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EDITORIAL

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Volume 2 - Issue 2

Welcome to the latest issue of the Essentials of Frontline Medicine Journal. This volume continues our commitment to advancing research and knowledge in the critical fields of general medicine and primary healthcare.

In this issue, we present a collection of high-quality articles that address some of the most pressing health challenges facing our communities today. We are proud to feature contributions that offer new insights into a holistic approach to patient care, encompassing health promotion, health literacy, and access to care.

We extend our gratitude to the dedicated authors, reviewers, and editors who have contributed their expertise to make this issue possible. It is their tireless work that allows us to provide a platform for groundbreaking research and to foster a dialogue that will shape the future of frontline medicine. We hope this issue serves as a valuable resource for clinicians, researchers, and policymakers alike, inspiring new perspectives and actionable solutions.

As we turn the page to this new issue, we reaffirm our commitment to excellence in medical publishing and invite you to explore, share, and contribute to future volumes of Essentials of Frontline Medicine Journal (ISSN: 3062-1704).

Sincerely,

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ESSENTIALS OF FRONTLINE MEDICINE JOURNAL (ISSN: 3062-1704)

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Evaluating Research Rigor in National Ophthalmology Abstracts: Insights from a STROBE-Based Assessment

Nurcan GÜRSOY[1*], Şenay TOSUN[1] **Original Article**

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Externally Peer-Reviewed.

ABSTRACT

Objective: Congress abstracts reflect current research practices but often lack methodological transparency. In ophthalmology, the extent to which abstracts comply with standardized reporting frameworks remains unclear. To evaluate the study designs and reporting quality of oral presentation abstracts presented at the 57th National Congress of the Turkish Ophthalmology Society using an adapted STROBE checklist.

Methods: This descriptive cross-sectional study included 280 oral abstracts published in the official abstract book of the 2024 congress. Abstracts were classified by study design as observational, randomized controlled, or experimental. Reporting quality was assessed using an 11-item STROBE-based checklist. Each item was scored as 1 (present) or 0 (absent), yielding a total score out of 11. Two independent reviewers scored the abstracts. Differences between reviewers were analyzed using Student's t-test.

Results: Of the 280 abstracts, 93.6% (n=262) were observational studies, 4.6% (n=13) were experimental, and 1.8% (n=5) were randomized controlled trials. The overall mean STROBE score was 7.21 ± 0.96, with no significant difference between reviewers (p=0.430). The most frequently reported items were author contact information (S2), study objectives (S4), defined outcomes (S7), and participant numbers (S9). The least reported items were study design stated in the title (S1) and statistical methods including control for confounding (S8), indicating insufficient attention to methodological detail.

Conclusion: While the abstracts demonstrated moderate adherence to reporting standards, key elements related to study design and statistical transparency were frequently underreported. Incorporating checklists like STROBE into abstract submission processes and improving researcher training in study methodology may enhance the scientific quality of future ophthalmology congress presentations.

Keywords: STROBE, ophthalmology, congress abstracts, methodological quality, reporting standards

INTRODUCTION

Scientific congresses play a pivotal role in the dissemination of current research findings and the promotion of academic collaboration within medical disciplines (1). In particular, national ophthalmology congresses serve as critical platforms where clinicians and researchers share recent developments, discuss clinical innovations, and present new data. The abstracts presented at such congresses, especially oral presentations, offer insights into the research quality and methodological rigor upheld by the scientific community (2, 3). Although congress abstracts are generally not subjected to the same peer-review standards as full-length journal articles, they often reflect the prevailing trends in study design and reporting practices within the field (4, 5). Evaluating the methodological features of these abstracts is important not only for identifying common strengths and deficiencies but also for guiding efforts to improve research reporting and scientific communication (6-8).

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist was developed to enhance the quality and transparency of observational research (9). Although it is primarily intended for full-text manuscripts, its key items can also

be adapted to assess the clarity and comprehensiveness of congress abstracts (10). Previous studies evaluating the adherence of abstracts to established reporting guidelines have revealed substantial variability in reporting quality across disciplines and formats.

To date, no study has systematically evaluated the methodological characteristics and reporting quality of abstracts presented at the National Congress of the Turkish Ophthalmology Society using the STROBE framework. Understanding the extent to which these abstracts adhere to standardized reporting principles can inform educational initiatives, improve abstract submission guidelines, and ultimately contribute to higher research standards in the field of ophthalmology.

This study aimed to evaluate the study designs and STROBE compliance levels of oral presentation abstracts presented at the 57th National Congress of the Turkish Ophthalmology Society. By doing so, we sought to provide an evidence-based overview of the methodological strengths and areas for improvement in the reporting practices of ophthalmology researchers in Türkiye.

METHODS

Study Design

This study was designed as a descriptive cross-sectional study. The research aimed to evaluate the methodological characteristics and reporting quality of abstracts presented at the 57th National Congress of the Turkish Ophthalmology Society, which was held as an in-person scientific event. The 57th National Congress of the Turkish Ophthalmology Society was held in Antalya, Türkiye, between 8-12 November 2023 as a face-to-face scientific meeting.

Data Source and Sample

All oral presentation abstracts accepted to the 57th National Ophthalmology Congress and published in the official abstract book were included in the study. Each abstract was reviewed and categorized based on study type and methodological design.

Classification of Study Designs

Abstracts were classified into specific study types according to defined criteria given below. Observational studies, including:

Case reports: Presenting individual or series of clinical cases.
Cross-sectional studies: Describing the prevalence of a condition in a defined population.
Case-control studies: Retrospective evaluations comparing exposure in individuals with and without a specific disease.
Cohort studies: Retrospective or prospective follow-up of individuals without the disease at baseline, evaluating the presence of exposure over time.

Randomized controlled trials (RCTs): Studies describing the prospective random allocation of individuals into intervention or control groups.

