

Research Article

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Validation of a Moroccan Arabic Version of the Dizziness Handicap Inventory (DHI-M)

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ABSTRACT

Objective: To Develop and validate the dizziness handicap inventory questionnaire to the Moroccan dialect version.

Method: We conducted a prospective study over a year (January 2025-January 2026) in the Otolaryngology Department of Casablanca University hospital. The questionnaire was translated by a forward-backward procedure. The translated version was then tested using 40 patients with vestibular disorders, and then analyzed.

Results: patients included filled the questionnaire twice before liberation and once after.

Conclusion: The Moroccan version of DHI showed satisfactory measurement properties and turns out to be a valid and reliable for evaluating the dizziness effects on quality of life in Moroccan population.

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Introduction

Dizziness is a common complaint in the adult community in Morocco and worldwide. this condition can significantly alter the quality of life of individuals. It creates a public health care problem as 80% of affected patients require medical help, and there is an interruption of their work or daily activities as a result of the symptoms [1].

Clinical examination of a dizzy patient is not a suitable procedure to assess the psychological impact of dizziness, and this has prompted many investigators to develop questionnaires to evaluate the quality of life of a dizzy patient, as it is challenging to diagnose and treat [2,3].

There are some clinical tests utilizing in evaluation of dizzy patients. However, they are not representing the dizziness effects on patient's life or treatment progress, for example caloric test remains abnormal even after resolving the dizziness [4]. it is then, necessary to develop tools and methods to measure the real impact on the quality of life.

In 1990, Jacobson and Newman designed and validated a specific questionnaire for dizziness, the Dizziness Handicap Inventory (DHI) aiming at evaluating the self-perception of the incapacitating effects provoked by dizziness [4].

The DHI is translated to many languages such as Arabic, Brazilian, Chinese, Dutch, French, German, Italian, Norwegian, Portuguese, Spanish and Swedish and show good psychometric properties such as validity, reliability and internal consistency in these translations , but no validated Moroccan version was published [5-14].

The aim of the study is the translation and cultural adaptation of the dizziness handicap inventory questionnaire in order to make it available for research and clinics for Moroccan population.

Materials and Methods

Ethical Approval

written informed consent was obtained from all the participants of this study.

Patient Recruitment

Subjects were recruited from the otology consultation unit, at hospital 20 august of Casablanca in the period from January 2025 to January 2026. All subjects in the current study were native Moroccan speakers, being able to speak and understand the common Moroccan dialect. In total, 40 patients with vestibular disorders, were enrolled in the study, they underwent 2 questionnaires DHI-M and FES-I for comparison.

After a careful and detailed anamnesis, all patients underwent pure-tone audiometry, tympanometry and Dix- Hallpike Maneuver

Patients with handicaps due to other causes were excluded.

Translation Process

The translation was performed without serious problems and was produced by a forward–backward procedure, involving two forward and two backward translators. The DHI was first translated independently by two translators, both Moroccan native speakers, into Moroccan Arabic dialect. The translated versions were quite similar. We solved a few discrepancies. Then, this version was back translated to English by two English speakers fluent in Moroccan Arabic. We compared the English back translation to the original Version to make sure that the meaning of the original questions was preserved.

Questionnaire

The DHI consists of 25 items designed to assess the self-perceived level of handicap due to dizziness. Answer “Yes” to each question has 4 scores; “sometimes” has 2 and “No” has 0 scores. Total score ranges from 0 to 100. The higher total score shows a greater amount of disability. The questionnaire has three subscales; physical (7 item), functional (9 item) and emotional (9 item) [Table 1] and showed good validity, reliability and internal consistency in original version and other translations [6-14].

