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# Additive effect of non-alcoholic fatty liver disease on the development of diabetes in individuals with metabolic syndrome

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Background: Non-alcoholic fatty liver disease (NAFLD) is considered as the hepatic manifestation of the metabolic syndrome (MetS), with insulin resistance as the common pathophysiology. In a current longitudinal cohort study, we evaluated the separate and combined effects of MetS and NAFLD on incident diabetes risk.
Methods: Participants were categorized into four groups on the basis of the presence of NAFLD and MetS at baseline (i.e., with NAFLD, with MetS, with both, or without either). We compared the development of diabetes among these four groups.
Results: During the mean follow up of 4 years, 435 of the 7849 participants (5.5%) developed diabetes. The age, sex, and smoking-adjusted risk of incident diabetes was higher in the NAFLD only group (HR 1.51, 95% CI 1.14–1.99), MetS only group (HR 2.82, 95% CI 2.01–3.95), and both group (HR 5.45, 95% CI 4.32–6.82) compared with the group of neither. When compared with the NAFLD only group, the adjusted HR for incident diabetes was 1.87 (95% CI 1.29–2.72) in the MetS only group and 3.62 (95% CI 2.74–4.77) in both group. Among individuals with MetS, the presence of NAFLD showed a significant increase in risk of incident diabetes even after further adjustment for MetS components including fasting glucose, TG, BMI, systolic BP, and HDL-C (HR 1.53, 95% CI 1.09–2.16).
Conclusion: The presence of NAFLD further increased the risk of incident diabetes in individuals with metabolic syndrome. Our results suggest that coexistence of NAFLD has an additive effect on the development of diabetes in individuals with MetS.