Experimental studies: Studies involving laboratory-based research on animals, human tissues, or in vitro models.

In determining the study design, key terms such as “randomized,” “blind,” “survey,” “prevalence,” “placebo,” “odds ratio,” “relative risk,” and “laboratory techniques” were used to guide classification.

Quality Assessment

For all abstracts classified as observational studies, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist (2007) was used to assess reporting quality (10). This tool consists of 11 items. Each item present in the abstract was scored as “1” and each missing item as “0,” generating a total STROBE score ranging from 0 to 11. Although the original STROBE checklist consists of 22 items, an 11-item version adapted for abstracts was used in this study, as the evaluation was limited to congress abstracts. This adapted version has also been employed in previous studies assessing abstract reporting quality (11).

Two independent raters evaluated and scored the abstracts separately. The results were compared for consistency, and disagreements were resolved through discussion.

To minimize potential bias, the abstracts were anonymized prior to scoring. An independent third person who was not involved in the evaluation process removed all identifying information regarding the authors and institutions before the abstracts were delivered to the raters for scoring.

Ethical Approval

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Erzincan Binali Yıldırım University (Date: 01/08/2024, Decision No: 2024-10/08).

Statistical Analysis

Normality of the data was assessed using the Kolmogorov-Smirnov test. Descriptive statistics were presented as mean ± standard

deviation. Group comparisons were performed using Student's t-test. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 280 oral presentation abstracts were included in the study. Of these, 93.6% (n=262) were observational studies, 1.8% (n=5) were randomized controlled trials, and 4.6% (n=13) were experimental studies.

The mean STROBE checklist score was 7.21 ± 0.96 (7.23 ± 0.95 for Researcher 1 and 7.20 ± 0.97 for Researcher 2), with no statistically significant difference between the two raters (p=0.430). The comparison of the scores is presented in Table 1.

Table 1. Mean STROBE Item Scores and Inter-Rater Comparison for Each Checklist Criterion.

	Researcher 1	Researcher 2	Total	p
S1	0.05 ± 0.21	0.05 ± 0.21	0.05 ± 0.21	0.844
S2	0.98 ± 0.13	0.99 ± 0.08	0.99 ± 0.11	0.254
S3	0.09 ± 0.29	0.10 ± 0.29	0.09 ± 0.29	0.885
S4	0.99 ± 0.11	1 ± 0.06	0.99 ± 0.09	0.178
S5	0.71 ± 0.45	0.66 ± 0.47	0.68 ± 0.46	0.238
S6	0.53 ± 0.50	0.46 ± 0.50	0.49 ± 0.50	0.151
S7	0.99 ± 0.08	0.99 ± 0.08	0.99 ± 0.08	1
S8	0.04 ± 0.19	0.05 ± 0.22	0.05 ± 0.21	0.422
S9	1 ± 0.06	0.99 ± 0.11	0.99 ± 0.09	0.178
S10	0.93 ± 0.26	0.94 ± 0.23	0.93 ± 0.25	0.502
S11	0.94 ± 0.23	0.97 ± 0.17	0.96 ± 0.207	0.152
Total	7.23 ± 095	7.20 ± 0.97	7.21 ± 0.96	0.430

The highest scoring items were S2 (Contact details of the corresponding author), S4 (Specific objectives or hypotheses), S7 (Clearly define the primary outcome for this report), and S9 (Report the number of participants at the beginning and end of the study).

The lowest scoring items were S1 (Indicate the study design with a commonly used term in the title) and S8 (Describe statistical methods, including those used to control for confounding) (Figure 1).

