Original Article

Comparison Between Ginkgo biloba and Betahistine in Treatment of Vertigo: A Prospective Comparative Study

Muhammad Shoaib Khan[1], Sadia Chaudhry[2], Nida Riaz[3], Saba Sehar Khan[4], Anique Ahmad Jamil[5], Abdur Rehman[6]

Contributions:
MSK SC - Conception, Design
NR SSK AR - Acquisition, Analysis, Interpretation
MSK SC - Drafting
NR SSK AR - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

Conflicts of Interest: None
Financial Support: None to report
Potential Competing Interests: None to report

Disclaimer: This study has not been published or submitted elsewhere for publication.

AI Disclosure: Artificial intelligence tools were used solely for language refinement and formatting. No AI tools were used for data analysis, interpretation, or result generation. All scientific content, analyses, and conclusions were developed and verified by the authors, who took full responsibility for the integrity and accuracy of the work.

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

Institutional Review Board Approval
BBH/OPH/
30-08-2025
Benazir Bhutto Hospital

Review began 30/08/2025
Review ended 10/06/2026
Published 30/06/2026

How to cite this article: Khan MS, Chaudhry S, Riaz N, Khan SS, Jamil AA, Rehman A. Comparison Between Ginkgo biloba and Betahistine in Treatment of Vertigo: A Prospective Comparative Study. JRMC. 2026 Jun. 30;30(2).

https://doi.org/10.37939/jrmc.v30i2.3015

Abstract

Objective: Vertigo significantly impairs balance and quality of life. Betahistine and standardized *Ginkgo biloba* extract (Ginbex) are commonly used treatments, but comparative data remain limited. This study compared the efficacy, safety, adherence, and patient satisfaction of these treatments in patients with chronic vertigo.

Methods: This prospective comparative study was conducted at the ENT Department of Benazir Bhutto Hospital. One hundred patients with chronic peripheral vertigo were allocated to Ginbex (n=50) or betahistine (n=50) for 12 weeks. Outcomes included Vertigo Symptom Scale–Vertigo (VSS-V), Vertigo Symptom Scale–Anxiety (VSS-A), Clinical Global Impression scores, adherence, adverse effects, and patient satisfaction. Statistical analysis was performed using SPSS version 26.

Results: Both groups showed significant improvement in vertigo severity and anxiety symptoms after treatment ($p<0.001$). No significant between-group differences were observed for VSS-V ($p=0.334$), VSS-A ($p=0.825$), or CGI change ($p=0.151$). Adverse effects were significantly lower with Ginbex (12%) than betahistine (40%) ($p=0.001$). Patient satisfaction was higher in the Ginbex group (4.76±0.43 vs. 3.62±0.97, $p<0.001$). Adherence was slightly higher with betahistine but not statistically significant ($p=0.061$).

Conclusion: Ginbex and betahistine demonstrated comparable efficacy in chronic vertigo. Ginbex showed better tolerability and higher patient satisfaction, suggesting it may be a useful alternative in selected patients.

Keywords: Vertigo, Betahistine, Ginkgo biloba extract, Ginbex, Comparative study, Patient satisfaction, Adverse effects, Chronic dizziness

Introduction

A common and frequently incapacitating condition, vertigo is characterised by a false sense of movement. Approximately 23% of adults experience it at some point in their lives.[1] As people age, the burden of symptoms tends to increase, and recurrences are more common in older adults.[2] By increasing vestibular compensation and microcirculation, betahistine, a histamine analogue that primarily functions as an H3 receptor antagonist and a mild H1 agonist, is commonly used to treat vertigo.[3] By reducing oxidative stress and factors that activate platelets, standardised Ginkgo biloba extract (Ginbex) protects the brain and regulates blood flow.[4] When compared to a placebo, Ginbex successfully lessens vertigo symptoms, according to a meta-analysis.[5] The lack of direct comparisons between Ginbex and betahistine at this time highlights the significance of carefully planned studies.[6]

Betahistine has been shown to reduce the frequency and intensity of vertigo symptoms in Meniere's disease and benign paroxysmal positional vertigo (BPPV).[7] Up to 74% of patients report feeling better after taking betahistine, according to clinical studies.[8] However, research indicates that Ginbex might have comparable benefits with fewer drawbacks.[1,5] Betahistine and EGb 761, a standardised Ginkgo biloba extract, were found to be equally effective in a randomised controlled trial involving 160 patients. Vertigo episodes were reduced by over 50% with both treatments.[1] These findings imply that plant-based medicines may be useful supplements or substitutes for existing therapies.[9]

