Assessment of Psychometric Properties of WHOQOL-OLD Instrument: A Literature Review

Phu Dac Le Pham[1], Trung Quang Vo[1,*]

[1]Department of Pharmacy Administration, Faculty of Pharmacy, University of Medicine and Pharmacy, Ho Chi Minh City 700000, Vietnam.

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ABSTRACT

Quality of life (QOL) is a multidimensional concept, and various definitions of QOL relate to issues of concern in modern society. With the current population growth, the elderly people should be considered sane. Several studies have been reported to measure the quality of life based on different instruments of the elderly people. In 2006, WHOQOL-OLD instrument was developed as a cross-cultural tool for this purpose. This study was conducted to find out the rationality of other WHOQOL-OLD module version when applied in different nations. The study was designed as a systematic review. The literature were searched from three databases namely, PubMed, Science Direct, and Google scholar between the year of 2005 and 2015 with key words "WHOQOL-OLD"; "instrument" and "WHO". From 1316 articles, only those from abstract/ title were selected which relate with the assessment and rationality with this instrument. The study only selected articles written in English. Finally, there were 10 publications disclosing WHOQOL-OLD instrument in several countries which included two articles on PubMed and eight articles on Google Scholar. The reliability of instruments were assessed by the Cronbach's alpha coefficient with values acceptable (>0.7, except some cases). Correlation analysis, EPA, CFA were used to measure the validity of instrument. The results showed that WHOQOL-OLD instrument had good content validity, construct validity, convergence validity with 5 or 6 factors from EPA analysis and fit indices of CFA>0.9, RMSEA<0.8 and items of each domain had good correlation together. Besides, the study also points out the factors affecting quality of life such as health status, age, gender, level of education. Results of the studies indicated that the WHO instrument with different versions of each country is appropriate when applied to evaluate the quality of life of the elderly. WHOQOL-OLD instrument was developed to assess total QOL of elderly people beside other tools. This instrument will support the policy marker to recognize factors that affect overall quality of life and will help to generate appropriate policies.

INTRODUCTION

Currently, world population has increased especially in the elderly group. The proportion of people aged 60 and over, across the world is growing faster than any other age group..Speculations From 1970s to 2025s, have presumed a significant growth of approximately 694 million seniors (223% increase). It is estimated that by 2025 the old group (people with age 60 years and over) will reach the population of 1.2 billion, while by 2050, this number would be 2 billion. Importantly around 80% among them will be from developing countries (1).

The older people group has unique characteristics in terms of psychology and feeling. Ever rising population of this group requires a serious concern from government and society across the world. With special physiological features, people at these ages have to suffer from acute and chronic diseases which cause many troubles in their life. The change in psychology during aging also has severe effects on them. This concerned social welfare andthis was one of social burden which requires every nation to come up with a proper development strategy (1).

There are many studies reported to assess the quality of life of seniors all over the world. These researchers have used various tools such as as CASP-19, EQ-5D, OPQOL-35 and so on (2-4) for investigations related to elderly participants. In 2006, World Health Organization has developed new instrument namely WHOQOL-OLD (5) with the purpose of measuring quality of life of older adults. Application of this tool has been implemented in several nations like Turkey, China, etc(6, 7). On the other hand, the WHOQOL-OLD instrument has still many disadvantages may be due to differences in culture. This review attempts to assess the adequacy and rationality of WHOQOL-OLD instrument in determining the quality of life of elderly people. Moreover, the review provides herewith a general information in view of factors affecting the quality of life of older adults in terms of age, gender, health, education level.

MATERIALS AND METHODS

Study was designed as a systematic review carried out and updated by the end of October, 2015. The literature was searched in PubMed, Science Direct, and Google scholar database using the following keywords: 'WHOQOL-OLD', "instrument", and "WHO". This study aimed to

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compile all those research articles which are related to determination of quality of life of older people using WHOQOL-OLD instrument as main tool. The literature was reviewed between the years 2005 and 2015. The articles published in English language were considered. On these databases, with above key words, the review only selected the articlesfocused assessment of quality of life of elderly group without evaluating the relevance of a certain disease on quality of life or quality of life of particular elderly people. The title and abstract related to assessment reliability and validity of this instrument was considered