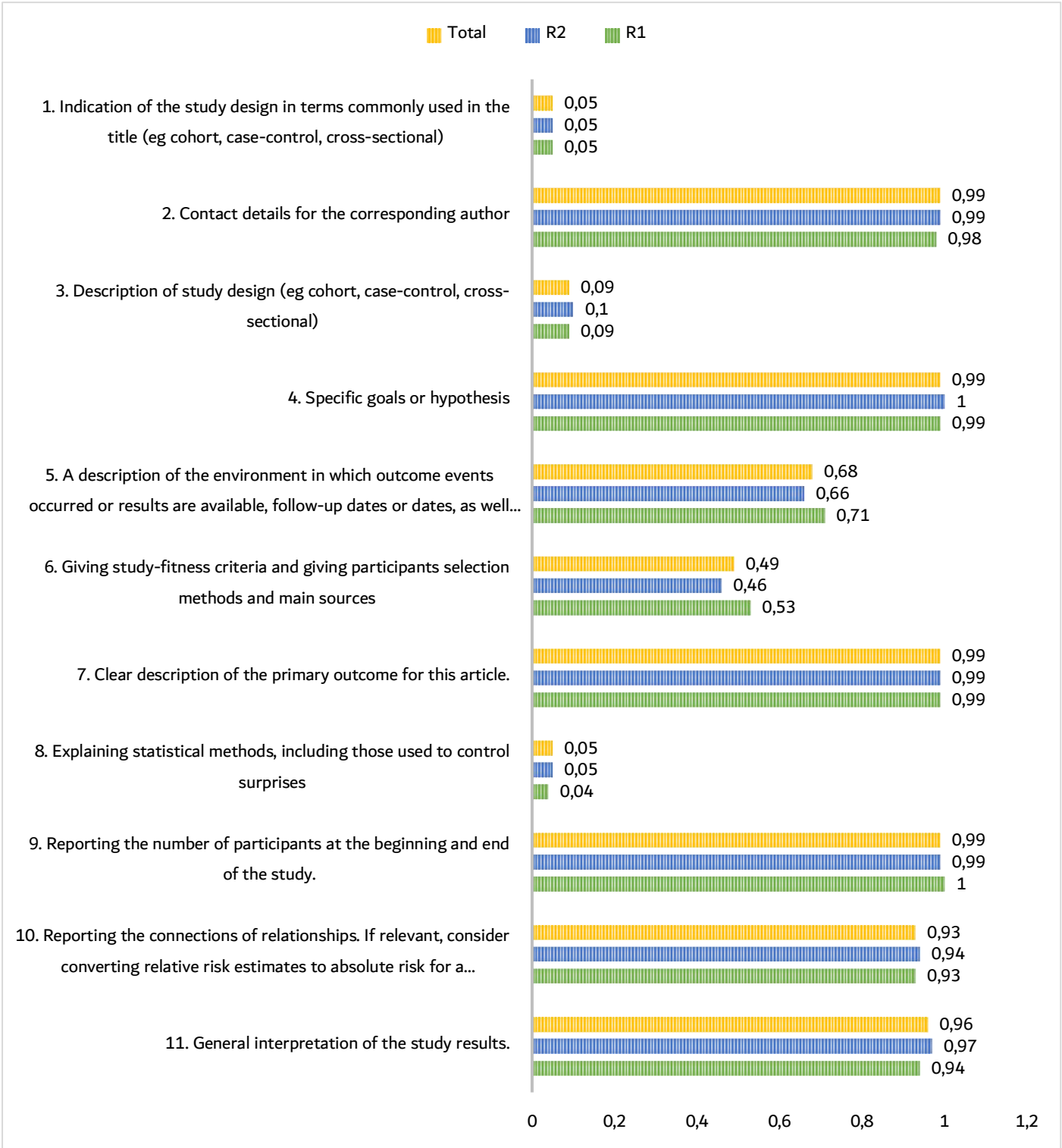

Figure 1. Item-wise STROBE Checklist Scores Assigned by Two Independent Reviewers.

DISCUSSION

This study evaluated the methodological characteristics and reporting quality of oral presentation abstracts presented at the 57th National Congress of the Turkish Ophthalmology Society using the STROBE checklist as a standardized tool. The analysis revealed that while the overall compliance with basic reporting elements was moderate, substantial deficiencies were observed in key methodological and statistical domains.

The overwhelming dominance of observational studies (93.6%) is consistent with patterns observed in other national and international congresses, where practical constraints often limit the feasibility of conducting and presenting interventional research (3,

12, 13). However, the notably low proportion of randomized controlled trials (1.8%) and experimental studies (4.6%) raises concerns about the diversity and robustness of evidence presented at ophthalmology congresses. This trend may reflect a research culture that favors descriptive or hypothesis-generating studies over hypothesis-testing designs, which are critical for advancing clinical practice (14, 15).

The mean STROBE score of 7.21 out of 11 suggests that, while many abstracts fulfilled fundamental structural expectations, important methodological components were frequently underreported (8, 11). Notably, the highest scoring item was the inclusion of the corresponding author's contact information (S2), followed by the articulation of specific objectives or hypotheses (S4), definition of primary outcomes (S7), and reporting of participant numbers (S9). It is important to note, however, that the high compliance with S2 is likely attributable to the congress abstract submission template, which mandates author contact details. Therefore, this score reflects adherence to editorial or formatting requirements rather than deliberate methodological rigor on the part of researchers.

In contrast, items such as "indicating the study design in the title" (S1) and "describing statistical methods, including those used to control for confounding" (S8) received the lowest scores. These omissions are particularly concerning, as they suggest a limited emphasis on research methodology and statistical transparency during the abstract preparation process (16, 17). Such deficiencies hinder the reader's ability to critically assess study validity and replicate findings, thereby undermining the scientific value of the presented research (6, 7). The lack of methodological detail in abstracts may be partially explained by word count limitations; however, it also points to potential gaps in training or prioritization of research design and statistical literacy among contributors (7).

The consistency between the two independent scorers (p=0.430) reinforces the objectivity of the evaluation process and supports the reliability of the scoring system. The anonymization of abstracts prior to scoring further minimized potential evaluator bias, strengthening the internal validity of the study.

These findings align with prior research evaluating the reporting quality of medical congress abstracts, which consistently highlight the need for improved methodological transparency and adherence to reporting standards (8, 18). Promoting the routine use of checklists such as STROBE—even at the abstract stage—can enhance clarity, reproducibility, and overall research quality. Furthermore, providing targeted education in study design and biostatistics for early-career researchers may help address recurring deficiencies in methodological reporting (10, 11, 19).

Limitations

This study is not without limitations. It focuses solely on one congress year (2024), and the findings may not reflect patterns observed in other years or congresses. Additionally, the analysis was limited to oral presentation abstracts and did not include poster presentations, which may exhibit different reporting trends. Finally, the assessment was based on abstract content only, which is inherently limited in detail compared to full manuscripts.

CONCLUSION

In conclusion, while the reporting quality of oral abstracts presented at the 57th National Congress of the Turkish Ophthalmology Society was moderate, key elements related to study design and statistical methodology were frequently underreported. This highlights a need for increased emphasis on research design and biostatistics during both the preparation and review of abstracts. The integration of reporting checklists like STROBE into the abstract submission process, along with structured training initiatives, may serve to improve research quality and transparency in future ophthalmology congresses.

DECLARATIONS

Ethical Consideration: This study was approved by the Non-Interventional Clinical Research Ethics Committee of Erzincan Binali Yıldırım University (Date: 01/08/2024, Decision No: 2024-10/08).

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Conflicts of Interest Statement: The authors declare no conflicts of interest related to this study.

Data Availability Statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Application of Cupping Therapy and Hirudotherapy in Family Medicine

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Externally Peer-Reviewed.

ABSTRACT

Cupping therapy (Hijama) and hirudotherapy (leech therapy) are increasingly popular Traditional and Complementary Medicine (TCM) practices in family medicine. This review focuses on their historical background, mechanisms of action, clinical indications, evidence of effectiveness, safety, and regulatory framework.