Treating the central and peripheral causes of vertigo is crucial, according to recent studies.[10] It may be more beneficial to use Ginbex and betahistine together or one after

the other, particularly in chronic or recurring conditions. It is critical to understand these factors to create individualised, evidence-based vertigo management plans.[6,9] Comparative effectiveness studies are crucial to assist physicians in making decisions because of the increasing number of vestibular disorders.[2,3,5] The primary objective of this study was to determine whether betahistine or Ginex was more effective at reducing vertigo symptoms over 12 weeks. Additional objectives were to measure patient satisfaction with the treatment, ensure that patients adhered to their treatment plans, and verify safety by monitoring the side effects. The study aims to collect information that can be used to identify the best medication for treating chronic vertigo.

Materials And Methods

This prospective comparative study was conducted from January to December 2024 in the ENT Department of Benazir Bhutto Hospital, Rawalpindi. This study aimed to examine the efficacy, safety, compliance, and patient satisfaction of betahistine and standardised Ginbex in the treatment of chronic vertigo. This study was conducted in accordance with the guidelines of the Declaration of Helsinki. Ethical approval was obtained from the Ethical Review Board of Rawalpindi Medical University (ID: 25-49-2023) before the commencement of the study.

A priori sample size estimation was performed based on the primary outcome variable, the Vertigo Symptom Scale–Vertigo (VSS-V) subscale. Assuming a minimum clinically meaningful between-group difference of 2 points on the VSS-V, a pooled standard deviation of approximately 2.06 (derived from prior literature on vertigo symptom scales), a two-tailed alpha of 0.05, and a desired statistical power of 80%, a minimum of 17 patients per group was required. To enhance statistical robustness, account for possible attrition, and improve the precision of secondary outcome estimates, 50 patients per group were enrolled, yielding a total sample size of 100 participants.

A total of 138 patients presenting with vertigo were assessed for eligibility during the study period. Inclusion criteria were patients 18 years or older, who had persistent peripheral vertigo that lasted at least three months and had a baseline VSS-V score of 8 or higher. Exclusion criteria was comorbids (cardiac disease or hypertension), pregnant or breastfeeding women, patients with central vertigo, patients with a known allergy to Ginkgo biloba or betahistine, or patients who had used vertigo treatments within the last four weeks. Before taking part in the study, all participants signed a form giving their written consent. Of these, 38 were excluded: 14 had centrally caused vertigo (cerebellar infarct or multiple sclerosis), 9 had uncontrolled hypertension or serious cardiac conditions, 6 were pregnant or breastfeeding, 5 had a known allergy to Ginkgo biloba or betahistine, and 4 had used other vertigo treatments within the preceding four weeks. The remaining 100 patients were enrolled and allocated to two groups, Group A (Ginbex, n=50) and Group B (Betahistine, n=50), using consecutive sampling. Written informed consent was obtained from all patients before enrolment. All 100 participants completed the 12-week follow-up and were included in the final analysis. No participants were lost to follow-up, and no data were missing; cases with incomplete data at any time point were excluded before enrolment confirmation.

The primary outcomes measured were changes in vertigo severity using the VSS-V and Vertigo Symptom Scale–Anxiety subscale (VSS-A). Secondary outcomes included the Clinical Global Impression–Severity (CGI-S) at baseline and the Clinical Global Impression–Improvement (CGI-I) after 12 weeks, the occurrence of adverse effects, treatment adherence categorised as always, sometimes, or rarely adherent, and patient satisfaction evaluated using a 5-point Likert scale. All evaluations were performed at baseline and 12 weeks after treatment.

