Mar 9:tpmd201451. doi: 10.4269/ajtmh.20-1451.
Alomari et al., 2020	Alomari MA, Khabour OF, Alzoubi KH. Changes in Physical Activity and Sedentary Behavior Amid Confinement: The BKSQ-COVID-19 Project. Risk Manag Healthc Policy. 2020 Sep 25;13:1757-1764. doi: 10.2147/RMHP.S268320.
Ammar et al., 2020	Ammar A, Brach M, Trabelsi K, Chtourou H, Boukhris O, Masmoudi L, Bouaziz B, Bentlage E, How D, Ahmed M, Müller P, Müller N, Aloui A, Hammouda O, Paineiras-Domingos LL, Braakman-Jansen A, Wrede C, Bastoni S, Pernambuco CS, Mataruna L, Taheri M, Irandoust K, Khacharem A, Bragazzi NL, Chamari K, Glenn JM, Bott NT, Gargouri F, Chaari L, Batatia H, Ali GM, Abdelkarim O, Jarraya M, Abed KE, Souissi N, Van Gemert-Pijnen L, Riemann BL, Riemann L, Moalla W, Gómez-Raja J, Epstein M, Sanderman R, Schulz SV, Jerg A, Al-Horani R, Mansi T, Jmail M, Barbosa F, Ferreira-Santos F, Šimunič B, Pišot R, Gaggioli A, Bailey SJ, Steinacker JM, Driss T, Hoekelmann A. Effects of COVID-19 Home Confinement on Eating Behaviour and Physical Activity: Results of the ECLB-COVID19 International Online Survey. Nutrients. 2020 May 28;12(6):1583. doi: 10.3390/nu12061583.
Androutsos et al., 2021	Androutsos O, Perperidi M, Georgiou C, Chouliaras G. Lifestyle Changes and Determinants of Children's and Adolescents' Body Weight Increase during the First COVID-19 Lock-down in Greece: The COV-EAT Study. Nutrients. 2021 Mar 13;13(3):930. doi: 10.3390/nu13030930.
Antunes et al., 2020	Antunes R, Frontini R, Amaro N, Salvador R, Matos R, Morouço P, Rebelo-Gonçalves R. Exploring Lifestyle Habits, Physical Activity, Anxiety and Basic Psychological Needs in a Sample of Portuguese Adults during COVID-19. Int J Environ Res Public Health. 2020 Jun 18;17(12):4360. doi: 10.3390/ijerph17124360.
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S2.1.5 Excluded Fulltexts – Reason: Unclear recruitment procedure

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S2.1.6 Excluded Fulltexts – Reason: Outcome

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Mamun et al., 2021	Mamun MA, Sakib N, Gozal D, Bhuiyan AI, Hossain S, Bodrud-Doza M, Al Mamun F, Hosen I, Safiq MB, Abdullah AH, Sarker MA, Rayhan I, Sikder MT, Muhit M, Lin CY, Griffiths MD, Pakpour AH. The COVID-19 pandemic and serious psychological consequences in Bangladesh: A population-based nationwide study. J Affect Disord. 2021 Jan 15;279:462-472. doi: 10.1016/j.jad.2020.10.036.
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Owen et al., 2021	Owen AJ, Tran T, Hammarberg K, Kirkman M, Fisher J; COVID-19 Restrictions Impact Research Group. Poor appetite and overeating reported by adults in Australia during the coronavirus-19 disease pandemic: a population-based study. Public Health Nutr. 2021 Feb;24(2):275-281. doi: 10.1017/S1368980020003833.
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S2.1.7 EXCLUDED FULLTEXTS – REASON: LANGUAGE

Study	Reference
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Study	Reference
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Wiwanikit et al., 2020	Wiwanitkit V, Rodríguez-Núñez I. COVID-19, cuarentena, intensidad del ejercicio y niños [COVID-19, quarantine, exercise intensity and children]. Rev Chil Pediatr. 2020 Dec;91(6):1000. Spanish. doi: 10.32641/rchped.vi91i6.2991.

S2.1.8 Excluded Fulltexts – Reason: Population

Study	Reference
Cavarretta et al., 2021	Cavarretta E, D'Angeli I, Giammarinaro M, Gervasi S, Fanchini M, Causarano A, Costa V, Manara M, Terribili N, Sciarra L, CalÒ L, Fossati C, Peruzzi M, Versaci F, Carnevale R, Biondi-Zoccai G, Frati G. Cardiovascular effects of COVID-19 lockdown in professional Football players. Panminerva Med. 2021 Feb 10. doi: 10.23736/S0031-0808.21.04340-8.

S2.1.9 Excluded Fulltexts – Reason: Double publication

Study	Reference
Bourion-Bédès et al., 2021	Bourion-Bédès S, Tarquinio C, Batt M, Tarquinio P, Lebreuilly R, Sorsana C, Legrand K, Rousseau H, Baumann C. Stress and associated factors among French university students under the COVID-19 lockdown: The results of the PIMS-CoV 19 study. J Affect Disord. 2021 Mar 15;283:108-114. doi: 10.1016/j.jad.2021.01.041.

S2.2 Results of data extraction

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td colspan="7">ADULTS FROM THE GENERAL POPULATION</td></tr>
<tr><td>Alpers et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
Norway
Time of study:
April 15–30, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Adults
Inclusion criteria:
n.r.
# invited:
n = 81,170
# baseline:
n = 25,708
# follow-up:
n.a.
Age at baseline:
Median: 50 years (IQR: 36–63)
% females:
56.2 %
Response:
31.7 %
Lost to follow-up:
n.a.</td><td>COVID-19 pandemic measures (implemented on March 12, 2020, social distancing, closure of educational, cultural, and training/sport/gym facilities, requirements to work from home, introduction of quarantine requirements):
- “placed in quarantine” (dichotomous variable: true/false)
- “temporarily laid-off” (dichotomous variable: true/false)
- “home office/study”, (dichotomous variable: true/false)</td><td>Alcohol consumption:
- Alcohol Use Disorders Identification Test Consumption (AUDIT-C) (score for hazardous drinking for women: ≥ 3, for men: ≥ 4)
- consumed mean units per week via units per drinking day and drinking days per month (frequent binge drinking: drinking > 6 units on one occasion at least once a month)
- (Change in) alcohol consumption (1 self-reported single question)</td><td>Tables 2 and S1: Descriptive statistics for the change in alcohol consumption since COVID-19 pandemic measures
<table><tr><th></th><th>Increase (%)</th><th>Decrease (%)</th></tr><tr><td>Total sample</td><td></td><td></td></tr><tr><td></td><td>13</td><td>23</td></tr><tr><td>Gender</td><td></td><td></td></tr><tr><td>Women</td><td>14</td><td>23</td></tr><tr><td>Men</td><td>13</td><td>22</td></tr><tr><td>Age</td><td></td><td></td></tr><tr><td>18–29 years</td><td>16</td><td>48</td></tr><tr><td>30–39 years</td><td>20</td><td>25</td></tr><tr><td>40–49 years</td><td>16</td><td>21</td></tr><tr><td>50–59 years</td><td>12</td><td>19</td></tr><tr><td>60–69 years</td><td>10</td><td>15</td></tr><tr><td>≥ 70 years</td><td>6</td><td>15</td></tr></table>Table 3: Risk factors for increase in alcohol consumption during COVID-19 pandemic phase
<table><tr><th></th><th>Unadjusted model
OR (95 % CI)</th><th>Adjusted model
OR (95 % CI)</th></tr><tr><td>Temporarily lay-off</td><td></td><td></td></tr><tr><td></td><td>1.7 (1.5–2.0)</td><td>1.2 (1.0–1.4)</td></tr><tr><td>Quarantine</td><td></td><td></td></tr><tr><td></td><td>1.2 (1.1–1.4)</td><td>1.2 (1.1–1.4)</td></tr><tr><td>Home office/study</td><td></td><td></td></tr><tr><td></td><td>1.7 (1.5–1.9)</td><td>1.4 (1.3–1.6)</td></tr></table>Table S4: Risk factors for decrease in alcohol consumption during COVID-19 pandemic phase
<table><tr><th></th><th>Unadjusted model
OR (95 % CI)</th><th>Adjusted model
OR (95 % CI)</th></tr><tr><td>Temporarily laid-off</td><td></td><td></td></tr><tr><td></td><td>1.7 (1.6–1.9)</td><td>1.3 (1.1–1.4)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Public funds

+ ethical approval from the Regional Committee for Medical and Health Research Ethics, Health Region West
+ random sampling
+ validated outcome measurement for the association with the self-reported quarantine status
+ logistic regression analysis for the investigation of associations
+ consideration of confounders “sex” and “age” (by stratification and adjustment)

- low response and no non-responder analysis
- self-reported question for the change in alcohol consumption
- due to study design no actual chronological investigation</td></tr>
</table>

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
					Quarantine 1.4 (1.2–1.5) 1.2 (1.1–1.4) **Home office/study** 1.9 (1.7–2.0) 1.4 (1.3–1.5) Multivariable binary logistic regression Adjusted model adjusted for age, gender, economic worries, health worries, temporarily lay-off and/or quarantine and/or home office/study	
Avery et al., 2020	**Study design:** Cross-sectional study **Study name:** Washington State Twin Registry **Country of study:** United States **Time of study:** March 26–April 5, 2020 **No. of waves:** *n* = 1 **Follow-up duration:** n.a.	**Description:** Adult twins **Inclusion criteria:** Identical, same-sex fraternal twins **# invited:** *n* = 12,173 **# baseline:** *n* = 3,971 **# follow-up:** n.a. **Age at baseline:** M: 50.4 years (SD: 16.0) **% females:** 69.2 % **Response:** Individual: 32.8 % Pair-wise: 21.1 % **Lost to follow-up:** n.a.	**COVID-19 mitigation strategies:** Washington implemented the state-wide "stay home, stay healthy" order on March 24, 2020	**(Change in) alcohol use:** 1 self-reported single question	**Table 1: Descriptive statistics for the change in alcohol use since lockdown** **Prevalence** (%) Do not use 35.5 Use more 14.3 Use the same 39.4 Use less 10.9	**Overall study quality:** High risk **Conflict of interest:** Stated (none declared) **Funding:** Public funds +ethical approval from the Institutional Review Board at Washington State University + recruitment in the Washington State Twin Registry (identification of twins by the Washington State Department of Licensing (DOL), researchers receive a list of potential twins from the DOL on a weekly basis, the register sends potential participants an enrolment survey, and twins are enrolled when surveys have been received from both members) - low response and no non-responder analysis - outcome measurement with a single self-reported question

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>- no consideration of the confounders “age” and “sex” in statistical analysis
- descriptive analysis only
- due to study design no actual chronological investigation</td></tr>
<tr><td>Berard et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
PSYCOV-CV study
Country of study:
France
Time of study:
April 17–May 10, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Older adults from the general population (aged ≥ 50 years)
Inclusion criteria:
n.r.
# invited:
n = 777
# baseline:
n = 536
# follow-up:
n.a.
Age at baseline:
M: 67 years (range: 50–89)
% females:
52 %
Response:
69 %
Lost to follow-up:
n.a.</td><td>COVID-19 lockdown (March 17–May 10, 2020):
- requirement to stay at home
- only reasons for going out: going to work (if teleworking was impossible); doing essential food shopping; travelling for health reasons, assisting vulnerable people, family emergencies, childcare; for individual physical activity, taking out a pet (within the limit of one hour per day and within a maximum radius of one kilometre around the home)
- prohibition of any gathering of people who did not live in the same home
- infringements to these rules were penalized initially by fines and further punishable by 6 months imprisonment</td><td>(Change in) diet quality:
Short, qualitative food frequency questionnaire (increased consumption of sugary foods, alcohol, fat or carbohydrates, not compensated by increased fruit and vegetable, dairy (within a limit of 2.5 servings/day), or lean protein consumption)
(Change in) physical activity (reduction of ≥ 15 minutes/week since the start of lockdown (as compared to the last 2–4 weeks before lockdown):
Self-reported question
(Change in) weight gain (≥ 500 g):
Self-reported question
(Change in) smoking (≥ 1 cigarette/day):
Self-reported question
(Change in) antihypertensive, lipid-lowering or hypoglycemic drug treatment:
Self-reported question</td><td>Table 1 and text: Descriptive statistics for the change in lifestyle factors since lockdown<table><tr><th></th><th>Prevalence (n (%))</th></tr><tr><td>Decreased diet quality</td><td>142 (26.5)</td></tr><tr><td>Decreased physical activity</td><td>194 (36.2)</td></tr><tr><td>Weight gain</td><td>137 (25.6)</td></tr><tr><td>Increased smoking</td><td>21 (4.0)</td></tr><tr><td>Increased antihypertensive, lipid-lowering or hypoglycemic drug treatment</td><td>2 (0.37)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Public funds

+ random sampling
+ high response
+ outcome measurement of diet quality with a validated instrument

- self-reported outcome measurement of physical activity, weight gain, and smoking with single questions
- descriptive analysis only
- no consideration of the confounders “age” and “sex” in statistical analysis
- due to study design no actual chronological investigation</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td>Cicero et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
Brisighella Heart Study
Country of study:
Italy
Time of study:
n.r.
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Adults
Inclusion criteria:
Exclusion of workers not in quarantine (e.g., healthcare personnel, police forces, military personnel and farmers), if they were in quarantine from less than four weeks, or were affected by COVID-19 infection or other severe diseases diagnosed after the last population survey
# invited:
n = 1,538
# baseline:
n = 359
# follow-up:
n.a.
Age at baseline:
M: 64.6 years (SD: 13.3)
% females:
56.5 %
Response:
23.3 %
Lost to follow-up:
n.a.</td><td>COVID-19-related quarantine
(February–April 2020)</td><td>Dietary quality:
Dietary Quality Index
Alcohol consumption:
1 item from the Dietary Quality Index
Smoking: Single question
Body mass index: Single question

