25TH NATIONAL & 11TH INTERNATIONAL ANNUAL CONGRESS
ON RESEARCH AND TECHNOLOGY OF IRANIAN MEDICAL SCIENCES STUDENTS
URMIA UNIVERSITY OF MEDICAL SCIENCES, URMIA, IRAN

Coffee Consumption and Risk of Multiple Sclerosis: A Systematic Review and Meta-Analysis

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Citation:
Amirnia M, Raeisnia K, Ashayeri H, Hakimzadeh Z, Nasiri E, Talebi M, Sanaie S, Naseri A. Coffee Consumption and Risk of Multiple Sclerosis: A Systematic Review and Meta-Analysis. *Iranian biomedical journal*. Supplementary (12-2024): 309.

ABSTRACT

Introduction: Multiple sclerosis (MS) is an immune-mediated disease with several etiological origins. Caffeine is an adenosine receptor antagonist in the central nervous and immune systems. Due to the pharmacologic properties of caffeine, it has neuroprotective and anti-inflammatory features. These propose a potential influence on MS risk, but the studies investigating the effect of coffee on MS development show conflicting results. This study aimed to assess existing clinical evidence on the association between caffeine consumption and the risk of MS.

Search Strategy: A comprehensive search was conducted in databases, including PubMed, Scopus, Web of Science, and Embase, to cover all articles published up to January 2024 using the following strategy for PubMed: ("Coffee" [Mesh] OR "Caffeine" [Mesh] OR Coffee OR Caffeine OR Vivarin OR Caffedrine OR Coffeinum) AND ("Multiple Sclerosis" [Mesh] OR "Multiple sclerosis"). No restriction on search date, language, or country of origin was applied during the search. Also, the reference lists and citations of the included studies and related review articles were checked.

Results: Among 604 initial records, 10 studies (eight case-control studies, one cohort, and one Mendelian randomized study) with 19,430 participants met the inclusion criteria. The included case-control studies showed an overall high quality (4 scored 100% and 4 scored 90%). Our meta-analysis showed reduced MS development in coffee consumers (OR: 0.66). The protective effects of coffee were also higher in the groups consuming at least three cups daily compared to those consuming less than three cups (OR: 0.83).

Conclusion and Discussion: The current evidence on the impact of caffeine on MS risk is inconclusive, with studies showing both protective and neutral effects. Coffee consumption, especially in high doses, may decrease the risk of MS; however, the variability in outcomes highlights the influence of study design, demographic factors, and methodological approaches in assessing dietary impacts on disease incidence. Further well-designed prospective studies are required to clarify the role of caffeine in MS pathophysiology and to explore potential protective or predisposing effects on its incidence.

Keywords: Coffee, Multiple sclerosis, Systematic review

[DOI: 10.61186/ibj.25th-11th-IACRTIMSS]