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THE SYSTEMATIC REVIEW OF EXAMINING THE CONNECTION BETWEEN NUTRITION AND VERTIGO

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ABSTRACT

Background: *Vertigo is a clinical symptom that is often encountered in clinical practice, with a significant impact on the sufferer's quality of life. Although much research has been conducted to understand the factors that cause vertigo, the relationship between nutrition and the incidence of vertigo is still an area of research that is not fully understood. Although there is some literature describing the effects of nutrition on general health, a specific understanding of the impact of nutrition on the incidence of vertigo is still lacking.*

Aim : *This study examined the association and connections between the uptake of nutrition and vertigo*

Methods: *By comparing itself to the standards set by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. So, the experts were able to make sure that the study was as up-to-date as it was possible to be. For this search approach, publications that came out between 2014 and 2024 were taken into account. Several different online reference sources, like Pubmed and Science Direct, were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.*

Result: *In the PubMed database, the results of our search brought up 93 articles, whereas the results of our search on Science Direct brought up 163 articles. The results of the search conducted for the last year of 2014 yielded a total 67 articles for PubMed and 12 articles for Science Direct. In the end, we compiled a total of 4 papers, 2 of which came from PubMed and 2 of which came from Science Direct. We included four research that met the criteria.*

Conclusion: *In summary, nutrient intake and consumption frequency of certain food categories varied significantly.*

Keyword: *Vertigo, nutrition, association*

INTRODUCTION

Numerous studies have revealed that vertigo, including non-vestibular vertigo, is among the most prevalent medical conditions, affecting 20–30% of the general population and two–three times more women than males. A collection of balance problems that are typically connected to lightheadedness are referred to as dizziness. One kind of vertigo is motion sickness, which produces the illusion that one's surroundings are moving or spinning. People are greatly affected by vertigo, which may also be a sign of a wide range of illnesses with different etiologies.[1,2]

Vestibular vertigo was divided into three categories: recurring dizziness associated with nausea, oscillopsia, or imbalance; positional vertigo (vertigo or dizziness generated by changes in head position, such as laying down or turning in bed); and rotational vertigo (the illusion of self-motion or object motion). Research on general risk factors for vertigo/dizziness has limited potential value, and the results should be evaluated cautiously. Still, these tests can yield some fascinating findings. The frequency of vertigo symptoms can vary, from one episode within a particular time period (monophasic) to recurrent bouts (episodic) to continual. Although dizzy patients find it difficult to describe the exact nature of their symptoms, they can consistently identify the origin and time of them.[3,4]

Human positional vertigo (PV) is the most common form of vertigo; older adults are more likely than other age groups to experience benign paroxysmal positional vertigo (BPPV). Conversely, vertigo may indicate Meniere's disease (MD), which is typified by recurrent episodes of vertigo, varying sensorineural hearing loss, auditory fullness, and tinnitus. The most common first symptom of MD is vertigo, which is followed by perspiration, nausea, and vomiting. Consequently, the goal of MD therapy is to lessen vertigo's frequency and intensity. About 3% of patients brought to the hospital with dizziness had MDs.[1,5]

Eating habits have been linked to a number of metabolic and circulatory disorders that, particularly in the elderly, can induce a variety of symptoms, including dizziness.A shift in equilibrium known as dizziness is typified by the person or their surroundings appearing to move. We refer to rotational dizziness as vertigo. Globally, this condition is quite common, impacting around 2% of young adults, 30% of those over 65, and up to 50% of old people over 85.[6]

According to available data, senior citizens' quality of life can be enhanced by maintaining healthy eating habits. Malnutrition is becoming more common in this population and is linked to a number of health problems, including decreased bone mass, anemia, immunological dysfunction, poor wound healing, delayed postoperative recovery, increased readmission rates, and mortality. Malnutrition is characterized as a condition when there are unfavorable consequences on body shape, function, and clinical outcome due to an excess, shortage, or imbalance of energy, protein, and other nutrients. Evidence exists to support the idea that dietary practices such a low-sodium diet can affect the homeostasis of inner ear fluid and hearing function. The results of the studies suggest that the endolymph compartment is equipped with an internal mechanism that keeps the surrounding serum and perilymph in ionic balance while preserving a low concentration of sodium.[6]

