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Understanding Health-related Quality of Life in Older Adults with Vestibular Dysfunction: An Integrative Narrative Review

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Abstract— Vestibular dysfunction is a prevalent age-related condition that substantially impairs health-related quality of life (HRQoL) through its effects on physical, psychological, and social functioning. However, current evidence remains fragmented, with limited integration of the biological, functional, and psychosocial mechanisms underlying reduced HRQoL in older adults. This narrative review synthesises available evidence on the multidimensional impact of vestibular dysfunction on HRQoL among older adults. A literature search was conducted in the Scopus and PubMed databases to identify English-language studies investigating vestibular disorders, ageing, and HRQoL. Evidence was thematically synthesised within the International Classification of Functioning, Disability and Health (ICF) framework. The findings indicate that age-related vestibular degeneration initiates a cascade of impairments characterised by dizziness, balance deficits, gait instability, falls, and reduced functional independence. These physical limitations interact with cognitive impairment, anxiety, depression, fear of falling, diminished balance confidence, and social isolation, resulting in progressive participation restrictions and poorer HRQoL. The review further highlights that improvements in vestibular function alone do not consistently translate into meaningful gains in patient-perceived quality of life, emphasising the importance of comprehensive assessment using both generic and vestibular-specific outcome measures. An integrated conceptual framework is proposed to illustrate the interconnected biological, functional, psychosocial, and contextual pathways influencing HRQoL. This framework supports multidisciplinary, person-centred rehabilitation strategies that extend beyond symptom management to promote autonomy, resilience, social participation, and healthy ageing while providing a foundation for future longitudinal and intervention research.

Keywords—health-related quality of life; older adults; vestibular dysfunction; healthy ageing; vestibular rehabilitation

I. INTRODUCTION

Population ageing has emerged as one of the most significant demographic transitions worldwide, accompanied by a growing prevalence of chronic conditions that compromise physical function, independence, and health-related quality of life (HRQoL). HRQoL is a

multidimensional, patient-centred construct that reflects individuals' subjective perceptions of how their health status influences physical, psychological, and social well-being [1, 2]. Unlike objective measures of health status or functional ability, HRQoL captures the broader impact of disease on daily life, including emotional well-being, social participation,

and life satisfaction [3]. Health status typically refers to clinically assessed physical and mental conditions, while functional ability describes the capacity to perform daily activities. In contrast, HRQoL integrates these dimensions with subjective experiences and personal values, making it particularly relevant for evaluating outcomes in chronic conditions and ageing populations [4]. Among older adults, HRQoL is especially important because it reflects the cumulative effects of multimorbidity, frailty, cognitive decline, and social determinants of health [5], all of which significantly influence overall well-being and independence.

Among these conditions, vestibular dysfunction represents an increasingly important yet frequently under-recognised geriatric syndrome. The vestibular system is fundamental for maintaining gaze stability, postural control, spatial orientation, and balance during movement [6]. However, age-related degeneration of vestibular sensory organs, vestibular afferents, and central vestibular pathways progressively impairs these functions, predisposing older adults to dizziness, vertigo, gait instability, and functional limitations [7]. Consequently, older adults with vestibular disorders may experience a substantially greater risk of falls, fall-related injuries, hospitalisation, institutionalisation, and loss of independence [8]. Falls also initiate a cascade of secondary consequences, including a fear of falling, reduced physical activity, deconditioning, frailty, and diminished social participation, all of which further contribute to declines in HRQoL [9]. Furthermore, increasing evidence suggests that chronic vestibular impairment is associated with anxiety, depression, poor sleep quality, social isolation, and cognitive decline, indicating that vestibular dysfunction should be viewed as a multidimensional condition rather than solely a disorder of balance [10-12]. Ultimately, these impairments and their secondary consequences not only limit functional independence but also impose a significant emotional burden, exacerbating the overall decline in HRQoL among this population.

Given the rapid growth of the ageing population worldwide, preserving mobility, independence, and quality of life among older adults with vestibular dysfunction has become a critical public health and rehabilitation priority. Vestibular rehabilitation remains a first-line intervention for dizziness and balance, with modern approaches incorporating conventional exercises, modified manoeuvres, home-based programmes, technology, and personalised care [13]. Home-based and digital therapies effectively treat benign paroxysmal positional vertigo (BPPV) and improve treatment adherence [14]. Nevertheless, studies examining long-term outcomes suggest that improvements in vestibular function do not always translate into clinically meaningful gains in HRQoL. For example, a longitudinal follow-up of patients with bilateral vestibulopathy reported limited changes in dizziness symptoms and HRQoL despite minor physiological improvements over time, suggesting that factors beyond vestibular impairment alone influence patients' perceived health status [15]. These findings indicate that rehabilitation outcomes should be evaluated using multidimensional, patient-centred measures rather than relying solely on physiological recovery metrics.

