




Cross-Cultural Adaptation and Psychometric Validation of the Moroccan Dialect Version of the Zarit Scale of Dementia Caregivers' Burden

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ABSTRACT

Introduction: The management of chronic diseases in general and neurological diseases in particular, given their complex nature, requires an increasing involvement of families. For this reason, several studies have attempted to describe the burden and needs of family dementia caregivers of patients with dementia around the world based on the ZaritAA scale. Because of its relevance, it has been translated and validated in many contexts around the world. However, there does not seem to be a valid Moroccan Arabic dialect version suitable for research in the Moroccan socio-cultural environment according to the scientific literature.

Objective: Adapt and validate a Moroccan dialect version of Zarit (Zarit-MOR).

Method: The Arabic translation of the Zarit scale was obtained. The prefianl version was then revised by a committee of experts, then tested out on a group of 34 participants, befor arriving at the final version. The Reliability was assessed using the intraclass correlation coefficient (ICC). Internal consistency was assessed using Cronbach's alpha.

Results: The adapted version of the Zarit scale was 100% acceptable. The statistical analysis of Cronbach's alpha coefficients shows a high internal correlation of the scale (0.88) among the caregivers, of whom 66.7% were female with a mean age of 47.17 years (SD±14.2 years). The Moroccan version shows a very good reliability with an intra-class correlation coefficient ICC of 0.87 [0.79-0.92].

Conclusion: The adapted version can be used reliably in Morocco, which will make it possible to assess the experiences of Moroccan informal caregivers in the face of dementia, as well as other chronic diseases.

Keywords: dementia, caregivers, Zarit scale, adaptation, Arabic dialect, Zarit-MOR

INTRODUCTION

Chronic diseases, including neurodegenerative diseases, are becoming increasingly common as the general population ages. In Morocco, according to the last census of the population in 2014, people aged over 60 represent 9.4% of the total population. However, given the rapidity of the demographic ageing process, this proportion should continue increasing to reach 11.7% by 2021 and 23.2% by 2025, according to the Moroccan High Commission for Planning (HCP) [1].

This demographic change could increase the prevalence of dementia and Alzheimer's among Morocco's ageing population, especially given the absence of official data in the country. Moreover, the World Health Organization (WHO) [2] estimates that a new case of dementia is diagnosed every four seconds worldwide, and the global prevalence will be 139

million by 2050. This will result in major obstacles for the health system, as well as for primary family caregivers.

In this respect, dementia is a disease that no longer affects the sick person alone, but has consequences for the family as a whole. As soon as the diagnosis is confirmed, the problem of care is raised and can be handled either through hospitalization or, in most cases, at home. In the latter case, family members are faced with the responsibility of becoming caregivers, and are forced to assist, support and help a relative suffering from disability or dependency [3].

Most caregivers play this complex role with little training and inadequate household resources on the one hand [4]. On the other hand, physical, psychological and economic pressures can weigh heavily on families and patients, necessitating the support of health, social, financial and legal systems.

For this reason, the study of caregiver experiences remains important to enable the development of action plans in favor of this category of people. This is in line with the objective set

Table 1. Interpretation of the Zarit [7] scale

Score	≤20	21-40	41-60	>60
Interpretation	Low or no load	Light load	Moderate load	Severe load

Table 2. Translation teams

Team 1: T1	Team 2: T2
- Neuroscience professor; High Institute of Nursing Professions and Technical Health, Marrakech, Morocco - A caregiver from the city of Marrakech with a good command of the French language	- Instructor and doctoral student in neuroscience, epidemiologist, and head of the epidemiology unit of the regional health department of Marrakech - High-school French teacher

by the WHO [5] in the Global Public Health Action Plan on Dementia 2017-2025 (supporting caregivers).

