

Evidence of The Psychometric Properties of The Feelings of The Informal Primary Family Caregiver Scale

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ABSTRACT : Objective: to analyze the psychometric properties of the Feelings of the Informal Primary Family Caregiver Scale.

Methodology: This is a methodological, descriptive, and analytical study. The sample consisted of 115 informal primary family caregivers from a city in the south of Minas Gerais. The sample was a non-probabilistic convenience sample. The Information and Feelings of the Informal Primary Family Caregiver instrument was used, which consisted of two sections. The first section was entitled Information on the Caregiver's Daily Life and consisted of close-ended questions with only one answer option. The second section consisted of the Feelings Scale, containing 17 items and four factors, namely: Life and health compromises; Mental health compromises; Perspectives on providing care and Insecurities on providing care. Each item has five answer options, as follows: Never (5 points); Almost Never (4); Sometimes (3); Almost Always (2); and Always (1). The minimum score on the scale is 17 points and the maximum is 85. This study was approved by the Research Ethics Committee of a Federal Higher Education Institution.

Results: After exploratory factor analysis, the scale consisted of 17 items and four factors with a Cronbach's alpha of 0.8 for Factors 1, 2, and the total scale, and 0.6 for Factors 3 and 4. In discriminant validity, there was discrimination in the caregiver's daily information with the aforementioned scale ($p < 0.05$).

Conclusion: the Scale showed adequate psychometric properties for use in the Brazilian context, both in research and in care.

KEYWORDS: Caregivers; Feelings; Validation study; Factor analysis.

INTRODUCTION

Chronic Non-Communicable Diseases (CNCDs) are becoming increasingly common among elderly people. Over the years, these diseases can compromise functional capacity, demanding family caregivers. This will require the family to designate a caregiver and, consequently, make adjustments and rearrange the family context (Silva, *et al.*, 2022).

Caregivers are classified into two groups: formal and informal. The former is a healthcare professional or a person who is formally qualified to perform this work and is compensated for it. The latter refers to a family member, who is a layperson in the field of care and is unpaid, but who has been assigned to help their loved one, even though they are improvising and lack adequate knowledge (Machado de Jesus; Orlandi; Zazzeta, 2018; Monte, *et al.*; 2020).

Family caregivers can be primary caregivers, who are the main ones responsible for the person receiving care; or secondary caregivers, who do not share the same level of responsibility and decision-making, as most of the time they replace primary caregivers. Finally, tertiary caregivers are those responsible for providing the resources needed to provide care, who are also supporters and have no fixed responsibilities (Vieira, *et al.*; 2011). This study focused on informal primary family caregivers.

It should be noted that the informal primary family caregiver is most often responsible for providing care to an elderly relative, but there are caregivers who also provide care to non-elderly relatives. However, the positive and negative feelings that arise from being a caregiver do not depend on whether the relative is elderly or not. The activities are performed without a time limit, resulting in overload and without allowing them the opportunity for self-care, which compromises their physical and mental health (Carvalho, *et al.*, 2016).

In this regard, the informal primary family caregivers warrant consideration, as they go through a range of challenging experiences and feelings, especially when they do not receive family or social support. There are reports of family caregivers who become overburdened, as work and responsibilities are all placed on one person. They feel love and care for the person under their care, while at the same time they feel tired, stressed, distressed, frightened, and fragile (Cetish; Batistella, 2007; Carvalho, *et al.*, 2016).

Feelings are part of a strategy used by people to express how they are living from the perspective of satisfaction, dissatisfaction,

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happiness, unhappiness, and so on. The platform for feelings is a person's own life. The way one lives and its meaning are expressed through feelings (Metista; Batista; Da Silva, 2019).

The large array of events that surround the life of the family caregiver is remarkable. Therefore, one of the ways of responding to all the situations they experience is by expressing their feelings, because no one can live without experiencing situations that reflect their feelings in the face of events or facts in their lives (Lima; Machado, 2018).

Life's memorable moments are expressed through feelings, whether pleasant or not. Positive feelings include happiness, pleasure, and satisfaction with something in the context of life. Negative feelings are the opposite. This means that the accomplishment or emergence of a phenomenon in life can manifest itself in sadness, dissatisfaction, unhappiness, and restlessness (Reis et al., 2019).

The occurrence of any given phenomenon in life, its process, and final outcome are driven by positive or negative feelings, or by both. This will depend on several factors, such as choice, adaptation, integration, interaction, empathy, and so on (Ferreira et al., 2018).

In this sense, being an informal family caregiver is a fact that arises in people's lives and is also surrounded by feelings that can be filled with positive or negative aspects or, intermittently, both (Ferreira et al., 2018).

