

Research Project

Physical activity as a life style component of aggressive decrease of atherosclerotic modifiers (ADAM) in elderly subjects: the SAPALIDA Cohort Study

Third-party funded project

Project title Physical activity as a life style component of aggressive decrease of atherosclerotic modifiers (ADAM) in elderly subjects: the SAPALIDA Cohort Study

Principal Investigator(s) [Schmidt-Trucksäss, Arno](#) ;

Co-Investigator(s) [Künzli, Nino](#) ; [Probst Hensch, Nicole](#) ;

Organisation / Research unit

Departement Sport, Bewegung und Gesundheit / Sportmedizin (Schmidt-Trucksäss)

Department

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This proposal outlines a research program of a large nested study of the third part of the **Swiss Cohort Study on Air Pollution and Lung and Heart Diseases in Adults (SAPALDIA)** including 3026 subjects. The research program seeks (i) to evaluate the measuring characteristics of the new cardio-ankle vascular index (CAVI) as a measurement tool of arterial stiffness for the first time in a Caucasian cohort and (ii) to analyse the association between PA as a preventive life style component of aggressive decrease of atherosclerotic modifiers (ADAM) and cardiovascular disease (CVD) in this Caucasian clientele. Cardiovascular diseases constitute a major worldwide health problem, upon which the bigger part of death causes are attributed to. Cardiovascular health issues are closely related to long-term asymptomatic changes of the vasculature in terms of arteriosclerosis and, especially, atherosclerosis as its major condition. Starting point of these alterations are vessel stiffening processes, for which reason arterial stiffness is an early, subclinical marker of potentially grave cardiovascular modifications. CAVI's beneficial characteristic is the lower correlation with blood pressure (BP) fluctuations during investigations compared to other arterial stiffness measurements. Therefore, CAVI as a non-invasive, easy-to-apply technique may present a highly useful clinical tool for cardiovascular risk stratification and evidence-based treatment procedures at an early stage. In order to evaluate the potential usefulness of CAVI in Caucasians this research project targets three specific aims. At first this study aims at determining CAVI's measuring characteristics so as to lay the basis for serial clinical application of CAVI in Caucasian populations. This will be performed by scrutinizing CAVI's reproducibility, its dependency on blood pressure (BP) and the correlation with carotid intima-media thickness (CIMT), a traditional ultrasonographic marker of atherosclerosis reliability and validity in the SAPALDIA cohort. All the named has not been shown for Caucasian people before, which is a prerequisite for the clinical application in these subjects. Within the second and third aim of the research project CAVI will be implemented for stratifying the cardiovascular risk based on physical inactivity. During the data collection of SAPALDIA the International Physical Activity Questionnaire (IPAQ) has been consulted to classify the subjects' physical activity (PA), which is regarded as an important health promotion measure with protective impact on the cardiovascular system and, thus, as one component of ADAM. Therefore, CAVI will be analysed across groups of different physical activity patterns in the SAPALDIA cohort. In this context the question, whether a sedentary lifestyle is associated with increased CAVI values is of particular relevance. Up-to-date there exists no comparable cohort in which a measure of arterial stiffness may be analysed in association with a detailed questionnaire of PA like the IPAQ. Furthermore, this project implies the unique and worldwide first chance to study changes of PA in association with CAVI measurement over a time period of several

years like between SAPALDIA² and SAPALDIA³. Differences of arterial stiffness in association with changes in PA ranking from SAPALDIA² to SAPALDIA³ over a reasonable time span of nine years may strengthen PA recommendations in middle-aged and elderly with respect to the prevention of manifest cardiovascular disease. Consequently, a systematic study is proposed, which tends to establish CAVI for cardiovascular risk group evaluations like physically inactive people. Because of CAVI having specific significance for examinations of asymptomatic subjects the herewith obtained cohort study results may lead to improvements of early stage diagnosis and treatment of cardiovascular disease including guidelines for appropriate PA.

Keywords arterial stiffness, atherosclerosis, cardio-ankle vascular index, cardiovascular disease, carotid intima-media thickness, physical activity, pulse wave velocity, ultrasound

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