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Article in *International Journal of Otorhinolaryngology and Head and Neck Surgery* · April 2023

DOI: 10.18203/issn.2454-5929.ijohns20231093

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Review Article

Quality of life in patients with vestibular disorders: a narrative review

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Received: 26 February 2023

Accepted: 17 April 2023

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ABSTRACT

Vestibular disorders may lead to physical disability and altered quality-of life. Even though, some specific diseases are associated with sleep, work, leisure, and emotional impairment, little is known about which vestibular disorders may lead to disturbances in daily life activities. We aim to extend the understanding of this issue and provide a comprehensive overview about how vestibular disorders are linked to altered quality of life (QoL). Currently available literature was analysed for understanding the affection of QoL in several focused daily-life activities. Vestibular disorders and QoL articles were reviewed; 431 articles were found on different databases and 50 were included in this review. We provide the latest evidence about how QoL is affected by vestibular disorders, their relationship, and upcoming challenges in this review. The deepest understanding of how QoL may be affected by vestibular disorders would provide better comprehension of this process for primary care physicians, otolaryngologists, neurologists, and neuro-otologists.

Keywords: Vestibular system, QoL, Vestibular disorders

INTRODUCTION

Vestibular disorders are affections into vestibular system, leading to physical disability and altered QoL.¹ Dizziness, vertigo and unsteadiness are the most common symptoms associated with these disorders.¹ At least 7 million of Americans complain of vestibular disorders, leading to several consultations on outpatient settings and emergency departments.¹ These disorders may be involved in important depletion of work, leisure, and daily activities.¹ Social and economic impacts are also considered when patients complain about these disorders.^{1,2}

Some of the most common types of vertigo worldwide are Meniere's disease (MD), benign paroxysmal positional vertigo (BPPV), vestibular migraine and unilateral vestibulopathy, most of them associated to

altered QoL in each of them.^{1,2} Even though these vertigos may cause physical impairment and disability, those present diverse clinical features that may contribute to different grades of QoL.

MD criteria include vertigo episodes lasting from 4 to 72 hours, fluctuant sensorineural hearing loss, tinnitus, and fullness.³ Benign paroxysmal positional vertigo (BPPV) is characterized by short vertigo episodes lasting seconds triggered by positional and head movements while lying down or turning over in space, and vertical torsional nystagmus.⁴ Vestibular migraine, is one of the most common vertigos mainly found in females, including episodic vertigo episodes concomitant to pulsatile headache, phonophobia, photophobia and migraine auras according to the Barany Society criteria.⁵ Unilateral vestibulopathy is characterized by acute and continuous vertigo triggered by infections, vascular disorders and sometimes, this may not have a clear etiology.⁶

Vestibular disorders are commonly associated with increased rates of depression, anxiety, and cognitive impairment.^{6,7} These are commonly seen in patients with MD, vestibular neuritis, and benign paroxysmal positional vertigo. When depression and anxiety have been reported are usually associated with balance and gait impairment, as well as headache and disproportionate and continuous sensation of falling. Some possible hypotheses are associated with some disturbances at some specific pathways shared by the vestibular nucleus and locus coeruleus, parabrachial nuclei and dorsal raphe nucleus.⁸ Even though these findings have been described, several controversies do exist regarding the association of vestibular disorders, psychological symptoms and QoL.^{6,7} Currently, it is known that there is a deterioration in the QoL caused by vestibular disorders, including in functional, physical and emotional settings, risk of falls, limited participation in work and social activities, fear of falling, avoidance on leisure and travel, depression, panic, and agoraphobia.⁹ Although these events have been independently detailed on some vestibular disorders, there is few available information on how QoL may be affected in each vestibular disorders and which specific settings are affected in each one. The aim of this review is to describe how vestibular disorders may affect QoL and which of them do present direct affection on sleeping, work, leisure, and emotions.

