RESEARCH ARTICLE OPEN ACCESS

# Worker-Qol 76 – An Instrument For Evaluating Workers' Quality Of Life: A Description Of Its Construction And Key Psychometric Properties

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**ABSTRACT**
**Introduction:** Quality of Life (QOL) is an individual's perception of his position in life in the context of the culture and value systems in which he lives and in relation to his goals, expectations, standards, and concerns. It involves the presence of physical, mental, and social well-being. Although there are instruments that have been used to evaluate QOL generically, including questions about workers' QOL, specific instruments for evaluating the QOL of workers have not been found.
**Objectives:** To develop and validate a specific instrument (WORKER-QOL 76) to individually evaluate the QOL of workers in general.
**Methods:** The sample comprised 708 workers of both genders who responded to an initial version of the WORKER-QOL 76 questionnaire that included 106 items, the World Health Organization Quality of Life Scale-Abbreviated Version (WHOQOL-BREF), the Center for Epidemiological Studies-Depression Scale (CES-D), and a questionnaire on demographics and economic classifications. Statistical analyses resulted in a final draft of the WORKER-QOL 76 questionnaire that comprised 76 questions divided into four domains (psychological, social, physical, and environmental), with internal consistency indices of 0.91, 0.88, 0.76, and 0.76, respectively. The test-retest reliability of the scores was estimated, and the intraclass correlation coefficients ranged between 0.78 and 0.93. The correlations between the final version of the WORKER-QOL 76 questionnaire and the WHOQOL-BREF and between the WORKER-QOL 76 questionnaire and the Depression Scale (CES-D) attested to the convergent and discriminant validity.
Conclusion: It can be concluded that the WORKER-QOL 76 evaluation instrument has good psychometric properties for evaluating workers' QOL.
**Keywords:** Quality of life; Evaluation; Workers

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Date of Submission: 09-11-2017 Date of acceptance: 05-12-2017

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## I. INTRODUCTION

The World Health Organization Quality of Life (WHOQOL) group defines Quality of Life (QOL) as "an individual's perception of his position in life in the context of the culture and value system in which he lives and in relation to his goals, expectations, standards, and concerns." It involves the presence of physical, mental, and social well-being [1-4].

Several instruments have been used to evaluate the QOL of patients with various diseases. These instruments can be divided into two large groups: generic and specific[5, 6].

Generic instruments are developed to reflect the impact of an illness on a patient's QOL in different populations. These instruments evaluate aspects related to function, dysfunction, and physical and emotional discomfort[5].

Specific instruments are designed to evaluate, individually and specifically, certain aspects of QOL to provide a greater capacity to detect improvement or worsening of a particular aspect under study. Their main characteristic is their potential to be sensitive to change; that is, specific instruments are able to detect changes after a given intervention. Such changes may be specific to a

particular function (physical ability, sleep, sexual function), to a given population (the elderly, the young), or to a particular characteristic (pain)[5].

A qualitative research technique using focus groups was chosen for the present study as a first step in building a specific questionnaire to evaluate workers' QOL. This choice was based on standards provided by international organizations that bring together QOL researchers (e.g., the International Society for Pharmacoeconomics and Outcomes Research - ISPOR) and that recommend the use of focus groups to ensure the content validity of the instrument to be created[7].

The term "quality of working life" has been discussed and researched, and it has become an object of interest for leaders, managers, workers, and professionals in the occupational sciences as well as researchers[8]. The term "quality of life of the worker" has gained increased use in recent years and covers a number of practices, such as total quality programs, which emphasize workers' individual characteristics, improved working environments, and satisfaction with economic elements[9].

Although there are instruments that can evaluate QOL generically and that include some questions about workers' QOL, consulting the Bireme and Pubmed databases for the period from October 1, 2013, to January 30, 2014, revealed no specific instruments for such an evaluation. In this scientific environment, various instruments for measuring QOL have been constructed and studied in different populations, but no validated instruments that offer a definitive concept for the evaluation of workers' QOL have been found[10, 11].

With the above in mind, the present study aims to develop and validate a specific instrument to individually evaluate the QOL of workers in general.

