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Research Article:

## Cross-Cultural Adaptation and Validation of the Quality of Life, Obesity and Dietetics Rating Scale

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### Abstract

**Background:** Obesity significantly impacts health-related quality of life (HRQoL), yet few culturally appropriate tools exist for Arabic-speaking populations. This cross-sectional validation study aimed to translate and validate the Arabic version of the Quality of Life, Obesity and Dietetics (QOLOD) rating scale. **Methods:** The translation followed internationally accepted guidelines, including forward-backward translation, expert committee review, pretesting, and formal content validity assessment. A convenience sample of 82 overweight or obese Arabic-speaking adults participated in the validation phase. The Arabic version of the QOLOD was evaluated for content validity, internal consistency, test-retest reliability, construct validity, and floor/ceiling effects to assess its overall reliability and validity. **Results:** The Arabic QOLOD demonstrated excellent content validity: item-level CVI (I-CVI) = 0.91–0.94; scale-level CVI (S-CVI) = 0.92–0.95; universal agreement (S-CVI/UA) = 0.82–0.84. The instrument showed strong internal consistency (Cronbach's alpha = 0.87–0.89). Test-retest reliability was excellent (ICC = 0.91). EFA confirmed a five-factor structure consistent with the original French version: physical impact, psychological impact, sex life, comfort with food, and diet experience, explaining 68.3% of total variance. No significant floor or ceiling effects were observed except for the sex life domain (19.9%). HRQoL scores varied significantly by BMI, gender, and age group. **Conclusion:** The Arabic version of the QOLOD is a reliable and valid tool for assessing HRQoL among Arabic-speaking individuals with obesity. It is recommended for use in clinical and research settings across Arab countries.

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### 1. Introduction

Obesity is a growing public health concern globally, particularly in Middle Eastern countries where its prevalence has increased dramatically in recent decades (1, 2). Obesity affects multiple domains of health-related quality of life (HRQoL), including physical function, emotional well-being, sexual health, and dietary habits (3, 4). While several generic and disease-specific HRQoL instruments exist, few have been validated in Arabic-speaking populations (5 - 7). While generic instruments

such as the SF-36 and disease-specific tools like the IWQOL-Lite have been widely used in obesity research, they may not fully capture culturally specific aspects of HRQoL, such as dietary behaviors, body image concerns, and social stigma experienced by Arabic-speaking individuals (6,7). These tools were developed primarily in Western contexts and may lack sensitivity to local norms and expressions of well-being. Therefore, a culturally adapted instrument like the Quality of Life, Obesity and Dietetics (QOLOD) rating scale is essential to accurately assess HRQoL among Arabic-speaking populations affected by obesity. The QOLOD rating scale was originally developed in French to assess HRQoL specifically in obese individuals, focusing on dietary experience and food-related behaviors (8). The QOLOD has since been validated in Turkish and other languages, demonstrating robust psychometric properties across diverse cultures (9).

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According to a nationally representative survey conducted in Iraq in 2015, approximately 33.9% of adults were obese and 31.8% were overweight (10). Regional estimates suggest that overweight and obesity affect more than 75% of adults in countries like Jordan and Kuwait (11). These figures highlight the growing need for culturally adapted tools to assess HRQoL in Arabic-speaking populations affected by obesity. In many Arab countries, including Iraq, obesity carries significant social stigma, particularly for women, and is often linked with perceptions of wealth and hospitality. Dietary habits are deeply rooted in tradition and vary significantly across regions, making standardized tools less applicable. Additionally, discussions around sexual health remain sensitive, which further supports the need for a culturally adapted questionnaire that respects these nuances while ensuring accurate assessment of HRQoL.

This study aimed to develop and validate an Arabic version of the QOLOD rating scale following international standards for translation and cultural adaptation. We also sought to evaluate its psychometric properties, including content validity, reliability, and responsiveness to demographic and clinical variables.

## 2. Methods

### 2.1. Translation and Cross-Cultural Adaptation

The International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Task Force for Translation and Cultural Adaptation (12,13) guidelines for translation were followed. The steps detailed below were implemented during the translation process. The process began with a forward translation of the original QOLOD rating scale by two independent bilingual translators into Arabic. This was followed by the synthesis of translations, in which a consensus meeting was held to produce a single draft (Draft 1). Next, a back-translation process took place, in which Draft 1 was translated back into English by two native English speakers who were blinded to the original version. To ensure the authenticity of the translation process, an expert committee review was conducted, during which the panel reviewed the translations for conceptual equivalence, cultural appropriateness, and linguistic accuracy. Finally, the preliminary Arabic version was pretested on 30 overweight or obese individuals for clarity, comprehension, and relevance, and feedback was incorporated into the final version.