Although previous reviews have examined vestibular rehabilitation, specific vestibular disorders, falls, or age-

related vestibular decline, evidence linking vestibular dysfunction to HRQoL in older adults remains fragmented. Existing reviews have predominantly focused on treatment effectiveness, diagnosis, or individual disease entities, with limited integration of the biological, functional, and psychosocial mechanisms underlying HRQoL. Furthermore, few have adopted a unified framework explaining how age-related vestibular impairment progresses from body structure and function deficits to activity limitations, participation restrictions, and reduced HRQoL. This review addresses these gaps by synthesising current evidence within the International Classification of Functioning, Disability and Health (ICF) framework, integrating biological, functional, and psychosocial pathways into a comprehensive biopsychosocial model. It also evaluates generic and vestibular-specific outcome measures and proposes an integrated conceptual framework illustrating how vestibular dysfunction influences HRQoL in older adults. By moving beyond disease- and intervention-focused perspectives, this review provides a comprehensive understanding of the multidimensional determinants of HRQoL. It identifies priorities for future research and person-centred rehabilitation to support healthy ageing.

Therefore, this narrative review aims to explore the impact of vestibular dysfunction on HRQoL in older adults by integrating current evidence on age-related vestibular changes, functional impairments, psychosocial determinants, and patient-reported outcomes to provide a comprehensive understanding of the mechanisms underlying reduced quality of life and to inform future research and multidisciplinary rehabilitation.

II. METHOD

This narrative review provides a comprehensive synthesis of the current evidence on HRQoL among older adults with vestibular dysfunction. A literature search was performed on 6 July 2026 using the Scopus and PubMed electronic databases. The search strategy combined controlled vocabulary and free-text terms related to vestibular disorders, ageing, and HRQoL using the following Boolean search string: ("vestibular dysfunction" OR "vestibular disorder" OR vertigo OR dizziness OR "vestibular disease" OR "peripheral vestibular disorder*" OR "bilateral vestibular hypofunction" OR "unilateral vestibular hypofunction" OR BPPV OR "benign paroxysmal positional vertigo" OR "vestibular loss") AND ("older adult*" OR elder* OR elderly OR ageing OR aging OR geriatric* OR "older people" OR "older person*" OR senior*) AND ("health-related quality of life" OR HRQoL OR "quality of life" OR QoL) AND (physical OR functional OR psychological OR psychosocial OR social OR participation OR mobility OR balance OR gait OR depression OR anxiety).

Eligible studies were limited to English-language articles involving adults aged 60 years and above with vestibular disorders and reporting HRQoL-related outcomes. For this review, older adults were operationally defined as individuals aged ≥ 60 years. Studies involving mixed-age populations were considered eligible when findings for participants aged ≥ 60 years were separately reported or could be clearly identified. Studies involving paediatric populations, animal models, or non-English publications were excluded. No

publication-year restriction was applied because the review aimed to integrate both foundational and recent evidence on age-related vestibular changes, functional consequences, psychosocial determinants, and HRQoL. The literature search was conducted on 6 July 2026 to capture the most recent available evidence. Following title, abstract, and full-text screening, relevant publications were organised thematically according to the biological, functional, and psychosocial dimensions of HRQoL. In alignment with the methodology of a narrative review, no formal quality appraisal or meta-analysis was conducted. Instead, the evidence was critically synthesised to summarise current knowledge and identify gaps in the literature.

III. BIOLOGICAL PERSPECTIVE: VESTIBULAR AGEING AFFECTING HRQOL

The vestibular system is an essential sensory component of the inner ear that continuously provides information regarding head position, angular and linear acceleration, and gravitational orientation to maintain gaze stability, postural control, and spatial orientation [16]. Histopathological evidence shows reductions in vestibular hair cells, degeneration of otoconia, loss of vestibular afferent neurons, and decreased vestibular nuclei density, thereby impairing signal transmission [6][7]. These cellular and neural alterations are compounded by reduced neural plasticity, which further limits central compensation for declining vestibular input [6], disrupting sensory integration and vestibulo-ocular and vestibulo-spinal reflexes.