Cupping therapy, rooted in Chinese and Islamic medicine, is believed to reduce pain by increasing circulation through local suction. Systematic reviews support its efficacy in conditions like low back and neck pain.

Hirudotherapy works through bioactive substances in leech saliva that provide anticoagulant and anti-inflammatory effects. It has shown benefits in osteoarthritis and venous congestion, although adverse effects such as prolonged bleeding and infections require caution.

In Türkiye, these practices were officially regulated by the 2014 TCM Regulation, and application is restricted to certified professionals. Family physicians play a key role in patient education and appropriate referrals. However, gaps in training and inconsistent integration into family medicine practice limit their use.

In conclusion, cupping and hirudotherapy are traditional, low-cost treatment options with some clinical benefit. However, further high-quality studies are needed to confirm their efficacy and safety. Strengthening training programs, regulatory support, and evidence-based guidance is crucial for their safe and effective use. Enhancing family physicians' knowledge in this field may support safer and more informed use of these therapies in primary care.

Keywords: Complementary medicine, cupping therapy, family medicine, hirudotherapy

INTRODUCTION

Traditional and complementary medicine (TCM) practices are increasingly being integrated into modern healthcare systems, in line with the World Health Organization's (WHO) strategic framework (1). Cupping therapy (hijama) and hirudotherapy (leech therapy) are among these practices and have gained global popularity, particularly for the treatment of musculoskeletal conditions and chronic pain (2–4). In recent years, these methods have attracted growing attention in primary care, particularly in family medicine (5-7).

However, the quality and consistency of scientific evidence regarding their efficacy and safety remain variable (2, 8). In addition, challenges related to standardization, practitioner competence, and patient education persist, particularly in primary care settings (9). Given the increasing patient demand and the cultural relevance of these therapies in many communities, it is essential for family physicians to be actively engaged with TCM practices. By developing foundational knowledge, attending certified training programs, and maintaining an evidence-based perspective, family physicians can play a pivotal role in guiding safe and informed use of these therapies (10). Strengthening this role not only enhances patient trust but also promotes holistic and integrative care within the primary healthcare system.

In Türkiye, the 2014 Regulation on Traditional and Complementary Medicine Practices legally defined and standardized the use of several TCM modalities, including cupping and hirudotherapy,

creating a formal framework for certified professionals (11). This regulation has provided all licensed physicians with a formal legal pathway to practice these methods following approved certification. It represents a key step toward integrating TCM practices into mainstream medical care under controlled and safe conditions.

This review aims to provide a comprehensive overview of the historical background, physiological mechanisms of action, clinical indications, levels of evidence on efficacy, safety profiles, potential complications, as well as the legal framework in Türkiye and the role of family physicians in the context of these therapies.

CUPPING THERAPY

Historical Background

Cupping therapy is an ancient healing practice with origins traced back to at least 3000 BCE in ancient Egypt (12). It was later adopted and developed by Greek and Roman physicians such as Hippocrates and Galen. Over the centuries, cupping spread across various medical traditions, becoming an integral part of both Traditional Chinese Medicine, and Islamic medicine (12). In Islamic medical texts, particularly during the Golden Age, wet cupping, known as Hijama, was widely advocated and systematized by scholars like Avicenna (13). Traditionally and in recent times, cupping has been practised in two main forms: dry cupping, which involves suction only, and wet cupping, which involves making small incisions in the skin to remove blood (14, 15).

The primary aim of cupping therapy is to enhance local blood circulation and facilitate the elimination of toxins by creating negative pressure on the skin (15). During the Islamic Golden Age, scholars like Avicenna (Ibn Sina) referenced cupping in medical texts, further supporting its dissemination.

In Ottoman-era and early Republican Türkiye, cupping was widely practiced by folk healers and religious figures, often without formal regulation (16). Despite the absence of standardized medical oversight, the practice remained embedded in community-based healing traditions and persisted across generations (17). This long-standing cultural presence has contributed to a high level of public familiarity and acceptance. As a result, many patients today continue to express interest in cupping therapy, particularly in contexts where conventional treatments may be perceived as insufficient (17). Such sustained demand has become increasingly visible in primary care settings, where family physicians often serve as the first point of contact for patients seeking information or access to these therapies.

In modern medicine, cupping therapy is being revisited as a complementary and alternative treatment method, particularly due to its potential effects on pain modulation, circulatory support, muscle relaxation, and inflammation reduction (15, 18). Recent clinical studies have reported promising results not only in the management of musculoskeletal pain syndromes but also in conditions such as migraines, tension headaches, and some inflammatory disorders (19, 20). Emerging evidence has also suggested possible roles in enhancing local tissue perfusion and promoting general well-being, although further research is warranted (19). These developments have renewed attention among healthcare professionals, including family physicians, who are increasingly expected to provide guidance not only regarding the safety of such traditional interventions but also their clinical relevance and appropriate indications across diverse patient presentations.

Mechanism of Action and Safety Profile

Although the precise mechanisms of action of cupping therapy remain unclear, existing evidence suggests that it may enhance pain control through analgesic and relaxing effects (18). Proposed physiological mechanisms include increased endogenous opioid release, improved regional blood flow, modulation of inflammatory responses, and nitric oxide release induced by local hypoxia (15). These processes are believed to promote vasodilation and enhance microcirculation. In addition, it has been hypothesized that cupping stimulates the parasympathetic nervous system, contributing to a general sense of relaxation and stress reduction.

Clinically, cupping therapy is most frequently utilized in the management of musculoskeletal conditions such as chronic low back pain, neck pain, rheumatic disorders, and migraines (20). Beyond its analgesic effects, cupping has been associated with improvements in functional capacity and overall well-being (21). A growing number of systematic reviews and meta-analyses have demonstrated beneficial effects, particularly in chronic low back pain, where significant improvements in pain intensity and physical function have been consistently reported. Furthermore, studies exploring its use in migraine management have shown promising trends toward reduced attack frequency and intensity (22). Although current evidence in this area is still evolving, these findings highlight the potential role of cupping as a supportive intervention. Similarly, cupping therapy has been explored as a

complementary approach in inflammatory joint diseases such as osteoarthritis, with some studies reporting symptomatic relief (23). The diversity in techniques (e.g., wet vs. dry cupping), treatment parameters, and study designs may partly explain the variability in outcomes and underscores the need for further standardized research.

