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BRIEF COMMUNICATION

## Development and validation of a WHOQOL-BREF Taiwanese audio player-assisted interview version for the elderly who use a spoken dialect

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**Abstract** A quality of life questionnaire is rarely adapted to an interview mode for people who mainly use spoken language in daily life. In Taiwan, the WHOQOL-BREF (Mandarin Chinese version) has been developed, as a self-administered questionnaire, but it cannot be applied to the majority of the elderly in Taiwan, who speak only Taiwanese (a dialect). This study adopted the audio player-assisted interview mode to develop a Taiwanese version of the WHOQOL-BREF

specifically for Taiwanese-speaking elderly people, and followed with examinations of the reliability and validity of this version. Initially, the WHOQOL-BREF (English version) was translated into colloquial Taiwanese, and field tests confirmed the equivalence and appropriateness of the translation. A total of 228 Taiwanese-speaking elderly people were assessed using the Taiwanese interview version, of which 144 subjects were re-assessed two weeks later. Interviewers assessed each subject aided by an audio player on which all the translated WHOQOL-BREF contents were recorded. The Taiwanese interview version of the WHOQOL-BREF, except for the item related to dependence on medication, showed acceptable reliability (internal consistency, corrected item-domain correlation, and test–retest reliability) and validity (criterion-related, convergent, and discriminant validity). Confirmatory factor analyses supported the four-factor model of the Taiwanese interview version, providing evidence for construct validity. The results suggest that the Taiwanese audio player-assisted interview version of the WHOQOL-BREF was reliable and valid in assessing quality of life of elderly Taiwanese.

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**Keywords** WHOQOL-BREF · Interview version · Quality of life

### Abbreviations

WHOQOL World Health Organization Quality of Life  
BREF Abbreviated version

### Introduction

The brief version of the World Health Organization's Quality of Life instrument (WHOQOL-BREF) has been

widely used to assess quality of life (QOL) [1–6]. The WHOQOL-BREF was designed as a self-administration questionnaire; however, it has limited clinical application for people who are unable to read [1, 3]. It is common to find that elderly people with elementary education or less use exclusively spoken language in their daily lives. These elderly people would benefit greatly from the development of an interview version of the WHOQOL-BREF that could assess their QOL [3].

The Mandarin Chinese version of the WHOQOL-BREF currently exists in Taiwan [7–9]. However, this tool cannot be applied to more than half of elderly Taiwanese aged over 65 years old [10], who speak only the Taiwanese dialect [11]. That is largely because these elderly Taiwanese received only a rudimentary education in the early part of the last century. In order to evaluate the QOL of this population, a Taiwanese version of the WHOQOL-BREF (WHOQOL-BREF [TV]) that is based on an oral interview mode is required.

A newly developed QOL questionnaire must be shown to be reliable and valid [12] prior to its introduction into clinical settings. This paper examined the reliability (internal consistency, corrected item-domain correlation, and test-retest reliability) and validity (criterion-related, convergent, construct, and discriminant validity) of the WHOQOL-BREF (TV) in Taiwanese-speaking elderly people.

## Methods

### Subjects

Subjects were recruited from 13 long-term care institutions by convenience sampling. These institutions were geographically distributed in 4 major areas of Taiwan: the northern (4 institutions), central (2 institutions), southern (4 institutions), and eastern (3 institutions) parts. Four institutions were chosen in the northern and southern areas because these regions have higher population densities, and more elderly people are thus assumed to live there. Subjects who were included met the following criteria: (1) speak only Taiwanese; (2) do not comprehend Mandarin Chinese; (3) score above 20 on the Mini-Mental State Examination [13], which was administered using colloquial/spoken Taiwanese, to indicate no cognitive impairment; and (4) give oral consent to participation.