The amounts of glucose and hormones in the bloodstream, which are dependent on adenosine triphosphate's energy production, have an impact on the labyrinth system's energy needs. Research from the literature suggests that between 42 and 80% of people who experience tinnitus and dizziness also have a glucose metabolic condition, whereas 2.5 to 15% of the population has asymptomatic hypoglycemia or a problem with their glucose tolerance curves.[6]

Vertigo is a clinical symptom that is often encountered in clinical practice, with a significant impact on the sufferer's quality of life. Although much research has been conducted to understand the factors that cause vertigo, the relationship between nutrition and the incidence of vertigo is still an area of research that is not fully understood. Although there is some literature describing the effects of nutrition on general health, a specific understanding of the impact of nutrition on the incidence of vertigo is still lacking.

The findings of this study will shed light on health practices that might lessen the negative implications of symptom management while also promoting good benefits in those suffering from dizziness or vertigo.

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

Criteria for Eligibility

For the purpose of this literature review, we review published literature contains the connection of nutrition and cases of vertigo. This is done to provide an explanation and improve the handling of treatment at the patient. As the main purpose of this paper, to show the relevance of the difficulties that have been identified as a whole.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2013, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

Search Strategy

We used "vertigo" and "nutrition" as keywords.The search for studies to be included in the systematic review was carried out using the PubMed and SCIENCE DIRECT databases by inputting the words: *(("vertigo"[MeSH Terms] OR "vertigo"[All Fields] OR "vertigos"[All Fields] OR "vertigoes"[All Fields] OR ("menier s"[All Fields] OR "meniere"[All Fields] OR "meniere s"[All Fields] OR "menieres"[All Fields])) AND ("nutrition s"[All Fields] OR "nutritional status"[MeSH Terms] OR ("nutritional"[All Fields] AND "status"[All Fields]) OR "nutritional status"[All Fields] OR "nutrition"[All Fields] OR "nutritional sciences"[MeSH Terms] OR ("nutritional"[All Fields] AND "sciences"[All Fields]) OR "nutritional sciences"[All Fields] OR "nutritional"[All Fields] OR "nutritionals"[All Fields] OR "nutritions"[All Fields] OR "nutritive"[All Fields])) AND (clinicaltrial[Filter] OR randomizedcontrolledtrial[Filter])* used in searching the literature.

Data retrieval

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and can't have been seen anywhere else.

