Validity, Reliability and Cross-Cultural Adaptation of the Myocardial Infarction Dimensional Assessment Scale for Arabic Egyptian Speaking Patients

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Abstract: *Myocardial infarction (MI) is a major cause of mortality and morbidity and significantly affects health-related quality of life. Consequently, there is growing interest in measuring health related quality of life. The aim of this study is to translate myocardial infarction dimensional assessment scale into Arabic language for Egyptian MI patients, test its validity, reliability and culturally adapt the developed Arabic version of the MIDAS to the Egyptian MI patients. Cross-sectional, methodological research design was used to achieve the aim of the study. This study was conducted at cardiac department in Ain Shams University hospital. A purposeful sample of 100 patients who had MI for the first time was included in the study. Data were collected through 3 tools: (1) Demographic data questionnaire. (2) The Myocardial Infarction Dimensional Assessment Scale. (3) Validity and cultural relevance assessment questionnaire. Content validity index of the scale was 0.92. The overall Cronbach's alpha coefficient was 0.90, ranging from 0.40 to 0.84 for seven subscales. The test- retest reliability ranging from 0.67 to 0.92 for seven subscales. The study concluded that the translated Arabic Egyptian version of the MIDAS is a valid, reliable and culturally adapted tool for measuring health-related QoL of Egyptian MI patients. It is recommended to use the MIDAS Arabic version to assess the HRQoL among patients with MI in Egypt.*
Keywords: *Cross-cultural adaptation, MI, MIDAS, Reliability, Validity.*

I. Introduction

Cardiovascular diseases (CVD) are one of the most prevalent chronic diseases all over the world accounting for high rates of mortality and disability. Unfortunately, inspite of increase in developments in prevention, diagnosis, treatment, and rehabilitation of cardiac diseases, there is still a growing trend in mortality rate resulted from these diseases [1]. CVD is an important and growing cause of mortality in Eastern Mediterranean countries and the Middle East. Over 80% of CVD deaths take place in low- and middle-income countries [2]. By 2030, nearly 23.3 million deaths each year will be due to cardiovascular diseases [2]. Coronary artery disease (CAD) is the main cause of mortality among Egyptians, being responsible for 47% of deaths per year. The age standardized mortality rates for CAD in Egypt were 560 per 100.000 populations in the year 2008 exceeding many European and African countries according to WHO statistics in 2008 [3].

A heart attack, also called a myocardial infarction (MI), occurs when a part of the heart muscle is damaged or dies because blood flow is reduced or completely blocked. The more time that passes without treatment to restore blood flow, the greater the damage to the heart muscle. Every 43 seconds**,** someone in the United States has a heart attack. Every year, about 735,000 Americans have a heart attack. Of these cases 525,000 are a first heart attack, and 210,000 happen to people who have already had a first heart attack [4]. After MI, patients are very vulnerable physically, socially, mentally and emotionally. Patients with MI are suffering from chest pain or discomfort, shortness of breath, indigestion, nausea, fatigue, anxiety and depression. It was determined that Health-Related Quality of Life (HRQoL) among those patients was disordered and lower due to the presence of previous symptoms. Moreover, the economic burden of continued treatment and re-hospitalization, absence from work, and loss of their role in the family also decreases the HRQoL of patients with MI [5, 6].

In general, the quality of life is everything that makes life worth living. Quantitatively, the quality of life is the duration of the remaining life without disability and incapability [7]. In a clinical setting, assessment of patient-reported outcomes focuses on HRQoL, i.e., how patient's physical, emotional and social well-being is affected by a disease or its treatment [8].Quality of Life (QoL) assessment is considered an important source of information on how disease truly affects patient's lives. It identifies how patients face and cope with their situation, not only focus on the physical component. Its assessment provides data that support the choice of a therapeutic regimen and the assessment of the effectiveness of a treatment. Therefore, it is an important source of information, in addition to diagnostic and laboratory tests [9].

