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ORIGINAL ARTICLE

Quality of Life Rating for Dizziness: A Self-reporting Questionnaire

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Abstract The aim of the present study was to develop a questionnaire in Kannada language which assesses the handicapping consequences of dizziness. A cross sectional study design and a convenient type of sampling was used to recruit the participants. A total of 36 participants in age range of (18–60 years of age) who reported to have dizziness or vertigo for at least three months of period and who knew to read and write in kannada language participated. The overall questionnaire was found to have an internal consistency $\alpha = 0.935$ on cronbach's alpha test and for test retest reliability ($r = 0.988$) on intra-class correlation coefficient measure. The present studies provide International Classification of Functioning, Disability and Health based questionnaire in kannada which can be used in the clinical set up to assess the quality of life (QOL) in individuals with Vertigo or Dizziness. It will also help to understand the impact of dizziness on QOL from individual's perspective.

Keywords QOL rating for dizziness · Vertigo · Self-reporting questionnaire in Kannada · International classification of functioning · Disability and health

Introduction

Dizziness is a common complaint in adult and geriatric populations and it is often used to describe the sensations of vertigo, like light headedness, presyncope, disorientation and/or gait instability. Dizziness is caused by varied conditions which can range from benign self-limiting to potentially life threatening ones, causing extensive morbidity and utilizing health services [1]. Prevalence of dizziness reported to range from 1.8% to more than 30% in young and older adults respectively [2]. One of the common complaints of patients having chronic or episodic dizziness is the fear of being dizzy which has also led to changes in patient's behavior [1]. Owing to the unpleasant memories due to dizziness, patients develop mood disorders like that of anxiety, depression and other behavioral issues [3–5]. Thus individuals with dizziness often have their daily activities restricted. It is also that the QOL was is not dependent on age and is impaired in elderly individuals. It was affected more in females when compared with males [6]. Individuals having the diagnosis of dizziness may be affected differently and hence, vestibulometric evaluations alone are insufficient, and the QOL assessment is mandatory [7].

International Classification of Functioning, Disability and Health, known as ICF which is a branch of the family of International Classifications were developed by the World Health Organization (WHO) in May 2001, for the purpose of applying to a range of health aspects. The WHO family of international classifications gives a structure to code an ample range of information about health in various disciplines and sciences. ICF covers the entire human health aspects and a number of health-relevant components of well-being and portrays them in terms of domains of health. ICF categorizes the information of health into two

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parts. Part 1 covers Functioning and Disability, and Part 2 covers Contextual Factors. Each part has two components: First is the Components of Functioning and Disability. This consists of "Body component" which in turn encompasses two classifications: the body structures and body functions and the "Activities and Participation" component. Second is the Components of Contextual Factors. This component encompasses the "Environmental factors" and the "Personal factors". The requirement of ICF based assessment for vertigo related patients is reported by [8]. They explored the ability of the ICF to depict the perspective of the patient about vertigo. The study concluded stating that from the patients' perception, vertigo has its effects on numerous functioning and disability aspects, mainly body functions and activities participation, along with contextual factors.

Need for the Study

Dizziness impact on quality of life and functional abilities are more compared to several other chronic conditions [1]. The conventional vestibulometric procedures are insufficient to measure the effects of dizziness on daily life, as it does not attempt to evaluate the impact of dizziness on individual's functions in daily life. Also quantifying the handicapping consequences of dizziness may be more useful means of a thorough assessment and validating treatment procedures. Those inventories developed in several western languages to assess the impact of dizziness on quality of life, is not practical to administer on Indian population having a varied language and cultural background. Hence present study aims to develop a questionnaire in Kannada to evaluate dizziness related quality of life on Kannada speaking population.

Method

The study followed a cross sectional design and a convenient type of sampling to recruit the participants. The study commenced following the ethical approval by the Institutional Ethical Committee and "Informed consent was obtained from all individual participants included in the study."

Participants

A total of 36 participants whose age ranged between 18 and 60 years participated in this study. Of the 36 participants 10 (27%) were males and 26 (73%) were females. The participants who reported to have dizziness or vertigo for at least three months of period and who knew to read and write in kannada language were included in the study. The

participants with any metabolic disorders, psychiatric or psychological history with regard to their vertigo or dizziness were excluded from the study.