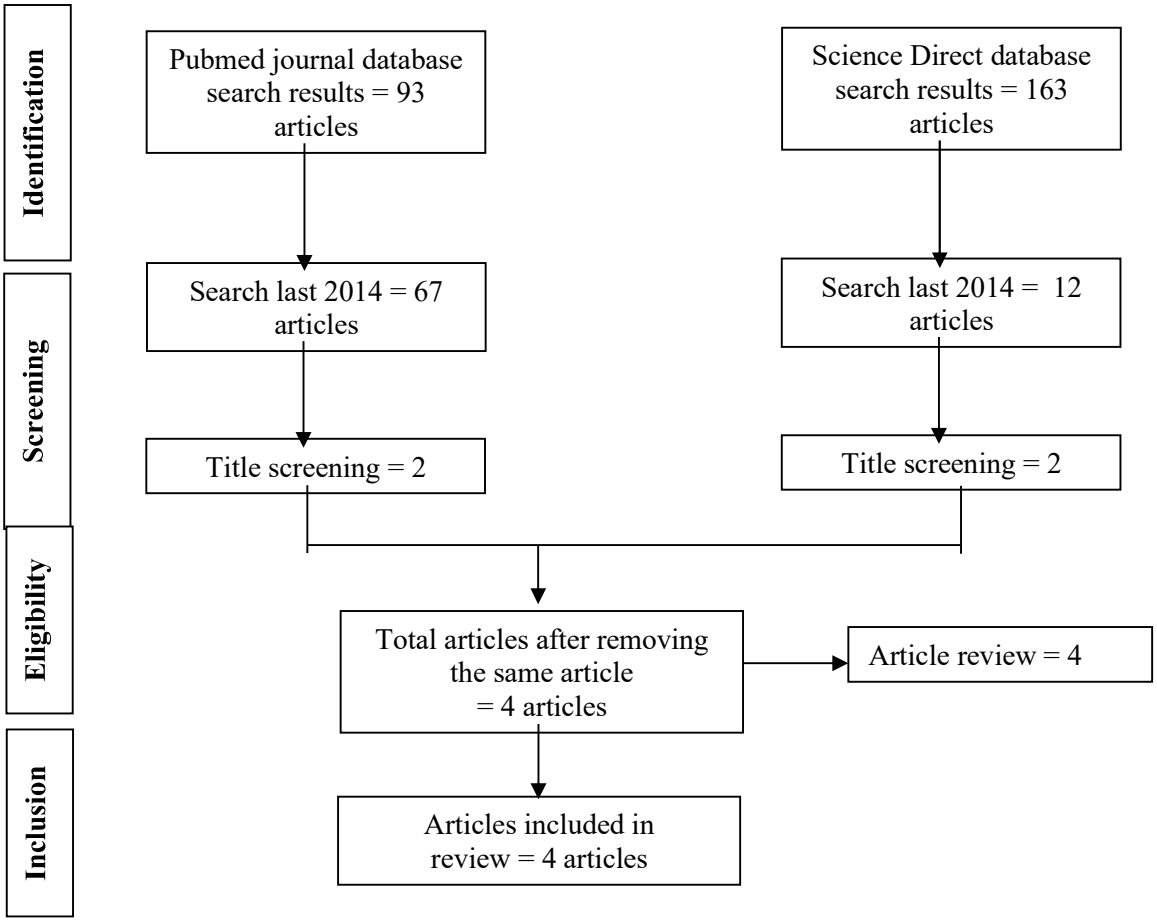

Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed

in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

Quality Assessment and Data Synthesis

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

In the PubMed database, the results of our search brought up 93 articles, whereas the results of our search on SCIENCE DIRECT brought up 163 articles. The results of the search conducted for the last year of 2014 yielded a total 67 articles for PubMed and 12 articles for SCIENCE DIRECT. In the end, we compiled a total of 4 papers, 2 of which came from PubMed and 2 of which came from SCIENCE DIRECT. We included four research that met the criteria.

Scuto, et al[7] (2019) showed that approaching the redox biology of the aging inner-ear system, as demonstrated in the current study, combined with broadening the potential of lipidomic analysis, represents an innovative tool for monitoring at the omic level the extent of oxidative insult and related modifications, allowing the identification of targeted antioxidative cytoprotective vitagene system proteins. The current work also emphasizes the need of studying MD as a useful model of cochlear neurodegenerative disease.

Schultz, et al[6] (2015) showed that these findings are consistent with dyslipidemia and hypertriglyceridemia, emphasizing the importance of reducing fat and carbohydrate intake while increasing fiber intake to regulate triglycerides and thereby limit detrimental effects on the inner ear. Food adjustments are recommended for patients with BPPV, as well as the work of a multidisciplinary team to improve the quality of life for the elderly.

Table 1. The litelature include in this study

Author	Origin	Method	Sample	Result
Scuto et al, 2020[7]	Italy	Cross sectional study	40 patients	Our study included 40 patients (22 men and 18 females) with an average age of 49.5 +/− 14.6 years (range 29-60 years). After Coriolus therapy, there was a substantial ($p < 0.01$) rise in vitagenes such HO-1, Hsp70, Trx, sirtuin-1, and γ-GC liase in lymphocytes, as well as a significant ($p < 0.05$) increase in the plasma ratio of reduced glutathione (GSH) vs. oxidized glutathione (GSSG). Patients with MD experience systemic oxidative stress, and the activation of vitagenes following mushroom administration suggests a sustained response to counterbalance intracellular pro-oxidant state.
Schultz et al, 2015[6]	Brazil	Cross sectional study	487 patients	In a sample of 487 people, 117 had BPPV. Of the 117 elderly individuals with BPPV, 37 (31.62%) had insufficient nutrition. Of the 370 people without BPPV, 97 (26.21%) had incorrect feeding. There was no significant correlation between dietary habits and BPPV in the overall group

