INPLASY

Exploring the Therapeutic Potential of Phytochemicals in Autoimmune Diseases: A Systematic Literature Review

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ADMINISTRATIVE INFORMATION

INTRODUCTION

$\mathcal{R}$eview question / Objective Following the PICO framework for this Research.
1. Population (P): Individuals diagnosed with any autoimmune disease (e.g., rheumatoid arthritis, multiple sclerosis, lupus, etc.).

2. Intervention (I): Administration of phytochemicals (e.g., curcumin, resveratrol, quercetin, etc.), either alone or in combination with conventional treatments.

3. Comparison (C): Placebo, no treatment, or conventional treatments alone.

4. Outcomes (O): Primary outcomes include disease activity scores, inflammatory markers, and quality of life. Secondary outcomes include adverse effects and patient-reported outcomes.

Study Types: Randomized controlled trials (RCTs), Clinical trials (CTs), cohort studies, case-control studies, and observational studies.

Research question
1. What are the effects of phytochemicals on improving the quality of life in individuals with autoimmune diseases?
2. What is the safety profile of phytochemicals used in the management of autoimmune diseases?

Objectives:
• To evaluate the efficacy of phytochemicals in the treatment of autoimmune diseases.
• To compare the effectiveness of phytochemicals with conventional treatments in managing symptoms and disease progression in autoimmune diseases.

• To assess the safety profile of phytochemicals used in autoimmune disease management.

Rationale Autoimmune diseases involve an abnormal immune response against self-antigens, resulting in chronic inflammation and tissue damage. Conventional treatments often rely on immunosuppressive drugs, which can have significant side effects. Phytochemicals, which are bioactive compounds found in plants, have shown promise in modulating immune responses and reducing inflammation, suggesting their potential as alternative or adjunctive therapies for autoimmune diseases. This systematic review aims to synthesize current evidence on the therapeutic potential of phytochemicals in autoimmune diseases.

Condition being studied Autoimmune disease conditions in humans and animal models.

METHODS

Search strategy A comprehensive search strategy will be developed for each database, using a combination of Medical Subject Headings (MeSH) terms and keywords related to autoimmune diseases and phytochemicals along with Boolean operators.
An example of search strategy for PubMed is provided:

(("Autoimmune Diseases" OR "autoimmune disease" OR "rheumatoid arthritis" OR "multiple sclerosis" OR "lupus" OR "autoimmune" AND ("Phytochemicals" OR "phytochemical*" OR "curcumin" OR "resveratrol" OR "quercetin" OR "plant extract*" AND ("therapeutic use" OR "therapeutic potential" OR "treatment" OR "therapy" OR "efficacy")).

Participant or population Patient, Participant, or population Individuals diagnosed with any autoimmune disease (e.g., rheumatoid arthritis, multiple sclerosis, lupus, etc.).

Intervention Administration of phytochemicals (e.g., curcumin, resveratrol, quercetin, etc.), either alone or in combination with conventional treatments.

Comparator Placebo, no treatment, or conventional treatments alone.

Study designs to be included Randomized controlled trials (RCTs), Clinical trials (CTs), cohort studies, case-control studies, and observational studies.

Eligibility criteria Inclusion criteria:
a. The review only considers Randomized controlled trials (RCTs), Clinical trials (CTs), cohort studies, case-control studies, and observational studies.
b. Studies published between 2013 to 2023 are only included.
c. Only fully open-access studies are included.
d. Studies that have a detailed and scientific methodology for the therapeutic potential of phytochemicals

Exclusion criteria:
a. Studies published in languages other than English are not considered.
b. Studies that don't have a clear definition of the AID studied.
c. Conference presentations are excluded.

Information sources PubMed, Web of Science, and the Cochrane Central Register of Controlled Trials (CENTRAL). Other Sources: Reference lists of included studies and grey literature sources (e.g., clinical trial registries).

Main outcome(s) Conventional treatments often rely on immunosuppressive drugs, which can have significant side effects. Phytochemicals, which are bioactive compounds found in plants, have shown promise in modulating immune responses and reducing inflammation, suggesting their potential as alternative or adjunctive therapies for autoimmune diseases.
This review will provide a systematic qualitative summary of all available literature and published studies per the protocol.
Main outcomes:
1. Finding the therapeutic potential of different phytochemicals against auto-immune diseases.
2. List the phytochemical compounds and their mechanisms of action if possible.
3. The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach will be used to assess the overall quality of evidence for each outcome.

Quality assessment / Risk of bias analysis The risk of bias will be assessed using the Cochrane Risk of Bias tool for RCTs and the Newcastle-Ottawa Scale for observational studies. Two reviewers will independently assess the risk of bias, and disagreements will be resolved by consensus.

Strategy of data synthesis A narrative synthesis will be conducted for all included studies. If feasible, meta-analyses will be performed using a random-effects model. Heterogeneity will be assessed using the I^2 statistic. Subgroup analyses will be conducted based on the type of autoimmune disease and type of phytochemical.

Subgroup analysis 1. Subgroup Analysis Plan
A. Type of Autoimmune Disease:
Rheumatoid arthritis
Multiple sclerosis
Lupus
Other autoimmune diseases (e.g., psoriasis, inflammatory bowel disease, Sjogren's syndrome, etc.)
B. Type of Phytochemical:
Curcumin
Resveratrol
Quercetin
Other phytochemicals (e.g., flavonoids, polyphenols, plant extracts, etc.)
C. Form of Phytochemical Administration:
Oral supplements
Topical applications
Intravenous administration
Dietary sources.

Sensitivity analysis Forest plots will be used for sensitivity analysis. The following methods will be implemented according to suitability to increase confidence in the overall findings of the systematic review:
Inclusion Criteria: By excluding certain studies (e.g., those with a high risk of bias, low-quality studies, or studies with outliers) and comparing the results to the overall
analysis.
Study Designs: Including only certain types of studies (e.g., only randomized controlled trials or only observational studies) and comparing the results. Leave-One-Out Analysis: Systematically excluding one study at a time to see how each study affects the overall results.
Statistical Methods: Using different statistical models (e.g., fixed-effects vs. random-effects models) to check the robustness of the findings.
Effect Measures: Comparing the results using different effect measures (e.g., risk ratios, odds ratios, mean
differences).
Forest plots will be used for both the original and sensitivity analysis results to visually assess the robustness and reliability of the findings.

Language restriction Review is limited to works that have been published in English or that are fully available in English.

Country(ies) involved India.

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