Several idiomatic expressions related to body image, eating behavior, and emotional well-being required modification to reflect local norms. For instance, the phrase "I feel guilty when people see me eating" was rephrased to better fit cultural norms around eating in public.

### 2.2. Validation Study

#### 2.2.1. Participants

Participants were recruited through purposive sampling from primary care clinics and weight management centers. Interested individuals were approached directly by researchers and provided with an explanation of the study's purpose before giving informed consent. The validation phase included a sample of 82 obese (BMI  $\geq 25$  kg/m<sup>2</sup>), Arabic-speaking adults aged 18–65 years. Exclusion was based on pregnancy, major psychiatric disorder (i.e., schizophrenia or bipolar illness), and cognitive impairment. The sample size (n=82) was determined based on recommendations for validation studies, which suggest a minimum of 5–10 participants per item for factor analysis. With 31 items on the QOLOD scale, a sample size of at least 155 is typically recommended; however, due to time constraints and recruitment challenges, as this study was a part of an MSC project, we aimed for a target of at least 80 participants, consistent with previous similar validation studies (9).

#### 2.2.2. Participant characteristics

The validation sample of 82 adults had Arabic as their first language. The participants' average age was  $43.3 \pm 12.2$  years, and the majority were female (77.7%). Mean BMI was  $35.8 \pm 7.4$  kg/m<sup>2</sup>, so all subjects were overweight-obese according to WHO. Participants were recruited from urban primary care clinics and weight management centers in four major cities: Mosul, Erbil, Duhok, and Baghdad. These locations represent diverse geographic and socioeconomic backgrounds within Iraq. While rural representation was limited, future multi-center studies could include more varied settings.

#### 2.2.3. Measures

The Arabic version of the QOLOD is a 31-item questionnaire designed to assess HRQoL across five domains: physical impact, psychological impact, sex life, comfort with food, and diet experience (8). During the validation process, data on sociodemographic and clinical characteristics were collected from participants, including age, gender, BMI, level of education, and employment status.

### 2.3. Statistical Analysis

To evaluate the psychometric properties of the translated version of the QOLOD, statistical testing was conducted. Initially, the content validity of the translated questionnaire was conducted to determine if the questions were relevant and clear (14). In which twelve reviewers were recruited to review each question and score it on a 4-point scale which was then combined to determine how well the questionnaire was designed (15).

To assess the reliability of the questionnaire, internal consistency was measured by Cronbach's alpha tests where a 0.70 value is regarded as adequate (16). Test-retest

reliability was assessed by administering the questionnaire twice to a subset of 30 participants who completed the questionnaire twice, with a 7–10-day interval (17).

Exploratory factor analysis was used to study the structure with a cut-off retention criteria of factor loadings above 0.4 in order to gauge the basic structure (18).

To evaluate the presence of floor and ceiling effects, the percentage of participants scoring at the minimum or maximum possible score on each domain was calculated. An effect was deemed meaningful if the proportion exceeded 15%, indicating limited sensitivity of the scale in detecting differences at the extremes of HRQoL (19). Health-related quality of life scores assessed against various BMI categories, gender, age and their groupings for clinical validity were analyzed using ANOVA and independent group t-test. All statistical testing was done with the use of SPSS version 26, where significant results were set below a p-value of 0.05. Missing data were handled using pairwise deletion during statistical analysis, which is appropriate for small amounts of missingness (<5%). No significant patterns of missing data were observed.

### 3. Results

#### 3.1. Translation Process

The translation process identified several culturally sensitive items that required adaptation. For instance, the phrase “I feel guilty when people see me eating” was rephrased to better fit cultural norms around eating in public. Pretesting confirmed high levels of understanding and acceptability among participants.

#### 3.2. Content Validity

**Table 1** presents the content validity indices of the Arabic version of the QOLOD, as evaluated by a panel of 12 expert reviewers.

**Table 1.** Content Validity Indices of the Arabic QOLOD

| Validity Index            | Clarity | Relevance |
|---------------------------|---------|-----------|
| Item-Level CVI (I-CVI)    | 0.94    | 0.91      |
| Scale-Level CVI (S-CVI)   | 0.95    | 0.92      |
| S-CVI/Universal Agreement | 0.84    | 0.82      |

All indices exceeded recommended thresholds, indicating strong content validity.

#### 3.3. Psychometric Properties

**Table 2** displays the psychometric properties of the five subscales of the Arabic QOLOD, including Cronbach's alpha coefficients for internal consistency and intraclass correlation coefficients (ICC) for test-retest reliability.

