Evidence of validity and accuracy for the Mindful Self-Care Scale-Brief among family caregivers of people with cancer in Brazil: A cross-sectional study

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Abstract

Objectives. This study aimed to evaluate the evidence of validity and accuracy for the Mindful Self-Care Scale-Brief (B-MSCS) in Brazil among family caregivers of people with cancer.
Methods. This was a cross-sectional study with a sample of 203 family caregivers of people with cancer. The instruments used in this study were the following: B-MSCS, Brief Resilience Scale, and Brief Scale for Spiritual/Religious Coping. Exploratory factor analysis was carried out using the principal axis factoring method and direct oblimin oblique rotation, and confirmatory factor analysis using the robust weighted least squares means and variance adjusted estimation method and GEOMIM oblique rotation. The internal consistency of the latent factors was measured using Cronbach's alpha coefficients.
Results. The 6-factor model showed good fit to the data, with satisfactory reliability indices and adequate representation of the scale's internal structure. The results that can support arguments in favor of validity evidence based on internal structure for the B-MSCS-Brazilian version (BR) relate to a 19-item version which, grouped into 6 latent factors, explained 46.47% of the variance. The factor solution reproduced 79.2% of the theoretically expected structure and 5 items were excluded. The Cronbach's alpha coefficient of the factors in the B-MSCS-BR ranged from 0.58 to 0.84. Positive religious/spiritual coping had a direct association with the B-MSCS-BR factors, with the exception of the Physical Care factor ($r = 0.033$, $p = 0.635$). Negative spiritual/religious coping was inversely associated with the Mindful Relaxation ($r = -0.160$, $p = 0.023$), Supportive Relationships ($r = -0.142$, $p = 0.043$), and Mindful Awareness factors ($r = -0.140$, $p = 0.045$). There were no associations between the B-MSCS-BR factors and resilience.
Significance of results. The findings reveal that the B-MSCS (19-item) is a valid, reliable, and culturally-appropriate instrument to examine the practice of mindful self-care by family caregivers of people with cancer in Brazil.

Introduction

Worldwide, it is estimated that 349 million people are care-dependent, i.e. they need frequent human help or care beyond what is usually required by a person considered healthy (World Health Organization 2017). Informal caregivers play a key role in the physical, functional, and emotional well-being of patients with chronic noncommunicable conditions, including patients with cancer (Sun et al. 2019). They are people who provide home care, usually unpaid, to a sick person (Sun et al. 2019; World Health Organization 2017). Family members, such as adult children, spouses, and parents, are often the ones who bear this task; however, most informal caregivers are not prepared for this role (Sun et al. 2019). Thus, these people are exposed to several kinds of burdens due to providing long-term care for people with chronic conditions or other disabilities (Adelman et al. 2014).

The burdens related to these tasks affect both their physical and psychosocial health, including long working hours spent in caregiving, financial pressure, social isolation, lack of choice, as well as limited family and social support, which are all important factors that can lead to overload (Adelman et al. 2014; Thana et al. 2021). Beyond these external burdens, the caregivers' internal burdens, such as perceived care-related competence, positive aspects, stress,

and the level of role captivity, are highly related to their well-being and life satisfaction (Quinn et al. 2019). As a result, caregivers have their physical, mental, and psychosocial health affected, which manifests itself in late-life depression, social isolation, overload and, in more serious cases, suicide (Adelman et al. 2014). In the case of caregivers of people with cancer, according to the literature, their unpaid role when caring for a relative or close friend with advanced cancer is among the life circumstances that can challenge an individual's ability to manage stress and work under high pressure (Dionne-Odom et al. 2021). The experience of providing care to a family member with advanced cancer, from diagnosis to postmortem, is filled with important stressors that test the individual's ability to cope and maintain well-being (Dionne-Odom et al. 2021). Despite this, caregivers' demands are often ignored by clinicians (Adelman et al. 2014).

One of the consequences of the demands of this role is that these people are less involved in self-care activities (van Roij et al. 2021). Self-care is being defined as "self-initiated behavior that people choose to incorporate to promote good health and general well-being" (Sherman 2004). Mindful self-care is a synthesis of mindfulness with conventional conceptualizations of self-care practices based on the development of multiple well-established mindfulness-based interventions, including mindfulness-based stress reduction and dialectical behavior therapy (Cook-Cottone and Guyker 2018). Mindful self-care combines the basics of self-care, such as healthy eating, engaging in regular physical activity, and other health-related routines, with mindful and self-soothing acts like self-compassion, self-awareness practice, as well as maintaining an equilibrium in interpersonal relationships (Cook-Cottone 2020). Both the effect of self-care and mindful self-care have been well-researched on helping professionals, such as palliative care nurses and hospice care professionals (Hotchkiss 2018; Hotchkiss and Lesher 2018; Mills et al. 2018), who documented their association with compassion satisfaction, mental burnout, and compassion fatigue. However, the norms and effect of mindful self-care have not yet been well-established among nonprofessional caregivers as defined in the current research.

The Mindful Self-Care Scale (MSCS) is needed to measure the normal level of mindful self-care among informal caregivers, in order to evaluate to what extent they have engaged in mindful-based and self-soothing daily activities, and care for their physical and psychosocial well-being. Despite the solid establishment of the 33-item MSCS, studies found that the brief 24-item version (B-MSCS) has the advantage of eliminating redundant items (Hotchkiss and Cook-Cottone 2019) and is more suitable for application in both clinical and research settings. As the MSCS, its brief version (B-MSCS) covers the 6 main dimensions of mindful self-care (physical care, supportive relationships, mindful awareness, self-compassion and purpose, mindful relaxation, and supportive structure) and has good conceptual coverage (Hotchkiss and Cook-Cottone 2019). Hence, this study aimed to evaluate the evidence of validity and accuracy for the B-MSCS in Brazil among family caregivers of people with cancer.

