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RESEARCH ARTICLE

DIZZINESS HANDICAP INVENTORY (DHI) AS A RELIABLE TOOL FOR ASSESSMENT OF PATIENTS OF BENIGN POSITIONAL PAROXYSMAL VERTIGO (BPPV) – A STUDY OF 30 CASES

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ABSTRACT

Introduction: Dizziness is a subjective feeling of postural instability or of illusory motion of self or environment either as a sensation of spinning or falling. It can be caused by a wide spectrum of peripheral and central disorders. BPPV is one of the commonest causes. Dizziness affects the quality of life of the patient and hence a subjective assessment using Various Scales is essential. ***Methodology:*** We have assessed 30 patients of BPPV using the Dizziness Handicap Inventroy (DHI), and used the same for determining treatment outcomes. ***Results and Discussion:*** Majority of our patients were females with a mean age of 52. DHI scores were severe especially with lateral canal BPPV. The Physical Parameters were most affected in the DHI Scale. Treatment had a great impact on the DHI Results. ***Summary***: DHI is a easy to use, effective and reliable scale to assess patients of dizziness especially BPPV and also for treatment response.

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INTRODUCTION

Dizziness or vertigo is an ill defined subjective sensation of postural instability or of illusory motion of self or environment either as a sensation of spinning or falling. Dizziness is one of the most common complaints among all outpatients causing significant handicap (Saxena and Prabhakar, 2013). Dizziness/vertigo can be produced by peripheral vestibular disorders or central nervous system disorders or by combined lesions, and other conditions. Peripheral vestibular disorders include BPPV (benign paroxysmal positional vertigo), acute labyrinthitis, acute vestibular neuritis, Meniere's disease, recurrent vestibulopathy, middle ear disease, otosclerosis and perilymphatic fistula. Central nervous system disorders include cerebrovascular diseases such as transient ischaemic attacks (TIAs), brain stem disease, cerebellar disease, demyelinating diseases like multiple sclerosis, cerebellopontine angle tumor, posterior fossa lesions, infections and migraine.Other conditions which may cause dizziness are cervical spondylosis, postural hypotension, endocrinal diseases, drugs, vasculitis, anemia, polycythemia, psychological factors and cardiovascular diseases (Saxena and Prabhakar, 2013; Neuhauser, 2007). BPPV is the most frequent peripheral vestibular diagnosis reported in majority studies (Neuhauser, 2007). Posterior canal BPPV is more common than lateral canal and anterior canal BPPV, constituting approximately 85 to 95 percent of BPPV cases (Korres *et al.,* 2002). The recurrence rate of BPPV is 27%, and relapse mainly occurs in the first few months (Perez *et al.,* 2012).

The physical, emotional and functional disturbances that are associated with dizziness harm the professional, social and domestic activities of the patient. It may cause difficulties on the patients' daily life and even reduce their life quality. The interference of dizziness in quality of life may be assessed by validated questionnaires. Among the existing options, there is the Dizziness Handicap Inventory (DHI) that assesses the self-perception of the disabling effects imposed by dizziness (Jacobson and Newman, 1990). We have used the DHI Questionnaire to assess the severity of BPPV and its affection on the Quality of Life and also to compare the effect of treatment on Quality of Life of these patients.

METHODS

30 patients of BPPV, proven by positional testing and other causes excluded were included to be part of this study for a period of over 6 months. The patients were evaluated using the DHI Questionnaire at the time of presentation. The patients were given appropriate treatment depending on the canal involved. The patients were then evaluated at the end of 3 months for assessment of symptoms and review of the DHI Questionnaire post treatment. Each of the parameters of the Questionnaire were evaluated and analyzed and the same were also compared pre & post treatment.

