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Relationship between clinical features of dizziness and self-perceived dizziness handicap

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ABSTRACT

Background: Dizziness symptoms have a negative impact on daily activities and quality of life. The relationship between clinical features of dizziness and self-perceived dizziness handicap would gain a better understanding of impact of dizziness.

Objectives: To investigate the correlations of the clinical features of dizziness symptoms and the self-perceived dizziness handicap.

Materials and methods: Fifty participants (13 men and 37 women), aged between 18-65 years old, were recruited from the Otolaryngology clinic. All participants had experienced dizziness at least one month. The clinical features of dizziness measured were intensity (a 10-cm Visual Analogue Scale), frequency (times/week), duration (minutes each episode), and time of onset (months). The self-perceived level of handicap was measured using the Thai version of Dizziness Handicap Inventory (DHI-TH).

Results: The total score of DHI-TH was positively correlated with dizziness intensity and frequency (r=0.65 and 0.48, respectively, $p<0.01$). The subscale scores (physical, emotional and functional) were positively correlated with dizziness intensity and frequency (r ranged from 0.37 to 0.59, $p<0.01$). There were no correlations between the total and subscale DHI scores and duration and time of onset ($p>0.05$).

Conclusion: Self-perceived dizziness handicap as measured by the DHI-TH had a positive correlation with intensity and frequency of dizziness.

Introduction

Dizziness is one of the most common symptoms which bring patients to medical consultations. The prevalence of dizziness is approximately 20-30% of persons in the general population.[1] Dizziness has a tendency to increase with age and is more prevalent in women than men.[2,3] Dizziness symptoms can arise from various etiologies such as benign paroxysmal postural vertigo, vestibular neuritis, Ménière's disease, cardiovascular diseases, neurological disorders, psychological disorders, and chronic nonspecific dizziness.[4] Previous studies demonstrated that patients with either acute or chronic dizziness had diminished their daily activities and quality of life.[5-8] Severity of dizziness is often quantified by its intensity and frequency of dizziness attacks. However, severity is a multidimensional concept which may not be fully explained by only intensity and frequency of symptoms.

Dizziness Handicap Inventory (DHI) is a widely used questionnaire designed to evaluate self-perceived handicaps due to dizziness.[9] The original DHI was developed in English version and subsequently translated into many languages including Thai.[10-12] Original and translated versions of the DHI have been shown to have good validity and reliability.[9-1] DHI of Thai version was also shown to have good validity (Cronbach's alpha ranged from 0.75 to 0.92).[10] The DHI consists of three subscales identifying physical, emotional, and functional aspects. The total DHI scores reflect

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dizziness-related handicap perceived by the patients and help therapist in setting intervention goals and evaluating treatment or rehabilitation programs. Research evidence suggests that the DHI used in conjunction with physical examination and history taking might help quantifying the benefits of medical and rehabilitative treatments.[13]

Relationship of the DHI scores and subjective perception of dizziness has been investigated in previous studies.[14-16] Grigol et al.[14] found that the DHI had a positive correlation with a 10-cm visual vertigo analog scale in patients with vestibular dysfunctions. Likewise, Son et al.[16] found that the DHI was significantly correlated with a 10-cm vertigo visual analog scale and disability scale. Perez et al.[15] also demonstrated that the DHI was related to vestibular handicap, vestibular disability and visuo-vestibular disability. However, whether the clinical features of dizziness symptoms reflected the magnitude of self-perceived dizziness handicaps still remain unclear. The dizziness symptoms may not necessarily be correlated with the level of self-perceived handicaps due to dizziness. The relationship between clinical features of dizziness and self-perceived dizziness handicap will provide a better understanding of impact of dizziness. Thus the purpose of this study was to investigate the correlations of the clinical features of dizziness symptoms and self-perceived dizziness handicap, as measured by the DHI.

Materials and methods

Participants

Fifty participants were recruited from the Otolaryngology clinic, Chiang Mai University Hospital. Participants were aged between 18-65 years old and complained of dizziness at least one month. Participants were excluded if they had dizziness due to cardiovascular or neurological diseases (i.e. Stroke, Parkinson's disease, and multiple sclerosis), a history of head trauma, somatic illness, diagnosis of dementia and cognitive impairment, and psychological disorders.

The study was approved by the research ethics committee for research in humans, Faculty of Medicine, Chiang Mai University (No. NONE-2561-05250). All participants signed written informed consent forms before the commencement of the study.

Questionnaires

All participants were asked to complete a questionnaire designed to collect demographic data and clinical features of dizziness. The participants also completed the Dizziness Handicap Inventory-Thai version (DHI-TH) questionnaire to evaluate self-perceived level of handicap due to dizziness.

