

INFLUENCE OF VESTIBULAR REHABILITATION ON THE QUALITY OF LIFE OF INDIVIDUALS WITH LABYRINTH DISEASE

Influência da reabilitação vestibular na qualidade de vida de indivíduos labirintopatas

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ABSTRACT

Purpose: to check the influence of vestibular rehabilitation concerning the quality of life of individuals through Brazilian questionnaire Dizziness Handicap Inventory applied pre and post-therapy. **Methods:** 28 medical chart of individual of both sexes attended in a public teaching clinic at Belo Horizonte city, in where they were analyzed. On analyzed medical chart patients were been submitted to the questionnaire pre and post individual vestibular rehabilitation. The statistical analysis from the data was done through the paired T-Student test. **Results:** the sample of study medical chart was composed of 28 patients, 23 (82%) of them were female. The average of ages was 54,7 years ($\pm 20,6$) and the medium number of sessions was 5,6 ($\pm 6,4$). Before the treatment patients showed the following scores: 18,10 ($\pm 9,83$) physics aspects, 13,5 ($\pm 8,57$) functions and 15,14 ($\pm 7,48$) emotional. After medium of 5,6 ($\pm 6,4$) sessions, there was a significant reduction in the physics 4,32 ($\pm 5,32$), functions 4,32 ($\pm 6,91$) and emotional 3,78 ($\pm 5,16$) aspects. **Conclusion:** it can be conclude that there was a significant statistic difference between the questionnaire scores pre and post personalized vestibular rehabilitation, showing that the vestibular rehabilitation is an important instrument on the improvement of life quality for with labyrinth disease.

KEYWORDS: Dizziness; Quality of Life; Rehabilitation

■ INTRODUCTION

The labyrinth is responsible for balance and maintenance of the body position in space. Body balance relies on the integrity of the vestibular system (labyrinth, vestibulocochlear nerve, nuclei, pathways, and inter-relations in the central nervous system), the somatosensory system (sensory receptors located at the tendons, muscles, and

joints) and vision (sight), under cerebellar coordination. If injury occurs in any of those systems, there will be an input of conflicting information, and symptoms of body imbalance—dizziness or vertigo—could arise¹.

Dizziness and vertigo are the symptoms most frequently reported by the general population. Dizziness can be characterized as a subjective manifestation of body balance disturbance (e.g., unsteadiness, tilting, floating, and light-headedness) while vertigo is a form of dizziness of rotational character. These major symptoms can be compounded by frequent falling, nausea, vomiting^{2,3}, and even symptoms of depression⁴ impacting the quality of life (QOL) of the affected individuals^{5,6}.

Up until 65 years of age, dizziness is the world's second most prevalent symptom, with headaches coming first. After age 75, dizziness becomes the most prevalent symptom, affecting around 80% of persons⁷. The high incidence of dizziness is

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largely due to the hypersensitivity of the labyrinth to a variety of disturbances, such as hormonal, metabolic, cervical, and circulatory, in addition to being a symptom commonly found after traumatic injuries⁸.

The major treatment modalities for vestibular dysfunction are medications, surgery, and vestibular rehabilitation⁷. Currently, personalized vestibular rehabilitation (PVR) has been widely used in the treatment of vertiginous patients to attenuate dizziness and body unsteadiness. It has shown to be an important and effective strategy to treat patients with body balance disorders, enhancing competence and well-being of individuals in performing the activities of daily living and promoting a marked improvement in their QOL^{5,6,9}.

The repetitive exercises prescribed in vestibular rehabilitation therapy accelerate the physiological process of compensation by habituation, generating a conditioned compensatory response of the reticular neurons in order to maintain the activation of the cerebral cortex at a homeostatic level—a slowly-developing, active response to repeated exposure in a process similar to conditioning. Hence the importance of the daily practice of the proposed exercises, two to three times a day for a definite length of time, to achieve effectiveness¹⁰.

It is believed that the success of PVR can be influenced by some factors, such as patient age, willingness to practice the exercises, emotional state, use of medications, and presence of central nervous system (CNS) diseases that could compromise the structures involved in the neuroplasticity of the vestibular system⁹.

