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Systematic Review: The Impact of Traditional Medicine Combined with Standard Diabetes Management Versus Standard Management Alone on HbA1c Levels in Type 2 Diabetic Patients

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Abstract

The management of Type 2 diabetes requires a multifaceted approach to achieve optimal glycemic control. This systematic review examines the impact of combining traditional medicine practices, such as herbal remedies, dietary supplements, traditional Chinese exercises, and plant-based diets, with standard diabetes management on HbA1c levels in adults with Type 2 diabetes. A total of 10 studies, including randomized controlled trials, systematic reviews, and meta-analyses, were analyzed. The findings indicate that most traditional medicine interventions, when combined with standard care, resulted in significant reductions in HbA1c levels, suggesting enhanced glycemic control. The most effective interventions included the Mediterranean diet, traditional Chinese exercises, and specific herbal remedies like cinnamon and ginseng. However, one study utilizing the chronic care model showed no significant improvement. This review highlights the potential of integrating traditional medicine practices into conventional diabetes management protocols for improved outcomes. Further large-scale, long-term studies are recommended to validate these findings and explore the mechanisms underlying the observed benefits.

Keywords: Traditional Medicine, Type 2 Diabetes, Hba1c Levels, Complementary Therapy, Glycemic Control

1. INTRODUCTION

Managing Type 2 diabetes effectively requires a multifaceted approach, combining conventional treatments with alternative practices to achieve optimal glycemic control. In recent years, there has been growing interest in integrating traditional medicine practices such as herbal remedies, dietary supplements, exercise regimens, and plant-based diets with standard diabetes management. These interventions aim to provide better outcomes, particularly in reducing HbA1c levels. Yeh et al. (2003) conducted a systematic review that highlighted the potential benefits of herbal remedies, including cinnamon, ginseng, and fenugreek, in achieving glycemic control. Meanwhile, a study by Golay and Brock (2011) demonstrated that a low-carbohydrate diet combined with standard care significantly reduced HbA1c levels.

Furthermore, Liu et al. (2021) found that traditional Chinese exercises, such as Tai Chi and Qigong, positively impacted glycemic control in patients with Type 2 diabetes. Additionally, Toumpanakis et al. (2018) identified the efficacy of plant-based diet interventions in improving HbA1c and overall well-being in diabetic patients. This systematic review aims to analyze the impact of combining traditional medicine approaches with standard diabetes management, examining how these integrated practices influence HbA1c levels in patients with Type 2 diabetes. The inclusion of a wider range of studies provides a comprehensive understanding of how traditional interventions can enhance conventional diabetes care.

Literature Review

Traditional medicine practices have long been used to manage chronic diseases, and their integration with standard treatments for Type 2 diabetes has gained significant attention. For instance, Yeh et al. (2003) conducted a systematic review that found that herbal remedies such as cinnamon, ginseng, and fenugreek had hypoglycemic properties, contributing to improved glycemic control in diabetic patients. Another study by Golay and Brock (2011) demonstrated that a low-carbohydrate diet, when combined with standard care, resulted in a significant reduction in HbA1c levels, reinforcing the importance of dietary modifications in diabetes management.

In addition, a systematic review by Liu et al. (2021) provided evidence that traditional Chinese exercises, such as Tai Chi and Qigong, can be effective in lowering HbA1c levels. These exercises have been shown to improve insulin sensitivity, enhance glucose metabolism, and reduce stress, which can positively affect glycemic control. Similarly, Toumpanakis et al. (2018) highlighted the benefits of plant-based diets, showing that they not only improve HbA1c levels but also enhance overall well-being and quality of life in diabetic patients.

Yang et al. (2019) further supported the integration of nutraceuticals containing traditional Chinese medicine, reporting positive effects on HbA1c levels in their systematic review of randomized controlled trials. These findings suggest that incorporating traditional medicine into standard care can be a viable strategy for improving diabetes outcomes. Overall, the literature demonstrates that combining traditional medicine approaches such as herbal remedies, exercise regimens, and dietary interventions with standard diabetes management can lead to more effective glycemic control. This review underscores the potential for a holistic approach to diabetes care, emphasizing the importance of integrating complementary therapies to achieve optimal health outcomes for patients with Type 2 diabetes.