No studies investigating the burden experienced by primary caregivers with their relatives have been conducted in Morocco. It is for this reason that this study proposes to translate the Zarit scale in Moroccan Arabic dialect (Zarit-MOR) and evaluate its psychometric characteristics in the Moroccan population according to the methodology of adaptation and cross-cultural validation of a measurement tool, while respecting the latest recommendations in [6]. This adaptation process will allow and encourage researchers to study the burden experienced by Moroccan caregivers.

MATERIALS AND METHODS

Definition of the Zarit Score

The Zarit score is a score that consists of 22 items [7]. It was developed and validated by Zarit Burden in 1980 in English. This score essentially aims to measure the physical and psychological burden experienced by families caring for a relative with a chronic disease such as Alzheimer's, Parkinson's, multiple sclerosis, or diabetes. Other versions translated into other languages were created later on. The questionnaire's goal is to rank each item from 0 to 4 according to its importance; 0=never, 1=rarely, 2=sometimes, 3=quite often, and 4=almost always. The sum of the scores obtained for each of the 22 items will vary from 0 to 88 (**Table 1**).

Location and Target Population

This study included 34 primary caregivers from the city of Marrakech, which is the third most populous city in Morocco with over 13% of the population [8] of the country.

Procedure

We follow a rigorous scientific process [6].

Direct translation

Recruitment of expert translators and clinicians in the field: The choice of translators was based on their profiles and professional experience. All translators are fluent in French and Moroccan Arabic dialect. The original version of Zarit scale was translated by two Moroccan; one of whom is a health professional (**Table 2**). This allowed the detection of errors and divergent interpretations of certain ambiguous items in the original version during the initial translations. We recruited two teams in total.

Analysis of the adaptation of the score components to the Moroccan culture: A preliminary reading was carried out by the translators to understand the scale and grasp the meaning of each item. The committee unanimously agreed to

replace the word "parent" by "patient" to make it suitable for our study context.

Preparation of initial translated draft versions: Each translator prepared an Arabic dialect version deriving from the original French version that consists in 22 items. This step resulted in two versions, T1 and T2.

Synthesis and preliminary experimental version

A remote meeting with the five translators made it possible to agree on a single validated initial version (T12) after a thorough elimination of the discrepancies between the different translations.

Back-translation

Based on the translated version (T12), two other translators were chosen to elaborate two new versions BT1 and BT2 (using back-translation) without having an idea of the content of the original French version and the properties sought of this study. From these two versions, and after a synthesis meeting, a common back translation version (BT12) was obtained. This version and the original version of the test were superimposable. Some minor differences were noted between the two, but these differences did not affect the meaning of the items because the terms used were synonymous.

Synthesis and validation of the draft version by a committee composed of two original translators and the back translator

The overall synthesis during which the translated version and the back-translation were compared shows an optimal consistency, which proves the high validity of the Arabic dialect version of the scale.

Validation: Evaluation of the Psychometric Properties of the Zarit-MOR Version

- Acceptability: The acceptability of the adapted Zarit score by caregivers of patients with dementia was tested by analyzing the percentage of refusals, missing data, complete tests, items that are difficult to understand, and willingness to take the test for the second time. It was measured at the first test run of the questionnaire.
- Reliability (psychometric tests)
 - **Internal consistency:** Using SPSS 22 software, and after coding the responses of the 34 questionnaires, we measured Cronbach's alpha coefficients.
 - **Reproducibility:** The ICC intra-class correlation coefficient for this score is 0.87 with confidence interval 95%.
- Internal construct validity (or factorial validity)

Table 3. Cronbach's alpha α test for internal validity of the scale

Mean	Variance	Standard deviation	Number of items	Cronbach's alpha
52.47	268.878	16.398	22	.887

Table 4. Intra-class correlation coefficient

	Interclass correlation	Confidence interval 95%		F-test with actual value 0			
		Lower terminal	Upper terminal	Value	ddl1	ddl2	Sig.
Single measures	.235	.150	.373	8.875	29	609	.000
Medium measures	.871	.795	.929	8.875	29	609	.000

Testing Using the Correlation Matrix and Principal Component Analysis

It was tested using the correlation matrix and principal component analysis. The former (the correlation matrix) represents the correlation between the different domains of the test, so that domains measuring equivalent or similar dimensions produce strong correlations.

