

# Reliability and validity study of the translated Arabic version of Moorehead-Ardelt Quality of Life Questionnaire II

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## ABSTRACT

**الأهداف:** إنشاء نسخة مترجمة باللغة العربية لاستبيان جودة الحياة المنقح (MA-II)، ومن ثم تقييم موثوقيته وصلاحيته.

**المنهجية:** أجريت ترجمة لاستبيان MA-II إلى العربية بواسطة 3 مترجمين مستقلين. بعد ذلك، أعدنا ترجمة المترجمين للنص الأصلي، تم تطويرها من الترجمات الثلاث إلى اللغة الإنجليزية ومقارنتها بالاستبيان الأصلي. قمنا بعد ذلك بتقييم موثوقية وصلاحية MA-II الاستبيان العربي في 144 مريضاً يعانون من السمنة قبل وبعد إجراء عملية السمنة في مستشفى جامعة خالد، الرياض، المملكة العربية السعودية. استخدمنا كل من MA-II والمسح الصحي القصير المكون من 36 عنصراً (SF-36) إضافة إلى البيانات الديموغرافية لجمع بيانات جودة الحياة المتعلقة بالصحة (HRQL). استخدمنا طريقة الاختبار، إعادة الاختبار واختبار ألفا كرونباخ لتقييم الموثوقية والاتساق الداخلي.

**النتائج:** أظهرت موثوقية الاختبار-إعادة الاختبار معامل ارتباط داخل الصف 0.966. كان التناسق الداخلي للنسخة المترجمة مرتفعاً أيضاً ( $\alpha=0.812$ ). ظهرت علاقة مرضية بين النسخة العربية المترجمة والعناصر الثمانية في SF-36. كما وجدنا ارتباطاً سلبياً كبيراً بين MA-II ومؤشر كتلة الجسم ( $r=-0.5778$ )،  $(p<0.001)$ .

**الخلاصة:** إن قوة واستدامة النسخة العربية المترجمة من MA-II تشير إلى أن هذه الأداة الخاصة بالمرض أداة موثوقة وصالحة لقياس HRQL لدى الأشخاص المصابين بالسمنة والناطقين باللغة العربية.

**Objectives:** To generate a translated Arabic adaptation of the revised Moorehead-Ardelt Quality of Life Questionnaire II (MA-II), then to assess its reliability and validity.

**Methods:** The MA-II was translated to Arabic by 3 independent translators. Next, a concise translation, developed from the 3 translations, was re-translated to English and was compared with the original questionnaire. Both the reliability and the validity of the Arabic MA-II were assessed in 144 patients struggling with obesity before and after bariatric procedures at Khalid University Hospital, Riyadh, Saudi Arabia. Apart from the demographic data, both the MA-II and the 36-item short-form health survey (SF-36) were used to collect health-related quality of life (HRQL) data. The test-retest method and Cronbach's alpha ( $\alpha$ ) were used to assess reliability and internal consistency.

**Results:** Test-retest reliability exhibited an intraclass correlation coefficient of 0.966. The internal consistency of the translated version was also high ( $\alpha=0.812$ ). A satisfactory correlation was demonstrated between the translated Arabic version and the 8 items of the SF-36. A significant negative correlation was also observed between the MA-II and body mass index ( $r=-0.5778$ ,  $p<0.001$ ).

**Conclusion:** The robustness and sustainability of the translated Arabic version of the MA-II suggested that this disease-specific instrument is a reliable and valid tool for the measurement of HRQL in obese Arabic-speaking people.

**Keywords:** obesity, quality of life

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The prevalence of obesity in Arab countries has increased significantly. According to the World Health Organization (WHO), the highest rate of obesity has been reported in the Gulf countries, such as Kuwait, Saudi Arabia, Bahrain, and United Arab Emirates that are leading worldwide in terms of obesity.<sup>1</sup> It is interesting to note that the occurrence of obesity is especially pronounced in the female population in these countries, which could be due to traditional or cultural restrictions on the lifestyles of women in

these countries.<sup>2</sup> In the Gulf countries, eating habits and a sedentary lifestyle have been major causes of the increased prevalence of obesity.<sup>1-3</sup>

