

## Portuguese version of the Short-Form Survivor Unmet Needs Survey: Psychometric properties in a sample of Azorean cancer survivors

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### Abstract

This study aims to investigate the psychometric properties and the factor structure of the Portuguese version of the Short-Form Survivor Unmet Needs Survey (SF-Suns). The sample comprises 151 cancer survivors from the Azores (Portugal), who completed a survey assessing unmet needs (SF-Suns), psychological symptoms (HADS) and quality of life (QLQ-C30). A Confirmatory Factorial Analysis (CFA) and an Exploratory Factorial Analysis (EFA) were conducted to assess the factorial structure of the SF-Suns. The results of the CFA indicated that the original SF-Suns model did not present an adequate fit to the data. Therefore, an EFA was conducted to explore the factor structure of the scale in the current sample. The resulting four-factor structure differed from the structure of the original version of the scale. The measure presented adequate internal consistency (good Cronbach's alpha values for each factor and for the total scale) and showed convergent validity (moderate correlations with anxiety, depression and some quality of life dimensions). The Portuguese version of the SF-Suns is a reliable and

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psychometrically valid measure for evaluating Azorean cancer survivors' unmet needs. The dissemination of its use can allow tailoring specific clinical and psychotherapeutic responses to their needs.

**Keywords:** cancer survivors, short-form, *Survivor Unmet Needs Survey*, psychometrics

### Versão Portuguesa da Escala de Avaliação de Necessidades de Sobreviventes: Propriedades psicométricas numa amostra de sobreviventes de doença oncológica dos Açores

#### Resumo

Este artigo pretendeu estudar as propriedades psicométricas e a estrutura fatorial da versão portuguesa da *Short-Form Survivor Unmet Needs Survey* (SF-Suns). A amostra incluiu 151 sobreviventes oncológicos dos Açores-Portugal, que completou um protocolo para avaliação de necessidades não satisfeitas (SF-Suns), sintomas psicológicos (EADH) e qualidade de vida (QLQ-C30). Uma Análise Fatorial Confirmatória (AFC) e uma Análise Fatorial Exploratória (AFE) foram conduzidas para avaliar a estrutura fatorial da SF-Suns. Os resultados da AFC indicaram que o modelo original da SF-Suns não apresentou um ajustamento adequado aos dados. Assim, uma AFE foi conduzida para explorar a estrutura fatorial da escala na presente amostra. A estrutura fatorial de quatro fatores foi diferente da estrutura da versão original da escala. A medida apresentou boa consistência interna (bons níveis de alfa de Cronbach foram obtidos para cada fator e para a escala total) e revelou validade convergente (correlações moderadas foram encontradas com ansiedade, depressão e algumas dimensões da qualidade de vida). A versão portuguesa da SF-Suns mostrou ser uma medida fiável e psicometricamente válida para avaliar as necessidades de sobreviventes oncológicos açorianos. A disseminação do seu uso poderá permitir respostas clínicas e psicoterapêuticas mais direcionadas às suas necessidades específicas.

**Palavras-chave:** sobreviventes de cancro, versão breve, escala de avaliação de necessidades não satisfeitas, psicometria

## INTRODUCTION

In Portugal, the mortality rate of cancer patients has been decreasing as a result of recent innovative treatments, among other aspects, and despite the tendency

toward an increase in new cases of cancer – 3% per year (Direção Geral da Saúde [DGS], 2017). According to the Azores Oncology Center, the survival rate five years after diagnosis is close to the national average (Allemani et al., 2018). Thus, we are currently dealing with increasing numbers of cancer survivors, rather than cancer patients. According to the World Health Organization (2008), a cancer survivor is any individual who has recovered from clinically proven evidence of disease and/or shows a minimal risk of recurrence, displaying health restoration in the physical, developmental, and psychosocial domains.