RESULTS

Out of the 30 patients, 18 patients with BPPV were females and 12 were males. The age range of patients was between 30-

65 yrs with Average age being 52 yrs of age. Most of the patients were in the 45-65 age Group. 26 patients had a posterior Semicircular canal BPPV while 4 had lateral canal involvement (Fig 1). No cases of anterior canal involvement were noted in the study group. All the patients were diagnosed using the Positional Testing method depending on the canal involvement and other causes were excluded using suitable examination & investigations. A detailed DHI analysis of the DHI Scale at presentation & post treatment is shown (Table 1, 2). In patients with Posterior Canal BPPV the pre-treatment mean total DHI score was 45.45 and the post treatment mean score was 4.69 (Figure 2). Similarly lateral canal BPPV had a mean pre treatment score of 61.5 and post treatment score of 4 (Figure 2). As seen the physical parameters were affected most severly followed by functional and then emotional in both the groups (Table 3/Figure 3).

DISCUSSION

Dizziness is one of the most important symptoms with negative influence in the wellbeing of subjects of both genders and different age ranges. The common causes of Dizziness across various age groups have been previously described. BPPV remains the single most Common Cause of Dizziness and is easily diagnosed and treated. BPPV was observed more commonly in our study in females and the mean age was 52 years of age. This is comparable to most other population studies of BPPV (Ogun *et al.,* 2014; Blessing *et al.,* 1986). Patients with Vestibular disorders may present with Vertigo of variable intensity. The subjective perception of vertigo and dizziness is influenced by the patient's personality, anxiety with regard to unforeseeable recurrence, associated symptoms

Table 1. The DHI Scores of Patients with Posterior Canal BPPV (N=26)

Serial No.	Pre treatment total DHI	Post treatment total DHI	Pre treatment Physical DHI	Post treatment Physical DHI	Pre treatment functional DHI	Post treatment Functional DHI	Pre treatment Emotional DHI	Post treatment Emotional DHI
1	76	16	24	4	28	6	24	6
2	54	0	20	0	18	0	16	0
3	60	6	22	2	18	2	20	2
4	78	10	26	2	28	4	24	4
5	30	4	10	0	14	2	6	2
6	20	0	8	0	8	0	4	0
7	14	2	6	2	4	0	4	0
8	12	0	4	0	4	0	4	0
9	52	8	16	4	18	2	18	2
10	36	2	14	2	12	0	10	0
11	66	0	22	0	24	0	20	0
12	38	0	12	0	16	0	10	0
13	44	0	16	0	14	0	14	0
14	26	10	10	4	10	4	6	2
15	66	4	24	2	22	2	20	0
16	64	14	22	6	22	4	20	4
17	48	12	18	4	16	4	14	4
18	54	6	16	2	20	2	18	2
19	38	0	20	0	16	0	12	0
20	68	2	24	0	22	2	22	0
21	78	10	24	2	28	6	26	2
22	26	0	10	0	8	0	8	0
23	8	0	6	0	2	0	0	0
24	40	6	16	2	12	2	12	2
25	52	10	18	4	16	2	18	4
26	34	0	12	0	12	0	10	0
Mean	45.45	4.69	16.19	1.62	15.31	1.69	13.95	1.38

Table 2.The DHI Scores of Patients with Lateral Canal BPPV (N=4)

Serial No.	Pre treatment total DHI	Post treatment total DHI	Pre treatment Physical DHI	Post treatment Physical DHI	Pre treatment functional DHI	Post treatment Functional DHI	Pre treatment Emotional DHI	Post treatment Emotional DHI
1	86	10	28	2	30	4	28	4
2	58	2	18	0	20	2	20	0
3	42	2	14	2	16	0	12	0
4	60	2	22	0	20	0	18	2
Mean	61.5	4	20.5	1	21.5	1.5	19.5	1.5