To measure the QOL or functional capacity of the patients, several instruments have been proposed and employed. One of the most prominent is the Dizziness Handicap Inventory (DHI), designed and validated by Jacobson and Newman¹¹, which assesses the patient's self-perception of the incapacitating effects of dizziness. This instrument was translated and culturally adapted by Castro et al.¹², and is known as Brazilian DHI.

Outcome analysis in PVR programs is paramount. One efficacious way of measuring the success of an intervention in chronic diseases is the systematic use of QOL assessment instruments such as the DHI prior to, during, and after the treatment period. The literature indicates that the DHI could be a good instrument for the assessment, monitoring, and reappraisal of the success of vestibular rehabilitation^{12,13}.

Several authors have demonstrated that vestibular rehabilitation has excellent results when tailored in accordance with the patient's complaint, clinical presentation, and findings of the vestibular

examination^{7,9,12-14}. However, the practice of vestibular rehabilitation and the evaluation of PVR programs have not yet become routine in many speech and hearing rehabilitation services.

The objective of the present study was to determine the influence of rehabilitation vestibular on the QOL using the Brazilian DHI questionnaire given prior to, and following PVR therapy.

■ METHODS

To undertake the present study, we first requested permission from the coordination of the teaching clinic of an undergraduate program in speech-language pathology and audiology in the city of Belo Horizonte, Brazil to conduct the study at that institution.

All the medical records of the individuals who underwent individual vestibular rehabilitation at the teaching clinic from February 2007 through June 2010 were reviewed. The study included patients of different age groups (youths, adults, and older persons) with peripheral or central vestibular disorders who had at least one PVR session at the above-mentioned institution and who completed treatment until June 2010. Patients were excluded if they did not complete the DHI questionnaire before and/or after vestibular rehabilitation therapy, dropped out of treatment, or did not provide written informed consent authorizing the use of their data for research purposes.

The patients who underwent PVR at the teaching clinic had been referred to the rehabilitation program by an otolaryngologist after evaluation of their clinical history and indication in the program. The vestibular rehabilitation program developed at the teaching clinic is tailored to suit the needs of each patient, based on a series of specific exercises planned from the chief complaint and symptoms referred by the patient. The PVR sessions were individual and included information about the functioning of hearing and balance, the nature of the patient's impairment, the implications of dizziness in his or her daily life, prevention of falls in the home environment, explanations regarding the PVR therapy itself (mechanisms of vestibular compensation, neuroplasticity, and role of the exercises), and exercises based on the Cawthorne and Cooksey protocol^{15,16}.

The exercises were given according to each patient's needs. Whenever necessary, exercises to enhance adaptation were included, using balls, cards, figures, stickers, and an exercise mat. Such activities characterize the conventional treatment, in which no postural maneuvers are done. However, repositioning maneuvers are always performed in patients with benign paroxysmal positional vertigo

(BPPV) by speech-language and hearing therapists in selected cases and included as part of non-conventional PVR.

The sessions took place once weekly and lasted approximately 40 minutes. In the first session, in addition to the instructions mentioned earlier, the patient completed the DHI. In the course of the subsequent sessions, the patients were instructed to practice the therapy exercises at home, two to three times daily, before meals. Doubts regarding the activities were clarified for the patient and his or her accompanying person, if present. Additionally, written directions of how to perform the exercises at home were given to most of the patients. For illiterate patients, the information was given in the form of pictures of the exercises to be performed.

During the personalized therapy, the exercises were performed taking into account the functional limitations of the patients, such as spine or joint problems, obesity, and others. The exercises were modified or not depending on the degree of difficulty; the modifications were progressively introduced over the course of the sessions.

The patients were discharged from treatment when the therapy goals were achieved or when the symptoms had disappeared and improvement was observed in the activities of daily living. At that point, the DHI was administered again.

The Brazilian version of the Dizziness Handicap Inventory (DHI)¹² was administered pre- and posttreatment. This questionnaire comprises 25 questions with the following response options: “yes”, “no”, or “sometimes”. Four points are assigned to each affirmative answer, a negative is scored zero, and two points are given each time the patient answers “sometimes”. The maximum score is 100 points—the higher the score, the greater the impact of dizziness on the patient’s QOL. Three aspects are analyzed separately, and the sum of the three scores yields a total score. Seven questions assess physical aspects, nine refer to emotional issues,

and nine evaluate the functional status. These three aspects are closely related to the QOL of vertiginous individuals¹².