A variety of instruments exist to measure health-related quality of life such as the Short Form-36 (SF-36) health survey questionnaire, that measure the general health status and can be used to assess functioning and well-being in any patient group. In contrast to such generic instruments, disease specific instruments, which measure the multiple aspects of quality of life, comprise content specific to the disease in question, making them clinically more sensitive and potentially more responsive in detecting change following clinical intervention. An example of such an instrument is the Myocardial Infarction Dimensional Assessment Scale (MIDAS) [10]. The Myocardial Infarction Dimensional Assessment Scale is considered an easy, simple instrument, and can be obtained by either self- administered or through patient's interview. It facilitates the communication between the patient and the health care providers by obtaining valid and reliable information. It is also sensitive to change in health status overtime because it can measure the outcome of any intervention, either educational, behavioral, pharmacological or surgical (Cooper et al, 2007) in [11].

The MIDAS instrument was developed a few years ago by a group from the UK to be specific for patients with MI [12]. It is commonly used nowadays. This tool comprises a 35-item covering seven dimensions related to health status (physical activity, insecurity, emotional reaction, dependency, diet, concerns over medications and side effects). The MIDAS showed excellent content validity, good criterion validity and sensitivity to change. Compared with other already validated questionnaires such as the SF-36, this tool showed a good correlation in most of the variables [13]. The MIDAS has good reliability, with Cronbach's a ranging from 0.74 to 0.95 for the seven domains [10]. It is clear that one cannot directly transpose a scale for the second environment because of linguistic and cultural differences. The results based on such instrument may therefore not accurately reflect what they are supposed to measure, because cultural groups vary in disease expression and in their use of various health care systems [14].

1.1 Significance of the study:

The myocardial infarction patient may experience functional limitations, emotional problems and social difficulties, even to the extent of considering life less satisfactory. Nowadays the health care management of those patients has been changed from just saving lives of patients and alleviating symptoms to improving quality of life. The MIDAS instrument used to assess quality of life of those patients was translated to languages other than English such as Turkish, Faris and Chinese. As evident in the site of Oxford University innovation, the Arabic version of the myocardial infarction dimensional assessment scale is not yet available. Keeping in mind the need to have a valid, reliable and culturally relevant tool for assessing the HRQoL of Egyptian MI patients in our country, and the fact that, without linguistic validation, clinical research are in danger of being rejected due to patient misunderstanding of poorly translated clinical instruments [15], so, this study was designed to develop an Arabic version of the myocardial infarction dimensional assessment scale to assess the QoL of Egyptian MI patients.

1.2 Aim of the study:

This study aims to develop an equivalent Arabic version of the Myocardial Infarction Dimensional Assessment Scale (MIDAS) through the following:
1. Translating the English version of the Myocardial Infarction Dimensional Assessment Scale (MIDAS) into Arabic Language.
2. Test the validity and reliability of the translated Arabic version of the Myocardial Infarction Dimensional Assessment Scale (MIDAS).
3. Culturally adapt the developed Arabic version of the MIDAS to the Egyptian MI patients.

1.3 Research questions:

This study aimed to answer the following questions:
1. Is the Arabic translated MIDAS a valid tool for measuring health related QoL of Egyptian MI patients?
2. Is the Arabic translated MIDAS a reliable tool for measuring health related QoL of Egyptian MI patients?
3. Is the Arabic translated MIDAS a culturally relevant scale for measuring quality of life of Egyptian MI patients?

II. Methods

2.1 Research design:

Cross-sectional, methodological research design was used to achieve the aim of the present study.

2.2 Setting:

This study was conducted at the cardiac department in Ain Shams University hospital affiliated to Ain Shams University, Cairo, Egypt.

2.3 Subjects:

A purposeful sample of 100 patients (87 males and 22 females) who had myocardial infarction for the first time was recruited from the previous mentioned setting.

Inclusion criteria included the following: adult, Egyptian patients, older than 18 years, Arabic speakers, diagnosed with myocardial infarction (MI) for the first time, had the ability to read and write, not suffering from any psychiatric disorders or cognitive impairment and agree to participate in the study.