Research shows that even after finishing treatments, survivors can still express unmet needs (e.g., DGS, 2017; Jacobs & Shulman, 2017; Jimenez et al., 2017; Oancea & Cheruvu, 2016; O’Hea et al., 2016; Tang et al., 2015; Wang et al., 2017). Campbell et al. (2011) defined “unmet needs” as problems experienced by cancer survivors related with lack of information, lack of access to and continuity of care, lack of support in domains such as personal relationships and emotional health, and financial concerns. The knowledge gap among health professionals regarding the survivors’ needs can have real implications for survivorship. First, the lack of professional skills for identifying and assessing survivors’ needs can lead to the inadequate referral to specialized services (e.g., Oancea & Cheruvu, 2016; O’Hea et al., 2016), aggravating psychological adjustment issues (e.g., Inhestern et al., 2017; Jean & Syrjala, 2017; Stanton et al., 2015). Second, considering the psychosocial impact of the disease during survivorship, nonreferral to specialized services may affect survivors’ ability to adhere to follow-up (e.g., Jacobs & Shulman, 2017; Tang et al., 2015). Third, the provision of care to these survivors implies that the screening and assessment of needs become integrated into the routine of care (Lai-Kwon & Jefford, 2017; Oancea & Cheruvu, 2016).

The use of standardized measures for assessing cancer survivors’ needs acquires great importance for the purposes of identifying the specific needs to be met, and for referring survivors to specialized services (e.g., mental health services; Campbell et al., 2014; Stanton et al., 2015). Therefore, instruments for assessing patients’ and survivors’ needs have been developed and validated, including the *Cancer Survivors’ Unmet Needs* (CaSUN; Hodgkinson et al., 2007) and the *Supportive Care Needs Survey* (SCNS; Thewes et al., 2004). Both instruments assess the needs of patients and survivors recruited from oncological centers and allow comparisons to be made between types of neoplasia, but do not allow for comparisons with relapsed patients recruited from the community (Campbell et al., 2011). Thus, the need for a psychometrically robust measure to identify the needs of survivors from different contexts and with different sociodemographic and clinical characteristics becomes evident (Campbell et al., 2011). The *Short-Form Survivor Unmet Needs Survey* (SF-Suns; Campbell et al., 2014) is the only standardized measure developed for this purpose (Campbell et al., 2014). The SF-Suns assesses unmet needs in domains

such as information and financial concerns (Campbell et al., 2014). In the original validation study, SF-Suns showed good psychometric properties, with internal reliability values of .85 or above (Campbell et al., 2014). Although this instrument has not yet been validated in other countries, its test-retest validity (Taylor et al., 2018) in a sample of survivors of lymphoma revealed that the measure is sensitive to changes in survivors' needs, as these needs can change over time (Taylor et al., 2018). Thus, the instrument also seems to be sensitive to responsiveness or changes in needs over the survivorship period (Taylor et al., 2018).

In the Azores, a Portuguese archipelago comprising nine islands, the cancer survivors' needs become more relevant given the geographical constraints imposed by the distance between the islands and the difficulties in accessing adequate healthcare services, which are concentrated in three islands. Moreover, survivors often have to move to the Portuguese mainland to undergo surveillance examinations because they are locally unavailable or the regional healthcare system does not have sufficient capacity to deliver. These contingencies increase the burden of Azorean cancer patients and survivors, emphasizing their specific needs in the areas of diagnosis and follow-up. Therefore, the need for brief questionnaires to evaluate the unmet needs of the cancer survivors, especially those from the insular region, is of utmost importance. In Portugal, to our knowledge, there are no measures for assessing cancer survivors' needs. Hence, the goal of the present study is to: a) assess the factor structure of the Portuguese version of the SF-Suns; b) examine the reliability of the SF-Suns subscale scores; and c), examine evidence for the validity of the SF-Suns scores based on their associations with other variables.

## METHOD

### *Participants*

The sample comprised 151 cancer survivors from the Azores, mainly from São Miguel island ( $n = 93$ , 61.6%). The participants were between 19 and 83 years old ( $M = 55.11$ ;  $SD = 13.25$ ); were mostly female ( $n = 117$ , 77.5%), married ( $n = 90$ , 59.6%), have completed elementary education ( $n = 38$ , 25.2%), held a job ( $n = 59$ , 39.1%) and earned between 500 to 900 euros per month.