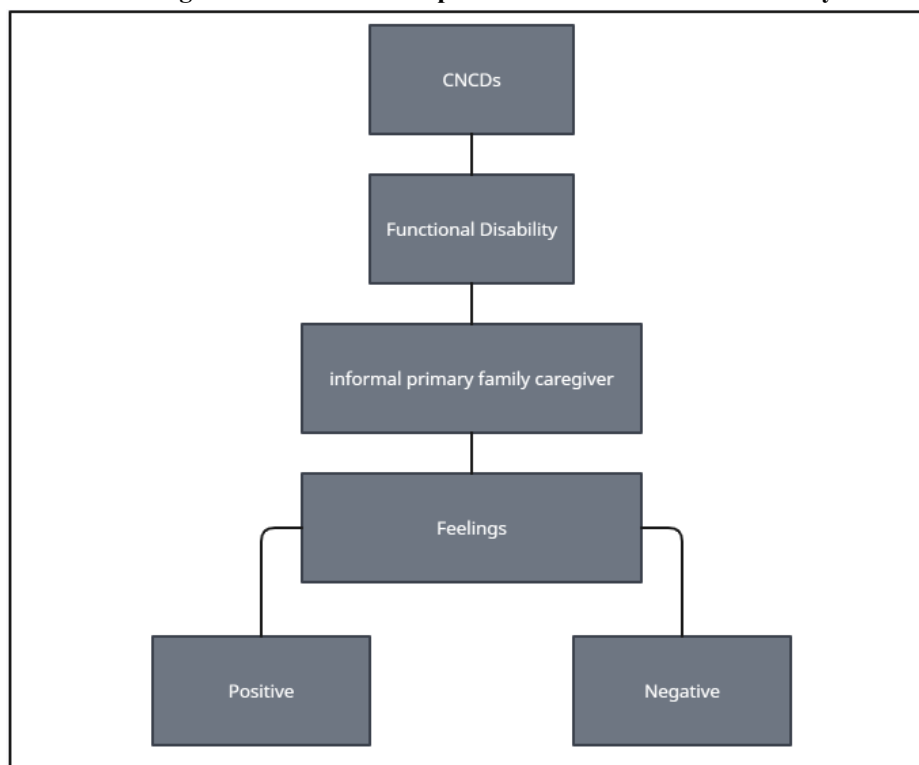
Thus, informal primary family caregivers, who reduce their own lives to a single scenario with responsibilities, concerns, demands, and little recognition, will have positive feelings about the act of caregiving, but it can be assumed that their lives will be filled with several negative feelings, especially when they feel that they no longer have a personal life that is lived and recognized (Cetish; Batistella, 2007; Carvalho, et al., 2016).

Their mental health may be severely compromised and caregivers may be just as ill as the person they provide care to (Silva, et al., 2021). Regarding caregivers and recognizing their activities in such an isolated and lonely way is itself a public health issue. They commit their lives without guidance or direction and, in the absence of training, this leads one to wonder about audacity, altruism, and ignorance (Silva, et al., 2022).

It is highly relevant, significant, and essential to study the feelings of informal primary family caregivers and have a valid instrument to quantify them. There are several scales designed for caregivers, either developed or adapted to the Brazilian context, which are valid and reliable. However, none of them cover feelings. In this context, a scale that is sensitive to positive and negative feelings is essential for care and research among this type of caregiver. Its psychometric properties must be reliable for assessing this subject.

Therefore, this study aimed to analyze the psychometric properties of the Scale of Feelings of the Informal Primary Family Caregiver.

Figure 1 shows the conceptual framework used in this study.



Source: author of the study

FIGURE 1 – CONCEPTUAL FRAMEWORK OF THE FEELINGS OF THE INFORMAL PRIMARY FAMILY CAREGIVER.

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METHODS

Study design

This is a methodological, descriptive, and analytical study.

Psychometry

To be able to understand what psychometric properties are, it is necessary to establish their definition, which is the representation of the theory and measurement technique related to mental elaboration processes, mainly applied in the fields of Psychology and Education (Pasquali, 2009).

Psychometry is based on the measurement theory of science in general, i.e. the quantitative method whose main characteristic and strength is that it represents knowledge of nature more accurately than using trivial language to describe the observation of natural phenomena (Pasquali, 2009).

In general, psychometry aims to explain the meaning of the answers provided by participants to a series of activities, usually labeled as items. The term “psychometric properties” comes from psychometry (Pasquali, 2009).

Validity concerns whether an instrument measures exactly what it is intended to measure. It is clear that validity is not a characteristic of the instrument and must be determined in relation to a particular question, since it refers to an established population (Souza; Alexandre; Guirardello, 2017).

The measurement properties - validity and reliability - are not totally independent. Researchers claim that an unreliable instrument cannot be valid; however, a reliable instrument may not always be valid. Therefore, high reliability does not ensure the validity of an instrument (Souza; Alexandre; Guirardello, 2017).

The types of validity are as follows: content; criterion; concurrent; predictive; construct; known groups technique; convergent; discriminant; structural or factorial; and cross-cultural. In the present study, structural or factorial validity and divergent or discriminant validity were used.

Structural or Factorial Validity (Exploratory Factor Analysis -EFA-): these statistical tests are defined as a set of multivariate techniques which aim to find the specific and underlying structure in a certain data matrix and establish the number and nature of latent variables (factors and items) which best specify a set of observed variables. By analyzing the structure of the interrelationships of a given number of observed variables, EFA defines the factor(s) and items that best explain their covariance, eliminating items that behave inversely (Damásio, 2012).

The variables identified (instrument items) comprise the same factor when, and if, they share common variance and are influenced by the same underlying construct, which is the factor (Brown, 2006). Thus, a factor refers to a latent variable (e.g. quality of life) that affects more than one observed variable and more than one factor. However, the EFA will only show the item of that factor that represents it in its essence (Damásio 2012).

Thus, the aim of EFA is to identify these factors and estimate the relationships between them and the observed variables. However, EFA is based on a correlation or covariance matrix of the observed variables and uses statistical techniques to extract the latent factors with the respective items that best explain the structure of the object in question (Damásio 2012).

Items can be correlated by grouping them into domains (or dimensions). The variables that are most representative are identified, reducing the data (items) and creating a new, smaller, and more significant set. With EFA, it is determined whether an instrument is unidimensional or composed of dimensions (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

Divergent or discriminant validity is an alternative way of testing the hypothesis that the measurements produced by the instrument are not mistakenly associated with different constructs. The extent to which the scale discriminates with variables from which it should differ is calculated (Souza; Alexandre; Guirardello, 2017).

This validity consists of the extent to which a measurement does not correlate with other measurements from which it is supposed to differ (Sánchez, 1999; Pasquali 2009). Still in relation to this validity, careful planning of the validation process must be carried out during the development of the instrument so that, at the same time, the necessary data can be collected. The correlations between the measurements involved in this process can be presented through a matrix referred to as multiconcept-multimethod or multimethod-multirater (Morales Vallejo, et al., 2003; Pasquali 2009).

