

The study was aimed to evaluate current practice in vestibular rehabilitation and to identify its key challenges and potential areas for optimisation. In 2024–2026, a two-round Delphi expert study was conducted involving 30 specialists in neurology, otorhinolaryngology, physical and rehabilitation medicine, physical therapy, neurophysiology, neurosurgery, and family medicine. Consensus was defined as a level of agreement of $\geq 75\%$. In the first round, the greatest disagreement concerned the timing of physical therapy initiation, prolonged use of vestibular suppressants, the balance between clinical experience and guideline recommendations, and criteria for completion of rehabilitation. Following reassessment, consensus was achieved for all 28 closed-ended statements (83.3–100%), while Kendall's coefficient of concordance (W) increased from 0.62 to 0.79 ($p < 0.001$). The experts identified the absence of clear interdisciplinary referral pathways (80.0%), insufficient access to specialised vestibular physical therapy (73.3%), and inadequate proficiency in positional testing and repositioning manoeuvres (66.7%) as the most significant challenges. The priority areas for optimisation were the standardisation of patient pathways, training healthcare professionals in evidence-based vestibular rehabilitation methods, and expanding access to specialised physical therapy. The findings indicate that the principal opportunities for improving vestibular rehabilitation relate not so much to a lack of effective methods as to their insufficiently consistent implementation, shortcomings in interdisciplinary collaboration, and the organisation of patient pathways.

Key words: vestibular disorders, vestibular rehabilitation, physical therapy, interdisciplinary communication.

Connection of the publication with planned research work.

This article was prepared within the framework of the research project of the Department of Therapeutic Disciplines, Petro Mohyla Black Sea National University, entitled "Clinical and Pathogenetic Substantiation of Systems for the Primary and Secondary Prevention of the Most Socially Significant Chronic Non-Communicable Diseases of Internal Organs" (state registration number 0120U101641).

Introduction.

Vestibular disorders are among the common causes of impaired balance, gait instability, falls, and substantial limitations in activities of daily living [1, 2]. Their clinical heterogeneity, the combination of peripheral and central mechanisms, and frequent comorbidity with neurological, otological, and musculoskeletal disorders necessitate a multidisciplinary approach to diagnosis and rehabilitation [3, 4]. Contemporary vestibular rehabilitation extends beyond the symptomatic treatment of dizziness and involves targeted interventions aimed at the mechanisms of vestibular compensation, postural control, and sensory integration [3, 5].

Positional and repositioning manoeuvres occupy a particularly important place in the management of vestibular disorders, especially benign paroxysmal positional vertigo (BPPV) [6]. These manoeuvres directly target the pathophysiological mechanism of the disorder and frequently result in a rapid reduction or resolution of positional vertigo. However, the resolution of positional nystagmus does not necessarily indicate complete functional recovery: instability, gait impairment, visual dependence, fear of falling, and activity limitations may persist [6, 7].

Physical therapy is therefore an important component of treatment and includes gaze-stabilisation exercises, habituation, static and dynamic balance training, gait training, and sensory reorganisation [8–10]. The combination of repositioning manoeuvres with person-

alised physical therapy forms the basis of comprehensive vestibular rehabilitation and requires coordinated collaboration between neurologists, otorhinolaryngologists, physical therapists, and other healthcare professionals.

The aim of the study.

To evaluate current practice in vestibular rehabilitation and to identify its key problematic aspects and potential areas for optimisation.

Object and research methods.

The study was conducted at the clinical departments of the Educational and Scientific Medical Institute of Petro Mohyla Black Sea National University between 2024 and 2026. To evaluate current vestibular rehabilitation practice and identify its most problematic aspects, the Delphi method [11] was employed as a structured approach to developing expert consensus through successive rounds of anonymous assessment. The expert group comprised 30 specialists from various fields of medicine and rehabilitation whose professional activities were directly or indirectly related to the diagnosis, treatment, and rehabilitation of patients with vestibular disorders. The panel included neurologists, otorhinolaryngologists, physicians in physical and rehabilitation medicine (PRM), physical therapists, neurophysiologists, neurosurgeons, and general practitioners/family physicians. The multidisciplinary composition of the expert panel was selected to account for differences in clinical approaches and to ensure a comprehensive assessment of the patient pathway.