Items	yes	sometimes	no
P1. Does looking up increase your problem?	Yes	Sometimes	No
E2. Because of your problem, do you feel frustrated?	Yes	Sometimes	No
F3. Because of your problem, do you restrict your travel for business or recreation?	Yes	Sometimes	No
P4. Does walking down the aisle of a supermarket increase your problem?	Yes	Sometimes	No
F5. Because of your problem, do you have difficulty getting into or out of bed?	Yes	Sometimes	No
F6. 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
F7. Because of your problem, do you have difficulty reading?	Yes	Sometimes	No
P8. Does performing more ambitious activities like sports, dancing, household chores such as sweeping or putting dishes away increase your problem?	Yes	Sometimes	No
E9. Because of your problem, are you afraid to leave your home without having someone accompany you?	Yes	Sometimes	No
F10. Because of your problem, have you been embarrassed in front of others?	Yes	Sometimes	No
P11. Do quick movements of your head increase your problem?	Yes	Sometimes	No
F12. Because of your problem, do you avoid heights?	Yes	Sometimes	No
I3. Does turning over in bed increase your problem?	Yes	Sometimes	No
F14. Because of your problem, is it difficult for you to do strenuous housework or yardwork?	Yes	Sometimes	No
E15. Because of your problem, are you afraid people may think you are intoxicated?	Yes	Sometimes	No
F16. Because of your problem, is it difficult for you to go for a walk by yourself?	Yes	Sometimes	No
P17. Does walking down a sidewalk increase your problem?	Yes	Sometimes	No
E18. Because of your problem, is it difficult for you to concentrate?	Yes	Sometimes	No
F19. Because of your problem, is it difficult for you to walk around your house in the dark?	Yes	Sometimes	No
E20. Because of your problem, are you afraid to stay home alone?	Yes	Sometimes	No
E21. Because of your problem, do you feel handicapped?	Yes	Sometimes	No
E22. Has your problem placed stress on your relationships with members of your family or friends?	Yes	Sometimes	No
E23. Because of your problem, are you depressed?	Yes	Sometimes	No
F24. Does your problem interfere with your job or household responsibilities?	Yes	Sometimes	No
P25. Does bending over increase your problem?	Yes	Sometimes	No

Table 1: Dizziness Handicap Inventory from Jacobson and Newman (1990)

Statistical Analysis

A descriptive analysis was carried out with expression of the quantitative variables as means standard deviations or as medians with its extremes, and the qualitative variables in numbers and percentages.

Cronbach’s alpha was used to test reliability. A value greater than 0.8 was considered ‘good’, greater than 0.9 was considered ‘excellent’, and a value greater than 0.7 was considered ‘satisfactory.’

Results

The study population consisted of 40 patients. 80% females and 20% males.

Internal Validity

The internal validity of the DHI-M was assessed using Cronbach’s α coefficients.

Cronbach’s alpha for the total and emotional, physical and functional subscales were 0.89 and 0.78, 0.77, and 0.74 respectively, it’s showed good internal consistency for total score and individual subscales of the DHI-M.

Reliability

Test–retest reliability was assessed in the 40 patients who completed the questionnaire a second time 1 week apart. The results of initial and retest examination were compared using the intraclass correlation coefficient.

Construct Validity

We measured in each dimension of the questionnaire.

- **DHI-P:** we found that there is good correlation between most items scale in each subtest ($0.56 < r < 0.78$, $P < 0.01$)

There was a good correlation between each item and total score as well ($0.40 < r < 0.86$, $P < 0.01$).

- **DHI-E:** good correlation between items ($0.37 < r < 0.74$) Item total correlation ($0.21 < r < 0.68$)
- **DHI-F:** ($0.26 < r < 0.78$) for items and ($0.36 < r < 0.76$) for item total correlation

Responsiveness after Liberation

Scores have shown a good clinical improvement after liberation maneuvers the effect size in DHI_P, DHI_E DHI_F and DHI_total was respectively, 1,62 ; 1,24 ; 1,55 and 1,65.

in all patients the effect size was superior to 0.8. This indicates high sensitivity to change for all three DHI sub-scales (Table 2).

Table 2: Mean Change in DHI Scores after Liberation

	DHI-P before	DHI-E before	DHI-F before	DHI-P After	DHI-E after	DHI-F after	Absolute P	Absolute E	Absolute F
Standard deviation	6,61	7,21	8,18	3,81	2,87	3,47	7,09	7,13	8,57
Mean deviation	15,30	11,35	16,35	4,55	2,40	3,65	10,75	8,95	12,70

Criterion Validity

A statistically significant correlation ($r = 0.853$, $p < 0.0001$) between the total score on the DHI questionnaire and the FES-I questionnaire was observed.

Discussion

Cultural acceptability was the main goal to achieve by developing DHI-M. It 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 in the Moroccan society.

Our findings are similar to those of the original study by Jacobson and Newman, [4] and to those of the more recent studies of the Arabic [2], Italian and Persian versions of the DHI [10]. We investigated internal consistency, some aspects of validity and reproducibility.

Regarding item correlation, they were all statistically significant ($p < 0.01$), however item 15 showed the lowest item correlation (0.186) whereas it was item 20 that had the lowest item correlation in the original version. The rest of the item correlations were quite comparable to the original version.

item 15 « because of your problem, are you afraid people may think you are intoxicated » showed the lowest correlation (0,18), may be because in our study most participants were females and had no medical history of using toxic substances.