It tests the hypothesis that the target measurement is not inadequately related to different constructs, i.e. to variables from which it should differ (Polit; Beck, 2019).

In the psychometry field, it is also necessary to understand what is known as reliability, which refers to the level of consistency with which the items in the instrument measure the proposed attribute free of measurement errors and the extent to which the instrument allows consistent results to be reproduced and obtained when applied on different occasions, except for random errors. If there are no errors in the measurement or if they are minimized, the measurement can be considered reliable (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

In the literature searched, reliability is also referred to as precision, agreement, equivalence, consistency, objectivity, reliability, constancy, reproducibility, stability, confidence and homogeneity, and these terms are also used to establish the reliability

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of the measurement scale. The use of these terms varies according to the aspect of the test that is being highlighted and the literature used (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

The research into reliability includes three important aspects: internal consistency, reliability itself, and measurement error. In this study, only the internal consistency aspect was used, which consists of the homogeneity of the items, i.e. the extent to which the items measure the same attribute and produce consistent results (Polit; Yang, 2019; Mokkink, *et al.* 2017).

Internal consistency analysis is possible for instruments composed of multiple items applied to a single instance. To do this, the internal consistency of the total number of items can be assessed (unidimensional instruments) or according to the sub-scales that comprise the instrument, which can be multidimensional (Polit; Yang, 2019; Mokkink, *et al.* 2017).

Among the most commonly used forms of analysis to calculate the internal consistency of a measurement instrument are the split-half test, the Kuder-Richardson test, and Cronbach's alpha coefficient. In this study, Cronbach's alpha test was used (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

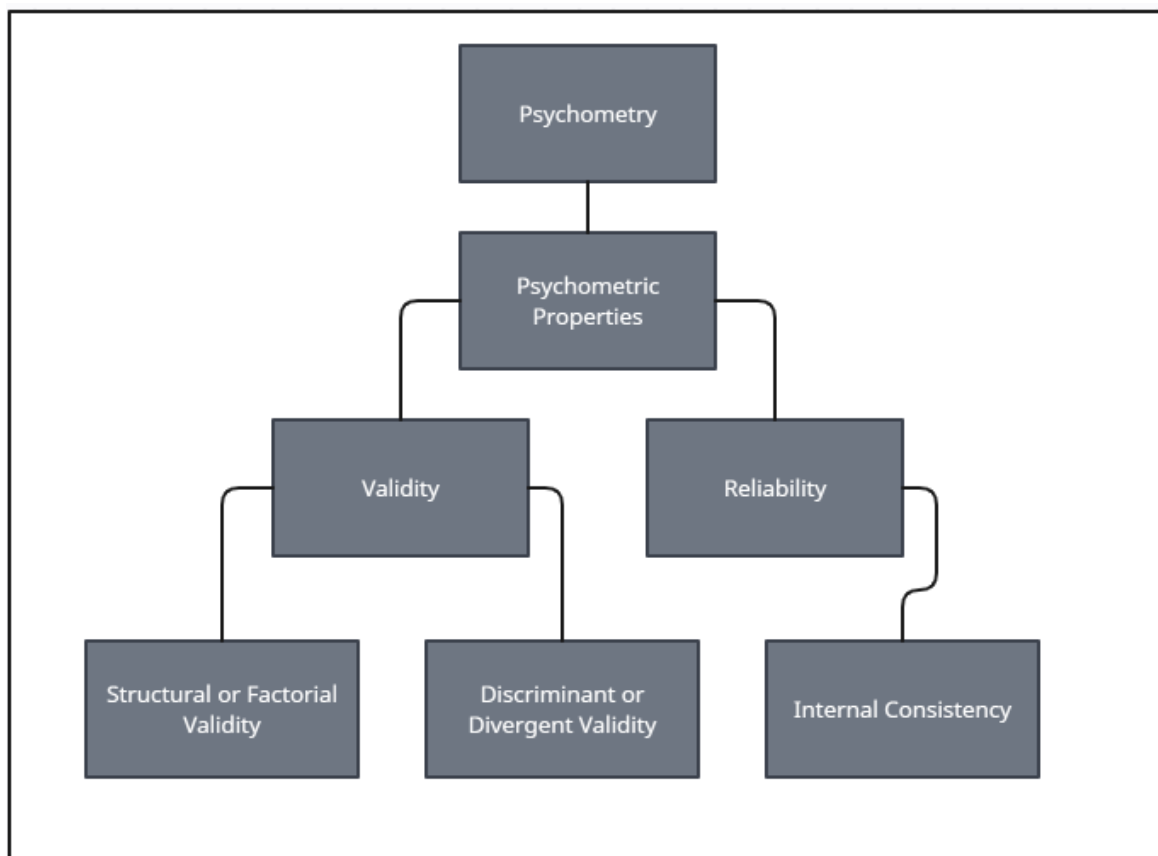
Cronbach's alpha is a technique in which the items' variances are based on discrete numerical scores that represent the various possibilities for each item in the instrument (Polit; Yang, 2019; Bandeira, *et al.* 2007).

This is based on the premise that the scale consists of homogeneous elements selected at random from the population and that the elements show the same characteristic. Cronbach's alpha is recommended for measurement instruments that use Likert-type or multiple-choice scales whose categories have an ascending or descending order of values (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

When Cronbach's alpha is used, several of its characteristics must be considered: the alpha yields a single value for any set of data and yields the value for the distribution mean of all the possible coefficients of the parts that comprise the instrument, thus representing an association for the set of data established (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

Furthermore, it not only hinges on the magnitude of the correlation between the items, but also on the number of items in the scale. If the number of items in an instrument is increased, the alpha value will also increase. Consequently, items from two instruments combined into a single scale increase the alpha value and high alpha values can indicate the existence of a high level of redundant items (Echevarría-Guanilo; Gonçalves; Romanoski, 2017).