At the preparatory stage, a list of statements was developed covering the diagnostic stage; indications for and techniques of positional tests and repositioning manoeuvres; the prescription of vestibular physical therapy; the use of gaze-stabilisation, habituation, balance, and gait exercises; assessment of fall risk; criteria for rehabilitation effectiveness; interdisciplinary collaboration; and continuity of patient management. The statements were formulated with reference to current inter-

national clinical guidelines and consensus documents on the diagnosis and management of peripheral and central vestibular disorders, including recommendations issued by professional societies in otoneurology, otorhinolaryngology, and physical therapy.

The study comprised several successive rounds of expert assessment. In the first round, participants assessed the clinical relevance of the proposed statements and were able to provide their own comments and suggestions [11]. Following synthesis of the responses, the wording of the statements was refined, combined, or supplemented as appropriate, after which the revised statements were resubmitted to the experts. In subsequent rounds, participants rated their level of agreement with each statement using a Likert scale. Consensus was defined as achievement of a prespecified level of agreement of at least 75% of the experts. Statements for which consensus was not achieved were subjected to further discussion and reassessment.

The final analysis involved comparing the resulting expert consensus with the provisions of international guidelines. Discrepancies between recommended approaches and actual clinical practice were regarded as potential “weak points” in the current vestibular rehabilitation system and as a basis for identifying areas for its further optimisation.

Statistical analysis was performed using TIBCO Statistica 14.1, employing the Basic Statistics/Tables and Descriptive Statistics modules. Descriptive statistics were calculated, and the normality of data distributions was assessed using the Shapiro–Wilk test [12]. The level of Delphi consensus was determined as the proportion of responses rated as “agree/strongly agree”, with a

threshold of $\geq 75\%$, while agreement among expert ratings was assessed using Kendall’s coefficient of concordance (W). Between-group differences were evaluated using Pearson’s χ^2 test/Fisher’s exact test, the Mann–Whitney U test, and the Kruskal–Wallis test, as appropriate. Associations between variables were assessed using Spearman’s rank correlation coefficient. Results were considered statistically significant at $p < 0.05$, with the Bonferroni correction applied for multiple comparisons.

During preparation of the manuscript, artificial intelligence tools and generative language models were not used for text generation, data analysis or interpretation, statistical calculations, or formulation of conclusions. All stages of the research and manuscript preparation were undertaken personally by the authors in accordance with the principles of the European Code of Conduct for Research Integrity (ALLEA, 2023) [13].

Research results and their discussion.

The study included 8 neurologists (including 2 specialists in neurophysiological investigations), 5 otorhinolaryngologists, 2 neurosurgeons, 3 PRM physicians, 6 physical therapists, and 6 family physicians. Following the first round of the Delphi survey, a high level of consensus ($\geq 75\%$) was achieved for the majority of the statements (fig. 1).

This applied, in particular, to the need for multidisciplinary management of patients with vestibular disorders (93.3%), balance training (93.3%), differentiation between central and peripheral vestibular syndromes (90.0%), assessment of fall risk (90.0%), and standardised patient pathways (90.0%).

At the same time, the greatest divergence of expert opinion concerned the timing of initiation of physical