Retrospective assessment of levels pre-quarantine using the same instruments</td><td>Text: Change in energy intake (kcal) and overall dietary quality index since lockdown
<table><tr><th></th><th>Pre-quarantine (M (SD))</th><th>During quarantine (M (SD))</th><th>p</th></tr><tr><td>Energy intake</td><td>2568 (322)</td><td>2739 (442)</td><td>< 0.001</td></tr><tr><td>Dietary quality index</td><td>42.4 (4.1)</td><td>37.8 (4.7)</td><td>0.011</td></tr></table>Text: Change in daily consumption of different food categories since lockdown
<table><tr><th></th><th>Direction of change</th><th>p</th></tr><tr><td colspan="3">Daily intake</td></tr><tr><td>Bread and bread-like products</td><td>↑</td><td>< 0.001</td></tr><tr><td>Pasta and rice</td><td>↑</td><td>< 0.001</td></tr><tr><td>Green vegetable</td><td>↑</td><td>< 0.001</td></tr><tr><td>Other vegetables</td><td>↑</td><td>< 0.001</td></tr><tr><td>Healthy vegetable oils</td><td>↑</td><td>< 0.001</td></tr><tr><td>Milk and yogurt</td><td>↑</td><td>< 0.001</td></tr><tr><td>Simple sugars and sweets</td><td>↑</td><td>< 0.001</td></tr><tr><td>Coffee</td><td>↑</td><td>< 0.001</td></tr><tr><td>Non-alcoholic drinks</td><td>=</td><td>0.778</td></tr><tr><td>Water</td><td>=</td><td>0.69</td></tr><tr><td colspan="3">Frequent weekly intake (0–6 portion per week)</td></tr><tr><td>Low-fat meat</td><td>↑</td><td>< 0.001</td></tr><tr><td>Cured meats other than ham</td><td>↑</td><td>< 0.001</td></tr><tr><td>Cheeses</td><td>↑</td><td>< 0.001</td></tr><tr><td>Eggs</td><td>↑</td><td>0.015</td></tr><tr><td>Mixed seed oils</td><td>↑</td><td>< 0.001</td></tr><tr><td>Non-cured fat meat</td><td>=</td><td>0.954</td></tr><tr><td>Ham</td><td>=</td><td>0.835</td></tr><tr><td colspan="3">Less frequent week intake (0–3 portion per week)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Bank foundation

+ ethical approval from the Institutional Ethical Board of the University Hospital of Bologna
+ random sampling of the participants of the original study
+ measurement of dietary quality with a validated instrument
+ using t-tests for paired samples or the Wilcoxon rank test to investigate differences
+ consideration of confounders “sex” and “age” (by stratification)

- low response
- measurement of smoking and body mass index with single questions
- retrospective assessment of energy intake, main diet components, alcohol consumption, and body mass index before lockdown (recall bias)
- due to study design no actual chronological investigation</td></tr>
</table>

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))

Fish	↓	< 0.001
Mussels and shellfish	↓	< 0.001
Legumes	↓	< 0.001
Nuts	↑	0.042

Table 2: Percentage of total energy derived from the main diet components

	Pre-quarantine (% (SD))	**During quarantine** (% (SD))	**p**
Total carbo-hydrates	49.3 (4.6)	52.6 (6.5)	0.048
Simple sugars	3.1 (0.9)	4.6 (1.1)	0.002
Total fats	28.1 (3.2)	31.4 (2.9)	0.047
Added fats	3.9 (1.1)	4.3 (1.2)	0.021
Proteins	16.2 (2.6)	10.1 (2.7)	0.003

Table 2: Percentage of total energy derived from the alcohol

	Pre-quarantine (% (SD))	**During quarantine** (% (SD))	**p**
Alcohol	2.9 (0.6)	4.9 (1.0)	0.002

Text: Descriptive statistics for the change in smoking since lockdown

	Prevalence (%)
Reduction	2.2
Increase	1.7

Text: Change in body mass index (kg/m^2) since lockdown

	Pre-quarantine (M (SD))	**During quarantine** (M (SD))	**p**

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
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(e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
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(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Body mass index</td><td>26.6 (4.7)</td><td>26.9 (4.5)</td><td>0.361</td></tr>
</table>
Results were confirmed by repeating the analysis by gender, education level, and age class.</td><td></td></tr>
<tr><td>Colley et al., 2020</td><td>Study design:
Cross-sectional study
Study name:
Canadian Perspective Survey Series – Impacts of COVID-19
(CPSS1)
Country of study:
Canada
Time of study:
March 29–April 3, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Adults (1 household member selected at random from four Labour Force Survey (LFS) groups that answered the LFS for the last time in 2019)
Inclusion criteria:
Canadian residents aged ≥ 20 years, living in the 10 provinces, exclusion of persons living on reserves and Aboriginal settlements in the provinces; full-time members of the Canadian Armed Forces; the institutionalized population; and households in extremely remote areas with very low population density
# invited:
n = 7,242
# baseline:
n = 4,524
# follow-up:
n.a.
Age at baseline:
n.r.
% females:
53.4 %</td><td>Physical distancing measures (implemented in March 2020):
- border, school, and business closures
- avoiding unnecessary trips</td><td>Screen time behaviours:
3 self-reported single questions (“Have your weekly habits changed for any of the following activities?”: watching TV, spending time on the internet, playing video games)</td><td>Table 1: Descriptive statistics for an increase in watching TV
<table>
<tr><th></th><th>Prevalence (% (95% CI))</th></tr>
<tr><td>Overall</td><td></td></tr>
<tr><td>Men</td><td>59.8 (56.3–63.2)</td></tr>
<tr><td>Women</td><td>66.0 (63.2–68.6)</td></tr>
<tr><td>20–34 years</td><td></td></tr>
<tr><td>Men</td><td>59.6 (50.4–68.2)</td></tr>
<tr><td>Women</td><td>72.7 (66.2–78.3)</td></tr>
<tr><td>35–54 years</td><td></td></tr>
<tr><td>Men</td><td>61.8 (56.2–67.2)</td></tr>
<tr><td>Women</td><td>68.1 (63.6–72.4)</td></tr>
<tr><td>≥ 55 years</td><td></td></tr>
<tr><td>Men</td><td>58.1 (53.4–62.7)</td></tr>
<tr><td>Women</td><td>60.2 (55.7–64.5)</td></tr>
</table>
Table 1: Descriptive statistics for an increase in spending time on the internet
<table>
<tr><th></th><th>Prevalence (% (95% CI))</th></tr>
<tr><td>Overall</td><td></td></tr>
<tr><td>Men</td><td>63.5 (60.2–66.6)</td></tr>
<tr><td>Women</td><td>68.7 (65.6–71.6)</td></tr>
<tr><td>20–34 years</td><td></td></tr>
<tr><td>Men</td><td>75.8 (67.6–82.5)</td></tr>
<tr><td>Women</td><td>74.8 (67.5–80.9)</td></tr>
<tr><td>35–54 years</td><td></td></tr>
<tr><td>Men</td><td>62.9 (57.2–68.2)</td></tr>
<tr><td>Women</td><td>74.2 (69.8–78.3)</td></tr>
<tr><td>≥ 55 years</td><td></td></tr>
<tr><td>Men</td><td>55.9 (51.1–60.7)</td></tr>
<tr><td>Women</td><td>60.5 (55.8–65.1)</td></tr>
</table></td><td>Overall study quality:
High risk
Conflict of interest:
Unclear
Funding:
Unclear

+ random sampling
+ high response
+ consideration of confounders “sex” and “age” (by stratification)

- outcome measurement with self-reported single questions
- descriptive analysis only
- due to study design no actual chronological investigation</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>Response:
62.5 %
Lost to follow-up:
n.a.</td><td></td><td></td><td>Table 1: Descriptive statistics for an increase in playing video games
<table><tr><th></th><th>Prevalence (% (95% CI))</th></tr><tr><td>Overall</td><td></td></tr><tr><td>Men</td><td>24.1 (21.1–27.3)</td></tr><tr><td>Women</td><td>16.0 (13.6–18.6)</td></tr><tr><td>20–34 years</td><td></td></tr><tr><td>Men</td><td>50.6 (42.3–58.9)</td></tr><tr><td>Women</td><td>29.4 (23.1–36.6)</td></tr><tr><td>35–54 years</td><td></td></tr><tr><td>Men</td><td>21.3 (17.5–25.6)</td></tr><tr><td>Women</td><td>15.5 (11.8–19.9)</td></tr><tr><td>≥ 55 years</td><td></td></tr><tr><td>Men</td><td>7.2 (5.1–10.0)</td></tr><tr><td>Women</td><td>7.3 (5.5–9.7)</td></tr></table>
Table 1: Descriptive statistics for an increase in 2 or 3 types of screen time behaviors
<table><tr><th></th><th>Prevalence (% (95% CI))</th></tr><tr><td>Overall</td><td></td></tr><tr><td>Men</td><td>52.7 (49.1–56.2)</td></tr><tr><td>Women</td><td>56.7 (53.4–60.0)</td></tr><tr><td>20–34 years</td><td></td></tr><tr><td>Men</td><td>63.9 (54.9–72.1)</td></tr><tr><td>Women</td><td>67.8 (60.7–74.3)</td></tr><tr><td>35–54 years</td><td></td></tr><tr><td>Men</td><td>53.6 (48.2–58.9)</td></tr><tr><td>Women</td><td>60.0 (55.0–64.8)</td></tr><tr><td>≥ 55 years</td><td></td></tr><tr><td>Men</td><td>43.3 (38.2–48.6)</td></tr><tr><td>Women</td><td>46.3 (41.2–51.4)</td></tr></table></td><td></td></tr>
<tr><td>Crochemore-Silva et al., 2020</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:</td><td>Description:
Adults
Inclusion criteria:
Residents of Bagé’s urban area aged ≥ 18 years</td><td>Social distancing (public calamity had been declared (municipal decree 050/2020) in the municipality since March 19, 2020, with the adoption of strict social distancing</td><td>Leisure-time physical activity:
1 item from an adapted version of the International Physical Activity Questionnaire:</td><td>Figure 3 (A) and text: Percentage of those engaging in physical activities
<table><tr><th>Level of social distancing</th><th>Prevalence (%)</th><th>p</th></tr><tr><td>Very little</td><td>~ 20</td><td rowspan="2">0.023</td></tr><tr><td>Little</td><td>n.r. (~ 21*)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Unclear
Funding:
Unclear</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td>Brazil
Time of study:
May 7–9, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td># invited:
n = 400
# baseline:
n = 377
# follow-up:
n.a.
Age at baseline:
n.r.
% females:
62.9 %
Response:
94.3 %
Lost to follow-up:
n.a.</td><td>measures, where only essential activities in force remained open; decrees 58 and 59/2020 (published on April 15 and 30, 2020, respectively) were in effect during data collection (suspension of activities in the education network (public and private), social and sports clubs, gyms, cinemas, and bars, amongst others):
2 self-reported single questions from the EPICOVID-RS study:
1. level of “the social distancing instructed by health authorities, that is, staying at home and avoiding contact with other people”, how much they considered they were managing to do it” (response categories: very little; little; average; a lot; practically isolated from everyone)
2. activity routine (response categories: stayed at home all the time; went out only for essential things like buying food; went out from time to time to shop and stretch their legs; went out every day for some activity; went out every day, all day, to work or to perform other regular activities)</td><td>percentage of those engaging in physical activities such as gymnastics, sports, hiking, or jogging during the past seven days</td><td><table><tr><td>Average</td><td>37.7</td></tr><tr><td>A lot</td><td>n.r. (~ 25*)</td></tr><tr><td>Virtually isolated</td><td>~ 20</td></tr></table>Figure 3 (B) and text: Percentage of those engaging in physical activities<table><tr><th>Activity routine</th><th>Prevalence (%)</th><th>p</th></tr><tr><td>Staying home</td><td>12.5</td><td>0.014</td></tr><tr><td>Leaves home for essential purchases</td><td>n.r. (~ 27*)</td><td></td></tr><tr><td>Leaves home sometimes</td><td>n.r. (~ 35*)</td><td></td></tr><tr><td>Leaves home every day</td><td>40.7</td><td></td></tr><tr><td>Leaves home every day (for work)</td><td>27.0</td><td></td></tr></table>Chi-square test of heterogeneity and linear trend
* Estimation by the review authors by reading the bars of figure 3.</td><td>+ ethical approval from the Research Ethics Committee of the Federal University of Pelotas
+ multiple-stage process (random selection of census tracts, households, and household individuals)
+ high response
+ using Chi-square test to investigate differences

- self-reported exposure measurement with 2 single questions
- self-reported outcome measurement with a single item
- no consideration of the confounders “age” and “sex” in statistical analysis
- due to study design no actual chronological investigation</td></tr>
<tr><td>Daly & Robinson, 2021</td><td>Study design:
Cohort study
Study name:
1970 British Cohort Study</td><td>Description:
Adults born in Britain in 1970
Inclusion criteria:
baseline:</td><td>COVID-19 lockdown restrictions:
- pubs, bars, and restaurants and other nonessential businesses were closed for</td><td>High risk alcohol consumption:
Alcohol Use Disorders Identification Test (AUDIT) for detecting</td><td>Text: Overall AUDITPC score<table><tr><th></th><th>2016–2018 (M (SD))</th><th>May 2020 (M (SD))</th><th>p</th></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Unclear
Funding:</td></tr>
</table>

