VESTIBOLOGY

Validity of Italian adaptation of the Dizziness Handicap Inventory (DHI) and evaluation of the quality of life in patients with acute dizziness

Validazione italiana del Dizziness Handicap Inventory (DHI) e valutazione della qualità della vita in pazienti con sindrome vertiginosa acuta

G. NOLA, C. MOSTARDINI[1], V. SALVI[1], A.P. ERCOLANI[2], G. RALLI[3]

Operative Unit ENT, "G.B. Grassi" Hospital, Rome; [1] Operative Unit Neurology, "G.B. Grassi" Hospital, Rome; [2] Department of Psychology, University of Rome "La Sapienza", Rome; [3] Department of ENT, Audiology and Phoniatrics "G. Ferreri", University of Rome "La Sapienza", Rome, Italy

SUMMARY

The impact of dizziness on Quality of Life (QoL) can be assessed by the Dizziness Handicap Inventory (DHI), which is used as a discriminative and evaluative tool. Although the DHI is available in several languages, an equivalent version for the Italian population is not yet available. Aim of this study was to translate the DHI into the Italian language (DHI-I), assess its correlation to the Italian version of the Short Form-36 Health Survey and to investigate its reliability in evaluating the QoL of patients with acute dizziness. The study population consisted of 50 patients (76% females and 24% males), mean age 51.6 years, range 25-85 years (SD = 14.5). A cross-sectional design was used to examine the internal consistency (Cronbach's α) and concurrent validity (Pearson's product moment correlation r). The application followed the stages of translation from English to Italian and linguistic adaptation, grammatical and idiomatic equivalence review. To confirm the external validity of DHI-I, the Pearson correlation test between the total score and single subscales of DHI-I and the 8 scales of the Short Form Health Survey (SF-36) was performed. The Cronbach α coefficients for internal consistency were 0.92 for the DHI-I and 0.82, 0.84 and 0.75 for the sub-scale functional, emotional and physical, respectively. The frequency distribution of no one item showed a percentage higher than 75% in a single possible answer (0, 2, 4), excluding a ceiling or floor effect. Correlations with the total score of DHI-I were consistent and the correlation between total score of DHI-I and total score on SF-36 was -0.593. Of the single subscales, the emotional scale showed a closer correlation with almost all scales of the SF-36. The correlation between the total score of SF-36 and the single sub-scale of DHI-I (functional, emotional, physical) were respectively -0.599, -0.563, -0.398. The DHI was culturally and linguistically adapted for its application in the Italian population. The DHI-I demonstrated a good reliability and is recommended as a measure of disability in patients with dizziness and unsteadiness. According to the DHI-I, patients with acute dizziness and with a clinical diagnosis of vestibular syndrome presented a decreased QoL; the physical aspects were the most compromised.

KEY WORDS: Dizziness Handicap Inventory (DHI) • Health-related Quality of Life (QoL) • SF-36 Health Survey • Validity • Disability