Regarding the clinical characteristics, 70.2% ( $n = 106$ ) received their cancer diagnosis over three years ago. Among them, 47% ( $n = 71$ ) were breast cancer sur-

vivors. The majority of participants have finished their treatments less than five years ago ( $n = 87$ , 57.6%), have previously performed surgery ( $n = 84$ , 55.6%) and received concomitant chemotherapy and radiotherapy during the active stage of the disease ( $n = 56$ , 37.1%). The treatments were provided in the Azores for 41.7% of the sample ( $n = 63$ ), in mainland Portugal for 19.2% ( $n = 29$ ) and in both places for 39.1% ( $n = 59$ ).

### *Procedures*

Participants were recruited from the oncology service at the regional hospital in Ponta Delgada and from the local centers of the Portuguese League Against Cancer (São Miguel, Terceira, and Fayal delegations) after ethical approval was obtained from those institutions. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee, with the Helsinki declaration and with the Order of Portuguese Psychologists. Informed consent was obtained from all participants who partook in the study.

The inclusion criteria for the sample were as follows: a) being 18 years of age or older; b) being a resident in the Azores; c) absence of clinical signs of oncological disease, as confirmed by the appropriate diagnostic examinations; d) absence of cognitive impairment; and e) being able to read and write in Portuguese.

The participants were contacted through regional health care professionals and a social worker from the institutions involved in the study, who described the study and invited the cancer survivors to participate. The participants who agreed to participate were referred to the researcher and were asked to sign an informed consent form stating the study goals, the conditions for participation, and warranting the confidentiality of the collected information. The data were collected in the presence of each participant, who voluntarily agreed to participate in the research.

### *Measures*

#### *Sociodemographic and clinical data*

Sociodemographic (e.g., age, gender, education, island of residence) and clinical data (e.g., diagnosis, treatments received, time elapsed since the end of treatments) were evaluated through a self-response questionnaire developed for this purpose by the authors of the study.

### *Short Form-Survivor Unmet Needs Survey*

This scale (SF-Suns; Campbell et al., 2014) aims to evaluate cancer survivors' unmet needs. It comprises 30 items rated in a Likert-type response scale ranging from 0 (*no unmet needs*) to 4 (*very high unmet needs*). It is organized into four domains: a) Information (e.g., "Finding information about complementary and alternative therapies"); b) Financial Concerns (e.g., "Having to take a pension or disability allowance"); c) Access and Continuity of Care (e.g., "Having access to cancer services close to my home"); and d) Relations and Emotional Health (e.g., "Telling others how I was feeling emotionally"). In the validation study (Campbell et al., 2014), the domains of the scale revealed good internal reliability ( $\alpha$  ranging from .85 to .95).

The translation of the SF-Suns from English to Portuguese was performed through a process of translation, back-translation, semantic equivalence analysis and experimental application phases, taking into account the cultural and linguistic specificities of each language and the guidelines proposed by Herdman et al. (1997). Two of the authors of the Portuguese version performed the translations independently. The two translations were subsequently compared and the first Portuguese draft version was obtained. This draft version was then back-translated by a researcher fluent in English. The resulting version was compared with the original version of the scale. The final Portuguese version was tested on 10 survivors to evaluate possible difficulties in understanding the translated items. They were able to respond to all items and reported a good comprehension of the items' content.

### *Hospital Anxiety and Depression Scale*

This instrument (HADS; Zigmond & Snaith, 1993; Portuguese version Pais-Ribeiro et al., 2007) comprises 14 items and aims to evaluate anxiety and depression (seven items, each) in clinical populations. Each item has four response options (0-3), and the score on this scale may vary between a minimum of 0 and a maximum of 21 points on both scales. Higher scores indicate higher levels of anxiety and depressive symptomatology. In the present study, the scale showed good levels of internal reliability ( $\alpha = .82$  on both scales).

### *European Organization for the Research and Treatment of Cancer Questionnaire*

This questionnaire (EORTC QLQ-C30; Aaronson et al., 1993; Portuguese version Pais-Ribeiro et al., 2008) includes 30 items rated on a 4-point Likert scale, ranging from 1 (*no*) to 4 (*very much*). The last two items assess the overall quality of life

(QOL) and are answered on a 7-point numerical scale. The 30 items are organized into five functional subscales (Physical, Role, Cognitive, Emotional, Social), one subscale regarding global QOL assessment, three symptoms subscales (Fatigue, Pain, Nausea/Vomiting), items for the assessment of additional symptoms and one item for the assessment of perceived financial difficulties. Scores for all subscales and the item of perceived financial difficulties range from 0 to 100. Higher scores indicate a greater level of functioning and QOL.