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
	Country of study: United Kingdom **Time of study:** Baseline: 2016–2018 Follow-up: May 2020 **No. of waves:** *n* = 2 **Follow-up duration:** Range: 2–4 years	n.r. **# invited at follow-up:** *n* = 10,458 **# follow-up:** *n* = 3,358 (those who took part at baseline and at follow-up) **Age at baseline:** Range: 46–48 years **% females:** 50.0 % **Response (at follow-up):** 32.1 % **Lost to follow-up:** n.r.	> 3 months between late March and early July 2020	hazardous drinkers in primary care settings (AUDITPC) - for the COVID-19 survey, the AUDIT-PC was adapted by adding Since the start of the Coronavirus outbreak to the start of each item - High risk score: ≥ 5	<table><tr><td>Total sample</td><td>3.17 (2.46)</td><td>3.34 (2.77)</td><td>0.003</td></tr></table> **Table 1: Prevalence of high-risk drinking** <table><tr><th></th><th>**2016–2018** (%)</th><th>**May 2020** (%)</th><th>**Difference** (% (95 % CI))</th></tr><tr><td>Total sample</td><td>19.3</td><td>24.6</td><td>5.2 (2.4–8.0) (p < 0.001)</td></tr><tr><td>Men</td><td>24.7</td><td>29.9</td><td>5.2 (0.5–10.1) (p < 0.001)</td></tr><tr><td>Women</td><td>14.0</td><td>19.2</td><td>5.2 (2.3–8.1) (p < 0.001)</td></tr></table> Logistic regression analyses Adjusted for sex, marital status, educational qualifications, diagnosis of a chronic mental or physical health condition, year when the 2016−2018 baseline survey was completed	Public funds + ethical approval from the National Research Ethics Service + validated outcome measure + using logistic regression analyses to investigate differences + statistical analysis of confounders “sex” (adjustment) and “age” (homogeneous group) + temporal investigation - no information on lost to follow-up and number of participants at baseline
Duncan et al., 2020	**Study design:** Cross-sectional study **Study name:** Washington State Twin Registry **Country of study:** United States **Time of study:** March 26–April 5, 2020 **No. of waves:** *n* = 1 **Follow-up duration:** n.a.	**Description:** Adult Twins **Inclusion criteria:** Identical, same-sex fraternal twins **# invited:** *n* = 12,173 **# baseline:** *n* = 3,971 **# follow-up:** n.a. **Age at baseline:** M: 50.4 years (SD: 16.0) **% females:** 69.2 % **Response:** Individual: 32.8 % Pair-wise: 21.1 % **Lost to follow-up:**	**COVID-19 mitigation strategies:** Washington implemented the state-wide “stay home, stay healthy” order on March 24, 2020	**(Change in) physical activity:** 1 self-reported single question	**Table 1 and text: Descriptive statistics for the change in physical activity compared to one month ago (i.e., prior to the spread of COVID-19)** <table><tr><th></th><th>**Prevalence** (%)</th></tr><tr><td>**Total sample**</td><td></td></tr><tr><td>Decreased a lot</td><td>15.1</td></tr><tr><td>Decreased somewhat</td><td>28.7</td></tr><tr><td>No change</td><td>26.4</td></tr><tr><td>Increased a lot</td><td>5.2</td></tr><tr><td>Increased somewhat</td><td>21.2</td></tr><tr><td>**Men**</td><td></td></tr><tr><td>Decreased (a lot or somewhat)</td><td>45.3</td></tr><tr><td>No change</td><td>29.8</td></tr><tr><td>Increased (a lot or somewhat)</td><td>25.5</td></tr><tr><td>**Women**</td><td></td></tr><tr><td>Decreased (a lot or somewhat)</td><td>41.5</td></tr><tr><td>No change</td><td>31.1</td></tr><tr><td>Increased (a lot or somewhat)</td><td>27.4</td></tr></table>	**Overall study quality:** High risk **Conflict of interest:** Stated (none declared) **Funding:** Public funds +ethical approval from the Institutional Review Board at Washington State University + recruitment in the Washington State Twin Registry (identification of twins by the Washington State Department of Licensing (DOL), researchers receive a list of potential twins from the DOL on a weekly basis, the register sends potential participants an enrolment survey,

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
		n.a.				and twins are enrolled when surveys have been received from both members) + stratification of the results for the confounder "sex" - low response and no non-responder analysis - outcome measurement with a self-reported single question - no consideration of the confounder "age" in the statistical analysis - descriptive analysis only - due to study design no actual chronological investigation
Garre-Olmo et al., 2020	**Study design:** Cross-sectional study **Study name:** Girona Healthy Region Study **Country of study:** Spain **Time of study:** April 8–May 4, 2020 **No. of waves:** *n* = 1 **Follow-up duration:** n.a.	**Description:** Adults from the general population **Inclusion criteria:** Residents living in the province of Girona (Catalonia), Spain, aged ≥ 18 years, exclusion of subjects with terminal illness, cognitive impairment or dementia, intellectual disability, or institutionalized **# invited:** *n* = 765 **# baseline:** *n* = 692 **# follow-up:** n.a. **Age at baseline:**	**Movement restrictions and confinement due to the COVID-19 pandemic** (state of alarm implemented by the Spanish government on March 15, 2020): - suspension of all academic activities - Spanish citizens were obliged to stay at home except to purchase food and medicines, to go to work, or to attend emergencies (- more restrictive lockdown period that included the temporary closure of all the non-essential activities and businesses between March 29 and April 9, 2020)	**(Change in) physical activity:** 1 self-reported single question **(Change in) dietary pattern:** 1 self-reported single question	**Table 2: Characteristics of study participants regarding confinement consequences** | | **N (%)** | | Worsening dietary pattern | 134 (19.4) | | Diminished sport practice | 420 (60.7) |	**Overall study quality:** High risk **Conflict of interest:** Stated (none declared) **Funding:** Public funds + ethical approval from Ethics Committee of the IDIAP Jordi Gol + ratified random sampling procedure according to the population structure + high response + non-responder analysis (no differences by age or gender between participants and persons who refused to participate)

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>M: 50.2 years (SD: 16.3, range: 18.9–90.9)
% females:
54.8 %
Response:
90.5 %
Lost to follow-up:
n.a.</td><td></td><td></td><td></td><td>- outcome measurement with self-reported single questions
- descriptive analysis only
- no consideration of the confounders “age” and “sex” in the statistical analysis
- due to study design no actual chronological investigation</td></tr>
<tr><td>Karuc et al., 2020</td><td>Study design:
Cross-sectional study
Study name:
Croatian physical activity in adolescence longitudinal study (CRO-PALS)
Country of study:
Croatia
Time of study:
April 24–May 8, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Young adults
Inclusion criteria:
n.r.
# invited:
n = 363
# baseline:
n = 91
# follow-up:
n.a.
Age at baseline:
Females: M: 21.6 years (SD: 0.4)
Males: M: 21.5 years (SD: 0.3)
% females:
64.8 %
Response:
25.1 %
Lost to follow-up:
n.a.</td><td>Restrictions due to COVID-19 Pandemic (March 19th–May 11, 2020):
- restricting gathering in public places and parks
- suspension of public transportation, and close institutions
- prohibition of all social gatherings, work in retail and services including sports activities</td><td>Physical activity:
- 7-day recall of moderate intensity physical activity (MPA) and vigorous intensity physical activity (VPA): School Health Action, Planning, and Evaluation System (SHAPES) questionnaire
- (Change in) physical activity: self-reported single question

Retrospective assessment of levels pre-restrictions using the same instruments</td><td>Table 1: Moderate-to-vigorous physical activity (minutes/day) since restrictions
<table><tr><th></th><th>Pre-restrictions (Median (IQR))</th><th>Post-restrictions (Median (IQR))</th><th>p</th></tr><tr><td>Females</td><td>120.0 (227.1)</td><td>64.3 (75.0)</td><td>> 0.0001</td></tr><tr><td>Males</td><td>135.0 (127.5)</td><td>85.7 (56.8)</td><td>0.006</td></tr></table>ANOVA
- no interaction between sex and time (p = 0.79)

Table 1: Descriptive statistics in changes of physical activity since restrictions
<table><tr><th></th><th>Prevalence (%)</th></tr><tr><td>Females</td><td></td></tr><tr><td>No change</td><td>25</td></tr><tr><td>Increase</td><td>19</td></tr><tr><td>Decrease</td><td>56</td></tr><tr><td>Males</td><td></td></tr><tr><td>No change</td><td>31</td></tr><tr><td>Increase</td><td>19</td></tr><tr><td>Decrease</td><td>50</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest
Stated (none declared)
Funding:
Public funds

+ ethical approval from the Ethics Committee of the Faculty of Kinesiology of the University of Zagreb
+ stratified two-stage random sampling procedures (school level and class level) of the original study
+ validated outcome measurement for the investigation of the association between quarantine status and physical activity
+ using ANOVA to investigate differences
+ statistical analysis of confounders “sex” (by stratification and interaction analysis) and “age” (homogeneous group)

- low response</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>- difference between responders and non-responders regarding age, sex, socio-economic status, and moderate-to-vigorous physical activity
- retrospective assessment of activity levels, before lockdown (recall bias)
- self-reported question for the outcome “change in physical activity”
- due to study design no actual chronological investigation</td></tr>
<tr><td>Mason et al., 2020</td><td>Study design:
Cohort study
Study name:
Happiness and Health prospective cohort study
Country of study:
United States
Time of study:
Baseline (wave 9): October 2018–October 2019
Follow-up (wave 10): May–July 2020
No. of waves:
n = 2
Follow-up duration:
About 1.5 years</td><td>Description:
Young adults
Inclusion criteria:
n.r.
invited:
Wave 1 (2013): n = 4,100
Wave 10 (2020): n = 2,548
baseline:
Baseline (wave 9): n.r.
# follow-up:
n = 1,820
Age at baseline:
M: 19.72 years (SD: 0.46)
% females:
61.5 %
Response:
Wave 1 (2013): 82.5 %
Wave 10 (2020): 71.4 %
Lost to follow-up:</td><td>COVID-19 restrictions:
- modified on May 4, 2020
- residents were still directed to stay at home except for essential needs
- but lower-risk businesses and spaces were allowed to reopen (“Stage two”, May 4, 2020)
- counties could selectively reopen higher-risk businesses and spaces /“Stage three”, May 18, 2020)
- air service businesses could reopen with restrictions (May 26, 2020)
- closure of most indoor businesses in many counties due to increase in cases (June and July 2020)
- closure of gyms, indoor dining, bars, movie theatres, and museums (July 13, 2020)</td><td>Weight:
Self-reported single question</td><td>Text: Descriptive statistics in weight change (pounds (lbs.)) since restrictions
<table><tr><th></th><th>M (SD)</th><th>M% (SD)</th></tr><tr><td>Weight change</td><td>3.47 (14.57)</td><td>2.5 % (8.6 %)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest
Stated (none declared)
Funding:
Public funds

+ ethical approval from the University of Southern California Institutional Review Board
+ complete sampling of participants in the original study (all 9th grade students from 10 out of 40 invited public high schools which were chosen due to their diverse demographic characteristics and proximity)
+ high response
+ temporal investigation
+ consideration of the confounder “age” (homogeneous group)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>From wave 1 (2013) to wave 10 (2020): 55.6 %
From wave 9 to wave 10: n.r.</td><td>(Measures were researched on the internet)</td><td></td><td></td><td>- self-reported outcome measurement
- no consideration of the confounder “sex” in statistical analysis
- descriptive analysis only</td></tr>
<tr><td>Niedzwiedz et al., 2020</td><td>Study design:
Cohort study
Study name:
UK Household Longitudinal Study (also called “Understanding Society)”
Country of study:
United Kingdom
Time of study:
2015–2020
Wave 7: 2015–2017
Wave 8: 2016–2018
Wave 9: 2017–2019
COVID-19 wave
April 24–30, 2020
No. of waves:
n = 4
Follow-up duration:
Annually</td><td>Description:
Adults
Inclusion criteria:
Data from persons who took part in all 4 waves, having complete data sets at all 4 waves, aged ≥ 16 years
invited:
n.r.
# baseline:
n = 27,141 (wave 7)
# follow-up:
n = 25,231 (wave 8)
n = 22,823 (wave 9)
n = 10,977 (COVID-19 wave)
(analysed: n = 9,748 (repeated measures for all relevant waves)
Age at baseline:
18–24 years:
n = 3,009 (11.1 %)
25–44 years:
n = 8,504 (30.7 %)
45–64 years:
n = 9,766 (35.0 %)
≥ 65 years: n = 5,862 (23.2 %)
% females:
52.2 % (follow-up)</td><td>COVID-19 lockdown in the UK:
March 12, 2020:
- all with symptoms of possible COVID-19 required to isolate for 7 days
March 16, 2020:
- all living with someone with symptoms of possible COVID19 required to isolate for 14 days
- all others advised against unnecessary social contact and travel
- mass gatherings banned
March 17, 2020:
- foreign and Commonwealth Office advises against all non-essential world-wide travel
March 20, 2020:
- entertainment, hospitality and indoor leisure premises ordered to close
- schools, colleges and nurseries close for all except children of key workers or children identified as vulnerable by social services
March 22, 2020:
- Those identified as being extremely clinically vulnerable (i.e. those at highest risk of</td><td>Alcohol consumption:
Alcohol Use Disorder Identification Test for Consumption:
- binge drinking (≥ 6 drinks on a single occasion)
- alcohol frequency (≥ 4 times per week)
- heavy drinking (≥ 7 drinks on a typical drinking day)
Cigarette smoking:
2 self-reported single questions
- current smoker versus non-smoker
- number of cigarettes per day (< 10, 10–19, 20+ cigarettes)
E-Cigarette use:
1 single question (use of e-cigarettes once a week)</td><td>Table S2: Descriptive statistics (in %)
<table><tr><th></th><th>Wave 7</th><th>Wave 9</th><th>COVID-19 wave</th></tr><tr><td colspan="4">Binge drinking</td></tr><tr><td>No</td><td>88.5 (88.0–89.0)</td><td>89.2 (88.7–89.7)</td><td>83.8 (82.6–85.0)</td></tr><tr><td>Yes</td><td>11.5 (11.1–12.0)</td><td>10.8 (10.3–11.3)</td><td>16.2 (15.0–17.4)</td></tr><tr><td colspan="4">Number of drinks on typical drinking day</td></tr><tr><td>0–4</td><td>86.7 (86.1–87.2)</td><td>86.4 (85.7–87.0)</td><td>94.5 (93.6–95.2)</td></tr><tr><td>≥ 5</td><td>13.3 (12.8–13.9)</td><td>13.6 (13.0–14.3)</td><td>5.6 (4.8–6.4)</td></tr><tr><td colspan="4">Alcohol frequency (in times per week)</td></tr><tr><td>0–3</td><td>87.2 (86.6–87.7)</td><td>86.3 (85.7–86.9)]</td><td>78.0 (76.6–79.4)</td></tr><tr><td>≥ 4</td><td>12.8 (12.3–13.4)</td><td>13.7 (13.1–14.3)</td><td>22.0 (20.6–23.4)</td></tr></table>
Table S5: Binge drinking
<table><tr><th></th><th>Model 1
RR (95 % CI)</th><th>Model 2
RR (95 % CI)</th></tr><tr><td>During Covid-19</td><td>1.18 (0.97–1.45)</td><td>1.27 (1.08–1.48)</td></tr></table></td><td>Overall study quality:
Outcome “alcohol consumption”: Low risk
Outcome “smoking”: High risk
Conflict of interest
Stated (none declared)
Funding:
Public funds

+ ethical approval from University of Essex Ethics Committee
+ clustered stratified probability sample
+ large UK household survey
+ high response
+ validated outcome measurement for drinking behaviour
+ temporal investigation
+ regression analysis for the investigation of associations
+ statistical analysis of confounders “sex” and “age” (interaction analysis)

- high lost to follow-up (and no information on drop-outs)
- single questions for</td></tr>
</table>

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
		Response: Household response waves 7–9: 81–84 % COVID-19 wave (of those who took part in wave 9): 48.6 % **Lost to follow-up:** Wave 7 to COVID-19 wave: 59.6 %	severe illness if they contract COVID-19) advised to begin 'shielding' – they should not leave their house for any reason, necessary food/ supplies will be provided by Local Authorities where needed **March 23, 2020:** - hole population not permitted to leave home except for very limited purposes (to buy food; to exercise once per day; for any medical need; to care for a vulnerable person; to travel to/from essential work) - all gatherings of more than two people in public banned - lockdown measures to be reviewed every 3 weeks **March 27, 2020:** - public advised to only use open spaces near own house for exercise, and to stay at least 2metres apart from other households while outdoors **April:** - no significant change to lockdown measures			