## II. MATERIALS AND METHODS

### CONSTRUCTION OF THE WORKER-QOL 76 INSTRUMENT

The focus group technique was used to construct the instrument. The first focus group was designated as an expert focus group. This group was formed by professionals with experience in health and in workers' QOL. It was composed of one physiatrist, two psychiatrists, two occupational physicians, one physiotherapist, two physical education professionals, and one workplace safety technician. The objectives of this group were to produce questionnaire items and to review, modify, and construct the domains that are important for workers' QOL in relation to the four WHOQOL group domains (physical, psychological, social, and environmental).Two meetings were held with the expert focus group at the Clinical Hospital of Porto Alegre in the meeting room of the Psychiatric Research Center on July 7 and 12, 2011. The meetings lasted an average of one hour and 30 minutes. At the end of each meeting, a transcription phase began, and the data used to build the instrument's domains were categorized, summarized, and analyzed.

The content analysis followed the Bardin content analysis method and included stages of pre-analysis, material exploration and treatment of the results, inferences, and interpretation, after which the recording units were organized for the formation of the domains[12]. The domains were then used to elaborate upon the issues to be discussed in the workers' focus groups.

Three workers' focus groups were created from different economic activity sectors in three different regions of the state of Rio Grande do Sul, Brazil, to discuss and evaluate whether the proposed questions assessed workers' QOL. At the end of the workers' focus group discussions, the construction of the instrument, which at this stage contained 106 questions, was completed. To increase their ability to generalize, the workers' focus groups should include at least six of the eight Annual Social Information Report (RelaçãoAnual de InformaçõesSociais - RAIS) categories[13].

### EVALUATION OF THE WORKER-QOL 76 INSTRUMENT'S PSYCHOMETRIC PROPERTIES

This study was approved by the Research Ethics Committee of the Porto Alegre Clinical Hospital-RS under protocol number 10-0250. The participants signed terms of free and informed consent (TFIC).

### SEMANTIC ANALYSIS AND COGNITIVE INTERVIEWS

A semantic analysis was performed to verify that the 106 questions were understandable to the study participants. Ten workers participated in this analysis and had no difficulty understanding the questions. As a result of this analysis, the same wording was maintained for the questionnaire. Cognitive interviews were then conducted with 20 workers to determine whether they had any doubts in terms of understanding the questions. The workers did not have any difficulty understanding or completing the questionnaire. After these two stages, the 106 questions were applied in a field test.

### POPULATION AND SAMPLE

This stage was a field test of the instrument. To calculate sample size, some studies suggest that a sample of 20 or more individuals per question should be adequate for analysis.Given that the physical domain had the highest number of questions (35), it was chosen as the basis, which yielded a sample of 700 individuals [14]. We recruited a sample of 708 workers in 46 different

professions who were residents of 32 cities in the state of Rio Grande do Sul, Brazil.

**INSTRUMENTS**

Demographic data and economic classification questionnaire

Demographic data and economic classification questionnaires were used to summarize the demographic and economic characteristics of the sample.

Depression Scale (CES-D)

The Center for Epidemiological Studies-Depression (CES-D) Scale consists of 20 questions that evaluate depression, with each question answered on a four-point scale ranging from (1) never or seldom to (4) almost always or always.

WHOQOL-BREF questionnaire

The World Health Organization Quality of Life Scale-Abbreviated Version (WHOQOL-BREF) has 26 questions based on a five-point scale to evaluate QOL. It consists of four domains (psychological, physical, social, and environmental) and has good reliability and validity.

WORKER-QOL 76 questionnaire

This questionnaire consists of 76 questions, with each question answered on a 5-point scale. The WORKER-QOL 76 has four domains: 1) a psychological domain, consisting of 17 questions; 2) a social domain, consisting of 24 questions; 3) an environmental domain, consisting of 22 questions; and 4) a physical domain, consisting of 14 questions.

**DATA COLLECTION**

Data were collected between October 2014 and June 2015. The participants signed terms of free and informed consent. They then completed the demographic and economic classification questionnaires, the CES-D scale, the WHOQOL-BREF questionnaire, and the WORKER-QOL 76 questionnaire. The response time was approximately 30 minutes.