RIASSUNTO

L'impatto delle vertigini sulla qualità della vita (QoL) può essere valutato utilizzando il Dizziness Handicap Inventory (DHI). Il DHI è disponibile in diverse lingue ma non è ancora disponibile una versione equivalente per la popolazione italiana. L'obiettivo di questo studio è quello di tradurre il DHI in lingua italiana (DHI-I), valutando la validità e l'affidabilità con la versione italiana del Short Form-36 Health Survey della QoL dei pazienti con vertigini acute. Abbiamo studiato 50 pazienti con vertigini acute (76% femmine e 24% maschi) con un'età media di 51,6 anni, range da 25 a 85 anni (DS = 14,5). Abbiamo calcolato la consistenza interna (α di Cronbach) e la validità concorrente (coefficiente di correlazione prodotto-momento di Pearson). Per confermare la validità esterna di DHI-I, abbiamo calcolato il test di correlazione di Pearson tra il punteggio totale e le sottoscale unico di DHI-I e le otto sottoscale del Short Form Health Survey (SF-36). I coefficienti di Cronbach α per consistenza interna sono stati 0,92 per la DHI-I e rispettivamente 0,82, 0,84 e 0,75 per le sottoscale funzionale, emotiva e fisica. Le correlazioni con il punteggio totale di DHI-I sono stati coerenti e la correlazione tra il punteggio totale di DHI-I e punteggio totale su SF-36 è stata -0,593. Tra le singole sottoscale, la scala emozionale ha mostrato maggiore correlazione con quasi tutte le scale del SF-36. La correlazione tra il punteggio totale di SF-36 e le sottoscale di DHI-I (funzionale, emotiva, fisica) è stata rispettivamente -0,599, -0,563, -0,398. Il DHI è stato adeguato oltre che alla lingua anche alla cultura della popolazione italiana. Il DHI-I ha dimostrato una buona affidabilità, ed è raccomandato come misura per la disabilità nei pazienti con vertigini e instabilità. Secondo il DHI-I, i pazienti con vertigini acute e con diagnosi clinica di sindrome vestibolare hanno presentato una diminuzione QoL e compromissione in particolare degli aspetti fisici.

PAROLE CHIAVE: *Dizziness Handicap Inventory (DHI) • Qualità della Vita relativa alla salute • SF-36 • Validità • Disabilità*

Introduction

Calculating the effects of medical and rehabilitative management of the acute dizziness patient is not easy.
The World Health Organization (WHO) defines the Quality of Life (QoL) as the individual's perception of his/her position in life, in the context of the culture and values system in which he/she is inserted and in relation to his/her goals, expectations, patterns, and worries [1].
Many of the tools used to evaluate the QoL were developed in English. However, it is necessary to develop QoL evaluation tools also in other languages by developing a new measurement instrument or adapting an existing one to a different language as proposed by Guillemin et al., in 1993 [2]. The cultural adaptation has the advantage of enabling the comparison of results when administered in countries with different languages.
In 1990, Jacobson and Newman designed and validated a specific questionnaire for dizziness, the Dizziness Handicap Inventory (DHI) [3], which evaluated the self-perception of the incapacitating effects, on the QoL, caused by dizziness.
The DHI questionnaire has been used in many studies to evaluate the effects of vestibular diseases. DHI is a useful tool for physiotherapists and professional rehabilitation teams to list patient's problems, define intervention goals, and plan and evaluate treatment and/or rehabilitation programmes.
The original American version has been translated into several languages and cultures, such as Spanish (2000) [4], Swedish (2003) [5], Chinese (2004) [6], French (2004) [7], Dutch (2006) [8], Brazilian (2007) [9], Portuguese (2008) [10], German (2009) [11] and Norwegian (2009) [12].
The DHI comprises 25 items with a total score ranging between 0 and 100 points; DHI can be further subdivided into physical (DHI-P, 28 points), functional (DHI-F 36 points) and emotional (DHI-E 36 points) subscores. A higher score indicates a more severe handicap.
Despite the popular use of the DHI, an equivalent version for the Italian population is not yet available. At the moment, vestibular diseases, in Italian patients, are evaluated using a generic questionnaire, the Italian version of the Medical Outcome Study 36-Item Short Form Health Survey (SF-36) [13], which assesses changes in individuals undergoing medical vestibular treatment.
Aims of the present study were to translate and perform a cross-cultural adaptation of the DHI into the Italian language and to evaluate the QoL of Italian patients with acute dizziness by means of the Italian DHI (DHI-I) and Italian SF-36 [14].

Materials and methods

The original DHI comprises 25 questions designed to assess a patient's functional (9 questions), emotional (9 questions) and physical (7 questions) limitations. Each question provides a choice of 3 replies: "yes" (4 points), "sometimes" (2 points) and "no" (0 points) (Table I).
The maximum of 100 points indicates the greatest disturbance to the patient and the minimum of 0 points suggests that there is no handicap. The DHI has been reported to have good psychometric properties: high test-retest reliability (interclass correlation coefficient [ICC] 0.72-0.97) and internal consistency reliability (Cronbach α = 0.72-0.89) responsiveness [3].