Methods

Study design

This cross-sectional study was conducted between November 2022 and July 2023. The reporting of this study was carried out according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies (von Elm et al. 2007), when applicable.

Study site

The study was carried out at the "Soraya Rodrigues Alves" *Casa do Café* (Coffee House) of the *Vida Viva* Volunteers Association of Alfenas. *Vida Viva Alfenas*, a non-profit association, runs a series of assistance, educational, and therapeutic programs for approximately 3,000 patients with cancer living in the region. The services provided by the organization are divided between its 3 units, including the "Soraya Rodrigues Alves" Coffee House – an assistance center where patients with cancer and their families receive a welcome and guidance, meals (breakfast, snacks, and lunch), food supplements, legal advice, and a space to socialize and relax. It is worth mentioning that the Oncology Center of a general hospital in the city is located opposite *Casa do Café*.

Participants, sampling and recruitment

Participants who were (1) aged over 18 and (2) the main family caregiver of people diagnosed with cancer (regardless of the type and stage of cancer). The sample was non-probabilistic but recruited through convenience sampling. The minimum sample size adopted for this study was of 120 participants, complying with the guidelines stating that the sample size should consist of 100 or more participants to carry out factor analysis, with a minimum of at least 5 times more observations than the number of items to be analyzed (the B-MSCS contains 24 items) (Hair et al. 2010; Mokkink et al. 2017).

Recruitment was carried out at *Casa do Café*. Potential participants were approached in the morning, when patients and their companions go to *Casa do Café* to have a meal before their medical appointment in the Oncology Center located opposite the establishment. The researchers (CPS and EMCP) approached the participants at the end of their meals, introduced themselves, and explained the purpose of the study. Those who stated that they met the eligibility criteria were invited to participate in the study.

Measures

Participant demographics questionnaire

Participants completed an initial questionnaire, asking about their age (years), race, gender, marital status, level of education, degree of kinship with the patient, religion. and whether the participant considered themselves to be practicing their religion.

Mindful Self-Care Scale-Brief (B-MSCS)

The B-MSCS (24-item) (Hotchkiss and Cook-Cottone 2019) comes from the full version of the MSCS (33-item) (Cook-Cottone and Guyker 2018), which was developed in the United States as a measure of the self-reported frequency of mindful self-care behaviors. Garcia et al. (2022a) developed the Brazilian version of the MSCS (33-item). The brief version used in this study (Hotchkiss and Cook-Cottone 2019) was retrieved from the original English version of 33 items (Cook-Cottone and Guyker 2018), and from the version translation, cultural adaptation, and validation to Brazilian Portuguese by Garcia et al. (2022a). The translation and cultural adaptation stages of the Brazilian version of the MSCS are described in the study by Garcia et al. (2022a). The items are divided into 6 factors, namely: Physical Care (5 items); Supportive Relationships (4 items); Mindful Awareness (3 items);

Self-Compassion and Purpose (4 items); Mindful Relaxation (4 items); and Supportive Structure (4 items) (Hotchkiss and Cook-Cottone 2019). The factors are scored using the average of the responses to the items that make them up, so that the higher the score, the greater the presence of the latent trait in the factors.

Brief Resilience Scale – Brazilian version (BRS-BR)

The BRS is an instrument that assesses the level of resilience in adults. It was developed by Smith et al. (2008) and validated for use in Brazil by Coelho et al. (2016). Resilience is generally defined as an individual's ability to overcome stress and adversity and to recover from stressful events (Babić et al. 2020). The BRS is a one-dimensional instrument ($\alpha = 0.76$), consisting of 6 items (Coelho et al. 2016). According to the study carried out by Coelho et al. (2016), the instrument showed good reliability results ($\omega = 0.77$; $\alpha = 0.76$). Responses to the items are given from a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The score is calculated by adding up the answers to the items, so the higher the score, the higher the level of resilience.

Brief Scale for Spiritual/Religious Coping (SRCOPE-14-BR)

The brief version (14 items) of the Religious/Spiritual Coping Scale was developed by Pargament et al. (2011) and validated for Brazilian culture by Esperandio et al. (2018). The scale aims to assess the use of religious/spiritual coping strategies. The scale is subdivided into 2 factors: positive religious/spiritual coping (RSC) and negative RSC. In the validation study of the shortened version of the scale for Brazilian culture, the positive factor showed $\alpha = 0.884$, and the negative factor $\alpha = 0.845$ (Esperandio et al. 2018). The higher the factor score, the greater the use of RSC strategies, whether positive or negative.

Procedures

Data collection, which lasted approximately 20 minutes, was carried out in the living environment of the place where the study was carried out. After formally giving their consent, the participants answered the study instruments by means of an interview. Data were collected individually. The data were recorded using the Google Forms Platform.

