Study shows that regular physical activity is an effective strategy to prevent type 2 diabetes

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New research published in *Diabetologia* (the journal of the European Association for the Study of Diabetes [EASD]) shows that regular

physical activity is a safe diabetes prevention strategy for people residing in relatively polluted regions.

The study, which is the first to investigate the combined effects of physical activity and pollution exposure on type 2 diabetes risk, is by Dr. Cui Guo and Professor Lao Xiang Qian, Faculty of Medicine at the Chinese University of Hong Kong, Hong Kong SAR, China, and Dr. Hsiao Ting Yang, Institute for Risk Assessment Sciences, Utrecht University, Utrecht, the Netherlands, and colleagues.

An increasing body of evidence has shown that air pollution is a novel risk factor for the development of type 2 diabetes. Physical activity increases the inhalation of air pollutants, which may exacerbate the adverse health effects of air pollution. There is limited information on the combined associations of air pollution and habitual physical activity with the development of type 2 diabetes. Thus, the risk-benefit relationship between air pollution and physical activity has become an important public concern as almost all (over 91%) of the world's population lives in a place where air quality does not meet the WHO guidelines. Health guidelines are urgently needed, especially in regions with significant air pollution, to inform people whether they can benefit from regular physical activity.

In this study, the authors investigated the combined associations of regular physical activity and chronic exposure to ambient particulate matter with a diameter less than 2.5 μm (so called PM2.5 particles) with the incidence of type 2 diabetes in 156,314 adults who had undergone a total of 422,831 medical examinations in Taiwan, where the annual PM2.5 concentration is around 2.6 times higher than the WHO recommended limit.

Diabetes diagnoses were identified from medical examinations, while two-year mean PM2.5 exposure was estimated at each participant's

address using a satellite-based model. Information on physical activity and a wide range of other variables was collected using a standard self-administered questionnaire.

Compared with high physical activity, moderate (by 31%) and inactive/low physical activity (by 56%) were associated with a higher risk of diabetes. Participants with moderate (by 31%) and high (by 94%) PM2.5 had a higher risk of type 2 diabetes than the participants exposed to low PM2.5. The participants with high physical activity and low PM2.5 had a 64% lower risk of type 2 diabetes than those with inactive/low physical activity and high PM2.5.

The authors say: "We found that high levels of habitual physical activity combined with low levels of chronic PM2.5 exposure were associated with a lower risk of developing type 2 diabetes, whereas low levels of habitual physical activity combined with high levels of chronic PM2.5 exposure were associated with a higher risk of developing type 2 diabetes."

They further emphasize that "the benefits of habitual physical activity on type 2 diabetes remained stable in participants with different levels of PM2.5 exposure." Additional analysis showed that the effect on diabetes risk seemed to be more pronounced for higher levels of pollution that it was for lower levels of physical activity.

Regarding potential mechanisms, the authors say the metabolic improvements caused by physical activity, that prevent development of diabetes, have been extensively discussed. Pollution could exert its effect by causing system-wide inflammation, including in the lungs, blood vessels and central nervous system. A previous study also showed that pollutants inhaled during exercise are only a small fraction of those inhaled overall by a person, which could explain why the effect of physical activity on diabetes risk is similar even in different levels of

pollution.

The authors conclude: "Our findings suggest that habitual physical activity is a safe strategy for diabetes prevention for people who reside in relatively polluted areas and should be promoted. Our study reinforces the importance of air pollution mitigation for diabetes prevention."

More information: Cui Guo et al. Habitual exercise is associated with reduced risk of diabetes regardless of air pollution: a longitudinal cohort study, *Diabetologia* (2021). DOI: 10.1007/s00125-021-05408-4

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