Procedure

The study was conducted in three phases: Phase I consisted of development of a self-report type of questionnaire in Kannada for dizziness related QOL. In phase II content validation was done by subject experts and in phase III internal consistency and retest reliability was checked by administration of the questionnaire on the participants.

Phase I

A set of questions were constructed in Kannada based on the case history reports on the experiences with dizziness, inputs from the experts, a review on ICF core set for vertigo, and literature review on impact of dizziness. The constructed questions were then arranged to be classified under the domains of ICF, which included body function, activity limitation and participation restriction, environmental factors, and personal factors. Each of these domains contained a set of questions. The first domain 'body function' contained 11 questions pertaining to the physiological changes in relation to dizziness. The second domain 'activity limitation and participation restriction' contained 16 questions which depicted the limitations and restrictions posed by dizziness in the daily life activities. The third domain 'environmental factors' contained 9 questions that related to the changes faced by the individual with dizziness from the surrounding people and environment because of dizziness. The fourth domain 'personal factors' contained 18 questions related to the personal attitude and emotional changes experienced by the individual with dizziness. The questionnaire altogether contained fifty-four questions, covering different situations of daily life based on Indian cultural context. Each of those questions was provided with a 4 point 'frequency' rating scale as shown in Table 1, to quantify the impact of dizziness based on the frequency of occurrence of the problems by the individual with dizziness. The occurrence of the problems were described by the four points that ranged from '0' as 'not at all' occurring to '3' as 'always' occurring. On the rating scale, a lower score (0 and 1) indicated lesser degree of impact and a higher score (2 and 3) indicated a higher degree of impact on QOL.

Along with the questions and the rating scale, the questionnaire also contained the 'Instructions' for the patients on how to rate the questionnaire. The questionnaire first underwent a familiarization check by 10 proficient Kannada speakers to assess the familiarity and ease in comprehending the language used.

Table 1 Four point rating scale to quantify and rate the impact of dizziness on QOL

Points	Description of the ratings	Description of ratings in Kannada
0	Not at all	i'lavei'la
1	Sometimes	kelavo'me
2	Almost always	halavUbɑ′ri
3	Always	java:galu

Table 2 Five point rating scale to rate the relevance of the items in the questionnaire by the experts

Points	Description of the ratings
1	Not at all relevant
2	Low relevance
3	Neutral
4	Relevant
5	Extremely relevant

Phase II

The constructed questionnaire was then subjected to content validation. In order to assess the content validity of the questionnaire, the whole questionnaire including the instructions to fill the questionnaire, the questions and the rating scale was reviewed by 5 experts in the field of Vestibular assessment and management. Among the 5 experts, 3 were Audiologists and 2 were Otolaryngologists. The experts were asked to assess for the content validity based on the relevance of the content to the questionnaire. They were provided with a '5' point rating scale to rate the contents, where '1' denoted an item to be 'not at all relevant' and 5 denoted an item to be 'extremely relevant'. The rating scale provided for the reviewers is described in Table 2.

The reviewers were also asked to comment on the clarity of the content and to suggest on the changes if required in the questions. Following the review, Content Validity Index was computed to evaluate on the items to be retained in the questionnaire.

Phase III

In this phase, the validated questionnaire was administered on the participants chosen for the study. The participants were initially explained about the reasons and the importance for the study to be conducted, the importance of their participation in the study, the benefits of the study and the confidentiality of the participant's personal information. They were then provided with a printed copy of the questionnaire and were requested to fill the questionnaire by self, based on the instructions provided in the

questionnaire. Subsequently, based on the data compiled from the participant's responses, internal consistency of the questionnaire was obtained. The questionnaire was then evaluated for its retest reliability. For evaluation of the retest reliability, the questionnaire was re administered on 22% (eight participants) of the total study participants after 1 day and within 3 days of the first administration.

Analysis

Statistical analysis was performed using the statistical software SPSS, version 17.0. The description of the statistical analysis is described in Table 3.

Results

The initially constructed questionnaire contained 54 questions and all questions underwent a familiarization check by 10 native and proficient Kannada speakers. Based on the suggestions from the familiarization check, necessary changes were made in the language structure of the questionnaire. Following familiarization check expert response were reviewed based on the relevance of the content by rating each item on a rating scale that depicted 'relevance'. Following which content validity was computed using the following formulae.