It is worth noting that the data collection procedures were tested by means of a procedural test carried out before data collection began. The aim was to test the instruments and the data collection strategy (interview) on a group of participants ($n = 30$) who met the eligibility criteria for this study. Connelly (2008) suggests that the sample for a pilot study should consist of 10% of the sample designed for the larger main study. Addington-Hall (2007b) explains that the decision regarding which research data collection method to use should be based on contextual factors, such as the characteristics of the study population. The decision to interview participants in the present study was based on the knowledge gained from piloting the validated instruments and the insight, prior to the start of data collection, that data collection through interviews would not only ensure the provision of complete data in this population but would also be more inclusive in terms of the participation of individuals with low levels of reading and writing skills who might not otherwise be able to complete a questionnaire independently (Addington-Hall 2007a, 2007b). Thus, despite consuming more of the research team's time and resources, the interview method was chosen to prioritize the reliability of the data collected and also to grant participants the opportunity to seek verbal clarification on any possible misunderstandings regarding the constructs or the questions asked before answering.

Since there was no need to change the data collection procedure or the instruments used, the data from the participants in the test procedures was included in the final sample of this study. The researchers responsible for data collection (CPS and EMCP) were trained to ask the questions on each scale exactly according to the description of each item, without changing any words or terms. This measure was taken in order to avoid inducing responses on the part of the data collectors.

Data analysis

In order to assess the suitability of the theoretical structure of the 6 dimensions assessed by the MSCS-Brief-BR for the sample in this study, exploratory factor analysis (EFA) was carried out using the principal axis factoring (PAF) method and direct oblimim oblique rotation, and confirmatory factor analysis (CFA) using the robust weighted least squares means and variance adjusted (WLSMV) estimation method (Aparuhov et al. 2009) and GEOMIM oblique rotation. The internal consistency of the latent factors was assessed through Cronbach's alpha coefficients, where values above 0.60 were expected, considering the exploratory nature of the study (Hair et al. 2010).

Predictive validity based on relationships with external measures of the B-MSCS-BR was carried out using the SRCOPE-14-BR and the BRS-BR. It was expected that mindful self-care would show a significant and positive correlation with resilience (Garcia et al. 2022b) and spiritual/religious coping (Goudarzian et al. 2019). Correlation values greater than 0.4 were considered acceptable ($r > 0.4$) (Fayers and Machin 2007). To asses the association between these related constructs, Pearson's bivariate correlation analyses were carried out at a level of $p \leq 0.05$.

Results

Sample characteristics

Of the 253 caregivers recruited, a total of 203 family caregivers of people with cancer participated in the study, with an average age of 48.4 years (SD = 14). The average time spent as a caregiver was 2.6 years (SD = 3.11). As for the difficulty of caring for a person with cancer, on a scale of 0 to 10, with 0 being not at all difficult and 10 being excessively difficult, the average response was 4.22 (SD = 3.71). The other data characterizing the sample are shown in Table 1.

Dimensionality analysis of the B-MSCS-BR

To assess the adequacy of the theoretical structure of the 6 dimensions assessed by the B-MSCS with the sample of the present study, a measurement model was specified based on a previous study that originated the B-MSCS (24-item) (Hotchkiss and Cook-Cottone 2019): Factor 1: Mindful Relaxation (items 01 to 04), Factor 2: Physical Care (items 05 to 09), Factor 3: Self-Compassion and Purpose (items 10 to 13), Factor 4: Supportive Relationships (items 14 to 17), Factor 5: Supportive Structure (items 18 to 21), and Factor 6: Mindful Awareness (items 22 to 24). This model was tested using CFA, implemented in Mplus 8 software, with a robust WLSMV estimation method (Aparuhov et al. 2009) and GEOMIM oblique rotation. According to the analysis carried out, the model was not identified and convergence was not obtained.

Table 1. Sample characteristics (*n* = 203)

Variables	*n* (%)
Gender	
Male	54 (26.7)
Female	148 (73.3)
Race	
White	126 (62.1)
Black	33 (16.3)
Brown	43 (21.2)
Other	1 (0.5)
Relatives	
Husband/Wife	69 (34)
Mother	5 (2.5)
Father	2 (1)
Son/Daughter	69 (34)
Other[a]	58 (28.6)
Education	
Primary (<8 years)	91 (44.8)
Secondary (8 to 11 years)	83 (40.9)
Higher (>11 years)	29 (14.3)
Marital status	
Single	55 (27.2)
Married	147 (72.8)
Religion	
No religion	5 (2.5)
Christian	186 (92.1)
Spiritism	7 (3.5)
Other	4 (2)
You consider yourself to be practicing your religion	
Yes	136 (67.3)
No	66 (32.7)

[a]Sister, husband, granddaughter, niece.

We then opted for exploratory factor analysis (EFA), with the PAF method and direct oblimim oblique rotation, implemented in IBM SPSS Statistics 21 software. In this analysis, the Kaiser–Meyer–Olkin index of sampling adequacy (= 0.79) indicated the relevance of using EFA in the search for latent factors. Initial information on the number of factors to be extracted was obtained from the initial eigenvalues greater than or equal to 1 – K1 criterion. It was defined a priori that, in order to be accepted, the factor solution should present items grouped into factors with interpretative reasonableness (theoretical reasonableness), saturation, and item-total correlation in the factor grouping greater than or equal to 0.30 (Pasquali 2005).

Up to 7 eigenvalues greater than or equal to 1 were estimated: 1 = 5.891, 2 = 2.286, 3 = 1.893, 4 = 1.506, 5 = 1.397, 6 = 1.176, 7 = 1.033, 8 = 0.907. A first analysis with 7 factors was not satisfactory from the point of view of the theoretical interpretation

of the groupings. The analysis of the 6-factor solution generated factors that were more in line with the theoretical model that underpins the evaluation of the construct, at the cost of excluding 4 items (01, 13, 17, and 21) that were grouped differently from what was theoretically expected and for which there was no interpretative reasonableness. A fifth item (item 05) was excluded because it did not meet the saturation criterion of at least 0.30 in any of the extracted factors (Table 2).