Italian Dizziness Handicap Inventory (DHI-I)

Translation from English to Italian and linguistic adaptation

DHI translation into the Italian language followed international guidelines through a process of reviews and modification [15 16]. Two expert otorhinolaryngologists and two psychologists each performed, separately, an initial translation from English to Italian. The translated versions were then discussed and adjusted to obtain consensus and close equivalence to the original version [16]. Back translation was performed by a bilingual person with a professional academic level of Italian and English and by an English mother tongue speaker. The original and the back-translated English versions were compared by the two translators and, if discrepancies were found, the Italian version was adjusted to optimize the conceptual overlap. The translated version (Table II) was pilot tested on a few Italian speaking patients presenting with dizziness (n = 10); patients found no difficulty in understanding and replying to the questions.

Italian Medical Outcome Study 36-Item Short Form Health Survey (SF-36)

The Italian version SF-36 [14] includes 36 items divided into 8 scales: Physical Functioning (10 questions), Physical Role (4 questions), Body Pain (2 questions), General Health (5 questions), Vitality (4 questions), Social Functioning (2 questions), Emotional Role (4 questions) and Mental Health (5 questions). The 8 scales were scored individually and then combined, resulting in a scale ranging from 0 to 100; the highest score indicates the best health while the lowest score denotes poor health.
The study was approved by the Ethics Committee of the "G.B. Grassi" Hospital of Rome (Protocol no. 60037). All patients signed the specific informed consent forms.
Patients suffering from acute dizziness from 1 day to 30 days were recruited in the operative unit of ENT "G.B. Grassi" Hospital of Rome between July 2009 and February 2010. Patients included in the study suffered from at least one of the following vestibular disorders: benign paroxysmal positional vertigo (BPPV), vestibular neuritis and uncompensated vestibular hypo-function; exclusion criteria were dizziness due to cardio-vascular disease and neurological disease.

Table I. Dizziness Handicap Inventory from Jacobson and Newman (1990)[3].

1.	Does looking up increase your problem?	Yes	Sometimes	No
2.	Because of your problem, do you feel frustrated?	Yes	Sometimes	No
3.	Because of your problem, do you restrict your travel for business or recreation?	Yes	Sometimes	No
4.	Does walking down the aisle of a supermarket increase your problem?	Yes	Sometimes	No
5.	Because of your problem, do you have difficulty getting into or out of bed?	Yes	Sometimes	No
6.	Does your problem significantly restrict your participation in social activities, such as going out to dinner, going to movies, dancing, or to parties?	Yes	Sometimes	No
7.	Because of your problem, do you have difficulty reading?	Yes	Sometimes	No
8.	Does performing more ambitious activities like sports, dancing, household chores such as sweeping or putting dishes away increase your problem?	Yes	Sometimes	No
9.	Because of your problem, are you afraid to leave home without having someone with you?	Yes	Sometimes	No
10.	Because of your problem, have you been embarrassed in front of others?	Yes	Sometimes	No
11.	Do quick movements of your head increase your problem?	Yes	Sometimes	No
12.	Because of your problem, do you avoid heights?	Yes	Sometimes	No
13.	Does turning over in bed increase your problem?	Yes	Sometimes	No
14.	Because of your problem, is it difficult for you to do strenuous housework or yardwork?	Yes	Sometimes	No
15.	Because of your problem, are you afraid people may think you are intoxicated?	Yes	Sometimes	No
16.	Because of your problem, is it difficult for you to go for a walk by yourself?	Yes	Sometimes	No
17.	Does walking down a sidewalk increase your problem?	Yes	Sometimes	No
18.	Because of your problem, is it difficult for you to concentrate?	Yes	Sometimes	No
19.	Because of your problem is it difficult for you to go for a walk around your house in the dark?	Yes	Sometimes	No
20.	Because of your problem, are you afraid to stay home alone?	Yes	Sometimes	No
21.	Because of your problem, do you feel handicapped?	Yes	Sometimes	No
22.	Has your problem placed stress on your relationship with members of your family or friends?	Yes	Sometimes	No
23.	Because of your problem, are you depressed?	Yes	Sometimes	No
24.	Does your problem interfere with your job or household responsibilities?	Yes	Sometimes	No
25.	Does bending over increase your problem?	Yes	Sometimes	No