The following variables were analyzed in the records of the vertiginous patients: pre- and posttreatment DHI scores, age, gender, number of sessions, diagnosis, and type of treatment (maneuvers or conventional vestibular rehabilitation).

The present study was submitted to our institutional review board (CEP) for feasibility analysis, and approved under Protocol No. 166. Even though this study was based on medical record review, all the individuals whose records were reviewed provided written informed consent, as required by Resolution 196/96 (Resolution MS/CNS/CONEP No. 196/96).

The data were entered into a database constructed specifically for this study using the statistical software Epi-Info 6.04. In the analysis of continuous variables, the means were used as the measure of central tendency and standard deviations were the measure of dispersion. The statistical analysis was conducted using Student’s paired *t* test at the 5% level of significance.

■ RESULTS

The records of 51 patients of a Belo Horizonte teaching clinic from February 2007 through June 2010 were analyzed. Of these, 23 did not meet the inclusion criteria.

Thus, the study sample was composed of the medical charts of 28 patients, with 23 (82 %) female. The mean age of the patients was 54.7 (\pm 20.6) years, ranging from 15 to 82 years. The mean number of PVR sessions was 5.6 (\pm 6.4). Only two patients (7.1%) had a diagnosis of CNS involvement.

The DHI scores of the 28 patients before and after vestibular rehabilitation are shown in Table 1.

Table 1 – Pre- and posttreatment DHI scores of the 28 patients by Student’s paired t test

	Pre-treatment		Posttreatment		Difference	Student’s paired t test	P-value
	Mean	Standard deviation	Mean	Standard deviation			
Physical score	18.10	9.83	4.32	5.32	13.78	7.3	0.000*
Functional score	13.53	8.57	4.32	6.91	9.21	5.3	0.000*
Emotional score	15.14	7.48	3.78	5.16	11.36	7.4	0.000*
Total score	46.71	22.27	12.42	15.44	34.29	7.7	0.000*

Note: Dizziness Handicap Inventory (DHI) scores
 *Statistical significance at $P \leq 0.05$

The characteristics of the sample regarding patient diagnosis are shown in Figure 1.

Of the 28 patients who underwent treatment, 17 (61%) were treated with the repositioning maneuver,

6 (21%) received only the conventional treatment, and 5 (18%) were treated with the repositioning maneuver combined with the conventional therapy (Figure 2).

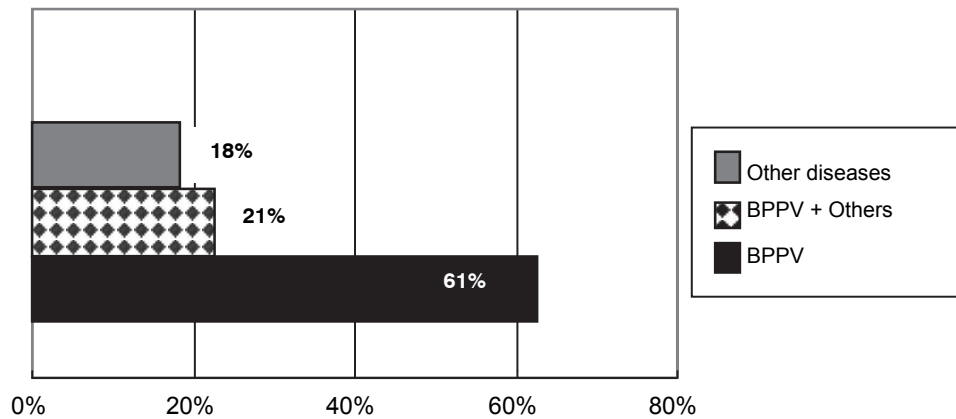


Figure 1 - Sample characteristics regarding the diagnosis of the patients who underwent PVR