In the present study, the alphas obtained were .87 for the subscale on overall QOL and between .67 and .84 for the functional subscales. For the symptoms subscales, the alpha values obtained were adequate (ranging from .72 to .82). Given the values found in the cognitive ( $\alpha = .40$ ) and nausea/vomiting ( $\alpha = .27$ ) dimensions, the researchers decided to exclude them from further analyses.

### *Data Analyses*

All statistical analyses were performed using the *Statistical Package for the Social Sciences* (SPSS, version 24, SPSS, Inc., Chicago, IL). Confirmatory Factor Analysis (CFA) was performed using *Amos* (IBM® SPSS® Amos™ 25). Preliminary analyses were performed to assess whether the data followed a normal distribution. Following the recommendations of Kline (2011), normality was assessed through examination of skewness and kurtosis of each subscale. The data distribution was considered non-normal if the values of skewness and kurtosis were above 3 and 10, respectively. The sociodemographic and clinical characteristics of the sample were obtained through descriptive analysis. A CFA using maximum likelihood estimation was conducted to test the adequacy of the original factor structure of the SF-Suns to the Azorean cancer survivors. A  $\chi^2$ /degrees of freedom (df) ratio of 5 or less was assumed as indicative of acceptable model fit (Ullman, 1996). Additionally, the quality of the model fit was evaluated according to the criteria established by Browne and Cudeck (1993), and Hu and Bentler (1999), based on the following guidelines for adequate and good model fit: the *Comparative Fit Index* (CFI) and the *Tucker-Lewis Index* (TLI), which have reference values of  $\geq .90$  and  $\geq .95$  for these criteria, respectively. Regarding the *Root Mean Square Error of Approximation* (RMSEA), reference values were  $\leq .08$  (for adequate fit) and  $\leq .06$  (for good model fit).

An Exploratory Factor Analysis (EFA), using a principal components method with Varimax rotation, was performed. Both the Kaiser-Meyer-Olkin (KMO) and the Bartlett sphericity tests were used to evaluate the suitability of the sample for the EFA.

To explore the internal reliability, Cronbach's alpha values were obtained for the total scale and its factors. The criteria established by Murphy and Davidshofer (1988) for Cronbach alpha were  $< .60$  (not acceptable),  $.70$  (low reliability), between  $.80$  and  $.90$  (moderate to high reliability) and  $> .90$  (high reliability). Corrected item-total correlations were considered only when they were equal to or greater than  $.40$ , and the internal reliability was recalculated each time an item was eliminated to determine whether removing it affected the total alpha coefficient.

To evaluate convergent validity, Pearson's correlations were calculated between the SF-Suns and other measures. The guidelines proposed by Cohen (1988) were followed: values of  $.10$ ,  $.30$  and  $.50$  (or higher) were considered weak, moderate and strong correlations, respectively.

## RESULTS

### *Descriptive statistics of the SF-Suns*

The descriptive statistics regarding each subscale and the total scale are presented in Table 1.

**Table 1**  
*Descriptive statistics of the SF-Suns (N = 151)*

Variable	M (SD)	Minimum-Maximum	Skewness	Kurtosis
1. SF-Suns_Emoional Experience	17.38 (11.10)	0-44	0.41	-0.49
2. SF-Suns_Access and Continuity of Care	3.09 (5.04)	0-24	2.00	4.00
3. SF-Suns_Financial Concerns	5.31 (5.43)	0-20	0.89	- 0.24
4. SF-Suns_Relation with Others	2.37 (3.51)	0-15	1.67	2.19
5. SF-Suns_Total	28.15 (18.79)	0-92	0.74	0.23

### *Confirmatory factor analysis*

The result of Chi-square/degrees of freedom (1081.436/399) ratio was 2.71. However, regarding other fitting indicators, the original correlated four-factor model failed to present an adequate fit to the data ( $\chi^2_{(399)} = 1081.436$ ,  $p < .001$ ; TLI



= .740; CFI = .762; RMSEA = .107; PCFI = .701). The modification indices suggested that correlating some parameters would improve model adjustment. However, despite correlating the errors in different items that belonged to the same factor and assessed the same content (#1 and #2; #5 and #9; #27 and #29), the model fit indices were still below acceptable values ( $\chi^2_{(396)} = 924.178, p < .001$ ; TLI = .797; CFI = .815; RMSEA = .094; PCFI = .742). Given these results, an EFA was performed to examine the underlying structure of the SF-Suns variables in the current sample.