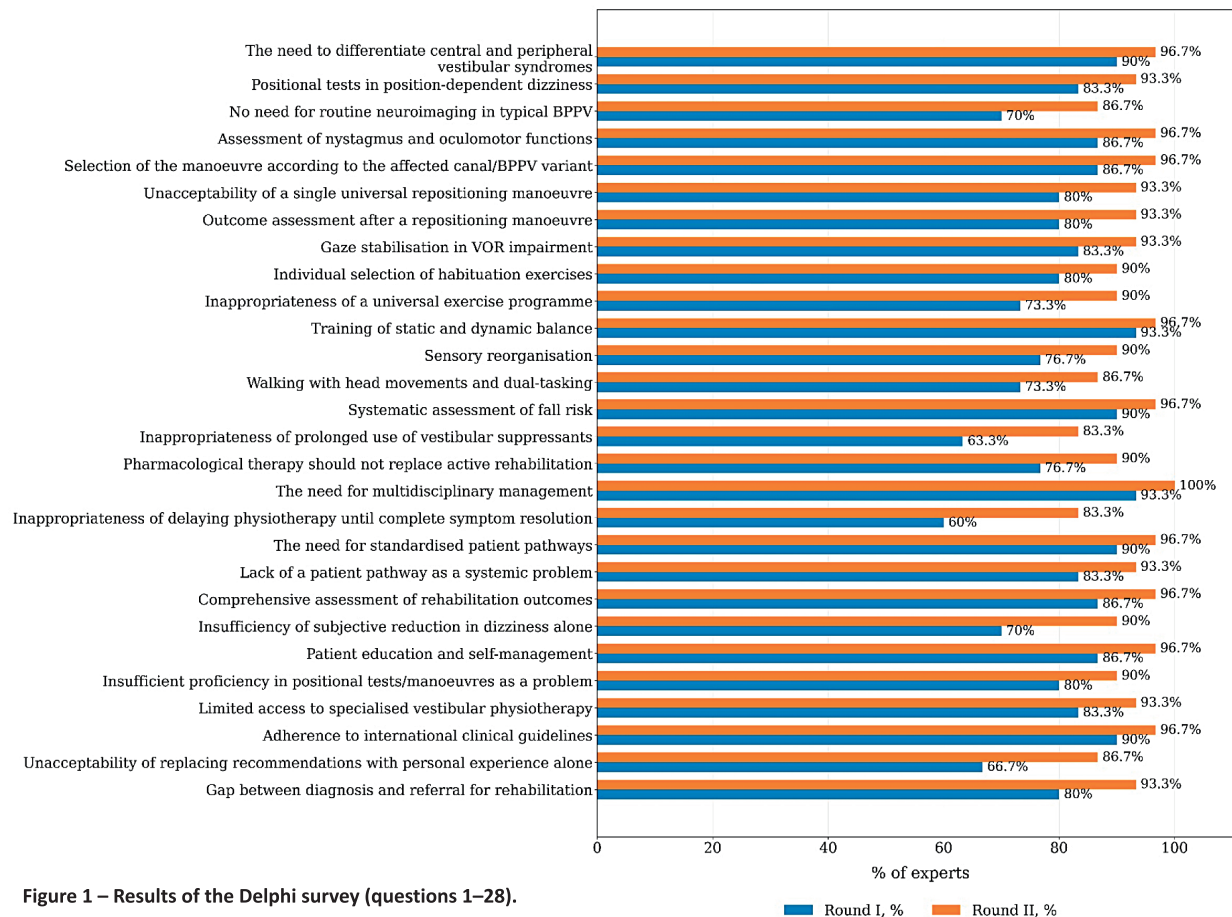
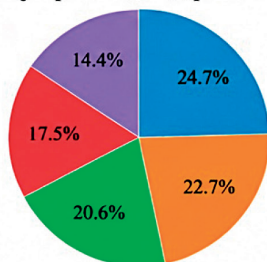


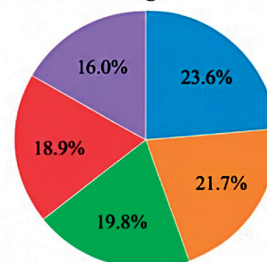
Figure 1 – Results of the Delphi survey (questions 1–28).

29. Three major problematic aspects in current practice



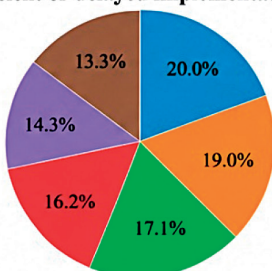
- 1. Lack of clear interdisciplinary referral pathways — 80% of experts
- 2. Limited access to specialised vestibular physical therapy — 73.3% of experts
- 3. Insufficient proficiency in positional testing and repositioning manoeuvres — 66.7% of experts
- 4. Excessive use of pharmacotherapy/vestibular suppressants — 56.7% of experts
- 5. Lack of standardisation in outcome assessment — 46.7% of experts