In terms of safety, cupping therapy is generally considered low-risk (24). Common side effects include skin bruising, itching, and transient burning (24). However, the risk of infection increases if sterile techniques are not followed. Rarely, complications such as abscess formation, anemia, and claims of toxin accumulation have been reported (24). According to the literature, these adverse events are largely preventable with proper sterilization protocols.

From a primary care perspective, it is essential that family physicians not only recognize the potential complications of cupping therapy but also engage proactively in patient education. By providing accurate information on safety protocols and therapeutic indications, physicians can help patients make informed decisions and reduce the risks associated with unsupervised or improperly conducted procedures. Furthermore, by guiding patients toward certified practitioners and evidence-informed practices, family physicians can play a pivotal role in integrating safe and effective traditional therapies into modern primary care.

HIRUDOTHERAPY

Historical Background

Hirudotherapy, or leech therapy, is a traditional bloodletting method that dates back to around 1500 BCE (25). Evidence of its use is found in ancient Egyptian tomb illustrations, and it was described by classical medical authorities such as Galen and Avicenna (Ibn Sina) as a means of restoring humoral balance within the body's systems (26).

In Türkiye, leech therapy has long been used in traditional healing practices, particularly in rural and religious settings, often administered by non-medical practitioners. This cultural familiarity contributes to continued patient interest, despite limited regulation in earlier decades. Historically, leech therapy was not only associated with folk medicine but also referenced in Ottoman medical manuscripts, indicating its widespread use across social and professional strata. The formal recognition of hirudotherapy in national health policy has encouraged its re-evaluation within the scope of evidence-based medicine and family practice. This shift has helped transition the practice from informal settings into regulated clinical environments, promoting safer and more standardized application.

Mechanism of Action, Clinical Use, and Safety

Although the use of leech therapy declined during the 20th century, it has regained clinical relevance in recent years, particularly in the context of microsurgical procedures and integrative medicine (7). The therapeutic application of medicinal leeches (e.g., Hirudo medicinalis) is primarily attributed to a complex mixture of bioactive compounds in their saliva, which possess anticoagulant, anti-inflammatory, analgesic, and vasodilatory properties (27). Among these, hirudin acts as a potent thrombin inhibitor; eglin and bdellin suppress inflammation; and vasodilators improve local blood flow. Additionally, hyaluronidase increases tissue permeability, facilitating the diffusion of these substances into surrounding tissues (27).

Each leech can extract 5–15 mL of blood during therapy, and its secretions enter the systemic circulation, thereby contributing to improved tissue perfusion and modulation of local immune responses. These effects underpin the use of hirudotherapy in a range of clinical scenarios. Commonly accepted indications include the treatment of postoperative venous congestion (especially in flap or replantation surgeries), prevention of deep vein thrombosis, management of diabetic complications and peripheral vascular diseases, and symptomatic relief in conditions such as tinnitus, migraine, and osteoarthritis (28). Among these, knee osteoarthritis has been most extensively investigated. However, challenges remain regarding optimal treatment protocols (including the number of sessions, duration, and site of leech placement) which currently limit standardization and broader adoption (25).

In terms of safety, hirudotherapy is generally well tolerated when performed under sterile conditions by trained professionals (4). Nonetheless, several adverse effects require attention. The most commonly reported risks include prolonged bleeding, allergic reactions, and infections—particularly those caused by Aeromonas species naturally present in leech saliva (4). To reduce the risk of infection, prophylactic antibiotics such as ciprofloxacin or third-generation cephalosporins are recommended. When clinical guidelines are followed, serious complications are rare.

IMPLEMENTATION AND REGULATION IN FAMILY MEDICINE

In Türkiye, TCM practices were formally recognized and standardized with the enactment of the "Regulation on Traditional

and Complementary Medicine Practices," published in the Official Gazette on October 27, 2014 (Issue No. 29158) (11). This regulation defines 15 approved TCM modalities and outlines detailed requirements for practitioner qualifications, clinical settings, equipment, and indications/contraindications.

Cupping therapy and hirudotherapy fall under this regulatory framework and are legally permitted only when performed by certified healthcare professionals who have completed Ministry of Health-approved training programs. For instance, leech therapy can be administered by physicians, pharmacists, dentists, or veterinarians, while wet cupping must be carried out in clinical environments that meet strict hygiene and medical waste disposal standards (11).

Although the regulation applies broadly to licensed practitioners, it has particular implications for family physicians, who often serve as patients' first point of contact. A June 2025 update to the legislation permits certified family physicians to provide certain TCM services, such as acupuncture and phytotherapy, outside regular working hours (28). This amendment represents a significant step toward broadening access to TCM and integrating these modalities more systematically into primary care. It also reflects a policy-level effort to support the safe, standardized, and community-level dissemination of TCM practices within the national health system.

In this context, the integration of TCM practices into primary care not only enhances patient-centered service delivery but also contributes to the broader goals of holistic and preventive medicine. As public interest in these therapies continues to grow, family physicians—whether as certified practitioners or informed advisors—will be central to guiding safe, evidence-informed choices. To this end, supporting family physicians through structured certification pathways, regionally accessible training programs, and inclusion of TCM in continuing medical education will be critical. Such measures can help bridge traditional healing practices with modern medical standards, ensuring that interventions like cupping therapy and hirudotherapy are used responsibly and effectively within the scope of family medicine.