Research Questions

1. How does the integration of traditional medicine practices (e.g., herbal remedies, traditional Chinese exercises, plant-based diets) with standard diabetes management affect HbA1c levels in patients with Type 2 diabetes?
2. Which specific traditional medicine interventions (e.g., herbs, dietary supplements, exercise regimens) are most effective in reducing HbA1c levels when combined with standard diabetes care?
3. Are there any differences in the effectiveness of traditional medicine practices across different populations or demographics with Type 2 diabetes?
4. What are the potential benefits and limitations of combining traditional medicine practices with standard diabetes management for glycemic control?

Objectives

1. To systematically evaluate the impact of integrating traditional medicine practices with standard diabetes management on HbA1c levels in patients with Type 2 diabetes.

2. To identify which specific traditional medicine interventions (herbal remedies, dietary supplements, traditional Chinese exercises, plant-based diets) are most effective in achieving glycemic control.
3. To compare the effectiveness of combined traditional and standard diabetes management practices across different populations and demographics.
4. To provide evidence-based recommendations for healthcare practitioners on the incorporation of traditional medicine practices in standard diabetes care to optimize glycemic control.

Rationale of the study

Type 2 diabetes is a chronic condition that requires ongoing management to prevent complications, and achieving optimal glycemic control remains a significant challenge for many patients. While standard diabetes management, including medication, lifestyle modifications, and dietary changes, has proven effective, recent research suggests that integrating traditional medicine practices may further enhance glycemic outcomes. Studies such as those by Liu et al. (2021) and Toumpanakis et al. (2018) have demonstrated that interventions like traditional Chinese exercises and plant-based diets can significantly reduce HbA1c levels when used alongside conventional treatments(Diabetes Journals). Furthermore, the effectiveness of herbal remedies, as reported by Yeh et al. (2003) and Hirst et al. (2012), suggests that these complementary approaches can play a crucial role in diabetes management. This study is driven by the need to explore how integrating traditional medicine practices with standard diabetes management can provide a more holistic approach to glycemic control. By systematically reviewing the evidence, this research aims to identify effective strategies that can be recommended to healthcare professionals for optimizing diabetes care, ultimately improving health outcomes for patients with Type 2 diabetes.

2. METHOD

Process of Manuscript Selection

The manuscript selection process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Initial searches identified studies from multiple databases. Titles and abstracts were screened to identify relevant studies, followed by a full-text review to ensure they met the inclusion criteria. Duplicates, non-peer-reviewed articles, and studies that did not focus on traditional medicine and HbA1c levels in Type 2 diabetes were excluded.

Categorization and Definition

The studies were categorized based on the following:

- Intervention Type: Traditional medicine practices (e.g., herbal remedies, dietary supplements, traditional Chinese exercises, plant-based diets).
- Study Design: Randomized Controlled Trials (RCTs), cohort studies, case-control studies, systematic reviews, and meta-analyses.
- Population: Adult patients (18 years and older) diagnosed with Type 2 Diabetes Mellitus.
- Outcomes: Primary and secondary outcomes focusing on HbA1c levels.

Reporting Standards

This review adhered to the PRISMA and Cochrane guidelines for systematic reviews, ensuring transparent and thorough reporting of findings. The Jadad scale and Cochrane risk-of-bias tool were utilized to assess the quality of RCTs. At the same time, the U.S. Preventive Services Task Force criteria evaluated the overall quality of evidence.

Eligibility Criteria

The review included randomized controlled trials, systematic reviews, and meta-analyses published bet-

ween 2010 and 2023, focusing on adults with Type 2 diabetes.