Figure 2 shows the psychometric methodological framework used in the present study.



Source: author of the study

FIGURE 2 – METHODOLOGICAL FRAMEWORK OF PSYCHOMETRY

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Study participants, sample, and sampling

Data was collected from informal primary family caregivers, of both sexes, aged 18 or over, living in the city of Varginha-MG. The information and contact details of potential participants were collected from the community health agents of the Family Health Strategies (ESFs), since no database or register of family caregivers was available. The interviews were carried out in the caregiver's own residence. The location of the interviews was quiet, noise-free, and private in order to preserve the principle of privacy and to be able to carry out the interviews.

The sample size was calculated in order to obtain stable factorial solutions. The "items/subject ratio" criterion was used. A minimum ratio of 5:1 between the sample size and the number of items that comprise the scale is necessary for an adequate survey of the psychometric characteristics that can be discovered through factor analysis (Pasquali, 2010). Since the FIPFCS consisted of 23 items (reduced to 17 items after the Exploratory Factor Analysis), 5 participants were used per item, totaling 115 respondents. Sampling was non-probabilistic by convenience and snowballing (Sudana, 2019).

Inclusion and exclusion criteria

The following inclusion criteria were adopted: having been an informal primary family caregiver for at least six months. Formal caregivers were excluded.

Data collection instruments

The following research instrument was used:

Information and Feelings of the Informal Primary Family Caregiver, prepared by the first researcher of this study, consisting of two sections. The first, entitled Information on the daily life of the informal primary family caregiver (IDLIPFC), presents information regarding the informal primary family caregiver setting, via closed questions with only one answer option. The second section consists of the Feelings of the informal primary family caregiver scale (FIPFCS). It contains 17 items and four factors, as follows: Life and health compromise (items 1 to 7); Mental health compromise (8 to 13); Perspectives on care (14 and 15), and Insecurities when providing care (16 and 17). This scale structure was achieved after structural or factor analysis. Each item has five answer options, namely: Never (5 points); Almost Never (4); Sometimes (3); Almost Always (2); and Always (1). The minimum score on the scale is 17 points and the maximum is 85 points. The higher the score, the worse the feelings experienced by the informal primary family caregiver, and vice versa. The following numerical distribution was used to classify the scores obtained as **bad, regular, good, and very good**:

a) Full scale:

Very good - 17.0 to 34.0 points

Good - 34.1 to 51.0 points

Regular - 51.1 to 68.0 points

Bad - 68.1 to 85.0 points

b) Factors:

Factor 1 - Life and health compromise

Very good - 7.0 to 14.0 points

Good - 14.1 to 21.0 points

Regular - 21.1 to 28.0 points

Bad - 28.1 to 35.0 points

Factor 2 - Mental health compromise

Very good - 6.0 to 12.0 points

Good - 12.1 to 18.0 points

Regular - 18.1 to 24.0 points

Bad - 24.1 to 30.0 points

Factor 3 - Perspectives on care and Factor 4 - Insecurities when providing care

Very good - 2.0 to 4.0 points

Good - 4.1 to 6.0 points

Regular - 6.1 to 8.0 points

Bad - 8.1 to 10.0 points

Pilot study

The pilot study was carried out with 5% of the total sample, corresponding to six participants who were not part of the definitive sample, but who met the inclusion and exclusion criteria. The pilot study has three purposes, as follows: 1) To ensure that the content

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of the instrument is comprehensible to the study participants; 2) To identify the time required to apply the instrument; and 3) To prepare the participants for the final collection. In the pilot study, these three purposes were met.

Data analysis

For data collection, a database was created using the FIPFCS scale. To do this, the SPSS (Statistical Package for the Social Sciences) computer program, version 22, was used. Regarding data analysis, Exploratory Factor Analysis (main axes) with Varimax rotation was performed to verify the behavior of the domains and items in terms of the permanence or not of the elements that comprise the FIPFCS. The requirements for retaining the item on the scale were a factor load equal to 0.5 and an analysis of Cronbach's alpha. In other words, the alpha was analyzed according to the item's presence. If the item interfered positively with the alpha result, it was retained and vice versa. The Kaiser Meyer Olkin (KMO) test was used to measure the suitability of using Factor Analysis and Bartlett's test of sphericity to measure whether Factor Analysis was suitable for the problem in question.

Cronbach's alpha test was used to assess the internal consistency of the scale and its factors. Regarding the minimum cut-off point, a Cronbach's alpha equal to 0.6 was adopted, based on the authors' unanimous statement that internal consistency, using this alpha value, is the minimum acceptable to consider a scale and its domains reliable. For discriminant validity, the Mann-Whitney and Kruskal-Wallis non-parametric tests were used. The significance level adopted was equal to or lower than 0.05 (5%).

Ethical aspects of the research

In this study, all ethical aspects were complied with in line with Resolution 466/12 of 2012 of the National Health Council of the Ministry of Health, which covers ethics in research involving human beings. This study was approved by the Research Ethics Committee of a Federal Higher Education Institution.

RESULTS

The results are presented in 3 parts:

- 1) Exploratory Factor Analysis;
- 2) Internal consistency of the total scale and its factors;
- 3) Discriminant Validity.

Exploratory Factor Analysis

The data related to the FIPFCS Exploratory Factor Analysis is presented below. To study the suitability of applying Factor Analysis, the KMO test was performed and the value found was 0.810 (suitable when > 0.5). Bartlett's test of sphericity was also performed, which is adequate when significant ($p \leq 0.05$). The p-value found was $< 0.001^*$. Both tests showed that Factor Analysis is suitable for the data collected.