Obesity is perceived as a serious health issue and has been demonstrated to be a risk factor for multiple comorbidities.<sup>4</sup> Medical illnesses are not the only burden associated with obesity; functional capacity and quality of life (QoL) are also negatively affected by excess body weight.<sup>5</sup> Weight reduction achieved by bariatric procedures was found to improve patients' subsequent QoL.<sup>6</sup> Investigators have developed the concept of health-related quality of life (HRQL) to appraise the impact of any medical disease, including obesity, on functional capacity and well-being.<sup>7,8</sup> Multiple generic and disease-specific questionnaires have been developed to assess HRQL.<sup>6</sup> Generic instruments are not specific to a single disease; their purpose is to evaluate the effect of any medical illness on the QoL. However, generic questionnaires often lack the sensitivity to detect treatment effects.<sup>6</sup> The most commonly used generic QoL questionnaire is the 36-item short-form health survey (SF-36).<sup>9</sup> In contrast, disease-specific HRQL questionnaires were found to be sensitive in detecting minor changes that significantly affect QoL. Furthermore, disease-specific questionnaires were found to be more sensitive than generic questionnaires in detecting treatment effects.<sup>6</sup>

In the last 20 years, multiple obesity-specific HRQL questionnaires have been developed with a focus on measuring the QoL of people suffering from obesity and related problems.<sup>6</sup> An internationally recognized tool, the Bariatric Analysis and Reporting Outcome System (BAROS), was developed to assess the results of bariatric surgery. The BAROS is a questionnaire that measures broader aspects related to obesity. The BAROS scores depend on the degree of weight loss, alleviation of medical problems, complications associated with bariatric surgery, and the effect of obesity on QoL.<sup>10</sup> The Moorehead-Ardelt Quality of Life Questionnaire (MA) is one of the oldest and most common questionnaires evaluating the QoL of people struggling with obesity. The MA, which was developed in 1998 as part of BAROS (Edition 2), underwent revision in 2003, yielding the MA-II.<sup>11</sup> Although the BAROS measures multiple aspects related to obesity, it can be used only after bariatric procedures. In contrast, the MA-II can assess HRQL changes both before and after bariatric

surgery. Thus, MA-II can be used separately or as part of the BAROS.<sup>11</sup> The MA-II is a user-friendly HRQL questionnaire with a total of 6 questions, which can be completed in less than one minute. The questionnaire also uses illustrations to facilitate the understanding of each question.<sup>11</sup> Multiple studies have shown that the MA-II has high reliability and high construct validity.<sup>12-14</sup> The MA-II has been widely used in North America, it has also been translated into multiple European and Asian languages.<sup>12-17</sup> Up to our knowledge, there were no published validation studies of an Arabic translation of the MA-II. This study was carried out with the purpose of generating a translated Arabic adaptation of the revised MA-II and then evaluating the reliability and validity of the translated form.

**Methods.** This is a cross sectional study conducted between January-May 2018. Patients struggling with obesity who visited the bariatric clinic and bariatric educational classes in King Khalid University Hospital, Riyadh, Saudi Arabia, were enrolled for the validation study. The inclusion criterion called for patients who were scheduled for bariatric surgery or had undergone bariatric surgery in the past. If a patient had bariatric surgery in the past 3 months, the patient was excluded from the study, since it was believed that multiple factors other than obesity might influence QoL in the early period after surgery.

A study group consisting of 3 independent bilingual translators was designated to translate the original MA-II questionnaire into the Arabic language, after which their translated versions were validated. Out of the 3 Arabic translations, a concise form was selected based on consensus. The Arabic form was again translated back to the English language by another translator. The study group then carried out a comparison between the re-translated and original English forms of the questionnaire and reviewed their differences. Subsequently, the final Arabic form was generated after linguistic and structural review. A few words needed to be changed due to the religious and cultural background of the Arab population; the group changed the wording of question 5 from "pleasure I get from sex" to "pleasure I get from marital relations." In addition, the meaning of question 6 was lost in translation, and the study group found it necessary to add the word "excessively" to "I live to eat" and "moderately" to "I eat to live".

The Arabic version of the MA-II was similar to the original English version, retaining the same structure and number of questions. Each question was scored on a 10-point Likert scale. The score for each question ranged from -0.5 - 0.5, and the total score for all 6

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considered high. The final step was criterion validation, which examines the correlation between scores on a scale and an external non-test criterion.<sup>18</sup> In this step, the relation between the MA-II scores and the external non-test criterion of body mass index (BMI) was studied using Spearman's rank correlation coefficient. Statistical analysis was carried out using Statistical Package for the Social Sciences for Windows, version 17 (IBM Corp., Armonk, NY, USA)

**Results.** A total of 104 participants (80 pre-operative and 24 post-operative) were enrolled for the reliability and validity studies between January 2017 and May 2017. The demographics and bariatric surgery information of the participants were summarized in **Table 1**. The majority of the participants were females (52.9%) and few of them did not mention their gender (14.4%). It was observed that 70.2% of the participants had a mean BMI between 35-50, and 76.9% had not undergone any previous bariatric procedures. The majority were educated, with only 10.6% having less than a high school diploma.