RESULTS

Quality of life concept and several instruments assessing the quality of life

According to World Health Organization (WHO, 2004) definition: "*Quality of life is as "individuals" perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept incorporating in a complex way the persons' physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the environment*" (8). According to U.S. Department of Health and Human Services, another concept of QOL is a common terminology to convey complete feelings of happiness, including perspectives of happiness and the pleasure of life. The definition of QOL is wide and subjective rather than specific and objective (9). Due to that complex relationship, the measurement of QOL is quite difficult and requires necessary instruments. Thus, researchers in psychology and sociology have developed useful tools for measuring QOL and WHOQOL is one of those tools. It has been acknowledged by WHO and applied in many different countries with different versions to suit each country's culture (9).

With the above definition of QOL, it should not be simply comprehend as "health conditions", "lifestyle", "the pleasure of life", "mental state", or "happiness". Therefore, WHOQOL modules focus on answering "feeling" QOL; these modules not only provide a method to measure sickness, but also reflect effects of diseases and health interference on personal QOL (10). Quality of life concept included many aspects which affected to our life. It is a multidimensional

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concept, so evaluation quality of life is not easy work. Apart from WHO modules, there are many modules in the world to measure QOL indicator. Besides the assessment of normal people, some modules are conducted for special targets such as children, unusual/specific groups including HIV or cancer patients, dementia or disable people (8). Generally, several instruments which evaluate QOL beside WHO modules are listed below.

Table 1.Several instruments to evaluate QOL

No.	Instruments	Organizations Design	Year	Number of factors	Number of questions	Note
1	SF-36 (11)	n/a	1991	8	36	n/a
2	EQ-5D (12)	EuroQOL group	1990	5	5	n/a
3	WHOQOL-BREF(13)	WHO	1995	6	100	6 topics comprising of 24 relevant features
4	WHOQOL-OLD(5)	WHO	1996	4	26	Summary of WHOQOL-100
5	WHOQOL-AGE(14)	WHO	2005	6	24	Brief and combination of WHOQOL-100 and WHOQOL-BREF
6		WHO			13	8 questions from EUROHIS_QOL and 5 questions from WHOQOL-OLD
7	EUROHIS-QOL(15)	WHOQOL project	2000	4	8	Brief of WHOQOL-100 combining with Brief
8	CASP-19(16)	n/a	2003	4	19	Develop in Britain
9	OPQOL-35(2)	n/a	n/a	8	35	n/a

Notes: n/a: not available

For old people group (60^{+} years old), there are modules specialized can be utilized such as WHOQOL-BREF, WHOQOL-OLD, WHOQOL-AGE, CASP-19, OPQOL-35.

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WHOQOL-OLD instrument

To measure QOL for older adults, project WHOQOL-OLD has been conducted by the WHOQOL research group. This module is a supplemental model of other WHOQOL modules and developed based on methods of WHOQOL. This modules has been used and assessed in 22 different centres in the world(17). After many periods of examination and screening, complete WHOQOL-OLD has been announced. The full version of WHOQOL-OLD contains 24 questions with 5 levels of option for six different aspects relating to QOL of elderly people. These aspects include sensory abilities; autonomy; past, present and future activities; social participation; death and dying, and intimacy. For the facet of "sensory abilities", the module assesses sensory functioning and impacts the loss or decline of sensory abilities (eye, nose, ear, taste and feel) on quality of life. The facet of autonomy describes the ability to live independently in old age and to take own decisions. In the meanwhile, the feature of "past, present and future activities" characterizes the satisfaction about achievements in life and things to look forward in the future. The "social participation" mentioned in daily activities, especially those in community. The "death and dying" is a sensitive feature in life, and this modules directs at concerns, worries and fears about the death. Finally, for the "intimacy", the modules evaluate personal and intimate relationships in one's living (18).

On the other hand WHOQOL-OLD set up on account of database of 22 centres of different nations, were still working on researches to evaluate the psychometric properties of this module. These all reports concluded that the modules are appropriate to be applied for the evaluation of QOL of elderly people. This module is utilized with varied purposes; it can be used individually or combined with other tools to match research's goal (19-21). The modules can also be applied to older adults suffering from acute and chronic diseases, to examine the influence of diseases on the life of older adults or to assess an intervention in a treatment (22). With the usage of WHOQOL-OLD modules, researches can have preliminary verdict on health and QOL of older adults at a place and can be compared with other countries. The module helps researchers to find out the factors which influenced QOL of older adults through different facets of life.

