



WHAT VARIABLES INFLUENCE THE RELATIONSHIP BETWEEN MENIERE'S DISEASE AND CHRONIC KIDNEY DISEASE?

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Abstract

Introduction: According to the American Hearing Research Foundation, Meniere's disease (MD), a disorder characterized by vertigo, tinnitus, and muffled hearing, roughly affects 615,000 people in the United States. While the underlying pathology of MD remains subject to debate, previous literature has demonstrated evidence that viral infections, allergies and autoimmune reactions as potential contributors to its symptomatology. Additionally, recent studies have postulated that chronic kidney disease (CKD) may negatively impact the audio-vestibular system, potentially influencing the development and progression of MD. Despite these emerging findings, there is a dearth of knowledge on the relationship between CKD and MD, particularly regarding factors that may moderate this association and how these interactions affect patients' overall health and well-being. The objective of this literature review is to examine existing evidence on the relationship between CKD and MD, identifying moderating variables and their implications for clinical practice and future research.

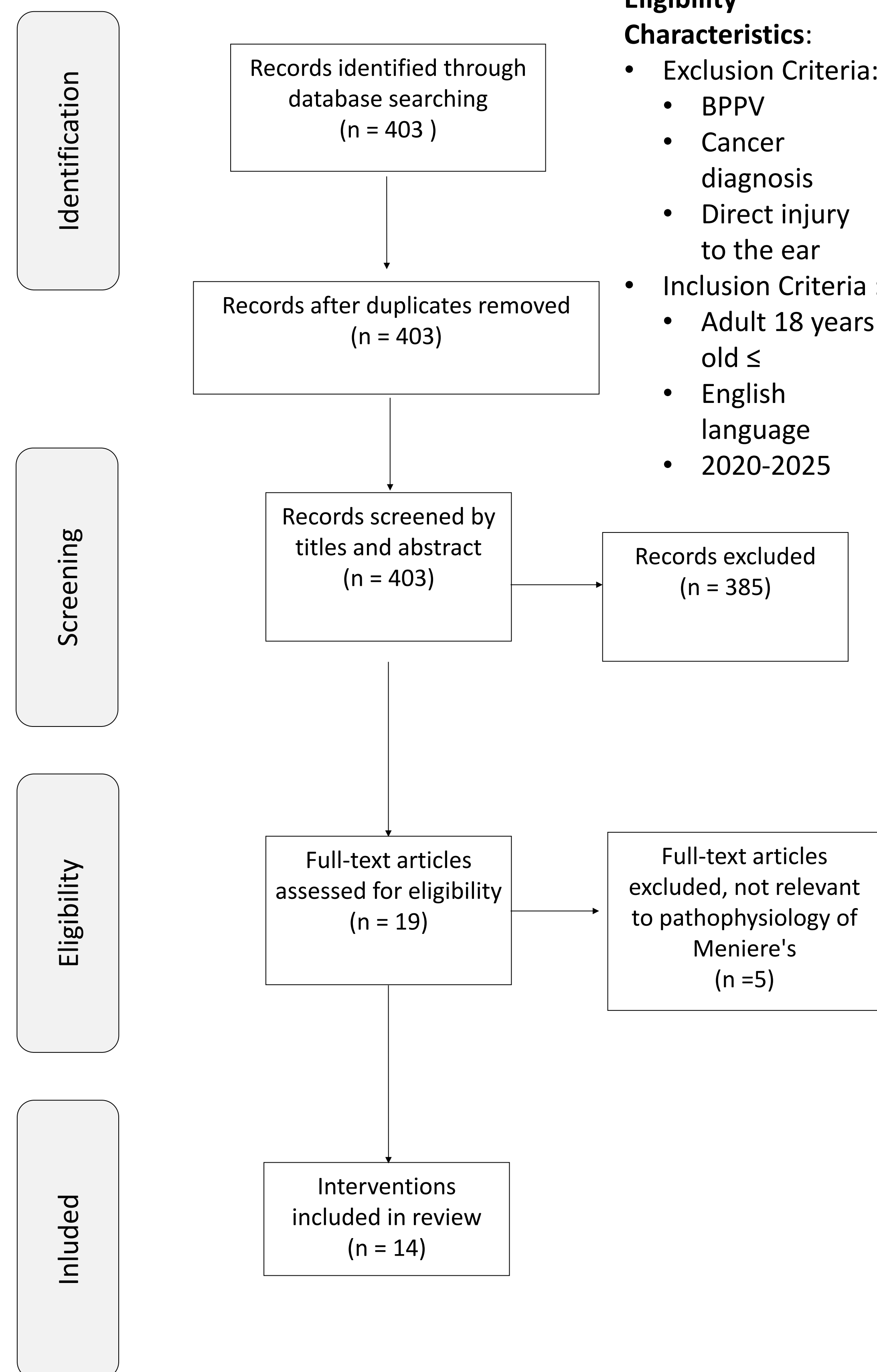
Methods: To address this gap, the research team completed a preliminary search within PubMed, EmBase, Medline, screening for CKD-related audio-vestibular dysfunction and MD pathophysiology. We identified 403 peer-reviewed articles published between 2020 and 2025 that met initial inclusion criteria (adult participants aged 19+, English-language, primary and secondary research studies). Data extraction focused on proposed biological mechanisms, demographic moderators, and clinical outcomes.