DISCUSSION

Public interest in TCM practices such as cupping therapy and hirudotherapy has been steadily increasing. Studies show that a significant proportion of patients in primary care are aware of these therapies, yet much of their knowledge comes from informal sources like media or the internet (5, 17). A considerable number undergo these treatments in unregulated environments, raising concerns regarding safety, hygiene, and misinformation (5, 8). These patterns highlight a crucial opportunity for family physicians to provide evidence-based guidance, address misconceptions, and help patients make informed decisions.

Despite regulatory advancements and the growing prevalence of certified practitioners, gaps remain in the formal education and practical readiness of family physicians regarding TCM. While some family physicians have obtained certifications in certain modalities, many report limited knowledge, largely due to the lack of structured TCM training during medical education (9). Incorporating TCM into undergraduate curricula and continuing professional development may help bridge this gap and foster more informed, balanced clinical perspectives (1, 10).

From a clinical standpoint, cupping therapy and hirudotherapy offer promising benefits, especially for chronic pain and vascular conditions (2, 7, 18, 27, 29). Although the mechanisms—particularly for hirudotherapy—are increasingly well understood, the current evidence base is characterized by heterogeneity and methodological limitations (18, 27). Variations in treatment protocols, small sample sizes, and insufficient blinding affect the generalizability of results. Nevertheless, both therapies are generally considered safe when performed under certified, hygienic conditions, underscoring the importance of guiding patients toward regulated services.

To support safe and appropriate use of these therapies, a multi-pronged approach is essential. This includes expanding regionally accessible training programs, integrating TCM topics into national medical education strategies, and fostering interdisciplinary collaboration among physicians, researchers, and policy-makers. Such efforts can help build standardized, evidence-informed pathways for incorporating TCM into routine primary care.

CONCLUSION

Cupping therapy and hirudotherapy represent historically rooted, cost-effective therapeutic options that continue to attract attention in contemporary healthcare. Although the scientific literature demonstrates potential benefits the need for high-quality, large-scale clinical research remains critical.

In Türkiye, formal regulation of these therapies provides a valuable framework for safe implementation. Within this system, family

physicians are uniquely positioned to offer informed counseling, mitigate risks associated with unregulated use, and, when trained, provide or refer patients to appropriate care.

Moving forward, integrating TCM into family medicine will depend on strengthening physician education, standardizing practice protocols, and conducting rigorous research. Empowering primary care providers with the knowledge and tools to navigate this evolving field will be key to developing safe, effective, and culturally sensitive integrative healthcare models.

DECLARATIONS

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Targeting Autophagy in Alzheimer's Disease: The Emerging Role of Intermittent Fasting and Caloric Restriction

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ABSTRACT

Alzheimer's disease (AD), first described by Alois Alzheimer in 1906, is the most prevalent cause of dementia and a significant public health concern. As global life expectancy increases, so does the burden of AD, with no definitive cure currently available. Existing pharmacological treatments are limited by high costs and adverse side effects, highlighting the urgent need for natural, accessible, and sustainable prevention and management strategies. Among these, conscious dietary patterns are gaining prominence. Recent research suggests that dietary models that induce autophagy, such as intermittent fasting and caloric restriction, may mitigate neurodegeneration by preventing the accumulation of amyloid-beta (Aβ) and the formation of neurofibrillary tau plaques in the brain. Given the rising prevalence and chronic course of AD, family physicians and public health authorities must prioritize comprehensive patient care that extends beyond pharmacological interventions to include diet and lifestyle. This review aims to consolidate current literature on dietary strategies that support autophagy, specifically intermittent fasting and caloric restriction, to inform the management of patients with or at risk for AD. By emphasizing the role of these nutritional interventions, this review seeks to provide a framework for a more sustainable and effective approach to disease prevention and progression.

Keywords: Alzheimer's Disease, autophagy, caloric restriction, diet, intermittent fasting, neurodegenerative diseases, nutrition

INTRODUCTION

In 1906, German psychiatrist and neuropathologist Alois Alzheimer published the findings from a case study of a 51-year-old patient, Auguste Deter, who had suffered from progressive dementia characterized by severe memory loss, behavioral disturbances, and paranoia. A post-mortem microscopic examination of her brain tissue revealed significant pathological changes, including dense amyloid plaques and neurofibrillary tangles. Following this groundbreaking work, Alzheimer's mentor, Emil Kraepelin, formally designated this clinico-pathological condition as "Alzheimer's disease" (AD) in recognition of the discovery (1-4).

Alzheimer's disease is now recognized as the most common cause of dementia, yet its pathogenesis remains incompletely understood. It is a neurodegenerative disorder classified within the group of proteopathies, primarily characterized by the accumulation of abnormally folded amyloid-beta (Aβ) protein in the brain (5, 6). Beyond Aβ deposits, AD is associated with a range of characteristic histopathological, molecular, and biochemical abnormalities. These include widespread neuronal loss, neurofibrillary tangles, dystrophic neurites, increased activation of pro-death signaling pathways, impaired energy metabolism, mitochondrial dysfunction, chronic oxidative stress, and DNA damage (7).

Many of these core abnormalities reflect the effects of brain insulin resistance and insulin deficiency, with the resulting biochemical consequences resembling those of type 1 and type 2 diabetes. This pivotal role of insulin resistance and impaired glucose metabolism has led some recent research to propose a reclassification of AD as "type 3 diabetes" (8, 9).

As a progressive neurodegenerative disorder, AD currently has no definitive cure, and existing treatments are limited by various side effects (10). Consequently, there is an increasing emphasis on nutritional strategies that can support autophagy, a crucial cellular process for waste clearance. Natural dietary approaches, such as

intermittent fasting and caloric restriction, are thought to slow the course of the disease and improve quality of life by exerting beneficial effects on metabolic balance and cellular waste removal (11, 12).