All the questions were answered, except for the question on sexual pleasure, which was not answered by 38 participants. The answers and characteristics of the 40 participants included in the test-retest reliability sample were not included in the rest of the study.

The translated Arabic MA-II questionnaire was found to have a relatively high internal consistency ( $\alpha=0.812$ ).

The item-total correlation coefficient ranged from 0.39-0.697, with the question on sexual pleasure having the lowest correlation. The question on self-esteem (I usually feel) had the highest correlation, followed by work capability, physical activity, social life, and eating behavior. If any single item was deleted, the alpha coefficient ranged between 0.754-0.817, as shown in **Table 2**.

The test-retest reliability showed excellent agreement, with an overall ICC: 0.966 (95% confidence interval (CI): [0.933-0.983]). The ICC values for each question of the MA-II were as follows: general self-esteem, ICC: 0.85 (95% CI: [0.699-0.925]); physical activity, ICC: 0.882 (95% CI: [0.764-0.941]); social life, ICC: 0.907 (95% CI: [0.814-0.953]); work capability, ICC: 0.903 (95% CI: [0.806-0.952]); sexual life, ICC: 0.962 (95% CI: [0.925-0.981]); and eating behavior, ICC: 0.812 (95% CI: [0.623-0.906]).

The concurrent validity of the MA-II was examined through a correlation study with the SF-36. Upon comparison, the correlation between the total MA-II scores and the 8 domains of the SF-36 was found to

**Table 1 -** Demographics of the study population (N=104).

| Variables                                     | n (%)          |
|-----------------------------------------------|----------------|
| <i>Gender</i>                                 |                |
| Male                                          | 34 (32.7)      |
| Female                                        | 55 (52.9)      |
| Not mentioned                                 | 15(14.4)       |
| Age (years), mean±SD                          | 32.46±10.736   |
| Height (cm), mean±SD                          | 164.25±11.87   |
| Weight, mean±SD                               | 113.535±29.435 |
| <i>BMI, mean±SD</i>                           |                |
| <35                                           | 17 (16.3)      |
| 35-50                                         | 73 (70.2)      |
| >50                                           | 14 (13.5)      |
| <i>Education levels</i>                       |                |
| Elementary                                    | 5 (4.8)        |
| Intermediate                                  | 6 (5.8)        |
| High school                                   | 29 (27.9)      |
| Diploma                                       | 1 (1.0)        |
| Bachelor                                      | 55 (52.9)      |
| Master                                        | 7 (6.7)        |
| Doctorate                                     | 1 (1.0)        |
| <i>Did you have previous obesity surgery?</i> |                |
| Yes                                           | 24 (23.1)      |
| No                                            | 80 (76.9)      |

BMI: body mass index, SD: standard deviation

**Table 2 -** The item-total correlation coefficient.

| MA-II questions                                | ICC   | $\alpha$ if item deleted |
|------------------------------------------------|-------|--------------------------|
| Usually I feel                                 | 0.697 | 0.754                    |
| I enjoy physical activities                    | 0.670 | 0.759                    |
| I have satisfactory social contacts            | 0.514 | 0.796                    |
| I am able to work                              | 0.683 | 0.759                    |
| The pleasure I get out of marital relations is | 0.390 | 0.817                    |
| The way I approach food is                     | 0.495 | 0.800                    |

MA-II: Moorehead-Ardelt Quality of Life Questionnaire, ICC: item-total correlation coefficient,  $\alpha$ : Cronbach's alpha

be high with 2 domains of the SF-36 (general health and vitality) and the rest correlations were satisfactory. Correlation of SF-36 with the pre-operative and post-operative groups was found to be satisfactory except for a poor correlation with the role emotional domine in the pre-operative group and a poor correlation with physical functioning in the post-operative group (**Table 3**).

Upon assessment of the criterion validity, a statistically significant negative correlation was observed between the MA-II scores and BMI ( $r= -0.5778$ ,  $p<0.001$ ), indicating that patients with higher BMIs have lower MA-II scores.

**Discussion.** Fortunately, obesity and overweight are preventable. Thus, effective prevention strategies

can most likely reduce the associated costs and negative health effects. The development of effective behavioral interventions requires an examination of the potential determinants of obesity or weight related behaviors and a review of existing interventions targeting these weight related behaviors.<sup>1</sup> Therefore, HRQL has been widely used to describe the daily experience of people with health conditions, including obesity.