Content Validity Index

$$= \frac{Number\ of\ desired\ ratings\ obtained\ by\ the\ subject\ Experts}{Total\ number\ of\ Experts}$$

CVI criterion point 0.87 was adopted for the study as suggested by [9]. To obtain a CVI equal to or greater than 0.8, the desired ratings by all (5) the experts were to be '4' and '5' as they denoted a high relevance of an item in the questionnaire.

The CVI was therefore computed for each question and the questions with a high CVI (0.8 or 1) were retained in the questionnaire and other questions with a low CVI (less than 0.8) were excluded from the questionnaire. Tables 4, 5, 6, and 7 summarizes the obtained CVI for 54 questions of 4 domains.

As depicted in the Tables 4, 5, 6, and 7 the questions from each domain attained CVI ranging from 0 to 1. However, only those questions which had a CVI equal to and greater than 0.8 were chosen for the questionnaire. Under the domain 'Body Function', out of 11 questions, '6' and '3' questions had a CVI of '1' and '0.8' respectively. From the domain 'Activity Limitation and Participation Restriction', out of 16 questions, '11' and '3' questions obtained a CVI of '1' and '0.8' respectively. Under the domain 'Environmental Factors', out of 9 questions, '7'

Table 3 The objective specific statistical analysis used in the study

Statistical objectives	Statistical test used
To evaluate the content validity of the questionnaire following the expert review	Content Validity Index De Von et al. (2007)
To test the reliability (internal consistency) of the questionnaire	Cronbach's alpha
To assess the test re-test difference and test re-test reliability of the questionnaire	Paired sample 't' test and intra-class correlation coefficient

Table 4 The number of desired ratings by the experts and the Content Validity Index obtained for each question under the 'Body Function' domain

Questions	Domain 1: body function		
	Number of desired ratings by the experts	Total number of experts	Content Validity Index
BF 1	5	5	1*
BF2	4	5	0.8*
BF3	5	5	1*
BF4	5	5	1*
BF5	5	5	1*
BF6	4	5	0.8*
BF7	3	5	0.6
BF8	4	5	0.8*
BF9	2	5	0.4
BF10	5	5	1*
BF11	5	5	1*

* Indicates the desired CVI meeting the criterion point

Table 5 The number of desired ratings by the experts and the Content Validity Index obtained for each question under the 'Activity Limitation and Participation Restriction' domain

Questions	Domain 2: activity limitation and participation restriction		
	Number of desired ratings by the experts	Total number of experts	Content Validity Index
AP1	5	5	1*
AP2	5	5	1*
AP3	5	5	1*
AP4	5	5	1*
AP5	5	5	1*
AP6	5	5	1*
AP7	3	5	0.6
AP8	5	5	1*
AP9	5	5	1*
AP10	5	5	1*
AP11	5	5	1*
AP12	4	5	0.8*
AP13	4	5	0.8*
AP14	3	5	0.6
AP15	5	5	1*
AP16	4	5	0.8*

* Indicates the desired CVI meeting the criterion point

questions had a CVI of '0.8'. From the domain 'Personal Factors', out of 18 questions, '10' and '2' questions, obtained a CVI of '1' and '0.8' respectively.

The questionnaire finally contained a total of '42' questions. Total number of questions in each domain is shown in the Table 8.

The validated questionnaire was then administered on 36 participants of the study who had Dizziness and were asked to rate the impact on QOL across 4 domains. The scores obtained by the participants were subjected to analysis of internal consistency using Cronbach's alpha test. The description of the obtained internal consistency values are given in the Table 9.

The internal consistencies for each of the domains were $\alpha > 0.50$. A moderate level of consistency was obtained for the domains 'Body function' and 'Environmental Factors' and an excellent level of consistency was obtained for the domains 'Activity Limitation and Participation Restriction' and 'Personal Factors'. Cronbach's alpha coefficient of 0.935 was obtained for the overall questionnaire which indicated an excellent reliability.