### Procedures

The study comprised two parts. First, the WHOQOL-BREF (TV) was developed in compliance with the WHOQOL

guidelines [14, 15]. This development process began with determination of four types of Taiwanese scale descriptors [16, 17]. The WHOQOL-BREF was subsequently translated from English to colloquial Taiwanese. Following this, cognitive debriefing was implemented on another group of 67 elderly Taiwanese in order to verify the conceptual equivalence and appropriateness of the words used. The subjects included 23 females and 44 males who were, on average, 75 years old and met the four selection criteria above. They were recruited from five long-term care institutions throughout four major areas of Taiwan. The cognitive debriefing was carried out by interviewing subjects with the translated WHOQOL-BREF items and then asking for their subjective interpretations of the meaning of each item. After modifying any misleading words, a draft version was translated back into English to examine any possible conceptual discrepancies in equivalence. Several rounds of discussions by a panel of experts led to the final version. The contents were recorded by a female, who enunciated the questions clearly in Taiwanese, using an audio recorder. The choice of a female voice was made at the recommendation of a speech specialist (our team member). The specialist pointed out that, in spoken Taiwanese, which has eight tonal patterns, a female voice is easier than a male voice for the elderly to understand. The recording was made to reduce variability in interviewers' administration of the questionnaire.

The second part of the study was to validate the WHOQOL-BREF (TV). For the validity investigation, the WHOQOL-BREF (TV) was administered face-to-face to each subject by interviewers with assistance of the audio player. Three interviewers received two-hour training by the first author as well as a minimum of three interview practice sessions under supervision. These trained interviewers conducted the WHOQOL-BREF (TV) interviews separately in each assigned institution by following the standardized interview procedure [18] such as subject invitation, audio player installation, and interview administration. Prior to the formal WHOQOL-BREF (TV) interview, each subject was given one practice item to provide familiarity with the audio player-assisted mode of interview. During the formal WHOQOL-BREF (TV) interview, the interviewers played/stopped the audio player when appropriate and recorded the subjects' responses on each item. Replaying of the questions and their scale descriptors was allowed to ensure that the subjects understood the questions and descriptors.

Following the WHOQOL-BREF (TV) interview, a health-related QOL (HRQOL) visual analogue scale (VAS), a self-evaluation health status question, and personal information were collected with the assistance of an audio player. All the interview materials and assessment instruments were translated into colloquial Taiwanese and

were pre-recorded into the audio player, in order to ensure that the interview was conducted in a standardized manner. The subjects whose QOL remained stable, as determined by additional questions about their self-reported QOL/health status, were interviewed again two weeks later to determine the test–retest reliability of the WHOQOL-BREF (TV).

### Instruments

The WHOQOL-BREF (TV) included 28 items, consisting of 26 standard items from the original WHOQOL-BREF and two culturally relevant items [8, 9]. The 26-item standard WHOQOL-BREF contains two generic items (overall QOL and general health), and the remaining 24 items can be further classified into 4 domains: physical (7 items), psychological (6 items), social relationships (3 items), and environment (8 items). The two cultural items were “*Do you feel respected by others?*”, which was included in the social relationships domain, and “*Are you usually able to get the things you like to eat?*” in the environment domain [8, 9].

The HRQOL VAS was used to evaluate a subject’s level of satisfaction on his/her overall HRQOL, in which subjects specify the value on a 20 cm VAS with the left end indicating 0 (worst) and the right end 100 (best). In addition, the self-evaluation health status question required subjects to assess their current health status by selecting 1 of 5 response options: “Very poor”, “Poor”, “Neither good nor poor”, “Good”, and “Very good”. Both the HRQOL VAS and the self-evaluation health status question were used to examine the convergent validity of the WHOQOL-BREF (TV).

### Data analysis

The distributions of domain and item scores as well as the percentage of subjects with missing values for each item were calculated. Cronbach’s alpha was used to evaluate the internal consistency of each domain of the WHOQOL-BREF (TV). The corrected item-domain correlation was also reported to evaluate the homogeneity of the items in each domain. The intraclass correlation coefficient (ICC) was calculated to determine the test–retest reliability of domain scores of the first and second administrations. The weighted kappa was employed to examine the test–retest reliability of each item of the WHOQOL-BREF (TV).

