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Breakfast skipping and risk of cardiovascular disease: A systematic review and meta-analysis of prospective studies

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Abstract

Breakfast is considered to be the most important meal of the day, which significantly contributes to overall dietary quality. Global trends suggest a decline in breakfast consumption frequency in all age groups over the years. Breakfast skipping is associated with increased risk of weight gain, insulin resistance and type 2 diabetes, which are crucial risk factors of cardiovascular diseases (CVD). Regular breakfast consumption as a modifiable risk factor might be of great interest for cardiovascular prevention. Several prospective cohort studies showed contradictory findings on breakfast skipping and CVD risk. To the best knowledge of authors, this topic was not covered by any previous meta-analysis. Therefore, this review aimed to summarise the evidence on the association between breakfast skipping and CVD risk in prospective studies with particular emphasis on dose-response relationship and quality of existing evidence. A comprehensive search of the literature was performed using PubMed and Embase databases until February 2019, with no restriction to language and date. Inclusion criteria were as following: (1) participants aged ≥ 18 years, (2) prospective design, (3) information about breakfast consumption/skipping frequency and (4) outcome is the risk of CVD including coronary heart disease, stroke or heart failure. For high versus low comparison, random effects model was applied using the inverse variance method. Greenland-Longenecker method was used to conduct linear dose-response meta-analysis. Potential nonlinear association were examined using restricted cubic splines model. Heterogeneity was evaluated using the Cochrane Q test and I^2 statistic with value $> 50\%$ indicating substantial heterogeneity. Quality of evidence was assessed using NutriGrade tool. Out of 877 records identified in the literature search, four prospective cohort studies with 7258 CVD cases were included. Comparing breakfast skipping to regular breakfast consumption, there was a positive association with CVD risk (RR = 1.17 95%CI: 1.02–1.34, $I^2 = 39\%$, $p_{\text{heterogeneity}} = 0.14$). In linear dose-response meta-analysis, each additional day of breakfast skipping was related to 2% higher risk of CVD (RR = 1.02 95%CI: 1.00–1.04, $I^2 = 15\%$, $p_{\text{heterogeneity}} = 0.31$, $n = 3$). No non-linear association was observed ($p_{\text{non-linearity}} = 0.53$, $n = 3$). The quality of evidence for these associations was rated as low. This review indicated that breakfast skipping is associated with increased risk of CVD. Potential implementation of these findings in cardiovascular prevention has to consider low trust in existing evidence. Further prospective studies on this topic have to focus on the type of foods and meals consumed during breakfast, as well as BMI mediation.

Conflict of Interest

There is no conflict of interest