

# The association of elevated fasting blood glucose and increased risk of oral health problem in Koreans with metabolic syndrome

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**Background:** The prevalence of metabolic syndrome has been rising during the past 12 years in Korea, and gingivitis and periodontitis have resulted in the largest medical expenses among outpatient diseases in 2021. Though there have been many studies that diabetes mellitus patients have poorer oral health, the relationship between of metabolic syndrome and oral health is unclear. We aimed to determine whether oral health problem is affected by the state of metabolic syndrome.

**Methods:** Data from 15,930 adults aged  $\geq 19$  years who participated in the Korea National Health and Nutrition Examination Survey (KNHANES) in 2019–2021 were considered for analyses. Participants with either chewing or speech problems were defined as the oral health problem group. Multivariable logistic regression analysis was conducted to calculate odds ratios (ORs) and 95% confidence intervals (CIs) of oral health problem.

**Results:** The prevalence of oral problems increased with the number of metabolic syndrome risk factors ( $p$  for trend  $<0.001$ ). Out of the 5 risk factors of metabolic syndrome, only the elevated fasting blood glucose risk factor increased risk on oral health (OR 1.11, 95% CI 1.02–1.21). The adjusted OR was statistically significant when metabolic syndrome was diagnosed with more than 4 risk factors, with an OR of 1.173 (95% CI: 1.021–1.347). Moreover, when comparing the risk of oral health problem in the 4-risk factor group, the OR in the high fasting blood increased by 1.361 (95% CI 1.001–1.851,  $p$ -value 0.0495) compared to people with normal fasting blood glucose.

**Conclusions:** It can be implied that diagnosis of metabolic syndrome is not sufficient enough to influence a poorer oral health. However, a clustering of more than 4 risk factors especially the inclusion of elevated fasting blood glucose can significantly influence a poorer oral health. Therefore, blood sugar control should be emphasized in the early stages of developing metabolic syndrome to promote oral health and intersectoral care.

**Keywords:** metabolic syndrome, Oral health problem, impaired glucose control, Korea