Results: Emerging evidence suggests that a multitude of variables, including oxidative stress, endolymph hydrops, electrolyte disturbances, and factors such as sex, age, dietary intake, and vitamin balance, may contribute to the progression of both MD and CKD.

Conclusion: Preliminary findings suggest the potential for future interventions and research to mitigate the negative impact of CKD on MD, including implementation of audio-vestibular and kidney screening protocols, multidisciplinary management of both the inner ear and kidney, and patient education programs highlighting symptom management of both disorders.

Methodology

Figure 1. PRISMA Diagram



Eligibility Characteristics:

- Exclusion Criteria:**
 - BPPV
 - Cancer diagnosis
 - Direct injury to the ear
- Inclusion Criteria:**
 - Adult 18 years old ≤
 - English language
 - 2020-2025

Results

Table 1: Mechanistic Links Proposed Mechanistic Links Between CKD and Meniere's Disease

	Mineral/Trace Imbalance	Oxidative Stress	Metabolic/Cardio	Vascular	Genetic/Structural	Lifestyle/Diet
Hakizimama et al., 2024	✓					
Burlutsky et al., 2024						✓
Lu et al., 2022					✓	
Peng et al., 2020					✓	
Kurioka et al., 2021	✓					
Warady et al., 2022		✓				
Zhang et al., 2025						✓
Ismail et al., 2025			✓			
Mehta et al., 2021				✓		
Osman et al., 2025	✓					
Wang, 2024	✓					
Al-Rubeann et al., 2021			✓			
Duarte et al., 2025			✓	✓		
Balatsouras, 2024		✓				

Study Characteristics

Study Design*:

- Cohort/observational
- RCT
- Systematic reviews/meta-analyses
- Experimental
- Case report
- Clinical trial
- Cross sectional study

Countries of origin*:

- Asia
- Europe
- Australia
- Africa
- Middle East
- North America
- Latin America