Age-related vestibular dysfunction also affects cognition, spatial orientation, and memory. Reduced vestibular input is linked to altered hippocampal function, impaired navigation, and poorer executive and cognitive performance [11], altering cortical regions responsible for multisensory integration [17]-[19]. These neurological changes occur alongside age-related declines in vision, proprioception, muscle strength, reaction time and cognitive processing. As a result, individuals increasingly rely on multisensory compensation strategies that may become insufficient during complex mobility tasks, contributing to balance impairment, dizziness, gait instability, and reduced confidence in daily activities.

Chronic vestibular dysfunction also disrupts autonomic regulation, increasing stress, fatigue, and psychological distress [20, 21], while persistent sensory mismatch reinforces maladaptive neural processing [22]. From an HRQoL perspective, these persistent symptoms may create a cycle of activity avoidance, fear of falling, reduced physical activity, and social isolation. These biological mechanisms demonstrate that vestibular dysfunction is not confined to peripheral sensory decline, but rather represents a complex, multisystem process that initiates the decline of HRQoL in older adults. Rather than functioning as isolated pathological processes, age-related changes within the vestibular system interact with cognitive ageing, multisensory decline, and reduced neuroplasticity to increase vulnerability to dizziness, postural instability, and impaired spatial orientation [6, 11, 18]. These biological alterations establish the foundation upon which subsequent functional disability and psychosocial consequences develop, highlighting that vestibular degeneration should be viewed as the first stage of a

multidimensional pathway leading to reduced HRQoL, rather than as the sole determinant of patient well-being.

IV. FUNCTIONAL PERSPECTIVE: FROM VESTIBULAR DYSFUNCTION TO ACTIVITY LIMITATION

The functional consequences of vestibular dysfunction represent a major pathway through which age-related vestibular decline reduces HRQoL in older adults. Although originating from biological changes within the vestibular system, these effects manifest primarily as impaired physical function that limits safe and independent daily activities. Age-related degeneration disrupts the integration of vestibular, visual, and proprioceptive inputs required for balance and movement control, resulting in dizziness, postural instability, and gait disturbances [7]. Consequently, older adults may exhibit increased postural sway, delayed motor responses, slower gait speed, shorter stride length, and greater gait variability, which collectively reduce mobility efficiency and stability [23, 24]. These impairments extend beyond physical performance to affect activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Tasks such as bathing, cooking, and shopping may become challenging due to dizziness or imbalance, leading individuals to modify activities, rely on support, or require assistance [25]. Furthermore, even highly treatable conditions, such as BPPV, can cause recurrent symptoms that significantly disrupt daily functioning [26]. Over time, these impairments compromise balance, mobility, and functional independence, establishing the transition from biological deterioration to broader psychosocial consequences in later life.

The relationship between vestibular dysfunction and HRQoL aligns with the ICF framework, which describes disability as an interaction between impairments, activity limitations, participation restrictions, and contextual factors [27]. Participation restriction represents a significant yet frequently under-recognised consequence of chronic vestibular dysfunction, providing a vital link between physical impairment and reduced HRQoL. Persistent dizziness and imbalance may lead older adults to avoid crowded environments, unfamiliar settings, and social activities, reducing community mobility and quality of life [28]. Although such avoidance may initially reduce fall risk, prolonged restriction can promote physical deconditioning, loneliness, and dependence. Therefore, rehabilitation should focus not only on symptom reduction but also on restoring participation and independence [29]. Patient-reported outcomes further indicate that improvements in balance or gait do not always translate into better HRQoL, as perceived well-being is strongly influenced by the ability to engage in meaningful activities [15, 30].

Falls represent another major consequence of vestibular dysfunction and an important mechanism linking impaired balance with declining HRQoL. Age-related vestibular decline impairs multisensory postural control, increasing instability during walking, turning, and navigating uneven surfaces [7]. As a result, older adults with vestibular disorders have a higher risk of recurrent falls, which are associated with injury, hospitalisation, loss of independence, and mortality [8]. Beyond physical consequences, falls often lead to fear of

falling, reduced confidence, activity avoidance, and social withdrawal, creating a cycle of declining mobility and increased fall vulnerability [31]. These behavioural and psychological responses contribute to reduced physical capacity, diminished self-efficacy, and greater reliance on others, thereby amplifying the adverse effects of vestibular dysfunction on HRQoL.