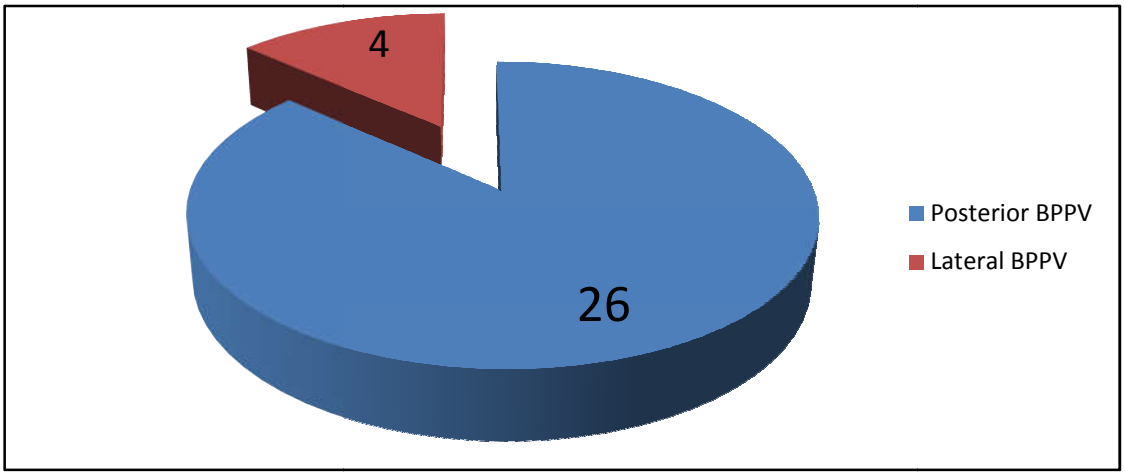

Figure 1 – Distribution of BPPV with respect to Semicircular Canal Involvement

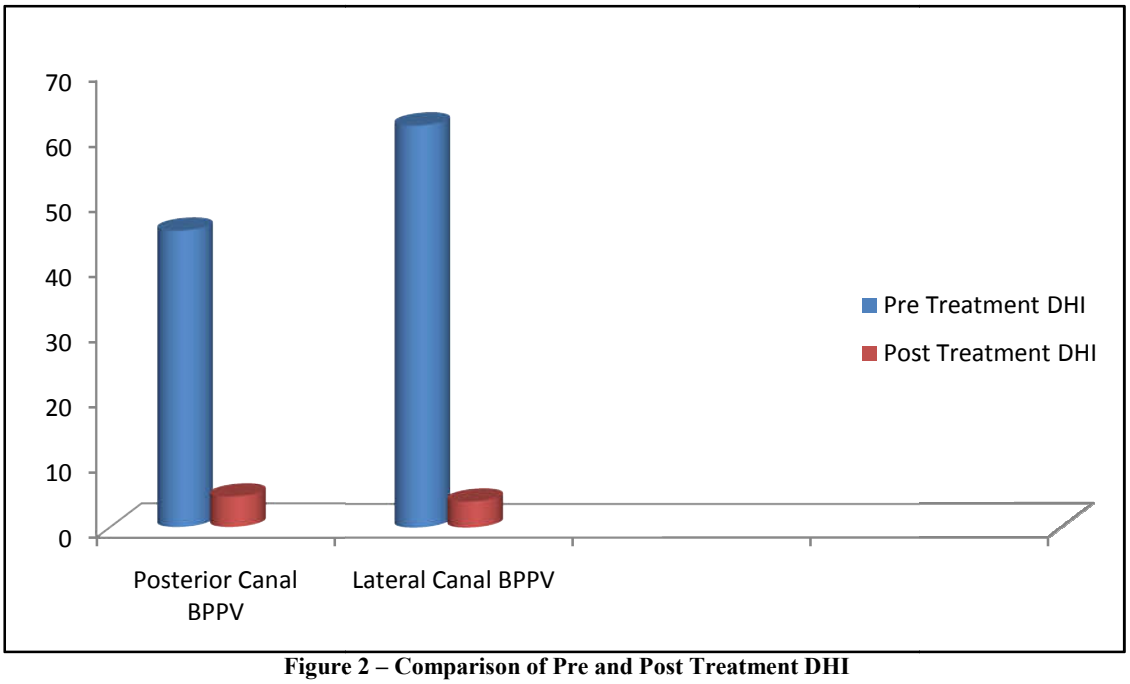

Figure 2 – Comparison of Pre and Post Treatment DHI

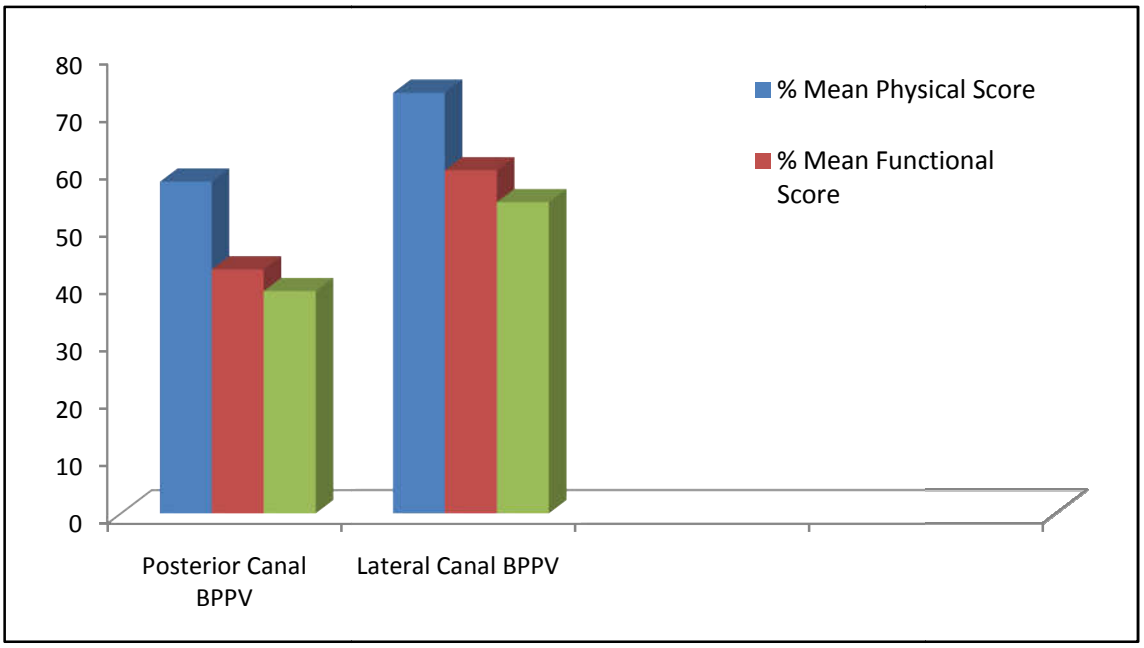

Figure 3. Comparison of percentage mean affection of each domain

Instructions: The purpose of this scale is to identify difficulties that you may be experiencing because of your dizziness. Please check "always", or "no" or "sometimes" to each question. Answer each question only as it pertains to your dizziness problem.

	Questions	Always	Sometimes	No
P1	Does looking up increase your problem?	☐	☐	☐
E2	Because of your problem, do you feel frustrated?	☐	☐	☐
F3	Because of your problem, do you restrict your travel for business or pleasure?	☐	☐	☐
P4	Does walking down the aisle of a supermarket increase your problem?	☐	☐	☐
F5	Because of your problem, do you have difficulty getting into or out of bed?	☐	☐	☐
F6	Does your problem significantly restrict your participation in social activities, such as going out to dinner, going to movies, dancing or to parties?	☐	☐	☐
F7	Because of your problem, do you have difficulty reading?	☐	☐	☐
F8	Does performing more ambitious activities like sports, dancing, and household chores, such as sweeping or putting dishes away; increase your problem?	☐	☐	☐