				(p = 0.3064). BPPV was significantly associated with low carbohydrate and fiber intake (p = 0.0419), as well as a diet high in polyunsaturated fatty acids (p = 0.0084).
Ren et al, 2024[8]	China	Cross sectional study	298 patients	The median 25(OH)D level was 15.32 (IQR 10.61-20.90) ng/mL. The recurrent group had lower 25(OH)D levels than the non-recurrent group [13.28 (IQR 9.47–17.57) ng/ml vs 16.21 (IQR 11.49–21.13) ng/ml]. There were substantial disparities in 25(OH)D levels among age groups. Patients over 60 had a reduced percentage of vitamin D insufficiency compared to the other two age groups.
Cobb et al, 2023[9]	USA	Cross sectional study	173 patients	Our BPPV group comprised of 173 patients (mean age 66.2 ± 11.8 years), with a 75.7 percent female and 76.3% Caucasian distribution. Almost all age categories (BPPV, NHANES, and locoregional groups) under 60 years old had inadequate vitamin D levels. The BPPV cohort showed substantially higher vitamin D levels compared to the NHANES control (31.4 ± 16.5 vs. 26.0 ± 11.2 ng/mL, d=0.474 [0.323, 0.626]). There was no significant variation from the overall locoregional control (31.4 ± 20.5 ng/mL). Migraines were significantly associated with higher BPPV recurrence rates in both univariate (beta=0.927, p=0.037, 95% CI: [0.057, 1.798]) and multiple regression models. Furthermore, individuals with BPPV recurrences had considerably lower vitamin D levels at initial presentation than patients without recurrences.

Ren, et al[8] (2024) showed that BPPV patients have low 25(OH)D levels and a significant rate of vitamin D insufficiency. The 25(OH)D level in recurrent BPPV patients was lower than in non-recurrent cases. The elderly (≥60 years) had the lowest frequency of deficiency and the highest incidence of sufficiency.

Cobb, et al[9] (2023) showed that many BPPV patients in the sample had inadequate vitamin D levels, and patients with recurrent BPPV had considerably lower vitamin D levels than those without. Vitamin D, being a generally accessible and cheap supplement, may be utilized as an adjuvant therapy, although further research is needed to see whether it helps prevent or lessen recurrence.

DISCUSSION

This systematic review involved data of nutritional status of 998 data of patients with vertigo and dizziness disease.

A collection of balance problems that are typically connected to lightheadedness are referred to as dizziness. One kind of vertigo is motion sickness, which produces the illusion that one's surroundings are moving or spinning. People are greatly affected by vertigo, which can also be a sign of several medical conditions. Vestibular vertigo was divided into three categories: recurring dizziness accompanied by nausea, oscillopsia, or imbalance; rotational vertigo (the illusion of self-motion or object motion); and positional vertigo (vertigo or dizziness caused by changes in head position, such as laying down or turning in bed).[10]

According to research, vertigo is becoming more and more of a health problem, especially for healthy aging. As a result, there has been a steady rise in the use of healthcare services. In addition to making it more difficult for patients to accomplish daily tasks due to the increased risk of falling, dizziness and vertigo are also commonly linked to depression and anxiety in their sufferers. A common but ill-defined symptom is vertigo, for which the patient's anamnesis is crucial to the diagnosis. A comprehensive physical examination is necessary due to the wide range of potential diagnoses. Further imaging studies and laboratory testing can aid in the evaluation of individuals with vertigo. Monitoring the patient during acute periods may be required in order to get an accurate diagnosis.[5]

From 2002 to 2019, a cohort research in Korea looked at the correlation between lifestyle factors such smoking, alcohol drinking, and obesity in a group of MDs aged 40 and above. The findings indicated that smoking was favorably correlated with MD, but alcohol use was adversely associated with an increased risk of MD. In contrast, the same study found no link between obesity and MD. In contrast, another research comparing cross-sectional data from the UK Biobank of MD patients and non-MD patients revealed that the obesity rate was greater in MD patients.[11,12]