### *Exploratory factor analysis*

The Bartlett sphericity test ( $\chi^2 = 3059.573; p < .001$ ) and the Kaiser-Meyer-Olkin measure (KMO = .830) showed that data were adequate for pursuing the analysis. According to the rule of an *eigenvalue* higher than 1, the structure of the scale revealed the existence of seven factors explaining 69.8% of the total scale variance. Because the solutions of 7, 6 and 5 factors resulted in a small number of items in each factor, factor extraction was fixed at 4, as in the original version of the instrument. This factorial structure explained 60.53% of the total scale's variance. Item 8 ("Finding parking that I can afford at the hospital or clinic") and item 9 ("Understanding what is covered by my medical insurance or benefits") yielded *factor loadings* below .40 (.19 and .32, respectively). They were excluded and do not appear in subsequent analyses. There were no cross-loadings in the final structure.

Factor 1 explained 31.84% of the scale variance. It included items previously belonging to the "Relationship and Emotional Health" factor (#18, #19, #23, #24, #25, #27, #28, #29, #30), items previously belonging to the "Information" factor (#2, #3) and a single item from the "Financial Concerns" factor (#11). Considering the content of these items and what they intend to evaluate, this factor was renamed "Emotional Experience" (EE). Factor 2 explained 13.25% of the scale variance and included the same items from "Access and Continuity of Care" (ACC) factor of the original version of the scale (#12, #13, #14, #15, #16, #17). Factor 3 explained 8.85% of the scale's variance and consisted of items comprising the "Financial Concerns" (FC) factor of the original instrument structure (#4, #5, #6, #7 and #10), except item 11, which saturated in factor 1. Factor 4 explained 6.59% of the variance in the scale. It included items 20, 21, 22 and 26 of the "Relationship and Emotional Health" factor, as well as item 1 of the "Information" factor. Given the content of these items, this factor was renamed "Relationship with Others" (RwO). The factor loading for each item ranged from .413 (item 10) to .934 (item 6) (see Table 2).

**Table 2***Factor Loadings after Principal Components Analysis with Varimax Rotation*

Items	Original SF-Suns	EE	ACC	FC	RwO
27. Dealing with not being able to feel "normal"	REH	.812			
23. Dealing with feeling depressed	REH	.738			
18. Telling others how I was feeling emotionally	REH	.718			
24. Dealing with feeling tired	REH	.703			
19. Finding someone to talk to who understands and has been through a similar experience	REH	.659			
3. Dealing with worry about whether the treatment has worked	INF	.646			
2. Dealing with fears about cancer spreading	INF	.622			
30. Dealing with changes in how my body appears	REH	.620			
28. Trying to stay positive	REH	.613			
11. Doing work around the house	FC	.597			
29. Coping with having a bad memory or lack of focus	REH	.590			
25. Dealing with feeling stressed	REH	.579			
16. Making sure I had enough time to ask my doctor or nurse questions	ACC		.868		
17. Getting the health care team to attend promptly to my physical needs	ACC		.823		
14. Getting test results quickly enough	ACC		.804		
13. Getting appointments with specialists quickly enough	ACC		.798		
15. Having access to care from other health specialists	ACC		.781		
12. Having access to cancer services close to my home	ACC		.628		
6. Paying household bills or other payments	FC			.934	
7. Finding out what type of financial assistance is available and how to obtain it	FC			.904	
4. Worrying about earning money	FC			.895	
5. Having to take a pension or disability allowance	FC			.798	
10. Knowing how much time I would need away from work	FC			.413	
22. Dealing with reduced support from others when treatment has ended	REH				.768
20. Dealing with people who expect me to be "back to normal"	REH				.665
26. Dealing with feeling lonely	REH				.655
21. Dealing with people accepting that having cancer has changed me as a person	REH				.649
1. Finding information about complementary or alternative therapies	INF				.553

*Note.* Only factor loadings > .40 are reported in the Table. Factors in the original SF-Suns: REH = Relationship and Emotional Health; INF = Information; ACC = Access and Continuity of Care; FC = Financial Concerns.