After a careful and detailed anamnesis, all patients underwent pure-tone audiometry, tympanometry, Dix-Hallpike manoeuvre, McClure manoeuvre, Head Shaking Test (HST), caloric labyrinth stimulation according to the Fitzgerald-Hallpike method and Vestibular Evoked Myogenic Potential (VEMP). The patients with vestibular neuritis were treated with a therapeutic protocol with beclomethasone i.m. (intramuscularly), 4 mg twice a day for 8 days, and Vanciclovir, 400 mg twice a day, for 20 days. Our patients self-administered the DHI-I and Italian SF-36, followed by a neurological and psychological evaluation.

Statistical analysis

Descriptive statistics of the respondents' characteristics were performed. To investigate possible ceiling or floor effects, the frequency distribution of each item was evaluated. Cronbach α coefficient and corrected item-total correlation were performed to investigate the internal consistency and the strength of the relationship between a single item and the others in the DHI-I total scale and in each of the three subscales. To investigate the external validity of the DHI-I, the total score of DHI-I and each sub-scale were correlated to the Short Form Health Survey (SF-36) and ANOVA (analysis of variance) between dizziness diagnosis (0, 1, 2 level) and the total score of DHI-I and each sub-scale.

The analyses were made using the SPSS version 17.0 computer software.

Results

The study population consisted of 50 patients (76% females and 24% males), mean age 51.6 years (range 25-85 years, SD = 14.5 years). Details of descriptive information regarding the patients are given in Table III.

The frequency distribution of no single item showed a percentage higher than 75% in a single possible answer (0, 2, 4) thus excluding a ceiling or floor effect.

The Cronbach α coefficients, for internal consistency, were 0.92 for the DHI-I and 0.82, 0.84 and 0.75 for the

Table II. Italian Dizziness Handicap Inventory (DHI-I).

1.	Il suo problema aumenta guardando in alto?	Sì	Talvolta	No
2.	A causa del suo problema si sente frustrato/a?	Sì	Talvolta	No
3.	A causa del suo problema limita i suoi viaggi di lavoro o di svago?	Sì	Talvolta	No
4.	Camminare lungo un corridoio di un supermarket aumenta il suo problema?	Sì	Talvolta	No
5.	A causa del suo problema ha difficoltà a coricarsi o alzarsi dal letto?	Sì	Talvolta	No
6.	Il suo problema limita significativamente la sua partecipazione ad attività sociali come andare fuori a cena, o al cinema, o a ballare o partecipare a una festa?	Sì	Talvolta	No
7.	A causa del suo problema ha difficoltà a leggere?	Sì	Talvolta	No
8.	Effettuare attività sportive o di ballo o svolgere lavori domestici come spazzare o mettere via i piatti, aumenta il suo problema?	Sì	Talvolta	No
9.	A causa del suo problema, è preoccupato/a se deve uscire da casa senza essere accompagnato/a da qualcuno?	Sì	Talvolta	No
10.	A causa del suo problema si sente imbarazzato/a di fronte ad altri?	Sì	Talvolta	No
11.	Movimenti veloci della sua testa aumentano il problema?	Sì	Talvolta	No
12.	A causa del suo problema evita luoghi alti?	Sì	Talvolta	No
13.	Girarsi nel letto aumenta il suo problema?	Sì	Talvolta	No
14.	A causa del suo problema è difficile per lei eseguire lavori di casa faticosi o di precisione?	Sì	Talvolta	No
15.	A causa del suo problema teme che la gente possa pensare che lei sia intossicato?	Sì	Talvolta	No
16.	A causa del suo problema le è difficile passeggiare da solo/a?	Sì	Talvolta	No
17.	Camminare sul marciapiede aumenta il suo problema?	Sì	Talvolta	No
18.	A causa del suo problema le è difficile concentrarsi?	Sì	Talvolta	No
19.	A causa del suo problema le è difficile camminare in casa al buio?	Sì	Talvolta	No
20.	A causa del suo problema ha paura di restare solo/a a casa?	Sì	Talvolta	No
21.	A causa del suo problema si sente handicappato/a?	Sì	Talvolta	No
22.	Il suo problema le ha causato difficoltà nelle relazioni con qualcuno della sua famiglia o dei suoi amici?	Sì	Talvolta	No
23.	A causa del suo problema si sente depresso/a?	Sì	Talvolta	No
24.	Il suo problema interferisce con il lavoro o le responsabilità familiari?	Sì	Talvolta	No
25.	Piegarsi in avanti aumenta il suo problema?	Sì	Talvolta	No