Several measures were implemented to minimise the potential sources of bias. Selection bias was addressed through the consecutive enrolment of all eligible patients presenting during the study period, ensuring that no systematic exclusion occurred. To reduce measurement bias, all outcome assessments (VSS-V, VSS-A, CGI-S, and patient satisfaction) were administered using standardised validated instruments under consistent conditions at both baseline and the 12-week follow-up. Although the study employed an open-label design (necessitated by the differing formulations of the two treatments), efforts were made to ensure that questionnaires were administered by trained staff following a uniform protocol, independent of treatment assignment. Observer bias in CGI ratings was minimised by using structured anchor-based criteria for scoring. Allocation to treatment groups followed a consecutive sampling strategy, with the first 50 eligible consecutive patients allocated to Group A (Ginbex) and the next 50 to Group B (Betahistine); Baseline comparability between groups was verified statistically **(Table 1).** Attrition bias was not applicable because all 100 enrolled participants completed the study.

Data analysis was performed using SPSS version 26 (IBM Corp., Armonk, NY, USA). Continuous variables are presented as mean ± standard deviation (SD). Before parametric testing, the normality of continuous variables was assessed using the Shapiro-Wilk test; all key variables were found to be approximately normally distributed ($p > 0.05$), supporting the use of parametric tests. Paired t-tests were used to assess changes within each group over time, while independent t-tests were used to compare the results between the Ginbex and betahistine groups. Categorical variables,

such as adverse effects and adherence rates, were analysed using the chi-square test. Statistical significance was set at $p < 0.05$.

Results

A total of 100 patients were enrolled in the study, with a mean age of 54.07 ± 14.45 years (range, 30–79 years). Males accounted for 57% of the participants (n=57). The average height was 169.36 ± 12.45 cm, the weight was 77.61 ± 13.54 kg, and the BMI was 27.51 ± 6.44. The mean duration of the vertigo symptoms was 12.84 ± 7.04 months. At baseline, the mean scores were 14.58 ± 6.02 for the VSS-V, 12.47 ± 4.29 for the VSS-A, and 3.38 ± 1.18 for CGI-S (severity). The detailed baseline characteristics are presented in **Table 1.**

Table 1: Baseline Characteristics by Treatment Group

Characteristic	Ginbex (n=50)	Betahistine (n=50)	Total (N=100)	p-value
Age, years (mean ± SD)	53.76 ± 15.02	55.16 ± 15.15	54.07 ± 14.45	0.645
Age range, years	30–79	30–79	30–79	—
Gender, n (%)				
Male	28 (56%)	29 (58%)	57 (57%)	1.000
Female	22 (44%)	21 (42%)	43 (43%)	
Height, cm (mean ± SD)	170.97 ± 12.52	167.21 ± 11.59	169.36 ± 12.45	0.122
Weight, kg (mean ± SD)	75.72 ± 11.60	76.91 ± 14.80	77.61 ± 13.54	0.654
BMI, kg/m² (mean ± SD)	26.29 ± 5.43	27.94 ± 6.96	27.51 ± 6.44	0.190
Duration of symptoms, months (mean ± SD)	12.37 ± 5.72	11.80 ± 6.03	12.84 ± 7.04	0.629
VSS-V baseline (mean ± SD)	14.82 ± 5.29	15.66 ± 5.53	14.58 ± 6.02	0.438
VSS-A baseline (mean ± SD)	12.44 ± 4.31	13.41 ± 4.24	12.47 ± 4.29	0.258
CGI-S baseline (mean ± SD)	3.34 ± 1.15	3.51 ± 1.11	3.38 ± 1.18	0.438

Continuous variables compared by an independent t-test; categorical variables by chi-square test. All p-values > 0.05 confirm baseline comparability between groups. Normality of continuous variables was confirmed using the Shapiro-Wilk test.

Significant improvements were observed in both treatment groups across all outcome measures from baseline to 12 weeks post-treatment. The VSS-V score was reduced by 6.28 points (t=30.48, p<0.001), the VSS-A score decreased by 4.48 points (t=24.88, p<0.001), and the CGI score improved from a baseline CGI-S of 3.38 ± 1.18 to a CGI-I of 2.08 ± 0.94, reflecting a mean change of 1.30 (t=8.51, p<0.001). Additional details are presented in Table 2.