Four validity indicators were examined. First, the criterion-related validity was studied by measuring the strength of the Pearson  $r$  correlation between each item/domain and two criteria, i.e., Q1 (Overall QOL) and Q2 (General health) in this study. Second, convergent validity was determined

by examining the relationship between each item/domain of the WHOQOL-BREF (TV) and both the HRQOL VAS and the self-evaluation health status measuring similar constructs, using the Pearson  $r$  correlation coefficient. Third, the discriminant validity of the WHOQOL-BREF (TV) was evaluated by performing an analysis of covariance, adjusting for gender, age, and cognitive status, on the subjects’ self-evaluation health status. The gender, age, and cognitive status were adjusted because these characteristics might affect the subjective quality of life. Fourth, the confirmatory factor analysis (CFA) was conducted to examine construct validity with the LISREL 8 software [19]. The initial CFA was performed on each domain, using the corresponding items as potential indicators. A second-order factoring was conducted on the four domains with their corresponding indicators as a whole QOL model. The comparative fit index (CFI) was used to determine whether the proposed four factors of the WHOQOL-BREF (TV) were appropriate.

### Results

The study recruited 228 subjects at the first evaluation, 144 of whom were re-assessed after 2 weeks. A total of 84 subjects were lost to follow up largely due to unavailability or disinterest. There were no significant differences in gender, age, and education level between those who completed the second evaluation and those lost to follow-up. The detailed characteristics of the samples are tabulated in Table 1. Table 2 shows descriptive statistics of the items and domains of the WHOQOL-BREF (TV). The floor and ceiling effects (i.e., the percentage of minimum or maximum scores <10%) in each domain score were low (0.4%–9.5%). However, the ceiling effects for Q1 (37.1%) and Q2 (26.8%) were notable, but their floor effects were acceptable (3.6% and 6.6%, respectively). The missing values for all items were lower than 10.0%, except for 18.4% on item 21, which was “*How satisfied are you with your sex life?*” in the social relationships domain.

### Reliability

The estimated values of Cronbach’s alpha for the physical, psychological, social relationships, and environment domains were 0.68, 0.70, 0.72, and 0.80, respectively, indicating acceptable internal consistency. On corrected item-domain correlation in each domain, all but one individual item had reasonable correlation coefficients (0.21–0.62) which were above the minimum value of 0.2 [20]. Item 4, which asked “*How much do you need any medical treatment to function in your daily life?*”, showed a poor item-domain relationship (–0.03). In addition, the ICC values (0.73–0.79) at the domain level (Table 3) and

**Table 1** Demographic data of subjects that participated in the first and second evaluations

Characters	First evaluation ( <i>n</i> = 228)	Second evaluation ( <i>n</i> = 144)
Gender, <i>n</i> (%)		
Male	141 (61.8)	87 (60.4)
Female	87 (38.2)	57 (39.6)
Age (year)		
Mean ± SD	75.2 ± 6.5	75.0 ± 6.9
Range	57–101	57–101
Education level, <i>n</i> (%)		
Illiterate	88 (38.6)	56 (38.9)
Elementary school	140 (61.4)	88 (61.1)
Marital status <sup>a</sup> , <i>n</i> (%)		
Single	107 (47.2)	64 (44.7)
Married/Living together	16 (7.0)	8 (5.6)
Divorced/Separated	22 (9.7)	15 (10.5)
Widowed	82 (36.1)	56 (39.2)
Cognitive status		
MMSE <sup>b</sup> , Mean ± SD	22.8 ± 3.7	23.0 ± 3.5
Self-reported health status <sup>c</sup> , <i>n</i> (%)		
Very poor	24 (10.9)	17 (12.2)
Poor	33 (14.9)	22 (15.8)
Neither good nor poor	92 (41.6)	51 (36.7)
Good	44 (19.9)	28 (20.2)
Very good	28 (12.7)	21 (15.1)