2.4 Tools for data collection:
2.4.1 Demographic data questionnaire:
      This questionnaire was developed by the researchers to collect data about demographic characteristics of the study's subjects including; age, gender, marital status, residence, employment status, educational level and history of heart disease in the family.
2.4.2 The Myocardial Infarction Dimensional Assessment Scale (MIDAS):
      This scale is a patient-reported tool. It was developed by Thompson, et al, (2002) [16] for assessing health-related quality of life (HRQoL) of patients with myocardial infarction. It measures patients' perceptions of the effect of myocardial infarction on their lives.The MIDAS is a 35-items that covering seven domains: physical activity (12 questions), insecurity (9 questions), emotional reaction (4 questions), dependency (3 questions), diet (3 questions), concerns over medication (2 questions), and side effects resulting from medications that have prevented patients from living as they would have wanted to in the past week (2 questions). The questions are rated on a five-point Likert scale ranging from 0 to 4 or from never to always, where zero represents "no limitation" and 5 represent "maximum limitation". The total scores range from 0 to 140, and a higher score indicates a poor HRQoL or the higher effect of the disease and worse health conditions.

2.4.3 Validity and Cultural Relevance Assessment Questionnaire:
      This questionnaire was developed by the researchers in English language and filled by the experts to test the face and content validity and comment on cultural relevance for the Arabic translated tool through questions like; Is the questionnaire looks a suitable tool for measuring HRQoL of MI patients from its face? Is the questionnaire measuring what it intended to measure? Does it represent the content? Is it appropriate for the MI Egyptian patients? Is the questionnaire comprehensive enough to collect all the information related to HRQoL? Is this questionnaire culturally relevant to the Egyptian patients?
The content validity index (CVI) was used to assess the extent of agreement between the experts regarding the appropriateness of every item of the Arabic translated scale using a 4-point rating scale to avoid having neutral choices (1 = not agree, 2 = somewhat agree, 3 = quite agree, 4 = strongly agree).
The CVI is the percentage calculated based on the total items rated by the experts as either 3 or 4. A CVI score of 80% or higher is generally considered to have good content validity [17].

2.5 Ethical considerations:
      Permission to translate and use the MIDAS was granted by the copyright holders. Ethical approval was obtained from the Research Ethics Committee at the Faculty of Nursing of Ain Shams University to conduct the study. Permissions for data collection from patients were obtained from the medical directors of each of the previously mentioned settings. The aim of this study was explained for MI patients before their approval to participate in the study. They also told that, they have the right to withdraw from the study at any time without any penalty. Participants' confidentiality and anonymity were guaranteed and respected throughout the study.

2.6 Procedure:
      Permission to translate the MIDAS into an Arabic language and its use was obtained from Oxford University innovation previously known as Isis innovation (copyright holders) which is a wholly-owned subsidiary of the University of Oxford that manages the University's technology transfer and consulting activities and provides an innovation management service to clients around the world.

Translation: The translation processes was done based on the steps proposed by Oxford outcomes guidelines to be listed as official Arabic translation. The translation process of MIDAS was conducted as follow:
1. *Forward translation*: The MIDAS was translated from the original English language into the Arabic language by two certified Arabic translators, who worked independently; their mother tongue is Arabic, proficient in English and specialized in medical translations. They are informed about the purpose of the translation process.
2. *Forward translation reconciliation:* The researchers reviewed both two forward translations then choose the most accurate terms from both translations that culturally relevant and meaningful for use with Egyptian patients. Finally, a reconciled first Arabic version of the scale was produced.
3. *Back translation:* The reconciled Arabic version is back translated into English language by another two translators who worked independently, and did not see the original English tool to avoid bias and to elicit unexpected meanings from the original tool.

4. Back translation review: The researchers then reviewed the two back translations against the original version of MIDAS to highlight any discrepancies in meaning or terminology used. Accordingly, resolution was performed until the best possible translation solution is attained. Then the final Arabic version of the questionnaire was formatted.

Validity and cross-cultural adaptation:
The cultural relevance, face and content validity of the Egyptian Arabic version of the MIDAS was evaluated by panels of nine experts (one psychiatrist, five professors of medical surgical nursing, two cardiologists, and one nurse, all are specialized in cardiology).
They were recruited to comment on face and content validity and compare between the original English version and the translated Arabic version to elicit any discrepancies between them with respect to conceptual and cultural equivalence using the validity and cultural relevance assessment questionnaire. Items with scores less than 3 or 4 were reevaluated and the necessary changes were made.