Overall, vestibular dysfunction affects HRQoL not only through impaired balance but also through its compounding effects on mobility, participation, and independence. Dizziness, gait disturbances, activity restriction, and falls interact to create a cycle of functional decline and psychosocial burden. Importantly, improvements in vestibular function alone may not fully restore HRQoL, indicating that patient-perceived well-being is influenced more strongly by the ability to remain independent, socially connected, and engaged in meaningful activities than by clinical measures of impairment alone. These findings emphasise the need for rehabilitation strategies that integrate physiological recovery with functional goals, participation outcomes, and patient-centred approaches to address the broader impact of vestibular dysfunction in older adults.

V. PSYCHOSOCIAL PERSPECTIVE: THE HIDDEN BURDEN OF VESTIBULAR DYSFUNCTION

Vestibular dysfunction affects not only balance and spatial orientation but also cognitive and emotional health through its connections with brain regions involved in spatial memory, attention, executive function, and emotional regulation. It is associated with impairments in spatial cognition, navigation, and visuospatial memory, particularly in individuals with mild cognitive impairment or Alzheimer's disease [32-34]. Deficits in attention and immediate memory have also been reported in bilateral vestibulopathy and vestibular migraine, while language and delayed memory remain relatively preserved [33, 35]. These cognitive changes may reduce independence, increase fall risk, and diminish HRQoL by limiting functional capacity and participation. Furthermore, persistent dizziness and imbalance also contribute to substantial emotional distress. Older adults with vestibular dysfunction commonly experience anxiety, depression, panic symptoms, fear of falling, and social withdrawal, which further impair HRQoL [36, 37]. These manifestations reflect the bidirectional relationship between vestibular dysfunction, cognition, and emotional regulation, described as vestibular cognitive-affective syndrome. Anxiety, hypervigilance, and avoidance behaviours may reinforce symptoms and prolong disability even after vestibular symptoms stabilise [38]. Together, cognitive and emotional impairments contribute substantially to functional decline by limiting compensation for balance deficits, reducing confidence, impairing rehabilitation engagement, and restricting participation in everyday activities.

Beyond cognitive and emotional consequences, HRQoL is shaped by the interaction of physical limitations, psychological responses, social circumstances, and behavioural adaptations. Anxiety, depression, fear of falling, and reduced balance confidence can worsen disability by increasing symptom perception, restricting activity, and reducing functional performance [39-42]. Fear of falling is

particularly important, as avoidance of movement and challenging environments may lead to physical deconditioning, reduced confidence, increased dependence, and greater fall risk. Thus, psychological responses may mediate the relationship between vestibular impairment and HRQoL by transforming physical symptoms into broader limitations in independence and participation. Coping strategies and psychological adaptation also influence outcomes. Adaptive coping, including acceptance, problem-solving, and active symptom management, is associated with better adjustment and higher HRQoL, whereas avoidance-based coping predicts poorer outcomes [41]. Self-efficacy and balance confidence are particularly important, as greater confidence promotes participation, rehabilitation adherence, and functional recovery [40, 43]. Rehabilitation should therefore address not only vestibular function but also psychological barriers affecting confidence and engagement in daily activities.

Social determinants further shape HRQoL by influencing support, participation, and maintenance of social roles. Social participation is a fundamental component of healthy ageing and is associated with better mental health, lower loneliness, and greater life satisfaction [44, 45]. However, vestibular symptoms may limit participation through reduced mobility confidence, dependence, and avoidance of unfamiliar environments. Strong social networks can buffer these effects by providing emotional support and encouraging activity. In contrast, loneliness and social isolation are linked to poorer health outcomes, impaired balance, increased fall risk, and lower HRQoL [46]. The relationship between vestibular dysfunction and social participation is bidirectional, as symptoms restrict engagement while reduced social interaction contributes to distress, inactivity, and functional decline [47, 48]. These findings indicate that HRQoL is determined not only by vestibular symptom severity but also by the social context in which individuals experience and manage their condition.

Overall, HRQoL in older adults with vestibular dysfunction reflects the interaction of physical impairment, cognitive and emotional changes, coping behaviours, and social environment. Although evidence for psychosocial interventions remains limited, research in older adults suggests that improving self-efficacy, balance confidence, reducing maladaptive fear of falling, and strengthening social connectedness may facilitate participation and well-being [43, 49]. A degree of adaptive caution may support safer movement and environmental awareness; however, excessive or maladaptive fear of falling may promote avoidance, deconditioning, dependence, and further functional decline. A multidisciplinary, person-centred approach integrating symptom management with psychological and social interventions is essential to promote independence, participation, and healthy ageing.