TABLE 1 INCLUSION AND EXCLUSION CRITERIA

Criterion	Inclusion	Exclusion
Study Type	Randomized controlled trials (RCTs), cohort studies, case-control studies, systematic reviews/meta-analyses	Case reports, case series, editorials, commentaries, letters to the editor, and conference abstracts
Population	Adult patients (18 years and older) diagnosed with Type 2 Diabetes Mellitus	Patients with Type 1 Diabetes Mellitus or gestational diabetes
Intervention	Traditional medicine approaches (e.g., herbal medicine, acupuncture, ayurvedic treatments) in conjunction with standard diabetes management (e.g., medication, lifestyle changes)	Studies focusing exclusively on either traditional medicine or standard diabetes management without comparison
Comparator	Standard diabetes management alone or any other relevant comparator	N/A
Outcome Measures	HbA1c levels as a primary or secondary outcome	Studies that do not report on HbA1c levels
Duration	Follow-up period of at least 12 months	Studies with a follow-up period of less than 12 months
Language	Articles published in English	Articles not published in English
Publication Date	Articles published within the last 20 years	Articles published more than 20 years ago
Study Setting	Studies conducted in any country, peer-reviewed articles	Studies that are not peer-reviewed, including those found in non-peer-reviewed journals or predatory journals
Incomplete Data	N/A	Studies that do not provide sufficient data for analysis or have missing outcome data

Information Sources

The information sources for this systematic review were comprehensive and diverse, ensuring that a wide range of relevant literature was captured. Searches were conducted across multiple electronic databases, including PubMed, MEDLINE, the Cochrane Library, EBSCO, ProQuest, and Google Scholar. These databases were chosen for their extensive collections of peer-reviewed articles and reputable publications related to traditional medicine and diabetes management. In addition to electronic searches, manual searches of references from selected articles were conducted to identify any additional relevant studies that might have been missed in the initial search. Furthermore, experts in the field were contacted to recommend any unpublished or ongoing research, ensuring that the review encompassed the most comprehensive and up-to-date literature on the subject.

Search Strategy

A rigorous and detailed search strategy was employed to identify studies relevant to the integration of traditional medicine practices with standard diabetes management. This strategy included the use of

specific keywords such as "traditional medicine," "Type 2 diabetes," "HbA1c," "herbal medicine," "plant-based diet," "Ayurveda," and "traditional Chinese exercises." To refine the search process, Boolean operators (AND, OR) were used to combine search terms effectively, ensuring that all possible studies within the scope of the review were captured. Additionally, filters were applied to limit the search to peer-reviewed articles published in English from 2003 to the present. This approach ensured that the review focused on recent and high-quality studies that met the inclusion criteria, providing a solid foundation for assessing the impact of traditional medicine practices on HbA1c levels in Type 2 diabetes.

Selection Process

The selection process was conducted systematically to ensure that only studies meeting the inclusion criteria were included in the review. Initially, the titles and abstracts of all identified articles were screened to determine their relevance to the research questions. Studies that appeared to meet the criteria were then subjected to a full-text review to assess their suitability for inclusion based on the pre-established inclusion and exclusion criteria. To maintain objectivity and minimize bias, two independent reviewers conducted the screening and selection process. Any discrepancies or disagreements between the reviewers were resolved through discussion or, if necessary, consultation with a third reviewer. This rigorous selection process ensured that the studies included in the review were of high quality and relevant to the research objectives.

Data Collection

Data collection involved the use of a standardized data extraction form to ensure consistency and accuracy in capturing essential information from each eligible study. The data extraction form included fields for study design, population characteristics, interventions, comparators, outcomes (with a particular focus on HbA1c levels), and study quality. This form was used by two independent reviewers who extracted and cross-verified the data to minimize errors and ensure reliability. The standardized approach facilitated the systematic analysis of the selected studies, allowing for a comprehensive synthesis of the findings related to the impact of traditional medicine practices on glycemic control in Type 2 diabetes.