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Result of assessment reliability and validity of WHOQOL-OLD instrument

On PubMed, Google scholar, and Science Direct database, with above key words, the search resulted 131, 1620, 1140 hits published since 2005 to 2015, respectively. Then, authors have screened with title and abstract to choose 165 articles. Next, considered the title and abstract to remove the articles which are not related to health of people and measure rationale of instrument. The results research was presented in figure 1.
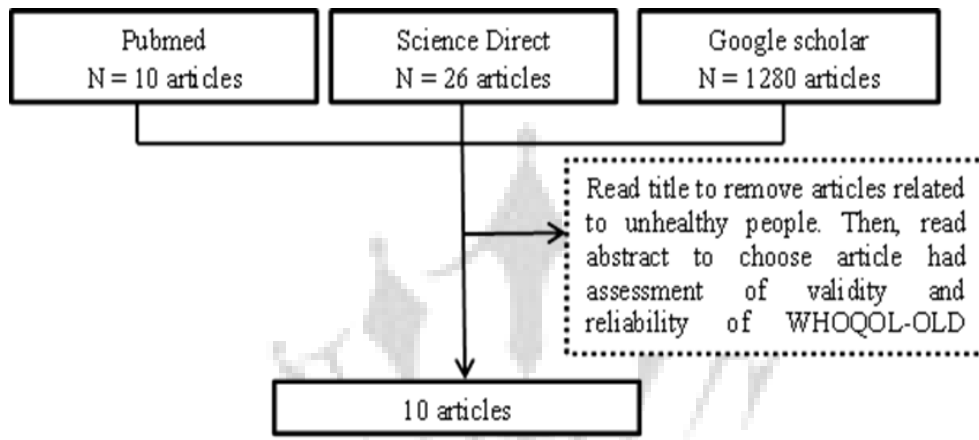

Figure 1. Search flow for systematic review

This was results of search to find articles related to assessment of reliability and validity of WHOQOL-OLD instrument (17-21, 23-27). The assessment result of psychometric properties of WHOQOL-OLD instrument was conducted in 9 nations including Portugal, Brazil, Norway, Turkey, China, Mexico, Spanish, Taiwan, and Germany (except studies in French, Chile). Particularly, the research developed WHOQOL-OLD module of WHO and collected data from 22 centres of different nations in the world. The characteristic of studies is shown in table 2.

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Table 2. The characteristic of studies

Characteristic	Number of studies	Percentage	Characteristic	Number of studies	Percentage
Sample (participants)			**Years**		
200-400	2	20%	2005	2	20%
> 400-600	5	50%	2010	1	10%
> 1000	3	30%	2011	1	10%
The mean age of participants			2012	1	10%
69 – 70	2	20%	n/a	5	50%
> 70 - 73	3	30%	**Number of instrument**		
> 73	1	10%	> 4	4	40%
n/a	4	40%	3	2	20%
Continent			2	2	20%
Asia	3	30%	1	2	20%
Europe	4	40%	*n/a: not available*		
America	2	20%			

A survey can use an instrument or several different tools. Beside WHOQOL-OLD instruments, WHOQOL-BREF, The 12-item Short Form Health Survey (SF-12), Geriatric Depression Scale (GDS)**,** Beck Depression Inventory (BDI), Beck Hopelessness Scale (BDS), and Quality of life for diabetic patient instrument (DQOL) also have been used. WHOQOL-BREF, SF-12, GDS instruments together with WHOQOL-OLD, WHOQOL-BREF were often combined. The amount of sample and mean age of participants were variable in studies. Although the size included over 1000 participants were difficult to conduct, there was 3 articles (3/10 in report) carried out. The sample size from 400 to 600 participants was accounted for largest ratio (a half part). Almost studies did not report significantly mean age. However, elderly people over 70 years old had high percentage in surveys.

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The information of assessment of rational WHOQOL-OLD instrument was synthesized and shown in Table 7. To evaluate the reliability of this instrument, the researcher used Cronbach's alpha value. As the value was high, it assures the consistency of instrument (Table 7). Validity of tool was assessed by content validity (correlation items in domain, domain to domain, or domain of instrument to domain of other tool), construct validity (assessed by exploratory factor analysis and confirmatory factor analysis), convergence validity. On the other hand, some factors affecting the quality of life of elderly people were included. These factors were often age, gender, education, health condition.