Age group interaction with period (Pre-COVID-19 is ref, 65+ is ref)		
18–24	1.06 (0.77–1.46)	
25–44	1.64 (1.35–1.98)	
45–64	1.16 (0.98–1.37)	
Gender interaction with period (Pre-COVID-19 is ref, male is ref)		
Female		1.49 (1.31–1.69)

Table S6: Alcohol frequency (drinking 4+ days per week)

	Model 1 RR (95 % CI)	**Model 2** RR (95 % CI)
During Covid-19	1.06 (0.96–1.17)	1.23 (1.11–1.35)
Age group interaction with period (Pre-COVID-19 is ref, 65+ is ref)		
18–24	2.90 (1.63–5.15)	
25–44	1.91 (1.66–2.20)	
45–64	1.25 (1.15–1.35)	
Gender interaction with period (Pre-COVID-19 is ref, male is ref)		
Female		1.34 (1.23–1.47)

Table S7: Heavy drinking (5+ drinks on a typical day when drinking)

	Model 1 RR (95 % CI)	**Model 2** RR (95 % CI)
During Covid-19	0.60 (0.42–0.86)	0.46 (0.38–0.55)
Age group interaction with period (Pre-COVID-19 is ref, 65+ is ref)		
18–24	0.37 (0.22–0.63)	
25–44	0.68 (0.47–0.99)	
45–64	0.86 (0.60–1.23)	
Gender interaction with period (Pre-COVID-19 is ref, male is ref)		

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Female</td><td></td><td>0.70 (0.56–0.88)</td></tr>
</table>
Table S8: Current smoking
<table>
<tr><th></th><th>Model 1
RR (95 % CI)</th><th>Model 2
RR (95 % CI)</th></tr>
<tr><td>During Covid-19</td><td>0.80 (0.69–0.93)</td><td>0.88 (0.78–0.98)</td></tr>
<tr><td colspan="3">Age group interaction with period (Pre-COVID-19 is ref, 65+ is ref)</td></tr>
<tr><td>18–24</td><td>1.23 (0.95–1.60)</td><td></td></tr>
<tr><td>25–44</td><td>1.08 (0.91–1.28)</td><td></td></tr>
<tr><td>45–64</td><td>1.14 (0.99–1.32)</td><td></td></tr>
<tr><td colspan="3">Gender interaction with period (Pre-COVID-19 is ref, male is ref)</td></tr>
<tr><td>Female</td><td></td><td>1.03 (0.93–1.16)</td></tr>
</table>
Table S9: Regular e-cigarette use
<table>
<tr><th></th><th>Model 1
RR (95 % CI)</th><th>Model 2
RR (95 % CI)</th></tr>
<tr><td>During Covid-19</td><td>0.68 (0.46–1.01)</td><td>0.61 (0.43–0.86)</td></tr>
<tr><td colspan="3">Age group interaction with period (Pre-COVID-19 is ref, 65+ is ref)</td></tr>
<tr><td>18–24</td><td>1.01 (0.40–2.58)</td><td></td></tr>
<tr><td>25–44</td><td>0.92 (0.64–1.31)</td><td></td></tr>
<tr><td>45–64</td><td>1.00 (0.71–1.39)</td><td></td></tr>
<tr><td colspan="3">Gender interaction with period (Pre-COVID-19 is ref, male is ref)</td></tr>
<tr><td>Female</td><td></td><td>1.20 (0.91–1.58)</td></tr>
</table>
Multi-level Poisson regression
Model 1: adjusted for year, age group, gender, ethnicity, period and period x age group interaction
Model 2: adjusted for year, age group, gender, ethnicity, period and period x gender interaction
</td><td></td></tr>
<tr><td>Okely et al., 2020</td><td>Study design:
Cohort study
Study name:</td><td>Description:
Community-dwelling older adults (born in 1936)</td><td>COVID-19 lockdown (that lasted 34 days at the beginning of data collection)</td><td>Physical activity:
Self-reported single question (“What level of physical activity do you</td><td>Table 1: Change in physical activity between 2017–2019 and COVID-19 lockdown in 2020</td><td>Overall study quality:
High risk
Conflict of interest
Stated (none declared)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td>Lothian Birth Cohort 1936 (LBC1936) study
Country of study:
Scotland
Time of study:
Baseline (T1): 2017–2019 (wave 5) of the LBC1936 study
Follow-up (T2): May 27–June 8, 2020
No. of waves:
n = 2
Follow-up duration:
~2 years</td><td>Inclusion criteria:
n.r.
# invited at follow-up:
n = 454
# baseline:
n.r.
# follow-up:
n = 137
Age at baseline:
M: 84 years
% females:
48.2 %
Response:
30.2 %
Lost to follow-up:
n.r.</td><td></td><td>mainly do?") with a 6-point scale (ranging from score 1: "moving only in connection with necessary (household) chores" to score 6 "keep fit/heavy exercise or competitive sport several times per week".)</td><td>
<table>
<tr><th></th><th>Baseline (n (%))</th><th>Follow-up (n (%))</th><th>p</th></tr>
<tr><td colspan="4">Physical activity (6-point scale)[1]</td></tr>
<tr><td>Only household chores</td><td>14 (10.2 %)</td><td>26 (19.0 %)</td><td rowspan="6">0.012</td></tr>
<tr><td>Outdoor activities 1–2x/ week</td><td>28 (20.4 %)</td><td>23 (16.8 %)</td></tr>
<tr><td>Outdoor activities > 2x/ week</td><td>67 (48.9 %)</td><td>74 (54.0 %)</td></tr>
<tr><td>Moderate exercise 1–2x/ week</td><td>19 (13.9 %)</td><td>4 (2.9 %)</td></tr>
<tr><td>Moderate exercise > 2x/ week</td><td>6 (4.4 %)</td><td>10 (7.3 %)</td></tr>
<tr><td>Keep-fit/heavy exercise several times/ week</td><td>3 (2.2 %)</td><td>0 (0.0 %)</td></tr>
<tr><td colspan="4">Physical activity (2-point scale)[2]</td></tr>
<tr><td>Minimal physical activity (score 1)</td><td>14 (10.2 %)</td><td>26 (19.0 %)</td><td rowspan="2">0.038</td></tr>
<tr><td>Any higher category of physical activity (scores 2–6)</td><td>123 (89.8)</td><td>111 (81.0)</td></tr>
</table>
[1]vage

[2]McNemar's test (with continuity correction)
</td><td>Funding:
Public funds

+ ethical approval from the Multi-Centre Research Ethics Committee for Scotland, the Lothian Research Ethics Committee, and the Scotland A Research Ethics Committee
+ complete sampling (from all eligible participants of the LBC1936 study (further representative sampling of the original study)
+ using Wilcoxon signed rank test and McNemar's test to investigate differences
+ consideration of the confounder "age" (homogeneous group)
+ temporal investigation

- outcome measurement with a self-developed, self-reported single question
- no consideration of the confounder "sex" in statistical analysis
- some changes may have been caused by the effects of ageing rather than lockdown measures, however, results from subsidiary analysis, testing for changes in physical activity between earlier waves of the LBC1936 study, suggest</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>that age-related changes are typically smaller than those documented in the study
- drop-out analysis: difference between excluded and included participants: included individuals had a higher IQ at age 1, were better in cognition (cognitive ability, less severe memory problems), had more years of education, a higher occupational social class, a higher intellect, and a higher emotional stability</td></tr>
<tr><td>Radwan et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
United Arab Emirates
Time of study:
May 5–18, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Adults
Inclusion criteria:
Residents of the United Arab Emirates, aged ≥ 18 years
# invited:
n = 13,500
# baseline:
n = 2,135
# included in analysis
n = 2,060
# follow-up:
n.a.
Age at baseline:
18–30 years: 31.7 %, 31–40 years: 38.4 %, > 40 years: 29.9 %
% females:
75.1 %
Response:
15.8 %
Lost to follow-up:</td><td>COVID-19 lockdown:
- on March 22, 2020, the United Arab Emirates authorities applied both strict infection control and partial lockdown</td><td>(Change in) dietary intake:
Self-reported question
(Change in) weight:
Self-reported question
(Change in) physical activity:
Self-reported question
(Change in) smoking:
Self-reported question</td><td>Table 2: Descriptive statistics for changes in lifestyle behaviors
<table><tr><th></th><th>Prevalence (n (%)</th></tr><tr><td>Physical activity</td><td></td></tr><tr><td>Increase</td><td>340 (16.5)</td></tr><tr><td>Decrease</td><td>618 (30.0)</td></tr><tr><td>Same</td><td>1,102 (53.5)</td></tr><tr><td>Food intake</td><td></td></tr><tr><td>Increase</td><td>655 (31.8)</td></tr><tr><td>Decrease</td><td>344 (16.7)</td></tr><tr><td>Same</td><td>1,061 (51.5)</td></tr><tr><td>Weight</td><td></td></tr><tr><td>Increase</td><td>606 (29.4)</td></tr><tr><td>Decrease</td><td>476 (23.1)</td></tr><tr><td>Same</td><td>978 (47.5)</td></tr><tr><td>Smoking</td><td></td></tr><tr><td>Increase</td><td>50 (21.0)</td></tr><tr><td>Decrease</td><td>93 (39.1)</td></tr><tr><td>Same</td><td>95 (39.9)</td></tr></table>
Tables A1–A3, and A4: Logistic regressions describing the association between unhealthy lifestyle changes due to lockdown and sex/age</td><td>Overall study quality:
High risk
Conflict of interest
Stated (none declared)
Funding:
None

+ ethical approval from the Research and Ethics Committee at the University of Sharjah
+ questionnaire link was distributed to 13,500 adults via emails and mobile messages (list of email addresses and phone numbers was obtained from the database of the Supreme Council for Family Affairs, Health promotion Department, Sharjah and their network in the various Emirates of the United Arab Emirates)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration
(e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>n.a.</td><td></td><td></td><td>
<table>
<tr><th></th><th></th><th>OR (95 % CI)</th></tr>
<tr><td colspan="3">Increased food intake</td></tr>
<tr><td>Sex</td><td>Males</td><td>Reference</td></tr>
<tr><td></td><td>Females</td><td>1.89 (1.47–2.41)</td></tr>
<tr><td>Age</td><td>18–30 years</td><td>Reference</td></tr>
<tr><td></td><td>31–40 years</td><td>0.69 (0.53–0.89)</td></tr>
<tr><td></td><td>> 40 years</td><td>0.55 (0.41–0.73)</td></tr>
<tr><td colspan="3">Increased weight</td></tr>
<tr><td>Sex</td><td>Males</td><td>Reference</td></tr>
<tr><td></td><td>Females</td><td>1.89 (1.47–2.41)</td></tr>
<tr><td>Age</td><td>18–30 years</td><td>Reference</td></tr>
<tr><td></td><td>31–40 years</td><td>0.69 (0.53–0.89)</td></tr>
<tr><td></td><td>> 40 years</td><td>0.55 (0.41–0.73)</td></tr>
<tr><td colspan="3">Decreased physical activity</td></tr>
<tr><td>Sex</td><td>Males</td><td>Reference</td></tr>
<tr><td></td><td>Females</td><td>1.12 (0.88–1.43)</td></tr>
<tr><td>Age</td><td>18–30 years</td><td>Reference</td></tr>
<tr><td></td><td>31–40 years</td><td>1.24 (0.98–1.59)</td></tr>
<tr><td></td><td>> 40 years</td><td>1.61 (1.25–2.08)</td></tr>
<tr><td colspan="3">Increased smoking</td></tr>
<tr><td>Sex</td><td>Males</td><td>Reference</td></tr>
<tr><td></td><td>Females</td><td>0.27 (0.15–0.49)</td></tr>
<tr><td>Age</td><td>18–30 years</td><td>Reference</td></tr>
<tr><td></td><td>31–40 years</td><td>0.60 (0.31–1.15)</td></tr>
<tr><td></td><td>> 40 years</td><td>0.25 (0.11–0.57)</td></tr>
</table>
Adjusted for sex, age, nationality, type of living, number of children, BMI</td><td>+ statistical analysis of the confounders “age” and “sex

- low response
- outcome measurement with self-reported single questions
- self-developed questionnaire (test prior with a convenience sample)
- descriptive analysis of main outcomes
- due to study design no actual chronological investigation</td></tr>
<tr><td>Sasaki et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
Japan
Time of study:
August 2020
No. of waves:</td><td>Description:
Older adults (60–95 years)
Inclusion criteria:
n.r.
# invited:
n = 2,008
# baseline:
n =1,493
n = 999 (full data set)</td><td>COVID-19-related distancing restrictions</td><td>(Change in) physical activity:
International Physical Activity Questionnaire Short Form (IPAQ-SF)

Classification:
- low physical activity (LPA)</td><td>Table 2: Descriptive statistics for the change in physical activity since lockdown
<table>
<tr><th></th><th>Prevalence (%)</th></tr>
<tr><td colspan="2">Men</td></tr>
<tr><td>Maintained low physical activity</td><td>34.4</td></tr>
<tr><td>Decreased</td><td>4.6</td></tr>
<tr><td>Maintained moderate-to-vigorous physical activity</td><td>59.1</td></tr>
<tr><td>Increased</td><td>1.9</td></tr>
<tr><td colspan="2">Women</td></tr>
</table></td><td>Overall study quality:
High risk
Conflict of interest
Stated (none declared)
Funding:
None

+ ethical approval from the institutional ethics board for epidemiological studies of</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration
(e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td>n = 1
Follow-up duration:
n.a.</td><td># follow-up:
n.a.
Age at baseline:
M: 74.5 years (SD: 6.3)
% females:
53.8 %
Response:
74.3% (full data set: 49.8 %)
Lost to follow-up:
n.a.</td><td></td><td>- moderate-to-vigorous physical activity (MVPA)
- walking: 3.3 METs
- moderate-intensity activity: 4.0 METs
- vigorous activity: 8.0 METs