functional, emotional and physical sub-scale, respectively (Table IV), according to both the original and the German version of the DHI.

Within the total scale, the corrected correlation between each item and the total score (CI-TC) ranged from 0.29 (item 22e) and 0.67 (item 9e) (Table V). Results were very similar to the two versions of DHI from US and Germany. None of the CI-TCs fell below the recommended value (0.20) [16].

To control the external validity of DHI-I, Pearson correlations were performed between total score and single subscales of DHI-I with the 8 scales of the Short Form Health Survey (SF-36) (a high score on SF-36 means good health perceived): all the correlations with the total score of DHI-I were consistent; the correlation between total score of DHI-I and total score on SF-36 was -0.593. Among the single subscales, the emotional scale showed

Table III. Description of the study patients.

Characteristics	Patients (n = 50)
Female: n (%)	38 (76)
Age (yrs): mean (SD, min-max)	51.6 (14.5, 25-85)
Duration of dizziness: mean days (SD, min-max)	2.3 (1.2, 1-5)
Diagnostic groups:	
Benign Paroxysmal Positional Vertigo (BPPV) n:	19
Vestibular neuritis (VN) n:	2
Uncompensated vestibular hypo-function n:	5
No vestibular disease n:	24

Table IV. Internal consistency reliability values (Cronbach's α) for DHI-I, DHI-US and DHI-G.

	Total	Functional	Emotional	Physical
DHI-I Cronbach's α	0.92	0.82	0.84	0.75
DHI-US Cronbach's α	0.89	0.85	0.72	0.78
DHI-G Cronbach's α	0.90	0.80	0.82	0.71

Table V. Item statistics and corrected item-total correlation (CI-TC) coefficients in DHI-I, DHI-US DHI-G.

Item	Subscales	CI-TC total scale Italian version	CI-TC total scale US version	CI-TC total scale German version
1	P	0.43	0.54	0.32
2	E	0.64	0.34	0.51
3	F	0.65	0.76	0.61
4	P	0.31	0.39	0.48
5	F	0.45	0.50	0.41
6	F	0.65	0.69	0.72
7	F	0.58	0.44	0.36
8	P	0.60	0.54	0.67
9	E	0.67	0.43	0.49
10	E	0.64	0.46	0.27
11	P	0.54	0.51	0.41
12	F	0.48	0.49	0.42
13	P	0.40	0.43	0.27
14	F	0.64	0.58	0.69
15	E	0.47	0.30	0.48
16	F	0.62	0.62	0.57
17	P	0.41	0.58	0.46
18	E	0.57	0.49	0.51
19	F	0.50	0.48	0.32
20	E	0.61	0.27	0.37
21	E	0.58	0.41	0.71
22	E	0.29	0.46	0.60
23	E	0.59	0.41	0.63
24	F	0.63	0.56	0.66
25	P	0.54	0.57	0.32