Table 7. The result of studies on reliability of WHOQOL-OLD instrument

No	Author	Country	Cronbach's alpha value	Result	Factors affected to quality of life
1	Mick Power et.al (17)	22 countries in the world	0.72 - 0.88	CFA was conducted with CFI= 0.939, RMSEA= 0.052, χ^2= 3759.4, df = 237	QOL score on all facets in older adults >80 (except for Death and Dying domain) was lower than elderly 60-80 years old.
2	Marcelo et al.(25)	Portuguese	0.71 - 0.88	The instrument showed sufficient discriminant validity (p<0.01), concurrent validity and test-retest reliability (correlation coefficients ranging from 0.58 to 0.82). There was statistically significant level between WHOQOL-OLD instrument and BDI, BHS scales. The facet "Death and Dying" showed the lowest correlation coefficients with both scales while the other facets had acceptable performance.	
3	Eduardo et al. (23)	Brazil	0.71 - 0.88	Two aspects "Sensory Ability" and "death and dying" lacked of item-trait interactions.	
4	Liv Halvors rud et al. (20)	Norway	0.69 - 0.87	Construct validity: All items revealed meaningful correlations with their corresponding domains. Facet–facet correlations: there were some correlations among domains. All correlations were meaningful. Value correlation of "Sensory Abilities" and "Autonomy", "Past, Present and Future Activities" and "Death and Dying" was not significant. Factor analysis: Result of EFA found five-factor solution. CFA was used with results: χ^2= 566.155, df = 231, χ^2/df =2.451, CFI = 0.940, RMSEA = 0.054, demonstrated good model fit.	
5	Sultan ESER et al. (18)	Turkey	0.68-0.88	Item total correlations and overall scale success were satisfactory. CFI values were quite high for each domains (range: 0.936-0.999). Convergence of WHOQOL-OLD domain scores on WHOQOL-BREF facets and WHOQOL-OLD were very good in general. "Sensory abilities", "Death and dying" domains had weak relationships with the other facet.	

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Table 7. The result of reliability of WHOQOL-OLD instrument (continued)

No	Author	Country	Cronbach's alpha indicators	Result	Factors affected to quality of life
6	Ramona et al.(26)	Spanish	0.65-0.88 (for each domain) 0.84 (total scale)	Construct validity: An correlation matrix illustrated all items correlated highest with their corresponding domains. Convergent validity: Correlations between WHOQOL-BREF domains and WHOQOL-OLD with the general QOL item were moderate-large. Discriminant validity: Gender and age did not find difference in all WHOQOL-OLD.	Education level related to QOL scores. Elderly people -higher than secondary school had statistically significant higher scores in all domains than people- primary and secondary school.
7	Yao G et al. (27)	Taiwan	0.72 - 0.95 for the 6 facets	The CFA was carried out, fit indices CFI = 0.93, IFI = 0.93, NNFI =0.92, RMSEA=0.06, were acceptable. Content validity: coefficients correlation ranged 0.41 -0.80 for item-associated domain correlations.	
8	Rong Liu et al. (21)	Chinese	0.711 – 0.842 for each domain.	There were a good test-retest reliability with ICC values was over 0.7 in subscale score and total score. CFI= 0.95, NFI= 0.94, NNFI= 0.94, GFI=0.86, RMSEA= 0.084, it lead to acceptable construct validity.	The score of all domain of the healthy group were higher than the unhealthy group..
9	Ana Luisa et al. (19)	Mexico	0.70 - 0.90 (except autonomy alpha value < 0.56)	The exploratory factor analysis carried out to consider the construct validity of the instrument yielded six factors (explained variance of 62.95%). The effect size of these differences was medium in all domains except for Autonomy, Death and Dying, and Intimacy, where the effect was small.	Unhealthy participants scored lower than healthy respondents on all domains of this instrument. There only were significant differences between men and women on the QOL scores for the domains Social Participation and Death and Dying.
10	Ines Conrad et al. (24)	Germany	0.75 - 0.85	The construct validity of the six-domain model of the WHOQOL-OLD was maintained by the outcome CFA, a common latent factor for the WHOQOL-OLD total scale could not be identified. Convergent validity of the WHOQOL-OLD domains could be well determined when analysis each domain and total QOL of WHOQOL-OLD instrument with the subscales of WHOQOL-BREF and SF-12.	The analysis illustrated that QOL scores growth up in line with participants' level of education.