<sup>a</sup> 1 missing datum at both evaluations

<sup>b</sup> MMSE: the Mini-Mental State Examination

<sup>c</sup> 7 and 5 missing data at the 1<sup>st</sup> and 2<sup>nd</sup> evaluations, respectively

**Table 2** Score distribution of the Taiwanese interview version of the WHOQOL-BREF

Item/domain (possible score range)	Mean ± SD <sup>a</sup>	Floor effect (%)	Ceiling effect (%)	Missing value (%)
Overall QOL, Q1 (1–5)	3.8 ± 1.1	3.6	37.1	1.8
General health, Q2 (1–5)	3.5 ± 1.1	6.6	26.8	0.0
Physical (4–20)	13.5 ± 2.9	0.9	1.8	0.4–7.9
Psychological (4–20)	13.3 ± 3.1	0.4	2.2	0.0–9.5
Social relationships (4–20)	14.3 ± 3.4	1.4	9.5	0.0–18.4
Environment (4–20)	14.2 ± 2.8	0.4	2.6	0.0–6.6

<sup>a</sup> Standard deviation

weighted  $\kappa$  values (0.35–0.68) at the item level between two evaluations demonstrated acceptable test–retest reliability of domain and item scores.

### Validity

Table 3 shows the results of the criterion-related and convergent validity for the WHOQOL-BREF (TV). All domain scores were fairly to moderately correlated with Q1 ( $r \geq 0.32$ ), Q2 ( $r \geq 0.34$ ), the level of satisfaction on HRQOL ( $r \geq 0.39$ ), and the self-evaluation health status

( $r \geq 0.44$ ). At the item level, all but one individual item exhibited weak to fair relationships with the aforementioned indicators ( $0.16 \leq r \leq 0.68$ ,  $p < 0.05$ ). Only item 4 demonstrated an extremely poor or nonexistent relationship ( $-0.07 \leq r \leq -0.01$ ). The observations indicated that all but item 4 of the four domains exhibited reasonable criterion-related and convergent validity.

The four first-order CFA showed that the CFI for physical, psychological, social relationships, and environment domains were 0.95, 0.99, 1.00, and 0.95, respectively, suggesting adequate construct validity. However, item 4

**Table 3** Intraclass correlation coefficient for test–retest reliability and the Person's *r* coefficient for the criterion-related and convergent validity of the Taiwanese interview version of the WHOQOL-BREF

Domain	Test–retest reliability	Criterion-related validity		Convergent validity	
		Q1 <sup>a</sup>	Q2 <sup>b</sup>	HRQOL VAS <sup>c</sup>	Self-evaluation health status
Physical domain	0.79	0.33	0.50	0.50	0.55
Psychological domain	0.77	0.40	0.45	0.48	0.50
Social relationships domain	0.73	0.32	0.34	0.39	0.44
Environment domain	0.77	0.47	0.39	0.52	0.45

<sup>a</sup> Indicates the overall QOL item

<sup>b</sup> Indicates the general health item

<sup>c</sup> Indicates the level of satisfaction on health-related QOL, measured by a 0–100 visual analogous scale.

\* All values achieved statistical significance, i.e.,  $p < 0.05$

did not exhibit a significant factor loading in the physical domain. This item remained a misfit item within the second-order factoring model (Fig. 1); however, the high model-fit index (CFI = 0.95) supported the construct validity of the WHOQOL-BREF (TV), with the exception of item 4. In addition, all four domain scores of the subjects were different in terms of their self-perceived health status (Table 4), supporting the discriminant validity of the WHOQOL-BREF (TV).

