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Alcohol drinking and rheumatoid arthritis risk: A systematic review and dose-response meta- analysis of prospective cohort studies

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Alcohol has been suggested as a potential inhibitor of the immune system[(1)]. Observational studies indicate that moderate alcohol consumption may reduce the risk of rheumatoid arthritis (RA)[(2)]. However, evidence on the association between alcohol consumption and RA remain inconsistent and no systematic assessment has been done on this topic in recent years. The aim of this study was to conduct a systematic review and meta- analysis to examine the associations between alcohol consumption and the risk of RA.

The Medline, Embase, Web of Science, and the Cochrane Library databases were systematically searched for cohort studies of diet and risk of RA. Random effects models were used to calculate pooled effect sizes and 95% confidences intervals for the highest versus lowest categories and to incorporate variation between studies. Linear and non-linear dose-response analyses were undertaken to evaluate the dose-response relations between alcohol intake and RA risk.

Linear dose-response meta-analysis was conducted using the method described by Greenland and Longnecker[(3)]. Potential non-linear dose-response relation was evaluated using restricted cubic splines with 3 knots at 5%, 50%, and 95% of the distribution of the exposure. Subgroup analysis were presented to examine possible sources of heterogeneity. Publication bias was examined by visual inspection of funnel plots as well as Egger's tests.

Ten studies were included, which together involved 1,030,578 participants and 8,308 incident cases of RA. We found that total alcohol consumption was inversely associated with the risk of RA, and from 9 studies for total alcohol consumption, the pooled RR with high v low comparison was 0.76 (95% CI: 0.69, 0.85; $I^2 = 50.1\%$). Inverse associations were also found for total alcohol and beer (n = 3) in linear dose-response analysis (RR for each 16 grams total alcohol per week: 0.96; 95% CI: 0.94, 0.97; $I^2 = 33\%$; n = 10; RR for each pint of beer per week: 0.90; 95% CI: 0.84, 0.97; $I^2 = 0\%$). Nonlinear relationships were observed for consumption of total alcohol and beer (all *P*-nonlinearity < 0.05). No effect on risk of RA was seen for consumption of wine or spirits. Stratification of available data revealed that the observed reductions in RA risk was absent in studies with participants <50 years old or sample populations from Asian regions.

Our findings suggest that low or moderate alcohol consumption especially beer intake, may be associated with a lower risk of RA. However, further studies are needed to confirm the causality and explore the role of alcohol intake in prevention of RA.

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