## III. STATISTICAL ANALYSIS

For purposes of instrument reliability, a test-retest was conducted, and the sample size calculation was deemed to require a 5% significance level, a power of 90%, and a minimum intraclass correlation coefficient (ICC) of 0.7, thus obtaining a total of 46 individuals. There was a two-week interval between the collection of the samples. A minimum ICC of 0.7 offers a good test-retest reliability index over two weeks[15].

The demographic data and the economic classification questionnaires were used to categorize the demographic and economic characteristics of the sample. A Pearson correlation test was used to evaluate the convergent construct validity between the WORKER-QOL 76 and the WHOQOL-BREF measurements and between the WORKER-QOL 76 and the CES-D scale measurements. In classifying the correlation strength between the variables, values close to 0.30 were considered satisfactory, those between 0.30 and 0.50 were considered moderate, those above 0.50 were considered strong, and those below 0.30 were considered to have little value, even if statistically significant[16]. The CES-D scale was used to classify the depression symptoms of the participants. Individuals with a score equal to or greater than 16 on the CES-D scale were classified as having symptoms of depression[17].Cronbach's alpha was used to evaluate the internal consistency reliability of the WORKER-QOL 76. The higher the coefficient, the more reliable the instrument. Values above 0.70 were therefore considered adequate for this study[18].

With regard to the handling of lost data, we followed a criterion establishing that participants who had 20% or more unanswered items were excluded from the sample[19]. Varimax rotation was used in the exploratory factor analysis. This method maximizes the factor loadings within a factor; a large number of variables are examined that can be summarized into a smaller set of factors without substantial loss of information. In general, factor loading should be at least 0.3 to contribute to the factor to which it belongs[20]. The analysis of the confirmatory factor model was performed using Bartlett's sphericity test, which evaluates the overall significance of all associations within a correlation matrix, and the Kaiser-Meyer-Olkin (KMO) Index, which is a measure that is calculated for both the total correlation matrix and each variable individually to evaluate the adequacy of the factor analysis. Values above 0.5 indicate adequacy of the factor model[20].

Score calculations were performed according to the syntax of the WORKER-QOL 76 instrument, which can be obtained from the authors.

The data were processed and analyzed using SPSS version 18.0 (IBM Company).

## IV. FIELD TEST RESULTS

A total of 293 (41.4%) men and 415 (58.6%) women were interviewed; the mean age was 38 years (SD = 12.0). Most of the participants had completed a university-level education (38.5%), and the most frequent occupation was administrative assistant. The metropolitan region of Porto Alegre had the most participants.

**Table 1.** Sample characteristics

| Variables | n= 708 |
|---|---|
| Age (Years) – average +- DP | 37,5 ± 12,0 |
| | |
| Gender – n(%) | |
| Male | 293 (41,4) |
| Female | 415 (58,6) |
| | |
| Marital Status – n(%) | |
| Single | 215 (30,4) |
| Married / stadyrelationship | 215 (30,4) |
| Separed / Divorsed | 61 (8,6) |
| Widower | 8 (1,1) |
| | |
| Education - n (%) | |
| IncompletePrimary | 29 (4,2) |
| Complete Primary | 39 (5,6) |
| Incomplete High School | 32 (4,6) |
| Complete High School | 173 (24,8) |
| IncompleteCollege | 156 (22,3) |
| Complete College | 269 (38,5) |
| | |
| EconomyClass - n (%) | |
| A | 66 (9,5) |
| B | 418 (60,1) |
| C | 173 (24,9) |
| D | 18 (2,6) |
| E | 21 (3,0) |
| | |
| Mostfrequentoccupations - n (%) | |
| AdministrativeAssistant | 304 (46,1) |
| Services Assistant | 49 (7,4) |
| technician | 41 (6,2) |
| Self Employed | 27 (4,1) |
| Maintenance Staff | 32 (4,9) |
| PhysicalEducationTeacher | 20 (3,0) |
| Nursing | 18 (2,7) |
| AgricultureWorkers | 18 (2,7) |
| SanitationWorkers | 17 (2,6) |
| Professors | 16 (2,4) |
| Physiotherapist | 12 (1,8) |
| Others | 154 (16,1) |
| | |
| Regions - n (%) | |
| Santa Cruz | 53 (7,5) |
| Metropolitan | 559 (79,0) |
| Serra | 96 (13,6) |

Regarding the analysis of removed WORKER-76 QOL questions, 21 questions were excluded after the exploratory factor analysis, including seven questions as a result of the Cronbach's alpha analysis and two questions due to the confirmatory factor analysis.

