Leisure-time physical activity and all-cause mortality and cardiovascular disease in adults with type 2 diabetes: Cross-country comparison of cohort studies

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Supplementary File 3

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1	
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	3	
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6	
Objectives	3	State specific objectives, including any prespecified hypotheses	6	The aim of this study was to quantify and compare the dose-response associations of leisure-time physical activity with all-cause mortality and cardiovascular disease in British and Chinese adults with type 2 diabetes
Methods				
Study design	4	Present key elements of study design early in the paper	6-7	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-10	
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6-10	
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		

Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-10	
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-10 Supplementary File 1: Supplementary Table 1	
Bias	9	Describe any efforts to address potential sources of bias	8-9	A statistical analysis plan was developed and registered at ClinicalTrials.gov (NCT05380232, prior to commencing the analysis
Study size	10	Explain how the study size was arrived at	Supplementary File 1: Supplementary Figure 1	

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Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7, 8, 11 Supplementary File 1: Supplementary Table 1	
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	9-10	
		(*b*) Describe any methods used to examine subgroups and interactions	10	
		(*c*) Explain how missing data were addressed	Supplementary File 1: Supplementary Figure 1	
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	8	Participants were followed until death, emigration, loss to follow-up, withdrawal from the study or end of observation time, whichever occurred first
		(*e*) Describe any sensitivity analyses	10	Finally, we performed sensitivity analyses by re-analysing our data (using model 3) restricted to never-smokers, with adjustment for more detailed diet information from 24-hour recalls conducted between 2009 and 2012 (UK Biobank, subsample only), and restricted to individuals classified as 'possible type 2 diabetes' who had HbA1c <48 mmol/mol (UK Biobank)
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Supplementary File 1: Supplementary figure 1	
		(b) Give reasons for non-participation at each stage	Supplementary File 1: Supplementary	

			Figure 1	
		(c) Consider use of a flow diagram	Supplementary File 1: Supplementary Figure 1	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1 Supplementary File 1: Supplementary Tables 4 and 5	
		(b) Indicate number of participants with missing data for each variable of interest	Supplementary File 1: Supplementary Figure 1	
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	10-11	During a median follow-up of 12.4 and 9.7 years after baseline, 1571 and 2351 deaths (392 and 1060 from CVD) and 2345 and 4458 major adverse cardiovascular events were included from UK Biobank and China Kadoorie Biobank, respectively
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	10-11	During a median follow-up of 12.4 and 9.7 years after baseline, 1571 and 2351 deaths (392 and 1060 from CVD) and 2345 and 4458 major adverse cardiovascular events were included from UK Biobank and China Kadoorie Biobank, respectively
		Case-control study—Report numbers in each exposure category, or summary measures of exposure		
		Cross-sectional study—Report numbers of outcome events or summary measures		
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Table 2	

	(*b*) Report category boundaries when continuous variables were categorized	Table 2	
	(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	11 Supplementary File 1: Supplementary Table 6	The absolute differences in 10-year cumulative mortality, compared with no activity, were -0.2%, -0.4%, and -0.6% in UK Biobank and -1.4%, -1.3%, and -1.6% in China Kadoorie Biobank for physical activity below, at and exceeding recommendations

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Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	12-13 Table 3 Supplementary File 1: Supplementary Table 7	
Discussion				
Key results	18	Summarise key results with reference to study objectives	13	The main finding included that physical activity below and at contemporary recommendations was associated with lower all-cause and cardiovascular mortality in British and Chinese adults with type 2 diabetes, but these reductions were uncertain and inconsistent across cohorts. There was no association between physical activity and lower major adverse cardiovascular events in China Kadoorie Biobank and activity far exceeding the WHO recommended levels was needed to lower the risk in UK Biobank
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16-17	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17	
Generalisability	21	Discuss the generalisability (external validity) of the study results	15-16	The UK Biobank and China Kadoorie Biobank cohorts are subject to different selection-mechanisms with a particular high risk of healthy-volunteer bias in UK Biobank We included large population-based samples and we therefore expect participants to represent the level of variation in social conditions and

				medical treatment given to the majority of adults with type 2 diabetes in the United Kingdom and China Finally, as an observational study, residual confounding and other biases may also impact the observed dose-response relationships
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18	JT received funding from the Danish Diabetes Association during the conduct of the study. DD received funding from the Australian National Health and Medical Research Council and the New South Wales Government. MASL was funded by the Spanish Ministry of Universities under application 33.50.460A.752 and by the European Union NextGenerationEU/PRTR through a Margarita Salas contract of the University of Vigo. BdPC is supported by the Government of Andalusia, Research Talent Recruitment Programme (EMERGIA 2020/00158). The funding sources had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.