To investigate the test retest reliability, the questionnaire was re-administered on 22% (8 participants) of the study participants within duration of 1 and 3 days. A Paired

Table 6 The number of desired ratings by the experts and the Content Validity Index obtained for each question under the 'Environmental Factors' domain

Questions	Domain 3: environmental factors		
	Number of desired ratings by the experts	Total number of experts	Content Validity Index
EF1	4	5	0.8*
EF2	4	5	0.8*
EF3	4	5	0.8*
EF4	0	5	0
EF5	1	5	0.2
EF6	4	5	0.8*
EF7	4	5	0.8*
EF8	4	5	0.8*
EF9	4	5	0.8*

* Indicate the desired CVI meeting the criterion point

Table 7 The number of desired ratings by the experts and the Content Validity Index obtained for each question under the 'Personal Factors' domain

Questions	Number of desired ratings by the experts	Total number of experts	Content Validity Index
PF1	5	5	1*
PF2	5	5	1*
PF3	5	5	1*
PF4	3	5	0.6
PF5	5	5	1*
PF6	4	5	0.8*
PF7	4	5	0.8*
PF8	3	5	0.6
PF9	5	5	1*
PF10	3	5	0.6
PF11	2	5	0.4
PF12	3	5	0.6
PF13	5	5	1*
PF14	2	5	0.4
PF15	5	5	1*
PF16	5	5	1*
PF17	5	5	1*
PF18	5	5	1*

* Indicate the desired CVI meeting the criterion point

Table 8 Domain specific number and total number of questions in the questionnaire

Domains	Number of questions
Body function	9
Activity limitation and participation restriction	14
Environmental factors	7
Personal factors	12
Total number of questions	42

Table 9 The domain specific and overall internal consistency (reliability)

Domain	Number of items	Cronbach's alpha (α)
Body function	9	0.638
Activity limitation and participation restriction	14	0.920
Environmental factors	7	0.511
Personal factors	12	0.929
Overall	42	0.935

Fig. 1 Mean and standard deviation of different subscale scores of 'test' and 're-test' sessions

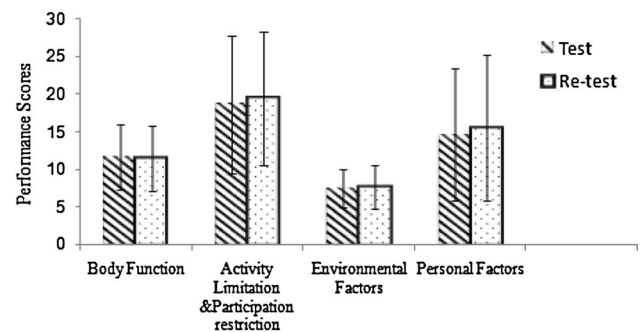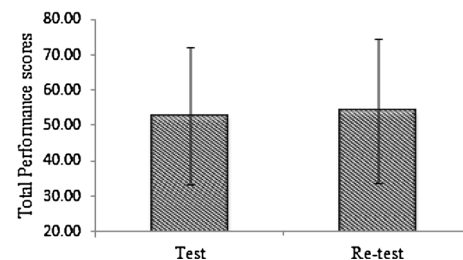**Fig. 2** Mean and standard deviation of total scores of 'test' and 're-test' sessions

sample 't' test was used to determine if there was any significant difference in the subscale and total scores of test and the re-test sessions. Paired sample 't' test indicated no significant difference ($p > 0.05$) between the scores attained in the test and re-test sessions.

Figures 1 and 2 depicts the means and standard deviations of 'subscale' and 'total' scores of test and re-test sessions respectively. Table 10 represents the results obtained from the paired sample 't' test.

To evaluate the test re-test reliability, intra-class coefficient was calculated for each of the subscales and the total scores. Intra-class correlation coefficient of each subscale and overall total is presented in the Table 11. The intra-class coefficients of subscale scores and overall scores

indicated the questionnaire to be having a "high" test re-test reliability.

Discussion

The development of the self-assessing type of questionnaire commenced with the initial construction of the questionnaire which contained 54 question under the ICF domains 'Body Function', Activity Limitation and Participation Restriction', 'Environmental Factors' and 'Personal Factors' to assess the QOL across various dimensions. The questionnaire underwent a familiarity check where native proficient Kannada speakers commented on the aspects of

Table 10 Scores of test and re-test sessions obtained from 8 participants

Domain	't' value	'p' value
Body function	0.552	0.598
Activity limitation and Participation restriction	−1.111	0.303
Environmental Factors	−2.049	0.080
Personal factors	−1.050	0.329
Overall	−1.093	0.311

Table 11 Intra-class correlation coefficients of test and re-test sessions for each subscale and overall scores