Among the participants, 31% scored above 16 points on the CES-D, which is the level indicative of a major depressive disorder.

The test-retest comparison showed strong agreement between the measurements (ICC = 0.88; 95% CI: 0.78 - 0.93; $p < 0.001$).

Internal consistency was measured using Cronbach's alpha. The indices showed good internal consistency in each domain. The values were 0.91, 0.88, 0.76, and 0.76 for the psychological, social, environmental, and physical domains, respectively.

**Table 2.** Consistency internal

| Domains | Psychological | Social | Environment | Physical |
|---|---|---|---|---|
| Cronbach Alfa | 0,91 | 0,88 | 0,76 | 0,76 |
| Average ± DP | 73,1 ± 16,5 | 63,6 ± 12,8 | 51,4 ± 12,8 | 62,2 ± 15,5 |

The results of the evaluation of the correlation between both the WHOQOL-BREF scale and the CES-D scale with the WORKER-QOL 76 are presented in Table 3, which shows values between 0.30 and 0.50, representing moderate correlation.

**Table 3**. Pearson correlation coefficient values with the WHOQOL measures - BREF, Center for Epidemiologic Studies - Depression Scale (CES-D) to the WORKER-QOL76.

| | WORKER-QOL76 |
|---|---|
| WHOQOL-BREF | |
| Psychological | 0,450 * |
| Social | 0,301 * |
| Environment | 0,480 * |
| Physical | 0,542 * |
| General | 0,366 * |
| CES–D | -0,489 * |

CES-D: Center Epidemiologic Studies – Depression Scale
* p<0,001

The confirmatory factor analysis showed a good fit for the model with four domains (KMO = 0.91; Bartlett's test = 21,806; p < 0.001). The factor loadings of the items belonging to each domain are presented in Tables 4.

**Table 4.** Confirmatory Factor Analysis _ WORKER - 76 QOL – Psycological Domain

| **Questions** | **Psychological Domain** | **Social Domai** | **Environment Domain** | **Physical Domain** |
|---|---|---|---|---|
| 12 - Does your job interfere with your sex life? | 0,42 | | | |
| 14 - Do external problems to work interfere with work? | 0,63 | | | |
| 15 – Do external problems to work interfere with their QOL? | 0,51 | | | |
| 16 –Do personal problems interfere with work tasks? | 0,68 | | | |
| 17 – Can't you fulfill the tasks related to your job because of external problems to work? | 0,51 | | | |
| 22 – Does the work that you do influence your health? | 0,38 | | | |
| 31 – Does the work make you an anxious person? | 0,58 | | | |
| 32 – Does the work make you a depressed person? | 0,65 | | | |
| 33 - Do working problems affect you emotionally? | 0,60 | | | |
| 36 - Do working problems make you a depressed person? | 0,65 | | | |
| 37 – Do working problems make him an anxious person? | 0,64 | | | |
| 38 -Do emotional problems harm your work? | 0,75 | | | |
| 39 – Do emotional problems make it difficult to start your work? | 0,74 | | | |
| 40 – Do emotional problems make it difficult to work required hours? | 0,66 | | | |
| 49 – Does your work let you emotionally exhausted? | 0,36 | | | |
| 51 - How much does your work let you emotionally exhausted? | 0,44 | | | |
| 52 - How much does your work let you depressed? | 0,42 | | | |
| 2- Do you feel pleased with the work you do? | | 0,63 | | |
| 3- Do you feel save in relation to stability? | | 0,35 | | |
| 5- How much does your salary give you the feelings of pleasure? | | 0,55 | | |
| 6- Do financial incentives influenceyourprofessionalqualification? | | 0,41 | | |
| 7- Is your salary from the work you do able to cover your needs? | | 0,51 | | |
| 13- Is information offered on labor risks? | | 0,40 | | |
| 34. Do you feel respected for the work you do? | | 0,55 | | |
| 35- Are you respected by other colleagues when you feel sick and does not have the same conditions to carry out your activities? | | 0,40 | | |
| 41. Do you feel motivated to improve knowledge, education and | | 0,38 | | |
| 42- Do you have adequate financial return for the work you do? | | 0,57 | | |
| 43- Do you feel emotionally done with work? | | 0,69 | | |
| 44-Do you consider yourself a person recognized by the work you | | 0,66 | | |
| 48. Do feel pleasure in the activities in your workplace? | | 0,45 | | |
| 53- Does the worplace give you the necessary conditions to perform the required tasks? | | 0,40 | | |
| 67- Do you feel that you have energy to perform activities of your daily life at the end of your workday? | | 0,32 | | |
| 93- Are you satisfied with personal relationships in your work? | | 0,55 | | |
| 94-Do you feel satisfied with the work you do? | | 0,65 | | |
| 95- Are you satisfied with the feedbacks that you receive in your | | 0,75 | | |