Originally, the scale consisted of 23 items. In order to select the Main Factors that represented the set of Factors, eigenvalues above 1 were considered. Thus, 6 factors emerged from this process, covering 63.5% of the Total Variance. The factor loadings after Varimax rotation were used to select the items in each Factor. Each of the 23 items was allocated to one of the 6 Factors. Cronbach's alpha coefficient was used to verify the internal consistency of the Factors and values above 0.6 were considered for the study.

Considering that the Cronbach's alpha of two factors, regardless of the factor loading value of each item, were 0.489 and 0.170, these factors were excluded from the scale. In Factor 3, as the exclusion of one item improved the Cronbach's alpha from 0.481 to 0.601, it was decided to exclude it. As a result, the FIPFCS consisted of 17 items and 4 Factors, which corresponded to factor loadings of 0.5 or above and a Cronbach's alpha of 0.6 or above, as shown in Table 1.

Table 1 - Items with their respective factor loadings and variable groupings.

		Factor			
		1	2	3	5
1	Do you feel that, due to the time you spend with your family member, you do not have enough time for yourself?	0.843	0.064	0.017	-0.044
2	Do you feel stressed between providing care to your family member and your other family and work responsibilities?	0.643	0.173	0.075	0.201
3	Do you feel that your health has been affected due to your involvement with your family member?	0.502	0.450	0.017	0.125
4	Do you feel that you do not have as much privacy as you would like to because of your family member?	0.708	0.285	0.016	0.265
5	Do you feel that your social life has been disrupted because you are providing care to your family member?	0.653	0.335	0.139	0.291
6	Do you feel that you have lost control of your life since your family member became ill?	0.593	0.187	0.244	0.190
7	In general, do you feel overwhelmed by providing care to	0.707	0.364	0.045	0.032

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	your family member?				
8	Do you feel ashamed of your family member's behavior?	0.130	0.639	-0.147	-0.303
9	Do you feel irritable when you are near or providing care to your family member?	0.317	0.714	0.131	0.218
10	Do you feel that providing care to your family member negatively affects your relationships with other family members or friends?	0.204	0.666	0.091	0.249
11	Do you feel uncomfortable having guests over because of your family member?	0.291	0.701	0.023	0.123
12	Would you like to simply have someone else provide care in your place?	0.240	0.516	-0.142	-0.087
13	Are you unhappy with being a caregiver?	0.004	0.701	0.030	0.000
14	Do you feel you should be doing more for your family member?	0.189	-0.054	0.746	0.041
15	Do you feel you could provide better care to your family member?	0.048	0.037	0.849	0.088
16	Do you fear for your family member's future?	0.145	0.161	0.068	0.732
17	Do you feel uncertain about what to do for your family member?	0.142	0.145	0.349	0.531

SOURCE: FIPFCS (2023).

Internal consistency of the full scale and its factors

Table 2 shows the internal consistency of the FIPFCS and its factors, using Cronbach's alpha.

Table 2 – Internal consistency of the full scale and its factors.

Factor	Cronbach's Alpha	95% Confidence Interval
1 – Life and health compromise	0.880	(0.843;0.911)
2 – Mental health compromise	0.807	(0.746;0.857)
3 – Perspectives on care	0.688	(0.548;0.784)
4 – Insecurities when providing care	0.601	(0.423;0.724)
Full scale	0.880	

SOURCE: FIPFCS (2023).

Discriminant validation between information on the daily life of the informal primary family caregiver with the FIPFCS and its factors

Table 3 shows that a significant association was found between the time spent as a caregiver and Factor 1 - Life and health compromise ($p=0.025$); Factor 4 - Insecurities when providing care ($p=0.005$) and the full scale ($p=0.008$). According to Table 4, a significant difference was found between Factor 1 - Life and health compromise and two variables: The caregiver stops doing their own things to provide care ($p<0.001$) and Household members help with care ($p=0.031$). Significance was also found between the differences in the full scale and the daily life variable, namely 'The caregiver stops doing their own things to provide care ($p=0.002$). According to Table 5, the variable 'Deterioration of the family member's state of health' showed significant changes in relation to the full scale ($p=0.003$) and all the factors, Factor 1 - Life and health compromise ($p=0.017$); Factor 2 - Mental health compromise ($p=0.012$); Factor 3 - Perspectives on providing care ($p=0.018$); and Factor 4 - Insecurities when providing care ($p=0.016$). Compromise to the caregiver's health, in turn, showed significant discrepancies for the full scale ($p<0.001$) and three factors: Factor 1 - Life and health compromise ($p<0.001$); Factor 2 - mental health compromise ($p<0.001$); and Factor 4 - Insecurities when providing care ($p=0.001$). Table 6 shows that family visits showed significant differences in relation to Factor 1 - Life and health compromise ($p=0.026$); Factor 2 - Mental health compromise ($p=0.017$); Factor 4 - Insecurities when providing care ($p=0.004$); and the full scale ($p=0.002$). Table 7 shows that the differences found were significant between family members' contributions and Factor 1 - Life and health compromise ($p=0.017$), in addition to the full scale ($p=0.004$).

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Table 3 - Association of the FIPFCS with time spent as a caregiver, reason for being a caregiver, and residing with the informal primary family caregiver (n=115). Varginha-MG, 2023.