30. Initial changes



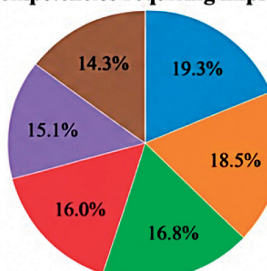
- 1. Implementation of a standardised patient pathway — 83.3% of experts
- 2. Training of physicians and physical therapists in evidence-based vestibular rehabilitation — 76.7% of experts
- 3. Expanded access to specialised physical therapy — 70% of experts
- 4. Implementation of unified clinical protocols/algorithms — 66.7% of experts
- 5. Early referral to active rehabilitation — 56.7% of experts

31. Insufficient or delayed implementation stages



- 1. Positional testing and accurate diagnosis of BPPV — 70% of experts
- 2. Timely referral to rehabilitation medicine/physical therapist — 66.7% of experts
- 3. Differentiation of central and peripheral vertigo — 60% of experts
- 4. Functional assessment of balance and fall risk — 56.7% of experts
- 5. Follow-up after repositioning manoeuvre — 50% of experts
- 6. Use of standardised outcome measures — 46.7% of experts

32. Competencies requiring improvement



- 1. Performance and interpretation of positional tests — 76.7% of experts
- 2. Appropriate selection and performance of repositioning manoeuvres — 73.3% of experts
- 3. Differential diagnosis of central vs peripheral syndromes — 66.7% of experts
- 4. Development of an individualised vestibular therapy programme — 63.3% of experts
- 5. Assessment of VOR, oculomotor function, balance and gait — 60% of experts
- 6. Interdisciplinary communication and referral pathways — 56.7% of experts

Figure 2 – Results of thematic coding.

therapy (60.0%), prolonged use of vestibular suppressants (63.3%), the balance between clinical experience and guideline recommendations (66.7%), the need for routine neuroimaging in typical BPPV (70.0%), criteria for completion of rehabilitation (70.0%), and the use of dual-task training and universal exercise programmes (73.3% each).

Following the second round, a marked convergence of expert opinions was observed: all 28 quantitatively assessed statements reached the predefined consensus threshold, with agreement ranging from 83.3% to 100%. The greatest increases in agreement were observed regarding early initiation of physical therapy (+23.3%), limiting the prolonged use of vestibular suppressants (+20.0%), the inadequacy of subjective reduction in dizziness as the sole criterion of effectiveness (+20.0%), and the priority of guideline recommendations over exclusively personal clinical experience (+20.0%).

Changes in ratings upon repeated assessment are consistent with the Delphi methodology and may have been associated with experts reviewing the anonymised aggregated results of the first round, considering the arguments provided by representatives of other specialties, and reassessing their own clinical practice in relation to international clinical guidelines. The particularly pronounced convergence of opinions on controversial issues may indicate that the initial discrepancies largely reflected differences in professional experience and established local practices rather than fundamental

disagreement regarding the goals of vestibular rehabilitation.

Analysis of responses to the open-ended questions (fig. 2) yielded the following categories, which were subsequently used in the discussion.

The three most problematic aspects of current practice identified by the respondents were the lack of a clear interdisciplinary referral pathway (80.0%), limited access to specialised vestibular physical therapy (73.3%), and insufficient proficiency in positional tests and repositioning manoeuvres (66.7%). According to the experts, priority changes should include the introduction of a standardised patient pathway (83.3%), training physicians and physical therapists in evidence-based methods of vestibular rehabilitation (76.7%), and expanding access to specialised physical therapy (70.0%). The procedures reported as being performed either inadequately or with delay included positional testing and correct identification of BPPV (70.0%), timely referral to a physical and rehabilitation medicine (PRM) physician/physical therapist (66.7%), and differentiation between central and peripheral vertigo (60.0%).