LITERATURE SEARCH

The literature search was conducted in PubMed, Scopus and Google Scholar to search articles published between September and October 2022 in the English language using the following medical subject headings (MeSH) terms: “Quality of life”, “Vestibular Disorders”, “Dizziness” and “Vertigo”, and Boolean operators AND/OR. The MeSH keywords used were Vertigo OR (“Vertigo” [Mesh] OR “Dizziness” [Mesh]) AND Quality of life AND (“Quality of life” [Mesh]), Vestibular diseases OR (“Vestibular diseases” [Mesh] AND (“Quality of life” [Mesh])). The detailed search strategy of this study is shown in Figure 1. We set the retrieval time from the database inception to September 2022 to make the retrieval strategy more comprehensive and detailed information as follows: 1. Database retrieval: PubMed, Scopus and Google scholar. Information resources were searched by a professional librarian to find peer-reviewed journal papers and grey literature. 2. Manual retrieval: The potentially relevant article which met the eligibility criteria and reference list of related systematic reviews and included studies were checked and searched by manual retrieval to supplement the unsearched paper and grey literature. 3. Contact with author and journal: we contacted author or journal for missing information or clarification of unclear data, if we did not receive a response after two intends of contact, we excluded the study.

Articles in English, those including information about postural persistent perceptual dizziness, acute and chronic

vestibular disorders, vestibular migraine, vestibular neuritis, benign paroxysmal positional vertigo and vestibular paroxysmia were included. Studies focused on pediatric populations, neurologic disorders, central vertigo, Parkinson's and Alzheimer's disease, CANVAS or cerebellar ataxia, neoplasms, facial palsy, glomus jugularis, chronic pain, and vestibular schwannoma were excluded.

In total 431 indexed papers were found, of which 381 articles were duplicates, articles in other language than English or Spanish, wrong comparator, wrong intervention, wrong patients’ population, articles not relevant to the topic and articles not focused on the inclusion criteria were removed (Figure 1). Fifty articles were included in this review. All articles selected were cross-checked by the authors. Prospective and retrospective studies randomized clinical trials, non-randomized controlled clinical trials, cross-sectional study, case series and longitudinal multicenter studies were included. Literature reviews, unpublished abstracts, posters, comments to the editor and letters to the editor were excluded. Articles were examined and classified according to the information regarding sleeping, leisure, pain, emotions, and work associated to and potential controversial events about clinical manifestations and diagnosis.

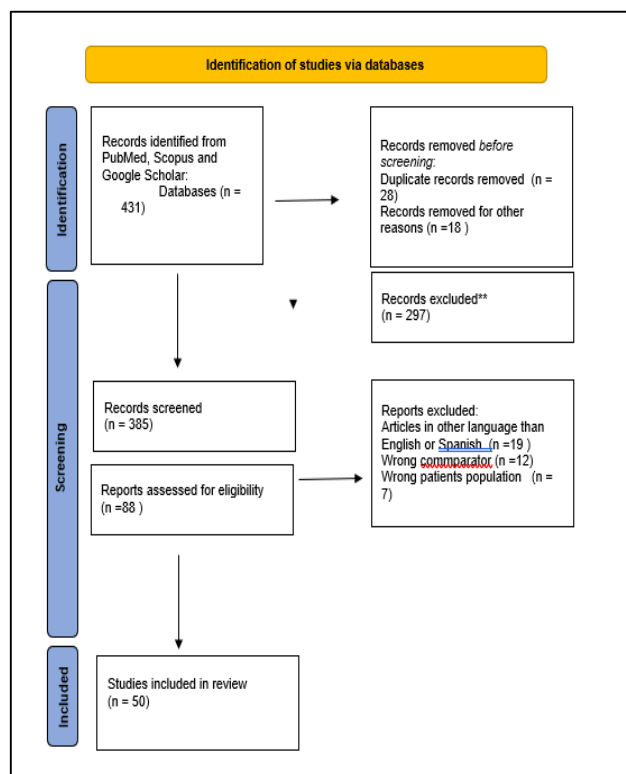


Figure 1: Study flow chart.

Data were manually extracted as profiles of manuscripts with major findings relevant to the review were added to an excel spreadsheet. Quality of evidence in published

articles was reviewed according to 2009 levels of evidence of Oxford center for evidence-based medicine.