Factors	Measurements of central tendency and dispersion	Time as a caregiver				Kruskal-Wallis Test (p)	Result	Reasons for being caregiver		Mann-Whitney Test (p)	Result	The person receiving care lives with the caregiver		Mann-Whitney Test (p)	Result
		6 months to 1 year	1 to 5 years	5 to 10 years	Over 10 years			Personal choice	Appointed by the family			Yes	No		
Factor 1 – Life and health compromise	Mean	21.8	16.1	21.5	23.5	0.025*	(1 - 5a) < (>10a)	21.3	21.6	1.000	Personal choice = appointed by the family	20.6	24.0	0.131	Yes = No
	Median	27.0	15.0	21.0	23.0			21.0	27.0			21.0	29.0		
	Standard deviation	10.7	7.5	9.5	9.3			9.3	11.7			9.0	10.8		
		10	23	35	47			108	5			94	21		
Factor 2 – Mental health compromise	Mean	25.7	24.3	25.4	27.1	0.068	Equal	26.1	22.6	0.495	Personal choice = appointed by the family	25.8	26.5	0.450	Yes = No
	Median	28.0	26.0	28.0	29.0			28.0	28.0			28.0	28.0		
	Standard deviation	4.8	5.7	6.4	4.4			5.1	10.1			5.4	5.8		
		10	23	35	47			108	5			94	21		
Factor 3 – Perspectives on care	Mean	4.6	5.0	5.0	5.9	0.417	Equal	5.5	4.4	0.570	Personal choice = appointed by the family	5.3	5.8	0.504	Yes = No
	Median	5.0	4.0	4.0	6.0			6.0	4.0			6.0	6.0		
	Standard deviation	2.68	3.2	3.0	3.1			3.1	1.7			3.1	3.1		
		10	23	35	47			108	5			94	21		
Factor 4 – Insecurities when providing care	Mean	8.4	5.5	6.1	7.5	0.005*	(6m - 1a) > (1 - 5a) < (>10a)	6.7	7.2	0.612	Personal choice = appointed by the family	6.8	6.5	0.648	Yes = No
	Median	9.0	6.0	6.0	8.0			6.0	10.0			7.0	6.0		
	Standard deviation	2.1	2.9	2.9	2.7			2.8	3.9			2.9	3.0		
		10	23	35	47			108	5			94	21		
Full scale	Mean	60.5	50.9	58.0	64.0	0.008*	(1 - 5a) < (>10a)	59.5	55.8	0.834	Personal choice = appointed by the family	58.5	62.8	0.209	Yes = No
	Median	67.0	49.0	57.0	67.0			59.5	63.0			59.0	66.0		
	Standard deviation	16.6	13.2	16.6	15.0			15.6	22.4			15.5	17.5		
		10	23	35	47			108	5			94	21		

SOURCES: FIPFCS (2023); IDLIPFC (2023).

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Table 4 - Association of the FIPFCS with the replacement of personal activities by caregiving and help obtained in caregiving regarding informal primary family caregivers (n=115). Varginha-MG, 2023.

Factors	Measurements of central tendency and dispersion	The caregiver stops doing their own things daily to provide care			Kruskal-Wallis Test (p)	Result	Household members help with care			Kruskal-Wallis Test (p)	Result	External people help with care			Kruskal-Wallis Test (p)	Result
		Yes	No	Sometimes			Yes. Always.	Yes. Sometimes.	No			Sim	Não	Some times		
Factor 1 – Life and health compromise	Mean	19.5	30.0	28.0	0.001*	Yes < No	23.9	22.7	18.8	0.031*	Yes. Always. > No	23.7	20.3	20.9	0.324	Yes = Não = Sometimes
	Median	19.0	31.5	29.0			25.0	23.0	19.0			25.0	20.0	21.0		
	Standard deviation	9.1	7.4	3.9			9.7	9.1	9.0			9.1	9.2	10.2		
	n	95	14	6			35	27	53			27	58	30		
Factor 2 – Mental health compromise	Mean	25.5	27.2	29.0	0.072	Yes = No = Sometimes	26.3	26.6	25.3	0.196	Yes = No = Sometimes	25.5	26.6	25.0	0.412	Yes = Não = Sometimes
	Median	28.0	30.0	29.5			28.0	29.0	28.0			28.0	28.0	28.0		
	Standard deviation	5.5	5.7	1.3			5.1	5.9	5.4			5.8	5.0	5.9		
	n	95	14	6			35	27	53			27	58	30		
Factor 3 – Perspectives on care	Mean	5.4	5.3	4.2	0.633	Yes = No = Sometimes	5.6	4.9	5.4	0.711	Yes = No = Sometimes	5.8	5.2	5.3	0.709	Yes = Não = Sometimes
	Median	6.0	5.0	2.5			6.0	4.0	6.0			6.0	5.5	5.0		
	Standard deviation	3.1	3.2	3.3			3.2	2.9	3.2			3.2	3.1	3.2		
	n	95	14	6			35	27	53			27	58	30		
Factor 4 – Insecurities when providing care	Mean	6.5	8.5	6.7	0.059	Yes = No = Sometimes	6.7	7.3	6.5	0.490	Yes = No = Sometimes	6.9	6.9	6.3	0.694	Yes = Não = Sometimes
	Median	6.0	9.5	6.0			8.0	8.0	6.0			8.0	7.0	6.0		
	Standard deviation	3.0	2.0	1.8			2.9	2.7	2.9			3.1	2.7	3.0		
	n	95	14	6			35	27	53			27	58	30		
Full scale	Mean	57.0	71.0	67.8	0.002*	Yes < No	62.51	61.56	55.94	0.076	Equal	61.78	59.02	57.47	0.558	Equal
	Median	57.0	75.0	67.0			65.00	67.00	57.00			65.00	59.00	58.50		
	Standard deviation	15.9	13.3	2.2			16.783	16.582	14.563			16.303	14.972	17.510		
	n	95	14	6			35	27	53			27	58	30		

SOURCES: FIPFCS (2023); IDLIPFC (2023).