Agreement among expert ratings, assessed using Kendall's coefficient of concordance, was moderately high in Round I ($W=0.62$; $\chi^2=502.2$; $df=27$; $p<0.001$) and increased to a high level after repeated assessment in Round II ($W=0.79$; $\chi^2=639.9$; $df=27$; $p<0.001$), reflecting convergence of expert opinions. The greatest interprofessional differences in Round I concerned the inappropriateness of delaying physical therapy until complete resolution of symptoms ($\chi^2=13.4$; $p=0.037$) and pro-

longed use of antivertigo medications (Fisher's exact test, $p=0.041$); in Round II, these differences were no longer statistically significant ($p=0.18$ and $p=0.21$, respectively). When experts were provisionally grouped into clinical and rehabilitation subgroups, support for early initiation of physical therapy was higher among rehabilitation professionals ($U=53.0$; $p=0.016$). According to the Kruskal–Wallis test, differences between individual professional groups regarding this statement were $H=13.1$; $p=0.041$. Positive correlations were found between support for standardised patient pathways and the perceived need for multidisciplinary management ($r_s=0.56$; $p=0.001$), between adherence to international guidelines and the unacceptability of replacing them solely with personal clinical experience ($r_s=0.61$; $p<0.001$), and between support for early initiation of physical therapy and a negative attitude towards prolonged use of antivertigo medications ($r_s=0.48$; $p=0.007$).

The main limitations of the study include the relatively small number of experts ($n=30$) and their professional heterogeneity, which, on the one hand, ensured the multidisciplinary nature of the assessment but, on the other hand, may have influenced the initial level of agreement among responses. The Delphi method is based on expert judgement and therefore does not

allow direct assessment of the actual prevalence of the identified problems in clinical practice. Furthermore, repeated assessment after reviewing the aggregated results of the preceding round may potentially promote convergence of opinions. Thematic coding of responses to open-ended questions also involves an element of researcher interpretation. The findings should therefore be regarded as a basis for developing interdisciplinary consensus and for further evaluation of the identified problematic aspects in larger multicentre studies of real-world clinical practice.

Conclusions.

The principal finding of the study was the convergence of expert ratings in the second Delphi round, while four key problems remained priorities: inadequate organisation of rehabilitation pathways for patients with vestibular disorders, limited access to specialised physical therapy, insufficient proficiency in positional diagnostics and repositioning manoeuvres, and the unjustified predominance of symptomatic pharmacological treatment over active vestibular rehabilitation.

Prospects for further research.

Further evaluation of the identified problematic aspects in multicentre studies of real-world clinical practice.