Pilot testing: a pilot study was conducted through face-to-face interview with 10 randomly selected patients who meet the same inclusion criteria and who are diagnosed with MI in the previous mentioned setting. During the pilot study the researchers took the following actions:

- Informed the patients to complete the questionnaire and ask about any words or sentence that are not clear or difficult to understand in order to detect any confusion or misleading of items.
- Explained any word that may be difficult to understand.
- Asked the patient to suggest any alternative words or phrase for any items that are difficult to comprehend.
- Recorded the time taken to complete the questionnaire which was approximately from 10-15 minutes.

Pilot testing review: the researchers reviewed the comments from the pilot and the required changes in the questionnaire were done.
Proofreading: final adjustments of the translated Arabic version were done based on the judgment of both researchers after the pilot study.
Testing reliability: Reliability of the translated tool was tested through test-retest reliability, the final Arabic version of the MIDAS questionnaire was administered on the study subjects after they left the coronary care unit then after 48 hrs to avoid any change in patients' condition as a result of any interventions that my affect the patients' responses.
The internal consistency reliability was tested by calculating Cronbach's alpha which assesses the extent to which item is related to the remainder of the scale.

Data analysis:
Data of this study were analyzed using the statistical package for social science (SPSS) version 18. Data are presented as mean and standard deviation (SD). Qualitative data were presented as percentage. Internal consistency of each scale of the MIDAS was determined using Cronbach's alpha. Test–retest reliability was calculated by computing the intraclass correlation coefficient (ICC) of each domain (It describes how strongly units in the same group resemble each other). A value of 0.7 or above was considered acceptable for both the Cronbach's alpha and the intraclass [18].

III. Results
The demographic data and clinical characteristics of the studied subjects were shown in table 1. The current study included 100 patients with MI, 88% of them are males and 22% are females. The mean ages for patients were 53.96 ranged from 22 to 76 years. Most of patients (89%) were married and 68% are university graduated. Regarding residence, 62% of the studied patients were living in urban areas, and 44% of the studied patients had family history of cardiac disease.

Table 1: Demographic and clinical characteristics of the studied patients (n=100)

Patients' characteristics	F	%
Gender		
▪ Male	88	88
▪ Female	22	22
Age: Mean 53.96		
Range: 22 - 76 yrs		
Marital status:		
▪ Single	4	4
▪ Married	89	89
▪ Widow	7	7
Educational level:		
▪ Read and write	4	4

▪ Secondary school	28	28
▪ University	68	68
Residence:		
▪ Rural	38	38
▪ Urban	62	62
Employment:		
▪ Employed	58	58
▪ Unemployed	2	2
▪ Housewife	10	10
▪ Retired	30	30
Family history of cardiac disease:		
▪ Yes	44	44
▪ No	56	56

Reliability of MIDAS was calculated with Cronbach's alpha internal consistency, and test–retest. Cronbach's alpha for the total scale was measured as 0.90, indicating acceptable internal consistency. Regarding the subscales, Table 2 reveals that, they were; 0.84 for the physical activity domain, 0.74 for the insecurity domain, 0.69 for the emotional reaction domain, 0.52 for the dependency domain, 0.77 for the diet domain, 0.71 for concerns over medications domain, and 0.40 for the side effects from medications domain. Table 3 presents the intraclass correlation coefficients, as well as the means and standard deviations of the test and re-tests scores. Strong test-retest reliability was found for the seven domains of the MIDAS with the ICC coefficient for subscales ranging between 0.679 and 0.929.

Table 2: Cronbach's alpha reliability of MIDAS

Subscales	Cronbach's alpha
- Physical activity	0.84
- Insecurity	0.74
- Emotional reaction	0.69
- Dependency	0.52
- Diet	0.77
- Concerns over medications	0.71
- Side effects	0.40
Total	0.90

Table 3: Test-retest reliability of MIDAS

MIDAS Subscales	First test score Mean ±SD	Re-test score Mean ±SD	Intraclass coefficient (ICC)
▪ Physical activity	37.78±8.2	37.78±7.8	0.825
▪ Insecurity	26.92±5.9	27.60±5.5	0.929
▪ Emotional reaction	13.52±2.9	13.04±3.0	0.828
▪ Dependency	9.08±2.2	9.56±1.8	0.756
▪ Diet	8.76±3.2	9.25+3.50	0.877
▪ Concerns over medications	5.92±1.8	6.16±1.6	0.735
▪ Side effects from medications	5.94±1.5	5.76±1.6	0.679