E9	Because of your problem, are you afraid to leave your home without having someone accompany you?	☐	☐	☐
E10	Because of your problem, have you been embarrassed in front of others?	☐	☐	☐
P11	Do quick movements of your head increase your problem?	☐	☐	☐
F12	Because of your problem, do you avoid heights?	☐	☐	☐
P13	Does turning over in bed increase your problem?	☐	☐	☐
F14	Because of your problem, is it difficult for you to do strenuous housework or yard work?	☐	☐	☐
E15	Because of your problem, are you afraid people may think that you are intoxicated?	☐	☐	☐
F16	Because of your problem, is it difficult for you to go for a walk by yourself?	☐	☐	☐
P17	Does walking down a sidewalk increase your problem?	☐	☐	☐
E18	Because of your problem, is it difficult for you to concentrate?	☐	☐	☐
F19	Because of your problem, is it difficult for you to walk around your house in the dark?	☐	☐	☐
E20	Because of your problem, are you afraid to stay home alone?	☐	☐	☐
E21	Because of your problem, do you feel handicapped?	☐	☐	☐
E22	Has your problem placed stress on your relationship with members of your family or friends?	☐	☐	☐
E23	Because of your problem, are you depressed?	☐	☐	☐
F24	Does your problem interfere with your job or household responsibilities?	☐	☐	☐
P25	Does bending over increase your problem?	☐	☐	☐