Thus, the results that can support arguments in favor of validity evidence based on internal structure (American Educational Research Association, American Psychological Association and National Council on Measurement in Education 2014; Rios and Wells 2014) for the B-MSCS-BR relate to a 19-item version which, grouped into 6 latent factors, explained 46.47% of the variance. The estimated parameters for this factor model are summarized in Table 3.

As shown in Table 3, the factor solution reproduced 79.2% of the theoretically expected structure – 5 items were excluded. There were also 5 items with cross loading, with saturation in more than 1 factor. These items were considered in the dominant factor – the one with the highest factor loading.

From the point of view of the internal consistency of the groupings, acceptable Cronbach's alpha coefficients (≥0.60) were observed for exploratory studies, with the exception of the Supportive Relationships factor whose coefficient was 0.58 (Hair et al. 2010). Table 4 shows the Cronbach's alpha values of the MSCS factors considering its original 33-item version (Cook-Cottone and Guyker 2018), the Brazilian version of the MSCS (Garcia et al. 2022a), the shortened 24-item version (Hotchkiss and Cook-Cottone 2019), and the shortened 19-item Brazilian version (referring to this study) (Supplementary Material).

Validity based on relationships with external measures

The results presented in this section come from analyses based on the B-MSCS-BR, i.e. excluding items 01, 05, 13, 17, and 21.

Table 5 shows the descriptive statistics of the instruments used to measure mindful self-care, spiritual/religious coping and resilience.

Table 6 shows the correlation results between the B-MSCS-BR factors and the spiritual/religious coping and resilience scales. Positive RSC showed a direct association with the B-MSCS-BR factors, with the exception of the Physical Care factor. Negative spiritual/religious coping was inversely associated with the Mindful Relaxation, Supportive Relationships and Mindful Awareness factors. There was no association between the B-MSCS-BR factors and resilience (Table 6).

Discussion

In descending order, caregivers engaged in mindful self-care activities related to the following B-MSCS-BR factors: Mindful Awareness, Supportive Relationships, Supportive Structure, Self Compassion Purpose, Mindful Relaxation, and finally, Physical Care (Table 5). Among Brazilian caregivers of people with cancer, despite the fact that their self-care needs (generally related to inadequate sleep and rest, ineffective nutrition and hydration, impaired social interaction, health risks, socioeconomic vulnerabilities, and lack of education), the evidence indicates that the barrier to sustained self-care is centered on the need to provide care to the sick person above anything else, making this a priority of higher importance than any other personal need (Vale et al. 2019). We would like

Table 2. Items excluded from the Brazilian version of the B-MSCS

Item	Theoretical expectation		Empirical grouping
	B-MSCS factors		
01 – I did something creative to relax (e.g., drew, played instrument, wrote creatively, sang, organized)	Mindful Relaxation		Physical Care
13 – I experienced meaning and/or a larger purpose in my work/school life (e.g.,for a cause)	Self-Compassion and Purpose		Mindful Relaxation
17 – I felt that I had someone who would listen to me if I became upset (e.g., friend, counselor, group)	Supportive Relationships		Supportive Structure
21 – I maintained a comforting and pleasing living environment	Supportive Structure		Mindful Awareness
05 – I ate a variety of nutritious foods – e.g., vegetables, protein, fruits, and grains	Excluded for not having a factor load $\geq$ 0.30 on any of the factors		

Table 3. Factor matrix of the Brazilian version of the B-MSCS ($n = 203$)

Items	B-MSCS-BR factors						
	Mindful Relaxation	Physical Care	Self-Compassion and Purpose	Supportive Relationships	Supportive Structure	Mindful Awareness	r_{it}
02 – I listened to relax (e.g., to music, a podcast, radio show, rainforest sounds)	0.70						0.56
03 – I sought out images to relax (e.g., art, film, window shopping, nature)	0.78						0.54
04 – I sought out smells to relax (lotions, nature, candles/incense, smells of baking)	−0.55						0.48
06 – I exercised at least 30 to 60 minutes		0.47	0.44				0.49
07 – I took part in sports, dance or other scheduled physical activities (e.g., sports teams, dance classes)		0.65					0.63
08 – I did sedentary activities instead of exercising (e.g., watched tv, worked on the computer)[a]reverse scored[a]		0.71					0.62
09 – I practiced yoga or another mind/body practice (e.g., Tae Kwon Do, Tai Chi)		0.52		0.49			0.53
10 – I kindly acknowledged my own challenges and difficulties			0.64				0.68
11 – I engaged in supportive and comforting self-talk (e.g., "My effort is valuable and meaningful")			0.72	0.33			0.72
12 – I gave myself permission to feel my feelings (e.g., allowed myself to cry)			0.61	0.37			0.71
14 – I spent time with people who are good to me (e.g., support, encourage, and believe in me)				0.59			0.38
15 – I felt supported by people in my life				0.44			0.39
16 – I felt confident that people in my life would respect my choice if I said "no"				0.41			0.40
18 – I maintained a manageable schedule					0.85		0.48
19 – I kept my work/schoolwork area organized to support my work/school tasks					0.64		0.54
20 – I maintained balance between the demands of others and what is important to me					0.33		0.36
22 – I had a calm awareness of my thoughts						0.60	0.39
23 – I had a calm awareness of my feelings				0.36		0.48	0.49
24 – I had a calm awareness of my body						0.52	0.48
n (items)	03	04	03	03	03	03	
Alfa de Cronbach	0.70	0.76	0.84	0.58	0.65	0.63	

[a]Item-total correlation coefficient. The model converged in 22 interactions.