*Reliability analysis and correlation between scales*

Good Cronbach's alpha values were obtained for the EE ( $\alpha = .90$ ), for the ACC ( $\alpha = .90$ ), for the FC ( $\alpha = .88$ ) and for the RwO ( $\alpha = .81$ ). As shown in Table 3, the 28-item scale revealed adequate internal reliability ( $\alpha = .92$ ).

**Table 3**  
*Reliability and item analyses*

Item	<i>M</i> ( <i>SD</i> )	Corrected item-total correlation	Cronbach's alpha when item was deleted
EE ( $\alpha = .90$ )			
2. Dealing with fears about cancer spreading	1.91 (1.42)	.602	.898
3. Dealing with worry about whether the treatment has worked	1.78 (1.43)	.584	.899
11. Doing work around the house	1.11 (1.28)	.520	.902
18. Telling others how I was feeling emotionally	1.34 (1.32)	.660	.895
19. Finding someone to talk to who understands and has been through a similar experience	1.01 (1.23)	.619	.897
23. Dealing with feeling depressed	1.35 (1.31)	.727	.892
24. Dealing with feeling tired	1.87 (1.37)	.687	.894
25. Dealing with feeling stressed	1.59 (1.34)	.623	.897
27. Dealing with not being able to feel 'normal'	1.79 (1.38)	.760	.890
28. Trying to stay positive	0.95 (1.22)	.619	.897
29. Coping with having a bad memory or lack of focus	1.28 (1.19)	.563	.900
30. Dealing with changes in how my body appears	1.40 (1.37)	.598	.898
ACC ( $\alpha = .90$ )			
12. Having access to cancer services close to my home	0.56 (1.12)	.528	.911
13. Getting appointments with specialists quickly enough	0.53 (1.03)	.775	.872
14. Getting test results quickly enough	0.56 (1.09)	.736	.878
15. Having access to care from other health specialists	0.50 (1.00)	.755	.875
16. Making sure I had enough time to ask my doctor or nurse questions	0.51 (1.00)	.805	.867
17. Getting the health care team to attend promptly to my physical needs	0.42 (0.93)	.778	.873

**Table 3**  
*Reliability and item analyses (cont.)*

Item	M (SD)	Corrected item-total correlation	Cronbach's alpha when item was deleted
FC ( $\alpha = .88$ )			
4. Worrying about earning money	1.22 (1.39)	.827	.779
5. Having to take a pension or disability allowance	0.84 (1.20)	.706	.808
6. Paying household bills or other payments	1.15 (1.38)	.868	.770
7. Finding out what type of financial assistance is available and how to obtain it	1.17 (1.34)	.844	.776
10. Knowing how much time I would need away from work	0.93 (1.26)	.355	.873
RwO ( $\alpha .81$ )			
1. Finding information about complementary or alternative therapies	0.27 (0.70)	.489	.777
20. Dealing with people who expect me to be "back to normal"	0.54 (0.97)	.632	.741
21. Dealing with people accepting that having cancer has changed me as a person	0.45 (0.91)	.635	.742
22. Dealing with reduced support from others when treatment has ended	0.39 (0.86)	.642	.742
26. Dealing with feeling lonely	0.72 (1.17)	.590	.756

Note. EE = Emotional Experience; ACC = Access and Continuity of Care; FC = Financial Concerns; RwO = Relation with Others.

Strong and statistically significant correlations between factors and the total scale were found (see Table 4). The weak statistically significant correlation between factor 3 (FC) and factor 4 (RwO) ( $r = .25$ ;  $p < .001$ ) is noteworthy. There was no statistically significant correlation between factor 2 (ACC) and factor 3 (FC).