Figure 4. Dizziness Handicap Inventory

(neurovegetative, hearing disorder, etc.), and the unpredictable evolution of the underlying disease. Subjective perception is thus only poorly correlated with objective assessment, by vestibular testing. Agreement between patient's and physician's symptom assessment has been reported to be moderate for vertigo and other symptoms (Suarez-Almazor *et al.,* 2001; Honrubia *et al.,* 1996). Because vertigo and dizziness impair daily life, even during asymptomatic periods, mere symptom assessment is not sufficient: the patient may in fact be more worried by the anticipation of the next unpredictable episode of vertigo or dizziness than by the symptom itself (Yardley *et al.,* 1992). In this context, the patient's perspective appears to be essential if all the aspects of vertigo and dizziness are to be taken into account; hence, it would be useful to have a relevant and valid questionnaire, filled in by the patient, which could be used both in everyday practice and for therapeutic strategy assessment. The Dizziness Handicap Inventory (DHI) Questionnaire is one such scale, which has been developed by Jacobson and Newman (1990) (Fig 4). It can be used to assess the impact of dizziness on patient's daily life (Jacobson and Newman, 1990). It evaluates the dizziness associated to the incapacities and handicap in the three areas of a patient's life: Physical, functional and emotional. Dizziness Handicap Inventory (DHI) consists of 25 questions, and a total score (0–100 points) is obtained by summing ordinal scale responses, higher scores indicating more severe handicap. The 25 items are grouped into three dimensions: functional, emotional, and physical aspects of dizziness and unsteadiness. There are nine questions within each of the functional and emotional dimensions; with a maximum score of 4 for each item. Within the physical dimension there are seven questions with a maximum score of

4 for each. Response stating always is given 4 points, sometimes is given 2 points and never is given 0. In our study patients with BPPV had a fairly high DHI score. The patients with Lateral Canal BPPV had poorer scores compared to the Posterior Canal BPPV. However we would not call it significant owing to the small sample size of lateral canal BPPV. We noticed the Physical aspects were more severely affected followed by the Functional and Emotional aspects. The mean scores could not be compared to each other as the physical domain has a Maximal Possible Score of 28 whereas the other two parameters had Maximal Possible score of 36. So a Percentage mean affection was calculated for each aspect. The temporary character of dizziness in BPPV and the situations in which this symptom can occur could justify the greater impairment of physical aspects seen in the DHI. After the crisis, which last some seconds, patients reported they could perform their daily living activities. This fact could explain why those physical aspects were more affected than functional ones. The emotional aspect was less affected because the abnormalities to this element are normally resultant from physical limitations and long lasting functional disabilities caused by dizziness that affect professional, social and family life. It is also worthwhile to note that majority of patients had near complete improvement of all parameters of DHI Scale thus proving that BPPV is a fairly easy condition to treat once diagnosed accurately.

Conclusion

Dizziness remains one of the most troublesome symptoms significantly affecting the Quality of life of the Patient. Dizziness Handicap Inventory is a useful, reliable, self administered Questionnaire which can help us judge the severity of dizziness, its impact on the patients quality of life and also help in treatment planning, monitoring and response.

Ethical considerations: Adhered

Conflict of Interest: None

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