Sitting:
International Physical Activity Questionnaire Short Form (minutes/day)</td><td>
<table>
<tr><td>Maintained low physical activity</td><td>47.5</td></tr>
<tr><td>Decreased</td><td>6.0</td></tr>
<tr><td>Maintained moderate-to-vigorous physical activity</td><td>45.2</td></tr>
<tr><td>Increased</td><td>1.3</td></tr>
</table>
Table 2: Differences in physical activity before and after the onset of COVID-19 restrictions
<table>
<tr><th></th><th>Before restrictions (M (SD))</th><th>After restrictions (M (SD))</th><th>p</th></tr>
<tr><td>Men</td><td></td><td></td><td></td></tr>
<tr><td>Vigorous intensity (MET)</td><td>1690.6 (2668.8)</td><td>1604.8 (2598.2)</td><td>0.035</td></tr>
<tr><td>Moderate intensity (MET)</td><td>1064.7 (1332.8)</td><td>1002.6 (1306.4)</td><td>0.0024</td></tr>
<tr><td>Walking (MET)</td><td>922.9 (1035.5)</td><td>877.4 (1028.9)</td><td>0.0054</td></tr>
<tr><td>Total physical activity (MET)</td><td>3678.2 (4163.1)</td><td>3484.8 (4112.3)</td><td>0.0024</td></tr>
<tr><td>Sitting time (minutes/day)</td><td>273.4 (203.4)</td><td>287.7 (204.1)</td><td>< 0.001</td></tr>
<tr><td>Women</td><td></td><td></td><td></td></tr>
<tr><td>Vigorous intensity (MET)</td><td>742.5 (1701.3)</td><td>717.5 (1738.0)</td><td>0.40</td></tr>
<tr><td>Moderate intensity (MET)</td><td>712.5 (1062.7)</td><td>644.4 (1005.1)</td><td>0.0022</td></tr>
<tr><td>Walking (MET)</td><td>717.2 (899.6)</td><td>647.2 (870.5)</td><td>< 0.001</td></tr>
</table>
</td><td>the Hokkaido Bunkyo University
+ stratified sampling method (random selection in terms of sex, age, residence, and social participation), based on the list held by Eniwa City Hall
+ high response
+ validated outcome measurement
+ using paired t-test or McNemar’s test to investigate differences
+ statistical analysis of the confounder “sex” (by stratification)

- no consideration of the confounder “age” in the statistical analysis
- due to study design no actual chronological investigation</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration
(e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Total physical activity (MET)</td><td>2172.1 (2873.2)</td><td>2009.2 (2876.6)</td><td>< 0.001</td></tr>
<tr><td>Sitting time (minutes/ day)</td><td>243.7 (181.5)</td><td>267.8 (191.6)</td><td>< 0.001</td></tr>
</table>
Paired t-test or McNemar’s test
</td><td></td></tr>
<tr><td colspan="7">CHILDREN AND ADOLESCENTS</td></tr>
<tr><td>McCormack et al., 2020</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
Canada
Time of study:
April 14–May 27, 2020
No. of waves:
n = 1
Follow-up duration:
n.r.</td><td>Description:
Children aged 5–17 years
Inclusion criteria:
n.r.
# invited:
n = 25,000
# baseline:
n = 1,124 (adults)
n = 345 (parents with at least one school-aged child)
n = 328 (children)
# follow-up:
n.a.
Age at baseline:
5–11 years: 80.5 %,
12–17 years: 19.5 %
% females:
45.1 %
Response:
4.5 % (adults)
1.3 % (parents with complete data)
Lost to follow-up:
n.a.</td><td>COVID-19 public health emergency response:
- forced closures of educational and day-care facilities, non-essential businesses, and private and public recreation facilities (e.g., playgrounds, outdoor exercise equipment, and sports courts and fields)
- individuals and families were advised to take personal steps to reduce virus transmission including practicing physical distancing (i.e., avoiding crowded places, avoiding common greetings, limiting contact with High risk individuals, and maintaining a distance of 2-metres from others), forgoing international travel, and self-quarantining if they experienced symptoms</td><td>(Change in) physical activity:
Parents-reported questions
(Change in) sedentary behaviours:
Parents-reported questions</td><td>Table 2: Descriptive statistics for the change physical activity and sedentary behaviors since COVID-19 public health emergency response
<table>
<tr><th></th><th>Prevalence (%)</th></tr>
<tr><td colspan="2">Physically active in home</td></tr>
<tr><td>Increased</td><td>48.8</td></tr>
<tr><td>No change</td><td>32.9</td></tr>
<tr><td>Decreased</td><td>18.3</td></tr>
<tr><td colspan="2">Physically active outdoors</td></tr>
<tr><td>Increased</td><td>38.7</td></tr>
<tr><td>No change</td><td>22.3</td></tr>
<tr><td>Decreased</td><td>39.0</td></tr>
<tr><td colspan="2">Watching television</td></tr>
<tr><td>Increased</td><td>58.8</td></tr>
<tr><td>No change</td><td>38.4</td></tr>
<tr><td>Decreased</td><td>2.7</td></tr>
<tr><td colspan="2">Playing video games</td></tr>
<tr><td>Increased</td><td>56.4</td></tr>
<tr><td>No change</td><td>40.9</td></tr>
<tr><td>Decreased</td><td>2.7</td></tr>
<tr><td colspan="2">Using screen-based devices</td></tr>
<tr><td>Increased</td><td>75.9</td></tr>
<tr><td>No change</td><td>22.0</td></tr>
<tr><td>Decreased</td><td>2.1</td></tr>
<tr><td colspan="2">Playing at park</td></tr>
<tr><td>Increased</td><td>15.5</td></tr>
<tr><td>No change</td><td>31.7</td></tr>
</table>
</td><td>Overall study quality:
High risk
Conflict of interest
Stated (none declared)
Funding:
Public and non-profit funds

+ ethical approval from the University of Calgary Conjoint Human Research Ethics Board
+ simple random sample of 25,000 households with equal chance of selection across 14 adjacent communities, one adult per household
+ consideration of the confounder “age” (homogeneous group)

- low response
- parental-reported questions
- descriptive analysis only
- no consideration of the confounder “sex” in the statistical analysis</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td><table>
<tr><td>Decreased</td><td>52.7</td></tr>
<tr><td>Playing at other public places</td><td></td></tr>
<tr><td>Increased</td><td>9.5</td></tr>
<tr><td>No change</td><td>36.9</td></tr>
<tr><td>Decreased</td><td>53.7</td></tr>
</table></td><td>- due to study design no actual chronological investigation</td></tr>
<tr><td>Medrano et al., 2020</td><td>Study design:
Cohort study
Study name:
MUGI project
Country of study:
Spain
Time of study:
T1: September–December 2019
T2: March–April 2020
No. of waves:
n = 2
Follow-up duration:
Around 4–8 month</td><td>Description:
School children (pupils), aged 8–16 years
Inclusion criteria:
Exclusion of pupils with an intellectual or a physical disability
# invited:
n = 348
# baseline:
n = 291
# follow-up:
n = 113
Age at baseline:
M: 12.1 years (SD: 2.4)
% females:
47.8 %
Response:
83.6%
Lost to follow-up:
61.2 %</td><td>Home confinement during the COVID-19 pandemic:
- closuring schools and establishing mandatory home confinement for children (6 weeks of total locked down, where children were not allowed to leave their house at all, from March 14 to April 26, 2020)</td><td>Physical activity:
“The Youth Activity Profile” questionnaire (YAP), measured in minutes/day
Screen time:
“The Youth Activity Profile” questionnaire (YAP)
Adherence to Mediterranean diet:
Mediterranean Diet Quality Index for children and teenagers (KIDMED) questionnaire (low adherence: score <8/12)</td><td>Table 2: Changes in lifestyle habits before and during the COVID-19 confinement<table>
<tr><th></th><th>T1
(M SD))</th><th>T2
(M SD))</th><th>p</th></tr>
<tr><td>Physical activity</td><td></td><td></td><td></td></tr>
<tr><td>Physical activity (minutes/day)</td><td>154 (40)</td><td>63 (39)</td><td>< 0.001</td></tr>
<tr><td>Screen time</td><td></td><td></td><td></td></tr>
<tr><td>Screen time (hours/day)</td><td>4.3 (2.4)</td><td>6.1 (2.4)</td><td>< 0.001</td></tr>
<tr><td>TV time ≥2 hours/day (N, %)</td><td>3 (2.8)</td><td>14 (13.2)</td><td>0.005</td></tr>
<tr><td>Videogame time ≥2 hours/day (N, %)</td><td>6 (5.7)</td><td>7 (6.6)</td><td>0.775</td></tr>
<tr><td>Computer (no homework) ≥2 hours/day (N, %)</td><td>1 (0.9)</td><td>0 (0.0)</td><td>0.316</td></tr>
<tr><td>Total mobile-phone ≥2 hours/day (N, %)</td><td>4 (3.8)</td><td>20 (18.9)</td><td>0.001</td></tr>
<tr><td>Total screen time ≥2 ≥2 hours/day (N, %)</td><td>70 (66.0)</td><td>93 (87.7)</td><td>< 0.001</td></tr>
<tr><td>Adherence to Mediterranean diet</td><td></td><td></td><td></td></tr>
<tr><td>KIDMED score</td><td>5.9 (1.8)</td><td>6.4 (1.5)</td><td>0.018</td></tr>
<tr><td>Low adherence (KIDMED score: < 8)</td><td>86 (81.1)</td><td>81 (76.4)</td><td>0.476</td></tr>
</table></td><td>Overall study quality:
Low risk
Conflict of interest
Stated (none declared)
Funding:
Public funds

+ ethical approval from the Ethics Committee of the Public University of Navarra
+ informed consent by parents or legal guardians
+ multiple-stage process (random selection of type of school (primary and secondary), region and funding type (public, state funded, private) of school, school-year, classroom)
+ outcome measurement with validated questionnaires filled out by pupils
+ using t test and Chi^2 test to investigate differences
+ statistical analysis of confounders “sex” and “age” (homogeneous group)
+ temporal investigation

- high lost to follow-up, but drop-out analysis (difference regarding physical activity between responders at T2</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
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(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>t test for continues variables and Chi^2 test for categorical variables

<u>Text: Prevalence of worsening of lifestyle behaviours</u><table><tr><th>Worsening of …</th><th>Prevalence (%)</th></tr><tr><td>… physical activity</td><td>95.2</td></tr><tr><td>… screen time</td><td>69.8</td></tr><tr><td>… adherence to the Mediterranean diet</td><td>31.4</td></tr></table>Figures 1 and 2: Changes of lifestyle behaviours according to sex, school grade, and economic status<table><tr><th>Differences in …</th><th>p</th></tr><tr><td colspan="2">… sex (boys vs. girls)</td></tr><tr><td>Physical activity</td><td>0.255</td></tr><tr><td>Screen time</td><td>0.020 (boys > girls)</td></tr><tr><td>Adherence to the Mediterranean diet</td><td>0.925</td></tr><tr><td colspan="2">… school grade (primary vs. secondary school)</td></tr><tr><td>Physical activity</td><td>0.795</td></tr><tr><td>Screen time</td><td>0.694</td></tr><tr><td>Adherence to the Mediterranean diet</td><td>0.916</td></tr><tr><td colspan="2">… economic status (low/medium vs. high)</td></tr><tr><td>Physical activity</td><td>0.152</td></tr><tr><td>Screen time</td><td>0.825</td></tr><tr><td>Adherence to the Mediterranean diet</td><td>0.598</td></tr></table></td><td>and drop-outs, but not regarding screen time and adherence to Mediterranean diet)</td></tr>
<tr><td>Ozturk Eyimaya & Yalçin Irmak, 2020</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
Turkey
Time of study:
May 15–31, 2020
No. of waves:</td><td>Description:
Children aged 6–13 years studying in 3 state schools (grades 1–8)
Inclusion criteria:
n.r.
# invited:
n = 1,544
# baseline:</td><td>Lockdown:
- closure of schools on March 16, 2020
- temporary lockdown on children and young people under the age of 20 on April 3, 2020</td><td>(Change in) screen time:
Single question (reported by the parents)</td><td>Text: Descriptive statistics for the change in screen time since lockdown (ignoring the time the children spent on academic studies)<table><tr><th></th><th>Prevalence (%)</th></tr><tr><td>Increase</td><td>71.7</td></tr><tr><td>Decrease</td><td>6.1</td></tr><tr><td>No change</td><td>23.2</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Unclear

+ ethical approval from the Namik Kemal University Faculty of Medicine Non-</td></tr>
</table>

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
	n = 1 **Follow-up duration:** n.a.	*n* = 1,115 **# follow-up:** n.a. **Age at baseline:** M: 9.03 years (SD: 1.95, range: 6–9) **% females:** 53.4 % **Response:** 72.2 % (parent response) **Lost to follow-up:** n.a.				invasive Clinical Trials Ethics Committee + random selection of schools, complete sampling on pupil's level + high response + consideration of the confounder "age" (homogeneous group) - parent-reported outcome measurement with a single item - descriptive analysis only - no consideration of the confounder "sex" in the statistical analysis - due to study design no actual chronological investigation
Schmidt et al., 2020	**Study design:** Cohort study **Study name:** German Motorik-Modul (MoMo) cohort study **Country of study:** Germany **Time of study:** Baseline (wave 3): August 2018 Follow-up: April 20–May 1, 2020 **No. of waves:** *n* = 2 **Follow-up duration:** Around 20 months	**Description:** Children and adolescents **Inclusion criteria:** n.r. **# invited:** *n* = 10,802 **# baseline:** *n* = 2,722 **# follow-up:** *n* = 1,711 **Age at baseline:** M: 10.36 years (SD: 4.04, range: 4–17) **% females:** 49.8 % **Response:** 25.2 % **Lost to follow-up:**	**COVID-19 lockdown:** - on March 11, 2020, the federal states in Germany closed kindergartens, schools, sports clubs, gyms, and other leisure institutions relevant to children's and adolescents organized physical activity - government also imposed physical distancing measures and contact restrictions, allowing no more than two people from different households to meet in public space - nonorganized sports activities, such as workouts at home, or jogging, and other forms of habitual physical activity besides sports, like going	**Physical activity:** MoMo PA Questionnaire (28 items) **Screen time:** Self-reported screen-time behaviours (time spent watching television (TV), playing games on any device (Gaming), and using the internet for recreational use (Internet) separately for weekdays and weekends, index reflecting weekdays and weekend days at a 5:2 ratio was then calculated for each activity)	**Table 1: Days active (days/week) for more than 60 min with moderate to vigorous intensity** **Baseline** (M (SD)) | **Follow-up** (M (SD)) | **Difference** (95 % CI, d) Total sample: 4.3 (1.8) | 4.7 (2.0) | +0.4 (0.4–0.5), 0.22 (p < 0.01) Boys: 4.4 (1.8) | 4.8 (2.0) | +0.4 (0.3–0.6), 0.20 (p < 0.01) Girls: 4.1 (1.8) | 4.6 (1.9) | +0.5 (0.3–0.6), 0.24 (p < 0.01) **Table 1: Physical activity guideline adherence** **Baseline** (%) | **Follow-up** (%) | **Difference** (95 % CI) Total sample: 19.1 | 30.1 | +11.1 (8.2–13.9), (p < 0.01)	**Overall study quality:** High risk **Conflict of interest:** Stated (none declared) **Funding:** Public funds + ethical approval from the the Charité Universitätsmedizin Berlin ethics committee, by the University of Konstanz, and the ethics committee of the Karlsruhe Institute of Technology + informed consent by parents + nationwide multi-stage sampling approach with two evaluation levels: 1.)