REVIEW

Fifty articles were reviewed. A total of 5,266,815 patients were analyzed, including patients with benign paroxysmal positional vertigo (BPPV), Ménière's disease, vestibular migraine, or unilateral vestibulopathy. Due to their low incidence, some specific vestibular disorders such as labyrinthitis, ototoxicity, and bilateral vestibulopathy were framed. According to each vestibular disorder, these were the patients considered in each one: BPPV 554 patients, Ménière's disease 5,392 patients, vestibular migraine 302 patients, and in terms of symptoms: dizziness 2,312 patients, vertigo 664 patients, and instability 1,021. patients. The countries from which the most studies were reviewed were Brazil and Turkey.

Four articles were related to unilateral and bilateral vestibulopathy, 23 articles to unspecified dizziness or vertigo, 15 articles to benign paroxysmal positional vertigo, 15 to Ménière's disease, 8 articles to vestibular migraine and 2 to persistent perceptual postural dizziness (Table 1). Most of studies corresponded to cross-sectional studies (12 articles), prospective studies (8 articles), randomized clinical trials (8 articles), retrospective studies (6 articles), observational studies (3 articles), analytical study (1 article), multicenter study (1 article), comparative study (1 study) and prospective case-control study (1 article) (Table 1).

Females between 50 to 65 years who complained of vestibular symptoms such as unsteadiness (35%), dizziness (44%), vertigo (7.4%) and oscillopsia (13.63%) were the most common population who also complained of disturbances in sleep, depression, anxiety, as well as in work and leisure.^{4,10} Other associated comorbidities found in this population osteoporosis, cardiovascular and metabolic disorders. Mental health disorders such as avoidance behaviours, agoraphobia, anguish, and panic attacks were also described in 37% of patients.^{11,12}

Patients who presented disturbances in sleep, work and leisure and presented depression and anxiety, presented

higher scores on the total scores of dizziness handicap inventory (DHI), vestibular disorders activities of daily living (VADL), activities-specific balance confidence, Pittsburgh sleep quality index (PSQI) and in the cognitive fusion questionnaire (CFQ). Higher scores were also seen in the Hamilton anxiety scale (HAM-A), and beck depression inventory (BDI scales). And a few studies were focused on the evaluation of QoL using the EuroQoL-5D (EQ-5D). These scores were mostly high in patients with diagnosis of BPPV, Vestibular migraine, MD, bilateral s well as the unilateral vestibulopathies, as well as the postural perceptual persistent dizziness (Table 2).¹¹⁻²⁰

Patients with BPPV mostly presented sleep disturbances, described as fear of rolling, and getting up. Individuals diagnosed with BPPV also described limitations to perform work duties, limited mobility, and increased perception of disability at office. Increased depression and anxiety rates were seen in patients with BPPV. Other items related to QoL disturbance in patients with BPPV were permanent concerning of avoiding falls during physical activities, increased discomfort on buildings and high attitudes, oscillopsia during daily activities during transportation and increased neck pain episodes associated with long-standing episodes of BPPV. Individuals diagnosed with Vestibular Migraine presented increased cognitive impairment as well as mobility and motion impairment at work and in daily activities. Patients who presented MD usually presented communication disabilities in social settings and increased disability during work activities mainly on communication. Also, anxiety, altered self-perception and self-esteem were mostly seen in patients who complained of sensorineural hearing loss (Table 3).

Patients with unilateral vestibulopathy mostly presented increased office days-off rates and panic attacks, anxiety, and depression episodes. In those with bilateral vestibulopathy increased rates of office days-off the office and increased number of lost work hours. Increased physical, emotional, and functional impairment as well as depression, anxiety and stress episodes were mostly described in patients with postural perceptual persistent dizziness (Table 3).

Table 1: Reviewed studies classified by vestibular disorders and authors containing items related to QoL.