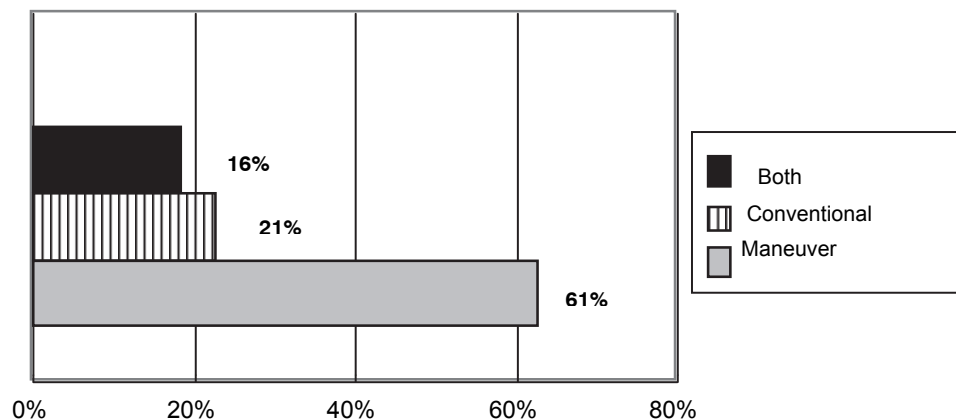


Figure 2 - Sample characteristics regarding the type of treatment received by the 28 patients

■ DISCUSSION

The DHI, translated and validated for Brazilian Portuguese, was the instrument chosen to compare the QOL before and after vestibular rehabilitation because it is reliable and easy to use and understand^{6,12,13,17}. The DHI measures the loss in QOL resulting from balance alterations by assessing the impact of dizziness or vertigo on the physical, functional, and emotional status of the patient when performing the activities of daily life¹². This instrument has been integrated into the routine of the teaching clinic for vestibular rehabilitation to assist in the monitoring of patient status during therapy, which has helped the dissemination of PVR practices and the consolidation of this body of knowledge in speech-language pathology and audiology.

Most patients who underwent PVR therapy were female (82 %). This fact is in agreement with the literature, which reports greater prevalence of labyrinth disease in women^{5,6,8}. Possible explanations for this are hormonal and metabolic alterations—more frequent in women—that could favor a higher occurrence of BPPV and other balance disorders^{13,18}.

Similarly to another study¹², the mean age of the patients who underwent PVR was high—54.7 years. Dizziness is more prevalent in the elderly, who tend to manifest more compromised body balance than young individuals^{3,6}.

The analysis of the 28 patients when beginning treatment showed that the physical aspects as measured by the DHI were the most severely compromised, with an average of 18.1 points, which is in accordance with other studies^{13,14}. The evaluation of the physical status indicates the relationship between eye, head, and body movements with the onset or aggravation of dizziness. These complaints are very common among patients with BPPV and, as mentioned earlier, are associated with poorer QOL. In the study sample, 82% of the patients manifested rotational vertigo and neurovegetative signs when maneuvers of change in head position were performed. In the DHI questionnaire, the patients also reported difficulty lying down or rising up from bed, worsened dizziness when looking upward, moving their head quickly, and turning over in bed. All these complaints have been cited in the literature¹².

A marked influence of dizziness was noted on the emotional state of the patients, which had the second highest score, averaging 15.1 points. The emotional aspect is directly related to an individual's psychological issues—how he or she feels in relation to the opinions of others and, in particular,

problems such as depression⁴. According to a study¹⁹, emotional changes are due to the impact of the perceived impairments on these patients' mindset, which interferes with their activities of daily living, social life, and self-image.

The patients' functional status was also compromised, with a mean score of 13.5—a comparable value to that found in individuals with Parkinson's disease²⁰, although the majority of the participants in the present study had no neurological alterations. In patients with migraine, this aspect was the most seriously affected; the greatest functional impairments involved avoiding heights, difficulty reading, and difficulty lying down or rising up from bed²¹. The evaluation of functional impairments makes it possible to verify limitations in professional, household, social, and leisure activities, in addition to assessing the degree of dependence when performing certain tasks, such as walking with assistance and difficulty in walking around the house in the dark¹². Many patients with dizziness restrict their physical activities, travels, and social meetings to reduce the risk of these unpleasant symptoms appearing.²¹ Patients who suffered a severe functional impact typically become withdrawn and show psychological and affective changes.