a better correlation with almost every scale of the SF-36. The correlations between the total score of SF-36 and the single sub-scale of DHI-I (functional, emotional, physical) were respectively -0.599, -0.563, -0.398 (Table VI). The ANOVA results are not statistically significant but the mean values of DHI-I and of the single sub-scale showed a decrease from the mild level of disability to the more severe condition (Table VII).

Discussion

Patients' self-perceived QoL measurement is becoming increasingly recognized as an important indicator for health care evaluation.

The DHI provides a useful, reliable and valid assessment of self-perceived handicap associated with acute dizziness. In addition to the results of the reliability and validity, we believe that the additional advantages of the DHI include its simplicity, the relevance of its items and its capacity to take into account all those health components described by the WHO's International Classification of Functioning, Disability and Health [1].

The DHI is a reliable, valid and clinically useful tool to measure the self-perceived handicap associated with the dizziness symptoms triggered by a variety of causes. The DHI may be used by clinicians not only to evaluate the dizziness handicap, but also to demonstrate functional outcomes in those patients presenting dizziness following surgery.

From the present investigation focusing on the measurement properties of a translated and adapted Italian version of the DHI, in patients with acute dizziness, the results showed that the 25-item DHI-I offers a high internal consistency for the total scale ($\alpha = 0.92$). In particular, Cronbach α values, for the 3 DHI-I subscales (functional = 0.75, emotional = 0.84, physical = 0.82) showed internal consistency and is comparable with the results of the original American [3] and German versions [11].

The functional aspects investigated by the DHI-I evaluate the interference of dizziness on the performance of certain eye, head and body movements, although focusing on the capacity of performing professional, domestic, social and pleasure activities and on the independency of performing tasks such as walking without help and walking around the house in the dark.

Table VI. Sf-36 subscales.

		DHI-I Total		Functional		Emotional		Physical	
PF	Pearson r	-0.342*		-0.369†		-0.328*		-0.183	
	Sig. (2-code)		0.015		0.008		0.02		0.203
PR	Pearson r	-0.349*		-0.382†		-0.275		-0.279	
	Sig. (2-code)		0.013		0.006		0.053		0.05
BP	Pearson r	-0.499†		-0.493†		-0.465†		-0.385†	
	Sig. (2-code)		0		0		0.001		0.006
GH	Pearson r	-0.321*		-0.278		-0.328*		-0.225	
	Sig. (2-code)		0.023		0.05		0.02		0.116
VT	Pearson r	-0.471†		-0.448†		-0.473†		-0.281*	
	Sig. (2-code)		0.001		0.001		0.001		0.048
SF	Pearson r	-0.571†		-0.612†		-0.580†		-0.285*	
	Sig. (2-code)		0		0		0		0.045
RE	Pearson r	-0.445†		-0.454†		-0.398†		-0.341*	
	Sig. (2-code)		0.001		0.001		0.004		0.015
MH	Pearson r	-0.598†		-0.556†		-0.646†		-0.365†	
	Sig. (2-code)		0		0		0		0.009

*PF: Physical Functioning; PR: Physical Role; BP: Body Pain; GH: General Health; VT: Vitality; SF: Social Functioning; RE: Role Emotional; MH: Mental Health (with DHI-I total and functional, emotional and physical subscales Pearson correlation); * < 0.05; † < 0.01.*

Table VII. Mean and standard deviation for the three groups with different dizziness diagnosis.