The objective of this review is to bridge the gap between preclinical research and clinical practice by consolidating the evidence on how dietary patterns, such as intermittent fasting and caloric restriction, influence the cellular mechanisms underlying AD. It was aimed to inform healthcare professionals, particularly family physicians, about the potential of these nutritional strategies to activate autophagy and thereby mitigate neurodegeneration. This review provides a practical guide for clinicians to counsel patients on dietary and lifestyle modifications as a complementary approach to current AD therapies.

METHODS

A literature review was conducted to search current evidence on the role of nutritional strategies, specifically intermittent fasting (IF) and caloric restriction (CR), in supporting autophagy within the context of Alzheimer's disease (AD). A comprehensive search was performed using major electronic databases, including PubMed and Google Scholar. The search queries combined terms related to the dietary interventions and key biological processes. Keywords included: "Alzheimer's disease," "intermittent fasting," "caloric restriction," "autophagy," "neurodegeneration," "amyloid-beta," and "tau."

To ensure the relevance and quality of the included literature, studies were selected based on the following criteria:

Inclusion Criteria: Studies published in English from peer-reviewed journals, including experimental studies on animal models and clinical trials involving human subjects, as well as review articles and case reports that discussed the relationship between CR, IF, autophagy, and AD pathophysiology.

Exclusion Criteria: Editorials, opinion pieces, and studies not directly related to the specified keywords or the central theme of the review were excluded.

The extracted data were qualitatively analyzed to identify key themes and synthesize findings on how CR and IF activate autophagy and their subsequent effects on Aβ and tau pathology, neuroinflammation, and cognitive function. The purpose of this qualitative synthesis was to provide a comprehensive overview of the current state of research and to identify areas for future investigation.

THE ROLE OF AUTOPHAGY IN ALZHEIMER'S DISEASE PATHOGENESIS

The pivotal role of cellular self-cleaning and renewal was formally recognized in 2016 when Japanese cell biologist Yoshinori Ohsumi was awarded the Nobel Prize in Physiology or Medicine for his groundbreaking work on autophagy (13). Autophagy, meaning "self-eating," is a fundamental catabolic process by which cells degrade and recycle their own components, including misfolded proteins, dysfunctional organelles, and other cellular waste products. This mechanism is critical for maintaining cellular homeostasis, regulating energy balance, and, in particular, preserving neuronal health (14).

Under normal physiological conditions, the autophagic pathway is essential for maintaining protein quality and preventing the accumulation of intracellular toxic waste. This process is broadly classified into three main subtypes:

Macroautophagy: The most well-known type, which involves the formation of a double-membraned vesicle called an autophagosome that engulfs cellular components and fuses with a lysosome for degradation.

Chaperone-Mediated Autophagy (CMA): A highly selective process that uses a specific chaperone protein to directly transport targeted proteins across the lysosomal membrane.

Mitophagy: A specialized form of autophagy that selectively clears damaged or dysfunctional mitochondria.

The integrity of these pathways is crucial for neuronal function. In neurodegenerative diseases like AD, these processes become dysfunctional, leading to the accumulation of toxic protein aggregates (Table 1).

Table 1. Types of Autophagy and Their Relationship with Alzheimer's Disease

Type of Autophagy	Definition and Mechanism	Relationship with Alzheimer's Disease
Macro autophagy	Double-membraned autophagosomes engulf cytoplasmic contents (damaged organelles, protein aggregates) and fuse with lysosomes. The contents are enzymatically degraded and recycled (15).	Plays a critical role in the clearance of amyloid beta (Aβ) and tau aggregates in AD; impairment of this process may accelerate disease progression (16).
Mitophagy	The selective degradation of damaged or dysfunctional mitochondria through their sequestration into autophagosomes and subsequent delivery to lysosomes for breakdown (17).	Essential for maintaining neuronal energy homeostasis; targeted reduction of mitochondrial dysfunction in AD may be achieved through mitophagy (18).
Chaperone-Mediated Autophagy (CMA)	Proteins containing a KFERQ-like motif are recognized by the HSC70 chaperone and the LAMP-2A receptor, which facilitates their direct translocation across the lysosomal membrane for degradation (19).	Exhibits high selectivity; involved in the degradation of pathological proteins such as tau in AD (20).

Given its critical role in cellular protein and organelle metabolism, functional impairments in autophagy are believed to contribute significantly to the progression of AD. Indeed, a growing body of evidence indicates that disruptions in the autophagic-lysosomal pathway occur in the early stages of the disease (21). While the initiation of macroautophagy may increase in the early phases of AD, defects in the subsequent lysosomal degradation stage lead to the accumulation of autophagosomes, preventing the complete clearance of misfolded proteins like Aβ and tau (22).

Studies have consistently demonstrated the importance of functional autophagy for neuronal survival. Autophagic dysfunction has been linked to the accumulation of polyubiquitinated proteins in aging neurons, a condition that predisposes to the development of neurodegenerative diseases (23). The development of Aβ pathology in the brain, for instance, is associated with synaptic dysfunction, which is linked to decreased mitochondrial function and impaired autophagy (24). A recent experimental study further demonstrated that synaptic autophagy is crucial for maintaining protein homeostasis and that its reduction disrupts normal cognitive function. This work proposed that impaired autophagic activity may directly contribute to the cognitive decline seen in AD (25).

The close relationship between autophagy and AD pathology has led to the proposal that autophagy activation is a promising therapeutic strategy for the disease. Investigating cellular pathways that can enhance both autophagy and lysosomal proteolytic activity in neurons is therefore of paramount importance for developing effective treatments for AD (16).

NUTRITIONAL INDUCTION OF AUTOPHAGY: THE ROLES OF CALORIC RESTRICTION AND INTERMITTENT FASTING

The lack of definitive treatments for a range of neurodegenerative diseases, including AD, Parkinson's disease, and multiple sclerosis, has directed recent research toward the therapeutic potential of daily dietary habits (26). The role of nutritional interventions, particularly caloric restriction (CR) and intermittent fasting (IF), has gained prominence as a means to address the rising prevalence of these conditions (27). Both CR and IF are recognized as potent dietary strategies for inducing autophagy, a process that is closely linked to the pathogenesis and progression of AD.