The Moroccan version, the original version and other translations showed high internal consistency.

Table 3: Internal Consistency (Cronbach's Alpha) of Different Versions of DHI

	Total	Functional	Emotional	Physical
DHI-Moroccan	0,89	0,74	0,78	0,77
DHI-US	0,89	0,85	0,72	0,78
DHI-German	0,90	0,80	0,82	0,71
DHI-Italian	0,92	0,82	0,84	0,75
DHI-Arabic	0,92	0,87	0,79	0,81
DHI-chinese	0,75	0,87	0,87	0,79
DHI-persian	0,79	0,90	0,82	0,83

The DHI-M also like other versions of DHI showed good reliability and high ICC, in our study it might be due to a memorization as we did the retest only 7 days after the first test.

Table 4: Intraclass Correlation Coefficient of Total score of Different Versions of DHI

Version	ICC
Moroccan	0,98
Original(us)	0,87
Persian (16)	0,96
French	0,98
Dutch	0,95

To assess the construct validity, we used the FES-I questionnaire and we found a significant correlation between DHI and FES-I as the mean score (SD) was 43 ± 19 and a Pearson correlation coefficient of 0.85.

Conclusion

In conclusion, the results of the study show that DHI-M is a reliable and valid tool to evaluate the quality of life and to assess dizziness-related handicaps in Moroccan-speaking adults as it has shown good psychometric properties.

Annexe

تقييم الإعاقة بسبب الدوخة

الهدف من هاد المقياس هو نعرفو المصاحب لكتواجيها بسبب الدوخة. جابوب بـ "دائما" أو "لا" أو "بعض المرات" على كل سؤال
جابوب على كل سؤال غير فيما يتعلق بمشكل الدوخة

السؤال	دائما	بعض المرات	لا
P1 واهلى ملى كتدوف الفوق كيتزاد المشكل			
E2 واهلى كتخص براسك مقلق بسبب هاد المشكل			
F3 واهلى كتمنع على راسك السفر الخدمة أو المتعة بسبب هاد المشكل			
P4 واهلى ملى كتعشا فى شى سوق كبير كيتزاد المشكل			
F5 واهلى بسبب هاد المشكل كتلقى صعوبة باش تمشى فالغراش أو تنوض من الغراش			
F6 واهلى بسبب هاد المشكل مكتقرش تشارك فى الحياة الإجتماعية بحال تعرج تعشا توج أو تمشى للمدائيات			
F7 واهلى بسبب هاد لمشكل عندك صعوبة فى القراءة			
F8 واهلى ملى كتير شى مجهود بحال الرياضة الشطيج الشقا ديال الدار بحال التشطاب أو ترد الماص لباصنهم كيتزاد عندك المشكل			
E9 واهلى بسبب هاد المشكل كتخاف تعرج من الدار بلا ميكون معاك شى حد			
E10 واهلى بسبب هاد المشكل فايت لياك تخرجنى قدام الناس			
P11 واهلى ملى كتحرك راسك بالزربة كيتزاد لياك المشكل			
F12 واهلى بسبب هاد المشكل كتغدا لباصيص العالية			
P13 واهلى ملى كتقلب فى الغراش كيتزاد المشكل			
F14 واهلى بسبب هاد المشكل مكتقرش دير الشقا الصعب ديال الدار			
E15 واهلى بسبب هاد المشكل كتخاف الناس يكلو عليك سكران			
F16 واهلى بسبب هاد المشكل كتجيك صعوبة تعرج بوحك			
P17 واهلى ملى كتعشى فالزربة كيتزاد المشكل			
E18 واهلى مكتقرش تركن بسبب هاد المشكل			
F19 واهلى بسبب هاد المشكل مكتقرش تمشا قدارك فالظلمة			
E20 واهلى بسبب هاد المشكل كتخاف تنقا فالدار بوحك			
E21 واهلى هاد المشكل مشكل لياك إعاقه			
E22 واهلى هاد المشكل كيزير لياك توتر فالعلاقة ديالك مع العائلة و الاصحاب			
E23 واهلى كتخص باكتاب بسبب هاد المشكل			
F24 واهلى هاد المشكل كياثر على الخدمة ديالك أو المسؤوليات ديالك فالدار			
P25 واهلى ملى كتحنى القدام كيتزاد المشكل			

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