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Table 5- Association of the FIPFCS with human resources available to help with care and with the health conditions of the family member and informal primary family caregivers (n=115). Varginha-MG, 2023

Fatores	Measurements of central tendency and dispersion	Search for someone		Mann-Whitney Test (p)	Result	Deterioration of the family member's state of health		Teste de Mann-Whitney (p)	Result	Compromise for the caregiver's health		Mann-Whitney Test (p)	Result
		Sim	Não			Yes	No			Yes	No		
Factor 1 – Life and health compromise	Mean	21.5	20.7	0.829	Yes = No	18.8	23.1	0.017*	Yes < No	15.1	26.3	<0.001*	Yes < No
	Median	21.0	22.0			17.0	23.0			14.0	27.0		
	Standard deviation	9.2	10.8			9.2	9.3			7.6	7.7		
		100	14			49	65			52	63		
Factor 2 – Mental health compromise	Mean	26.2	24.8	0.317	Yes = No	24.8	26.8	0.012*	Yes < No	23.1	28.2	<0.001*	Yes < No
	Median	28.0	27.0			26.0	29.0			25.5	30.0		
	Standard deviation	5.2	6.0			5.8	5.0			6.3	3.1		
		100	14			49	65			52	63		
Factor 3 – Perspectives on care	Mean	5.3	5.9	0.449	Yes = No	4.6	5.9	0.018*	Yes < No	4.9	5.7	0.135	Yes = No
	Median	6.0	6.0			3.0	6.0			4.0	6.0		
	Standard deviation	3.1	3.1			3.0	3.1			3.2	3.0		
		100	14			49	65			52	63		
Factor 4 – Insecurities when providing care	Mean	6.8	6.6	0.849	Yes = No	6.0	7.3	0.016*	Yes < No	5.7	7.6	0.001*	Yes < No
	Median	7.0	6.5			6.0	8.0			6.0	8.0		
	Standard deviation	2.9	2.9			2.9	2.7			2.9	2.6		
		100	14			49	65			52	63		
Full scale	Mean	59.7	58.0	0.812	Yes = No	54.1	63.1	0.003*	Yes < No	48.9	67.8	<0.001*	Yes < No
	Median	60.5	60.5			53.0	67.0			49.0	69.0		
	Standard deviation	15.4	18.5			15.5	15.3			13.9	11.8		
		100	14			49	65			52	63		

SOURCES: FIPFCS (2023); IDLIPFC (2023).

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Table 6 - Association of the FIPFCS with family members visits and its replacement by family members referring to informal primary family caregivers (n=115). Varginha-MG, 2023.

Fatores	Measurements of central tendency and dispersion	Family members visit					Kruskal-Wallis Test (p)	Result	Its replacement by family members				Kruskal-Wallis Test (p)	Result
		Always	Almost always	Sometimes	Almost never	Never			Always	Almost always	Sometimes	Almost never / Never		
Factor 1 – Life and health compromise	Mean	19.3	14.3	19.8	25.9	24.4	0.026*	Almost always < Almost never = Never Sometimes < Never	19.7	18.6	23.5	25.2	0.082	Equal
	Median	21.0	11.5	19.0	29.0	25.0			19.0	19.0	23.0	30.0		
	Standard deviation	9.9	9.5	8.9	10.3	8.7			9.3	8.7	8.8	10.1		
	N	16	6	51	10	32			59	13	25	18		
Factor 2 – Mental health compromise	Mean	23.6	25.2	25.1	28.6	27.6	0.017*	Always < Almost never = Never Sometimes < Never	25.6	25.1	26.6	26.5	0.598	Equal
	Median	26.0	26.5	28.0	30.0	30.0			28.0	28.0	29.0	28.0		
	Standard deviation	6.2	4.4	6.2	2.3	3.6			5.5	5.4	5.9	4.5		
	N	16	6	51	10	32			59	13	25	18		
Factor 3 – Perspectives on care	Mean	3.9	4.8	5.0	6.8	6.2	0.058	Equal	5.5	3.8	5.1	6.3	0.197	Equal
	Median	2.5	2.5	4.0	6.0	6.0			6.0	2.0	6.0	6.0		
	Standard deviation	2.3	4.0	3.1	2.7	3.1			3.2	2.7	2.5	3.4		
	N	16	6	51	10	32			59	13	25	18		
Factor 4 – Insecurities when providing care	Mean	5.4	5.5	6.2	8.6	7.9	0.004*	Always = Almost always = Sometimes < Almost never = Never	6.3	6.5	7.4	7.4	0.267	Equal
	Median	5.0	5.5	6.0	9.0	9.5			6.0	6.0	8.0	8.5		
	Standard deviation	3.1	3.2	2.6	1.6	2.8			2.8	2.8	2.8	3.1		
	N	16	6	51	10	32			59	13	25	18		
Full scale	Mean	52.3	49.8	56.2	69.9	66.1	0.002*	Always < Almost never = Never Sometimes < Never	57.1	54.1	62.6	65.4	0.053	Equal
	Median	53.0	46.0	57.0	78.0	67.0			57.0	51.0	67.0	68.0		
	Standard deviation	18.1	13.5	14.9	14.3	13.5			15.0	15.3	15.7	18.1		
	N	16	6	51	10	32			59	13	25	18		

SOURCES: FIPFCS (2023); IDLIFC (2023).

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Table 7 - Association of the FIPFCS with the frequency of contributions from family members related to informal primary family caregivers (n=115). Varginha-MG, 2023.