References

- Corre J, Grouvel G, Yadnik S, Cugnot JF, Ghavami S, Boutabla A, et al. Protocol for assessing functional impairments in patients with unilateral and bilateral vestibulopathy: a novel approach to evaluate the impact of vestibular loss in daily life setting. *Front Neurol*. 2025;16:1704687. DOI: <https://doi.org/10.3389/fneur.2025.1704687>
- Romaniuk NV, Hryb VA. Dyferentsiina diahnozyka hostroho vestybuliarnoho syndromu. *Ukrainskyi nevrolohichnyi zhurnal*. 2024;(4):40-45. DOI: <https://doi.org/10.30978/UNJ2024-4-40> [in Ukrainian].
- Tarnutzer AA, Kerkeni H, Diener S, Kalla R, Candrea C, Piantanida R, et al. Diagnosis and treatment of vertigo and dizziness : Interdisciplinary guidance paper for clinical practice. *HNO*. 2025;73(3):357-369. DOI: <https://doi.org/10.1007/s00106-025-01599-z> Erratum in: *HNO*. 2025;73(3):370. DOI: <https://doi.org/10.1007/s00106-025-01670-9>
- Patil V, Nagappala SB, Murali A, Pusztai K, John J, Ghannam L, et al. Improving the Diagnostic Workup of Vertigo: A Multidisciplinary Review. *Spartan Med Res J*. 2026;10(3):32-40. DOI: <https://doi.org/10.51894/001c.158361>
- Hall CD, Herdman SJ, Whitney SL, Anson ER, Carender WJ, Hoppes CW, et al. Vestibular Rehabilitation for Peripheral Vestibular Hypofunction: An Updated Clinical Practice Guideline From the Academy of Neurologic Physical Therapy of the American Physical Therapy Association. *J Neurol Phys Ther*. 2022;46(2):118-177. DOI: <https://doi.org/10.1097/npt.0000000000000382>
- Cole SR, Honaker JA. Benign paroxysmal positional vertigo: Effective diagnosis and treatment. *Cleve Clin J Med*. 2022;89(11):653-662. DOI: <https://doi.org/10.3949/ccjm.89a.21057>
- Kim HJ, Kim JS, Choi KD, Choi SY, Lee SH, Jung I, et al. Effect of Self-treatment of Recurrent Benign Paroxysmal Positional Vertigo: A Randomized Clinical Trial. *JAMA Neurol*. 2023;80(3):244-250. DOI: <https://doi.org/10.1001/jamaneurol.2022.4944>
- Carender WJ, Grzesiak M, Telian SA. Vestibular Physical Therapy and Fall Risk Assessment. *Otolaryngol Clin North Am*. 2021;54(5):1015-1036. DOI: <https://doi.org/10.1016/j.otc.2021.05.018>
- Hoppes CW, Lambert KH, Klatt BN, Harvard OD, Whitney SL. Vestibular Physical Therapy Treatment of Individuals Exposed to Directed Energy. *Mil Med*. 2023;188(1-2):e198-e204. DOI: <https://doi.org/10.1093/milmed/usab202>
- Kriz M, Conover S, Cameron N, Conover M, Simon J, Pruetter J, Samy R, Backous D. Comparing in-clinic versus telehealth for vestibular physical therapy. *J Vestib Res*. 2024;34(4):215-222. DOI: <https://doi.org/10.3233/ves-220094>
- Shang Z. Use of Delphi in health sciences research: A narrative review. *Medicine (Baltimore)*. 2023;102(7):e32829. DOI: <https://doi.org/10.1097/md.00000000000032829>
- TIBCO Software Inc. TIBCO Statistica® Quick Reference Guide. Version 14.0.1. Palo Alto (CA): TIBCO Software Inc.; 2022. 304 p. Available from: https://docs.tibco.com/pub/stat-all-servers/14.0.1/doc/pdf/TIB_stat-all-servers_14.0.1_quick_ref.pdf?id=6
- ALLEA. The European Code of Conduct for Research Integrity. Revised Edition 2023. Berlin: ALLEA; 2023.

ВЕСТИБУЛЯРНА РЕАБІЛІТАЦІЯ: МІЖДИСЦИПЛІНАРНІ АСПЕКТИ

Зак М. Ю., Храмцов Д. М., Ворохта Ю. М., Припутень А. М., Яблонська Т. М.

Резюме. Метою було Оцінити сучасну практику вестибулярної реабілітації, визначити ключові проблемні аспекти її організації та застосування, а також окреслити потенційні напрями оптимізації міждисциплінарного ведення пацієнтів із вестибулярними розладами.

У 2024–2026 рр. проведено експертне дослідження за методом Дельфі за участю 30 фахівців із неврології, оториноларингології, фізичної та реабілітаційної медицини, фізичної терапії, нейрофізіології, нейрохірургії та сімейної медицини. Дослідження включало послідовні раунди анонімого оцінювання; консенсус визначали при рівні згоди $\geq 75\%$. Узгодженість експертних оцінок визначали за коефіцієнтом конкордації Кендалла W, міжгрупові відмінності — за χ^2 Пірсона/точним критерієм Фішера, U-критерієм Манна–Уїтні та критерієм Краскала–Уолліса, взаємозв'язки — за ранговою кореляцією Спірмена.

У першому раунді найбільші розбіжності стосувалися термінів початку фізичної терапії, тривалого застосування вестибулосупресантів, співвідношення клінічного досвіду та рекомендацій і критеріїв завершення реабілітації. У другому раунді консенсусу досягнуто за всіма 28 закритими положеннями (83,3–100%); коефіцієнт Кендалла W зріс із 0,62 до 0,79 ($p<0,001$). Найбільш проблемними аспектами визнано відсутність

чіткої міждисциплінарної маршрутизації (80,0%), недостатню доступність спеціалізованої вестибулярної фізичної терапії (73,3%) та недостатнє володіння позиційними пробами й репозиційними маневрами (66,7%). Пріоритетними змінами визначено стандартизацію маршруту пацієнта (83,3 %), навчання фахівців доказовим методом вестибулярної реабілітації (76,7%) і розширення доступу до спеціалізованої фізичної терапії (70,0%).