Making changes to one's lifestyle can be a good place to start when controlling vertigo and dizziness since factors like obesity, alcohol use, and smoking can be adjusted gradually and affordably without causing harm. Conversely, the global increase in chronic diseases is in line with the trend toward hazardous lifestyle choices. The effects of dietary changes or nutritional alterations on MD or BPPV patients have been studied in certain study. Nevertheless, there was insufficient data to support the impact of these lifestyle factors or to demonstrate a connection between underweight and vertigo episodes.[13,14]

A number of studies have demonstrated that dietary imbalances may contribute to dizziness/vertigo. A research done in Brazil discovered a link between BPPV and a diet high in carbs and polyunsaturated fatty acids, as well as low dietary fiber intake in the elderly. Approximately 31% of BPPV patients reported insufficient eating. Decreased blood vitamin D levels may be a risk factor for BPPV. A recent study found that persons aged 40 and older suffering from vertigo had considerably reduced intakes of carotene, vitamin A, and vitamin B2, but their dietary fiber intake was not statistically different from non-vertigo adults in Korea.[6]

Some eating habits are thought to be risk factors for different changes in the human body, whereas dietary adjustments can help to alleviate illness symptoms and enhance overall quality of life. Low salt diets, reduced daily caffeine and alcohol use, gluten-free diets, and the ingestion of properly prepared grains may all assist to keep MD attacks under control. The current investigation used a questionnaire to inquire about eating habits under the supervision of a professional. Significant variations were discovered for missing meals, dining out once a month, and daily water intake. Homeostasis in the human body depends on the control of water intake and hydration. In this study, the sick group consumed less water per day than the control group. This discovery may indicate a breakdown of homeostasis and an imbalance of the vestibular system in these individuals. A research on MD patients found that water intake therapy helped patients rectify and avoid hearing loss. Recent study has focused on the link between missing meals, health, and illnesses.[15]

Dietary recommendations encourage reducing salt consumption in the diet, with a limit of 5 g per day. High salt consumption is one of the main reasons for MD attacks, whereas a low salt diet offered helpful therapy for MD patients. For the human body to operate normally, nutritional intake and metabolism must be balanced. An imbalance induced by dietary deficiency or excess can cause or exacerbate illness.[15]

In the current study, the frequency rate of intake of bread, milk, dairy products, eggs, fruits, and vegetables stated as "everyday" by the participants was high when compared to previous periods. In addition, a large proportion of individuals reported eating red meat "1 or 2 times/week" and white meat "2 or 3 times/week." These findings were consistent with the WHO's guidelines for a healthy diet in adults. However, the majority of participants stated that they consumed legumes and grains "1-2 times per week," despite WHO's recommendation of a daily diet. Nutritional evaluation using 24-hour Dietary Recall recording revealed no significant variations in calorie, carbohydrate, fat, protein, dietary fiber, or mineral consumption.[16]

Similarly, BPPV patients' dietary fiber intake was not substantially reduced as compared to non-vertigo persons in Korea. In contrast, a cross-sectional research in Brazil discovered a link between BPPV and an insufficient diet, which resulted in increased carbohydrate and polyunsaturated fatty acid intake and decreased dietary fiber intake. Studies have found that

low blood vitamin D levels may be a risk factor for BPPV. Furthermore, a 1-year consumption of vitamin D and calcium carbonate led in the return of vertigo in 24% of BPPV patients.[5,6,16]

A research comparing blood vitamin D levels in persons with and without positional vertigo found no statistically significant variations in vitamin D status. Although blood vitamin D levels were not measured in the current investigation, dietary vitamin D intake was found to be similarly low in both groups, with the control group consuming even less. Other studies provided limited support for the current study's findings. Of course, measuring blood vitamin D is a more reliable way to establish vitamin D supply in people than dietary and supplementary evaluations.[16]

Furthermore, blood vitamin D levels are dependent on sunshine exposure, which is a significant contributor to vitamin D levels in people. In this study, the sick group had lower intakes of carotene and vitamin K than the control group, and the differences were statistically significant. Similarly, a research indicated that patients aged > 40 years with vertigo had a considerably reduced consumption of carotene.[5,17]

CONCLUSION

In summary, nutrient intake (e.g., carotene, vitamins D and K) and consumption frequency of certain food categories varied significantly.

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