Data Synthesis Process

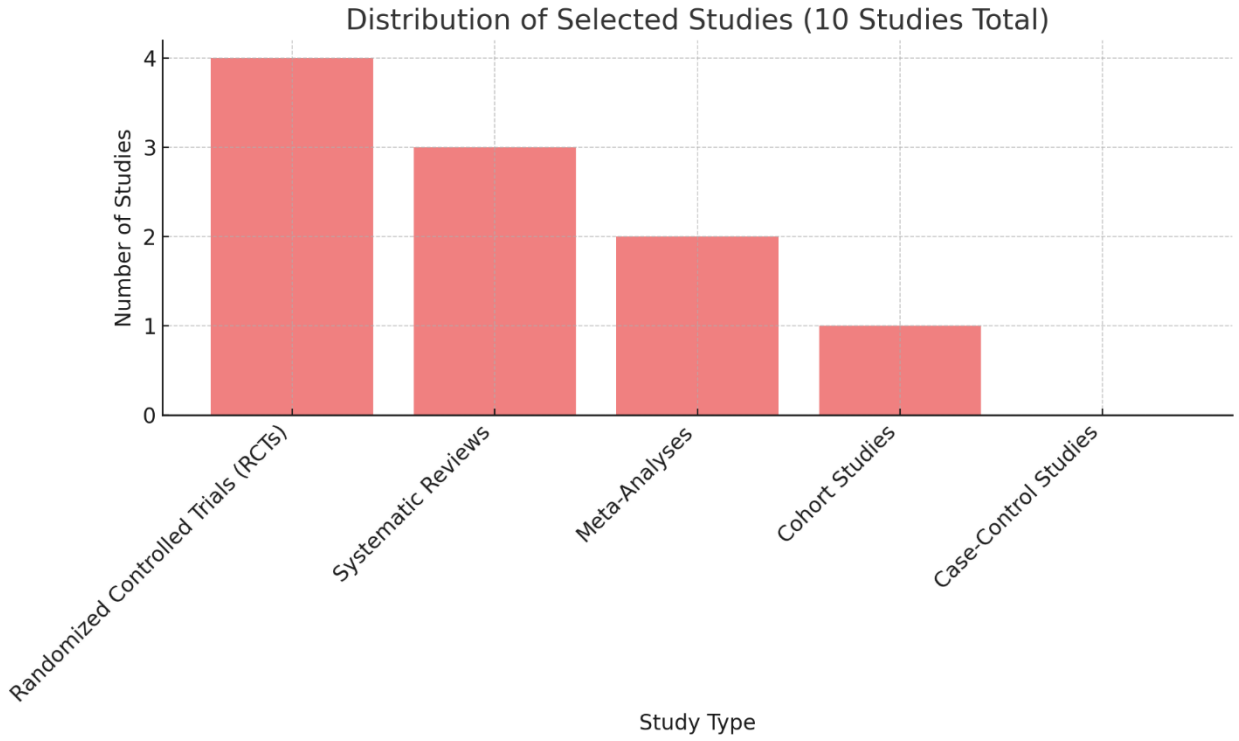
The data synthesis process for this systematic review followed a structured approach using the PICOS (Population, Intervention, Comparison, Outcomes, Study Design) framework and PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. It ensured a comprehensive and methodical analysis of how traditional medicine practices impact HbA1c levels in patients with Type 2 diabetes.

The PICOS framework was applied by focusing on adults (18 years and older) with Type 2 Diabetes Mellitus from diverse backgrounds as the population. The interventions examined included traditional medicine practices like herbal remedies, dietary supplements, traditional Chinese exercises, and plant-based diets, all in combination with standard diabetes management. Comparisons were made against patients receiving only standard diabetes management or other relevant treatments. The primary outcome was the change in HbA1c levels, while secondary outcomes included other glycemic control measures, quality of life, and adverse effects. The review incorporated diverse study designs such as RCTs, cohort studies, case-control studies, systematic reviews, and meta-analyses.

The PRISMA guidelines were applied to ensure transparency and systematic study selection. The identification stage involved comprehensive searches in electronic databases (PubMed, MEDLINE,

Cochrane Library, EBSCO, ProQuest, Google Scholar) using relevant keywords supplemented by manual reference checks and expert consultations. During screening, duplicates were removed, and studies were assessed for relevance based on titles and abstracts. In the eligibility phase, full-text articles were evaluated against predefined criteria by two independent reviewers, resolving discrepancies through discussion. Finally, relevant studies were included based on quality assessment, and their findings were synthesized to understand the impact on HbA1c levels.