VI. INTEGRATING BIOLOGICAL, FUNCTIONAL AND PSYCHOSOCIAL PERSPECTIVES

The proposed integrated conceptual framework explains how age-related vestibular degeneration contributes to declining HRQoL through interacting biological, functional, psychosocial, and contextual mechanisms, as shown in Figure

1. Rather than representing vestibular dysfunction as a direct cause of reduced quality of life, the framework highlights a dynamic cascade in which sensory decline initiates a series of interconnected changes that influence mobility, independence, participation, and psychological well-being. This interpretation aligns with the ICF framework, which emphasises that health outcomes emerge from the interaction between impairments, activity limitations, participation restrictions, and contextual factors. Within this framework, vestibular degeneration represents the initial biological disruption, where age-related structural and cellular changes impair the vestibular signalling required for balance regulation, spatial orientation, and postural control [27][50]. However, the impact of this impairment extends beyond the vestibular system itself, as reduced sensory input compromises the ability of older adults to maintain stable movement and adapt effectively to environmental demands [6, 7].

Figure 1 further illustrates that vestibular dysfunction acts as a catalyst for functional decline rather than an isolated physiological deficit. Impaired gaze stability, postural control, and spatial orientation contribute to dizziness, gait instability, and increased fall susceptibility, which subsequently restrict mobility and daily activities [7, 23, 25]. Dizziness, recurrent balance problems, and falls frequently lead to activity restriction and physical deconditioning, reinforcing a cycle in which declining mobility further exacerbates vestibular-related disability [8, 28, 29, 31]. Thus, the framework suggests that the relationship between vestibular dysfunction and HRQoL is mediated by progressive functional consequences rather than being solely determined by the severity of the vestibular impairment itself. As mobility declines, older adults may experience reduced opportunities for social engagement and meaningful activities, transforming an initial sensory impairment into broader participation restrictions and a loss of independence [51].

A key contribution of the integrated framework is its recognition that psychosocial responses are not merely secondary outcomes of vestibular dysfunction, but are active mechanisms that shape the trajectory of disability and quality of life. Persistent dizziness, falls, and uncertainty during movement can generate a fear of falling, anxiety, and reduced self-confidence, which may encourage avoidance behaviours and further decrease physical and social participation [36][37][39][40]. This creates a reciprocal relationship in which psychological distress reinforces functional decline, while increasing disability intensifies the emotional burden. Similarly, contextual factors modify the extent to which vestibular impairment affects daily life. Supportive environments, accessible community settings, and appropriate adaptations may reduce disability by enabling continued participation, whereas environmental barriers may magnify fall risk and accelerate the restriction of activities [52]. Personal factors, including health literacy, coping ability, self-efficacy, health beliefs, and resilience, may further influence whether individuals understand, respond to, and adapt to persistent vestibular symptoms [53].

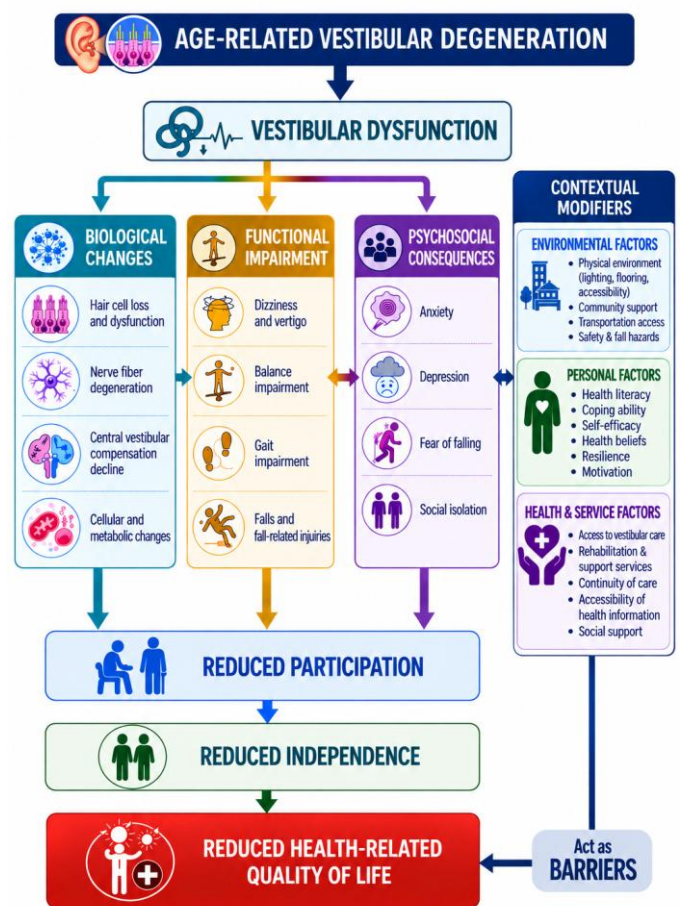


Figure 1. Illustration of integrating biological, functional and psychosocial perspectives that contribute to the diminished HRQoL among older adults with vestibular dysfunction.