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
		36.4 %	for a walk or playing outside remained allowed if done alone or with people from the same household			German communities, 2.) age-stratified sample of randomly selected children and adolescents + validated outcome measurement + statistical analysis of confounders “sex” (by stratification) and “age” (homogeneous group) + using ANOVA to investigate differences + temporal investigation - low response and high lost to follow-up

Boys	21.4	34.0	+12.5 (8.2–16.6), ($p < 0.01$)
Girls	16.4	26.3	+9.5 (4.5–13.3), ($p < 0.01$)

Table 2: Total amount of (organized and non-organized) sports (minutes per day)

	Baseline (M (SD))	**Follow-up** (M (SD))	**Difference** (95 % CI, d)
Total sample	34.9 (26.0)	24.3 (36.2)	-10.8 (-12.6–(-9.0)), 0.29 ($p < 0.01$)
Boys	36.3 (26.8)	24.6 (38.8)	-11.8 (-14.5–(-9.1)), 0.30 ($p < 0.01$)
Girls	33.5 (25.1)	24.0 (33.4)	-9.7 (-12.1–(-7.3)), 0.28 ($p < 0.01$)

Table 3: Total amount of habitual activity (playing outside, walking and cycling, gardening, housework) (minutes per day)

	Baseline (M (SD))	**Follow-up** (M (SD))	**Difference** (95 % CI, d)
Total sample	107.3 (73.9)	143.5 (110.5)	+36.2 (31.3–41.2), 0.35 ($p < 0.01$)
Boys	114.6 (75.5)	149.8 (115.5)	+35.2 (27.9–42.6), 0.32 ($p < 0.01$)
Girls	99.8 (71.4)	137.0 (104.8)	+37.2 (30.6–42.8), 0.38 ($p < 0.01$)

Table 1: Screen time guideline adherence

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><th></th><th>Baseline (%)</th><th>Follow-up (%)</th><th>Difference (95 % CI)</th></tr>
<tr><td>Total sample</td><td>60.9</td><td>37.6</td><td>-23.3 (-20.0–(-26.5)), p < 0.01)</td></tr>
<tr><td>Boys</td><td>60.7</td><td>35.2</td><td>-25.5 (-20.8–(-30.0)), (p < 0.01)</td></tr>
<tr><td>Girls</td><td>61.1</td><td>40.0</td><td>-21.1 (-16.4–(-25.7), (p < 0.01)</td></tr>
</table>
Table 4: Total amount of recreational screen time (TV, gaming, recreational internet) (minutes per day)
<table>
<tr><th></th><th>Baseline (M (SD))</th><th>Follow-up (M (SD))</th><th>Difference (95 % CI, d)</th></tr>
<tr><td>Total sample</td><td>133.3 (123.1)</td><td>194.5 (141.3)</td><td>+61.2 (56.2–66.3), 0.58 (p < 0.01)</td></tr>
<tr><td>Boys</td><td>139.2 (130.4)</td><td>205.4 (146.8)</td><td>+66.2 (58.6–73.7), 0.59 (p < 0.01)</td></tr>
<tr><td>Girls</td><td>127.3 (115.0)</td><td>183.6 (134.6)</td><td>+56.3 (9.6–63.0), 0.57 (p < 0.01)</td></tr>
</table>
ANOVA for repeated measurements</td><td></td></tr>
<tr><td>Tornaghi et al., 2020</td><td>Study design:
Cohort study
Study name:
n.a.
Country of study:
Italy
Time of study:
T1: January 27–30, 2020 (pre-lockdown)
T2: April 4–10, 2020 (during lockdown)</td><td>Description:
Adolescents (15–18 years)
Inclusion criteria:
n.r.
# invited:
n = 1,686 (personal communication
# baseline:
n = 1,568
# follow-up:
n = 1,568</td><td>COVID-19 lockdown (2 Decrees of the Italian government on March 11 and 22, 2020):
- abrogation of nonessential movement, including outdoor sports and motor activity, with the exception of activities practiced a 200 meters home-block area and provision of at least 1 meter of interhuman distance</td><td>Physical activity:
International Physical Activity Questionnaire:
- inactive:
< 700 minutes/week
- moderate: 700–2519 minutes/week
- intense:
≥ 2520 minutes/week</td><td>Table 1: Prevalence of physical activity levels
<table>
<tr><th></th><th>Pre-lockdown (n (%))</th><th>During lockdown (n (%))</th><th>Post-lockdown (n (%))</th></tr>
<tr><td>Physically inactive</td><td>154 (17.8)</td><td>102 (25.8)</td><td>53 (18.5)</td></tr>
<tr><td>Moderate activity</td><td>573 (66.3)</td><td>214 (53.6)</td><td>177 (61.7)</td></tr>
<tr><td>Intense activity</td><td>137 (15.8)</td><td>79 (19.8)</td><td>57 (19.9)</td></tr>
</table>
Figure 1: Continuous levels of physical activity</td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
None

+ ethical approval from the Department of Psychology of Development and Socialization Process Ethical</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td>T3: May 4–10, 2020 (post lockdown)
No. of waves:
n = 3
Follow-up duration:
Around 4 months</td><td>Age at baseline:
n.r.
% females:
n.r.
Response:
93 % (personal communication
Lost to follow-up:
0 %</td><td></td><td></td><td><table><tr><th></th><th>Pre-lockdown (M (SD))</th><th>During lockdown (M (SD))</th><th>Post-lockdown (M (SD))</th></tr><tr><td>Physical activity (minutes/ week)</td><td>1,676 (21)</td><td>n.r.</td><td>1,775 (34)</td></tr></table>- statistically significant difference in physical activity measured as MET-min/week, absolute, or categorical physical activity levels (3x3 ANOVA): higher physical activity during and after lockdown than before

- a similar pattern of results was obtained for males and females, either for categorial or continuous physical activity levels</td><td>Committee of University “La Sapenzia”
+ complete sampling at participating schools
+ high response
+ no lost to follow-up
+ outcome measurement with a validated instrument
+ using ANOVA to investigate differences
+ statistical analysis of the confounders “age” (homogeneous group) and “sex” (stratification)
+ temporal investigation

- decrease in group sample sizes throughout the observed time points (personal communication)</td></tr>
<tr><td colspan="7">SPECIFIC HEALTHY POPULATIONS</td></tr>
<tr><td>Anyan et al., 2020, Ernsten & Havnen 2020</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
Norway
Time of study:
June 3–15, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Physically active adults (members of one Norwegian fitness association)
Inclusion criteria:
n.r.
# invited:
n = 6,766
# baseline:
n = 1,314
# follow-up:
n.a.
Age at baseline:
M: 49 years (SD: 11.5, range: 18–81)
% females:
30.8 %</td><td>COVID-19 pandemic lockdown:
- Norwegian physical and social distancing regulations (March 12–June 15, 2020):</td><td>(Change in) physical activity:
Self-reported single question</td><td>Table 1: Descriptive statistics for the change in physical activity since lockdown<table><tr><th></th><th>Prevalence (n (%))</th></tr><tr><td>Total sample</td><td></td></tr><tr><td>Reduction</td><td>183 (14)</td></tr><tr><td>Increase</td><td>286 (22)</td></tr><tr><td>No change</td><td>845 (64)</td></tr><tr><td>Females</td><td></td></tr><tr><td>Reduction</td><td>65 (16.0)</td></tr><tr><td>Increase</td><td>93 (23.0)</td></tr><tr><td>No change</td><td>247 (61.0)</td></tr><tr><td>Males</td><td></td></tr><tr><td>Reduction</td><td>118 (13.1)</td></tr><tr><td>Increase</td><td>192 (21.2)</td></tr><tr><td>No change</td><td>594 (65.7)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Commercial funds

+ ethical approval from the Regional Committees for Medical and Health Research Ethics board and the Norwegian Centre for Research Data
+ complete sampling
+ consideration of the confounder “sex” (by stratification)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>Response:
19.4 %
Lost to follow-up:
n.a.</td><td></td><td></td><td></td><td>- only members of a Norwegian fitness association were invited
- low response
- self-reported outcome measurement with a single item (self-developed)
- descriptive analysis only
- no consideration of the confounder “age” in the statistical analysis
- due to study design no actual chronological investigation</td></tr>
<tr><td>Barkley et al., 2020</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
United States
Time of study:
May 18–June 18, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
University students, faculty & staff (results not extracted)
Inclusion criteria:
n.r.
# invited:
n = 5,000 (out of 27,716 university students)
# baseline:
n = 184 (undergraduate students: n = 100, graduate students: n = 84)
# follow-up:
n.a.
Age at baseline:
Undergraduate students: M: 26.9 years (SD: 8.9)
Graduate students: M: 29.9 years (SD: 8.7)
% females:</td><td>Campus closure due to the COVID-19 pandemic (since March 11, 2020):
- cancellation of face-to-face classes
March 11, 2020)
- closure of campus, including all fitness facilities, students were sent home (March 20, 2020)
- governor’s “stay at home” order (March 22, 2020)</td><td>Physical activity:
Godin physical activity questionnaire:
- mild physical activity: activities that require “minimal effort”
- moderate physical activity: activities that are “not exhausting”
- strenuous physical activity: activities in which the participant’s “heart beats rapidly”
Sedentary behaviour:
International Physical Activity Questionnaire^
Weight:
Self-reported question

Retrospective assessment of levels prior to March 11, 2020 using the same instruments.</td><td>Table 1: Descriptive statistics for the change in Godin physical activity score since campus closure:
<table><tr><th></th><th>Pre-campus closure (M (SD))</th><th>Post-campus closure (M (SD))</th></tr><tr><td colspan="3">Mild physical activity</td></tr><tr><td>Undergraduate students</td><td>16.3 (22.6)</td><td>10.8 (12.9)</td></tr><tr><td>Graduate students</td><td>12.0 (22.4)</td><td>11.2 (11.7)</td></tr><tr><td colspan="3">Moderate physical activity</td></tr><tr><td>Undergraduate students</td><td>15.0 (15.7)</td><td>12.9 (12.4)</td></tr><tr><td>Graduate students</td><td>17.1 (36.9)</td><td>16.6 (19.7)</td></tr><tr><td colspan="3">Strenuous physical activity</td></tr><tr><td>Undergraduate students</td><td>16.0 (22.1)</td><td>14.0 (17.9)</td></tr><tr><td>Graduate students</td><td>19.1 (32.9)</td><td>21.0 (33.7)</td></tr><tr><td colspan="3">Total physical activity</td></tr><tr><td>Undergraduate students</td><td>47.2 (40.2)</td><td>37.7 (30.7)</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
None

+ ethical approval from the university Institutional Review Board
+ random sampling
+ measurement of the outcomes “physical activity” and “sedentary behavior” with validated instruments
+ using ANOVA to investigate differences
+ statistical analysis of confounders “sex” (interaction analysis) and “age” (homogeneous group)
+ moderator analysis of activity levels before face-to-face classes ceased.</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration
(e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>73.2 % (of all participants incl. university staff)
Response:
3.7 % (personal communication)
Lost to follow-up:
n.a.</td><td></td><td></td><td>
<table>
<tr><td>Graduate students</td><td>48.2 (75.2)</td><td>48.7 (58.8)</td></tr>
</table>
- no statistically significant (p ≥ 0.16) main or interaction effects of time for moderate, vigorous, or total physical activity for the university role group by gender by time analyses
- statistically significant (p = 0.003) university role by time interaction for mild physical activity due to a significant (p = 0.015, d = 0.33) decrease in mild physical activity from pre- to post-cancellation in undergraduate students with no statistically significant (p ≥ 0.50, d ≤ 0.18) changes in mild physical activity for any of the other university role groups
- no additional main or interaction effects for differences in mild physical activity (p ≥ 0.17)

Table 2: Descriptive statistics for the change in sedentary behavior (minutes/week) since campus closure:
<table>
<tr><th></th><th>Pre-campus closure
(M (SD))</th><th>Post-campus closure
(M (SD))</th></tr>
<tr><td>Undergraduate students</td><td>3089.2 (1455.4)</td><td>3681.0 (1600.3)</td></tr>
<tr><td>Graduate students</td><td>3129.1 (1329.7)</td><td>3696.4 (1566.5)</td></tr>
</table>
- statistically significant (p = 0.003) main effect of time for sedentary behavior (participants significantly increased average weekly sitting from pre- to post-cancellation)
- no additional main or interaction effects for differences in sedentary behavior (p ≥ 0.18)

Table 2: Descriptive statistics for the change in bodyweight (pounds (lbs.)) since campus closure:
<table>
<tr><th></th><th>Pre-campus closure
(M (SD))</th><th>Post-campus closure
(M (SD))</th></tr>
</table>
</td><td>- monocentric study
- low response
- measurement of the outcome “weight” with a self-reported question
- exclusion of people not identifying as male or female
- retrospective assessment of activity levels, sedentary behaviour, and bodyweight before lockdown (recall bias)
- due to study design no actual chronological investigation</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td><table><tr><td>Undergraduate students</td><td>175.4 (48.4)</td><td>176.8 (48.4)</td></tr><tr><td>Graduate students</td><td>163.7 (45.6)</td><td>164.5 (45.6)</td></tr></table>- no statistically significant (p ≥ 0.16) main or interaction effects of time for bodyweight</td><td></td></tr>
<tr><td>Bourion-Bedes et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
Feelings and Psychological Impact of the COVID-19 Epidemic among Students in the Grand Est Area (PIMS-CoV19) study
Country of study:
France
Time of study:
May 7–17, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Students
Inclusion criteria:
n.r.
# invited:
n = around 50,000 (personal communication
# baseline:
n = 3,936
# follow-up:
n.a.
Age at baseline:
M: 21.7 years (SD: 4.0)
% females:
70.6 %
Response:
Around 7.9 % (personal information)
Lost to follow-up:
n.a.</td><td>Lockdown due to the COVID-19 outbreak</td><td>(Change in) alcohol consumption:
Self-reported single question
(Change in) tobacco consumption:
Self-reported single question</td><td>Table 1: Descriptive statistics for the change in alcohol and tobacco consumption since lockdown<table><tr><th></th><th>Prevalence (%)</th></tr><tr><td>Alcohol consumption</td><td></td></tr><tr><td>None</td><td>34.2</td></tr><tr><td>No change</td><td>17.1</td></tr><tr><td>Increased</td><td>13.7</td></tr><tr><td>Reduced</td><td>35.0</td></tr><tr><td>Tobacco consumption</td><td></td></tr><tr><td>None</td><td>83.5</td></tr><tr><td>No change</td><td>3.0</td></tr><tr><td>Increased</td><td>7.2</td></tr><tr><td>Reduced</td><td>6.3</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
None