**Table 4**  
*Correlations between factors of the SF-Suns*

Factor	1	2	3	4
1. SF-Suns_EE	—			
2. SF-Suns_ACC	.35**	—		
3. SF-Suns_FC	.43**	.15	—	
4. SF-Suns_RwO	.51**	.42**	.25**	—
5. SF-Suns_Total	.90**	.59**	.63**	.68**

Note. EE = Emotional Experience; ACC = Access and Continuity of Care; FC = Financial Concerns; RwO = Relation with Others.

\*\*  $p < .001$

### Convergent validity

Moderate to strong statistically significant correlations were found between SF-Suns factors and anxiety and depression (see Table 5). The total SF-Suns and its factors revealed weak negative statistically significant correlations with both the global dimension of the QOL and with the functional subscales of the EORTC QLQ-C30. No statistically significant correlations were observed between SF-Suns Access and Continuity of Care factor and the Global Assessment, Emotional and Role dimensions of quality of life.

**Table 5**  
*Correlations between the SF-Suns and other measures*

SF-Suns	HADS Depression	HADS Anxiety	QLQ-C30 Global Assessment	QLQ-C30 Emotional	QLQ-C30 Role	QLQ-C30 Social
SF-Suns_EE	.48**	.52**	-.36**	-.44**	-.34**	-.33**
SF-Suns_ACC	.17*	.18*	-.08	-.17	-.12	-.32**
SF-Suns_FC	.23**	.31**	-.20**	-.20*	-.20*	-.21*
SF-Suns_RwO	.56**	.44**	-.37**	-.39**	-.23**	-.23**
SF-Suns_Total	.50**	.51**	-.36**	-.44**	-.34**	-.38**

\*  $p < .05$ ; \*\*  $p < .001$

## DISCUSSION

This study aimed to explore the psychometric properties of the Portuguese version of the SF-Suns among Azorean cancer survivors. After examining the original factor structure of the scale and assessing the distribution of its items in the present sample, items from two factors showed a different distribution across factors when compared with its original version. Because the results of the CFA indicated that the original model presented a poor fit to the data, an EFA was performed to study the latent structure of the SF-Suns in a sample of Azorean cancer survivors. Based on the solution found in the EFA, the subsequent results showed that the Portuguese version is a psychometrically valid measure for assessing cancer survivors' needs of an insular region.

In the EFA, most items in the "Relationship and Emotional Health" original factor saturated in the EE factor. The latter factor assesses the need expressed by survivors to cope with feelings and emotions related to the disease. Additionally, items 2 and 3, which originally belonged to the "Information" factor, saturated in the EE factor.

Considering the content of item 2, which addresses the fears of recurrence, one can easily understand this predominantly refers to an emotional need/experience of cancer survivors (Conley et al., 2016; Edib et al., 2016; Stanton et al., 2015). The item 3 reflects emotional concerns related to the ability to deal with the disease, which is common among cancer survivors (Conley et al., 2016; Ellegaard et al., 2017). In addition, item 11, which was included in the FC factor in the original version, also saturated in the EE factor. From a theoretical standpoint, such a finding is not surprising, considering that performing household chores may be a self-efficacy strategy used by survivors to deal with the worries and fears that arise in their daily lives (e.g., Hajian et al., 2017).

The ACC and FC factors included the same items, as in the original scale (Campbell et al., 2014). The ACC evaluates survivors' needs to access health services close to their homes and their perceptions on how their needs are addressed by health professionals (Campbell et al., 2011). The FC assesses the survivors' needs regarding their jobs and the economic issues arising from it (Campbell et al., 2011). However, items 8 and 9, which were originally included in this second factor, were eliminated from the scale based both on a statistical criterion (loadings  $< .40$ ), and on the specificities inherent to the context of the studied sample. In the Azores, the parking for health services is free. Moreover, health insurance is not mandatory because the national health system ensures access to healthcare to all citizens. Thus, these items are not applicable to Portuguese health system users, and were deemed unnecessary, particularly because their removal was not detrimental to the internal reliability of the factors to which they belonged.