Dizziness disability level	N.	DHI-I Total		Functional		Emotional		Physical	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mild	24	45.42	23.75	19.58	9.89	13	9.798	15	7.46
Moderate	19	37.89	22.66	16.42	9.72	9.79	9.818	14.63	6.5
Severe	7	30	18.26	12.29	8.11	9.14	7.988	11.14	6.517
Total	50	40.4	22.9	17.36	9.72	11.24	9.552	14.32	6.968

The functional aspects were those most defeated together with the increasing age of the patients, probably due to the effects of aging on the vestibular system, which may enhance the functional limitations in these patients.

The emotional aspects, evaluated by the DHI-I, were also abnormal in the patients studied. These aspects investigated the possible harm caused by the dizziness on the QoL, generating frustration, fear of going outside without company or staying home alone, shame regarding the clinical manifestations, worries about concentration disorders, a sensation of incapacity, changes in family or social relationships, and depression. Our results are in agreement with those of Paiva and Kuhn (2004) [17], who confirmed that patients with vertigo present concomitant psychological symptoms in 56.38% of cases, anguish being the most prevalent (47.38%), followed by anxiety, fear, depression and memory disorders, thus stressing the relation between the vestibular disorder and emotional alterations.

The physical aspects investigated by the DHI-I, although evaluated by fewer questions compared to the other aspects of the questionnaire, were those that presented the highest scores of arithmetic averages. Fielder et al. (1996) [18] also found that for both men and women, the performance of physical functions was significantly more affected compared to the other aspects evaluated by the DHI. The Italian DHI physical aspects evaluated the relationship between the manifestation and/or the severity of the dizziness and the eye and body movements. The manifestation of dizziness, in specific positions or following head movements, is very common and may occur in patients with benign paroxysmal positional vertigo, the most common vestibulopathy.

Correlations of the DHI-I with the validated Italian Medical Outcome Study 36-Item Short Form Health Survey (SF-36) were used as a test of convergence validity. The total DHI-I score showed significant correlations with all 8 subscores of Italian SF-36, implying that acute dizziness has a very important impact on patients.

The DHI-I can be used as a tool to evaluate the reduction in QoL caused by dizziness in patients with acute vestibulopathy, and also, from the clinical point of view, as an instrument to evaluate, during the follow-up period, the therapeutic effect of rehabilitation treatment, or medications and/or surgery.
The DHI-I was found to be a reliable tool for the assessment of the impact of dizziness on the QoL. Those patients with acute dizziness or with a diagnostic hypothesis of a vestibular syndrome present a deterioration in their QoL due to this symptom, as evaluated using the Italian DHI. The physical aspects were those most defeated followed, in decreasing order, by the functional and the emotional aspects. The functional aspects were particularly changed in older patients.
According to the results of this study, the DHI-I retains high levels of reliability and validity as compared to the DHI-US and has a moderate level of responsiveness. It is recommended for use in the evaluation of the QoL of Italian patients with acute dizziness. Given reasonable time which is needed to complete both questionnaires, simultaneous use of the Italian SF-36 is advisable in order to establish a comparison between the QoL of patients with dizziness and those with other diseases.

Conclusions

The DHI was culturally and linguistically adapted for its use in the Italian population. The DHI-I demonstrated good reliability and is recommended in the evaluation of disability in patients with dizziness and/or unsteadiness. According to the DHI-I, patients with acute dizziness and with a clinical diagnosis of vestibular syndrome present a decreased QoL.
The physical aspects were those most altered, followed, in decreasing order, by the functional and emotional aspects. The functional aspects were more deteriorated in older patients.
The total scale of the DHI-I version showed satisfactory measurement properties, as a discriminating and evaluative means, and can, therefore, be used to assess the impact of dizziness on the QoL in Italian patients.

Acknowledgements

Authors thank the patients for the expressed interest and intense collaboration while answering all questions and the translator, Mrs Elena Nola, who contributed to the process of translation and adaptation of the questionnaire.