Table 4. Internal consistency of MSCS versions

Factors	Mindful Self-Care Scale			
	MSCS 33-item[a]	MSCS-BR 33-item[b]	B-MSCS 24-item[c]	B-MSCS-BR 19-item
Physical Care	0.76	0.84	0.77	0.76
Supportive Relationships	0.79	0.87	0.77	0.58
Mindful Awareness	0.82	0.85	0.86	0.63
Self-Compassion and Purpose	0.84	0.84	0.78	0.84
Mindful Relaxation	0.79	0.79	0.74	0.70
Supportive Structure	0.79	0.80	0.79	0.65

[a]Cook-Cottone and Guyker (2018).
[b]Garcia et al. (2022a).
[c]Hotchkiss and Cook-Cottone (2019).

Table 5. Descriptive statistics of the instruments for assessing religious/spiritual coping, resilience, and mindful self-care ($n = 203$)

Instruments	Maximum score	Mean	Median	SD	Minimum	Maximum
SRCOPE−14-BR – Positive	35	29.79	31	5.15	7	35
SRCOPE−14-BR – Negative	35	13.53	11	6.88	7	34
Brief Resilience Scale-BR	25	15.48	15.50	2.37	6	23
Mindful Relaxation[a]	5	2.22	2.25	0.81	0.75	3.75
Physical Care[a]	5	1.58	1.40	0.69	0.80	3.60
Self Compassion Purpose[a]	5	2.85	3.00	0.70	0.75	3.75
Supportive Relationships[a]	5	3.03	3.00	0.65	0.75	3.75
Supportive Structure[a]	5	2.93	3.00	0.66	0.75	3.75
Mindful Awareness[a]	5	4.18	4.00	0.82	1.00	5.00

[a]Factors – B-MSCS-BR – 19-item.

Table 6. Correlation between B-MSCS-BR factors, religious/spiritual coping, and resilience ($n = 203$)*

	SRCOPE – Positive	SRCOPE – Negative $r(p)$	Resilience
Mindful Relaxation	**0.168 (0.016)**	**−0.160 (0.023)**	0.055 (0.437)
Physical Care	0.033 (0.635)	−0.050 (0.480)	0.061 (0.383)
Self-Compassion and Purpose	**0.335 (<0.001)**	−0.122 (0.081)	0.065 (0.358)
Supportive Relationships	**0.415 (<0.001)**	**−0.142 (0.043)**	0.076 (0.282)
Supportive Structure	**0.265 (<0.001)**	−0.128 (0.068)	0.010 (0.885)
Mindful Awareness	**0.390 (<0.001)**	**−0.140 (0.045)**	0.093 (0.184)

*Pearson's bivariate correlation analyses, $p \leq 0.05$.

to highlight the result regarding the assessment of the difficulty of providing care to a person with cancer. On a scale of 0 to 10, with 0 being not difficult at all, and 10 being excessively difficult, the average response was 4.22, which we consider to be a relatively low average. According to a mixed-method study on burden and social support among Brazilian informal caregivers of people undergoing kidney dialysis, the experience of the caring task is marked by duality: on one hand, caregivers recognize the restrictions imposed by the demands of care; while on the other hand, the meanings attributed to care – designating it as an obligation, affection, divine design, learning experience, and responsibility – can influence the perception of overload, allowing caregivers to not feel overloaded even when they state that they perform multiple activities or report a lack of time for leisure and physical activities (Vieira et al. 2021).

Based on the EFA, with a factor solution that reproduced 79.2% of the theoretically expected structure, the B-MSCS-BR presented a theoretical structure of 6 dimensions, compatible both with its full (Cook-Cottone and Guyker 2018) and abbreviated versions in English (Hotchkiss and Cook-Cottone 2019), and with the full version of the MSCS adapted for Brazilian culture (Garcia et al. 2022a). The 6 factors of the MSCS are mapped onto the Attuned Representational Model of Self (Cook-Cottone 2015). From this model, it is understood that the internal aspects of self-care: physiological (body), emotional (feeling), and cognitive (thinking). The external aspects include the microsystem (family and close friends), the exosystem (community), and the macrosystem (culture) (Cook-Cottone 2015). According to Cook-Cottone and Guyker (2018), to nurture the internal experience of the self, the items in the *Physical Care* and *Self Compassion and Purpose* factors of the MSCS address the emotional and cognitive aspects of the self. The *Supportive Relationships* and *Supportive Structure* factors are practices aligned with the external experience of self, which provide structure for choosing and maintaining positive relationships, creating supportive environments and

balancing external demands. The *Mindful Awareness* and *Mindful Relaxation* factors are centering practices that enable the evaluation of internal and external experiences in an integrative, attuned and self-regulated way (Cook-Cottone and Guyker 2018).

