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Low Muscle Strength as a Risk Factor for Non-Alcoholic Fatty Liver Disease in Different Metabolic Subgroups

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Abstract

Background: Recently, Non-alcoholic fatty liver disease (NAFLD) has become one of the leading liver diseases that threatens our health worldwide. Low muscle strength, obesity, insulin resistance, and metabolic syndrome are recognized as key factors for NAFLD. However, the impact of low muscle strength in different metabolic subgroups has not been widely studied.

Methods: A cross-sectional analysis was performed on a sample of 5,427 participants from the 2019 Korea National Health and Nutrition Examination Survey (KNHANES). Relative handgrip strength [rHGS=hand-grip strength/body mass index (BMI)] was used to assess muscle strength. The cut-off values for low rHGS were 1.405 for men and 0.850 for women. NAFLD was diagnosed if the Hepatic Steatosis Index (HSI) was over 36. Participants were stratified according to BMI, homeostasis model assessment of insulin resistance, and metabolic syndrome.

Outcomes: Complex sample multivariate logistic regression analysis revealed a distinct correlation between low rHGS and NAFLD after adjustment for other confounders (odds ratio [OR] = 2.405, $p < 0.001$). In subgroups stratified by obesity, insulin resistance, and metabolic syndrome, a significant association between low rHGS and NAFLD was consistently present (odds ratio = 2.032-3.550 depending on the subgroup, all $p < 0.05$), except in the non-obese group.

Conclusion: This research presented that low muscle strength was associated with NAFLD. This relationship was independent of insulin resistance and metabolic syndrome, but was dependent on the presence of obesity. These findings suggest that interventions to improve muscle strength may be effective in reducing the risk of NAFLD in individuals regardless of insulin resistance or metabolic syndrome.