Clinical features of dizziness

For this study, the clinical features of dizziness are intensity, frequency, duration and time of onset. A Visual Analogue Scale (VAS) was used to determine intensity of dizziness. The VAS is a 10-cm long horizontal line labeled "no dizziness" at one end and "maximum dizziness" on the other end. The participants were asked to indicate their average dizziness intensity over the past week by marking a point on the VAS. The VAS score was subsequently classified into groups as mild intensity (VAS<4.0), moderate intensity (VAS 4.0-6.9), severe intensity (VAS≥7.0).[14] Frequency was defined as the average number of dizziness attack per week (times/week). Duration was defined as the length of time each episode of dizziness lasted (minutes). Time of onset was referred to the length of time that the participants had experienced dizziness symptoms (months).

Self-perceived level of handicap

Self-perceived level of handicap was measured using the DHI-TH. The DHI-TH has 25 items, divided into 3 subscales: emotional (9 items), functional (9 items), and physical (7 items). Each item has 3 response options "yes, sometimes and no", scored as "4, 2 and 0", respectively. The possible total DHI-TH score ranges from 0 (no handicap) to 100 (maximum handicap), with higher score indicates greater perceived handicap. DHI-TH scores were then classified into 3 groups of self-perceived level of handicap with a total score of 0-30 indicating mild, 31-60 moderate, and 61-100 severe.[17] The reliability of the DHI-TH for this study was shown to be excellent (ICC=0.90-0.96).

Statistical analysis

Sample size for the study was determined according to Roscoe.[18] The minimum number of cases required for correlation analysis should be at least 50. Descriptive statistics were used to describe demographic data and all outcome measures. Kolmogrov Smirnov test was used to test the assumption of normality. The DHI-TH scores (both total and its subscales) and intensity of dizziness data were normally distributed whereas the normality of the frequency, duration and time of onset of dizziness was not met. Pearson's correlation coefficient was then used to determine the relationship between the DHI-TH scores and intensity of dizziness and Spearman's correlation to determine the relationships between the DHI-TH scores and the frequency, duration and time of onset of dizziness. The correlation coefficient of 0.00-0.10 was considered as negligible, 0.10-0.39 weak, 0.40-0.69 moderate, 0.70-0.89 strong and 0.90-1.0 very strong.[19] Chi-square was used to examine the correlation of severity classification (mild, moderate and severe) between the DHI and VAS. A significance level was set at 0.05.

Results

Of the 50 participants, 70% were diagnosed with benign paroxysmal positional vertigo. The intensity of dizziness as measured by VAS was regarded as moderate (mean=4.99±1.95). Total DHI-TH score indicated a moderate level of self-perception handicap (mean=47.64±18.30, the scores range between 20 and 86). The scores ranged from 4 to 28 for the physical subscale, 2 to 30 for the emotional subscale, and 6 to 36 for the functional subscale. Demographic data, clinical features and the DHI-TH scores of the participants are presented in Table 1.

Table 1 Demographic and clinical data of the participants.

Demographic data	
Gender (Male: Female)	13:37
Age (years)	46.80±13.60
Clinical features of dizziness	
Intensity (0-10 VAS)	4.99±1.95
Frequency (times per week)	13.88±9.51
Duration (minutes each episode)	15.80±21.53
Time of onset (months)	10.76±34.27
Diagnosis of dizziness	
Benign Paroxysmal Positional Vertigo (n, %)	35 (70%)
Vestibular neuritis (n, %)	7 (14%)
Ménière's disease (n, %)	3 (6%)
No vestibular disease (n, %)	3 (6%)
Unknown (n, %)	2 (4%)
Medication used for dizziness (n, %)	42 (84%)
Dizziness Handicap Inventory score	
DHI total score	47.64±18.30
Physical subscale	16.36±5.72
Emotional subscale	11.40±7.00
Functional subscale	19.88±7.94

VAS: Visual Analogue Scale, Data are expressed as mean±standard deviation, otherwise as indicated.

Correlations between the DHI-TH scores and clinical features of dizziness

The total, physical, functional subscale scores of the DHI-TH were moderately correlated with both intensity and frequency of dizziness symptoms (r ranged from 0.47-0.65, $p<0.01$). The emotional subscale score had a weak correlation with the dizziness frequency (r=0.37, $p<0.01$) (Table 2). There was no correlation between the total DHI-TH score and any subscale scores with the dizziness duration and time of onset ($p>0.05$).

Table 2 Correlations between Dizziness Handicap Inventory scores and clinical features of dizziness.

Clinical features of dizziness	DHI - TH scores			
	Total	Physical	Emotional	Functional
Dizziness intensity (0-10 VAS) [a]	0.65*	0.57*	0.55*	0.59*
Dizziness frequency (times per week)[b]	0.48*	0.50*	0.37*	0.47*
Dizziness duration (minutes each episode)[b]	0.10	-0.01	0.10	0.12
Time of onset (months)[b]	-0.11	-0.13	-0.02	-0.12

**p<0.01, a data were analysed using Pearson's correlation, b data were analysed using Spearman's correlation, VAS: Visual Analogue Scale, DHI-TH: Dizziness Handicap Inventory-Thai version*

The frequency distribution of level of dizziness severity between the VAS and DHI-TH scores is presented in Table 3. Agreement in the severity classification of dizziness between the VAS and DHI-TH was 50% (mild =12%, moderate = 20%, severe = 18%). The Chi-square analysis revealed a moderate correlation between the severity level of handicap classified by the VAS and by the DHI-TH (r=0.50, $p<0.01$).