However, although the 6 dimensions of the scale were maintained, a total of 4 items were excluded from the B-MSCS-BR due to a lack of interpretative reasonableness, considering that they were grouped differently from what was theoretically expected. For example, item 01 (I did something creative to relax – e.g., drew, played instruments, wrote creatively, sang, organized) originally belonging to the *Mindful Relaxation* factor, according to our results, was allocated to the *Physical Care* factor. Item 13 (I experienced meaning and/or a larger purpose in my work/school life – e.g., for a cause), which should have been part of the *Self-Compassion and Purpose* factor, was allocated to the *Mindful Relaxation* factor. Cook-Cottone and Guyker (2018) argue that the items in the *Mindful Relaxation* factor are presented as specific practices that can help a person relax, such as doing something creative or engaging the senses with the aim of relaxation, so in essence, the organizing theme of the items in this factor is relaxation. According to the literature, self-care practices, especially those imbued with mindfulness, show varied manifestations in different parts of the world, so scholars in the field recommend that more research be carried out to investigate the relationship between culture and formal mind–body practices (Hotchkiss et al. 2023). Thus, we understand that cultural issues may have interfered with these results. On the other hand, there could be another interpretation of the lack of mental health literacy among the caregivers. Mental health literacy is usually defined as the ability to be aware of one's mental health conditions and is associated with help-seeking behavior (Vovou et al. 2021). While the disparities observed in item 01 might be considered as caregivers were being less literate in the purpose of different mental health coping strategies, and tended to perceive mindful relaxation activities as leisure activities, equating them with physical rest without acknowledging their significant impact on psychological well-being.

Item 05 (I eat a variety of nutritious foods – e.g., vegetables, proteins, fruits, and grains), originally part of the *Physical Care* factor (Cook-Cottone and Guyker 2018), was excluded from the B-MSCS-BR because it did not meet the saturation criterion of at least 0.30 to remain on the scale. Thus, we understand that among the participants in this study, healthy eating was not understood as a mindful self-care activity. However, in a qualitative study that aimed to understand the self-care needs of Brazilian family caregivers of people with cancer in palliative home care, the results indicated that the self-care needs of caregivers are linked, among other issues, to food and hydration (Vale et al. 2019). These caregivers reported irregular and inadequate diets and poor water intake; however, they recognize the importance of increasing and varying the consumption of fruit and vegetables, as well as reducing the consumption of foods with a high lipid content, canned goods, sausages, and fried foods (Vale et al. 2019). It is also worth noting that, in this study, the *Physical Care* factor was the one with the lowest average among the participants, considering the other factors of the B-MSCS-BR. This result is in line with evidence indicating that physical demands are among the main needs of caregivers of people with cancer (Semere et al. 2021; Vale et al. 2019).

The assessment of the validity based on relationships with external measures (SRCOPE-14-BR) of the B-MSCS-MR confirmed the association of the scores of its factors with the scores of the religious/spiritual coping scale, so that associations were found in the direction and magnitude expected theoretically. However, it is worth noting that, in general, the correlations were lower than 0.4, as shown in Table 6. The *Supportive Relationships, Mindful Awareness, Self-Compassion and Purpose, Mindful Relaxation*, and *Supportive Structure* factors showed a direct association with positive RSC. The factors *Mindful Relaxation, Supportive Relationships*, and *Mindful Awareness* were inversely associated with negative religious/spiritual coping. There are few studies investigating the association between self-care and spirituality. In the case of mindful self-care, no studies were identified that assessed the relationship between this variable and spirituality. Posluns and Gall (2020), through a literature review, examined the role of self-care in promoting well-being among mental health professionals. The authors indicate spirituality as a possible self-care strategy for mental health professionals, which encompasses strategies such as spiritual connection, prayer, mindfulness, spending time in nature, practicing gratitude, and meaning-making (positive re-evaluation, engaging in meaningful work, setting goals with a purpose in life, spiritual beliefs, and activities – for example, the ultimate meaning of work) (Posluns and Gall 2020). We understand that it is possible for individuals who practice mindful self-care, which involves mindfulness and self-compassion, to find in spirituality and/or religious practice a significant source of support and guidance. It is possible that integrating mindful self-care practices with spiritual aspects can result in psychological and emotional benefits, including a deeper sense of purpose in life and a strengthened ability to deal with existential challenges. However, the nature of this relationship can vary widely from person to person, depending on their religious beliefs, spiritual traditions, and levels of engagement with self-care practices. Therefore, an accurate understanding of this complex connection requires an interdisciplinary approach that takes into account both the psychological and spiritual aspects of the individual.

This study plays a crucial role in understanding and promoting the well-being of Brazilian caregivers of people with cancer, considering that, as far as we know, this is the first instrument developed for assessing mindful self-care validated for the Brazilian culture for this population. The B-MSCS-BR offers a validated and reliable tool for measuring the practice of mindful self-care, and can provide valuable insights into the psychological and emotional state of caregivers. By better understanding the specific needs and challenges faced by them, health-care professionals can tailor interventions and offer personalized support aimed at mitigating stress and promoting their quality of life. This research thus contributes to improving comprehensive care for caregivers of people with cancer, recognizing the importance of mental and emotional health among all those involved in the process of providing care to people with cancer.

In addition to its specific contributions to the literature on Brazilian caregivers of people with cancer, this study is also highly relevant in the context of evidence-based research. First, by validating a specific scale for assessing mindful self-care among caregivers, it adds a methodologically robust tool to the literature, providing a solid basis for future research in this field. By validating a scale for the assessment of mindful self-care, the study establishes a reliable instrument that can be replicated in subsequent studies, promoting methodological consistency and the comparability of results over time and between different contexts. Furthermore, by highlighting the psychometric properties of the scale, such as its reliability and validity, the study offers valuable insights into the quality of available assessment instruments, promoting accuracy in mindful self-care measurements. The use of this validated scale in future research can strengthen the knowledge base on effective mindful self-care strategies for caregivers, contributing to the development

of evidence-based interventions. This not only improves the quality of scientific research in this field but also provides grounded information that can be applied in clinical practice and health policy development.