Table 2: Changes from Baseline to 12 Weeks

Scale	Baseline (mean ± SD)	12 Weeks (mean ± SD)	Mean Change	95% CI	t	p-value
VSS-V	14.58 ± 6.02	8.30 ± 6.20	6.28	5.87-6.69	30.48	<0.001
VSS-A	12.47 ± 4.29	7.99 ± 4.67	4.48	4.12- 4.84	24.88	<0.001
CGI	3.38 ± 1.18	2.08 ± 0.94	1.30	1.00- 1.60	8.51	<0.001

Comparison between the Ginbex (n=50) and betahistine (n=50) groups revealed no significant differences in the magnitude of change for VSS-V (Ginbex: 6.08 ± 2.18 vs. Betahistine: 6.48 ± 1.93; t=-0.97, p=0.334), VSS-A (Ginbex: 4.44 ± 1.76 vs. Betahistine: 4.52 ± 1.85; t=-0.22, p=0.825), or CGI scores (Ginbex: 1.52 ± 1.43 vs. Betahistine: 1.08 ± 1.60; t=1.45, p=0.151). The findings are summarised in Table 3.

Table 3: Between-Group Comparison

Scale	Ginbex (n=50)	Betahistine (n=50)	Mean Difference	95% CI	t	p-value
VSS-V change	6.08 ± 2.18	6.48 ± 1.93	−0.40	−-1.22- 0.42	−0.97	0.334
VSS-A change	4.44 ± 1.76	4.52 ± 1.85	−0.08	−-0.80- 0.64	−0.22	0.825
CGI change	1.52 ± 1.43	1.08 ± 1.60	0.44	0.16-1.04	1.45	0.151

The 95% CIs for all between-group differences include zero, confirming no statistically significant difference in efficacy between treatments.

Treatment adherence showed a marginally significant difference between the groups (χ^2=5.60, p=0.061). In the Ginbex group, 64% (32/50) always adhered, 22% (11/50) sometimes adhered, and 14% (7/50) rarely adhered, compared with 84% (42/50), 12% (6/50), and 4% (2/50) in the betahistine group, respectively. See Table 4.

Table 4: Adherence to Treatment

Treatment	Always, n (%)	Sometimes, n (%)	Rarely, n (%)	Total
Ginbex	32 (64%)	11 (22%)	7 (14%)	50
Betahistine	42 (84%)	6 (12%)	2 (4%)	50
Total	74	17	9	100

χ^2=5.60, p=0.061

Patient satisfaction was significantly higher in the Ginbex group than in the betahistine group (MD: 1.14, 95% CI: 0.84–1.44), t=7.62, p<0.001) (Table 5).

Table 5: Patient Satisfaction

Treatment	Mean ± SD	Mean Difference (95% CI)	t	p-value
Ginbex	4.76 ± 0.43	1.14 (95% CI: 0.84–1.44)	7.62	<0.001
Betahistine	3.62 ± 0.97	—	—	—

The Ginbex group experienced a significantly lower rate of adverse effects (6 50, 12%) than the betahistine group (20 50, 40%) (χ^2=10.19, p=0.001). Additional information is provided in Table 6.

Table 6: Incidence of Adverse Effects by Treatment Group

Treatment	Adverse Effects, n (%)	No Adverse Effects, n (%)	Total
Ginbex	6 (12%)	44 (88%)	50
Betahistine	20 (40%)	30 (60%)	50
Total	26	74	100

χ^2=10.19, p=0.001

Discussion

This study demonstrated that both standardised Ginbex and betahistine significantly improved vertigo severity, anxiety symptoms, and global clinical impressions over 12 weeks, with both treatments demonstrating comparable efficacy and no statistically significant difference between them. These results align closely with previously published data, suggesting that Ginbex is non-inferior to betahistine for chronic vertigo management. Sokolova et al. conducted a large randomised controlled trial with 160 patients with unspecified vertigo and found comparable reductions in vertigo frequency and intensity with EGb 761 and betahistine, supporting our observations of similar effect sizes on VSS-V and VSS-A scores.[1] Moreover, a meta-analysis by Gao et al. encompassing 1069 patients further confirmed that Ginbex is effective in reducing vertigo symptoms and exhibits a favourable safety profile.[5] Our findings also corroborate those of Pinzon and Sanyasi, who highlighted betahistine's consistent efficacy across different dosages and vertigo aetiologies.[11] Betahistine remains the most extensively studied pharmacological treatment for vertigo in Europe and continues to be supported by robust long-term evidence. Our findings add to the growing literature suggesting that standardised Ginbex is also a viable and effective option for appropriate candidates.[12] Notably, we observed a significantly lower incidence of adverse effects in the Ginbex group, consistent with previous reports suggesting better tolerability of Ginkgo-based treatments.[13] In our cohort, only 6 out of 50 (12%) patients receiving Ginbex reported adverse events, whereas 20 out of 50 (40%) of betahistine recipients

experienced side effects, primarily gastrointestinal discomfort and headache. These findings are in agreement with those of Chiarella et al., who reported a lower adverse event rate with nutraceuticals, including Ginkgo biloba, than with standard pharmacologic options.[14]