Table 3 Frequency distribution of the VAS and DHI regarding the level of handicap due to dizziness.

	DHI - TH	DHI -TH	DHI - TH	Total
	Mild	Moderate	Severe	
VAS - Mild	6 (12%)	7 (14%)	0 (0%)	13 (26%)
VAS - Moderate	7 (14%)	10 (20%)	7 (14%)	24 (48%)
VAS - Severe	1 (2%)	3 (6%)	9 (18%)	13 (26%)
Total	14 (28%)	20 (40%)	16 (32%)	50 (100%)

VAS: Visual Analogue Scale, DHI-TH: Dizziness Handicap Inventory-Thai version, Data are presented as number (%)

Discussion

The results of this study demonstrated the moderate correlations between the total DHI-TH scores and dizziness intensity and frequency. Higher intensity and frequency of dizziness were associated with greater experience self-perceived handicap. The results are in agreement with the findings of previous studies regardless of etiologies and stages of dizziness.[14-16, 20] Grigol et al.[14] found a significant moderate correlation between the total DHI and VAS scores in patients with dizziness cause by vestibular dysfunction (r=0.54). Likewise, Caldara et al.[20] reported that the total DHI score was moderately correlated with the VAS (r=0.59) in patients with vertigo, dizziness or unsteadiness over prolonged periods. Son et al.[16] also found similar results in the acute phase of unilateral vestibulopathy.

In addition, the physical and functional subscale scores of the DHI-TH were moderately correlated with intensity and frequency of dizziness. The emotional subscale, however, had a relatively weak correlation with dizziness frequency. The results are similar with previous studies which demonstrated the relationships between the subscale DHI scores and intensity and frequency of dizziness.[15, 20] Caldara et al.[20] showed that VAS score was moderately correlated with all subscale scores of the DHI in patients with dizziness caused by vestibulopathy (r ranged from 0.54-0.55). Likewise, Perez et al.[15] demonstrated frequency of dizziness was correlated with all the subscales of the DHI (r ranged from 0.56-0.63). No correlations between the DHI-TH (both total and subscale scores) and dizziness duration and time of onset were found in this study. This may be explained by differences in the nature of dizziness symptoms. Additionally, patients may adapt and self-modify their daily activities even in the absence of the dizziness.[9] Medication use may also influence characteristics of dizziness.

The total DHI-TH score in this study was considered as moderate intensity, indicating impact of dizziness on quality of life. The functional subscale presented the highest score, whereas the physical subscale presented intermediate score and the emotional subscale displayed the lowest score. These results support the findings of previous studies demonstrating more marked disability in the physical and functional aspects in patients with dizziness.[21-23] An explanation for these results may be that the functional aspect of the DHI measures the interference of dizziness with certain movements of the eyes, head and body for participation in social and leisure activities and the physical subscale measures the aggravation of dizziness due to the movements of eyes, head and body.[22, 23] Alternatively, the emotional subscale measures the impact of dizziness to patient's emotional well-being such as feeling frustration, fear of going out or staying at home alone, and anxiety.[22, 24] It was noted that the participants participating in this study were middle-age population. Thus, dizziness may affect objectively the participant's ability to resume work or play, but they are still able to manage dizziness when under stress.

Furthermore, the result of this study suggested a moderate correlation of the level of handicap classified by the VAS and DHI-TH, which is consistent with the findings of a previous study.[14] About 50% of agreement were found between the VAS and DHI-TH regarding to the dizziness severity classification. However, the use of one in place of the other is not recommended. Although the VAS is simpler than the DHI, it does not provide information addressing influence of dizziness on physical, emotional and functional aspects of the patients. Besides, the VAS is more related to patient's subjective perception and experience. Thus, using only the VAS to assess the intensity of the dizziness symptom does not adequately provide the information about the impact of dizziness symptoms. The VAS and DHI should be used together when assessing patient's condition and impact of dizziness on everyday life as well as early management is also recommended.

This study has some limitations which have to be pointed out. Recall bias may occur when the participants were asked for their clinical features of dizziness symptoms. Also, the majority of our participants had dizziness caused by benign paroxysmal positional vertigo. Thus this may limit the generalization of the findings.

Conclusion

The study demonstrated a positive correlation between the intensity and frequency of dizziness and self-perceived dizziness handicap. Dizziness had substantial impact on quality of life measured with the Dizziness Handicap Inventory and its impact was more on functional and physical aspects than emotional aspect.

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