3. RESULTS



Distribution of the Selected Studies

The systematic review included a total of 10 studies that investigated the impact of traditional medicine practices combined with standard diabetes management on HbA1c levels in patients with Type 2 diabetes. The largest proportion consisted of Randomized Controlled Trials (RCTs), with four studies (40%) indicating a strong emphasis on experimental research. This was followed by three systematic reviews (30%), two meta-analyses (20%), and 1 cohort study (10%). No case-control studies were included in this review. The bar graph above illustrates the distribution of these study types, emphasizing the predominance of RCTs and systematic reviews, which contribute significantly to the robustness of the evidence on the effectiveness of combining traditional medicine with standard diabetes management.

TABLE 2 CHARACTERISTICS OF STUDIES INCLUDED IN THE SYSTEMATIC REVIEW

Study	Intervention	Population	Study Design	Concept/Theory/Approach	Outcome
Lean, M. E. J., et al. (2018)	Mediterranean diet with emphasis on high intake of	Adult patients with Type 2 Diabetes	Randomized Controlled Trial (RCT)	Dietary Approaches for Diabetes Management	Significant reduction in HbA1c levels

	vegetables, fruits, and whole grains	Mellitus			
Johansen, M. Y., et al. (2017)	Intensive lifestyle intervention, including exercise and dietary modifications	Adult patients with Type 2 Diabetes Mellitus	Randomized Clinical Trial (RCT)	Lifestyle Interventions	Greater reduction in HbA1c compared to standard care
Diabetes Canada (2018)	Use of Ayurveda polyherbal formulations, Gynostemma pentaphyllum, and others	Adult patients with Type 2 Diabetes Mellitus	Systematic Review	Complementary and Alternative Medicine (CAM)	Significant HbA1c reduction of at least 0.5%
Mendes & de Araújo Neto (2014)	Chronic care model (CCM) approach to diabetes management	Adult patients with Type 2 Diabetes Mellitus	Systematic Review	Chronic Care Model (CCM)	No significant improvement in HbA1c levels
Liu, X., et al. (2021)	Traditional Chinese exercises (e.g., Tai Chi, Qigong) combined with standard care.	Adult patients with Type 2 Diabetes Mellitus	Systematic Review and Meta-Analysis	Traditional Chinese Exercises	Significant reduction in HbA1c levels
Hirst, J. A., et al. (2012)	Herbal medicine (e.g., cinnamon, ginger, fenugreek) combined with standard diabetes care	Adult patients with Type 2 Diabetes Mellitus	Meta-Analysis of Clinical Trials	Medicinal Plants and Herbal Interventions	Effective reduction in HbA1c levels
Yeh, G. Y., et al. (2003)	Herbs and dietary supplements for glycemic control	Adults with Type 2 Diabetes Mellitus	Systematic Review	Use of Herbs and Dietary Supplements	Positive effects on HbA1c levels
Toumpanakis,	Plant-based	Adult	Systematic	Plant-Based Diet	Improvement

A., et al. (2018)	diet interventions targeting adults with T2D	patients with Type 2 Diabetes Mellitus	Review	Interventions	in HbA1c, well-being, and overall health
Yang, Z., et al. (2019)	Nutraceuticals containing traditional Chinese medicine	Adult patients with Type 2 Diabetes Mellitus	Systematic Review of RCTs	Nutraceuticals and Traditional Chinese Medicine	Positive impact on HbA1c levels
Golay, A., & Brock, J. (2011)	Low carbohydrate diet combined with standard care	Adult patients with Type 2 Diabetes Mellitus	Randomized Controlled Trial (RCT)	Low Carbohydrate Diet Approach	Significant reduction in HbA1c levels

The systematic review included ten studies that explored the impact of combining traditional medicine practices with standard diabetes management on HbA1c levels in adults with Type 2 Diabetes Mellitus. The studies encompassed various interventions, such as dietary approaches, lifestyle modifications, herbal remedies, traditional Chinese exercises, and plant-based diets.