References

[1] World Health Organization (WHO). *International classification of impairments, disabilities and handicaps: a manual of classification relating to the consequences of disease, published in accordance with resolution WHA29.35 of the Twenty-ninth World Health Assembly*. Proceedings of World Health Organization. Geneva: WHO 1980.

[2] Guillemin F, Bombardier C, Beaton D. *Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines*. J Clin Epidemiol 1993;46:1417-32.

[3] Jacobson GP, Newman CW. *The development of the Dizziness Handicap Inventory*. Arch Otolaryngol Head Neck Surg 1990;116:424-7.

[4] Perez N, Garmendia I, Martin E, et al. *Cultural adaption of 2 questionnaires for health measurement in patients with vertigo*. Acta Otorrinolaringol Esp 2000;51:572-80.

[5] Jarlsater S, Mattsson E. *Test of reliability of the Dizziness Handicap Inventory and the activities-specific balance confidence scale for use in Sweden*. Adv Physiother 2003;5:137-44.

[6] Poon DMY, Chow LCK, Au DKK, et al. *Translation of the Dizziness Handicap Inventory into Chinese, validation of it, and evaluation of the quality of life of patients with chronic dizziness*. Ann Otol Rhinol Laryngol 2004;113:1006-11.

[7] Nyabenda A, Briart C, Deggouj N, et al. *Étude normative et de la reproductibilité d'une échelle du handicap lié aux troubles de l'équilibre et aux vertiges "Dizziness Handicap Inventory" version Française Normative study and reliability of French version of the Dizziness Handicap Inventory*. Ann Readapt Med Phys 2004;47:105-13.

[8] Vereeck L, Truijen S, Wuyts F, et al. *Test-retest reliability of the Dutch version of the Dizziness Handicap Inventory*. B-ENT 2006;2:75-80.

[9] Oliveira de Castro AS, Gazzola JM, Natour J, et al. *Versão brasileira do Dizziness Handicap Inventory. Brazilian version of the Dizziness Handicap Inventory*. Pró-Fono Revista de Atualização Científica 2007;1:97-106.

[10] Garcia FV, Luzio CS, Benzinho TA, et al. *Validation and adaptation of Dizziness Handicap Inventory to the Portuguese language and population*. Acta ORL/Técnicas em Otorrinolaringologia 2008;2:128-32.

[11] Kurre A, Van Gool CJAW, Bastianen CHG, et al. *Translation, cross-cultural adaptation and reliability of the German version of the Dizziness Handicap Inventory*. Otol Neurotol 2009;30:359-67.

[12] Tamber AL, Wilhelmesen KT, Strand LI. *Measurement properties of the Dizziness Handicap Inventory by cross-sectional and longitudinal designs*. Health Qual Life Outcomes 2009;7:101.

[13] Ware JE, Gandek B. *The SF-36® Health Survey: development and use in mental health research and the IQOLA Project*. Int J Ment Health 1994;23:49-73.

[14] Apolone G, Mosconi P. *The Italian SF-36 health survey: translation, validation and norming*. J Clin Epidemiol 1998;51:1025-36.

[15] Sartorius N, Kuyyken W. *Translation of health status instruments*. Berlin: Springer-Verlag; 1994.

[16] Streiner DL, Norman GR. *Health measurement scales: a practical guide to their development and use*. Oxford: Oxford University Press; 2003.

[17] Paiva AD, Kuhn AMB. *Psychological symptoms associated to dizziness complaint in neurootological patients of Universidade Federal de São Paulo - Escola Paulista de Medicina*. R Bras Otorrinolaringol 2004;70:512-5.

[18] Fielder H, Denholm SW, Lyons RA, et al. *Measurement of health status in patients with vertigo*. Clin Otolaryngol 1996;21:124-6.

Received: March 5, 2010 - Accepted: June 12, 2010

Address for correspondence: Dr. G. Nola, viale Bruno Pelizzi 163, 00173 Roma, Italy. E-mail: giuseppenola@libero.it