Furthermore, by focusing on the psychometric properties of the instrument, the study demonstrates the importance of the validation and reliability of measurement methods, highlighting the need for methodological rigor in research on mindful self-care. By adding this layer of validation, the study contributes to the credibility and reliability of evidence-based research (Robinson et al. 2021), strengthening confidence in the results and increasing their potential impact on health-care practices and public policies.

Limitations

There are some limitations to this study, including the use of convenience sampling. A study conducted in a single center, although it can offer valuable insights, has some limitations. Caution is needed when generalizing the results to a wider population, since the sociodemographic characteristics of the participants may not represent the diversity present in different regions or contexts. It is therefore recommended that the study be replicated in multiple centers and with a larger sample size in order to obtain more robust and applicable conclusions on a broader scale. The instrument that was originally used as a reference for this study, as well as its version translated and adapted into Brazilian Portuguese, was not developed and validated for family caregivers. The instrument was developed among palliative care professionals. This may have had an impact on the results of the psychometric properties. Finally, the temporal stability of the responses to the B-MSCS-BR among the participants was not assessed, which could be considered a limitation.

Conclusions

The results of this study suggest that the B-MSCS-BR (19 items) (Supplementary Material) is a valid, reliable and culturally appropriate instrument for assessing mindful self-care practices among family caregivers of people with cancer. Although the MSCS-BR (33 items) has shown satisfactory validity evidence (Garcia et al. 2022a), its abbreviated version, the B-MSCS-BR, is a more concise measure that can be useful in order to avoid respondent fatigue, whether in a clinical or research context. Longitudinal studies are recommended in order to better understand the effects of mindful self-care on resilience and religious/spiritual coping among family caregivers of people with cancer, as well as to assess the temporal stability of responses to the Brazilian Portuguese version of the B-MSCS-BR among other populations in Brazil.

before participating in the study. No identifying information was recorded within the questionnaire responses collected.

References

Addington-Hall JM (2007a) Survey design. In Addington-Hall JM, Bruera E, Higginson I and Payne S (eds), *Research Methods in Palliative Care*. New York: Oxford University Press, 45–60.

Addington-Hall JM (2007b) Survey research: Methods of data collection, questionnaire design, and piloting. In Addington-Hall JM, Bruera E, Higginson I and Payne S (eds), *Research Methods in Palliative Care*. New York: Oxford University Press, 61–82.

Adelman RD, Tmanova LL, Delgado D, *et al.* (2014) Caregiver burden: A clinical review. *JAMA* **311**(10), 1052–1060. doi:10.1001/jama.2014.304

American Educational Research Association, American Psychological Association and National Council on Measurement in Education (2014) *Standards for Educational and Psychological Testing*. New York: American Educational Research Association.

Aparuhov T, Muthén LK and Muthén BO (2009) Exploratory structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal* **16**(3), 397–438. doi:10.1080/10705510903008204

Babić R, Babić M, Rastović P, *et al* (2020) Resilience in health and illness. *Psychiatria Danubina* **32**(Suppl 2), 226–232.

Coelho GLH, Hanel PHP, Cavalcanti TM, *et al.* (2016) Brief Resilience Scale: Testing its factorial structure and invariance in Brazil. *Universitas Psychologica* **15**(2), 397–408. doi:10.11144/Javeriana.upsy15-2.brst

Connelly LM (2008) Pilot studies. *Medsurg Nursing* **17**(6), 411–412.

Cook-Cottone CP (2015) Incorporating positive body image into the treatment of eating disorders: A model for attunement and mindful self-care. *Body Image* **14**, 158–167. doi:10.1016/j.bodyim.2015.03.004

Cook-Cottone C (2020) *Embodiment and the Treatment of Eating Disorders: The Body as a Resource in Recovery*. New York: WW Norton & Company.

Cook-Cottone CP and Guyker WM (2018) The development and validation of the Mindful Self-Care Scale (MSCS): An assessment of practices that support positive embodiment. *Mindfulness* **9**, 161–175. doi:10.1007/s12671-017-0759-1

Dionne-Odom JN, Azuero A, Taylor RA, *et al.* (2021) Resilience, preparedness, and distress among family caregivers of patients with advanced cancer. *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer* **29**(11), 6913–6920. doi:10.1007/s00520-021-06265-y

Esperandio MRG, Escudero FT, Fernandes ML, *et al.* (2018) Brazilian validation of the brief scale for spiritual/religious coping—SRCOPE-14. *Religions* **9**, 31. doi:10.3390/rel9010031

Fayers P and Machin D (2007) *Quality of Life: The Assessment, Analysis and Interpretation of Patient Reported Outcomes*. Chichester: John Wiley & Sons.

Garcia ACM, Ferreira ACG, Silva LSR, *et al.* (2022b) Mindful self-care, self-compassion, and resilience among palliative care providers during the COVID-19 pandemic. *Journal of Pain and Symptom Management.* **64**(1), 49–57. doi:10.1016/j.jpainsymman.2022.03.003

Garcia ACM, Silva LSR, Ferreira ACG, *et al.* (2022a) Translation, cultural adaptation, and validation of the mindful self-care scale among Brazilian palliative care providers. *Palliative and Supportive Care* **20**(6), 839–845. doi:10.1017/S1478951521001802

Goudarzian AH, Boyle C, Beik S, *et al.* (2019) Self-care in Iranian cancer patients: The role of religious coping. *Journal of Religion and Health* **58**(1), 259–270. doi:10.1007/s10943-018-0647-6

Hair JF, Black WC, Anderson RE, *et al.* (2010) *Análise Multivariada de Dados*, 6 edn. Porto Alegre: Bookman.