Vestibular disorder	Author	Type of study	N	Mean (Years)	Country
Benign paroxysmal positional vertigo	Sivrice, 2020	Randomized controlled trial	50	65	Turkey
	Lindell, 2021 ⁴	Cross-sectional	671	75	Sweden
	Mohwald, 2019 ²³	Prospective cohort	21	58.6	Germany
	Kalland, 2020 ³⁴	Cross-sectional	44	43.5	Norway
	Gupta, 2018 ²⁸	Prospective cohort	90	49.96	India
	Papa, 2017 ⁴¹	Randomized controlled trial	31	57.5	Italy
	Magliulo, 2005 ¹⁸	Retrospective	48	55.08	Italy
	Handa, 2005 ⁵	Prospective cohort	70	62.5	Brazil
	Socher, 2012 ¹⁴	Cross sectional	12	53.17	Brazil
	Pereira, 2010 ²⁷	Retrospective cohort	21	53.2	Brazil

Continued.

Vestibular disorder	Author	Type of study	N	Mean (Years)	Country
Vestibular Migraine	Mohwald, 2019 ²³	Prospective cohort	20	58.6	Germany
	Neuhauser, 2006 ⁷	Cross-sectional	1003	43	Germany
	Wang, 2016 ⁸	Randomized controlled trial	40	-	China
	Ak, 2022 ²⁰	Observational study	30	40	Turkey
	Celik, 2020 ²⁶	Analytic study	38	47.55	Turkey
Non - classified vestibular disorders	Søberg, 2021	Randomized controlled trial	65	39.4	Norway
	Toshininge, 2020	Observational study	37	46.1	Japan
	Lopes, 2019 ³⁸	Randomized controlled trial	31	63	Brazil
	Katzenberger, 2022	Multicenter	141	65	Germany
	Weidt, 2014 ⁴²	Cross-sectional	203	44.6	Switzerland
	Menant, 2017	Randomized controlled trial	300	50	Australia
	Tsukamoto, 2015 ³⁷	Randomized controlled trial	20	59.6	Brazil
	Molnar, 2022 ¹⁹	Prospective study	301	56.1	Hungary
Unilateral Vestibulopathy	Schmid, 2020 ²⁹	Retrospective study	40	60.1	Switzerland
	Knapstad, 2020 ³⁴	Cross-sectional	10	43.5	Norway
	Kim, 2018 ³⁵	Cross-sectional	36	41.73	Korea
	Huppert, 2019	Observational study	254008	18	Germany
MD	De Andrade, 2021	Cross-sectional	84	60.09	Brazil
	Kalland, 2020 ³⁴	Cross-sectional	18	44.7	Norway
	Ghavami, 2018 ³²	Retrospective cohort	25	58	USA
	Handa, 2005 ⁵	Prospective cohort	70	62.5	Brazil
	Socher, 2012 ⁴⁰	Cross sectional	12	53.17	Brazil
	Lopez- Escamez, 2009 ³¹	Comparative study	86	-	Spain
	Liu, 2020 ¹⁷	Prospective cases and controls	61	53.34	China
	Dornhoffer, 2021 ¹⁶	Retrospective study	29	-	USA
Chronic vestibular dysfunction	Tsukamoto, 2015 ³⁷	Randomized controlled trial	20	59.6	Brazil
	Koc, 2021 ⁵	Retrospective study	60	46	Turkey
Bilateral vestibulopathy	Sun, 2014	Cross-sectional	39	57	USA
	Guinand, 2012	Cross-sectional	-	-	Netherlands
Postural persistent perceptual dizziness	Teh, 2022	Prospective study	27	45.2	Malaysia
	Yardley, 2012 ²²	Comparative prospective study	337	59.4	United Kingdom

Table 2: Scores used in vestibular disorders.