Domains	Intra-class correlation coefficient
Body function	0.980
Activity limitation and participation restriction	0.988
Environmental factors	0.976
Personal factors	0.983
Overall	0.988

language used and with the ease of comprehending the questions by laymen. The suggestions were then incorporated and necessary changes were made. This was followed by content validation by a panel of subject experts. After content validation 54 questions were reduced to 42 questions keeping CVI 0.8 and 1. The questions deleted from the initial set were based on the comments of the reviewers. The comments were those with nearly similar meaning to another; that related to problems least reported or observed in literature, and those which did not correlate well with impacts of dizziness or vertigo. Some of the chosen questions were also reframed. Along with the questionnaire the reviewers were asked to rate and comment on the 'suitability of the rating scale provided for the questionnaire' for the individuals with dizziness to rate, and 'the instructions given to rate the questions'. The rating scale to rate the questions indicated the questions to be suitable, with the instructions provided in the questionnaire being appropriate and comprehensible. The comparisons were done for content of several self report types of measures utilized in vestibular rehabilitation with linkage to ICF [10]. Several questionnaires of QOL in dizziness did not include and relate to ICF components. But the developed questionnaire was reported to be comprehensible and covering all the aspects of daily life situations in view of ICF as reported by the reviewers.

The validated questionnaire was then administered on 36 participants of the study who had dizziness or vertigo. Following the administration, the participant's score were subjected to analysis of internal consistency. The Cronbach's alpha measure of internal consistency ranged from 0.511 to 0.929 across the 4 domains which indicated an internal consistency greater than the moderate level. However the internal consistency of the overall questionnaire was $\alpha = 0.935$ which indicated an excellent reliability. The varied reliability findings across the domains can be attributed to the individual differences in the experiences with dizziness. Even if an individual has minor impact on body function due to dizziness, still may have a major influence on his/her participation in the society which can have influence on the personal factors. The items correlation with the total scale ranged from an acceptable to good degree ($r \geq 0.3$) except for 6 items with ($r < 0.3$) which would have been dependent on the number of participants included in the study and their ratings. Among the 4 domains the questions in the 'Environmental factors' on an average had the least reliability ($0.511 =$ Moderate internal consistency) and the item correlation nearing the low cut criterion ($r = 0.3$) though they had good content validity indices. Hence the usage of these questions in future has to be strengthened by standardizing the questionnaire. Although few questions under other domains had lesser internal consistency values, the overall internal consistency was found to be "good". However, Standardization of the questionnaire on a larger number of participants may yield the better ability of the questionnaire to be sensitive and specific.

From the obtained demographic data, we intended to find if there was any correlation between age of the participants and the scores obtained for the questionnaire. On Pearson's correlation measure, a coefficient of ($r = 0.211$) was obtained which denoted a "weak" correlation between age and scores for QOL. This indicated that age had no effect on the impact on QOL due to Dizziness. These findings replicated the previous study findings obtained during the development of the Dizziness Handicap Inventory [11] in which they found no systematic effect of age on total scores of Dizziness Handicap Inventory.

The correlation between onset duration of dizziness and scores obtained on the questionnaire was investigated. The onset duration of dizziness of the participants ranged from 3 months to 10 years. On Pearson's correlation measure, a coefficient of ($r = 0.191$) was obtained which denoted a "very weak" correlation. This indicated that onset duration of dizziness also had no much effect on the perceived impact on QOL due to dizziness. This finding is in line with previous observations by [12] where a weak correlation was observed between the Impact of dizziness and Onset of dizziness at 6 months ago or more.

On investigation of test retest reliability on 22% of the total participants, Paired sample 't' test revealed no significant difference ($p > 0.05$) between the subscale and total scores of test and re-test session. Test re-test reliability was

also evaluated using intra-class coefficients which revealed high test re-test reliability on subscale and total scores of test and re-test sessions. Thus the developed questionnaire indicated good test re-test reliability for all the subscales.

Conclusion

Current study provides a questionnaire in kannada based on ICF which can be used in the clinical set up to assess the QOL in individuals with Vertigo or Dizziness to validate the assessment procedures and could be used to monitor the treatment. It will also help understand the impact of dizziness on QOL from individual's perspective.

Compliance with Ethical Standard

Conflict of interest The Authors of present study Rajesh Ranjan, Jayashree bhat & Priyanka. EM. Vas Naik declare that they have no conflict of interest.

Ethical Approval The study was approved by Institutional ethics committee of Kasturba Medical College, Mangalore.

Informed Consent Informed consent was obtained from all participants included in the study.

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