

## Validation of a Self-Management Instrument for Family Caregivers

### *Validación del instrumento Automanejo en Cuidadores Familiares*

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#### **Summary**

**Objective:** To determine the validity and reliability of a self-management instrument for family caregivers in Latin America. **Methods:** validation of the instrument to obtain psychometric qualities (validity and reliability) in a non-probabilistic by convenience sample of 66 family caregivers from Mexico, Peru, and Colombia. The exploratory factor analysis was performed with SPSS v. 25.0, which included the following statistical indicators: Kaiser-Meyer-Olkin test, Barlett's Test of Sphericity, and determinant value, the Varimax method was used for rotation. The Confirmatory Factor analysis was performed with AMOS 24.0 software. **Results:** Cronbach's Alpha coefficient estimation of the instrument was=0.815. The Kaiser-Meyer-Olkin value was 0.699, and Bartlett's Test of Sphericity was significant ( $p < 0.01$ ). Three factors were obtained with loadings greater than 0.40; they explained 63.76% of the variance. Factor 1 consisted of 2 items and factors 2 and 3 consisted of three items, respectively. Acceptable results were obtained for the construct validity of the three-factor caregiver self-management instrument. The absolute measures of fit and incremental fit indicate good model adequacy. **Conclusions:** The present instrument allowed the evaluation of self-management behavior in family caregivers of people with chronic disease, with important characteristics such as: the number of items (8), easy application, and a time of 15 minutes which will contribute to the health care provider to evaluate self-management in Latin America.

**Key words:** Self-Management; Validation Study, Family Caregiver, Latin America.

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## Resumen

**Objetivo:** estimar la validez y confiabilidad de un instrumento de automanejo en cuidador familiar en la región de Latinoamérica. **Método:** validación de instrumento para obtener cualidades psicométricas (validez y confiabilidad) en una muestra no probabilística en 66 cuidadores familiares de México, Perú y Colombia. El análisis factorial exploratorio fue realizado con el programa SPSS v. 25.0 e incluyó los siguientes indicadores estadísticos: prueba de Kaiser-Meyer-Olkin, prueba de esfericidad de Barlett y valor del determinante. Para la rotación se utilizó el método Varimax. El análisis factorial confirmatorio se realizó mediante el software AMOS 24.0. **Resultados:** se estimó el coeficiente alfa de Cronbach del instrumento=0.815. El valor de Kaiser-Meyer-Olkin fue de 0.699, la prueba de esfericidad de Bartlett fue significativa ( $p<0.01$ ). Se obtuvieron tres factores con cargas superiores a 0.40 que explicaron 63.76% de la varianza. El factor 1 estuvo integrado por 2 ítems y los factores 2 y 3 por tres ítems, respectivamente. Se obtuvieron resultados aceptables para la validez de constructo del instrumento de tres factores de automanejo en cuidadores. Las medidas absolutas de ajuste y de ajuste incremental indicaron buena adecuación al modelo. **Conclusiones:** el presente instrumento permitió evaluar el comportamiento de automanejo en el cuidador familiar de personas con enfermedad crónica que cuentan con características importantes como el número de ítems ( $n=8$ ), de fácil aplicación, y un tiempo de 15 minutos que puede ayudar al proveedor de salud a evaluar el automanejo en la región de Latinoamérica.

**Palabras clave:** automanejo, estudio de validación, cuidador familiar, Latinoamérica.

## Introduction

Non-communicable diseases (NCDs) are the most important cause of morbidity and mortality in the world,<sup>1</sup> people who suffer from them frequently experience decompensation at some point in their lives.<sup>2</sup> Some patients will require the care of a family caregiver to meet the basic needs of their daily lives, as well as those related to medical care as a result of complications caused by NCDs.

The caregiver is characterized by an affectionate family bond, commitment, and responsibility for caregiving. Clinical decision making may be part of the family caregiver's activities, in addition to taking on roles related to counseling, housekeeping, or nursing.<sup>3,4</sup> It has been documented that family caregivers frequently present emotional problems such as depersonalization, anxiety, deterioration in social support networks, fatigue, insomnia, and affective disorders.<sup>5-6</sup>

In response to these problems, programs have been developed to monitor the health of family caregivers, with different objectives such as developing skills, knowledge, and competencies to reduce the negative impact that caregiving activities can have.<sup>7-10</sup>

Among the developed instruments for the identification of at-risk caregivers is the Zarit caregiver burden scale,<sup>11-13</sup> as well as others aimed at strengthening self-efficacy, stress management, improving competencies, and dealing with depression, among others.<sup>14-18</sup>

Self-management in a family caregiver implies having knowledge of health and basic care procedures, using the support network, taking care of their physical, emotional, and social aspects. Based on the described scenario, the objective of this research was to evaluate

the validity and reliability of an instrument that allows the assessment of self-management in caregivers with regional representativeness for Latin America.

## Methodology

Validation of the instrument to obtain psychometric qualities (validity and reliability). A non-probabilistic sample of 66 family caregivers, who subsequently participated in the self-management program: "Working Together in Collaboration" in Mexico, Peru, and Colombia.