## Discussion

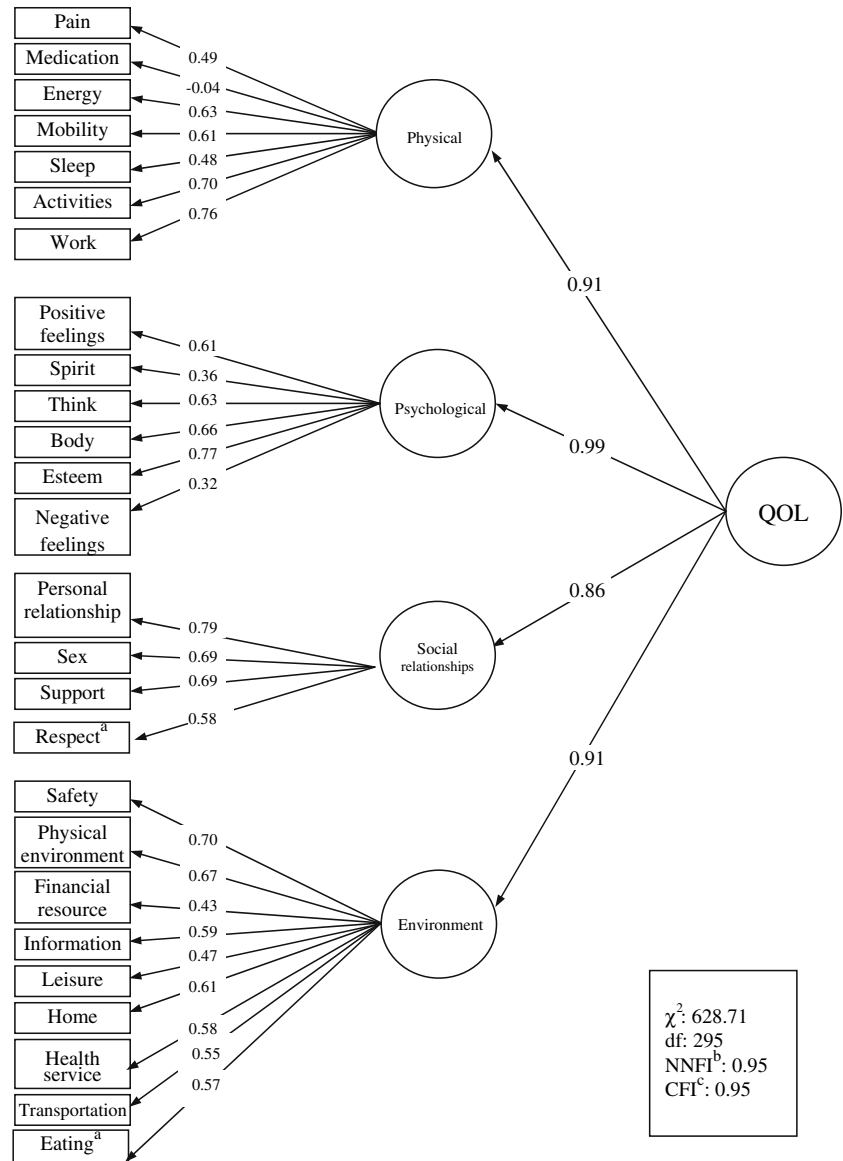
To the best of our knowledge, the current study is the first to apply the audio player-assisted interview mode in developing a QOL questionnaire for people using primarily spoken language in their daily lives. This study found that the WHOQOL-BREF (TV), except for the item related to dependence on medication, had acceptable reliability (internal consistency, corrected item-domain correlation, and test–retest reliability) and reasonable validity (criterion-related, convergent, discriminant, and construct validity). Furthermore, most elderly subjects accepted the audio player-assisted mode of interview, according to the interviewers' observations. Approximately a quarter of the subjects in our sample appeared at first to be unfamiliar with this type of interview. Replying to the questions with their own answers immediately after the questions was presented rather than listening to the scale descriptors and choosing one. These subjects, however, could complete the entire interview in the proper way after receiving further instruction and practice. With the aforementioned positive feedback and the acceptable psychometric findings, this study supports the use of an audio player-assisted interview, which can provide a practical method of assessing QOL for people who use only spoken language.

