

THE EFFECTS OF MODIFIABLE LIFESTYLE BEHAVIORS ON LIPOPROTEIN PARTICLE CONCENTRATION AND SIZE

Lipoprotein concentrations are well established biological markers associated with cardiovascular disease (CVD) risk. Recent research has placed great importance on the various functions of the different lipoprotein subfractions (small and large LDL; small, medium and large HDL). Modifiable lifestyle behaviors such as exercise, diet, and sleep have been shown to have direct effect on CVD risk, in part by altering blood lipid and lipoprotein profiles. The overall goal of this dissertation was to determine if specific modifiable lifestyle behaviors affected lipoprotein subfractions concentration and size.

Two studies, both utilizing a longitudinal study design, were conducted to 1) investigate the effects of 16-weeks of higher-dose (14 kilocalories per kilogram body weight per week [KKW]) compared to lower-dose (8 KKW) exercise training on blood lipid and lipoprotein particle concentrations and size and 2) investigate the effects sleep restriction (SR) during 8-weeks of a caloric restriction (CR) diet compared to CR alone on blood lipid and lipoprotein particle concentrations and size. Data for the first study were collected from the WEWALK study, a clinical exercise trial involving older women. Data for the second study were collected from the WORDS study, a clinical diet and sleep trial involving overweight men and women. For both studies, lipoprotein profiles were analyzed pre- and post-intervention utilizing nuclear magnetic resonance (NMR) spectroscopy.

In the first study, the lower-dose exercise group displayed a decrease in total HDL-P concentration ($p=0.001$), while the higher-dose group displayed an increase in mean LDL-P size ($p<0.05$). Both exercise dose treatments were found to significantly increase mean HDL particle size ($p<0.05$) with no significant difference between groups.

In the second study, large HDL-P concentration decreased in the CR group while mean HDL-P size decreased in the CR+SR group. No between-group differences were observed comparing lipoprotein subclasses of CR and CR+SR intervention groups.

Overall, this dissertation found that alterations within modifiable lifestyle behaviors may affect the degree to which behavior change effects CVD risk in terms of lipoprotein subfractions concentration and size. Higher-dose exercise may be more beneficial than lower-dose exercise in older women, and CR may be more beneficial for overweight individuals if sleep is not restricted during CR. Due to limited existing research on these topics, further investigation is needed to reach more definitive conclusions.