| | | | |
|---|---|---|---|
| 96- Does your salary bring the feelings of satisfaction? | 0,57 | | |
| 97- Are you satisfied with the equipment in your work? | 0,48 | | |
| 98- Are you satisfied with the structure of the place where you work? | 0,56 | | |
| 99- Are you satisfied with the relationship with your colleagues? | 0,50 | | |
| 101- Are you satisfied with your relationship with your manager? | 0,58 | | |
| 102- Are you satisfied with the ergonomic interventions of your | 0,47 | | |
| 1- Does satisfaction with life in general influences their QOL? | | 0,42 | |
| 4- Do earnings (salary, money, wages) influence QOL? | | 0,36 | |
| 8- Being healthy influences their quality of life? | | 0,38 | |
| 18- Does the incentive of schedule adequacy influence your professional qualification? | | 0,43 | |
| 23- Do sleep, physical fatigue and pain, influence quality of life? | | 0,62 | |
| 24- Do labor problems change your working routine? | | 0,49 | |
| 25- Do labor problems affect job performance? | | 0,44 | |
| 26- How much does food influence your health? | | 0,48 | |
| 27- Does food influence your ability to work? | | 0,30 | |
| 29- Do emotional or psychological aspects influence QOL? | | 0,51 | |
| 30- Does the work you do interfere in your QOL? | | 0,35 | |
| 56- Doesn't the workplace allow you to focus to accomplish the tasks required because of excesses of tasks performed? | | 0,32 | |
| 78- Being able to do the job interferes in the QOL? | | 0,55 | |
| 80- Do you feel glad to help other coworkers in their activities? | | 0,42 | |
| 81- Do paid extra hour activities interfere in the QOL? | | 0,60 | |
| 82- Does the work interfere in social events participation, health care, meetings with family and / or friends? | | 0,53 | |
| 83 – Going on vacation and holidays interfere in your QOL? | | 0,63 | |
| 84-Does the amount spend on means of transportation interfere in the | | 0,43 | |
| 85- Does the time spend on the means of transportation interfere in | | 0,50 | |
| 86- Do the extra hour activities interfere in your leisure? | | 0,65 | |
| 87- Do the extra hour activities interfere in your daily routine? | | 0,65 | |
| 88- Do the extra hour activities interfere in your QOL? | | 0,63 | |
| 9- Is the physical pain you feel in your work environment different from the pain you feel out of it? | | | 0,41 |
| 47- Do you need health care to carry out activities? | | | 0,56 |
| 61- Is your physical health influenced by activities performed in a standing position in your work? | | | 0,56 |
| 63- Is your physical health influenced by activities that change positions (eg standing, sitting, repetitive movements) in your work? | | | 0,47 |
| 64- Is your physical health influenced by repetitive movements performed in your work? | | | 0,59 |
| 65- Is your physical health influenced by excessive force held in your | | | 0,67 |
| 70- Does few hours sleeping influence at work? | | | 0,59 |
| 71- Does physical pain interfere in work-related activities? | | | 0,67 |
| 72- How much does physical pain affect your QOL? | | | 0,59 |
| 73- Does physical pain caused by factors outside work environment interfere in the activities of your job? | | | 0,65 |
| 74- Does physical pain felt by factors outside the work environment | | | 0,54 |
| 75- Does the fatigue felt by the work interfere in the leisure activities | | | 0,36 |
| 76- Do risk related factors related your job interfere in your activities? | | | 0,60 |

The calculation of scores carried out according to Worker instrument - QOL 76 syntax is shown in Table 5.