Table 4. Experts ratings regarding content of MIDAS by nine experts

Experts Sub-scales	1	2	3	4	5	6	7	8	9	No. of agreement	Item CVI (I-CVI)
1	√	√	√	√	√	√	√	√	√	9	1.0
2	√	√	√	√	x	x	√	√	√	7	0.77
3	√	√	√	√	√	√	√	√	√	9	1.0
4	√	√	√	√	√	√	√	√	√	9	1.0
5	x	√	√	√	√	√	√	√	√	8	0.88
6	√	√	√	√	√	√	√	√	√	9	1.0
7	√	x	√	√	√	√	√	√	x	7	0.77
Proportion of agreement	0.86	0.86	1.0	1.0	0.86	0.86	1.0	1.0	0.86	Scale CVI= 0.92	Mean I-CVI = 0.92

Table 4 shows that the Content Validity Index (CVI) rated by the experts was found to be 0. 92.

IV. Discussion
It is well known that MI has negative effects on patient's physical, emotional, and psychosocial functioning that impair their health related quality of life. For this reason, it is important to assess the quality of life from the perspectives of patients using patient reported outcome instruments that are disease-specific in order to assess the treatment outcomes and the effect of nursing intervention on patients' HRQoL. Most of the existing instruments are available in different language. So the aim of this study was to translate the Myocardial

Infarction Dimensional Assessment Scale (MIDAS) into Arabic Language for Egyptian patients, test its validity, reliability and culturally adapt the developed Arabic version of the MIDAS to the Egyptian MI patients. Demographic factors can have significant effect on the subjective well-being and quality of life of adult patients with CVD [19], and should be considered for future comparisons between HRQL assessment instruments. The current study revealed that most of patients with MI under study were males and about one fifth was females. The mean ages for patients were 53.96 ranged from 22 to 76 years. Most of patients were married and more than two thirds of them were university graduated. Regarding residence, about two thirds of the studied patients were living in urban areas, and more than two fifths of the studied patients had family history of cardiac disease.

These results are in agreement with Rejeh et al, (2015) [20] who stated that half (51.7%) of patients were men and most (84.5%) of them were married, but in contrast with the mean age of the study done by Rejeh et al. (2015) [20], in which participants' age was 69.4 years. The results also supported with Wang, Lopez and Thompson (2006) [21] who mentioned that, more than three quarters of patients under study (77%) were males and two fifths (23%) were females. While the mean age was 60 years (range, 36–82) which is contradicted with the current study.

According to some authors, the values of Cronbach's alpha 0.90 should be considered as optimal, ≥ 0.80 as good, ≥ 0.70 as acceptable, ≥ 0.60 as questionable, ≥ 0.50 as poor, and < 0.50 as unacceptable [22]. The results of the present study were interpreted according to these previous values. The overall Cronbach's alpha for the Arabic MIDAS was found to be 0.90; this finding demonstrates that the scale was very reliable and has high internal consistency. This result is similar to great extent to those reported in a Chinese-Mandarin study by Wang, et al. (2006) (Cronbach's alpha was 0.93) [21], Turkish study by Uysal and Özcan (2011) (Cronbach's alpha was 0.89) [23], and Farsi study by Rejeh et al. (2015) (Cronbach's alpha was 0.94) [20]. Similarities in the results of reliability between the Arabic, Turkish, and Chinese-Mandarin versions show the strong association between the individual items of the same scale in different settings. Also, it can be assumed that the similar methodological approach adopted for the translation, validation, and cultural adaptation attribute to the similarities in the findings. The same result of Cronbach's alpha was inconsistent with the result of another Turkish study by Uysal, Özcan, ands Enç, (2009) [24] where Cronbach's alpha was 0.83.

Regarding reliability of Arabic MIDAS subscales, the present study shows that, cronbach's alpha coefficients ranged from 0. 0.40 to 0.84 for the seven domains of MIDAS. The study findings are contradicted with the value in the original English instrument (0.74-0.94) by Thompson, et al. (2002) [16] and the values documented in translation and validation studies into other languages of different cultures including Chinese-Mandrian which was conducted by Wang, et al, (2006) on 180 patients as it was 0.71-0.93 [21] and Turkish language conducted by Uysal and Ozcan (2011) on 230 patients and the result was 0.65-0.88 [23]. The study result also is contradicting to another translation and validation study into Farsi language by Rejeh, et al. (2015) on 350 patients which ranged from 0.82 to 0.96 [20]. However, it was nearly similar to other Turkish study by Uysal, et al. (2009) on 81 patients which was 0.38 - 0.78 [24].