Defining and measuring the QoL of individuals or a particular population is difficult, as it is influenced by changes in the social and cultural environment, food habits, physical activity, education, and economic factors.<sup>2,18</sup> An interesting observation regarding the participant demographics was that the majority of them were women. The reason behind this observation could be the lifestyle of women in the Gulf countries. For instance, females have less access to physical activities; the availability of inexpensive labor has reduced the household burden, leading to a sedentary lifestyle; and multiple pregnancies result in weight gain.<sup>2</sup> The instrument for determining the QoL should therefore be appropriate to the culture and language of the target population. In this study, we focused on obesity-associated effects on the QoL of the Arab population. Hence, an Arabic version of the HRQL tool was the major prerequisite.

A variety of tools are available to gauge the QoL of patients struggling with obesity. One short and comprehensible tool that can be easily applied is the MA-II. In this study, the MA-II was translated from English to Arabic by 3 independent translators, and the final version was selected by consensus. Interestingly, the high reliability and validity of the English form of the MA-II was replicated to a great extent in this Arabic translation. The translated MA-II had excellent test-retest reliability with high internal consistency.

Per reports in the literature, the lowest Cronbach's  $\alpha$  coefficient for an MA-II version was that of the Korean translation ( $\alpha=0.76$ ), and the highest was that of the German translation ( $\alpha=0.88$ ).<sup>14-15</sup> In addition, the translated Arabic form of MA-II demonstrated a satisfactory construct validity and a statistically significant criterion validity. A similar result has been observed in all language versions of the MA-II, including Greek, German, Czech, Italian, Spanish, Portuguese, Korean, and Taiwanese.<sup>12-17</sup>

Taking into consideration cultural and linguistic preferences, the question about sexual satisfaction was rephrased to ask about satisfaction with "marital relations." We believed that an eastern religious society would be sensitive to questions concerning their sexual life. Thus, we attempted to rephrase the question with a more culturally acceptable term that would indirectly refer to sexual relations. A total of 38 participants did not answer the question about sexual satisfaction; most of them were unmarried females. We expected this response to be replicated in any study using this Arabic questionnaire, especially if it is used in the Gulf region. With regard to the last question about eating habits, the research team found that the question was not linguistically clear. We decided to add the terms "excessively" and "moderately" to the questionnaire to explain the intention behind the question. Despite this alteration, the participants still faced difficulty in understanding the idea behind this question. However, we were unable to comprehend why participants faced this difficulty. It might be helpful, especially if the questionnaire were distributed in therapy groups, to explain the whole idea of the questionnaire and give a brief explanation of each question before distributing the questionnaire.

**Table 3 -** Correlation of the MA-II total, pre-operative, and post-operative scores with the SF36.

| SF36                 | MA-II (total patients) | MA-II (postoperative patients) | MA-II (preoperative patients) |
|----------------------|------------------------|--------------------------------|-------------------------------|
| Vitality             | 0.65**                 | 0.33                           | 0.51                          |
| Mental health        | 0.57                   | 0.47                           | 0.49                          |
| Physical functioning | 0.56                   | 0.05*                          | 0.36                          |
| Role-physical        | 0.55                   | 0.47                           | 0.37                          |
| Role emotional       | 0.45                   | 0.39                           | 0.29*                         |
| Bodily pain          | 0.49                   | 0.36                           | 0.35                          |
| Social functioning   | 0.54                   | 0.38                           | 0.49                          |
| General health       | 0.70**                 | 0.32                           | 0.61                          |
| PCS                  | 0.66**                 | 0.38                           | 0.48                          |
| MCS                  | 0.65**                 | 0.53                           | 0.54                          |

\*Poor correlation, \*\*high correlation, MA-II: Moorehead-Ardelt Quality of Life Questionnaire II, SF36: 36-Item Short-Form Health Survey, PCS: physical component summary, MCS: mental component summary

**Study limitations.** The small number of post-operative participants included in the validation study, which could be a possible reason for the lower construct validity in this group. This warrants validation of the MA-II in a larger number of bariatric surgery recipients. Another limitation is that its sensitivity to change was not evaluated. Moreover, the consequences of specific types of bariatric procedures were not determined separately. Finally, whereas the other translated forms of the MA-II were validated by comparing their results with at least 2 existing QoL questionnaires, we have compared the Arabic translation to the SF-36 questionnaire only.

In conclusion, the MA-II effectively gauges the QoL of people struggling with obesity, as it is a short, comprehensible, and easily applicable instrument with high response rates. The robustness and sustainability of the Arabic translation of the MA-II suggest that this disease-specific instrument is a reliable and valid tool for the measurement of HRQL in Arabic-speaking people struggling with obesity. We suggest a future reliability and validity study in a larger sample of bariatric surgery recipients.

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