A value >0.60 is indicative of a high correlation, while a low correlation is represented by values <0.30 . Values between 0.30 and 0.60 indicate a moderate correlation. The aim of principal component analysis is to reduce the set of items while preserving as much of the information they contain as possible.

The reduction is done in a limited number of dimensions called principal components. In statistics, the strength of the different components is evaluated by the percentage of variance they represent.

Ethics

The present study aims to translate the Zarit scale from French into Moroccan Arabic dialect after securing the consent of the French team of Piette [9] that published the French version of the scale in the journal of kinesitherapy N° 158 in 2015.

In addition, the present study obtained the agreement of the Bioethics Advisory Commission of the Faculty of Sciences of Agadir (No: FCR-CS-09/2021-0001).

The 34 volunteer caregivers were chosen after carefully explaining to them the process and the interest of the study.

RESULTS

Characteristics of the Population

The results show that the average age of the caregivers is 47.13 years (standard deviation is 14.2 years) with a M/F ratio of two. Also, we noted that 47.06% of the caregivers have a professional activity and almost 41.18% are unemployed. Regarding the level of education of the caregivers, the data shows that primary education is the most common among them with 35.30% of the total sample, followed by illiterate caregivers with a percentage of 23.53%, secondary education with 23.50% and higher education with 17.67% of cases. As for marital status, 63.3% are married against 23.3% who are single, 10% who are divorced and 3.3% who are widowed. All the caregivers are people close to the patient, especially spouses, who account for 58.82%, 34% are their children and 8% are their brothers or sisters. In addition, one third of the caregivers stated that they had children themselves.

Initial Dialectal Version

The synthesis of the two translations T1 and T2 was conducted by the two teams and resulted in a general consensus on the content of the translated versions. Some concepts were discussed before all the translators agreed on a common version, such as the concept "innervated" in item N°5 as well as the concept "tense" in item N°9, and the concept in item N° 17 "lost". In sum, the development of this version was done through reaching unanimity.

The analysis of the French version after back-translation shows a great conformity with the initial version. This proves the rigor and the solid approach to translation adopted by the researchers. This is why our team has adopted the preliminary dialectal version.

Final Version and Tests

Final version of the tests is psychometric properties of the Moroccan version.

Acceptability

The response rate was 100% of the participants.

Reliability

Internal consistency

Cronbach's alpha coefficients aim to measure the internal consistency of the scale, based on the average correlations between the variables (or items) contained in the scale.

Table 3 shows that the mean burden score is 52.47, which reflects a moderate to severe burden among caregivers. Cronbach's alpha coefficient is equal to 0.887 (greater than 0.6), which confirms a good internal reliability of the translated scale.

Reproducibility or test-retest

Table 4 shows an average ICC with excellent repeatability of 0.871.

Internal construct validity

The main objective of this step is to group the 22 items into each of the seven resulting principal components of the PCA. According to **Table 5**, which represents the components' matrix after rotation, each item shows a different affinity to one of the seven components. Thus, we obtain the following grouping of items:

Component 1: Psychological and emotional (items 9, 10, 14, 18, & 21).

Component 2: Time management (items 1, 2, 3, & 8).

Component 3: Social and personal life (items 11 & 12).

Component 4: Behavioral (items 4, 6, 16, & 17).

Table 5. The component matrix after rotation

Items	Component						
	1	2	3	4	5	6	7
9	.751						
10	.688						
21	.680						
18	.493						
14	.437						
3		.809					
1		.779					
2		.568					
8		.547					
11			.924				
12			.905				
16				.833			
4				.650			
6				.638			
17				.528			
20					.893		
7					.535		
13					.480		
5					.429		
15						.895	
22						.516	
19							.903

Component 5: Communicative (items 5, 7, 13, & 20).

Component 6: Financial (items 15 & 22).

Component 7: Perception of overall burden (item 19).