The mean number of sessions was 5.64 (range, 1–25), which is corroborated by other studies^{22–24} noting that the duration of BPPV treatment is typically short, of less than one month. In the present study, most cases were in fact BPPV (Figure 1), a condition whose treatment is done through repositioning maneuvers that surpass vestibular rehabilitation therapy in terms of speediness and practicality and have an advantage over pharmacological treatments due to the absence of significant adverse effects¹³. When PVR did not include therapeutic maneuvers, the vestibular rehabilitation exercises demanded a longer period of time to achieve vestibular compensation, which extended the treatment period for a few more months^{8,14}.

There was a statistically significant difference in the physical, functional, emotional, and overall scores between the pre- and posttreatment periods, which is supported by various studies^{9,13,25}. According to the literature, the improvement in symptoms following PVR therapy is determined by neural adaptations, sensory substitutions, functional recovery of the vestibulo-ocular and vestibulospinal reflexes, improved overall body fitness, lifestyle changes, and the positive psychological effect of PVR on patients as they regain a sense of physical and psychological security²⁶.

The findings of the present study with respect to the efficacy of PVR are in line with the literature, which reports increments across the DHI scores

following PVR, thus indicating enhanced QOL of the patients.

Studies of the factors affecting the QOL of individuals with dizziness are of paramount importance to clinical practice, since PVR is an effective technique for many vestibular disorders, whose prevalence is high in the population—especially among the elderly. This age group comprises over 14.5 million people today according to data from the *Instituto Brasileiro de Geografia e Estatística–IBGE* (Brazilian Geography and Statistics Institute)²⁷. It is estimated that by 2025 the population older than 60 years will reach 32 million people in Brazil. Therefore, effective and timely measures should be taken so that this age group that is increasing quantitatively can also have the best possible QOL, which will demand a greater number of trained professionals working with PVR.

The DHI can also be an interesting instrument to evaluate the benefits and efficacy of conventional PVR when administered before and after

the therapy, promoting greater adherence to treatment by the vertiginous persons as they realize their own difficulties when answering the questionnaire. The professionals working with assessment and PVR should keep in mind that recognizing the negative impact on the QOL of vertiginous patients can be an important step in the rehabilitation process, especially considering that PVR is a new therapeutic tool that has been increasingly used in clinical practice.

■ CONCLUSION

The DHI scores before and after PVR were statistically different, with improvements in overall, physical, functional, and emotional status scores following PVR therapy. These results show that PVR therapy was effective in improving the symptoms and the QOL of the patients.

RESUMO

Objetivo: verificar a influência da reabilitação vestibular sobre a qualidade de vida dos indivíduos por meio do questionário Dizziness Handicap Inventory aplicado pré e pós-terapia. **Métodos:** foram analisados 28 prontuários de indivíduos de ambos os sexos atendidos em uma Clínica Escola do município de Belo Horizonte. Os pacientes responderam ao questionário pré e pós-terapia de reabilitação vestibular personalizada (RVP). A análise estatística dos dados foi feita por meio do teste T-Student pareado. **Resultados:** a amostra do estudo foi composta por 28 pacientes, sendo 23 (82 %) do sexo feminino. A idade média dos pacientes foi de 54,7 (\pm 20,6) anos e o número médio de sessões de terapia foi 5,6 (\pm 6,4). Antes do tratamento os pacientes apresentaram os seguintes escores: 18,10 (\pm 9,83) nos aspectos físicos, 13,53 (\pm 8,57) nos funcionais e 15,14 (\pm 7,48) nos emocionais. Após uma média de 5,6 (\pm 6,4) sessões, houve diminuição significativa ($p < 0,05$) dos escores nos aspectos físicos 4,32 (\pm 5,32), funcionais 4,32 (\pm 6,91) e emocionais 3,78 (\pm 5,16). **Conclusão:** pode-se concluir que houve diferença estatisticamente significativa entre os escores do Dizziness Handicap Inventory pré e pós-reabilitação vestibular personalizada, mostrando que a reabilitação vestibular é um importante instrumento na melhoria da qualidade de vida de pacientes labirintopatas.

DESCRITORES: Tontura; Qualidade de Vida; Reabilitação

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