People over 18 years of age who had been the main caregiver for a minimum of three months were included.

The design of the instrument was based on the characteristics of self-management in a family caregiver as proposed by the Thematic Network of Self-Management in Chronic Diseases.<sup>19</sup> The instrument consists of 8 items with a numerical visual response format from 0 to 8, the interpretation criterion being "the higher the score, the greater the self-management".

To carry out the data collection, a team of health care professionals was trained in the handling and application of the instrument, with prior authorization from the local ethics committees, and the informed consent signed by the participants.<sup>20</sup>

The instrument is self-applicable and was completed online, via any electronic device. Passwords were used to protect the collected personal data stored in a computer.

Data processing and analysis was performed with SPSS v. 25 and AMOS 24.0. The exploratory factor analysis included the Kaiser-Meyer-Olkin (KMO) tests, Bartlett's Test of Sphericity and the determinant value as statistical indicators.

The factor extraction method was principal axis factorization due to non-compliance with the normality assumption; the Varimax method was used for rotation, in which burdens lower than 0.40 were discarded.

In the confirmatory factor analysis (CFA) the Maximum Likelihood Method was used, the goodness of fit of the model was determined with the absolute measures of fit and the incremental measures of fit.

Additionally, the composite reliability of the instrument and the concurrent validity were verified by the Average Variance Explained (AVE) and the discriminant validity, comparing the square root of AVE and the correlations of factors, complemented with the HTMT (Heterotrait-hetero-method) matrix.

## Results

The sample consisted of 66 caregivers, 66.7% (n=44) from Peru, 18.2% (n=12) from Mexico, and 15.2% (n=10) from Colombia. The sample adequacy for the Exploratory Factor Analysis (EFA) showed acceptable values for the indicators. The determinant value of the correlation matrix was close to zero (0.028) and KMO equal to 0.699; the level was regular and acceptable for the sample size. High significance ( $p < 0.01$ ) was obtained in Bartlett's Test of Sphericity. Item 4 (0.643) had the minimum value of MSA (Measures of Sampling Adequacy) in the anti-image matrix, an acceptable value for including the items in the EFA.

Principal components and factor loadings are shown in Table 1. Three factors were obtained with loadings higher

than 0.40, explaining 63.76% of the variance. Factor 1 was composed of two items, and factors 2 and 3 were composed of three items, respectively.

Acceptable results were found for the construct validity of the instrument. The absolute adjustment measures  $\chi^2/df$  ratio (1.641), GFI (0.914)<sup>21</sup> and ECVI (1.014),<sup>22</sup> as well as the indicators of incremental fit measures TLI (0.912),<sup>23</sup> IFI (0.940)<sup>24</sup>, and CFI (0.947)<sup>21</sup> indicated a good fit of model. On the other hand, the AGFI (0.819),<sup>22</sup> NFI (0.880),<sup>25</sup> RFI (0.802),<sup>24</sup> and RSMR (0.686)<sup>25</sup> indicated a moderate fit and only the RMSEA (0.099)<sup>21</sup> indicated a weak fit. Figure 1 shows the solution of the CFA.

The results for composite reliability, concurrent and discriminant validity are shown in Table 2, which shows the composite reliability of the F1, F2, and F3

**Table 1. Factorial Loads of Self-Management Components**

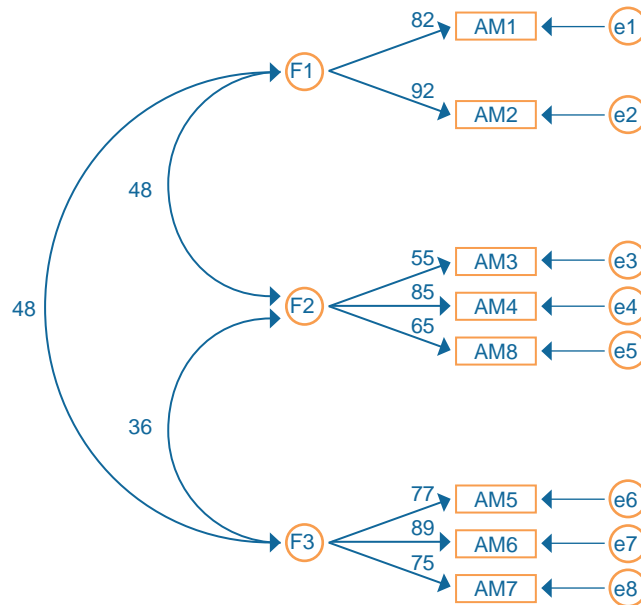
Ítem		Inicial	Extraction	Component		
				1	2	3
AM1	In general, what I know about the conditions of the person I care for, especially the changes that will occur in their chronic condition.	0.599	0.609	0.729		
AM2	In general, what I know about the aspects of care: procedural (medical treatment, hygiene, feeding, mobilization), emotional (changing behaviors, handling difficult situations).	0.639	0.958	0.940		
AM3	I have the confidence and ability to Access and use a supportive social network: family, friends, caregiver support social institutions, health services.	0.400	0.331		0.454	
AM4	I have a life plan (goals, personal life project), as well as a self-care plan.	0.483	0.702		0.805	
AM5	Management of the impact of my conditions as a caregiver on physical aspects (pain due to inadequate physical movements, sleeping problems, not eating on time or scheduling problems, inadequate feeding, etc.)	0.518	0.595			0.716
AM6	I manage the impact of my condition as a caregiver on emotional aspects (depression, frustration, irritability, depersonalization, not having my own life project).	0.655	0.751			0.823
AM7	I manage the impact of my status as a caregiver on social aspects (isolation, leaving usual social network, not having their own space).	0.585	0.655			0.789
AM8	In general, I lead a healthy lifestyle: I manage to live a healthy life (e.g., no smoking, moderate alcohol intake, healthy eating, regular physical activity, stress management).	0.372	0.499		0.688	

Extraction method: principal axis factorization.