All subscales of the Cronbach alpha value were considered to be reliable, except for the dependency subscale in which Cronbach's alpha 0.52 and side effects subscale in which alpha was 0.40. These findings are consistent with results of Uysal, et al. (2009) who reported that the values of the dependency subscale was found to be borderline with a value of 0.38 and side effects of drugs 0.64 [24]. This may be attributed to the small sample size of this study in comparison with other studies that may have affected the results. Nevertheless, those subscales were included in the scale, as the results of the current study showed that the internal consistency of the total scale was satisfactory.

By performing test-retest reliability to measure stability over time after 48 hours, it was found that, the ICC for the Arabic version ranged between 0.67 and 0.92. ICC results were interpreted as follows: 0.0–0.2 is low, 0.21–0.40 is fair, 0.41–0.60 is moderate, 0.61–0.80 is substantial, and 0.81–1 is almost perfect [25] which indicate that, the Arabic MIDAS is reliable in all subscales and has homogeneity. This result is in accordance with that of a Farsi study which revealed that, the ICC ranged from 0.81 to 0.97 [20], Chinese-Mandarin study in which it was ranged from 0.74 to 0.94 [21].However the same result is contrasted with the result of the original English scale by Thompson, et al. (2002) (0.34-0.84) [16], and two Turkish study done by Uysal, et al. (2009) [24] and Uysal and Ozcan (2011) [23] in which ICC ranged between 0.27-0.74 and 0.41-0.86 respectively.

The expert panel reported that the Arabic version of MIDAS was culturally relevant for Egyptians MI patients with modifications suggested for items 17, 18, 19, 31, 34 in order to be more suitable and understood by Egyptian patients. The item number 17, "felt vulnerable?" was changed to "felt vulnerable for another attack?" The item number 18, "felt insecure?" was changed to "felt insecure when you are alone?". The item number 19, felt your confidence has been affected? was changed to "felt your self-confidence has been affected?". The item number 31, "Worried about your weight? was changed to "worried about loss/increase your weight?". The item number 34, "felt the cold more?" was changed to "felt the cold more after taking medication?". It was changed because it was understudied as feel cold from weather and not specifically from medication as it mean in the

original version of the questionnaire. In the study done by Rejeh, et al. (2015) [20] and Wang et al. (2006) [21], it was reported that, the same changes in the item number 34 had been done for easy understanding by patients in their studies.The Arabic version of the MIDAS was well accepted by the patients. It was easy and took only 10 to 15 minutes to complete. The questions appeared to be relevant, reasonable, unambiguous, clear, simple and easy. Therefore, face validity was considered to be very good.The content validity index was 0.92, indicating good content validity. These results are nearly similar to that in Wang et al. (2006) who stated that the CVI was 0.89 [21]. Additionally, Rejeh et al. (2015) [20] and Uysal and Ozcan (2011) [23] stated that CVI value was 0.95 for the Farsi and Turkish MIDAS versions. These results indicate that there was an agreement among experts regarding items of the MIDAS scale in different culture and setting. This ensures that the MIDAS scale is suitable to be used for evaluation of HRQoL for patients with MI because the content of the scale reflect the idea concerned.

V. Conclusion
The translated Arabic Egyptian version of the MIDAS is a valid, reliable and culturally adapted tool for measuring HRQoL of Egyptian MI patients.

VI. Recommendations
It is recommended to use the MIDAS Arabic version to assess the HRQoL among patients with MI in Egypt. Because of its simplicity and ease of application, it will be useful to use it in routine practice and clinical research to measure health outcomes for patients with MI in order to evaluate the effect of medical and nursing interventions. Further, its cross-cultural characteristics make it very useful for comparisons among countries. Similar researches are needed to evaluate the psychometric properties of the Arabic MIDAS version in different settings, and further assessment of the Arabic MIDAS emotional reaction, dependency, concerns over medications, and side effects subscales are needed.

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