Повторне експертне оцінювання забезпечило виразне зближення міждисциплінарних позицій. Основними проблемами залишаються недостатня маршрутизація пацієнтів, обмежена доступність спеціалізованої фізичної терапії, недостатнє володіння позиційною діагностикою та репозиційними маневрами і невиправдане домінування симптоматичної медикаментозної терапії над активною вестибулярною реабілітацією.

Ключові слова: вестибулярні розлади, вестибулярна реабілітація, фізична терапія, міждисциплінарна комунікація

VESTIBULAR REHABILITATION: INTERDISCIPLINARY ASPECTS

Zak M. Y., Khramtsov D. M., Vorokhta Y. M., Pryputen A. M., Yablonska T. M.

Abstract. The study aimed to assess current practice in vestibular rehabilitation, identify key problems in its organisation and implementation, and outline potential directions for optimising the interdisciplinary management of patients with vestibular disorders.

In 2024–2026, a Delphi expert study was conducted involving 30 specialists in neurology, otorhinolaryngology, physical and rehabilitation medicine, physical therapy, neurophysiology, neurosurgery, and family medicine. The study comprised successive rounds of anonymous assessment; consensus was defined as an agreement level of $\geq 75\%$. Agreement among expert ratings was assessed using Kendall's coefficient of concordance (W); between-group differences were evaluated using Pearson's χ^2 test/Fisher's exact test, the Mann–Whitney U test, and the Kruskal–Wallis test, while associations between variables were assessed using Spearman's rank correlation.

In the first round, the greatest disagreement concerned the timing of initiation of physical therapy, prolonged use of vestibular suppressants, the relationship between clinical experience and clinical guidelines, and criteria for completion of rehabilitation. In the second round, consensus was achieved for all 28 closed statements (83.3–100%); Kendall's W increased from 0.62 to 0.79 ($p < 0.001$). The main problems identified were the absence of a clear interdisciplinary patient pathway (80.0%), limited access to specialised vestibular physical therapy (73.3%), and insufficient proficiency in positional testing and repositioning manoeuvres (66.7%). Priority changes included standardisation of the patient pathway (83.3%), training specialists in evidence-based vestibular rehabilitation methods (76.7%), and expanding access to specialised physical therapy (70.0%).

Repeated expert assessment resulted in marked convergence of interdisciplinary opinions. The principal remaining problems are inadequate patient routing, limited access to specialised physical therapy, insufficient proficiency in positional diagnosis and repositioning manoeuvres, and the unjustified predominance of symptomatic pharmacotherapy over active vestibular rehabilitation.

Key words: vestibular disorders, vestibular rehabilitation, physical therapy, interdisciplinary communication.

ORCID and contributionship:

Zak M. Y.: <https://orcid.org/0000-0002-9931-4290>^{ABEF}

Khramtsov D. M.: <https://orcid.org/0000-0002-5289-5542>^{ABCE}

Vorokhta Y. M.: <https://orcid.org/0000-0002-8390-4261>^{BCD}

Priputen A. M.: <https://orcid.org/0009-0004-2534-5125>^{BD}

Yablonska T. M.: <https://orcid.org/0000-0003-1637-4106>^{BDE}

Conflict of interest:

The authors declare no conflict of interest.

Corresponding author

Vorokhta Yuriy Mikolaiovich
Petro Mohyla Black Sea National University
Ukraine, 35000, Mykolaiv, 10 68 Desantnikov str.
Tel.: +380972733294
E-mail: vorokhta.y@chmnu.edu.ua

A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article.

This article is distributed under the terms of the **Creative Commons Attribution (CC-BY) License**, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited © All authors, 2026

Received 23.05.2026

Accepted 14.08.2026

Published 29.09.2026