**Table 2.** Internal Consistency and Test-Retest Reliability of the Arabic QOLOD Subscales

| Domain               | Cronbach's Alpha | ICC  |
|----------------------|------------------|------|
| Physical Impact      | 0.89             | 0.89 |
| Psychological Impact | 0.89             | 0.92 |
| Sex Life             | 0.81             | 0.87 |
| Comfort with Food    | 0.84             | 0.90 |
| Diet Experience      | 0.77             | 0.91 |

Overall internal consistency:  $\alpha = 0.87$ , Test-retest reliability: ICC = 0.91

Corrected item-total correlations for the Diet Experience subscale ranged from 0.308 to 0.650. Removing Diet Experience Item 4 slightly increased Cronbach's alpha to 0.803, suggesting potential for refinement.

#### 3.4. Exploratory Factor Analysis

Exploratory factor analysis was conducted to evaluate the underlying factor structure of the Arabic version of the QOLOD. Principal component analysis with Varimax rotation was employed, and items were retained based on a factor loading threshold of  $> 0.40$ , consistent with standard criteria in scale validation studies. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.86, indicating that the dataset was suitable for factor analysis. Additionally, Bartlett's test of sphericity was statistically significant ( $\chi^2 = 1152.34$ ,  $p < 0.001$ ), further supporting the appropriateness of the data for structural analysis.

The EFA confirmed the original five-factor structure—physical impact, psychological impact, sex life, comfort with food, and diet experience—which together explained 68.3% of the total variance. All items loaded strongly onto their respective factors, with factor loadings ranging from 0.45 to 0.82, confirming the construct validity of the Arabic QOLOD.

#### 3.5. Floor and Ceiling Effects

No significant floor or ceiling effects (<15%) were observed across domains, except for the sex life domain (19.9%). The relatively high floor effect observed in the 'sex life' domain (19.9%) suggests limited willingness to report positive experiences related to this aspect of life. This may reflect cultural reluctance or stigma associated with discussing sexual health, especially in relation to obesity. Similar patterns have been reported in other language versions of the QOLOD, indicating a potential cultural influence on reporting rather than a flaw in the tool itself (6).

#### 3.6. Clinical Validity

Significant differences were found in HRQoL scores by BMI ( $F = 6.21$ ,  $p < 0.01$ ), gender ( $t = 2.89$ ,  $p < 0.01$ ), and age group ( $F = 4.53$ ,  $p < 0.05$ ). Lower HRQoL scores were associated with higher BMI, female gender, and older age (6).

## 4. Discussion

This study successfully translated, culturally adapted, and validated the Arabic version of the QOLOD rating scale. The results demonstrate strong psychometric properties consistent with previous validations in French and Turkish populations (8,9).

### 4.1. Cultural Adaptation

During the translation process, several items required minor modifications to ensure cultural sensitivity without altering the intended meaning (20). These adaptations highlight the importance of considering local norms when adapting patient-reported outcome measures. Notably, the Turkish validation team removed one item ("I feel guilty whenever I eat foods that I should not") due to conceptual ambiguity and participant discomfort (9). In contrast, our Arabic participants generally understood this item without difficulty, suggesting potential differences in how emotional eating is perceived across cultures.

### 4.2. Psychometric Properties

The Arabic QOLOD showed excellent internal consistency and test-retest reliability, comparable to the original French and Turkish versions (8,9). EFA confirmed the five-dimensional structure, supporting the tool's construct validity. The observed floor effect in the sex life domain likely reflects sociocultural barriers to open discussion about sexual health, particularly among obese individuals. This highlights the importance of contextualizing HRQoL assessments and suggests that future studies should explore the integration of additional culturally tailored questions or qualitative components to better understand this dimension. This aligns with previous findings where similar patterns were noted in culturally adapted quality-of-life instruments (19).

### 4.3. Comparison with Other Language Versions

The Turkish validation also reported good psychometric properties, with slightly higher Cronbach's alphas across most domains (9). One item was excluded due to low factor loading, highlighting the need for careful consideration of item interpretation in different cultural contexts. Our findings align closely with those of the Turkish validation, although minor differences exist. For instance, one item ('I feel guilty whenever I eat foods that I should not') was removed in the Turkish version due to conceptual ambiguity and participant discomfort. In contrast, Iraqi participants generally understood this item without difficulty, suggesting possible cross-cultural variations in how emotional eating is perceived and reported.