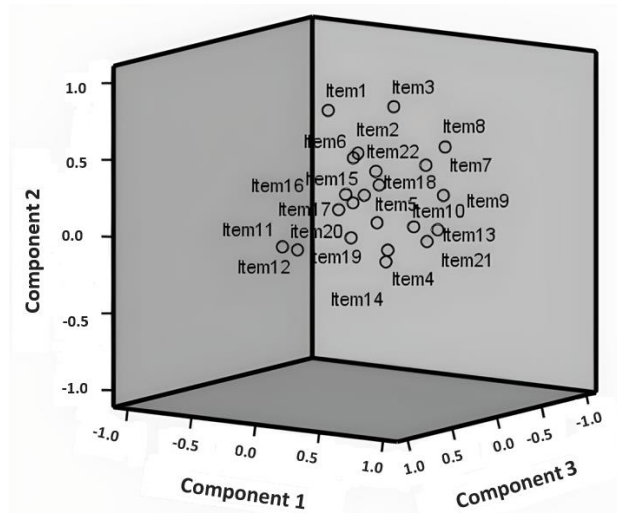
These results are similar to those of the component diagram in space after rotation (**Figure 1**). **Figure 1** shows the seven components of the Zarit-MOR scale after rotation.

DISCUSSION

To our knowledge, the present study is the first in Morocco that attempts to validate a Moroccan dialect version of the Zarit score, which will allow for an objective assessment of the burden of caregivers of dementia and of other chronic diseases as well. This burden appears to be relatively high according to the Zarit-MOR score obtained through our data collection. In addition, statistical tests show high internal reliability with high Cronbach's alpha (0.887) and intra-class correlation (0.871) values. Thus, a good validity after factor analysis.

Other studies have validated Arabic versions of informal caregivers of other chronic diseases in other contexts. According to [10], an Arabic version aimed for caregivers of patients in the oncology department, reliability results show an alpha coefficient of 0.77 in a sample of 96 caregivers with an average age of 38 years [10]. The alpha coefficient of this study was low because the investigation was conducted in a single medical center in a single geographical area and with caregivers of patients with a different disease. Similarly, in [11], a Bengali version realized with 100 caregivers of patients with dementia. This study found an alpha and ICC coefficient of 0.8 respectively. This difference may be due to the relatively larger sample size compared to our study.

The Zarit-MOR factor analysis extracted seven principal components with an eigenvalue ≥ 1 , which explain 77.838% of the total variance. These results are close to the Bengali version of Zarit scale indicating that six components with an eigenvalue ≥ 1 represent 69% of the total variance [11].

**Figure 1.** Component diagram in space after rotation

However, the Turkish study [12] reported the existence of a single factor explaining 55.05% of the variance. This discrepancy may be due to the reduction of the Zarit-TR score items to 18 instead of 22.

The results of this study show the predominance of the female gender voluntarily engaging in human care activities. This is consistent with the results of other studies [7].

As for the other results, we note that the relatively young age of the caregivers, the presence of children to be cared for as well as a professional activity outside the home could have a negative impact on the quality of care provided to patients and also on the health status of the caregivers. Similarly, low levels of education could make it difficult for caregivers to understand how to care for their relatives properly. We have done innovative work that has never been performed before in Morocco and we have demonstrated in this study the strong psychometric properties of the Moroccan version of the Zarit. With to this study, we are able to add Morocco to the list of countries where the cross-cultural adaptation and validation of the Zarit has been conducted.

CONCLUSION

Our study contributes to the improvement of the assessment of the burden of informal caregivers of Moroccan dementia patients, while allowing the care team that will limit the development of this burden that will certainly affect the quality of life of these patients. The present study, despite the small number of participants, showed a strong internal consistency of the Zarit-MOR scale. However, a study with a larger sample size would allow a better depiction of caregivers' burden in the Marrakech region and in Morocco. However, this study has some limitations such as the small sample size.

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Declaration of interest: No conflict of interest is declared by authors.

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