The WHOQOL-BREF (TV) was found to possess psychometric properties similar to those of the WHOQOL-

BREF Mandarin Chinese version [8, 9] and the English version [2]. However, the WHOQOL-BREF (TV) contained some specific items that call for careful attention. Item 4 (medication) was the only item which showed neither reasonable corrected item-domain correlation nor acceptable criterion-related and convergent validity. The high level of medication use in the elderly population seems necessary to support their function in daily life [21]. It could be that the requirement of medication becomes a daily routine for the elderly, thus making this item less important to their physical health and/or irrelevant to other health-related variables. The physical domain showed improved internal consistency (data not shown) after the deletion of item 4. These observations imply that item 4 in the WHOQOL-BREF (TV) may be deleted or needs to be revised. Moreover, the two generic items in the WHOQOL-BREF (TV) showed notable ceiling effects and therefore the ceiling effects might limit their abilities to discriminate people with high QOL. However, the discriminant validity of these two generic items was not significantly damaged according to the study results. In addition, item 21 (sexual life) in the WHOQOL-BREF (TV) exhibited a high missing value for Taiwanese-speaking elderly. The high missing response rate on item 21 was consistent with the findings of the WHOQOL-BREF Mandarin Chinese version [22, 23] and might be due to a substantial proportion of elderly people living alone (e.g., 92% in this study). It could also be that Chinese/Taiwanese culture discourages explicit self-expression of such sexual desires [22, 23]. Hwang et al. [23] and Power et al. [21] have suggested that considering intimacy other than sexual intercourse might increase the response from the elderly on this item. Fortunately in this study, this flaw in item 21 did not compromise the reliability and validity of the social relationship domain.

It is noted that, except for item 4, the WHOQOL-BREF (TV) items associated weakly or fairly with the chosen criteria, such as overall QOL or health status. The weak criterion-related and convergent validity at the item level

**Fig. 1** Confirmatory factor analyses on the second-order factor structure ( $N = 228$ ).  
<sup>a</sup>Taiwanese national items.  
<sup>b</sup>Indicates non-normed fit index.  
<sup>c</sup>Indicates comparative fit index



**Table 4** Discriminant validity of the Taiwanese interview version of the WHOQOL-BREF

Item/Domain	Self-evaluation health status <sup>a</sup> (mean)					F-statistics <sup>b</sup>	p-value
	Very poor ( $N = 24$ )	Poor ( $N = 33$ )	Neither good nor poor ( $N = 92$ )	Good ( $N = 44$ )	Very good ( $N = 28$ )		
Overall QOL (Q1)	3.2	3.4	3.7	4.3	4.5	5.6	<0.01
General health (Q2)	2.6	3.2	3.3	4.2	4.5	12.3	<0.01
Physical domain	10.8	12.2	13.1	15.2	16.1	13.7	<0.01
Psychological domain	10.0	12.4	12.9	15.3	15.3	14.1	<0.01
Social domain	12.4	13.0	13.6	15.3	17.4	9.1	<0.01
Environment domain	12.6	13.5	13.4	15.4	16.9	11.9	<0.01

<sup>a</sup>  $N = 221$ , 7 missing data

<sup>b</sup> An analysis of covariance adjusting gender, age, and cognitive status

were also found in previous studies [9, 24], possibly because the subjects' overall QOL or health status involve multiple factors (e.g., physical, psychological, and environmental factors), whereas each individual item relates to a certain narrow QOL facet. In addition, this study had a substantial sample size for the CFA operation (more than 200 subjects) according to suggestions from previous studies [25, 26]. However, CFA results showed low or even negative factor loadings for item 4 (medication) in the physical domain, as well as for item 6 (spirit) and item 26 (negative feelings) in the psychological domain. These results indicated that these items, especially item 4, might not measure the underlying construct inherent in their corresponding domains and thus might require modification or removal.

In conclusion, this study suggests that the newly developed audio player-assisted interview version of the WHOQOL-BREF (TV) provides a reliable and valid QOL instrument for Taiwanese-speaking elderly people. Future studies that examine agreement between the WHOQOL-BREF (TV) and the Mandarin Chinese version of WHOQOL-BREF are warranted to determine whether the results obtained from the two versions can be regarded as identical for individual/group comparisons.

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