### 4.4. Clinical implications

This validation study supports obesity care in Arabic-speaking populations by providing a culturally appropriate tool to measure HRQoL. The Arabic QOLOD can be used in clinical settings to evaluate HRQoL changes during weight reduction interventions, nutritional counseling, lifestyle modifications, or behavioral therapy. Beyond BMI, it captures culturally relevant consequences of obesity, offering patient-centered insights for holistic care.

Clinically, the tool enables healthcare providers to monitor changes in patients' physical and psychological functioning, as well as dietary experiences, aiding personalized treatment plans. Policymakers and stakeholders may apply the QOLOD to assess the effectiveness of public health programs targeting obesity and lifestyle modification. The findings of this study align with existing evidence that the QOLOD is a robust and adaptable instrument for HRQoL assessment in obese populations (8).

### 4.5. Limitations

This study has several limitations, including the absence of confirmatory factor analysis, which limits the ability to fully confirm the theoretical five-factor structure of the Arabic QOLOD rating scale. Furthermore, the sampling technique used in this study, i.e., convenience sample, in which the participants were mainly from urban areas and cities in Iraq, would limit the generalizability of the findings to rural populations or other Arabic-speaking countries with different sociocultural contexts. Future multi-center studies involving larger, more diverse samples across the Arab region are needed to enhance external validity and ensure broader applicability.

## 5. Conclusion

The Arabic version of the QOLOD is a solid tool for checking HRQoL in Arabic-speaking people with obesity. The availability of this tool enables it to be used in different countries, which is great for clinical trials and public health studies on obesity. Future research should look into how well the Arabic QOLOD reacts to changes from lifestyle changes, medications, or surgery, and test it in a wider range of regions and groups.

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### التكيف الثقافي والتحقق من صدق ومصداقية مقياس جودة الحياة والتغذية لدى المصابين بالسمنة

**الخلفية:** تؤثر السمنة بشكل كبير على جودة الحياة المرتبطة بالصحة (HRQoL)، ومع ذلك توجد أدوات قليلة مناسبة ثقافياً للسكان الناطقين باللغة العربية. هدفت دراسة التحقق المقطعية هذه إلى ترجمة النسخة العربية من مقياس تصنيف جودة الحياة والسمنة وعلم التغذية (QOLOD) والتحقق من صحتها. **الطريقة:** اتبعت الترجمة إرشادات مقبولة دولياً، بما في ذلك الترجمة للأمام والخلف، ومراجعة لجنة الخبراء، والاختبار المسبق، وتقييم صحة المحتوى الرسمي. شاركت عينة ملائمة من 82 بالغاً ناطقاً بالعربية يعانون من زيادة الوزن أو السمنة في مرحلة التحقق. تم تقييم النسخة العربية من QOLOD من حيث صحة المحتوى، والاتساق الداخلي، وموثوقية الاختبار وإعادة الاختبار، وصلاحية البناء، وتأثيرات الأرضية/السقف لتقييم موثوقيتها وصلاحياتها بشكل عام. النتائج: أظهر QOLOD العربي صلاحية محتوى ممتازة: مؤشر التباين على مستوى العنصر  $(CVI-I) = 0.91-0.94$ ؛ مؤشر التباين على مستوى المقياس  $(S-CVI) = 0.92-0.95$ ؛ التوافق العالمي  $(S-CVI/UA) = 0.82-0.84$ . أظهرت الأداة اتساقاً داخلياً قوياً (ألفا كرونباخ =  $0.87-0.89$ ). كانت موثوقية إعادة الاختبار ممتازة ( $ICC = 0.91$ ). أكد تقييم الأثر البيئي (EFA) وجود هيكل من خمسة عوامل يتوافق مع النسخة الفرنسية الأصلية: التأثير البدني، والتأثير النفسي، والحياة الجنسية، والراحة مع الطعام، وتجربة النظام الغذائي، موضحاً 68.3% من التباين الكلي. لم تُلاحظ أي تأثيرات ذات دلالة إحصائية على الحد الأدنى أو الأقصى باستثناء مجال الحياة الجنسية (19.9%). تباينت درجات جودة الحياة المتعلقة بالصحة (HRQoL) بشكل كبير حسب مؤشر كتلة الجسم والجنس والفئة العمرية. **الخلاصة:** تُعد النسخة العربية من مقياس جودة الحياة المتعلقة بالصحة (QOLOD) أداة موثوقة وصالحة لتقييم جودة الحياة المتعلقة بالصحة (HRQoL) بين الأفراد الناطقين بالعربية المصابين بالسمنة. ويُوصى باستخدامه في البيئات السريرية والبحثية في جميع أنحاء الدول العربية.

**الكلمات المفتاحية:** صلاحية المحتوى، جودة الحياة، السمنة، التأثير الجسدي، الخصائص السيكومترية