+ complete sampling at 2 universities
+ consideration of the confounder “age” (homogeneous group)

- low response
- outcome measurement with a self-reported question
- no consideration of the confounder “sex” in the statistical analysis
- descriptive analysis only
- due to study design no actual chronological investigation</td></tr>
<tr><td>Di Sebastiano et al., 2020</td><td>Study design:
(Prospective) secondary data analysis
Study name:
n.a.
Country of study:
Canada
Time of study:</td><td>Description:
Adults (≥ 18 years) using a physical activity tracking ParticipACTION app (PAC app)
Inclusion criteria:
n.r.
invited:</td><td>Physical distancing protocols</td><td>Physical activity:
Measured using data from PAC app, that is compatible and draws data from 3 manufacturers of wearable devices and their associated apps (Garmin, Fitbit, and Apple Watch), and</td><td>Weekly physical activity: T0–T1<table><tr><th></th><th>T0
(M (SE))</th><th>T1
(M (SE))</th><th>p</th></tr><tr><td>Moderate-to-vigorous physical activity (minutes)</td><td>194.2 (5.2)</td><td>176.7 (5.0)</td><td>< 0.001</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (2 authors are employed by the PAC app, 1 author is chair of the ParticipACTION Research Advisory Group, 1 author declares no conflict of interest)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td>February 10–April 19, 2020
T0: 4 weeks prior physical distancing protocols
T1: 1 weeks after the beginning of the physical distancing protocols
T2: 6 weeks after physical distancing protocols
No. of waves:
n = 3
Follow-up duration:
10 weeks</td><td>n = 23,173 (Canadians who logged on to the PAC app at least once)
# baseline:
n = 2.338 (PAC app user who had complete datasets)
# follow-up:
n.a.
Age at baseline:
18–24 years: 3.0 %, 25–34 years: 13.6 %, 35–44 years: 26.6 %, 45–54 years: 25.6 %, 55–64 years: 23.1 %, ≥ 65 years: 8.0 %, unknown: 0.2 %
% females:
90.2 %
% active users (of those registered with the app) providing data:
10.1 %
Lost to follow-up:
n.a. (only complete cases investigated)</td><td></td><td>2 activity tracking apps with no associated wearable devices (Apple Health and Google Fit)
- for wearable devices, physical activity intensity was defined based on the device specific definitions, which typically use heart rate or step cadence
- Moderate-to-vigorous physical activity (MVPA): step rate ≥ 100 steps/minute
- Light physical activity (LPA): < 100 steps/minute
- Steps (number of steps)</td><td><table><tr><td>Light physical activity (minutes)</td><td>1,000.5 (17.0)</td><td>874.1 (15.6)</td><td>< 0.001</td></tr><tr><td>Steps</td><td>48,625 (745)</td><td>43,395 (705)</td><td>< 0.001</td></tr></table>
Weekly physical activity: T0–T2<table><tr><th></th><th>T0 (M (SE))</th><th>T2 (M (SE))</th><th>p</th></tr><tr><td>Moderate-to-vigorous physical activity (minutes)</td><td>194.2 (5.2)</td><td>204.4 (5.4)</td><td>0.498</td></tr><tr><td>Light physical activity (minutes)</td><td>1,000.5 (17.0)</td><td>732.0 (14.3)</td><td>< 0.001</td></tr><tr><td>Steps</td><td>48,625 (745)</td><td>41,946 (763)</td><td>< 0.001</td></tr></table>Repeated measure ANOVA

- only selective significant differences for age groups
- no interaction observed by gender</td><td>Funding:
None

+ ethical approval from the Behavioral Research Ethics Board University of British Columbia
+ using ANOVA to investigate differences
+ statistical analysis of confounders “sex” and “age”
+ chronological investigation

- only data used from those app users who used the app every week throughout the 10 weeks of investigation
- selection bias due to volunteer bias (health-interested and technology-savvy users)
- app data may objectively measure walking levels (steps), but do not measure other types of physical activities (underestimation of the actual physical activity level of an individual)</td></tr>
<tr><td>Lechner et al., 2020</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
United States
Time of study:
March 26–31, 2020
No. of waves:
n = 1</td><td>Description:
Students using alcohol in the past 30 days
Inclusion criteria:
n.r.
# invited:
n = 33,280
# baseline:
n = 1,958
# follow-up:
n.a.</td><td>University closings (on March 11, 2020)</td><td>Alcohol consumption:
Timeline Follow-Back Interview administered to document alcohol use in the 2-weeks between March 4– 17, 2020

Retrospective assessment of levels prior to university closing using the same instruments</td><td>Text: Descriptive statistics for the change in alcohol consumption since university closing<table><tr><th></th><th>Week prior to university closing (4–10, March 2020) (M (SD))</th><th>Week succeeding university closing (11–17, March 2020) (M (SD))</th></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Unclear

+ complete sampling
+ validated outcome measure</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td>Follow-up duration:
n.a.</td><td>Age at baseline:
M: 24.94 years (SD: 7.65)
% females:
79.97 %
Response:
Students overall: 12.8 %
Lost to follow-up:
n.a.</td><td></td><td></td><td><table><tr><td>Number of weekly standard drinks</td><td>3.48 (5.45)</td><td>5.01 (6.86)</td></tr><tr><td>Number of drinking days</td><td>1.36 (1.55)</td><td>1.94 (1.84)</td></tr></table>- Regression coefficient for time (main effect): b = 0.396 (95 % CI: 0.316 –423, p < 0.001) (statistically significant increase in alcohol consumption over time)</td><td>+ general estimating equation (GEE) regression analysis with negative binomial distribution adjusted for race/ethnicity, grade-level, biological sex
+ consideration of age (heterogeneous group)

- monocentric study
- low response
- high percentage of female students
- retrospective assessment of alcohol consumption before lockdown (recall bias)
- due to study design no actual chronological investigation</td></tr>
<tr><td>Özden & Kilic, 2021</td><td>Study design:
Cross-sectional study
Study name:
n.a.
Country of study:
Turkey
Time of study:
May 15–29, 2020
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
Nursing students
Inclusion criteria:
n.r.
# invited:
n = 1,400
# baseline:
n = 1,011
# follow-up:
n.a.
Age at baseline:
M: 19.97 years (SD: 3.11)
% females:
60 %
Response:
72.2 %
Lost to follow-up:
n.a.</td><td>Lockdown (social isolation) due to COVID-19 pandemic:
- closure of all schools and universities on March 16, 2020
- university students continued education with distance learning possibilities</td><td>(Change in) weight:
Self-reported question
Exercise:
Self-reported question (retrospective assessment of levels before COVID-19 outbreak using the same instruments)</td><td>Table 1: Descriptive statistics for the change in weight since lockdown<table><tr><th></th><th>Prevalence (%)</th></tr><tr><td>Same weight</td><td>19.7</td></tr><tr><td>Weight gain</td><td>46.9</td></tr><tr><td>Weight loss</td><td>33.4</td></tr></table>Table 1: Descriptive statistics for the change in regular exercise since lockdown<table><tr><th></th><th>Before COVID-19 outbreak (%)</th><th>During lockdown (%)</th></tr><tr><td>Regular exercise every day</td><td>32.6</td><td>43.3</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
None

+ ethical approval from the he İnönü University Health Sciences Scientific Research and Publication Ethics Committee
+ complete sampling
+ high response
+ consideration of the confounder “age” (homogeneous group)

- monocentric study</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>- outcome measurement with a self-reported question
- no consideration of the confounder “sex” in the statistical analysis
- descriptive analysis only
- retrospective assessment of exercise levels before lockdown (recall bias)
- due to study design no actual chronological investigation</td></tr>
<tr><td>Savage et al., 2020</td><td>Study design:
Cohort study
Study name:
Student Health Study
Country of study:
United Kingdom
Time of study:
Pre-COVID-19:
T1: October 14, 2019
T2: January 28, 2020
During COVID-19:
T3: March 20, 2020 (1. week of lockdown)
T4: April 27, 2020 (5. week of lockdown)
No. of waves:
n = 4
Follow-up duration:
6–8 month</td><td>Description:
University students
Inclusion criteria:
n.r.
# invited:
n = 9,472
# baseline:
n = 1,477
# follow-up:
n = 214 (those who completed ≥3 assessments, including T1 and T4)
Age at baseline:
M: 28.0 years (final sample)
% females:
72.0 % (final sample)
Response:
15.6 %
Lost to follow-up:
85.5 %</td><td>Lockdown:
- requirement to stay at home as much as possible
- people were allowed only to leave home once per day for exercise</td><td>Physical activity:
Exercise Vital Sign (EVS) questionnaire to assess moderate to vigorous physical activity levels (MVPA)
Sedentary behaviour:
1 self-reported question</td><td>Figure 1: Changes in sedentary behaviour and physical activity
<table><tr><th></th><th>p</th><th>Cohens´ d</th></tr><tr><td colspan="3">Sedentary behaviour</td></tr><tr><td>Time spent in sedentary behaviour on a typical day in the last month</td><td>< 0.0001*</td><td>0.78</td></tr><tr><td colspan="3">Physical activity</td></tr><tr><td>MVPA</td><td>< 0.01**</td><td>0.12</td></tr></table>Repeated-measures ANCOVA
*no interactions between gender and changes in sedentary behaviour were found
**significant gender interaction, reflecting that MVPA was higher in males at T1, but not at T4 (p < 0.05)</td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
None

+ ethical approval from the Science and Technology College Research Ethics Committee at Nottingham Trent University
+ complete sampling
+ measuring physical activity with a validated questionnaire
+ using ANCOVA to investigate differences
+ consideration of the confounders “age” (homogeneous group) and “sex” (interaction analysis)
+ temporal investigation

- monocentric study
- low response and high lost to follow-up</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>- measuring sedentary behaviour with a single-question</td></tr>
<tr><td>To et al., 2021</td><td>Study design:
(Prospective) secondary data analysis
Study name:
10,000 Steps program
Country of study:
Australia
Time of study:
January 1, 2018-June 30, 2020
T1 (lockdown): March 2, 2020 (7 and 30 days before and after)
T2 (lockdown relaxation): May 8, 2020 (7 and 30 days before and after)
No. of waves:
n = 2 (continuous data collection)
Follow-up duration:
10 weeks</td><td>Description:
Adults, who are registered as members of the 10,000 Steps program
Inclusion criteria:
people living in Australia, aged 18 to 80 years, with at least 7 days of logged data, days with logged steps that were fewer than 1,000 steps per day) or more than 40,000 steps were considered invalid and excluded
# invited:
n = 463,000 (total number of members who registered an account with the program website)
# baseline:
n = 60,560 (data from registered members of the program between January 1, 2018, and June 30, 2020)
# follow-up:
n.a.
Age at baseline:
18–45 years: 59.7 %, 46–80 years: 40.3 %
% females:
67.0. %</td><td>Lockdown (start on March 2 2020):
- social distancing guidelines
- closure of nonessential businesses, such as gyms, indoor sports facilities, and clubs
- people were allowed to be outside only for exercise or other essential needs
- restaurants and cafes only offered takeaway and delivery services
Relaxation of restrictions
(start on May 8, 2020)</td><td>Physical activity:
Number of steps logged per day (entered manually by the members using pedometers or synced automatically with activity trackers connected to the program)</td><td>Table 2: 7-day average of steps per day before and after each event
<table><tr><th></th><th>Before (steps/ day)</th><th>After (steps/ day)</th><th>p</th></tr><tr><td colspan="4">Begin of lockdown</td></tr><tr><td>All</td><td>9,500</td><td>9,175</td><td>< 0.001</td></tr><tr><td>Male</td><td>9,716</td><td>9,270</td><td>< 0.001</td></tr><tr><td>Female</td><td>9,391</td><td>9,130</td><td>< 0.001</td></tr><tr><td>18–45 years</td><td>9,113</td><td>8,739</td><td>< 0.001</td></tr><tr><td>46–80 years</td><td>10,001</td><td>9,739</td><td>< 0.001</td></tr><tr><td colspan="4">Relaxation of restrictions</td></tr><tr><td>All</td><td>9,637</td><td>9,767</td><td>< 0.001</td></tr><tr><td>Male</td><td>9,887</td><td>10,035</td><td>0,004</td></tr><tr><td>Female</td><td>9,489</td><td>9,606</td><td>< 0.001</td></tr><tr><td>18–45 years</td><td>9,181</td><td>9,335</td><td>< 0.001</td></tr><tr><td>46–80 years</td><td>10,322</td><td>10,415</td><td>0.02</td></tr></table>Wilcoxon signed-rank tests

Table 2: 30-day average of steps per day before and after each event
<table><tr><th></th><th>Before (steps/ day)</th><th>After (steps/ day)</th><th>p</th></tr><tr><td colspan="4">Begin of lockdown</td></tr><tr><td>All</td><td>9,684</td><td>9,199</td><td>< 0.001</td></tr><tr><td>Male</td><td>9,938</td><td>9,381</td><td>< 0.001</td></tr><tr><td>Female</td><td>9,555</td><td>9,112</td><td>< 0.001</td></tr><tr><td>18–45 years</td><td>9,367</td><td>8,758</td><td>< 0.001</td></tr><tr><td>46–80 years</td><td>10,096</td><td>9,773</td><td>< 0.001</td></tr><tr><td colspan="4">Relaxation of restrictions</td></tr><tr><td>All</td><td>9,477</td><td>9,833</td><td>< 0.001</td></tr><tr><td>Male</td><td>9,723</td><td>10,137</td><td>< 0.001</td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Public funds

+ using Wilcoxon signed-rank test to investigate differences
+ statistical analysis stratified by confounders “sex” and “age” (by stratification)
+ chronological investigation