**Table 5 -** Calculation of worker scores - QOL 76

| Domain | Numberofquestions | Minimum | Maximum | Transformation |
|---|---|---|---|---|
| Psychological Domain | 17 | 17 | 85 | ((X-17) /68) *100 |
| Social Domain | 24 | 24 | 120 | ((X-24) /96) *100 |
| Environment Domain | 22 | 22 | 110 | ((X-22) /88) *100 |
| Physical Domain | 13 | 13 | 65 | ((X-13) /52) *100 |
| Total | 76 | 76 | 380 | ((X-76) /304) *100 |

## V. DISCUSSION

The psychometric indices obtained from the factorial validity of the instrument combined with the good indicators for convergent and discriminant validity provide evidence that the WORKER-QOL 76 questionnaire is a valid and reliable instrument for evaluating workers' QOL.

The initial version of the instrument consisted of 106 questions, which were then reduced to 76 questions after the statistical analysis.

The removal of 30 questions in the final version of the instrument did not harm the content thereof because each eliminated question had a question that corresponded to it among those remaining. For example, the deleted question, "To what extent does poor quality of sleep influence your quality of life?" had the corresponding question, "To what extent does sleeping fewer hours than is your routine affect your work?", which remained in the instrument.

The workers' focus groups included the participation of most of the categories represented in the RAIS, which affords it good generalizability[13].

The Cronbach's alpha coefficient values were substantial, which indicated that the instrument has good internal consistency. Our results were similar to those presented by Fleck et al[21].

Regarding stability, which was ascertained using the test-retest method, the intraclass correlation coefficients showed strong concordance between measurements, ranging from 0.78 to 0.93. Values of 0.70 or more represent a good test-retest reliability index[15].Our study achieved a test-retest reliability index of 0.88. The instruments were administered with an interval of two weeks between them. Two weeks is sufficient time to perform a test-retest. These results are similar to those observed by Moreno et al. [22]in a prospective cohort study of technical and administrative employees of a university in the State of Rio de Janeiro, Brazil.

Regarding convergent validity, it was observed that the correlations between the questions and the psychological, social, and environmental domains showed a moderate effect and that the correlation with the physical domain showed a strong effect. Similar results have been found by other authors when testing construct validity, showing a moderate to strong correlation variance[23-25]. Thus, with satisfactory convergent and divergent validity values, the instrument has construct validity[16].

The confirmatory factor analysis using the KMO test demonstrated a good fit for the model with four domains, which indicates the adequacy of the data for factor analysis. In addition, Bartlett's sphericity test was significant, thus providing evidence that the correlations between the items allowed the factor analysis to be performed. Ferreira et al.[26]found results similar to ours.

The strength of our study lies in the fact that it covers a large sample across three regions in the State of Rio Grande do Sul, Brazil. However, this state is divided into seven regions. Generalizing the results may therefore have certain limitations.

The WORKER-QOL 76 instrument may be used in future studies to profile a particular group of workers. It can also be used to compare different groups of workers with each other and to compare the same group in relation to factors such as time.

In conclusion, the present study showed that the WORKER-QOL 76 evaluation instrument is valid and reliable and has good psychometric properties for evaluating the QOL of workers in general.

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[27]. The authors declare no conflicts of interest.
[28]. This study was supported by FIPE/HCPA.

Marcio R. Martini Worker-Qol 76 – An Instrument For Evaluating Workers' Quality Of Life: A Description Of Its Construction And Key Psychometric Properties." International Journal of Engineering Research and Applications (IJERA), vol. 7, no. 12, 2017, pp. 10-14.