Rotation method: Varimax with Kaiser normalization.

a. Rotation converged into 5 iterations.

**Figure 1. Confirmatory Factor Analysis (AMOS)**



**Table 2. Concurrent and Discriminant Validity**

Indicator	Favorable values	F1	F2	F3
Cronbach's Alfa	>0.7			
CR	CR > 0.7	0.868	0.909	0.849
AVE	AVE > 0.5	0.754	0.482	0.653
MSV	MSV < AVE	0.231	0.231	0.229
F1	Square Root of AVE greater than inter-construct correlations.	<b>0.868</b>	0.481*	0.479**
F2			<b>0.695</b>	0.361*
F3				<b>0.808</b>

\* p < 0.050; \*\* p < 0.010; \*\*\* p < 0.001

**Table 3. HTMT (Monotrait-heteromethod) Analysis**

Factor	F1	F2
F2	0.507	
F3	0.480	0.421

factors, respectively. The overall composite reliability was 0.816, which is higher than the recommended value (0.7).<sup>26</sup>

The convergent validity measured by the value of the AVE had a greater value than 0.5 in factors 1 and 3; in factor 2 this value was 0.482, close to the recommended 0.5.<sup>27</sup>

Discriminant validity was evaluated taking into account that the square root of AVE was greater than the correlations of the inter-constructs, which was fulfilled in all three factors. This analysis was complemented with the HTMT (Monotrait-heteromethod) matrix shown in Table 3, which shows that the correlations were less than 0.90 as recommended by Gold et al.<sup>28</sup>

Cronbach's alpha (0.815) showed good reliability. In other dimensions such as knowledge (0.868), coping with the impact of being a caregiver on physical, psychological, and social aspects (0.909) and personal management (0.849) the reliability was also good.

### Discussion

Given the need for an instrument to assist in the identification of persons at risk, the purpose of this study was to estimate the validity and reliability of a self-management instrument for family caregivers in Latin America.

The results showed different indicators of validity and reliability that allow affirming that the instrument is adequate. Further research with larger probabilistic samples and from different countries in this region -considering regional differences in social dynamics- will help to confirm the representativeness of these results at the regional level.

The valid and reliable version of the instrument is composed of 8 items distributed in 3 dimensions: 1. knowledge, 2. management of the impact of being a caregiver on physical, psychological, and social aspects, 3. personal development.

The items incorporated the five characteristics present in a family caregiver with adequate self-management of their condition, which are: 1. Having sufficient knowledge related to their health and basic care procedures to provide the person being cared for; 2. Using a social support network to manage their role as caregiver; 3. Management of the impact care on physical aspects, emotional and social; 4. Having a life plan (goals, personal life project) as well as a self-care plan, and 5. Having an adequate lifestyle.

The convergent validity measured by the value of the AVE had a value above 0.5 in factors 1 and 3; in factor 2 this value was 0.482, close to 0.5.

There is evidence of instruments that evaluate self-management behavior in people with chronic conditions, with some similarities such as managing the impact derived from their role as caregivers in the physical, social, and emotional aspects. In the case of people with chronic diseases, reference was made to the impact of their condition. Likewise, in the knowledge dimension, similar characteristics considered in self-management were integrated, such as having a self-care plan, goals, adequate lifestyle, and the use of social networks,<sup>29-31</sup> aspects that were also incorporated into this instrument, but related to the family caregiver.

As a strength of the study, the careful process involving exploratory factor analysis and confirmatory factor analysis, which coincided with the same number of relevant dimensions, are mentioned.

The main limitation of this study was the sample size, its non-probabilistic selection and the limited participation to three countries; therefore, it is proposed to generate studies with larger and probabilistic samples from different Latin American countries.

### Conclusion

This instrument allows the evaluation of self-management behavior in family caregivers of people with non-communicable diseases. The instrument presented important characteristics such as a relatively short number of items (n=8), easy to apply, and in a time of 15 minutes.

These characteristics will allow the health care provider to obtain a measurable diagnosis of self-management in the target population and evaluate interventions aimed at addressing self-management in this group.

### Authors Contribution

MIP-C, RCL-H conceptualization, development and writing; AAC-P, CF-B, FF-B: survey application, MIP, CFA-J, RCC-H: processing, data analysis, and results; CF-B, AAC-P: discussion of results, conclusion and writing.

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### Conflict of Interest

The authors declare not having conflicts of interest.

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