- selection bias due to volunteer bias (health-interested and technology-savvy users)
- only data used from those app users who used the app every week throughout the 10 weeks of investigation
- app data may objectively measure walking levels (steps), but do not measure other types of physical activities (underestimation of the actual physical activity level of an individual)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
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(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>% active users (of those registered with the app) providing data:
13.1 %
Lost to follow-up:
n.a</td><td></td><td></td><td><table><tr><td>Female</td><td>9,330</td><td>9,649</td><td>< 0.001</td></tr><tr><td>18–45 years</td><td>9,060</td><td>9,426</td><td>< 0.001</td></tr><tr><td>46–80 years</td><td>10,106</td><td>10,446</td><td>< 0.001</td></tr></table>Wilcoxon signed-rank tests
* effects were not different for genders and age groups</td><td></td></tr>
<tr><td>Wang et al., 2020</td><td>Study design:
Cohort study
Study name:
Step Study
Country of study:
China
Time of study:
T0: corresponding period in 2019
T1: 30 days before January 21, 2020 (reference period)
T2: 30 days after January 21, 2020 (epidemic period)
(January 21, 2020: date of the first COVID-19 case diagnosed in Changsha)
No. of waves:
n = 3
Follow-up duration:
Around 1 year</td><td>Description:
Middle-aged and older adults
Inclusion criteria:
Residents aged ≥ 40 years, owning a personal smartphone and having a WeChat account, exclusion of residents with severe mental illness
# invited:
n = 7,262 (September 2018–January 2020)
# baseline:
n = 4,145
# follow-up:
n = 3,544
Age at baseline:
M: 51.6 years (SD: 8.9)
% females:
34.6 %
Response:
57.1 %
Lost to follow-up:
15.0 %</td><td>Physical distancing measures</td><td>Walking activity:
- Daily steps collected via a smartphone linked to WeChat (participants were required to wear their smartphone for≥ 10 hours on a given day)
- Prevalence of low daily steps (≤ 1500 steps/day)
- Prevalence of frequent low daily steps cases (≤ 1500 steps/day for ≥ 14 days)</td><td>Table 2: Associations of time period with daily step count<table><tr><th rowspan="2">Time period</th><th colspan="2">2019</th><th colspan="2">2020</th></tr><tr><th>M (SD)</th><th>MD (95 CI)</th><th>M (SD)</th><th>MD (95 CI)</th></tr><tr><td>Reference</td><td>7872 (4842)</td><td>0 (reference)</td><td>8097 (4793)</td><td>0 (reference)</td></tr><tr><td>Epidemic</td><td>7472 (4979)</td><td>-413 (-501–(-325))</td><td>5440 (4571)</td><td>-2672 (-2763–(-2582))</td></tr></table>Table 3: Associations of time period with prevalence of low daily steps<table><tr><th rowspan="2">Time period</th><th colspan="2">2019</th><th colspan="2">2020</th></tr><tr><th>Person-day, n (%)</th><th>PR (95 CI)</th><th>Person-day, n (%)</th><th>PR (95 CI)</th></tr><tr><td>Reference</td><td>1006 (3.3)</td><td>1.0 (reference)</td><td>2287 (3.0)</td><td>1.0 (reference)</td></tr><tr><td>Epidemic</td><td>1488 (5.1)</td><td>1.6 (1.4–1.7)</td><td>12,951 (18.5)</td><td>6.2 (5.8–6.7)</td></tr></table>Table 4: Prevalence of frequent low daily steps cases (≤ 1500 steps/day for ≥ 14 days)<table><tr><th>Frequent low daily steps cases</th><th>T1
n (%)</th><th>T2
n (%)</th><th>p</th></tr><tr><td>Total sample</td><td>12 (0.4)</td><td>196 (7.4)</td><td>n.a.</td></tr><tr><td>Sex</td><td></td><td></td><td></td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Stated (none declared)
Funding:
Public funds

+ ethical approval from Ethics Committee of Xiangya Hospital, Central South University
+ complete sampling
+ long-term monitoring of daily step count trends
+ using a statistical test to investigate differences
+ stratification for confounders “sex” and “age” in statistical analysis
+ temporal investigation

- only those who had their annual physical check-up and who used WeChat were invited
- app data may objectively measure walking levels (steps), but do not measure other types of physical activities (underestimation of the actual physical activity level of an individual)</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
(Description & assessment)</th><th>Results
(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Males</td><td>7 (0.4)</td><td>75 (4.2)</td><td>< 0.001*</td></tr>
<tr><td>Females</td><td>5 (0.5)</td><td>121 (14.0)</td><td></td></tr>
<tr><td>Age</td><td></td><td></td><td></td></tr>
<tr><td>40–49 years</td><td>1 (0.1)</td><td>84 (5.7)</td><td>0.001**</td></tr>
<tr><td>50–59 years</td><td>8 (0.8)</td><td>69 (7.9)</td><td></td></tr>
<tr><td>60–69 years</td><td>2 (0.7)</td><td>32 (12.5)</td><td></td></tr>
<tr><td>≥ 70 years</td><td>1 (1.4)</td><td>11 (19.3)</td><td></td></tr>
</table>
*interaction between change in prevalence of frequent low daily steps and sex: prevalence of frequent low daily steps increased more among women
*interaction between change in prevalence of frequent low daily steps and age: prevalence of frequent low daily steps increased more among older people</td><td>- previous studies found that iOS and Android devices have different accuracies in capturing the daily step count under free-living conditions (misclassification of daily step counts)</td></tr>
<tr><td>White et al., 2021</td><td>Study design:
Cross-sectional study
Study name:
3-campus Alcohol and Marijuana Study (original study)
Country of study:
United States
Time of study:
n.r.
No. of waves:
n = 1
Follow-up duration:
n.a.</td><td>Description:
College students, who reported drinking alcohol pre- and post-campus closure
Inclusion criteria:
Restriction to first-year students and sophomores at wave 1 assuming that they were still matriculated (as juniors and seniors) in spring 2020
# invited:
n = 473 (those who indicated at the end of wave 2 of the original study that they would like to be contacted for future studies)
# baseline:
n = 297
# follow-up:
n.a.
Age at baseline:</td><td>Campus closure because of COVID-19</td><td>Drinking:
Daily Drinking Questionnaire with reference to a typical week before campus closed and a typical week since campus closed

Retrospective assessment of levels pre-closure using the same instruments</td><td>Text: Overall change of drinking from pre-closure to post-closure
<table>
<tr><th></th><th>Pre-closure (M)</th><th>Post-closure (M)</th><th>p</th><th>d</th></tr>
<tr><td>Drinking frequency (in days)</td><td>3.0</td><td>3.2</td><td><0.05</td><td>0.12</td></tr>
<tr><td>Weekly quantity (drinks/ week)</td><td>11.5</td><td>9.9</td><td><0.01</td><td>0.15</td></tr>
<tr><td>Maximum number of drinks in one day</td><td>4.9</td><td>3.3</td><td><0.001</td><td>0.47</td></tr>
</table>
Paired sampled t-tests</td><td>Overall study quality:
High risk
Conflict of interest:
Unclear
Funding:
Public funds

+ ethical approval from the Brown University Institutional Review Board
+ random selection of students from 3 universities in the original study (responses: 30.4–35.7 %)
+ high response
+ non-responder analysis (no significant differences in terms of demographic characteristics) or past-3-months alcohol or cannabis use frequency collected at wave 1)
+ validated questionnaire for outcome measurement
+ using paired t-tests to investigate differences</td></tr>
</table>

<table>
<tr><th>Reference
(First author, publication year)</th><th>General
(Study design
Study name
Country of study
Time of study
No. of waves
Follow-up duration (e.g., mean, range))</th><th>Population
(Description
Inclusion criteria
invited
baseline
follow-up
Age at baseline
% females
Response
Lost to follow-up)</th><th>Exposure
(Description & assessment)</th><th>Outcome
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(Description of all topically relevant results)</th><th>Comments
(study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP]
Conflict of interest [stated vs. not stated]
Funding (public, non-profit, commercial)
Strengths (+) and weaknesses (-))</th></tr>
<tr><td></td><td></td><td>M: 21.2 years (SD: 0.82)
% females:
62 %
Response:
66 %
Lost to follow-up:
n.a.</td><td></td><td></td><td></td><td>+ consideration of confounder “age” (homogeneous group)

- no statistical analysis of confounder “sex” in statistical analysis
- retrospective assessment of drinking levels before lockdown (recall bias)
- due to study design no actual chronological investigation</td></tr>
<tr><td>Wickersham et al., 2021</td><td>Study design:
(Prospective) secondary data analysis
Study name:
n.a.
Country of study:
United Kingdom
Time of study:
Start: commencement of lockdown: March 23, 2020
Initial period of lockdown: March 23–May 10, 2020
(7 weeks)
Easing of restrictions: May 11–June 14, 2020
(5 weeks)
No. of waves:
Continuous data collection
Follow-up duration:
12 weeks</td><td>Description:
Students who had enrolled in the remote measurement technolocy (RMT) King’s Move Physical Activity (PA) tracker app
Inclusion criteria:
Having physical activity data available for the study period
invited:
Students using app:
n = 1,001 (personal communication)
Eligible sample size:
n = 770
# baseline:
n = 736
# follow-up:
n.a.
Age at baseline:
Median: 22 years (IQR: 20–25)
% females:
72.8 %</td><td>COVID-19 lockdown (announced on March 23, 2020):
- closure of services, including fitness centres, hospitality, leisure, and educational institutions
- people should only go outside for one form of exercise per day or to make essential shopping trips
- closure of all university campuses
- easing of restrictions on May 11, 2020: individuals were able to return to work (where they could not work from home), spend time outdoors as often as they would like, and meet one other person from outside their own household</td><td>Physical activity:
Measured using data from app, which collects and aggregates physical activity data from Google Fit and Apple Health fitness tracker apps and operates a rewards-based system. Physical activity considered:
- steps walked per week
- miles run per week</td><td>Figure 1 and Table 2: Trajectories of steps walked per week:
- gradual increase in steps walked per week over time on average (quadratic effect of week and no interaction terms, adjusted for gender, ethnicity, and age)

Table 2 (excerpt): Slope of outcome on week in the reference group:
<table><tr><th>Steps/week</th><th>IRR (95 % CI)</th><th>p</th></tr><tr><td>Linear effect</td><td>1.00 (0.97–1.03)</td><td>0.984</td></tr><tr><td>Quadratic effect</td><td>1.00 (1.00–1.01)</td><td>0.047</td></tr></table>
Figure 2 and Table 3: Trajectories of miles run per week:
- females tended to show a decrease in the number of miles run per week during the observation period, whereas males did not (linear effect of week, and an interaction term between gender and week)

Table 3 (excerpt): Slope of outcome on week in the reference group
<table><tr><th>Steps/week</th><th>IRR (95% CI)</th><th>p</th></tr><tr><td>Linear effect</td><td>1.01 (0.99–1.03)</td><td>0.394</td></tr><tr><td>Gender*Week Interaction</td><td></td><td></td></tr></table></td><td>Overall study quality:
High risk
Conflict of interest:
Statement that most authors are employed at King´s College London
Funding:
Public funds

+ ethical approval from the King’s College London Research Ethics Committee
+ app was offered to all students of the university in March 2020 (complete sampling)
+ excluded users were similar to the analytical sample in terms of gender, ethnicity and age, although a slightly higher proportion of those included in running trajectory models were male and from White ethnic groups</td></tr>
</table>

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
		% active users (of those registered with the app) providing data: Students using app: 73.5 % (personal communication) Of all students at the university: 2.2 % **Lost to follow-up:** n.a.			Female | 0.96 (0.94–0.99) | 0.007	+ using negative binomial mixed models to investigate differences + statistical analysis of confounders “sex” (stratification) and “age” (homogenous group) + chronological investigation of the trajectory after lockdown and easing of restrictions - monocentric study - selection bias due to volunteer bias (health-interested and technology-savvy users) - app data may objectively measure walking levels (steps), but do not measure other types of physical activities (underestimation of the actual physical activity level of an individual) - the app was launched just prior to the UK nationwide lockdown, and it was not possible to ascertain whether physical activity was reduced by lockdown, and if changes observed after lockdown were an artifact of increasing awareness of the app
Yamada et al., 2020	**Study design:** (Prospective) secondary data analysis **Study name:** n.a. **Country of study:**	**Description:** Physically independent residents, living in a continuing care retirement community **Inclusion criteria:**	**Social/physical distancing and self-isolation:** - continuing care retirement community announced the cancellation of all upcoming in-facility events/exhibitions and	**Walking:** Walking distance (in meters/day) within the continuing care retirement community based on behaviour logs from	- after the continuing care retirement community announcement (February 24, 2020) until the state of emergency declaration (April 7, 2020), walking distance gradually decreased at a rate of 0.5% [5.4 meters/day (95 % CI: -10.4–(-0.4))]	**Overall study quality:** High risk **Conflict of interest:** Unclear **Funding:** Unclear

Reference (First author, publication year)	**General** (Study design Study name Country of study Time of study No. of waves Follow-up duration (e.g., mean, range))	**Population** (Description Inclusion criteria # invited # baseline # follow-up Age at baseline % females Response Lost to follow-up)	**Exposure** (Description & assessment)	**Outcome** (Description & assessment)	**Results** (Description of all topically relevant results)	**Comments** (study quality [overall assessment according to Iljaz/Shamliyan/SIGN/CASP] Conflict of interest [stated vs. not stated] Funding (public, non-profit, commercial) Strengths (+) and weaknesses (-))
	Japan **Time of study:** January 1–May 25, 2020 **No. of waves:** Ccontinuous data collection **Follow-up duration:** around 5 months	n.r. **# invited:** *n* = 296 (personal communication) **# baseline:** *n* = 114 **# follow-up:** *n* = 114 **Age at baseline:** Range: 67–92 years **% females:** 70.4 % **Response:** 38.5 % (personal communication) **Lost to follow-up:** 0 %	the closure of some common facilities as a precaution measure (February 24, 2020) - state of emergency was declared by the prime minister, asking people to stay at home (April 7, 2020)	beacon transmitter (a senior-friendly internet-of-things device for tracking movement), which were carried by the residents daily	- the state of emergency declaration had a further significant acute impact on the daily walking distance by 20.3% decrease [-186.8 meters (95 %CI: -333.0–(-40.6))]	+ complete sampling + no lost to follow-up + using regression analyses to investigate differences + temporal investigation - monocentric study - low response - movement tracking may objectively measure walking distance, but do not measure other types of physical activities (underestimation of the actual physical activity level of an individual) - no consideration of the confounders “age” and “sex” in the statistical analysis - no information, whether an ethical approval existed

Abbreviations: *ANOVA* analysis of variance, *ANCOVA* analysis of covariance, *CI* confidence interval, *d* Cohens´ d, *HDL-C* high-density lipoprotein-cholesterol, *IQR* interquartile range, *IRR* Incident Rate Ratios, *LDL-C* low-density lipoprotein-cholesterol, *M* mean, *MD* mean difference, *MET* metabolic equivalent of task, *n/N* number of, *n.r.* not reported, *ref* reference, *PR* prevalence ratio, *RR* relative risk, *SD* standard deviation, *T* time