Caloric Restriction

Caloric restriction is a dietary approach that involves a consistent reduction in caloric intake without compromising the consumption of essential nutrients. It is widely considered the gold standard for delaying aging and extending a healthy lifespan (29, 30). The therapeutic use of CR and other forms of reduced food intake dates back to ancient times, particularly in the management of epilepsy (31, 32).

Recent studies on the effects of CR on AD have provided valuable insights. Experimental and clinical research demonstrate that CR can modulate insulin signaling pathways, enhance the production of antioxidant and anti-apoptotic proteins, promote DNA repair,

increase histone deacetylase activity, and reduce amyloid-beta (Aβ) plaque accumulation (33). Animal models have further shown that long-term CR can inhibit the development of AD by gradually altering the gut microbiota, leading to the depletion of microbes that trigger Aβ plaque formation (34).

In a prospective clinical study of healthy elderly individuals, a three-month period of 30% CR resulted in a 20% improvement in verbal memory performance. This cognitive enhancement was strongly correlated with significant reductions in insulin and high-sensitivity C-reactive protein (CRP) levels, suggesting that the benefits of CR are mediated through improved insulin sensitivity and reduced inflammation (35). Furthermore, a randomized controlled trial in obese postmenopausal women on a 12-week low-calorie diet demonstrated improvements in recognition memory, an increase in gray matter volume in the inferior frontal gyrus and hippocampus, and enhanced hippocampal functional connectivity. These findings indicate that CR may represent a viable dietary strategy to slow AD progression, particularly during the active weight loss phase (36).

Intermittent Fasting

Intermittent fasting, characterized by extended periods of food abstinence, induces an energy deficit that activates cellular stress response mechanisms, including autophagy (37, 38). This mechanism is believed to slow the progression of AD and other neurodegenerative diseases by reducing neuroinflammation, improving insulin resistance, regulating the gut microbiota, and clearing pathological protein aggregates like Aβ and tau (37).

In animal models, fasting regimens have been shown to improve AD-related processes and functional outcomes, protect cells from DNA damage, and promote the apoptosis of damaged cells (39). A key study suggested that intermittent fasting provides a simple, safe, and inexpensive method to promote a therapeutic neuronal response by inducing neuronal autophagy (40).

A recent study showed that a 30-day period of intermittent fasting from dawn to dusk modulated protective serum proteins against cancer, metabolic syndrome, and AD in healthy individuals, independent of caloric restriction or weight loss. This regimen also activated key regulatory proteins involved in DNA repair, circadian rhythm, immune function, and cognitive processes, underscoring its potential as a protective and therapeutic strategy (41).

Moreover, in a 36-month prospective study of elderly individuals with mild cognitive impairment, those who regularly practiced intermittent fasting had a significantly higher rate of successful aging without cognitive decline (24.3%) compared to those who did not. This group also exhibited reductions in oxidative stress and inflammatory markers and improved metabolic parameters, further supporting the beneficial role of IF on cognitive health and AD prevention (42).

LIMITATIONS

This review, while providing a valuable synthesis of the current literature, is subject to several limitations. First, the included studies exhibit significant heterogeneity in their methodologies. Animal studies vary widely in species, models of AD, and dietary protocols (e.g., fasting duration, caloric reduction percentage). Similarly, human clinical trials differ in sample size, dietary regimens, and patient populations, which complicates a direct comparison of their findings.

Second, many of the promising findings on the effects of CR and IF on autophagy and AD pathology are derived from preclinical animal models. While these studies provide mechanistic insights, their results may not be directly translatable to human subjects due to differences in metabolism, genetics, and disease progression.

Finally, the reviewed literature includes both randomized controlled trials and observational studies. This variability in study design, particularly the lack of large-scale, long-term clinical trials on nutritional interventions for AD, presents a significant limitation. It makes it challenging to definitively establish the long-term efficacy and clinical feasibility of CR and IF as standard therapeutic strategies for AD patients. These limitations highlight the need for future research to focus on standardized, large-scale, and long-term human clinical trials to validate the promising findings from preclinical studies.

CONCLUSION

Alzheimer's disease (AD) is a major public health concern, characterized by its increasing global prevalence and irreversible neurodegenerative progression. The evidence reviewed here indicates that beyond pharmacological interventions, conscious dietary and lifestyle modifications can play a pivotal role in managing the disease. Specifically, autophagy induced by intermittent fasting and caloric restriction contributes to the clearance of abnormal protein aggregates, preserves mitochondrial function, and reduces neuroinflammation, thereby offering a potential protective and disease-slowing effect in AD pathophysiology.

Family physicians, as primary healthcare providers, are uniquely positioned to integrate these nutritional and lifestyle modifications into the long-term management of patients. Incorporating these approaches into the treatment plans for individuals at risk for or diagnosed with AD promotes a more holistic and sustainable strategy alongside pharmacological therapy.

This review underscores the preventive and therapeutic potential of autophagy-activating dietary strategies in AD. It emphasizes the importance of nutrition-focused approaches from both a clinical and public health perspective. To definitively establish the efficacy and feasibility of these interventions, future research must focus on large-scale, well-designed clinical trials.

DECLARATIONS

Ethical Consideration: This study, being a comprehensive review of published literature, did not require ethical approval from an institutional review board (IRB) or equivalent ethics committee. The data analyzed were entirely sourced from publicly available, peer-reviewed articles, and did not involve direct interaction with human subjects, collection of primary data, or any form of intervention. Therefore, the principles governing research ethics, such as informed consent and protection of participant privacy, are not applicable to this study.

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Data Availability Statement: This review has searched the online literature and is included in the references.

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