Hotchkiss JT (2018) Mindful self-care and secondary traumatic stress mediate a relationship between compassion satisfaction and burnout risk among hospice care professionals. *The American Journal of Hospice & Palliative Care* **35**(8), 1099–1108. doi:10.1177/1049909118756657

Hotchkiss JT and Cook-Cottone CP (2019) Validation of the Mindful Self-Care Scale (MSCS) and development of the Brief-MSCS among hospice and healthcare professionals: A confirmatory factor analysis approach to

validation. *Palliative and Supportive Care* **17**(6), 628–636. doi:10.1017/S1478951519000269

Hotchkiss JT, Cook-Cottone CP, Wong MYC, *et al.* (2023) Intercultural validation of the mindful self-care scale—Rasch and factor analysis of 16 studies representing five continents. *Mindfulness* **14**, 2055–2072. doi:10.1007/s12671-023-02196-3

Hotchkiss JT and Lesher R (2018) Factors predicting burnout among chaplains: Compassion satisfaction, organizational factors, and the mediators of mindful self-care and secondary traumatic stress. *The Journal of Pastoral Care & Counseling: JPCC* **72**(2), 86–98. doi:10.1177/1542305018780655

Mills J, Wand T and Fraser JA (2018) Exploring the meaning and practice of self-care among palliative care nurses and doctors: A qualitative study. *BMC Palliative Care* **17**(1), 63. doi:10.1186/s12904-018-0318-0

Mokkink LB, Prinsen CAC, Patrick DL, *et al.* (2017) COSMIN methodology for systematic reviews of Patient-Reported Outcome Measures (PROMs) - user manual (Version 1.0).

Pargament K, Feuille M and Burdzy D (2011) The brief RCOPE: Current psychometric status of a short measure of religious coping. *Religions* **2**, 51–76. doi:10.3390/rel2010051

Pasquali L (2005) *Análise Fatorial Para Pesquisadores.* Brasília: LabPam.

Posluns K and Gall TL (2020) Dear mental health practitioners, take care of yourselves: A literature review on self-care. *International Journal for the Advancement of Counselling* **42**(1), 1–20. doi:10.1007/s10447-019-09382-w

Quinn C, Nelis S, Martyr A, *et al.* (2019) Influence of positive and negative dimensions of dementia caregiving oncaregiver well-being and satisfactionwith life: Findings from theIDEAL study. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry* **27**(8), 838–848. doi:10.1016/j.jagp.2019.02.005

Rios J and Wells C (2014) Validity evidence based on internal structure. *Psicothema (Oviedo)* **26**(1), 108–116. doi:10.7334/psicothema2013.260

Robinson KA, Brunnhuber K, Ciliska D, *et al.* (2021) Evidence-based research series-paper 1: What evidence-based research is and why is it important? *Journal of Clinical Epidemiology* **129**, 151–157. doi:10.1016/j.jclinepi.2020.07.020

Semere W, Althouse AD, Rosland AM, *et al.* (2021) Poor patient health is associated with higher caregiver burden for older adults with advanced cancer. *Journal of Geriatric Oncology* **12**(5), 771–778. doi:10.1016/j.jgo.2021.01.002

Sherman DW (2004) Nurses' stress & burnout. How to care for yourself when caring for patients and their families experiencing life-threatening illness. *The American Journal of Nursing* **104**(5), 48–57. doi:10.1097/00000446-200405000-00020

Smith BW, Dalen J, Wiggins K, *et al.* (2008) The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine* **15**(3), 194–200. doi:10.1080/10705500802222972

Sun V, Raz DJ and Kim JY (2019) Caring for the informal cancer caregiver. *Current Opinion in Supportive and Palliative Care* **13**(3), 238–242. doi:10.1097/SPC.0000000000000438

Thana K, Lehto R, Sikorskii A, *et al.* (2021) Informal caregiver burden for solid tumour cancer patients: A review and future directions. *Psychology and Health* **36**(12), 1514–1535. doi:10.1080/08870446.2020.1867136

Vale JMMD, Marques Neto AC, Santos LMSD, *et al.* (2019) Self-care of the caregiver of the sick in adequate palliative oncological home care. *Rev Enferm UFPE Online* **13**, e235923. doi:10.5205/1981-8963.2019.235923

van Roij J, Brom L, Sommeijer D, *et al.* (2021) Self-care, resilience, and caregiver burden in relatives of patients with advanced cancer: Results from the eQuiPe study. *Supportive Care in Cancer* **29**(12), 7975–7984. doi:10.1007/s00520-021-06365-9

Vieira IFO, Garcia ACM, Brito TRP, *et al.* (2021) Burden and social support among informal caregivers of people on hemodialysis: A mixed study. *Revista Brasileira de Enfermagem* **74**(3), e20201266. doi:10.1590/0034-7167-2020-1266

von Elm E, Altman DG, Egger M, *et al.* (2007) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Annals of Internal Medicine* **147**(8), 573–577. doi:10.7326/0003-4819-147-8-200710160-00010

Vovou F, Hull L and Petrides KV (2021) Mental health literacy of ADHD, autism, schizophrenia, and bipolar disorder: A cross-cultural investigation. *Journal of Mental Health* **30**(4), 470–480. doi:10.1080/09638237.2020.1713999

World Health Organization (2017) Integrated care for older people (ICOPE) Guidelines on community-level interventions to manage declines in intrinsic capacity. World Health Organization.