Author	Score	Vestibular disorder
Magliulo, 2005 ¹⁸	Hamilton anxiety scale (HAM-A)	Benign paroxysmal positional vertigo
Molnár, 2022 ¹⁹	BDI scales	Menière’s disease, vestibular neuritis, unilateral peripheral vestibulopathy, PPPD, vestibular migraine
Kisabay, 2022	BDI scales	Vestibular migraine, PPPD
Koc, 2022 ⁵	VADL	Vestibular Migraine
Yetiser, 2021	Activities-specific balance confidence (ABC)	Benign paroxysmal positional vertigo
Dornhoffer, 2021 ¹⁴	CFQ	Menière’s disease
Donaldson, 2021 ¹⁶	CFQ	Vestibular migraine
Möhwald, 2020 ¹⁷	(European QoL score five dimensions five levels, EQ-5D-5L)	Central vestibular, peripheral vestibular, episodic vestibular disorders
Lindell, 2021 ⁴	Short form-36 health survey (SF-36)	BPPV

Table 3: Altered ítems on QoL according to diverse vestibular disorders.

Vestibular disorder	Author	Sleeping	Leisure	Work	Other
Benign paroxysmal positional vertigo	Lindell, 2021 ⁴	-	-	-	Increased anxiety and depression during episodes psychological distress in patients with BPPV
	Mohwald, 2019 ²³	-	Diminished time for walking and fear of falling while exercising	Limitations to perform work activities increased emotional symptoms leading to interrupted work at office	-
	Kalland, 2020 ³⁴	Fear of rolling up at bedtime			Permanent concerning of avoiding falls during physical and work activities
	Gupta, 2018 ²⁸	-		Limitation on mobility and leisure activities	Increased anxiety and discomfort on buildings and high altitudes Oscillopsia during daily activities which makes transportation and walking harder
	Papa, 2017 ⁴¹	-			Lasting symptoms associated to neck pain increases unsteadiness in patients with BPPV leading to discomfort as well as pain
	Magliulo, 2005 ¹⁸	-		Increased restrictions for leisure activities	Increased perception of disability for going to work
Vestibular migraine	Wang, 2016 ⁸	-	-	Increased cognitive impairment with motion and mobility impairment at work	Increased cognitive impairment with motion and mobility impairment on daily activities
MD	Handa, 2005 ³	-	-	Increased disability during activities that may include physical activities	-
	Lopez-Escamez, 2009 ³¹	-	Communication disabilities in social settings	Communication disabilities at work	Anxiety, altered self-perception and communication issues mainly in patients with hearing loss

Continued.

Vestibular disorder	Author	Sleeping	Leisure	Work	Other
	Dornhoffer, 2021 ¹⁶	-	-	-	Cognitive impairment and physical disabilities
Unilateral vestibulopathy	Möhwald, 2020 ²³	-	-	Increased days-off in acute episodes	Increased panic attacks, anxiety and depression
Bilateral vestibulopathy	Sun, 2014	-	-	Increased economic impact and higher rates of days-off higher number of lost work hours	-
Postural perceptual persistent dizziness	Teh, 2022	-	-	-	Increased physical, emotional and functional impairment, increased depression, anxiety and stress levels

RESULTS AND IMPLICATIONS

Sleep, work and leisure disturbances are commonly reported in middle-aged females with vestibular disorders such as BPPV, vestibular migraine, MD, unilateral and bilateral vestibulopathy and postural perceptual persistent dizziness. Anxiety and depression were also seen as concomitant contributors to decreased QoL. To date, this is the first review focused on describing the disturbances generated in QoL due to vestibular disorders.

Vestibular symptoms such as dizziness, vertigo, or unsteadiness, regardless of their severity, do considerably present an impairment in QoL.²³⁻²⁵ These are associated with several emotions and behaviors before, during or after their presentation, such as behavioral avoidance, fear of falling, mental anguish, social distancing, and stress.²³ Most of these, are commonly associated with baseline mental health disorders such as anxiety, depression, panic episodes and bipolar disorders, however, is not a necessary condition to have it.²³ Some patients may present these as a transitory condition lasting while the vestibular disorder is active.^{20,22} Increased rates of anxiety and avoidance behaviors are described in acute and short episodes of vertigo, such as BPPV. In this type of vertigo, getting up or lying down during sleep or changing positions may increase the severity and intensity of symptoms leading to avoid provoking movements or common positions during daily activities.^{13,14,26-28} These patients usually get the outpatients settings complaining of disabilities in rolling up, lying down and describing scaring moments during short time episodes.^{13,14,26-28} Once the gold standard treatment for BPPV is done, a faster resolution of these symptoms is seen, and QoL gets easily restored.^{13,14,26-28}