Fatores	Measurements of central tendency and dispersion	Contributions from family members				Kruskal-Wallis Test (p)	Result
		Always	Almost always	Sometimes	Almost never / Never		
Factor 1 – Life and health compromise	Mean	19.5	15.8	21.2	26.0	0.017*	Always < Almost never / Never
	Median	19.0	14.0	19.0	27.0		
	Standard deviation	9.2	9.6	10.1	7.8		
		55	5	28	27		
Factor 2 – Mental health compromise	Mean	24.9	23.2	26.5	27.8	0.077	Equal
	Median	28.0	23.0	29.5	30.0		
	Standard deviation	5.6	5.4	6.0	3.6		
		55	5	28	27		
Factor 3 – Perspectives on care	Mean	5.0	3.8	5.4	6.4	0.150	Equal
	Median	4.0	3.0	6.0	6.0		
	Standard deviation	3.2	1.6	3.0	2.9		
		55	5	28	27		
Factor 4 – Insecurities when providing care	Mean	6.5	4.6	6.8	7.6	0.109	Equal
	Median	6.0	5.0	7.0	8.0		
	Standard deviation	2.8	1.7	3.1	2.7		
		55	5	28	27		
Full scale	Mean	55.87	47.40	59.82	67.78	0.004*	Always = Almost always < Almost never/ Never
	Median	56.00	42.00	61.00	69.00		
	Standard deviation	15.062	15.868	17.263	12.777		
		55	5	28	27		

SOURCES: FIPFCS (2023); IDLIPFC (2023).

DISCUSSION

Data analysis is divided into three parts: 1) Exploratory Factor Analysis (EFA); 2) Reliability through internal consistency; and 3) Discriminant validity.

EFA is a construct validation method used to assess the dimensionality and components of an instrument (Cunha, De Alemida Neto, Stackfleth, 2016), which reduced the FIPFCS from 23 to 17 items with 4 factors: Life and health compromise; Mental health compromise; Perspectives on caregiving; and Insecurities when providing care.

There are other scales that have been submitted to EFA and are related to caregivers. In one study, EFA was used to validate the Caregiver Competence Assessment Questionnaire for the Brazilian context, yielding four factors with the possible exclusion of one item. To carry out this deletion, Confirmatory Factor Analysis (CFA) was carried out, showing a high correlation, thus retaining the item (Santos, *et al.*; 2021). Another study carried out in Spain on the Generalized Self-Efficacy Scale performed EFA followed by CFA, resulting in a unidimensional scale. This suggests the need for future work with the FIPFCS, with the aim of applying CFA (Blanco, *et al.*, 2019).

Using these four domains in the FIPFCS, the internal consistency was analyzed, studying the correlation of the items between the same traits. Internal consistency was found to be effective through the Cronbach's alpha test for the full scale and its first two factors, by finding a value of 0.8. This means that the grouped items consistently reflect their domains and the scale in its entirety. When evaluating any phenomenon, it is essential that internal consistency is represented by indicators that ensure it is safe to measure what is intended (Cunha, De Alemida Neto, Stackfleth, 2016). The third and fourth domains, although they showed internal consistency at their limit values, are acceptable, especially in relation to the nature of the items, as both cover care, whether

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of a prospective or insecurity nature, which is the purpose of being a caregiver. It is noteworthy that they are only structured by two items and this may be the main cause, as a small number of items can influence internal consistency (Tamayo; Tróccoli, 2009). Further studies should analyze the behavior of reliability through the internal consistency of these two factors.

Instruments related to caregivers that address phenomena other than feelings have also been validated in terms of reliability through their internal consistency. The Family Burden Interview Schedule (FBIS) yielded Cronbach's alpha values of 0.82 for the global objective burden score, 0.92 for the global subjective scale, and 0.58 to 0.90 for the factors (Bandeira, et al.; 2007). The Informal Caregiver Burden Assessment Questionnaire in its entirety had a 0.90 alpha, while the seven factors ranged from 0.62 to 0.88 (Martins; Ribeiro; Garret, 2004). The Dyad Relationship Scale is another instrument used to assess the quality of the relationship between caregivers and dependent elderly people, which has two factors. The "Conflict" and "Positive Interaction" domains showed internal consistency of 0.81 and 0.77, respectively (Queluz, et al., 2018). In general, the range of Cronbach's alphas in the literature was close to that obtained in the present study.

The discriminant validity of the construct was carried out to assess whether the scale could discriminate the difference between the groups in a certain direction as predicted in the development of the study's hypotheses. It was verified whether the instrument distinguishes individuals or populations in which a difference is expected, as, for instance, people with and without pain. This validity does not require the construct to correlate with non-similar variables (Cunha, De Alemida Neto, Stackfleth, 2016).

When performing discriminant validity, the caregiver's daily information was associated with the scale and its factors. A high number of discriminants were found between these associations. It can be inferred that this is related to the fact that these variables are part of the caregiver's life context, which can lead to positive or negative feelings, such as time spent as a caregiver, not being able to do one's own things in order to provide care, someone in the house helping with care, the family member's health deteriorating, the caregiver's health being compromised, family members visiting the person receiving care and contributing with help.

Based on a report of discriminant validity related to caregiver burden, an analysis of the association of different variables with the Burden Interview Scale (Zarit Scale) applied to caregivers of children with cerebral palsy was found in the study (Camargos, et al., 2009). An association was found between the scale and two variables: family socioeconomic status ($p=0.03$) and severity of motor impairment in children with cerebral palsy ($p=0.05$). There was no significant difference in relation to the topographical diagnosis ($p=0.71$) and the age of the children with cerebral palsy ($p=0.035$) (Camargos, et al., 2009). The aforementioned study used the same tests applied in the present study, namely the Mann-Whitney and Kruskal-Wallis tests.

The present study was limited to a single city in southern Minas Gerais. From the perspective of reliability, it was restricted to internal consistency and, in terms of validity, discriminant validity was carried out.

CONCLUSION

This study concluded that the Feelings of the Informal Primary Family Caregiver Scale presented adequate psychometric evidence, qualifying it as a reliable and valid instrument to be used nationwide in research and healthcare for informal primary family caregivers. It is a resource that measures what it sets out to measure, and is available to the scientific community and healthcare professionals in the broad assessment that should be implemented for this type of caregiver, who remains largely underappreciated by the healthcare sector, family members, and society in general.

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