

# TEMPORAL PATTERNS AND INTENSITY OF PHYSICAL ACTIVITY AND SEDENTARY TIME ARE ASSOCIATED WITH CARDIOVASCULAR DISEASE RISK



Written by *Maisa Niemelä and Vahid Farrahi, June 2019*



UNIVERSITY OF OULU

Cardiovascular diseases (CVD) cause around one third of all deaths worldwide. Major risk factors for CVD include high blood pressure, physical inactivity and smoking. Physical activity (PA) decreases the risk of CVD. However, sedentary time is associated with higher CVD risk even in physically active individuals. It is yet unknown how temporal patterns of these behaviors are associated with cardiovascular health.

Northern Finland Birth Cohort 1966 study included all newborns whose birth was expected in 1966 in two northernmost provinces in Finland (Oulu and Lapland). In 46-years follow-up study in 2012 in addition to wide clinical measurements, physical activity was objectively measured using wrist-worn acceleration-based activity monitor during two-weeks measurement period. Using a machine learning method, participants were divided to distinct groups based on the intensity and temporal patterns of physical activity and sedentary time. CVD risk was evaluated using Framingham risk model which includes, inter alia, total cholesterol, HDL cholesterol, systolic blood pressure and smoking.



Data from 4582 person were used at the 46-year follow-up study. In this study sample the risk of CVD was low ( $< 10\%$ ) in 97% of women and 74% of men. With machine learning method four distinct PA groups were identified (inactive, evening active, moderately active and very active). The intensity of PA was highest in the very active group and lowest in the inactive group. The moderately active group was based on the PA intensity in between of these two groups. The evening active group was as active as the moderately active group, but in this group, activities took place later in the evening, also waking up and going to bed occurred later in this group.

In women, CVD risk was lower in the very active and moderately active and in men in the very active group compared to the inactive group. Blood HDL cholesterol levels were highest in the very active group in both genders. Proportion of smokers was highest in inactive and evening active groups.

The Prevalence of CVD increases with increasing age, in men considerably 65 years of age and in women even later on. The participants of this study were younger than 65 years and most of them had low CVD risk. Still, already at 46-years of age there was found differences in the CVD risk between the activity groups. Results of the study can be used in planning and executing interventions for those risk groups with patterns of physical activity and sedentary time deleterious for cardiovascular health.

Summary from research article: Niemelä M, Kangas M, Farrahi V, Kiviniemi A, Leinonen A-M, Ahola R, Puukka K, Auvinen J, Korpelainen R, Jämsä T (2019). Intensity and temporal patterns of physical activity and cardiovascular disease risk in midlife. *Preventive Medicine*. <https://doi.org/10.1016/j.ypmed.2019.04.023>

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