DISCUSSION

Many studies have been reported using the WHOQOL-OLD instrument to assess the rationality and application in evaluating the quality of life of elderly people in a country. Studies have shown that the use of WHO questionnaire for elderly people was reasonable and acceptable. With the reliability of the instrument, studies of China (21), Brazil (23), Portugal (25), Turkey (18), Taiwan (27), Spain (26), Germany (24), Norway (20), Mexico (19)demonstrated high reliability based on the Cronbach's alpha coefficient wherein, the values were mostly high and within the range of 0.7-0.95. This high reliability showed that the tool had internal consistency,

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the items of corresponding domain was related together and connected to general quality of life. The stability of the instrument was also ascertained through test-retest reliability assessment of some versions. These values were within reasonable distance, for instance Portuguese WHOQOL-OLD version was between 0.58 and 0.82 (25), and Chinese WHOQOL-OLD version was over 0.7 (21).

The factor analysis was conducted in order to distinguish the item of corresponding aspects with other domains. The EFA (exploratory factor analysis) and CFA (confirmatory factor analysis)assessment were carried out on some versions, where the result showed that FIT indices were acceptable, confirming the rationality of instrument. Comparing to the version of nations, the indices are within the permitted range. In study of Taiwan (27), CFI = 0.93, IFI = 0.93, NNFI = 0.92, RMSEA = 0.06; the Turkish version (18) with CFI values from 0.936 -0.999; the Chinese version (21) has RMSEA <0.08, CFI, NFI, NNFI are all higher than 0.9, except GFI a little lower than 0.9; the research of Norway (20) had $\chi2 = 566,155$, with df = 231, $\chi2$ / df. = 2451, CFI = 0.940, RMSEA = 0.054. The result of EPA indicated that items of corresponding aspect mostly lumped together, as results analysis in the study of the Chinese version (21) or Mexico (19), Norway (20). The item also had significant correlation with others in domain. Correlation analysis between these aspects was conducted. Most of the versions of country when assessedthe content validity or facet-facet correlation, were found suitable as the study in German population (24), Spanish (26) or Norway (20). The evidence proved that the instrument had well-constructed validity and content validity when applied in practice. The original design of the instrument with 6 facets and 4 questions in each aspect is appropriate.

In addition, some versions of other countries also have few shortcomings. Several studies indicate that some aspects of the instrument did not get the reliability. In aspects Past, Present and Future Activities of versions Norway (20), the Cronbach's alpha value was 0.69. Moreover, domains Autonomy usually had Cronbach's alpha coefficient lowest in all facets, presented in Mexican (19), Turkish (18), Spanish version (26) (0.56, 0.68, 0.65 respectively). However these values can still be acceptable. Some versions module indicate missing item-trait interactions, such as aspects of "death and dying" (versions of Brazil (23), Taiwan (27)). This aspect also

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education also contributes to better quality of life (research on Turkey (18), Germany (24), Spain (26)

In conclusion, the study provided an evidence for the applicability of the WHOQOL-OLD instrument of WHO as an appropriate tool for evaluating the quality of life of elderly people besides the other questionnaire. This instrument will be a useful tool to assess comprehensively the quality of life of special groups. However, the study aims to find out the assessment of psychometric properties of the WHOQOL-OLD instrument rather than focusing on the factors affecting the quality of life, therefore requires further study added. Some limitations of the study includes that it is based only on 3 databases. The search can be expanded to the other databases in order to gain more of the relevant articles. Further articles only in English language were considered while ignored the two studies of Chile and France.

CONCLUSION

The development of WHOQOL-OLD instrument is necessary to evaluate the quality of life of elderly people, because this tool was developed as cross-cultural tool and has been evaluated in many countries. This instrument will help to better assess the quality of life of the elderly group. The application of instrument will help the policy makers to recognize the factors that affect overall quality of life to generate appropriate policies

Conflict of interest

The authors have no conflict of interest.

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