Overall, Figure 1 conceptualises HRQoL decline in older adults with vestibular dysfunction as the result of a complex, reciprocal system rather than a linear progression from impairment to disability. The framework demonstrates that vestibular degeneration initiates interacting biological, functional, psychological, and environmental processes that collectively determine ageing outcomes. The significance of this framework lies in its ability to provide a comprehensive theoretical foundation for understanding vestibular dysfunction as a multidimensional ageing-related condition rather than an isolated sensory impairment. By identifying the interconnected pathways linking vestibular decline with functional limitations, psychosocial challenges, and environmental influences, the framework offers a structured approach for guiding future research, clinical assessment, and intervention development. It supports the integration of vestibular care within broader healthy ageing strategies by emphasising outcomes that extend beyond symptom control, including autonomy, social participation, resilience, and overall quality of life. Consequently, this framework may serve as a valuable model for developing personalised, multidisciplinary approaches that address the complex needs of older adults experiencing vestibular-related decline.

VII. MEASURING HRQoL IN VESTIBULAR DYSFUNCTION

Assessment of HRQoL in older adults with vestibular dysfunction requires both generic and vestibular-specific outcome measures because each captures different aspects of the condition (Table 1). Generic HRQoL instruments provide a broad evaluation of physical, psychological, and social well-being, allowing comparisons across diseases and populations [54]. In contrast, vestibular-specific instruments offer greater sensitivity for dizziness-related disability, balance impairment, and participation restrictions.

Table 1. List of generic HRQoL instruments and vestibular-specific outcome measures.

Generic HRQoL Instruments	Vestibular-specific Outcome Measures
• Short Form Health Survey 36 (SF-36) • Short Form Health Survey 12 (SF-12) • EuroQol Five-Dimensions (EQ-5D) • World Health Organisation Quality of Life (WHOQOL)	• Dizziness Handicap Inventory (DHI) • Activities-specific Balance Confidence (ABC) Scale • Vestibular Activities and Participation (VAP) • Penn Acoustic Neuroma Quality of Life (PANQOL) questionnaire • Vestibular Schwannoma Quality of Life (VSQOL) Index

A. Generic HRQoL Instruments

Common generic instruments include the Short Form Health Survey-36 (SF-36), Short Form Health Survey-12 (SF-12), EuroQol Five-Dimension questionnaire (EQ-5D), and World Health Organisation Quality of Life (WHOQOL) questionnaire.

The SF-36 assesses eight domains, including physical functioning, pain, general health, vitality, social functioning, and mental health [55], and the shorter SF-12 provides physical and mental component scores with reduced respondent burden, making it suitable for older adults and large-scale studies [56]. The EQ-5D evaluates mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, while also enabling calculation of health utility values and quality-adjusted life years (QALYs) for economic evaluations. Associations between EQ-5D and vestibular-specific measures such as the Dizziness Handicap Inventory (DHI) support its use in assessing the broader impact of vestibular disorders [48].

The WHOQOL questionnaire further expands assessment by considering physical health, psychological well-being, social relationships, and environmental factors. Although generic HRQoL instruments demonstrate good reliability and validity, their sensitivity to vestibular-specific symptoms varies. Individuals with bilateral vestibulopathy may continue to report reduced SF-36 and EQ-5D scores despite improvements in vestibular function, indicating that quality of life is influenced by disability, adaptation, and social participation beyond physiological recovery [57]. Similarly, chronic dizziness and vertigo are associated with poorer HRQoL across mobility, participation, emotional, and cognitive domains, supporting the integration of patient-reported outcomes into rehabilitation planning [58]. Overall, generic HRQoL instruments provide a valuable patient-centred perspective on the broader burden of vestibular

disorders and enable comparisons with other chronic conditions. However, they may not fully capture dizziness-related disability, balance confidence, or vestibular-specific participation restrictions. Therefore, combining generic and disease-specific measures offers a more comprehensive evaluation of outcomes in older adults with vestibular dysfunction.