Items 20, 21, 22 and 26 of the "Relationship and Emotional Health" original factor saturated in a single factor, which was designated RwO in this study. This factor assesses feelings and behaviors that express the survivors' need to connect with significant others (Campbell et al., 2011). The research notes that, among other aspects, relationships and social support are fundamental aspects of dealing with survivorship (Banovcinova & Baskova, 2016; Haviland et al., 2017). The inclusion of those items in that factor makes sense to the extent that they convey information that is passed among survivors. This process can help them accepting the therapeutic process as an opportunity to establish relationships with others with a similar experience in social settings, such as support or self-help groups.

When observing the correlations between factors found in the EFA, the highest correlations were observed between the EE factor and the RwO factors. This result highlights the importance of maintaining high-quality social support for emotional well-being during survivorship (e.g., Fong et al., 2017).

In terms of internal reliability, the Portuguese version of the instrument showed good consistency. Similar to the original study (Campbell et al., 2014), both the total scale and its factors revealed adequate Cronbach's alpha values (above .80).

As expected, the SF-Suns and its factors showed correlations with other measures of psychological adaptation and with QOL. These correlations seem to suggest that establishing appropriate resources to address specific domains of unmet needs could help overcoming psychological symptoms and improving quality of life domains. These results are congruous with other studies to the extent that unmet needs during the survivorship were associated with psychological disruption (anxiety and depression; Oberoi et al., 2017a; Oberoi et al., 2017b; Watson et al., 2016), and negatively affect the perceived QOL (Cheng et al., 2016; Edib et al., 2016; Mayer et al., 2017; Miyashita et al., 2015; Palmer et al., 2016). Specifically, the correlation observed between the ACC factor and the psychological symptoms and QOL is in line with previous research pointing out to the lack of access to health care and support services necessary to maintain or improve quality of life and mental health outcomes following a cancer diagnosis observed in rural or more isolated communities (Naughton & Weaver, 2014). Therefore, survivors needing mental health services may face additional challenges accessing health care providers and resources (Naughton & Weaver, 2014).

These findings demonstrate how crucial it is to assess survivor's needs so that appropriate responses can be provided to prevent psychological disorders or, upon their onset, to promote recovery and/or to improve the survivors' indicators of psychological adaptation and QOL.

This study has the following limitations. First, this is a psychometric study conducted with a Portuguese sample living in the Azores, which can limit the representativeness of the sample and the generalizations of the results to the Portuguese population. Caution should be made when generalizing the current results to the wider Portuguese population of cancer survivors, particularly in relation to cancer type. The majority of the sample comprised breast cancer survivors. Future research should test SF-Suns with other cancer populations. Second, the sample size required for CFA analysis may have compromised statistical power and model's parameters estimations relevant to model fit. Despite the preserving a four-factor structure, item loadings did not reproduce the original latent structure found by Campbell et al. (2014). Future studies must perform a CFA and model comparisons in a larger sample to confirm the current structure, along with the measurement invariance across groups (e.g., configural invariance). Third, it was not possible to evaluate the test-retest reliability of the scale and future studies should aim to evaluate temporal stability or responsiveness to change. Fourth, the convergent validity analysis was based on instruments used to assess variables/symptoms which can derive from satisfying, or not, certain needs rather than from similar measures devised to assess survivors' needs. To the best of our knowledge, there were no other scales for needs assessment in Portuguese oncological settings available, making the convergent

validity evaluation more difficult. This illustrates the need for a psychometrically valid needs assessment measure in Portuguese oncological settings. Fifth, two dimensions of quality of life (symptoms and cognition) obtained reliability scores below acceptable values and, for this reason, they were not included in the statistical analysis. Future studies should clarify the role of these dimensions in unmet needs.

Despite the aforementioned limitations, the Portuguese version proved to be a psychometrically valid measure for the evaluation of this construct in oncological survivors in community settings. Besides being the first validated instrument for the Portuguese population to assess cancer survivors' needs living in an insular region, it provides an important contribution in terms of clinical practice. The brevity of this instrument facilitates the rapid assessment of the survivors' needs and can be carried out by any health professional, for example, nurses. Assessing unmet needs allows the provision of support and resources tailored to the survivors' unique needs during the survivorship phase. Rapid, easy to apply, valid and reliable survivor-specific measures are also essential for routine screening and follow-up (Taylor et al., 2018), for preventing difficulties in disease adaptation and for promoting cancer survivors' quality of life.

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