Adherence to Healthy Diet and Risk and Severity of SARS-CoV-2 Infections: A Community Survey Study Within the COVID Symptom Study Application

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Objectives: To examine the association of adherence to a healthy diet with risk and severity of SARS-CoV-2 infections.

Methods: We included participants from the COVID Symptom Study smartphone application enrolled in March 2020 from the UK and the US who provided information about their sociodemographic characteristics and risk factors for COVID-19 at baseline, and subsequently reported any symptoms they were experiencing over follow-up. We administered a supplementary diet and lifestyle survey between August and September 2020 to ascertain diet quality before the pandemic using a validated 35-item short food frequency questionnaire. We defined incident predicted cases of COVID-19 over follow-up using a validated symptom-based model and a severe case of COVID-19 as a report of hospitalization with requirement of oxygen support. We used Cox models to calculate hazard ratios (HR) and 95% confidence intervals (95% CI) for predicted COVID-19 and severe COVID-19 after adjusting for potential sociodemographic and behavioral confounders.

Results: Over 4,044,344 person-months of follow-up, we recorded 33,360 incident COVID-19 cases. Compared with individuals in the lowest quartile of the diet quality score, high diet quality was associated with a reduced risk of predicted COVID-19 (adjusted HR 0.94, 95% CI 0.91 to 0.97) and reduced risk of severe COVID-19 (adjusted HR 0.80, 95% CI 0.65 to 0.99). We found evidence of significant interactions between diet quality and socioeconomic status on COVID-19 risk, in which the attributable risk proportion of the joint effect due to the interaction was 30% (95% CI 2.8 to 57.2). Among participants with higher levels of socioeconomic deprivation, COVID-19 incidence rate per 1,000 person-months was 7.5% for those with low diet quality (95% CI 7.1 to 7.8) compared with 5.5% for those with a high diet quality (95% CI 5.2 to 5.9).

Conclusions: These findings suggest that adherence to a healthy diet is associated with lower risk of COVID-19 infection and severity. The apparent beneficial association of a high-quality diet may be particularly evident among individuals with a higher levels of socioeconomic deprivation.