B. Vestibular-Specific Outcome Measures

While generic HRQoL instruments provide an overview of overall health status, vestibular-specific outcome measures offer greater sensitivity for evaluating symptoms and functional limitations directly attributable to vestibular disorders. These instruments are particularly valuable in both clinical practice and research because they quantify dizziness, imbalance, movement-related disability, and participation restrictions that may not be adequately captured by generic questionnaires. A major strength of vestibular-specific measures is their ability to detect clinically meaningful changes in symptom severity and functional outcomes, making them highly responsive for monitoring rehabilitation progress and evaluating treatment effectiveness. Their disease-focused approach also enables clinicians to identify specific areas of impairment, including balance confidence, activity limitation, and participation restriction, thereby supporting more individualised rehabilitation planning [58]. However, because these instruments are designed specifically for vestibular disorders, they generally provide limited information regarding broader psychosocial well-being and do not facilitate direct comparisons with other chronic health conditions.

The Dizziness Handicap Inventory (DHI) remains the most widely used vestibular-specific patient-reported outcome measure [59]. Comprising physical, emotional, and functional subscales, the DHI evaluates the perceived handicap associated with dizziness and has demonstrated strong reliability, validity, and responsiveness across a wide range of vestibular disorders [58]. Numerous studies have reported significant improvements in DHI scores following vestibular rehabilitation, reflecting reductions in symptom burden and enhanced daily functioning [60]. Furthermore, the DHI demonstrates strong correlations with generic HRQoL measures, supporting its usefulness in evaluating the patient-perceived impact of vestibular disorders [61]. Nevertheless, despite its widespread use, the DHI primarily reflects dizziness-related disability and provides limited information regarding broader psychosocial well-being, participation, and general health status. Because it is designed specifically for vestibular populations, its ability to compare health outcomes across different clinical conditions is also limited.

Another widely used instrument is the Activities-specific Balance Confidence (ABC) Scale, which assesses an individual's confidence in performing everyday activities without losing balance or becoming unsteady [62]. As diminished balance confidence is closely associated with fear of falling, activity restriction, and functional decline, the ABC Scale provides valuable information regarding behavioural adaptation and perceived functional ability among older adults with vestibular dysfunction [40]. Lower ABC scores have consistently been associated with poorer mobility, increased fall risk, and reduced social participation,

supporting its usefulness in identifying individuals who may benefit from targeted rehabilitation [63]. In addition, the instrument demonstrates good responsiveness to changes in functional mobility during rehabilitation. However, as a self-reported measure, ABC scores may be influenced by individual perceptions, psychological factors, and activity expectations, resulting in discrepancies between perceived and objectively measured functional performance. Similar to the DHI, the ABC Scale is restricted to vestibular populations, limiting cross-disease comparisons and providing relatively little information regarding broader psychosocial health.

The Vestibular Activities and Participation (VAP) Measure extends assessment beyond symptom severity by evaluating activity limitations and participation restrictions within the ICF framework [64]. This broader focus enables clinicians to evaluate how vestibular disorders influence everyday functioning and social participation, making the VAP particularly useful for monitoring rehabilitation outcomes and clinically meaningful changes in activity participation. However, its emphasis on vestibular-related functioning provides limited information regarding broader psychosocial well-being and restricts comparisons with individuals living with other chronic health conditions.

Although less frequently used, disease-specific instruments such as the Penn Acoustic Neuroma Quality of Life (PANQOL) questionnaire [65] and the Vestibular Schwannoma Quality of Life (VSQOL) Index further demonstrate the value of assessing vestibular-related impacts on daily functioning, participation, and overall well-being in specific patient populations [66, 67]. These instruments are particularly responsive to clinically meaningful changes following treatment and provide detailed evaluation of disease-specific symptoms. Nevertheless, their application is limited to individuals with vestibular schwannoma, restricting their use in broader vestibular populations and limiting comparisons with other health conditions. In addition, they provide relatively little information regarding wider psychosocial well-being beyond disease-specific impacts.

Vestibular-specific outcome measures demonstrate greater responsiveness to clinically meaningful changes than generic HRQoL instruments and are particularly valuable for evaluating treatment effectiveness following vestibular rehabilitation. Their principal limitation is that they focus predominantly on vestibular symptoms and related disability, potentially overlooking broader determinants of healthy ageing, including multimorbidity, emotional well-being, social participation, and overall perceived quality of life. Variation in instrument selection, scoring interpretation, and responsiveness across different vestibular conditions may also limit direct comparisons between studies. Furthermore, relatively few studies have established minimally clinically important differences for older adults with vestibular dysfunction, reducing confidence in interpreting meaningful clinical change. Cross-cultural adaptation and validation also remain incomplete for several instruments, particularly in low- and middle-income countries, limiting their applicability across diverse populations. Therefore, vestibular-specific measures should be interpreted alongside generic HRQoL instruments, including the SF-36, SF-12, EQ-5D, and WHOQOL, to provide a comprehensive evaluation of the

multidimensional effects of vestibular disorders on healthy ageing and overall quality of life.