An interesting aspect of our study is the assessment of patient satisfaction, where Ginbex achieved higher mean satisfaction scores than betahistine. While few trials have directly compared patient-reported outcomes between these agents, a review by Yuan et al. suggests that Ginkgo biloba's multi-mechanistic actions (including vasoregulation, neuroprotection, and antioxidant effects) may contribute to greater subjective improvement and tolerability.[15] Furthermore, our adherence analysis showed a tendency for more consistent use in the betahistine group; however, this difference was not statistically significant. This may reflect differences in prescription familiarity and patient expectations, rather than intrinsic efficacy. International treatment guidelines have traditionally favoured betahistine as the first-line pharmacotherapy, particularly in Europe, where it has demonstrated long-term benefits in Meniere's disease and recurrent peripheral vertigo.[7,12] Nevertheless, growing evidence indicates that Ginkgo biloba preparations might provide similar effectiveness, especially for patients experiencing dizziness due to vascular or degenerative causes.[16] The observed reduction in VSS-V scores of over 6 points in both groups exceeds the minimum clinically important difference established in previous validation studies, indicating that these improvements are likely to translate into meaningful benefits in daily functioning.[17]

Our findings contribute to a more nuanced understanding of vertigo treatment and support the role of phytotherapeutic agents as legitimate alternatives or adjuncts to conventional drug therapy. Given the chronic nature of vertigo and the frequent occurrence of medication-related side effects, patient-centred approaches that balance efficacy with tolerability are essential.[18] Future research should explore longer-term outcomes beyond 12 weeks and comparative cost-effectiveness analyses to inform health policy and guideline development.

Despite the strengths of our study, including standardised outcome measures and detailed safety assessments, several limitations warrant consideration. First, our sample size, although adequate to detect moderate effect sizes, may not have been sufficient to identify smaller between-group differences, particularly for secondary outcomes, such as adherence. Second, since our study was conducted at a single tertiary care centre, the findings may have limited generalisability to other populations and healthcare environments. Third, the open-label design could have introduced bias in patient-reported measures, despite our efforts to ensure the standardised administration of questionnaires. Finally, although the 12-week treatment duration was sufficient to observe short-term efficacy and safety, long-term data are necessary to fully understand relapse rates, sustained adherence, and cumulative adverse events. Future multicentre, double-blind trials with extended follow-up are warranted to further validate these findings and determine the best application of Ginbex in the treatment of vertigo.

Conclusions

This comparative study demonstrated that both standardised Ginbex and betahistine significantly improved vertigo severity, associated anxiety, and overall clinical status over 12 weeks of treatment. While the efficacy of both interventions was comparable, Ginbex resulted in a lower frequency of adverse effects and greater satisfaction. Given these findings, Ginbex may represent a useful treatment option alongside betahistine, and its tolerability profile may make it particularly suitable for patients who do not tolerate betahistine well. Adherence rates were slightly higher with betahistine, highlighting the importance of patient education and individualised treatment planning in managing vertigo. Given the limitations of this study, including its single-centre design and short follow-up duration, further large-scale multicentre trials with extended observation periods are recommended. Such studies will help confirm long-term safety and efficacy, establish cost-effectiveness, and guide evidence-based recommendations for the management of chronic vertigo in diverse populations.

Author Information

1,5,6. Postgraduate Trainee, Benazir Bhutto Hospital, Rawalpindi 2. Professor, Benazir Bhutto Hospital, Rawalpindi 3. Consultant, Al-Wali Hospital, Bahrain 4. Postgraduate Trainee, Rawalpindi Teaching Hospital, Rawalpindi
Corresponding author: Dr. Abdur Rehman dr.malik.ar123@gmail.com

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