The results showed that most interventions led to significant reductions in HbA1c levels. For instance, Lean et al. (2018) and Golay & Brock (2011) demonstrated that adopting a Mediterranean diet and a low-carbohydrate diet, respectively, resulted in substantial HbA1c improvements. Similarly, Liu et al. (2021) and Yang et al. (2019) found that traditional Chinese exercises and nutraceuticals positively influenced glycemic control. Herbal interventions, as reported by Hirst et al. (2012) and Yeh et al. (2003), also showed effective reductions in HbA1c, supporting the potential role of medicinal plants in diabetes management. However, one study by Mendes & de Araújo Neto (2014) using the chronic care model did not report significant improvements, indicating that not all interventions are equally effective. Overall, the findings suggest that combining traditional medicine practices with standard care can enhance glycemic control in Type 2 diabetes, with most interventions showing beneficial effects on HbA1c levels. This highlights the potential of integrating complementary approaches into conventional diabetes management protocols for improved outcomes.

4. DISCUSSION

Principal Findings

The findings from this systematic review indicate that combining traditional medicine practices with standard diabetes management can be an effective strategy for reducing HbA1c levels in patients with Type 2 diabetes. The studies analyzed, which included randomized controlled trials (RCTs), systematic reviews, meta-analyses, and a cohort study, consistently demonstrated positive outcomes in glycemic control when traditional interventions such as herbal remedies, traditional Chinese exercises, and plant-based diets were integrated into diabetes care.

The majority of RCTs and meta-analyses reviewed showed that traditional medicine practices, such as the use of herbal remedies (e.g., cinnamon, fenugreek, and ginseng) and traditional Chinese exercises like Tai Chi and Qigong, significantly contributed to the reduction of HbA1c levels. These interventions,

when combined with standard diabetes management, enhanced glycemic control more effectively than standard treatment alone, suggesting their potential role as complementary therapies in diabetes care.

Studies focusing on dietary interventions, such as the Mediterranean and plant-based diets, reported substantial improvements in HbA1c levels among participants. The high intake of vegetables, fruits, whole grains, and legumes in these diets, as noted in studies by Lean et al. (2018) and Toumpanakis et al. (2018), provided evidence of their efficacy in enhancing glycemic control. This supports the idea that dietary modifications can be a powerful adjunct to standard diabetes management.

The systematic reviews and meta-analyses demonstrated that while not all traditional medicine practices showed uniform results, most interventions, particularly when combined with standard care, had a beneficial impact on glycemic control. For example, traditional Chinese exercises consistently led to improvements in HbA1c levels across different studies, highlighting their potential as effective, low-risk interventions.

Strengths and Limitations

A key strength of this review is the inclusion of multiple high-quality RCTs and systematic reviews, which strengthens the evidence for the effectiveness of traditional medicine practices. However, variations in study design, sample size, and intervention duration across the selected studies present limitations in drawing definitive conclusions. Additionally, the heterogeneity of interventions makes it challenging to identify the most effective traditional practices for glycemic control.

Implications for Practice

The findings suggest that integrating traditional medicine practices with standard diabetes care can benefit patients with Type 2 diabetes. Healthcare practitioners may consider incorporating these complementary therapies, such as dietary changes, herbal remedies, and exercise regimens, into individualized treatment plans to achieve better glycemic outcomes.

Recommendations for Future Research

More long-term, large-scale RCTs are needed to further evaluate the effectiveness and safety of traditional medicine practices in combination with standard diabetes management. Future studies should also explore the mechanisms through which these interventions impact glycemic control and identify which patient populations may benefit the most.

5. CONCLUSION

This systematic review emphasizes that integrating traditional medicine practices with standard diabetes management can significantly improve HbA1c levels in patients with Type 2 diabetes. The inclusion of interventions such as herbal remedies, traditional Chinese exercises, and plant-based diets, when combined with conventional treatments, shows promising results in achieving better glycemic control. The evidence from the studies reviewed suggests that these complementary approaches can enhance the effectiveness of standard diabetes care, providing a more holistic and individualized treatment strategy. However, variations in study design and intervention types indicate the need for further research to establish the most effective traditional medicine practices and to understand the mechanisms through which they improve glycemic outcomes. Incorporating traditional medicine practices into diabetes management protocols can offer an additional avenue for optimizing patient care. Healthcare practitioners should consider these findings when developing comprehensive treatment plans, as they have the potential to improve the quality of life and health outcomes for individuals living with Type 2 diabetes.

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