* Descending order of frequency

Distribution of CKD-Meniere's Disease Mechanistic Links Across Studies

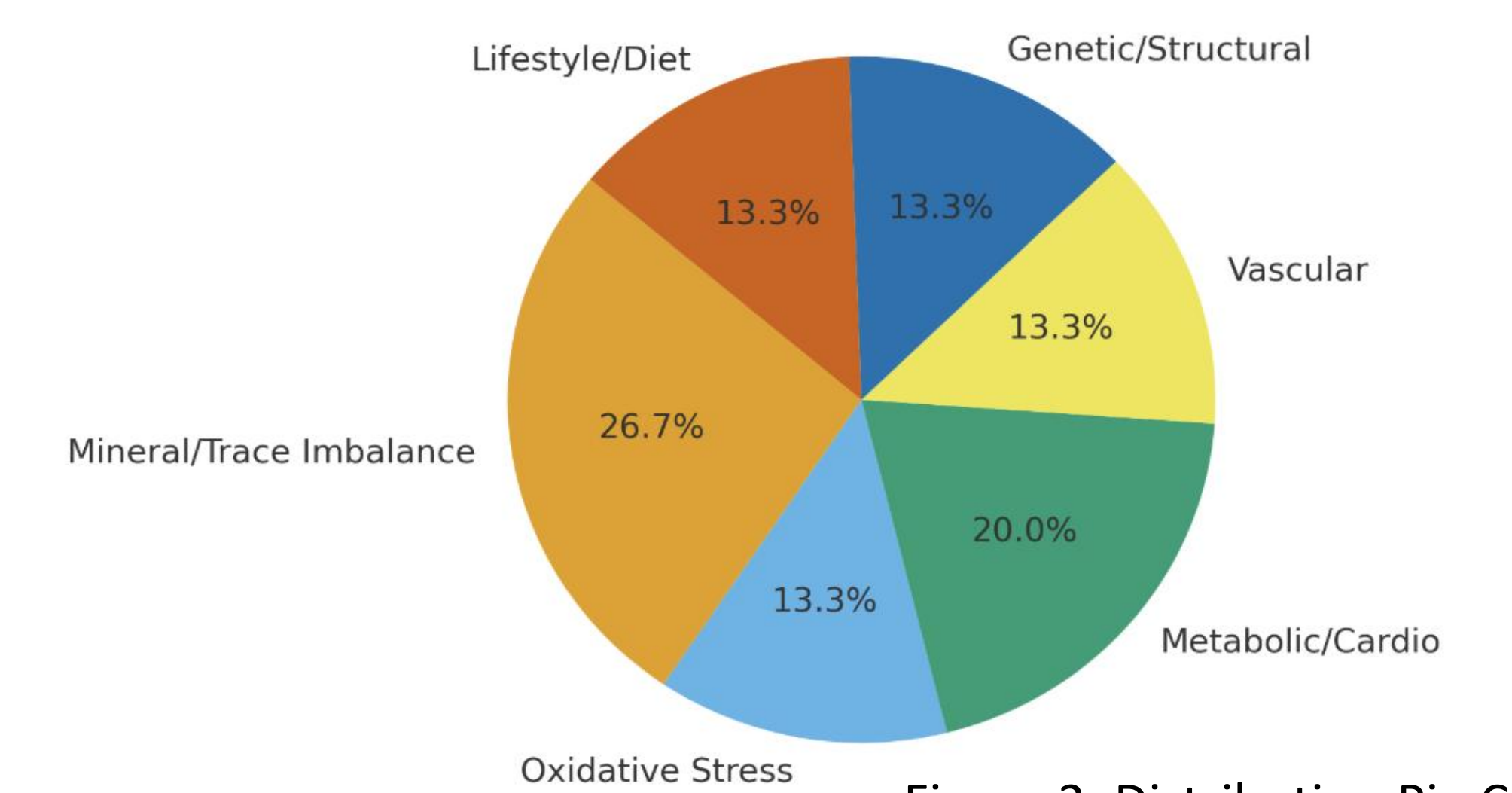


Figure 2: Distribution Pie Chart

Introduction

- Ménière's disease (MD) is characterized by a clinical triad: **recurrent vertigo, tinnitus, and progressive sensorineural hearing loss.**
- Approximately **615,000 people** in the United States are diagnosed with Meniere's disease
- A hallmark of MD is **endolymphatic hydrops**, or excess fluid volume in the inner ear.
- Chronic kidney disease (CKD)** is defined as impaired kidney structure or function lasting more than 3 months, with systemic consequences.
- CKD affects **~13% of adults** worldwide, while MD affects over **600,000 individuals** in the U.S.
- Because the **kidney and inner ear share structural and functional similarities**, disturbances in fluid and electrolyte homeostasis from CKD may contribute to the development of endolymphatic hydrops.
- The interplay between **MD and CKD remains poorly understood**, with limited research examining the moderating factors that may drive this association.

Conclusion

- Our findings suggest that **mineral and trace element imbalances represent a key link between Ménière's disease and chronic kidney disease (CKD).**
- Clarifying the connection between these conditions is important for clinicians, as it highlights the potential increased risk of MD in patients with CKD and underscores **the need for collaboration between nephrology and audiology providers.**
- Further research is needed to statistically evaluate the relationship between MD and CKD, particularly regarding **the predictive role of CKD in the development of MD.**
- This review is **limited by the scarcity of studies directly addressing the CKD-MD relationship**, the heterogeneity of available research, and the exclusion of certain populations (e.g., cancer patients), which may restrict the generalizability of the findings.
- Strengths include geographically diverse**, data search developed in consultation with research librarian, study selection process followed PRISMA guidelines

References