VIII. CLINICAL IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS

The findings of this review highlight that managing vestibular dysfunction in older adults should extend beyond improving dizziness and balance to address the broader determinants of HRQoL. Although vestibular rehabilitation improves vestibular function, gait, and mobility, physiological gains do not always translate into meaningful improvements in patient-perceived quality of life. Therefore, clinical assessment should combine objective vestibular measures with patient-reported outcomes. Integrating generic HRQoL instruments with vestibular-specific measures provides a more comprehensive evaluation of the multidimensional impact of vestibular disorders and facilitates individualised rehabilitation planning. In addition to vestibular rehabilitation, interventions should target fear of falling, anxiety, depression, cognitive impairment, reduced balance confidence, and participation restrictions, as these factors substantially influence HRQoL. The findings also encourage collaboration among physiotherapists, otolaryngologists, geriatricians, psychologists, occupational therapists, and primary healthcare providers to enhance participation, resilience, self-efficacy, and social engagement within supportive environments, and promote healthy ageing among older adults.

This review has several limitations. As a narrative review, evidence was synthesised qualitatively without formal quality appraisal or meta-analysis, precluding estimation of effect sizes or causal relationships. The search was limited to Scopus and PubMed only and English-language publications, potentially excluding relevant evidence. Furthermore, heterogeneity in vestibular diagnoses, study designs, participant characteristics, and HRQoL measures, together with the predominance of cross-sectional studies, limits direct comparisons and understanding of long-term disease progression. Accordingly, the proposed conceptual framework should be regarded as an evidence-informed model rather than a definitive causal framework.

Future research should prioritise longitudinal studies to clarify the temporal relationships between vestibular degeneration, functional decline, psychosocial adaptation, and HRQoL. Validation of the proposed framework using structural equation modelling or mediation analysis would strengthen understanding of the interactions among biological, functional, psychosocial, and contextual determinants. Intervention studies should also evaluate whether multidisciplinary programmes integrating vestibular rehabilitation with psychological support, cognitive training, fall prevention, and social participation produce greater improvements in HRQoL than conventional rehabilitation alone. In addition, further work is needed to establish minimally clinically important differences for vestibular-specific outcome measures, expand cross-cultural validation, and evaluate emerging technologies, including tele-rehabilitation, wearable sensors, and digital health platforms, to support long-term management and healthy ageing in older adults with vestibular dysfunction.

IX. CONCLUSIONS

Vestibular dysfunction substantially diminishes HRQoL in older adults through complex interactions among age-related biological degeneration, functional impairment, psychosocial consequences, and contextual factors. Rather than representing an isolated disorder of balance, vestibular dysfunction initiates a multidimensional cascade that contributes to dizziness, gait instability, falls, activity limitation, reduced participation, psychological distress, and loss of independence, collectively compromising overall well-being. By integrating current evidence within the ICF framework, this review provides a comprehensive biopsychosocial perspective that explains the pathways linking vestibular impairment to reduced HRQoL and highlights the importance of considering patient-centred outcomes alongside physiological measures. The proposed conceptual framework offers a theoretical foundation to guide future research, comprehensive clinical assessment, and multidisciplinary rehabilitation strategies that extend beyond symptom management to promote autonomy, resilience, social participation, and healthy ageing. Future longitudinal and intervention studies are needed to clarify the mechanisms linking vestibular dysfunction to HRQoL and to establish evidence-based, integrated rehabilitation models that support healthy ageing and improve quality of life in this growing population. Ultimately, optimising HRQoL in older adults with vestibular dysfunction requires holistic, person-centred care that addresses the interconnected biological, functional, and psychosocial determinants of health.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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DECLARATION OF AI-ASSISTED TOOLS USAGE

AI-assisted tools were used solely for language editing to improve grammar, clarity, and readability. An AI-detection assessment reported a score below 15%. The authors acknowledge the use of Grammarly for grammar and style checking, and ChatGPT (OpenAI) for language refinement, editing and visualisation figure assistance during the preparation of this manuscript. All scientific content, data analysis and interpretation are the responsibility of the authors. The authors have critically reviewed and verified all revisions and accept full responsibility for the accuracy, originality, integrity, and entire content of the manuscript.

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