However, not all the vestibular disorders, usually present faster resolution of symptoms and improvement in the QoL. Some others mentioned in our review, such as Ménière's disease, vestibular migraine and postural persistent perceptual dizziness, present longer duration, increased collateral symptoms and impairment in several settings of life.^{19,23} Also, some of them can present bilateral injuries related such as hearing loss, tinnitus and vestibular hypofunction or areflexia, which are usually associated with increased limitation of daily activities, increased rates of depression, lack of social communication, self-absorption, and social distancing, as well as behavioral avoidance and higher rates of office days-off.^{29,32} In chronic vestibular disorders, such as vestibular migraine, in addition to these events mentioned above, cognitive impairment, memory loss and language impairment are also described.³³ Chronicity and bilateralism may contribute to higher rates of social, emotional and physical disability; however, further studies are needed to correlate this assumption. In some entities such as unilateral and bilateral vestibulopathy and postural perceptual persistent dizziness, further studies are needed to get a better understanding on how they do affect the QoL of patients.

Even though, we found just few studies regarding QoL in patients with vestibular disorders and further prospective and experimental studies should be done, there are some specific proposals that can contribute to the improvement of affected settings of patients' daily activities.³⁴⁻³⁶ Every patient with vestibular disorders, should be evaluated with a questionnaire such as the EQ-5D and some others related to sleep, anxiety, depression, pain and self-care as well as a complete clinical evaluation and physical exam.³⁴⁻³⁶ In some specific disorders such as MD, an adequate counselling on dietary and hygienic recommendations should be done.³⁵ In those with

vestibular migraine, also these dietary recommendations should be followed and a training in acute care during the exacerbations using anti-migraine medications would benefit the patients' course of disease.³² These directed measures will avoid the presence of symptoms and acute episodes, which ones may lead to an altered QoL.³² Disorders such as unilateral and bilateral vestibulopathy and postural perceptual persistent dizziness, would benefit from vestibular rehabilitation and cognitive behavioral therapy, as well as other alternatives with diverse levels of evidence such as Tai Chi, acupuncture and Lian Gong.³⁷⁻³⁹ These strategies are mainly focused on the improvement of physical and functional impairment given by the vestibular disorders, but further work is needed on the treatment of emotional and mental health collateral conditions.⁴⁰⁻⁴²

This review is an overview of how vestibular disorders may affect the QoL of patients and is one of the first studies focused on describing in each vestibular disorder. However, this study presents some limitations. First, there is a lack of information about QoL in patients with vestibular disorders. Second, there is only one study to date regarding QoL in postural perceptual persistent dizziness based on the application of one focused questionnaire, however, there are no available data for other vestibular disorders for comparison with other vestibular disorders. We do also find there is a lack of information about on how to treat and what to do when patients do present a disturbance in their QoL. One challenge during this study, was to find several articles focused in depression and anxiety related to vestibular disorders with some given scores, but not describing how these pathologies may disturb the daily performance of vestibular patients.

We also observe in these reviewed articles, a lack of evaluation of cognitive, memory and spatial navigation, which ones may be affected as well for the vestibular disorders leading to even more altered QoL. Altered QoL in patients with vestibular disorders should be evaluated independently of the time of duration, onset and triggers. To get a better understanding of this issue, further studies must be done using focused questionnaires such as EQ-5D and prospective and longitudinal studies would give a better understanding on how QoL change throughout the time.

CONCLUSION

The impact of vestibular disorders in QoL is observed in different settings and may contribute to physical, emotional and functional disability and poor social and personal growth. Further longitudinal studies are needed to get a deeper understanding of this disturbance in diverse vestibular pathologies.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Franco I, Uricel Y, Valencia S, Castillo-Bustamante M, Madrigal J. Quality of life in patients with vestibular disorders: a narrative review. *Int J Otorhinolaryngol Head Neck Surg* 2023;9:426-34.